



Clean Water State Revolving Fund (SRF) Project Plan

Pittsfield Charter Township

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Prepared for:

Pittsfield Charter Township
6201 West Michigan Avenue
Ann Arbor, Michigan 48108

Prepared by:

Stantec Consulting Michigan Inc.
3754 Ranchero Drive
Ann Arbor, Michigan 48108



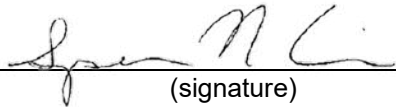
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CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

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Prepared by 
(signature)

Spencer Cain, PE

Reviewed by _____
(signature)

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Approved by _____
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Executive Summary

Pittsfield Charter Township (Township) submits this project plan to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to be ranked on the State's annual Project Priority List for obtaining low-interest loans from the State Revolving Fund. The Township intends to utilize the Clean Water State Revolving Fund (SRF) loan to address sewer collection system needs. The Township recently completed an Asset Management Plan which compiled information from sewer pipe and manhole inspections, a recent Sewer System Capacity Study, along with the knowledge of operations staff to identify a series of necessary improvements to the Township's sewer system.

The Township's main driver for this project is the need for improvements to the primary interceptor which runs along Michigan Avenue (US-12). The condition of this reinforced concrete pipe is deteriorating, and with its location under two high-volume transportation routes, it is of critical importance that action be taken. The proposed improvements address structural concerns due to pipe degradation from hydrogen sulfide (H₂S) gas, sewer capacity deficiency, and pump station concerns, including end-of-service-life components and odor control.

Pursuant to EGLE's project plan preparation guidelines, Stantec collected historical data, obtained historical and environmental clearances, evaluated alternatives, performed a feasibility analysis, evaluated environmental impacts, and developed an Engineer's opinion of probable construction cost (EOPC) associated with the evaluated alternatives. Details regarding the statement of need, methodologies, analysis, and results are discussed throughout this project plan.

Based on the evaluations (feasibility and environmental) presented in this project plan, the selected alternative includes:

- Phase 1
 - Construction of approximately 2,950 feet of new 18-inch sewer along Platt Road from the existing Platt/Merritt pump station to US-12.
 - Construction of 16,500 feet of 36-inch sewer along US-12 from Platt Road to Textile Road, along Textile Road from US-12 to Crane Road, along Crane Road from Textile Road to Hickory Woods Park, Across Hickory Woods Park to Munger Road, then along Munger Road from Hickory Woods Park to the Ypsilanti Community Utilities Authority (YCUA) outlet at Morgan Road
 - Construction of approximately 1,750 feet of new 10-inch sewer along US-12 from the southbound off-ramp of US-23 to Textile Road.
 - Construction of approximately 650 feet of new 12-inch sewer to redirect flows from Meadowview and Ashford Village pump stations to the proposed interceptor.



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- Abandonment of three (3) existing pump stations in the Study Area and their force mains (Platt/Merritt, Meadowview, and Ashford Village).
- Abandonment of approximately 11,450 feet of existing sewers and force mains, including approximately 2,100 feet of 36-inch interceptor sewer under US-23.
- Phase 2
 - Rehabilitation by structural liner of approximately 3,300 feet of 24-inch and 3,500 feet of 36-inch sewer along US-12 from the northbound on-ramp of US-23 to Munger Road.
 - Rehabilitation by structural liner of approximately 9,000 feet of 18-inch and 2,700 feet of 36-inch sewer along US-12 from Platt Road to Warner Road.

The EOPC for the proposed SRF project is approximately **\$31,011,000**.

This project is intended to be constructed in two phases. Phase 1 contains the bulk of the effort with the construction of the new interceptor, abandonment of pump stations, and redirection of flow, and the cost is estimated at approximately \$24.7M. Phase 2 contains the remainder of the rehabilitation work and the cost is estimated at approximately \$6.3M.

It should be noted that by completing work under Phase 1 of this project, the service area and criticality of the remaining interceptor along US-12 will be significantly reduced. While the degradation that has occurred thus far will remain a concern, the consequence of failure will be less. If economic conditions or the bids received for Phase 2 of the project are unfavorable, it may be reasonable to defer Phase 2 of this SRF project and/or pursue rehabilitation with other funding sources at a future date.

User costs were developed for construction of the sanitary collection system improvements using the EOPC. Based on a loan interest rate of 2.125% over a 30-year period, the annual loan repayment for the Township's sanitary collection system improvements is estimated at approximately \$1,408,551. It is assumed that these costs will be distributed among all sewer system users within the Township. According to the Township's records, there are 7,183 sewer system customers. Based on current average water use estimates, the cost impact to an average residential customer is estimated to be \$7.43 per month (\$5.92 for Phase 1, and \$1.51 for Phase 2). It should be noted that these numbers are preliminary estimates and will be further refined by the Township's Financial Consultant during the SRF loan process.

The project plan public review period was advertised on the Township's website and local publications on April 26, 2021 with the public hearing being held on May 26, 2021. A description of public participation along with minutes and comments from the public meeting are included in **Appendix H**. After the public hearing, the Township Board resolution accepting the project plan will be included in **Appendix G**.



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Abbreviations

AMP	Asset Management Plan
CCTV	Closed Circuit Television
City	City of Ann Arbor
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EOPC	Engineer's Opinion of Probable Construction Cost
gpd	Gallons per day
H ₂ S	Hydrogen Sulfide
I/I	Inflow and Infiltration
ICI	Industrial, Commercial, Institutional
M	Million Dollars
MGD	Million gallons per day
MDOT	Michigan Department of Transportation
NNL	National Natural Landmarks
O&M	Operation and Maintenance
OM&R	Operation, Maintenance & Replacement
PACP	Pipe Assessment Certification Program
RCP	Reinforced Concrete Pipe
SAW	Stormwater, Asset Management, and Wastewater (Grant)
SCSCS	Sanitary Collection System Capacity Study
SEMCOG	Southeast Michigan Council of Governments
SHPO	State Historic Preservation Office



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SRF	Clean Water State Revolving Fund
SSO	Sanitary Sewer Overflow
Stantec	Stantec Consulting Michigan Inc.
THPO	Tribal Historic Preservation Office
TPW	Total Present Worth
USFWS	United States Fish and Wildlife Service
WWTP	Wastewater Treatment Plant
YCUA	Ypsilanti Community Utilities Authority



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Project Background

1.0 PROJECT BACKGROUND

Pittsfield Charter Township (Township) recently completed an Asset Management Plan (AMP) funded through the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Stormwater, Asset Management, and Wastewater Grant (SAW) program. The SAW AMP pulled together information from sewer pipe and manhole inspections, a recent capacity study and the knowledge of operations staff to identify a series of improvements for the Township's sewer system. Reference can be made to **Appendix E** for the SAW AMP Executive Summary and the Pittsfield Township Sanitary Collection System Capacity Study (SCSCS) Executive Summary.

Based on the Pipe Assessment Certification Program (PACP) inspections performed as part of the SAW grant, and several recent collapses, progressive hydrogen sulfide (H₂S) attack has been identified as a major concern. This has made repair and/or replacement of the large diameter concrete pipes in the sewer collection system a high priority for the Township. Along with the deterioration of the concrete pipes, there were also several areas in the Township that were shown to be undersized for future conditions in the SCSCS. When combined with the ongoing needs of maintaining the aging sanitary pump stations, the Township's sewer system upgrade needs are substantial. To fund the large scope of improvements being considered, the Township is seeking a low-interest loan through the Clean Water State Revolving Fund (SRF) program.

To meet their system improvement goals, the Township has engaged Stantec Consulting Michigan Inc. (Stantec) to prepare this project plan, identify and evaluate alternative solutions, and apply for low-interest SRF funding.

1.1 STUDY AREA CHARACTERISTICS

Pittsfield Charter Township is located in Washtenaw County, Michigan. The service area of the Water and Sewer District includes the majority of developed land in the Township.

1.1.1 Delineation of Study Area

The project Study Area is located in the southeast portion of the Township's Water and Sewer District bounded approximately by Platt Road, Textile Road, US-12 and Munger Road, and extending along US-12 from Platt Road to Warner Road. This area contains the Township's primary sewer interceptor that discharges to the Ypsilanti Community Utilities Authority (YCUA) regional sewer system and services the majority of the customers in the south and west of the Township. **Appendix A, Figure 1** depicts the Township's Water and Sewer District and the portion of the Township served by the Study Area sewer infrastructure.

1.1.2 Land Use in Study Area

The Township contains a mix of land uses but is largely residential with areas of industrial, commercial, and institutional (ICI) clustered near major thoroughfares. Most of the areas where improvements are



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Project Background

proposed are residential, with some limited commercial and light industrial along US-12. Existing and future land use maps can be referenced in **Appendix A, Figures 2 and 3**.

1.1.3 Population Data

Population data and projections for the Township were obtained from the Southeast Michigan Council of Governments (SEMCOG) which compiles both U.S. Census data and their own projections. Based on the SEMCOG projections, the current population is estimated at 40,360 with an average household size of 2.46 persons per household. As shown in **Table 1-1**, SEMCOG projects the population to increase to 55,486 by the year 2045. Any seasonal change in population in the project Study Area is not large enough to have a discernable impact on sanitary flows in the Township. The SEMCOG community summary data can be referenced in **Appendix D**.

Table 1-1 - Population Summary

	2010	2020	2030	2040	2045
Population	34,663	40,360	47,019	52,337	55,486
Households	14,021	16,076	--	--	21,419
Average Household Size	2.43	2.47	--	--	2.44

**2010 values from U.S. Census, other values are SEMCOG projections*

1.1.4 Historical Overview

The Township has long held concern over both the capacity and condition of the primary interceptor along US-12. H₂S attack on the large diameter concrete pipes in the system is a known issue of concern and replacement or repair of those pipes is a priority for the Township, while phasing out the use of that material if possible. Recent failures of concrete sewers, including two in the project Study Area, highlight the need for action. After the latest collapse, a limited investigation of H₂S levels was conducted and showed that, although H₂S levels were not particularly high at that time, the aggressive, acidic nature of the wastewater likely promotes the release of H₂S, leading to structural damage. Large-scale closed-circuit televising (CCTV) inspections performed under the SAW Grant support the conclusion of widespread H₂S damage to the concrete pipes from the west side sewer to the primary interceptor.

Similarly, the steel can type pump stations in the Township's system present operation and maintenance (O&M) challenges, particularly with the safety concerns associated with confined space entry for maintenance. For that reason, another goal of the Township is to phase out the can stations by replacing them with submersible style pump stations as they exceed their service life. As another option, the Township has also been exploring options to eliminate pump stations altogether.

During the SAW Grant AMP development, the Township also performed a Sanitary Collection System Capacity Study (SCSCS) to update findings of its 2010 SCSCS. The objectives of the SCSCS included identifying and evaluating the capacity of the existing sanitary collection system; evaluating infiltration and inflow (I/I) impacts on the system; making recommendations for improvements to the system that are necessary to meet present and future needs (20-year planning horizon) of the Township. The results of



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the SCSCS indicated the presence of I/I in the system and identified under capacity pipes in the system, including within the Study Area.

1.1.5 Resources

The proposed improvements in this Project Plan have been compiled based on feedback from Township staff as well as results/recommendations from various studies and field investigations. Resources relied on in the development of this Project Plan include, but are not limited to:

- SAW Grant AMP
 - *Wastewater Asset Management and Capital Improvement Plan*, dated November 2018.
 - Technical Memorandum - *Wastewater Pump Station Condition Assessments*, dated November 2017.
 - *Pittsfield Charter Township Sanitary Collection System Capacity Study*, completed as part of the SAW grant activities.
 - CCTV inspection results completed as part of the recent SAW grant activities.
- H2S study technical memorandum– *Sewerage System Monitoring*, dated April 2018

It should be noted that executive summaries of these referenced reports are included in **Appendix E**, and full copies are available for review upon request.



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Environmental Assessment

2.0 ENVIRONMENTAL ASSESSMENT

Included in this environmental assessment section is a discussion of the project's potential impacts on historical and environmental characteristics.

2.1 CULTURAL RESOURCES

The State Historic Preservation Office (SHPO) was contacted on June 5, 2020 to determine if the work proposed within the project Study Area will affect any sites of historical significance. A response from SHPO was not received at the time of completing this draft plan. Once received, the SHPO opinion that "no historic properties are affected within the area of potential effects of this undertaking" will be included along with all related SHPO correspondence in **Appendix B**

The twelve Tribal Historic Preservation Officers (THPO) listed under Washtenaw County were also contacted to identify any federally recognized Tribes that might attach religious and cultural significance to historic properties in the area of potential effects and invite them to be consulting parties. Stantec has received a limited response from the notified THPOs indicating that "it does not appear as if any cultural or religious concerns of the Tribe's will be affected." Documentation of the correspondence with the THPO's is included in **Appendix B**.

2.2 CLIMATE

Information from the Michigan Department of Agriculture, Climatology Program indicates that the Township has a continental type climate that has larger temperature ranges than locations of similar latitude along the shores of the Great Lakes. Due to the prevailing westerly winds, the Township does experience some lake effect; however, this is minimal and mostly limited to increased cloudiness during the late fall and early winter.

The following data was selected from climatological summaries for the City of Ann Arbor station (1981-2010) and from the Willow Run Airport station (1981-2010) completed in collaboration with the Michigan Office of the State Climatologist

Station Information:

Station	Town	Range	Section	Elevation	Latitude	Longitude
Ann Arbor Astronomy Station	2S	6E	22	858 ft	42d 17m	83d 42m
Willow Run Airport Station	3S	8E	7	712 ft	42d 14m	83d 31m



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Environmental Assessment

Precipitation:

Mean Annual Total Precipitation (inches) 37.4

Lowest Mean Total Precipitation (inches) 30.5

Highest Mean Total Precipitation (inches) 47.6

Days/Year that exceed 1.25" of Precipitation 3.7

Temperature:

Mean Annual Temperature (°F) 49.8

Mean Annual Minimum Temperature (°F) 40.5

Mean Annual Maximum Temperature (°F) 59.1

Lowest Mean Annual Temperature (°F) 47.8

Highest Mean Annual Temperature (°F) 53.2

2.3 AIR QUALITY

The construction and operation of the proposed project is not anticipated to have any prolonged direct or indirect emissions that will increase air pollution.

2.4 WETLANDS

Wetland areas are land characterized by the presence of water for sufficient frequency and duration to support vegetation or aquatic life and provide the additional functions of storm water recharge, controlling the rate of runoff, improving groundwater quality, providing erosion control and lessening the effects of flooding.

Some areas within the project Study Area were identified as wetland areas. However, the construction or operation of the proposed project is not anticipated to adversely impact wetlands. Construction activities crossing wetlands are not anticipated but if areas are identified during the detailed design phase, construction will be conducted in the least invasive manner and restoration will be accomplished, in accordance with best management practices and the permit requirements of the regulating agency if applicable. Wetland information was obtained from a Natural Wetlands Inventory Map of Washtenaw County provided by EGLE. Refer to **Appendix A, Figure 4** for the Natural Features Inventory map for the project Study Area.

2.5 COASTAL ZONES

This project area does not contain any regions classified as coastal zones.



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Environmental Assessment

2.6 FLOODPLAINS

Flooding is a temporary condition of partial or complete accumulation of water on normally dry land areas caused by the overflow of surface water bodies, or from rapid accumulation of surface runoff.

Floodplain information was obtained from the Federal Emergency Management Agency, Flood Insurance Rate Maps. Refer to **Appendix A, Figure 5** for the Flood Insurance Rate Maps. No adverse impacts to the 100-year floodplain are anticipated.

2.7 WILD AND SCENIC RIVERS

In accordance with the “State Revolving Fund Project Plan Preparation Guidance” the websites for the National Park Service’s National Wild and Scenic Rivers System and Nationwide Rivers Inventory, as well as the Michigan Department of Natural Resources’ Michigan Natural Rivers, were consulted. According to those websites, there are no wild and scenic rivers located within the project Study Area.

2.8 MAJOR SURFACE WATERS

There are no major surface water bodies within the Township boundaries. Other surface water bodies include the Pittsfield Number 5 and Warner Drains, and miscellaneous drains throughout the Township. Drain crossings, if warranted, during the construction of this project will be addressed in coordination with the Washtenaw County Water Resources Commissioner. Refer to **Appendix A, Figure 4** for the Natural Features Map for further detail.

2.9 RECREATIONAL FACILITIES

Although the Township has various open and recreational areas, the proposed project construction and operation is expected to have only a limited impact to these areas. The route of the proposed interceptor from the selected alternative in this Project Plan crosses Hickory Woods Park. However, during detailed design, impacts to the park will be further evaluated and mitigated with alignment choice and best management practices wherever possible. Refer to **Appendix A, Figures 2 and 3** for the Township’s existing and future land use maps.

2.10 TOPOGRAPHY

The topography within the project area is characterized by rolling topography. The lowest elevation is approximately 790 feet above sea level, and the highest point is approximately 1020 feet above sea level.

2.11 GEOLOGY AND SOILS

Washtenaw County mainly consists of outwash deposits (saturated sand and gravel deposits, separated by layers of clay). These glacial materials, referred to as glacial drift, were deposited as the glaciers receded from this area of the continent some 18,000 years ago. Underlying the glacial drift deposits is bedrock. Bedrock consists of gently to rolling sedimentary rock formations. Three (3) types of bedrock



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Environmental Assessment

make up the bedrock surface in the County; these include Marshall Sandstone, Coldwater Shale, and Michigan Shale. According to the United States Department of Agriculture Soil Conservation Service the project area mainly consists of three types of soils: Boyer-Fox-Sebewa, Morley-Blount, and St. Clair Nappanee Hoytville.

Table 2-1 - Soil Type Characteristics

SOIL TYPE	TERRAIN	DRAINAGE	SURFACE TEXTURE	GEOLOGIC FORMATION
Boyer-Fox-Sebewa	Nearly level to steep	Well-drained and poorly drained	Moderately coarse-textured and fine textured	Moraines
Morley-Blount	Nearly level to steep	Well-drained and somewhat poorly-drained	Moderately fine textured	Till plains and moraines
St. Clair Nappanee Hoytville	Nearly level to steep	Moderately well-drained to very poorly drained	Fine textured	Moraines and till plains

2.12 AGRICULTURAL RESOURCES

According to the 2000 Land Use census, there is significant area of agricultural land in the Township. However, the proposed project construction and operation is not anticipated to impact these areas as it will be built in the public road right of way. Refer to **Appendix A, Figures 2 and 3** for the Township's existing and future land use maps.

2.13 PROTECTED PLANT AND ANIMAL COMMUNITIES

A request was made to the Michigan Natural Features Inventory (MNFI) to ascertain whether any species of fauna or flora listed or proposed to be listed in the MNFI as endangered, threatened, or special concern, or whether the critical habitat of such species, is found in the vicinity of the proposed project. A Rare Species Review request was submitted through the MNFI on April 12, 2021. MNFI has not yet responded to our inquiry. Copies of correspondence with MNFI once received will be included in **Appendix B** as part of the final project plan.

Acting as the designated agent, Stantec has reviewed the United States Fish and Wildlife Service (USFWS) website and the IPaC tool for threatened and endangered species. Upon review, based on Stantec's professional opinion, the project will have no or minimal adverse effects on the threatened and/or endangered species or their critical habitats. Copies of the USFWS analysis and determination are attached in **Appendix B**.

2.14 NATIONAL NATURAL LANDMARKS

The list of National Natural Landmarks (NNL) provided in the "*Clean Water Revolving Funds (SRF & SWQIF) Project Plan Preparation Guidance*", issued by EGLE was reviewed. None of the listed landmarks are within the project area; therefore, no impacts on NNL are anticipated.



3.0 EXISTING SANITARY SEWER COLLECTION SYSTEM

3.1 STATEMENT OF NEED

The Township's sanitary collection system discharges to two regional wastewater treatment plants (WWTPs). A large portion (40-50%) of the Township's sanitary flow collects to a single interceptor sewer which runs along Michigan Avenue (US-12) and discharges to the YCUA system. Both H₂S degradation and capacity concerns exist with this primary interceptor. Being constructed of reinforced concrete pipe (RCP) this 24-inch to 36-inch diameter sewer is vulnerable to H₂S attack and deterioration was observed during recent inspections. The fact that this sewer passes under the US-23 freeway only increases the criticality of this major interceptor.

The Township also owns and operates seven (7) sanitary sewer pump stations. Several of these are in need of maintenance and repair as they are nearing end of service life. Three (3) pump stations (Platt/Merritt, Ashford Village, and Meadowview) that have been identified in the Township's AMP as needing near-term improvements are within the Study Area for this project and could be eliminated during reconstruction of the primary interceptor.

The areas where SRF loan funding is requested include:

- Construction of the primary interceptor along an alternate route
- Abandonment of three (3) existing pump stations
- Abandonment of gravity sewer crossing beneath US-23
- Lining of existing gravity sewer

Details on the needed improvements are summarized below and discussed further throughout this project plan:

3.1.1 Recent and Historical Collapses of the US-12 Interceptor

In the last 11 years, there have been two failures of this critical interceptor sewer within the project Study Area. One was a collapse of the main sewer line in January of 2010 and the other was a manhole failure in February of 2018. They both occurred along US-12, between Crane Road and Munger Road. These failures have become a cause for significant concern related to reliability and risk of the system in this general area. This interceptor sewer conveys approximately 40-50% of the Township's flow, is quite deep in some places (>25-feet), and with the high flow rate, mobilizing for emergency repairs can be very costly, risky, and difficult. With a history of recent collapses, an elevated risk is present for a failure that could occur not only along US-12, but also within the US-23 corridor. Such high risk could potentially have a negative impact on public safety, major transportation networks, the Township's customers and the environment.



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Existing Sanitary Sewer Collection System

3.1.2 CCTV and Hydrogen Sulfide Damage

As part of the SAW Grant activities, Township staff performed a condition assessment of the gravity sewer system using Closed Circuit Television (CCTV) inspection. Inspections were completed for approximately 52% of the system (over 376,000 linear feet of pipe and 1,137 manholes), including portions of the interceptor in the Study Area. While some of the interceptor sewer was not inspected due to high flow conditions, evidence of H₂S surface damage and infiltration was recorded for most of the sections that were inspected. These issues are known to exist on nearly all of the RCP pipes in the Township's system. H₂S attack is known to be a main failure mode for this type of pipe in the Township's system.

Along US-12, west of US-23 in particular, CCTV data is limited. High flow made the pipes difficult to inspect at the time the crews were onsite performing the work. However, as noted previously, there is ample evidence of H₂S in the system, with the two recent failures as mentioned, and with odor challenges and previous H₂S corrosion issues at the Platt/Merritt pump station and along the Platt Road sewer, upstream of the area.

Along US-12, west of Platt Road to Warner Road there are two parallel sewers that together transport the majority of the flow from the west side of the Township through the discharge of two pump stations (Michigan Ave. PS, and Moon Road PS), as well as from local residential areas. CCTV inspections were performed on one of these two sewers, and the PACP standard coding of "Surface Roughness Increased" was noted throughout. This code generally indicates the beginning of H₂S degradation. Again, with the known failure mode of concrete pipes in the system, evidenced by the recent collapse (2016) upstream of the Michigan Ave. pump station, and criticality of these pipes along the US-12 corridor, proactive rehabilitation is a priority to maintain service.

The uncertainty associated with determining the degree of damage to the portions of the sewer interceptor under US-23 and along US-12, the risk associated with the unknowns and a possible collapse during an attempt to repair, along with the cost of bypassing of major sanitary flow, are all factors that contribute to the complexity of this needed sewer interceptor repair and rehabilitation project.

3.1.3 Capacity Concerns

A hydraulic capacity study (SCSCS) was performed by Stantec (*Pittsfield Charter Township Sanitary Collection System Capacity Study*, dated October 17, 2018), with the objective of evaluating the capacity of the existing sanitary collection system; evaluating infiltration and inflow (I/I) impacts on the system; making recommendations for improvements to the system that are necessary to meet present and future needs (20-year planning horizon) of the Township; and using recommendations from that study in the development of a comprehensive AMP. The Capacity Study identified several areas that are predicted to require upsizing to accommodate the 20-year master plan flows and a 25-year, 24-hour design storm. Sewers that were identified as undersized by model simulation include those in the Study Area between Arbor Meadows Drive and Munger Road.



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3.1.4 Pump Station Condition Assessments

As part of the SAW Grant activities, a series of field visits were conducted by Stantec in September of 2017 at each of the seven (7) sanitary pump stations. Information on the condition of each pump station was gathered from visual inspection, conversations with operations staff, and a review of record drawings to assess the condition of the facilities and their equipment. Of the seven (7) pump stations, all but one is a dry-pit “steel can” style pump station. The Township has decided that submersible style pump stations are preferable to avoid the additional expense and safety concerns associated with operating and maintaining the can style stations.

3.1.4.1 Platt/Merritt Pump Station

This can style pump station was refurbished in 2007, and all components are well maintained, however, moderate deterioration consistent with the pump station age was noted on most components. Structurally, the steel can exhibit significant oxidation and the wet well has some structural cracking. Per the Township’s AMP, the process and electrical systems are also due for upgrade within the next two to three years.

In addition to the needs identified during the condition assessment, the Platt/Merritt pump station has chronic odor issues, and the Township receives complaints from the neighboring residents on a regular basis. This pump station receives flow from two correctional facilities south of the Township via a long force main, and the wastewater characteristics are extremely harsh, contributing H₂S to the system. Any proposed upgrades must attempt to mitigate odor and H₂S issues.

3.1.4.2 Meadowview Pump Station

This can style pump station was constructed in 1978, and all components are well maintained, however, significant deterioration consistent with the pump station age was noted on most components. With significant structural deterioration and aging components, this station is due for a complete rebuild.

3.1.4.3 Ashford Village Pump Station

This can style pump station was refurbished in 2007, and all components are well maintained, however, moderate deterioration consistent with the pump station age was noted on most components. Per the Township’s AMP, the process and electrical systems are due for upgrade within the next two to three years.

3.2 EXISTING FACILITIES

The Township’s wastewater collection system service area is located within the Township municipal boundary and is generally bounded by Maple Road to the West, Munger Road and Golfside Road to the East, Clark Road and the I-94 freeway to the North, and Bemis Road to the South. A depiction of the Township’s sewer collection system can be referenced in **Appendix A, Figure 1**. Construction of the Township’s wastewater system began in the mid to late 1950s and expansion has continued through the



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Existing Sanitary Sewer Collection System

present. Approximately 68% of the Township's sewers are less than 30 years old (constructed since 1990).

The Township's wastewater collection system consists of a network of lateral sewers, collector and trunk sewers, force mains, and seven pump stations. The system discharges at multiple points to the interceptor network of the City of Ann Arbor (City) to be treated at the City's WWTP and also to the regional wastewater collection and treatment system operated by YCUA.

3.2.1 Gravity Sewers

The Township owns and operates over 133 miles of gravity sewer mains that range in diameter from 4 to 36-inches, with approximately 3,578 manholes. A summary of the gravity sewer system is presented in **Tables 3-1 and 3-2**.

Table 3-1 - Gravity Sewer Size Summary

Diameter (in.)	Length (ft)	Length (%)
4	298	<1%
6	27,940	4%
8	458,056	65%
10	70,597	10%
12	39,391	5%
15	35,504	5%
18	43,352	6%
21	12,195	2%
24	5,493	<1%
27	2,673	<1%
30	79	<1%
36	9,859	1%
Total	705,437	100%



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Existing Sanitary Sewer Collection System

Table 3-2 - Gravity Sewer Age Summary

Decade Installed	Length (ft)	Length (%)
1950	36,247	5%
1960	16,376	2%
1970	98,675	14%
1980	107,602	15%
1990	335,179	47%
2000	101,940	15%
2010	9,418	2%
Total	705,437	100%

3.2.2 Force Mains

The Township owns and operates over 7 miles of sanitary sewer force mains that range from 6-inches to 12-inches in diameter. A summary of the force mains is presented with the pump station summary in **Table 3-3**. Not included in **Table 3-3**, is approximately 5,500 feet of 8-inch force main from Bemis Road to the gravity sewer upstream of the Platt Road pump station that is owned and maintained by the Township but carries flow from two private pump stations that serve the correctional facilities to the south.

3.2.3 Pump Stations

The Township currently owns and operates seven pump stations. Also, within the Township are four privately owned and operated pump stations and two YCUA owned pump stations. A summary of the pump station details, and their associated force mains, is included in **Table 3-3**.

Table 3-3 - Pump Station Summary

Pump Station	Year Built	Capacity (gpm)	Design TDH (ft)	Motor HP	Configuration	Backup Power	Force Main Length (ft)	Force Main Diameter (in)	Force Main Material
Ashford Village PS	2007	220	50	7.5	Duplex - Wetwell & Steel Can	Onsite Generator	2,407	6"	Unknown
Lohr Road PS	2007	1,190	93	50	Triplex - Wetwell & Steel Can	Onsite Generator	9,772	12"	Ductile Iron
Meadowview PS	1977	315	48	15	Duplex - Wetwell & Steel Can	Portable Generator	1,901	8"	PVC
Michigan Ave. PS	2007	1,190	93	50	Triplex - Wetwell & Steel Can	Onsite Generator	8,978	12"	Ductile Iron



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Pump Station	Year Built	Capacity (gpm)	Design TDH (ft)	Motor HP	Configuration	Backup Power	Force Main Length (ft)	Force Main Diameter (in)	Force Main Material
Moon Road PS	2016	200	72	11	Duplex - Wetwell & Submersible Pumps	Onsite Generator	5,676	12" & 6"	Ductile Iron
Platt & Merritt PS	2007	700	70	30	Triplex - Wetwell & Steel Can	Onsite Generator	95	12"	HDPE
Warner Creek PS	2006	400	26	7.5	Duplex - Wetwell & Steel Can	Onsite Generator	negligible	6"	Ductile Iron

3.3 EXISTING AND FUTURE SEWER FLOWS

In the development of the SCSCS as described previously, system-wide flow monitoring was performed in the spring of 2017. Twenty (20) regional flow meters for twelve (12) sewer districts were installed on March 20, 2017 and removed on July 19, 2017. Rainfall data captured during this period was used to calibrate the hydraulic model and analyze I/I impacts, and a 25-year 24-hour Design SCS Type II storm event was simulated to predict peak wet weather flows. The existing flow estimates presented here have been generated by the SCSCS model. Future flows were first developed in the SCSCS model and have since been updated with more recent information upon the commencement of this Project Plan. A summary of the existing and future flows is provided in **Table 3-4**.

Table 3-4 - Existing and Future Flow Summary

Area	Existing		Future	
	Average Dry Weather Flow (MDG)	Peak Wet Weather Flow (MDG)	Average Dry Weather Flow (MDG)	Peak Wet Weather Flow (MDG)
Discharge to City of Ann Arbor	1.38	6.95	2.22	7.03
Discharge to YCUA*	2.84	19.45	4.34	22.06
Total	4.22	26.40	6.56	29.09
Project Service Area	1.81	12.31	2.49	14.33
Textile Interceptor Re-route	1.69	7.92	2.31	9.29

*YCUA discharge is approximate due to some unmetered areas

4.0 ANALYSIS OF ALTERNATIVES

In order to provide the most effective solution for any desired goal, a systematic evaluation of alternatives is essential. Alternatives under consideration must address the objective of the project, which is to correct



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Analysis of Alternatives

significant deficiencies, solve problems associated with the existing system infrastructure, and reduce the risk to public health and the environment.

4.1 IDENTIFICATION OF POTENTIAL ALTERNATIVES

In evaluating the various options available to address the issues and meet the desired objectives, the following potential alternatives were identified:

- No Action Alternative
- Optimum Performance of Existing Facility Alternatives
- Regional Alternatives
- Principal Sewer System Alternatives

4.1.1 No Action Taken

A no action alternative can be considered where transportation or conveyance, treatment, and disposal facilities are in compliance with governing wastewater discharge permits and/or where no public facilities currently exist. This alternative must also be considered when the purpose of the project is to enlarge the capacity of facilities for future needs and/or to serve currently un-served areas.

In the case of the Township's system, the proposed purpose of the project is not to expand the system, but instead to provide customers within the existing service area with more reliable service. The project would also serve to reduce the risk to public health and safety along the major transportation corridors by proactively maintaining the primary interceptor in the Study Area to prevent a catastrophic failure.

If the No Action Alternative is taken for the proposed project, deterioration of the primary interceptor will continue. This may result in a sudden interruption in service, thus causing adverse impacts on the environment and the system users. Emergency repairs are costly and do not reflect the proactive planning mentality of the Township as documented in the AMP. Furthermore, under capacity system components would remain, and carry with them the risk of adverse impacts to the collection system users and the environment (e.g. sewer overflows)

In light of the above, pursuit of the No Action Alternative for the replacements/rehabilitation of the sanitary collection system is not practical and was not further evaluated in this project plan.

4.1.2 Regional Alternative

The regional alternative would require that the Township seek correction of the existing needs through a regional system. The Township already discharges to two regional sanitary sewer collection systems. Moreover, the needs being addressed by this project plan are related to the reliability of the Township's existing collection system assets which have questionable structural integrity and capacity issues (in the case of the interceptor), and end of service life and odor control concerns (in the case of the pump



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stations). Those needs simply cannot be met by an outside entity and are critical to the Township's ability to maintain reliable regional sewer service for their customers.

In light of the above, pursuit of a Regional Alternative for the rehabilitation of the Township's sanitary collection system is not applicable and was not further evaluated in this project plan.

4.1.3 Principal Alternative (Alt. 1)

This alternative refers to system improvements that replace existing assets or construct new ones to address the needs of the system. In this alternative, an alternate route for the primary interceptor has been identified that would allow the Township to reduce risk both during and after construction, while addressing the collection system needs.

It should be noted that this alternative is considered the principal alternative in that it primarily consists of new infrastructure, but it will also require some optimization in the form of lining a portion of the existing interceptor.

Principal improvements to the collection system include:

- Construction of new interceptor sewer along an alternate route.
- Construction of new sewer along US-12 to redirect flow west of US-23 to the Textile Road interceptor.
- Abandonment of three (3) existing pump stations in the Study Area and their force mains.
- Abandonment of the existing interceptor under US-23.
- Rehabilitation of the remaining sewer along US-12 from east of US-23 to Munger Road and from Platt Road West to Warner Road.

Upgrades and improvements to the existing system under the principal alternative appear to be a practical and feasible alternative for the proposed project and will be further investigated. Details on the cost associated with the above-proposed components are described in the following sections.

4.1.3.1 Interceptor Sewer Reconstruction – Alternate Route

Under this alternative, the primary interceptor would be replaced, and realigned along a less critical road corridor. With this new interceptor, the Township would adjust sewer grades from the existing to provide gravity service to the Platt/Merritt and Meadowview pump station service areas and allow for adequate capacity to serve the future needs of the contributing collection systems.

This principal alternative includes the replacement and/or new installation of:

- 2,950 feet of 18-inch sewer along Platt Road.



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- 16,500 feet of 36-inch sewer along US-12 from Platt Road to Textile Road, along Textile Road from US-12 to Crane Road, along Crane Road from Textile Road to Hickory Woods Park, Across Hickory Woods Park to Munger Road, then along Munger Road from Hickory Woods Park to the YCUA outlet at Morgan Road.
- 1,750 feet of 10-inch sewer to redirect flow west of US-23 back to the Textile Road interceptor.

4.1.3.2 Pump Station Abandonment

Under this alternative, the new interceptor will be constructed at a lower grade to allow for the elimination of the three existing steel can type pump stations in the Study Area. The Platt/Merritt pump station tributary flows would be served by gravity and continuing along the new alignment at minimum slope allows for the Meadowview pump station service area to flow into the new interceptor by gravity as well. To avoid topography challenges east of the Ashford Village residential development, the new interceptor would turn north along Crane Road and through Hickory Woods Park to arrive at Munger Road and the YCUA outlet. The existing Ashford Village and Meadowview pump stations would be abandoned and their tributary flows would be directed to the new interceptor by gravity.

This principal alternative includes:

- Abandonment of three (3) existing pump stations (Platt/Merritt, Meadowview, and Ashford Village) along with their associated force mains.
- 650 feet of 12-inch sewer to redirect former pump station flows to the new gravity interceptor

4.1.3.3 Abandonment of Sewers

Once the proposed interceptor is installed along Textile Road, the existing interceptor crossing at US-23 would be abandoned. Force mains associated with the eliminated pump stations would also be properly abandoned.

This alternative includes:

- Abandonment of 6,200 feet of 36-inch sewer.
- Abandonment of 1,000 feet of 8-inch sewer.
- Abandonment of 2,350 feet of 6-inch force main.
- Abandonment of 1,900 feet of 8-inch force main.

4.1.3.4 Rehabilitation of Remaining Interceptor Sewer

Although the majority of the flow currently transported by the primary interceptor will be redirected along Textile Road, there remains approximately 6,800 feet of pipe that services commercial and residential customers east of US-23 that must remain in service. This pipe becomes less critical, but still has the same structural deficiencies as identified by recent inspection/study.



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In addition to the pipe east of US-23, there also remains 6,900 feet of pipe between Platt Road and Warner Road that is concrete pipe and has shown evidence of surface degradation. This area has parallel sewers that are mostly 18-inch in diameter, with one sewer transitioning to 27-inch. With these interceptor sewers transporting a large amount of flow from the west side of the Township, as well as the local residential and commercial flows, they remain critical to the operation of the Township's system. The known failure mode of concrete sewer pipes in the system due to H₂S exposure, as well as the recent collapses both upstream and downstream of this area, make proactive rehabilitation a priority to maintain reliable service.

Therefore, this alternative includes:

- 3,500 feet of structural lining of 36-inch sewer.
- 3,300 feet of structural lining of 24-inch sewer.
- 9,000 feet of structural lining of 18-inch sewer.
- 2,700 feet of structural lining of 27-inch sewer.

4.1.3.5 Cost Summary

The Engineer's Opinion of Probable Construction Cost (EOPC) for all components of this alternative is estimated at **\$31,011,000** in total. This includes a 25% contingency for engineering, administration, legal, etc., and a 15% general contingency. Detailed EOPCs are available for reference in **Appendix C**.

4.1.4 Optimum Performance Alternative (Alt. 2)

This alternative refers to improving the performance of the existing collection system through improved design, operation, public education, and management. Factors for this alternative include the optimum performance level possible with the existing design, the age and reliability of existing systems and their remaining useful life, additional operating controls, and system wide improvements.

The Township has been proactively maintaining its system, so optimum performance of some of the existing system components may be achieved by implementing various rehabilitation improvements. With focused improvements, components of the existing collection system may be brought up to more efficient and reliable modes of operation that would accommodate existing needs and take into consideration the 20-year planning objectives. It should be noted that this alternative is considered the optimization alternative in that it primarily consists of rehabilitating existing infrastructure, but it will also require construction of new infrastructure, such as upsizing under-capacity interceptor sewers, converting the steel can pump stations to submersible, and constructing new gravity sewer to redirect flow from Meadowview to the Ashford Village pump station site.

Optimization Improvements to the collection system include:

- Rehabilitation of the interceptor sewer along Platt Road and along US-12.



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- Rehabilitation of two (2) existing steel can pump stations in the Study Area (Platt/Merritt and Ashford Village).
- Improvements at the existing Platt/Merritt pump station for odor control mitigation.
- Abandonment of one (1) pump station (Meadowview).
- New gravity sewer to redirect flow from the Meadowview service area to Ashford Village pump station.
- Improvements to interceptor sewers that are under capacity due to wet weather impacts (this is not possible with rehabilitation only and would require new larger pipe).

Upgrades and improvements to the existing system to optimize performance of the existing system components appear to be a practical and feasible alternative for the proposed project and will be further investigated. Details on the cost associated with the above-proposed components are described in the following sections.

4.1.4.1 Interceptor Sewer Rehabilitation

Under the optimum performance alternative, the Township would attempt to optimize the existing interceptor sewer by adding a structural liner. This would address the H₂S degradation concerns and extend the life of the existing RCP sewer pipe. Included in this alternative is:

- 2,810 feet of 18-inch lining along Platt Road.
- 8,310 feet of 36-inch lining along US-12.
- 9,000 feet of 18-inch lining along US-12.
- 2,700 feet of 27-inch lining along US-12.

4.1.4.2 Pump Station Optimum Performance

Under the optimum performance alternative, the Township would attempt to optimize the existing pump stations. The Township would like to convert all steel can pump stations to submersible as improvements are performed. Therefore, optimizing these pump stations would include rebuilding them as submersible stations while reusing portions of the existing station components to the extent possible. Many of the pump station components would be replaced, except for the wet well structure, if structurally salvageable. The steel can would be abandoned, and a new valve vault would be added. In the case of the Platt/Merritt pump station, odor control would also be added to mitigate the chronic odor issues experienced at that location due to the correctional facility force main discharge upstream of this station.

This alternative includes:

- Rehabilitate/rebuild two (2) pump stations.



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- Add odor control at Platt/Merritt pump station.

4.1.4.3 Pump Station Abandonment

Because of the Township's priority to eliminate existing pump stations where practicable, several potential scenarios were explored in the development of this project plan to accomplish this goal. One option that fits within this optimization alternative is to eliminate the Meadowview pump station by sending its tributary flows to the Ashford Village pump station by gravity. Preliminary analysis indicates that a 15-inch sewer at minimum slope would convey flow to Ashford Village without exceeding a 25-foot installation depth and would require only a modest increase in wet well depth (approx. 5 feet). The wet well improvements at Ashford Village pump station would be performed during the station upgrades described in the previous section. This alternative includes:

- Abandonment of one (1) pump station.
- Abandonment of 1,900 feet of sanitary force main
- Abandonment of 1,000 feet of 8-inch sanitary sewer along Textile Road.
- 2,100 feet of 15-inch sewer along Textile Road between the existing Meadowview pump station and the Ashford Village pump station.

4.1.4.4 Interceptor Sewer Upsize

As discussed previously, the SCSCS has identified potential capacity deficiencies on the existing interceptor sewer between Arbor Meadows Drive and Munger Road when subjected to a design storm. Although structural liners can improve the hydraulic performance of a sewer by reducing wall friction, it will not alleviate the capacity constraint seen in the existing interceptor. Therefore, this alternative includes upsizing the existing interceptor by installing a new larger pipe, and abandoning the existing pipe:

- 4,520 feet of 42-inch sewer along US-12 between Arbor Meadows Drive and Munger Road.
- Abandonment of 3,260 feet of 24-inch sanitary sewer along US-12.
- Abandonment of 1,260 feet of 36-inch sanitary sewer along US-12

The EOPC for all components of this alternative is estimated at **\$23,339,000** in total. This includes a 25% contingency for engineering, administration, legal, etc., and a 15% general contingency. Detailed EOPCs are available for reference in **Appendix C**.

4.2 ALTERNATIVE FEASIBILITY

As discussed previously, the no action taken alternative is not considered a favorable alternative because it will not meet the objective of providing the Township with a more reliable sanitary sewer collection system as described in **Section 3**. The regional alternative is similarly unable to meet the objective.



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Therefore, the Principal Alternative (Alternative No. 1) and the Optimum Performance Alternative (Alternative No. 2) have been selected for further consideration.

4.2.1 Cost Effective Analysis

In order to evaluate the most cost-effective alternative, the total present worth (TPW) of each evaluated option was determined. TPW is the sum which, if invested now at a given interest rate, provides exactly the funds required for paying all present and future costs. It is the sum of the initial capital cost, plus the present worth of the annual Operations, Maintenance and Replacement (OM&R) costs, if applicable, minus the present worth of the salvage value at the end of the 30-year cost recovery period. The estimated lifetimes for project components were those given in the Cost-Effective Analysis section of the "Clean Water State Revolving Fund Project Plan Preparation Guidance" issued by EGLE. The interest (discount) rate is determined by market conditions, but for the purposes of this analysis it has been set as 2.125% with a 30-year term. Detailed cost estimates for each evaluated option are provided in **Appendix C**.

Table 4-1 presents the capital costs, OM&R costs and the TPW for the two alternatives being considered.

Table 4-1 - Alternative Feasibility - Total Present Worth

Proposed Alternative	Description	Capital Cost	Annual OM&R Cost	Total Present Worth (30-years)
Alternative 1	Re-route Interceptor Sewer along Textile Road, Eliminate 3 Pump Stations & Rehabilitate US-12 Sewers	\$31,011,000	\$36,000	\$25,202,525
Alternative 2	Rehabilitate US-12 and Platt Road Sewers, upsize sewers along US-12, remove 1 Pump Station, rehab 2 Pump Stations	\$23,339,000	\$48,000	\$20,238,171

As shown in **Table 4-1**, based solely on TPW, Alternative 2 appears to have a feasibility advantage. However, financial feasibility is not always the only factor for consideration, and there are additional considerations that will be taken into account in the following sections.

In addition, it should be noted that the Township has been evaluating pipe and manhole material options for use in construction. Because of the known H₂S issues in the system, consideration has been given to Fiber Reinforced Plastic (FRP) pipe, particularly for Alternative 1. Cured in Place Pipe (CIPP) is a likely candidate for the rehabilitation components of the project in both Alternative 1 and Alternative 2. Although SRF guidance defines the useful service life of conveyance structures (i.e. pipe and manholes) as 50 years, literature on FRP indicates that the actual service life may be much longer – 80 to 100 years or more. CIPP liners have a generally accepted design service life of 50 years. Given that the relative proportion of new pipe to lined pipe is greater in Alternative 1, a longer service life would tend to close the gap between the two alternatives in terms of total present worth.



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The present worth calculations take into account service life by assuming a straight-line depreciation of the value of the asset over its service life to estimate a remaining value for the asset at the end of the planning period. Then, that “salvage value,” as it is known as, is translated to present day dollars, thus reducing the present worth of the construction costs. For example, if a service life of 80 years was realized for FRP in Alternative 1, the total present worth at the end of 30 years would be approximately \$21.5M.

4.2.2 Environmental Evaluation

All scenarios being evaluated involve common environmental impacts associated with underground utility construction. This could include the temporary increased noise and dust along with nuisance factors of traffic control and temporarily modified access to residential and commercial drives. No adverse impacts on the environment are anticipated for utilizing the trenchless technologies, such as CIPP and/or jack and bore methods.

However, there are uncertainties associated with the construction/maintenance of Alternative 2 that could lead to additional impacts. For example, elimination of three pump stations under Alternative 1 would be expected to reduce the risk of Sanitary Sewer Overflows (SSOs) and thus reduce threats to the environment and public health that typically result from force main and pump station defects and obstructions. Also, the uncertainty associated with continuing to operate the interceptor under the US-23 corridor at an unknown condition (even after rehabilitation) has a potential for serious adverse impacts.

4.3 TECHNICAL AND OTHER CONSIDERATIONS

Although TPW provides a good benchmark for feasibility, there are many less-tangible considerations that often come into play, especially when addressing a complex infrastructure need as presented in this project plan. This section presents a discussion of additional measures for feasibility that may or may not have a specific monetary cost, but rather address the risks and uncertainties associated with each alternative under evaluation.

4.3.1 Bypass Pumping

With approximately 40-50% of the Township's flow being handled by the primary interceptor in this plan, bypass pumping during system improvements will be a critical concern.

4.3.1.1 Alternative 1

With Alternative 1, there is the possibility of leaving the existing interceptor in service while the new line is constructed. This will significantly reduce the need for bypass pumping along the major interceptor, and instead the flow can be redirected to the new interceptor upon completion of construction and testing. Bypass pumping will still be required during construction along Platt Road, and with the lining effort, but the flow rates and duration (estimated 1-2 month) will be appreciably less.



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4.3.1.2 Alternative 2

With Alternative 2, bypass pumping of the entire interceptor flow will be required for the entire duration of the construction, both lining and open-cut. Mobilizing the large equipment and appropriate redundancies will be costly and extremely difficult. For example, based on feedback from Township staff, plans were made back in 2017 to rehabilitate the US-12 sanitary sewer main crossing at the US-23. Permitting with the Michigan Department of Transportation (MDOT) to bypass pump at the crossing was extremely difficult. The initial proposal to lay out bypass pipe on the narrow shoulder across the bridge was denied as it was deemed to be a hazard. The Township was advised that two (2) options for the bypass would be acceptable. One option was to bore across the US-23 southbound on-ramp, US-23 north and southbound travel lanes, as well as boring across the northbound off-ramp. This option was deemed unfeasible by the Township. Costs for bypass pumping alone exceeded the cost of rehabilitation. The other option was to bore the on and off-ramps and hang the bypass pipe from the US-12 bridge spanning US-23 north and south travel lanes. The Township deemed this as an unacceptable risk and decided not to proceed with the rehabilitation project at that time.

4.3.2 Traffic Impacts

Traffic impacts can be a major nuisance for local residents and business during any construction project. Also, the increase risk to motorist safety and non-motorists: pedestrians, cyclists, etc. comes to play during construction. The US-12 corridor is one of the busiest non-freeway roads in the state and, even without construction impacts, experiences significant congestion daily, particularly at the junction with US-23. Safely maintaining the flow of traffic through this area will be very important to ensure a successful project.

4.3.2.1 Alternative 1

With this alternative, there would be approximately 15,600 feet of sewer work along the US-12 corridor. Approximately 2,950 of this would be by open cut, and the rest would be structural pipe lining. This would include local 10-inch sewer from the US-23 junction to Textile Road, and the 36-inch interceptor from Platt Road to Textile Road. This work is anticipated to be along the shoulder or off the edge of pavement. Further investigation of alignment will occur during the detailed design phase. It should also be mentioned that the entire extent of this 2,950 feet of open cut sewer work along US-12 lies within the bounds of an MDOT road and bridge reconstruction project that is proposed to occur during approximately the same timeframe as the sewer construction. This would mean that the major traffic impacts due to open cut operations would be aligned with those of the road work to the extent possible, also thereby reducing traffic control and restoration efforts and costs. This type of interagency coordination of major infrastructure projects is the cornerstone of sensible asset management planning. The lining efforts along US-12 will be extensive, and although outside of the bounds of the MDOT project, the surface impacts will be limited, and the duration of construction and bypass pumping will be shorter.



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Analysis of Alternatives

4.3.2.2 Alternative 2

With Alternate 2 there would be approximately 18,680 feet of sewer work along the US-12 corridor. Approximately 4,520 feet of this would be open-cut and the rest would be structural pipe lining. The open-cut portion would be 42-inch sewer, installed between 11 and 25 feet deep. Final alignment will be determined in the design phase, but it is anticipated that construction will disturb at least one full lane, possibly two, of US-12. Installing the large pipe amongst the existing utilities in the corridor and shifting the major traffic control and bypass pumping measures along as work progresses will disrupt traffic movement in the area for an extended period of time and result in major impacts to commercial establishments in the direct vicinity. It should be noted that with the exception of structural lining under from Platt Road to Carpenter Road, the majority of this work would occur outside of the bounds of the MDOT project, including the open cut sewer replacement.

4.3.3 Risk of Failure During Construction

Construction activities, especially those that rehabilitate failing infrastructure, can increase immediate risk of failure. This will be a risk with the lining activities in particular, as there have been instances of severely deteriorated pipes failing during pipe preparation prior to lining.

4.3.3.1 Alternative 1

With this alternative, the majority of the construction would occur along the alternate route before the flow was redirected. After redirecting the flow, lining activities would commence. Bypass pumping requirements would be significantly less, as would the impact of a potential failure during pipe preparation or liner installation. In the event of wet weather during liner installation, or bypass pumping failure, the now oversized host pipe would provide in-line storage before any overflow would occur. After sewer construction, any failure would require typical types of emergency response activities and would not subject any critical area within the Township to major environmental, traffic, or service interruption risks.

4.3.3.2 Alternative 2

With this alternative, a failure during or after construction will likely require bypass pumping to handle the full flow of the interceptor, including during wet weather. The same risk of sewer collapse during pipe preparation exists, but with the large bypass operation, an unexpected pipe collapse could lead to costly extras on the project due to an extended bypass pumping schedule during repairs. In addition, the interceptor would have less in-line storage to buy time for an emergency response, if needed. Major risks to the environment, traffic, public health, and commercial establishments can result from a failure on Platt Road or US-12.



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Analysis of Alternatives

4.3.4 Future Maintenance, Repairs, and Emergency Response

4.3.4.1 Alternative 1

For Alternative 1, most of the primary interceptor will be moved from US-12 to a minor roadway. Future maintenance and repair work of the primary interceptor will be easier to accomplish safely without having to contend with traffic.

It should be noted that much of the existing interceptor along US-12 will be lined and remain in service, though it will be much less critical due to the reduced service area. After redirecting most of the flow down Textile Road, this interceptor will be significantly oversized, and at a flatter slope than if a new pipe were to be installed to convey the reduced flow. Flow velocities will often be below recommended values and could lead to increased deposition of solids, necessitating more frequent jetting.

Regarding pump station maintenance, with three stations being taken offline, a reduction in maintenance effort will be realized immediately upon completion of the project. Current estimates show annual OM&R savings of approximately \$30,000 per year, or nearly \$1M over the course of the 30-year planning period.

4.3.4.2 Alternative 2

For Alternative 2, future maintenance, repairs, and emergency response needs would be essentially unchanged from what they are today. Emergency response activities associated with repairs related to this alternative are associated with various unknowns that can result with major environmental, financial, level of service and public health adverse impacts.

4.3.5 Single Point of Failure

With any critical infrastructure it is always important to understand the implications of a single point of failure in the system and plan appropriately.

4.3.5.1 Alternative 1

Any major interceptor will inherently have the risk of becoming a single point of failure. This risk will be essentially the same as it is currently, except repairs may be easier to accomplish along the alternate route as discussed in the previous section. The impacts that could result from a single point of failure can be mitigated with typical measures.

4.3.5.2 Alternative 2

For Alternative 2, the risk for a single point of failure will be the same as it is in the current configuration. However, the impacts that could result from a single point of failure are major and can result in major threats to the environment/public health (e.g., pump station force main collapse near a watercourse or wetland), major traffic disturbance (example US-23 interceptor corridor collapse), Township-wide service interruption (e.g., US-12 pipe collapse), major financial impacts (e.g., bypass pumping costs during failure), etc.



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Analysis of Alternatives

4.3.6 Major Highway Crossing

A failure under a major highway such as US-23 is the kind of thing that can keep utility owners awake at night. Proactive maintenance and good planning are essential to keep that from happening.

4.3.6.1 Alternative 1

While both alternatives will cross US-23, Alternative 1 moves the crossing from the junction with US-12, with the on and off ramps, to the south to cross a standard 4-lane highway section using trenchless methods.

4.3.6.2 Alternative 2

With Alternative 2, the crossing remains at the junction as with the current configuration.

4.3.7 Risk Comparison Summary

A comparison summary of the risks associated with Alternative 1 and Alternative 2 is presented in **Table 4.2**.

Table 4-2 - Risk Comparison Summary

	Impacts/Risk	Alternative 1			Alternative 2		
		Low	Medium	High	Low	Medium	High
Independent Factors	Bypass Pumping	X					X
	Traffic Impacts		X				X
	Pipe Failure During Construction	X					X
	Operation and Maintenance	X				X	
	Environmental		X				X
	Public Health	X					X
	Emergency Response	X					X
	Single Point of Failure		X				X
	Major Highway Crossing		X				X
Overall Factors	Uncertainty/Unknowns	X					X
	Sociological/ Environmental	X					X
	Risk	X					X



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Analysis of Alternatives

While no major construction activity is without risk, Alternative 1 is comparatively less risky than Alternative 2, and the difference is often significant. The reduced bypass pumping needs, reduced risk of failure during construction, and the ability to c

4.4 IMPLEMENTATION AND PUBLIC PARTICIPATION

A Notice of Public Hearing was advertised in the local newspaper, and the Township website and a copy is included in **Appendix F** of this project plan. The Project Plan was available for review at the Township Hall and on the Township website before the public hearing for a duration of 30 days. The public hearing will take place on May 26, 2021 and detailed information on items discussed at the public hearing will be included in a court recording manuscript that is included in **Appendix H**.

DRAFT



5.0 SELECTED ALTERNATIVE

Viable alternatives for meeting the objectives of the Township's sanitary collection system and efficient operation were identified and narrowed down to the most feasible and/or constructible alternative designed to meet the Township's objectives. Based on a number of factors explored in **Section 4**, the selected alternative for the Township's collection system improvements is Alternative 1. Alternative 1 is determined to be more reliable, and results in a significant reduction of risk in the form of impacts to the environment and, public health during and after construction of the project.

The elements of the selected alternative are described in detail in **Section 4.1.3** and shown in **Figure 1 of Appendix A**. The EOPC for the total SRF project is **\$31,011,000** and includes:

- Phase 1
 - Construction of approximately 2,950 feet of new 18-inch sewer along Platt Road from the existing Platt/Merritt pump station to US-12.
 - Construction of 16,500 feet of 36-inch sewer along US-12 from Platt Road to Textile Road, along Textile Road from US-12 to Crane Road, along Crane Road from Textile Road to Hickory Woods Park, Across Hickory Woods Park to Munger Road, then along Munger Road from Hickory Woods Park to the YCUA outlet at Morgan Road.
 - Construction of approximately 1,750 feet of new 10-inch sewer along US-12 from the southbound off-ramp of US-23 to Textile Road.
 - Construction of approximately 650 feet of new 12-inch sewer to redirect flows from Meadowview and Ashford Village pump stations to the proposed interceptor.
 - Abandonment of the three (3) existing pump station in the Study Area and their force mains (Platt/Merritt, Meadowview, and Ashford Village).
 - Abandonment of approximately 11,450 feet of existing sewers and force mains, including approximately 2,100 feet of 36-inch interceptor sewer under US-23.
- Phase 2
 - Rehabilitation by structural liner of approximately 3,300 feet of 24-inch and 3,500 feet of 36-inch sewer along US-12 from the northbound on-ramp of US-23 to Munger Road.
 - Rehabilitation by structural liner of approximately 9,000 feet of 18-inch and 2,700 feet of 36-inch sewer along US-12 from Platt Road to Warner Road.

This project is intended to be constructed in two phases. Phase 1 contains the bulk of the effort with the construction of the new interceptor, abandonment of pump stations, and redirection of flow, and the cost is estimated at approximately \$24.7M. Phase 2 contains the remainder of the rehabilitation work and the



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Selected Alternative

cost is estimated at approximately \$6.3M. It should be noted that by completing work under Phase 1 of this project, the service area and criticality of the remaining interceptor along US-12 will be significantly reduced. While the degradation that has occurred thus far will remain a concern, the consequence of failure will be less. If economic conditions or the bids received for Phase 2 of the project are unfavorable, it may be reasonable to defer the rehabilitation portion of this SRF project and/or pursue rehabilitation with other funding sources at a future date.

5.1 RELEVANT DESIGN PARAMETERS

The proposed improvements to the Township's collection system will be designed in accordance with the "Recommended Standards for Wastewater Facilities" published by the Great Lakes and Upper Mississippi Board of Sanitary Engineers, 2014 Edition. The preliminary basis of design was determined based on the results of the SCSCS, considering both existing and future scenarios when stressed with a 25-year 24-hour design storm event. Relevant design assumptions include:

- Future flows were based on the estimated future water consumption – sewer flow estimated as 80% of water use.
 - Future growth is estimated as 0.69 MGD for average daily flow, (approximately 16% increase).
 - 2.45 people per household/80 gpd per capita (100 gpd water use).
 - 400 gpd per acre for ICI demands (500 gpd water use).

5.2 CONTROLLING FACTORS

The controlling factors for the sanitary collection system improvements include the need to address:

- Aging sewers with significant H₂S degradation
- Undersized interceptor sewers
- End of service life for pump station structures and equipment components
- Odor control issues at the Platt/Merritt pump station

5.3 MAPS

Figures depicting the Project Study Area and the selected alternative can be referenced in **Appendix A, Figures 1 and Figure 6.**

5.4 SENSITIVE ECOSYSTEMS

No sensitive ecosystems are to be affected by the proposed project. The Michigan Natural Features Inventory has been consulted to determine whether there could be adverse effects to threatened or



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Selected Alternative

endangered species and habitats. Correspondence with the above-mentioned agency, in relation to the proposed project, is included in **Appendix B**.

5.5 MITIGATION OF ENVIRONMENTAL IMPACTS

A thorough discussion on mitigation is provided in **Section 7** below.

5.6 SCHEDULE FOR DESIGN AND CONSTRUCTION

Table 5-1 below presents a list of major milestones associated with the implementation of the proposed project. As indicated previously, the project is currently planned to be constructed in two distinct phases. The first will contain the interceptor construction, and the second will contain the rehabilitation work.

As noted previously, there is an MDOT project within the study area that is proposed to occur within approximately the same timeframe as the Township's sewer system improvements. MDOT's project is scheduled to begin in 2022 and will consist of road reconstruction and widening along US-12, a reconfiguration of the US-12 to US-23 interchange including a reconstruction of the US-12 overpass bridge, and other resurfacing of US-23. In order to take advantage of coordinating these projects, the Township's underground sewer work needs to be completed before the road construction is underway.

With the intent of meeting the aggressive schedule required to align this construction project with MDOT's roadway improvements, preliminary design on Phase 1 of the selected alternative has already been initiated. The Phase 2 construction dates in **Table 5-1** are estimates only, and the dates could be subject to change in coordination with MDOT's schedule.

Table 5-1 - SRF Project Schedule

	ACTIVITY	NO LATER THAN
1	Advertise Notice of Public Hearing for Project Plan	April 26, 2021
2	Public Hearing	May 26, 2021
3	Township Approval and Project Plan Resolution of Adoption	May 26, 2021
4	Final Project Plan Submittal to EGLE	June 1, 2021
5	Initiate Phase 1 Design	Currently underway
6	Begin Phase 1 Construction (1st Quarter Closing)	Winter 2021/22
7	Begin Phase 2 Design	Fall 2021
8	Complete Phase 1 Construction	Spring, 2023
9	Begin Phase 2 Construction	Summer, 2023
10	Complete Phase 2 Construction	Fall/Winter 2023

5.7 USER COSTS

User costs were developed for the construction of the sanitary collection system improvements using the EOPC. Based on an interest loan rate of 2.125% over a 30-year period, the annual loan repayment for



CLEAN WATER STATE REVOLVING FUND (SRF) PROJECT PLAN

Evaluation of Environmental Impacts

the Township's sanitary collection system improvements is estimated at approximately \$1,408,551. It is assumed that these costs will be distributed among all sewer system users within the Township. Based on the Township's records, there are 7,183 sewer system customers, and based on average water use estimates, the cost impact to an average residential customer is estimated to be \$7.43 per month (\$5.92 for Phase 1, and \$1.51 for Phase 2). It should be noted that these numbers are preliminary estimates and will be to be further refined by the Township's Financial Consultant during the SRF loan process.

6.0 EVALUATION OF ENVIRONMENTAL IMPACTS

6.1 DIRECT IMPACTS

Direct impacts related to the implementation of the selected alternative include dust, noise, construction traffic, and minor disruption to traffic/businesses on US-12. With the selection of structural lining construction only on US-12, interruption to service, access to business and day to day traffic will be minimized.

The proposed work would include construction within areas of existing pump stations, existing public road rights-of-way and existing utility easements, with the exception of the gravity sewer proposed across the Township-owned Hickory Woods Park. No historical, archaeological, geological, cultural or recreational areas are expected to be adversely impacted by this project. The proposed project will be constructed within areas that are already developed. Therefore, the project activities can be easily incorporated without causing any significant impact on the environment.

It should be noted that with the elimination of three pump stations, three possible SSOs threat locations will be removed. Also, the public safety and environmental risks related to interceptor failures under the US-23 and US-12 corridors will be eliminated or greatly reduced with this project. The Township finds all these positive impacts as advantageous and worth pursuing.

In light of the above, no, or very little, direct adverse impacts on the quality of environment or public health are anticipated from this project.

6.2 INDIRECT IMPACTS

Indirect impacts are those caused by the project but removed in time and/or distance. Indirect impacts are often secondary in nature and are generally caused by residential and/or commercial development made possible by the project. This project is proposed within an existing defined service area and is not intended to promote growth beyond the township master-planned and projected 20-year growth.

No adverse impact on land use, air quality, sensitive ecosystems, farmland, and or density of development will be triggered by this project.



Mitigation

6.3 CUMULATIVE IMPACTS

Cumulative impacts are those impacts which increase in magnitude over time, or which result from individually minor but collectively significant actions taking place over time. Cumulative impacts may also take the form of multiple impacts affecting one particular element of the environment. Growth beyond the Township master-planned 20-year growth is not anticipated to be induced due to the proposed project. In addition, since wastewater service is already available in the project service areas, no impact on the property value within the project service area is anticipated as a result of this project. No significant cumulative impacts are anticipated as a result of implementing this Project Plan.

7.0 MITIGATION

The short-term impacts on the community and environment include disturbance of road rights-of-way and minor noise and dust pollution from construction activities. Some soil erosion and minor vegetation removal can also be expected. Each of these issues will be handled in the Contract Documents and associated permits according to the portion of construction in question. Noise pollution will be kept from disturbing the residents as much as possible by the restriction of allowable work hours.

Soil erosion control measures are typically called out as bid items, paid for only when performed adequately. Additionally, the contractor(s) will be expected to adhere to the requirements called out in any and all soil erosion control permits, which will be enforced by both the Engineer and the local enforcement agency. Project restoration and traffic safety will be dealt with in a similar manner.

Any construction impacts near wetlands or surface waters will be identified during preliminary design and wetland delineation. Impacts will be minimized to the extent possible, and restoration will be accomplished in accordance with best management practices and regulatory agency permit requirements.

The elimination of three pump stations will reduce the manpower needed to operate the system, and increase operator safety, removing maintenance needs within three confined spaces. It will also reduce risks to public health, environment, and transportation, while increasing energy efficiency by conveying flow by gravity. Removing these three pump stations is anticipated to reduce energy consumption by approximately 68,000 kW of electricity and 5,800 cubic feet of natural gas annually.

Significant long-term impacts (noise, pollution, hauling traffic, etc.) are not anticipated. The proposed project is intended to improve the reliability of the existing wastewater collection system to meet the 20-year needs of the Township while also increasing energy efficiency.



8.0 PUBLIC PARTICIPATION

The project plan, public review period was advertised in the local newspaper on April 26, 2021, the public hearing is scheduled for May 26, 2021 and reference can be made to **Appendix F** for a copy of the advertisement.

After the public hearing, the Township Board will have the opportunity to pass a Resolution to adopt the project plan and proceed with seeking an SRF Loan from EGLE. A copy of the resolution, once adopted, will be included in **Appendix G** as part of the final project plan.

The public hearing attendees record, public hearing presentation, and court recording will be included in **Appendix H** as part of the final project plan. A recording of the Zoom meeting of the public hearing will also attached to the final project plan.

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Appendix A FIGURES

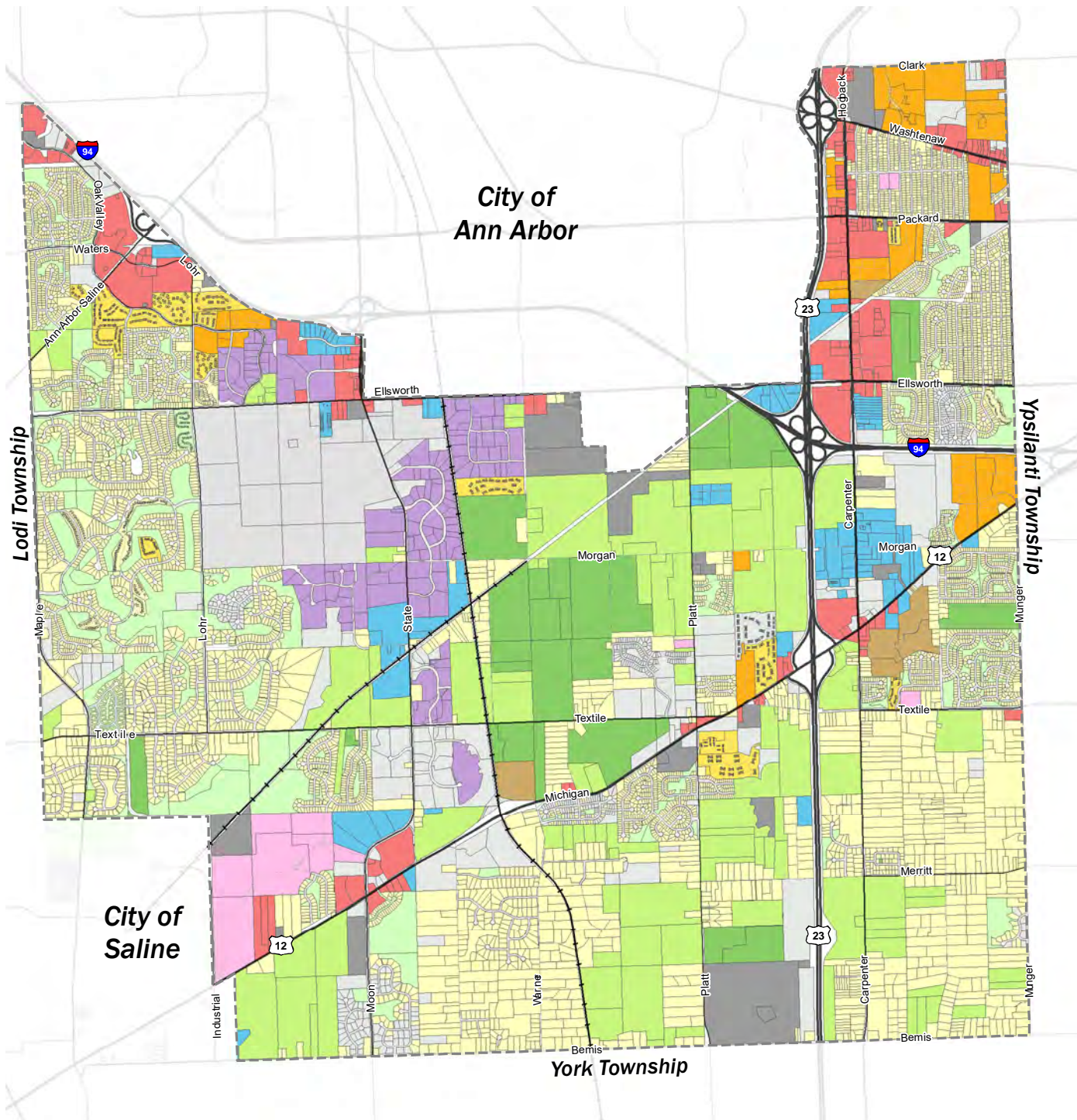
DRAFT



Existing Land Use Map



Pittsfield Charter Township
Washtenaw County, Michigan



- Agriculture
- Private Open Space
- Single Family Residential
- Attached Single Family Residential
- Multiple Family Residential
- Manufactured Housing Park
- Commercial
- Office/Research
- Industrial
- Ann Arbor Airport
- Public/Semi-Public
- School
- Park
- Vacant



1 Miles

Figure 2

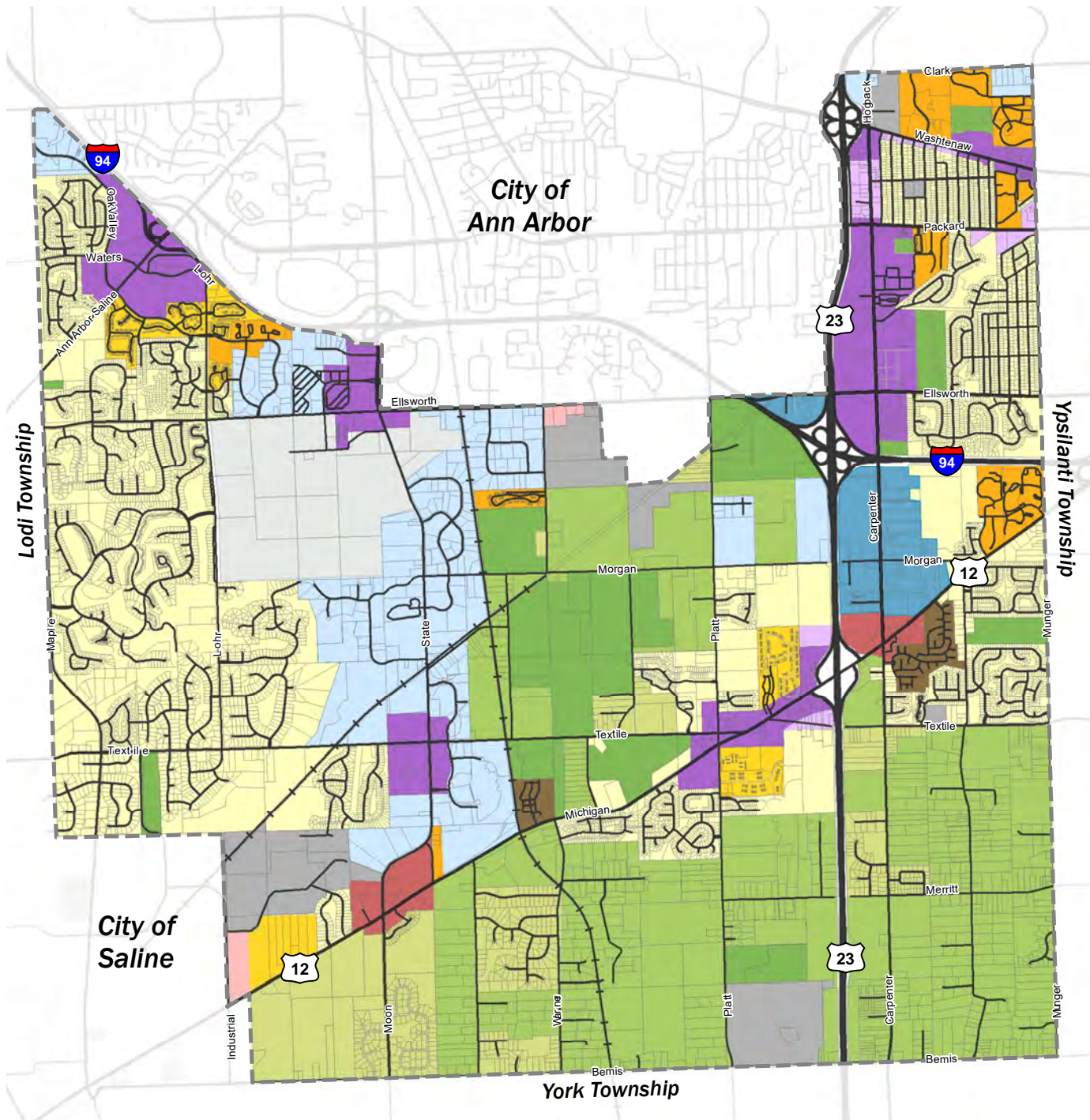
LAND USE CATEGORIES

JUNE 2011

Future Land Use Plan



Pittsfield Charter Township
Washtenaw County, Michigan



- Agricultural Preservation
- Rural Residential
- Suburban Residential
- Multi-Unit I
- Multi-Unit II
- Manufactured Housing
- Neighborhood Commercial
- Regional Commercial
- Business District
- Industrial
- Mixed-Use I
- Mixed-Use II
- Park & Open Space
- Public
- Airport

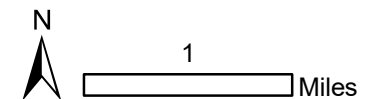
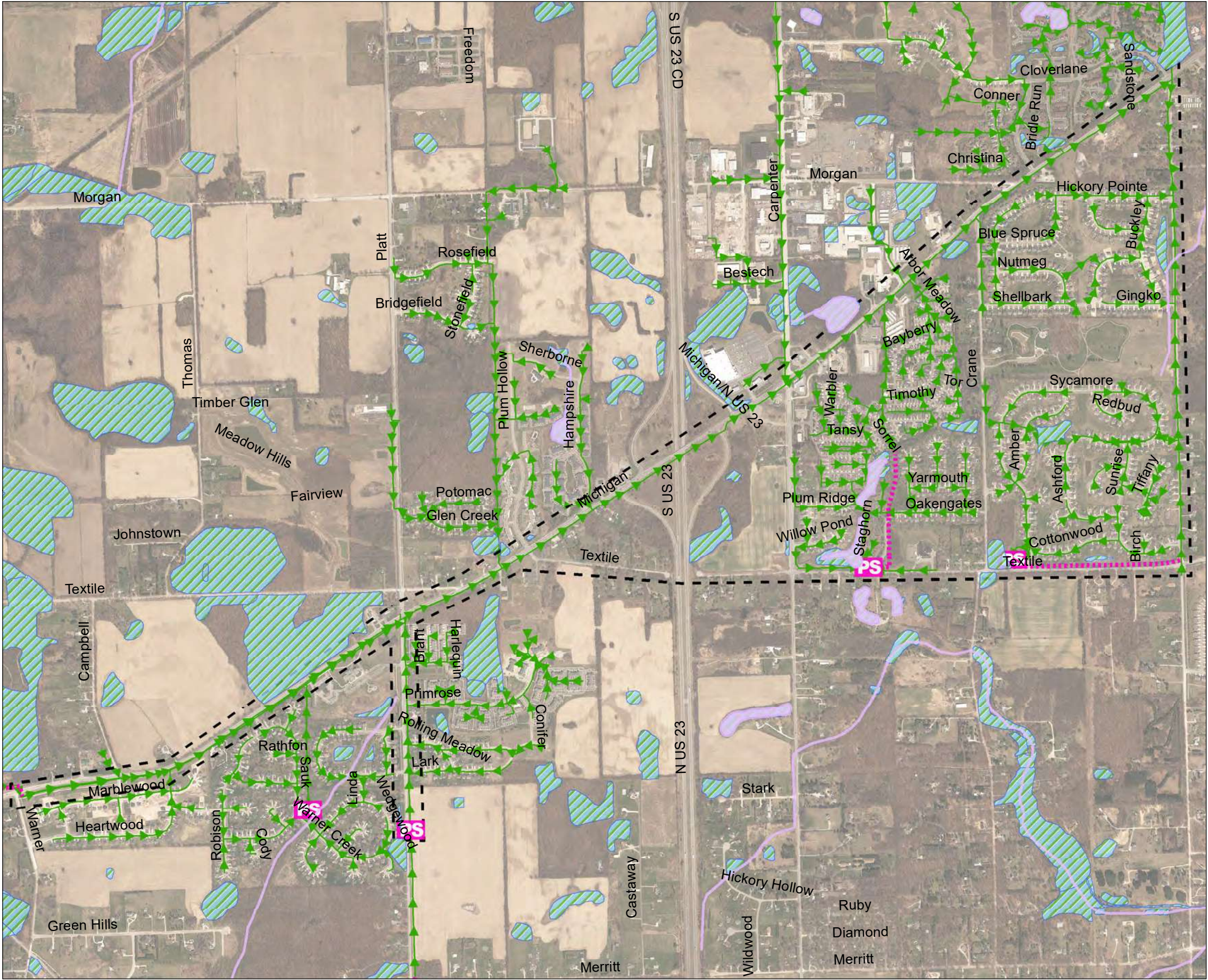


Figure 3

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Legend

- Existing Pump Station
- Existing Force Main
- Existing Gravity Sewer
- Project Study Area
- Watercourse
- Wetland



0 1,100 2,200 Feet
(At original document size of 11x17)
1:16,712

- Notes**
- 1. Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
 - 2. Data Sources:
 - 3. Background:

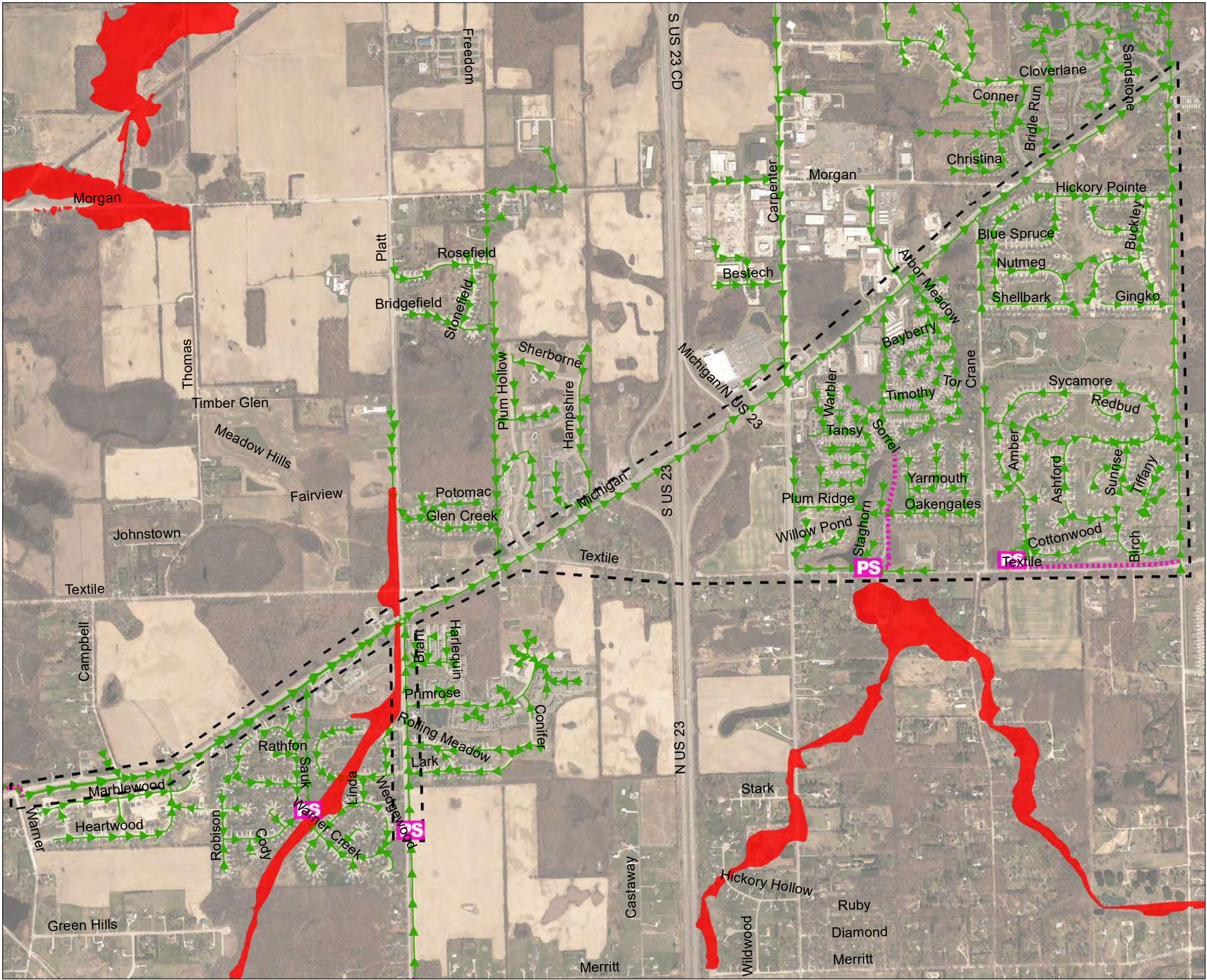
Project Location
Pittsfield Charter Township
Washtenaw County Michigan

Client/Project
Pittsfield Charter Township
Michigan Ave. Sewer Improvements

Figure No.
4

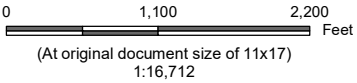
Title

Natural Features Inventory



Legend

- PS Existing Pump Station
- Existing Force Main
- ▶ Existing Gravity Sewer
- Project Study Area
- 100-Year Floodplain



- Notes**
1. Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
 2. Data Sources:
 3. Background:

Project Location
Pittsfield Charter Township
Washtenaw County Michigan

Client/Project
Pittsfield Charter Township
Michigan Ave. Sewer Improvements

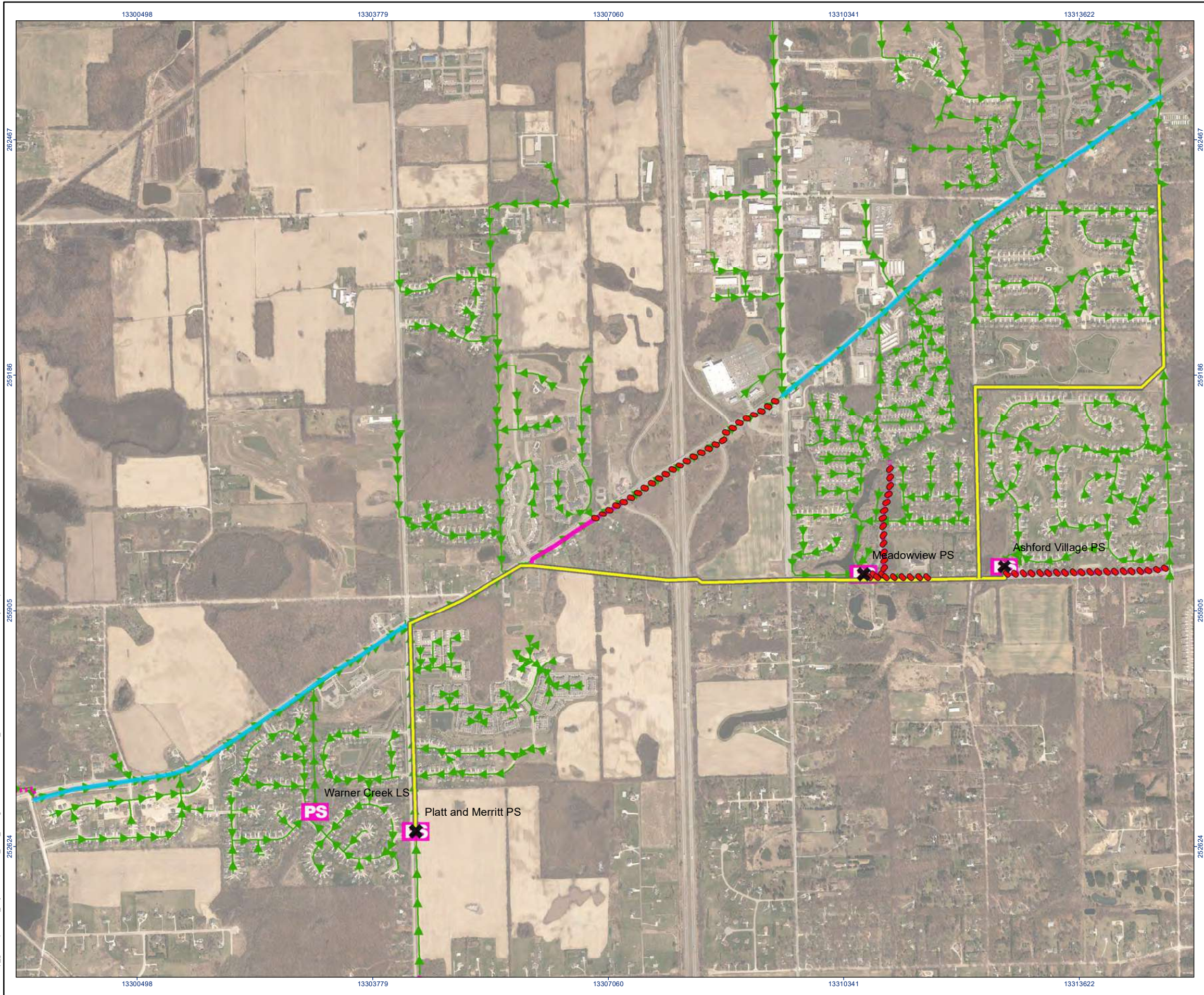
Figure No.

5

Title

Floodplain

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Legend

- Existing Gravity Sewer
- Existing Force Main
- Existing Pump Station
- Abandon Pump Station
- Abandoned Sewer
- Proposed Gravity Sewer
- Proposed Sewer Redirect
- Proposed CIPP Lining



0 1,100 2,200 Feet
(At original document size of 11x17)
1:16,712

Notes

- Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
- Data Sources:
- Background:

Project Location

Pittsfield Charter Township
Washtenaw County Michigan

Client/Project

Pittsfield Charter Township
Michigan Ave. Sewer Improvements

Figure No.

6

Title

Proposed Project Alternative

Appendix B CORRESPONDENCE

DRAFT





Stantec Consulting Michigan Inc,
3754 Ranchero Dr.
Ann Arbor, MI 48108
734-761-1010
734-761-1200 Fax

To: Brian Grennell

Company: State Historic Preservation Office,
Cultural Resources Management
Section

Address: 300 North Washington Square
Lansing, MI 48913

Phone: 517-335-2721

Date: June 5, 2020

File: 2075139100

Delivery: Electronic

From: Cassandra Winner

☐ For Your Information

☒ For Your Approval

☒ For Your Review

☐ As Requested

Confirmation

of receipt: _____

(signature)

Reference: Pittsfield Charter Township SRF

Attachment:

Copies	Description
1	Cover Letter
1	SHPO Application
1	SHPO Information Sheet
1	SHPO Research Emails (2)
1	Quad Map
1	Project Location Map via Google Earth
1	NRHP GIS Map of Historical Sites
1	Archaeological Atlas of Michigan – Map Excerpts
1	Project Photos

Reference: Pittsfield Charter Township SRF

Brian:

Please see the attached SHPO application and required documents for the above-mentioned project.

We conducted research using the NRHP, The *Archaeological Atlas of Michigan* (Wilbur B. Hinsdale), and the above-ground and archaeological historic files in your office and determined that there will be no adverse effect on historic properties.

Thank you for your help, and feel free to contact us with any questions or comments.

Stantec Consulting Michigan Inc.



Cassandra Winner EIT
Engineer-in-Training
Phone: 734 214 1867
Fax: 734 761 1200
Cassandra.Winner@stantec.com

Stantec Consulting Michigan Inc.



Spencer Cain PE
Project Engineer
Phone: 734 214 1858
Fax: 734 761 1200
Spencer.Cain@stantec.com

c. Pittsfield Charter Township
El-Gamal, Stantec

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Stantec Consulting Michigan Inc.
3754 Ranchero Drive, Ann Arbor, MI 48108-2771

June 5, 2020
File: 2075139100

Attention: Mr. Brian Grennell
State Historic Preservation Office
Cultural Resources Management Section
300 North Washington Square
Lansing, Michigan 48913

Dear Mr. Grennell,

Reference: Pittsfield Charter Township State Revolving Fund (SRF)

On behalf of Pittsfield Charter Township (Township), Stantec Consulting Michigan Inc. (Stantec) requests a historical review by your office for activities related to a sanitary collection system project. The purpose of the proposed project is to provide the Township's sanitary collection system customers with a more dependable sanitary collection system through implementing improvements, repairs, and/or replacement of its aging sanitary collection system infrastructure.

The Township is financing this project through low interest loan funding from the State Revolving Fund (SRF), which uses federal funds through the Environmental Project Agency (EPA), and is administered by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). In order to approve the project, EGLE requires a sign-off by SHPO upon review.

The project includes approximately 29,300 feet of construction of new interceptor sewer and rehabilitation of existing sewer, construction of a new pump station, and abandonment of three existing pump stations. Rehabilitation will generally be performed by trenchless lining methods and replacement will be generally by open cut. For vicinity maps of the proposed work locations, please refer to the attached project maps.

We request a review of the attached information and would appreciate a prompt response. We appreciate your help in this matter. If you need any additional information, please feel free to contact me at (734) 214-1867 or by e-mail.

Regards,

Stantec Consulting Michigan Inc.

Cassandra Winner
Engineer-in-Training
Phone: 734 214 1867
Fax: 734 761 1200
Cassandra.Winner@stantec.com

Stantec Consulting Michigan Inc.

Spencer Cain PE
Project Engineer
Phone: 734 214 1858
Fax: 734 761 1200
Spencer.Cain@stantec.com

Attachment: State Historic Preservation – Application for Section 106 Review
7.5 Minute Map
SHPO Research Emails
Location Map
NRHP GIS Map
Archaeological Atlas of Michigan – Map Excerpts
Project Area Photos

c. Pittsfield Charter Township
El-Gamal, Stantec

V:\2075\active\2075139100\analysis\SRF Planning\shpo\2_ltr_Grennell_SHPO Submittal_20200605.docx

STATE HISTORIC PRESERVATION OFFICE Application for Section 106 Review

SHPO Use Only				
<input type="checkbox"/> IN	Received Date	____ / ____ / ____	Log In Date	____ / ____ / ____
<input type="checkbox"/> OUT	Response Date	____ / ____ / ____	Log Out Date	____ / ____ / ____
	Sent Date	____ / ____ / ____		

Submit one copy for each project for which review is requested. This application is required. Please type. Applications must be complete for review to begin. Incomplete applications will be sent back to the applicant without comment. Send only the information and attachments requested on this application. Materials submitted for review cannot be returned. Due to limited resources we are unable to accept this application electronically.

I. GENERAL INFORMATION

☒ THIS IS A NEW SUBMITTAL ☐ THIS IS MORE INFORMATION RELATING TO ER#

- a. Project Name: Pittsfield Charter Township Revolving Fund (SRF)
- b. Project Address (if available): n/a
- c. Municipal Unit: Pittsfield Charter Township County: Washtenaw
- d. Federal Agency, Contact Name and Mailing Address (If you do not know the federal agency involved in your project please contact the party requiring you to apply for Section 106 review, not the SHPO, for this information.): US EPA Region 5; Andrew Lausted; 77 West Jackson Blvd, Chicago, IL 60604; P: (312) 886-0189; Email: lausted.andrew@epa.gov
- e. State Agency (if applicable), Contact Name and Mailing Address: EGLE; Eric Pocan; 525 W. Allegan, Lansing, MI 48933; P: (517) 284-5416; Email: pocane@michigan.gov
- f. Consultant or Applicant Contact Information (if applicable) *including mailing address*: Cassandra Winner, Stantec Consulting, 3754 Ranchero Drive, Ann Arbor, MI 48108; P: (734) 214-1867; Email: cassandra.winner@stantec.com

II. GROUND DISTURBING ACTIVITY (INCLUDING EXCAVATION, GRADING, TREE REMOVALS, UTILITY INSTALLATION, ETC.)

DOES THIS PROJECT INVOLVE GROUND-DISTURBING ACTIVITY? ☒ YES ☐ NO (If no, proceed to section III.)

Precise project location map (preferably USGS 7.5 min Quad with quad name, date, and location) with previously recorded archaeological sites visible (this site information is available to qualified archaeologists at the SHPO Office) Portions, photocopies of portions, and electronic USGS maps are acceptable as long as the location is clearly marked.

- a. USGS Quad Map Name: Ypsilanti West
- b. Township: 3S Range: 6E Section: Many
- c. Site plan showing limits of proposed excavation. Description of width, length and depth of proposed ground disturbing activity: 15-40' Width, 29,310' Length, 10-25+-' Depth
- d. Previous land use and disturbances: Residential, underground utilities, and roadway
- e. Current land use and conditions: Residential, underground utilities, and roadway
- f. Did you check the State Archaeological Site Files located at the SHPO? ☒ YES ☐ NO

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)

Note: Every project has an APE.

- a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statements (EIS), Environmental Assessments (EA), etc. **cannot** be substituted for the written description); See Attached
- b. Provide a localized map indicating the location of the project; road names must be included and legible.
- c. On the above-mentioned map, identify the APE.

- d. Provide a written description of the APE (physical, visual, auditory, and sociocultural), the steps taken to identify the APE, and the justification for the boundaries chosen. See Attached

IV. IDENTIFICATION OF HISTORIC PROPERTIES

- a. List and date **all** properties 50 years of age or older located in the APE. **The Section 106 Above-Ground Resources inventory form is the preferred format for providing this information and a completed form should be included as an attachment to this application.** If the property is located within a National Register eligible, listed or local district it is only necessary to identify the district: n/a
 - b. Describe the steps taken to identify whether or not any **historic** properties exist in the APE and include the level of effort made to carry out such steps: See Attached
 - c. Based on the information contained in "b", please choose one:
☒ Historic Properties Present in the APE
☐ No Historic Properties Present in the APE
 - d. Describe the condition, previous disturbance to, and history of any historic properties located in the APE: See Attached
-

V. PHOTOGRAPHS

Note: All photographs must be keyed to a localized map.

- a. Provide photographs of the site itself.
 - b. Provide photographs of all properties 50 years of age or older located in the APE (faxed or photocopied photographs are not acceptable).
-

VI. DETERMINATION OF EFFECT

**Note: you must provide a statement explaining/justifying your determination.
Include statement as an attachment if necessary.**

- ☐ No historic properties affected based on [36 CFR § 800.4(d)(1)], **please provide the basis for this determination.**
- ☒ No Adverse Effect [36 CFR § 800.5(b)] on historic properties, **explain why the criteria of adverse effect, 36 CFR Part 800.5(a)(1), were found not applicable.**
- ☐ Adverse Effect [36 CFR § 800.5(d)(2)] on historic properties, **explain why the criteria of adverse effect, [36 CFR Part 800.5(a)(1)], were found applicable.**

***Please print and mail completed form and required information to:
State Historic Preservation Office, Cultural Resources Management Section
Michigan Economic Development Corporation
300 North Washington Square, Lansing, MI 48913***

**PITTSFIELD CHARTER TOWNSHIP
STATE REVOLVING FUND (SRF)
Project Information**

Project Name: Pittsfield Charter Township SRF

Federal Agency and Contact: Andrew Lausted, US EPA Region 5
77 West Jackson Blvd
Chicago, IL 60604
(312) 886-0189
lausted.andrew@epa.gov

State Agency and Contact: Eric Pocan, Senior Project Manager
Finance Division I Water Infrastructure Financing
Section; Michigan Department of Environment, Great
Lakes, and Energy
(For Deliveries): Constitution Hall – 6th Floor South
525 West Allegan
Lansing, Michigan 48933
(For Mailings): P.O. Box 30457
Lansing, Michigan 48909-7957
(517) 284-5416
PocanE@Michigan.gov

Consultant Contact Information: Cassandra Winner, EIT
Stantec Consulting Michigan Inc.
3754 Ranchero Drive
Ann Arbor, MI 48108
(734) 214-1867
cassandra.winner@stantec.com

Project Location: Pittsfield Charter Township
T3S R6E
Sections 13, 23-27

Map of Project Location: Attached

Date of Existing Properties in APE: n/a

Photographs: See Attached Maps and Photographs

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)

a. Project Description:

Pittsfield Charter Township (Township) is proposing to pursue a sanitary system improvement project. The purpose of the proposed project is to provide the Township's sanitary collection system customers with a more dependable sanitary collection system through implementing improvements, repairs, and/or replacement of its aging sanitary collection system infrastructure. The project includes approximately 29,300 feet of construction of new interceptor sewer and rehabilitation of existing sewer, construction of a new pump station, and abandonment of three existing pump stations. Rehabilitation will generally be performed by trenchless lining methods and replacement

will be generally by open-cut. Some open-cut replacement may involve removing and replacing road asphalt pavement. The construction limits will be mostly in the road right-of-way. For general vicinity maps of the proposed work locations, please refer to the attached project maps.

The Township is financing this project through low interest loan funding from the State Revolving Fund (SRF), which uses federal funds through the Environmental Project Agency (EPA), and is administered by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). In order to approve the project, EGLE requires a sign-off by the State Historic Preservation Office (SHPO) upon review.

b. Description of the Area of Potential Effects (APE):

The area of potential effect has been identified as properties within the Township where sanitary sewer or manholes will be rehabilitated, abandoned or replaced that will be within the direct influence of effects such as construction noise, dust, and traffic control. No broader indirect sociocultural effects are anticipated as the proposed improvements are generally within road right-of-way and this project will not bring about additional development within or surrounding the area of potential effect.

IV. IDENTIFICATION OF HISTORIC PROPERTIES

The Archaeological Atlas of Michigan was utilized for research. It appears that there are possible Native American trails and village. The exact location of these trails and village is unknown, but they look to be on previously disturbed land. It is concluded from this research that the APE does not adversely affect this potential historical trail and village.

Research was also performed using the National Register of Historic Places; this resource provides geographical documentation of historical sites using a GIS mapping system. The map does not show any historical sites in the project's APE. Along with this, the Michigan State Historic Preservation Office in Lansing was also used to determine the presence of historic properties. In the attached email correspondence, SHPO Research provides historical architectural sites and archaeological sites. The architectural sites include 4740 Michigan Ave, 4980 Michigan Ave, 5066 Michigan Ave, 5102 Michigan Ave, 5105 Michigan Ave, 5126 Michigan Ave, 5138 Michigan Ave and 5896 Michigan Ave. All sites have not yet been listed in the National Register of Historic Places but are candidates. As the proposed work near these sites is in the road right-of-way, it is concluded that the APE will have no adverse effect on these properties.

There are previously reported archaeological sites (ER-900140, 20WA132, 20WA252, 20WA253, 20WA254, 20WA255, 20WA256, 20WA257, and 20WA318) in this APE, provided by SHPO Research in the attached email. The US-12 Reconstruction from Saline to Munger Road (ER-900140) was surveyed in the early 2000s, and the WA sites contain various undetermined Native American surface scatter. Although these sites are located within the APE, it is on previously disturbed land given the existing road, underground utilities and the commercial/residential neighborhood. It is concluded that the project will not adversely affect this archaeological site, but construction documents will instruct that, if anything is found, it should be immediately reported to SHPO.

VI. DETERMINATION OF EFFECT

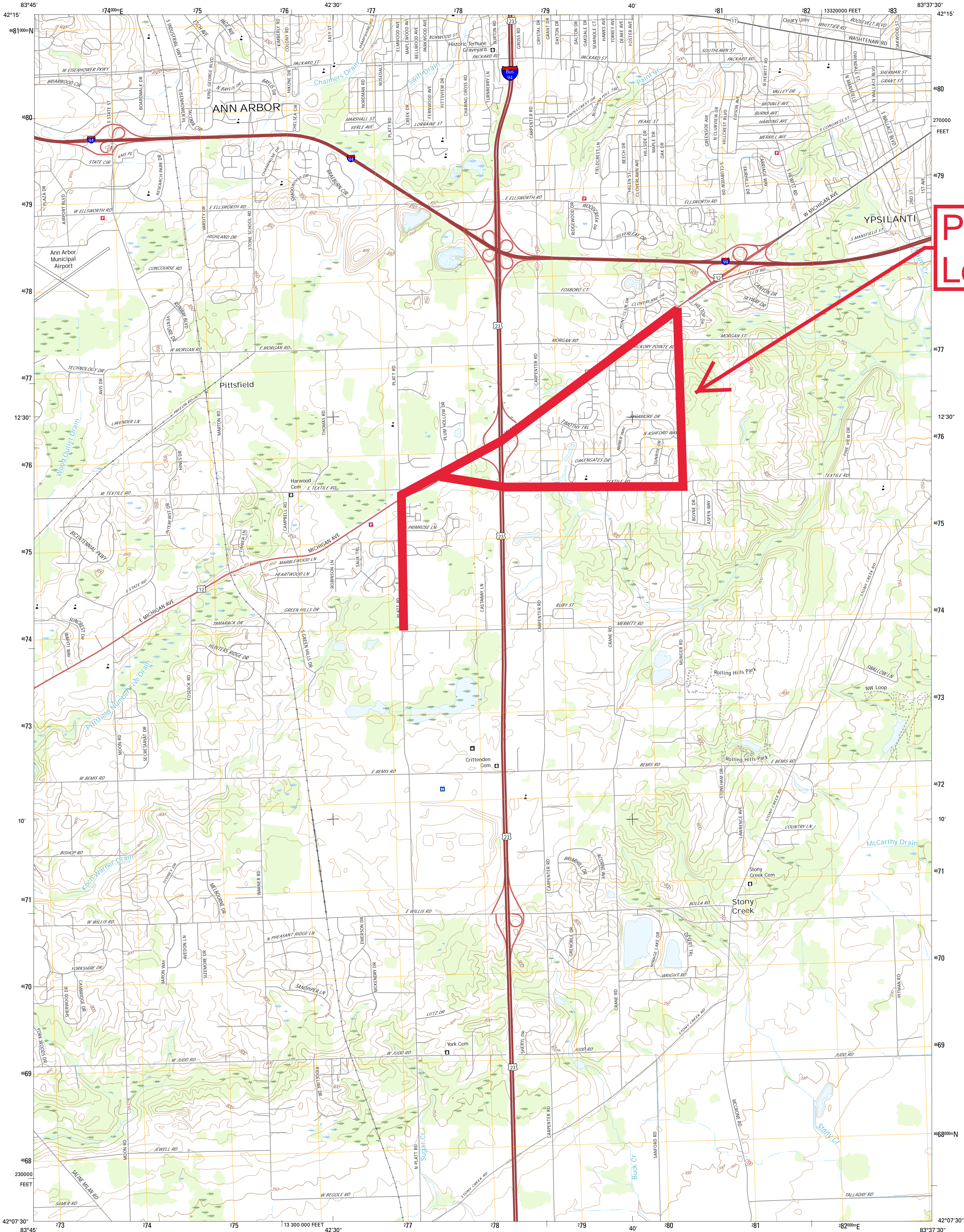
The proposed sanitary collection system rehabilitation resides in the road right-of-way where there is existing asphalt roadway, underground utilities, residential driveways and light foliage. It is therefore determined that no historic properties will be adversely affected.



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

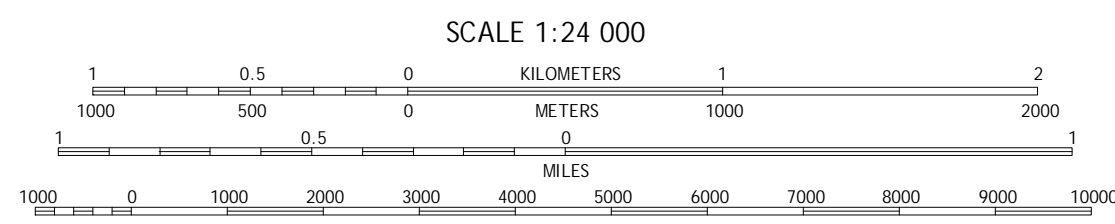
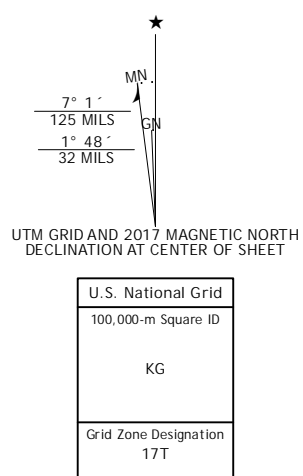


YPSILANTI WEST QUADRANGLE
MICHIGAN-WASHTENAW CO.
7.5-MINUTE SERIES



Project
Location

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84) Projection and
1 000-meter grid. Universal Transverse Mercator, Zone 17T
10 000-foot ticks. Michigan Coordinate System of 1983 (south
zone)
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.
Imagery.....NAIP, October 2014
Roads.....U.S. Census Bureau, 2015 2016
Names.....GNS, 2016
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 1999
Boundaries.....Multiple sources; see metadata file 1972 - 2016
Public Land Survey System.....BLM, 2016
Wetlands.....FWS National Wetlands Inventory 1977 - 2014



CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.19



1	2	3
4	5	6
7	8	9

1 Ann Arbor West
2 Ann Arbor East
3 Denton
4 Saline
5 Ypsilanti East
6 Macon
7 Milan
8 Mayhew

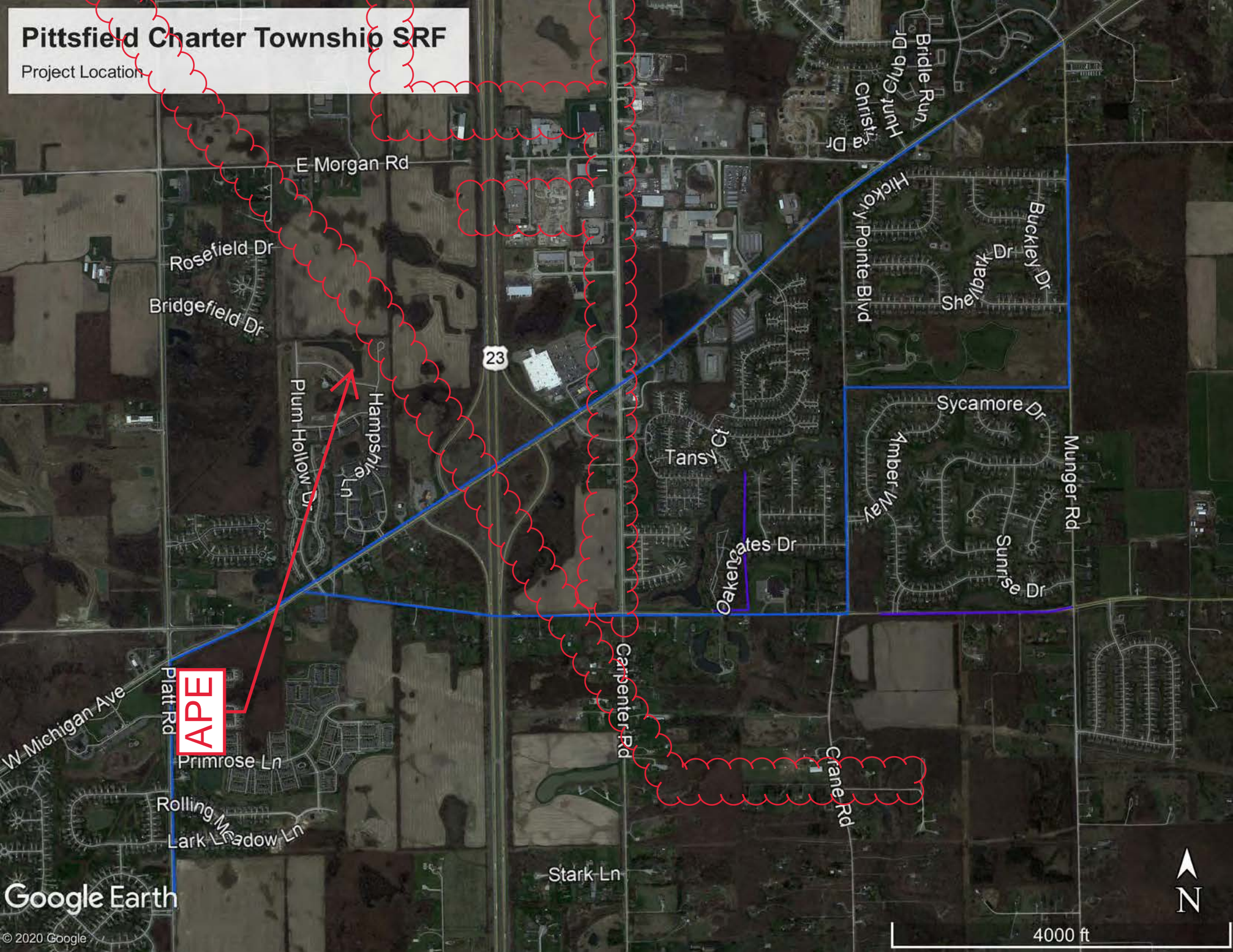
ROAD CLASSIFICATION	
Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route

YPSILANTI WEST, MI
2017



Pittsfield Charter Township SRF

Project Location



E Morgan Rd

Rosefield Dr

Bridgefield Dr

23

Plum Hollow Dr

Hampshire Ln

Tansy Ct

Oakens Dr

Christina Dr

Bridle Run Dr

Hickory Pointe Blvd

Sheepskin Dr

Buckley Dr

Sycamore Dr

Amber Way

Munger Rd

Sunrise Dr

Platt Rd

APE

Primrose Ln

Rolling Meadow Ln

Lark Meadow Ln

Carpenter Rd

Crane Rd

Stark Ln

Google Earth

© 2020 Google



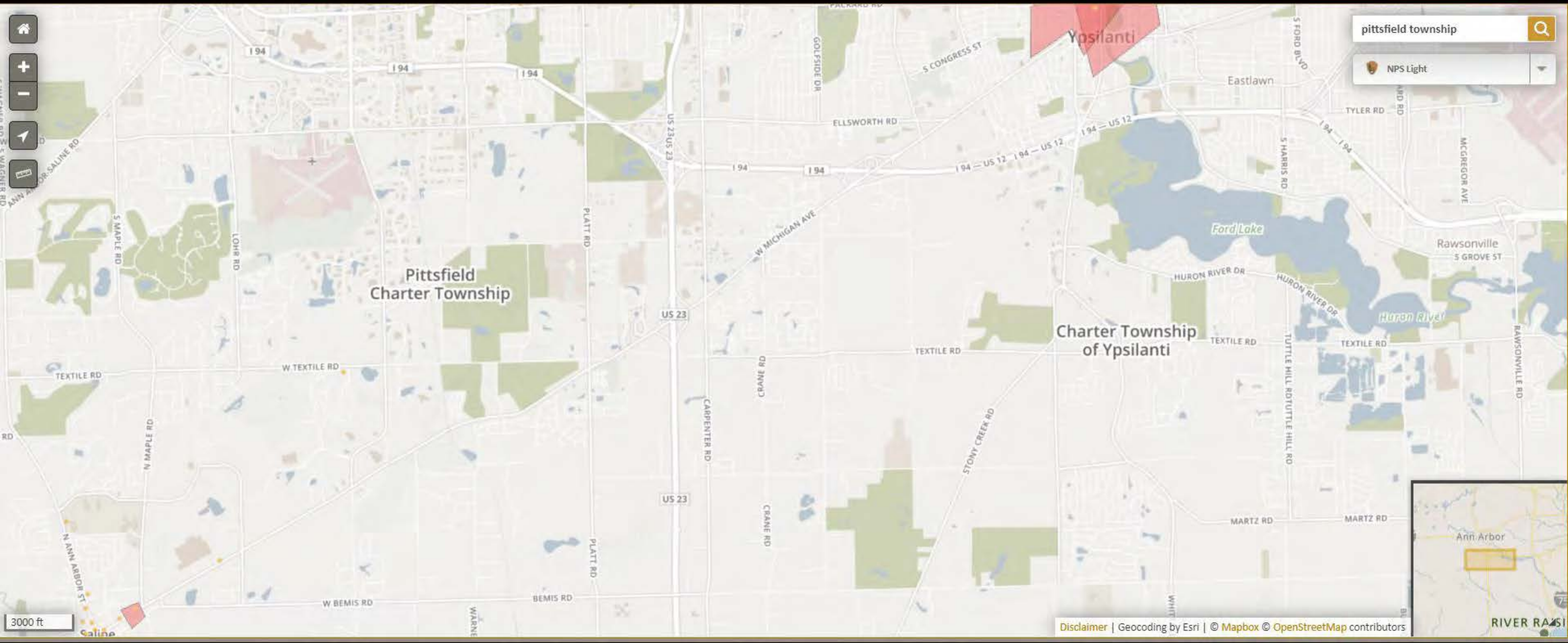
4000 ft

National Register of Historic Places

National Park Service
U.S. Department of the Interior



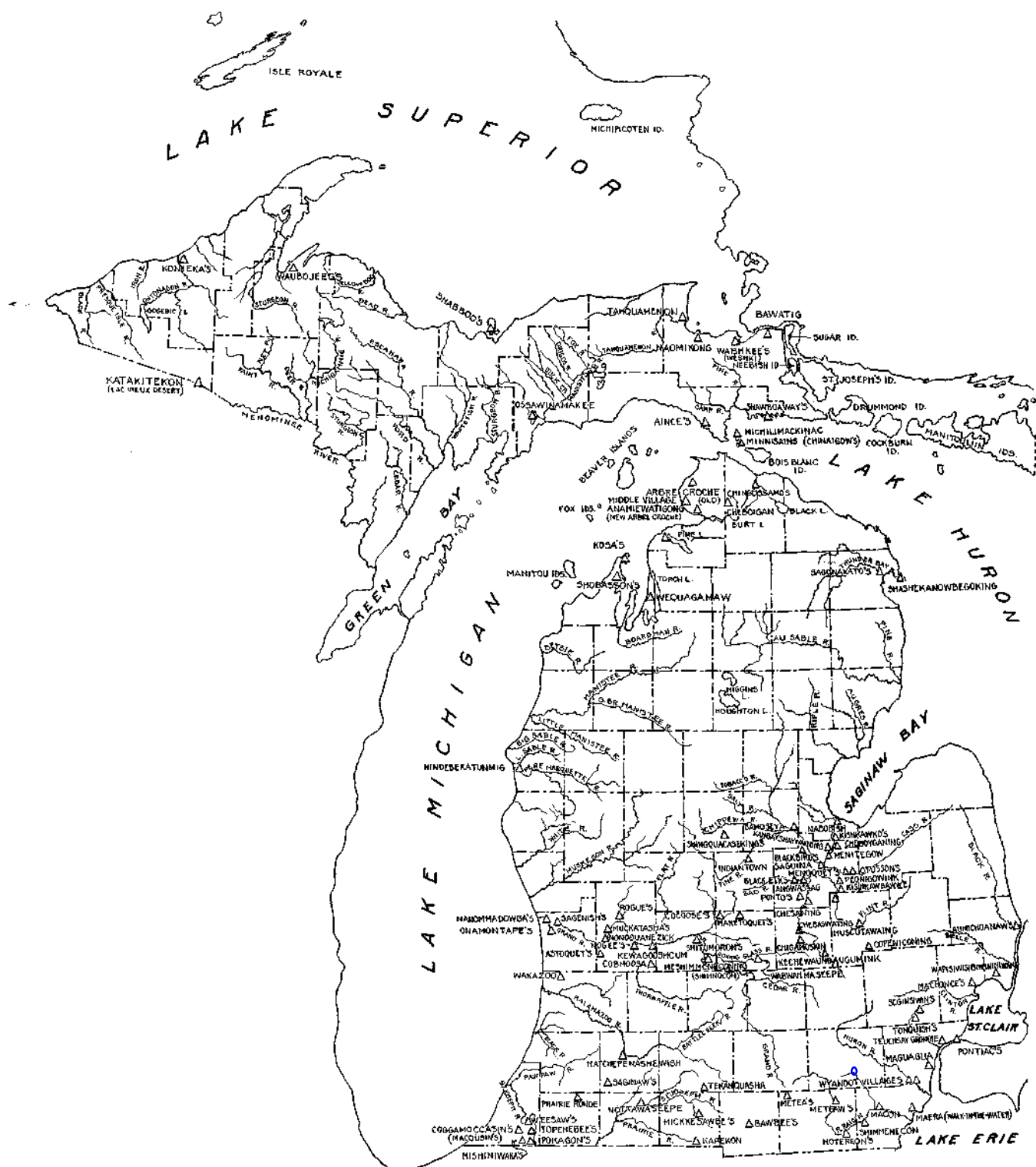
Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. Data last updated in April, 2014.



EXPLANATION OF CARTOGRAPHIC SYMBOLS

The numbers upon the maps indicate townships, which are listed in Chapter X, "Notes Upon the Archaeological Features of the Counties." The word "vague" beside a symbol indicates that the location was not determined nearer than a section of land.

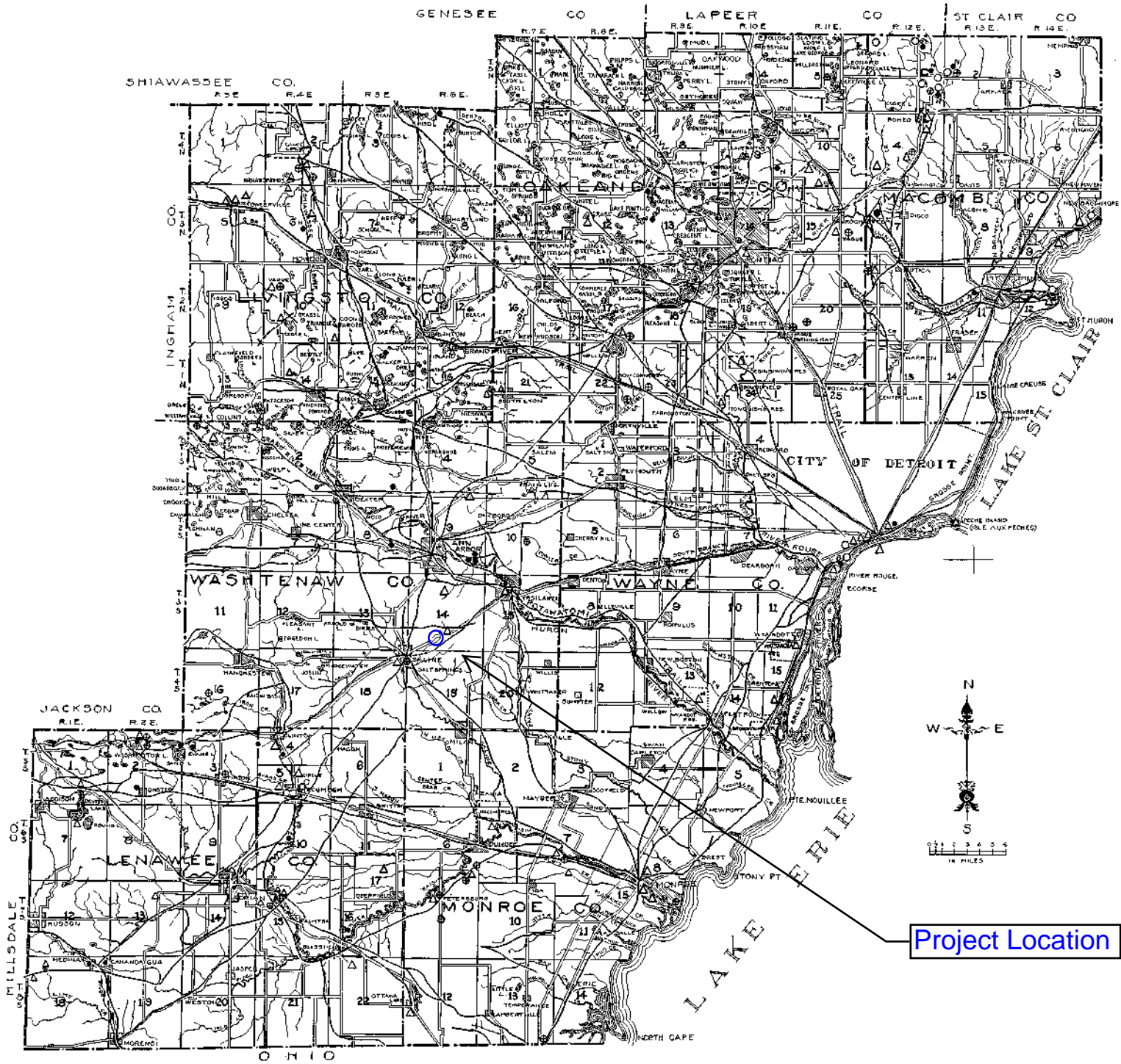
● Mound	⋈ Irregular earthwork
●4 Figures indicate exact number of mounds in a group	△ Village
●N Letter N indicates that the number of mounds in group is undetermined	⊕ Burying ground
○ Circular inclosure	▨ Garden bed
◌ Incomplete circular inclosure	⋈ Trail
□ Rectangular inclosure	⋈ Trail, location not accurately determined
◌ Incomplete rectangular inclosure	✕ Ancient excavation for copper



INDIAN VILLAGES OF MICHIGAN OF WHICH THE NAMES AND LOCATIONS ARE KNOWN

Project Location: ○





Project Location

LENAWEE, MONROE, WASHTENAW, WAYNE, LIVINGSTON, OAKLAND, MACOMB COUNTIES

Pittsfield SRF

E Textile Rd

12

Brant Ln

Harlequin Ln

Waterfoul Blvd

Wig on Ln

Primrose Ln

Conifer Dr

Hidden Creek N

Bedview Dr

Platt Rd

Inglewood Dr

Rolling Meadow Ln

Lark Ln

Linda Ave

er Cir

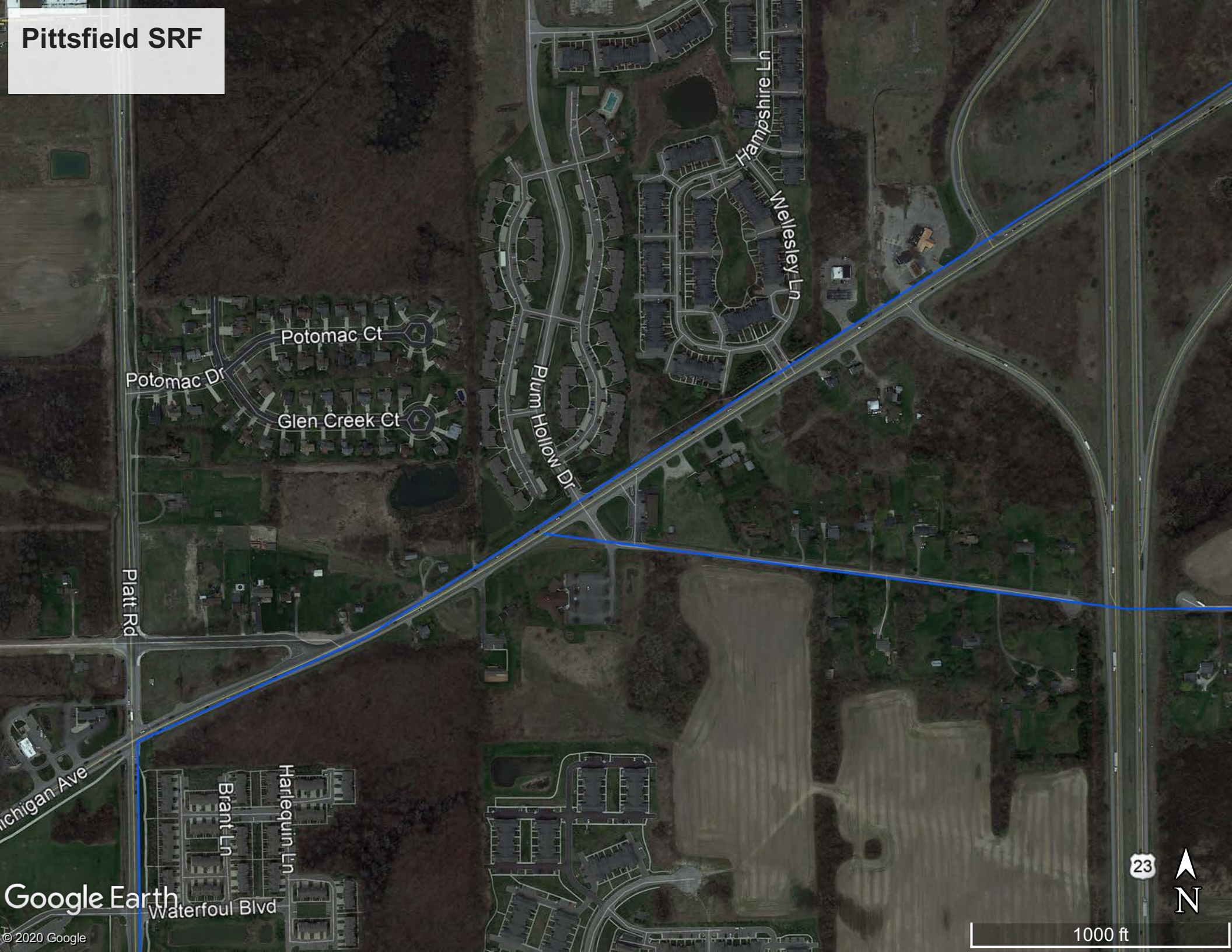
Google Earth

© 2020 Google

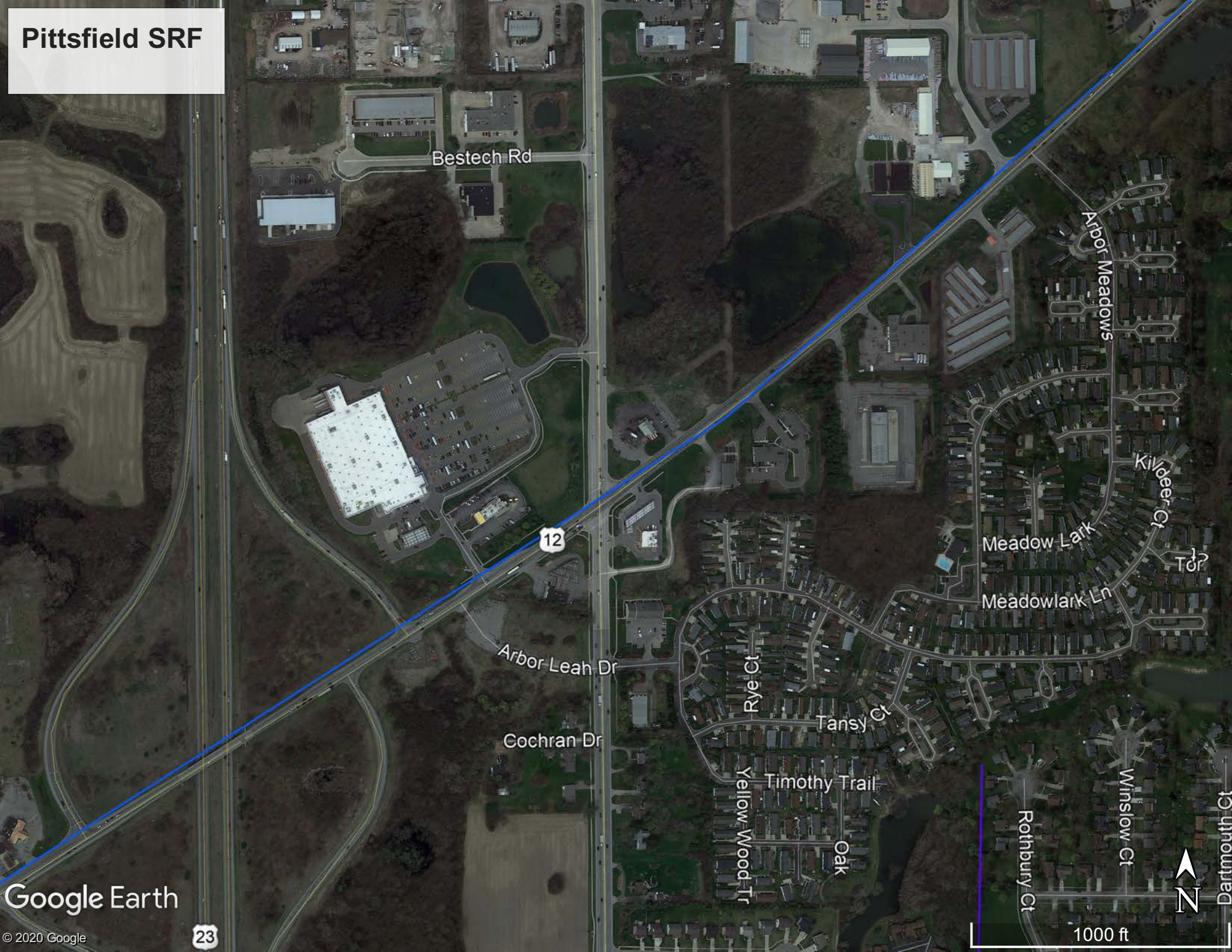


1000 ft

Pittsfield SRF



Pittsfield SRF



Bestech Rd

12

Arbor Leah Dr

Cochran Dr

Rye Ct

Tansy Ct

Timothy Trail

Yellow Wood Tr

Oak

Arbor Meadows

Kilpeck Ct

Meadow Lark

Meadowlark Ln

Top?

Rothbury Ct

Winslow Ct

Dartmouth Ct

Google Earth

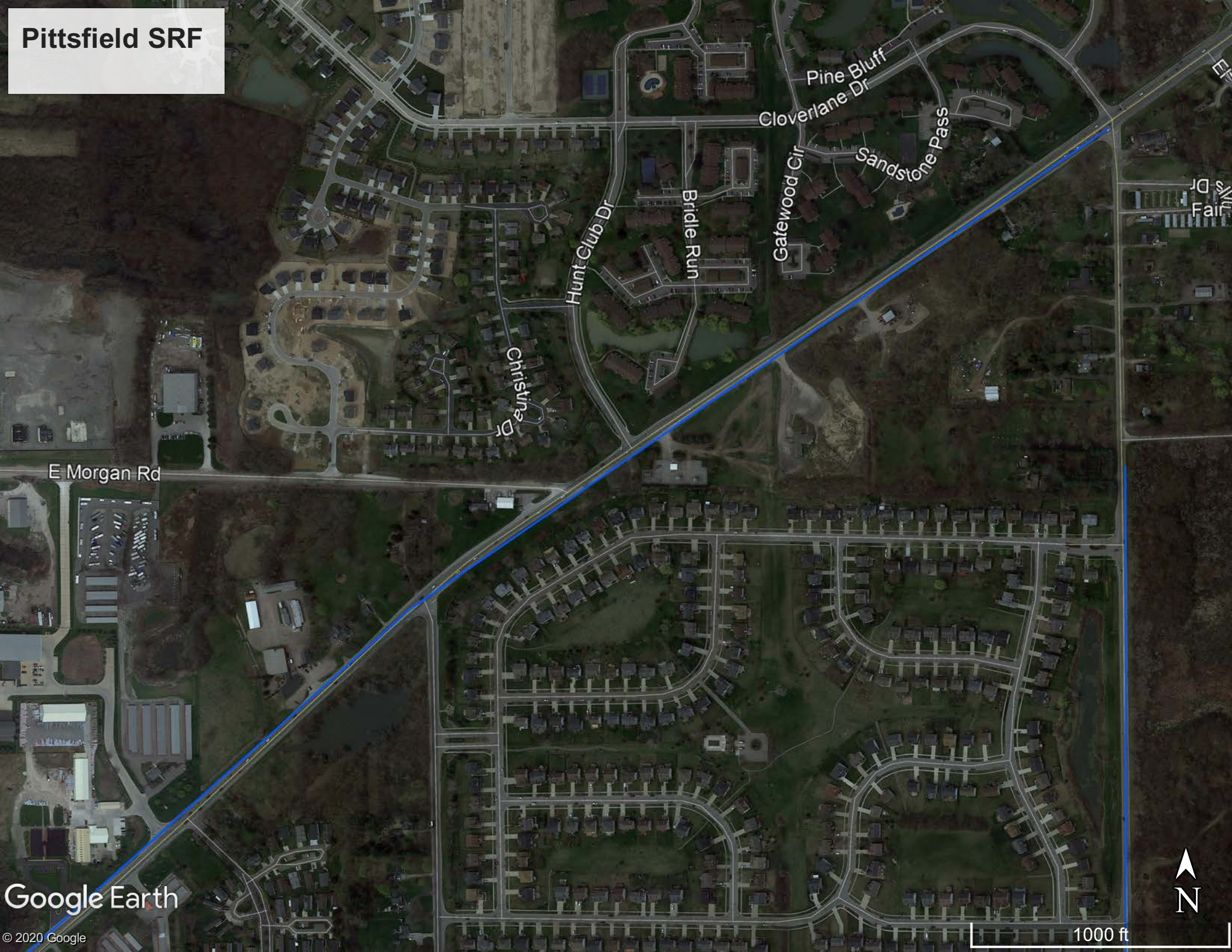
© 2020 Google

23

1000 ft



Pittsfield SRF



Pittsfield SRF

Morgan Rd

Hickory Pointe Blvd
Crane Rd
Blue Spruce Dr
Nutmeg Dr
Shellbark Dr
Pecan Dr
Buckley Dr
Gingko Dr
Munger Rd
Sycamore Dr
Amber Way
Redbud Ct

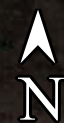
Arbor Meadows

Killdeer Ct

Tor

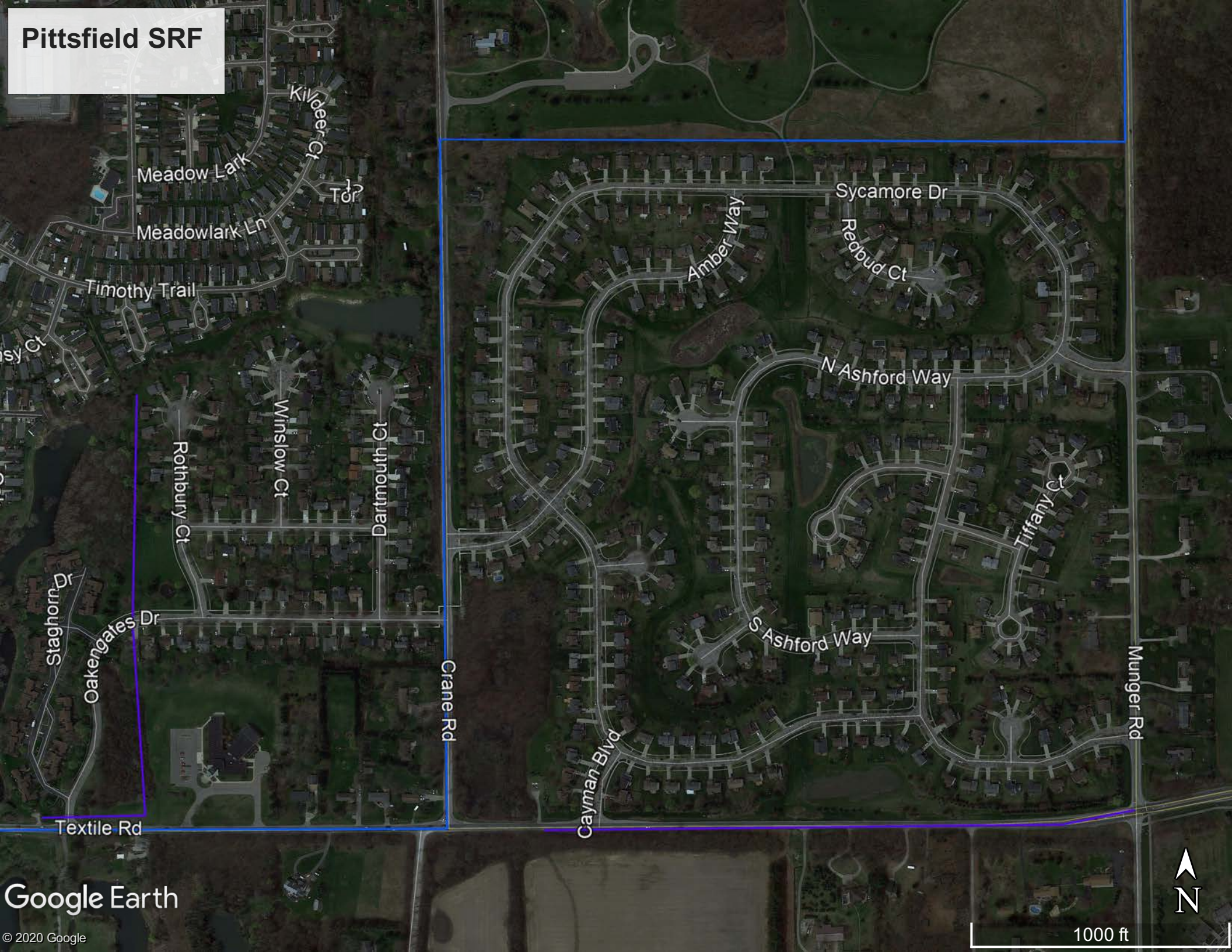
Google Earth

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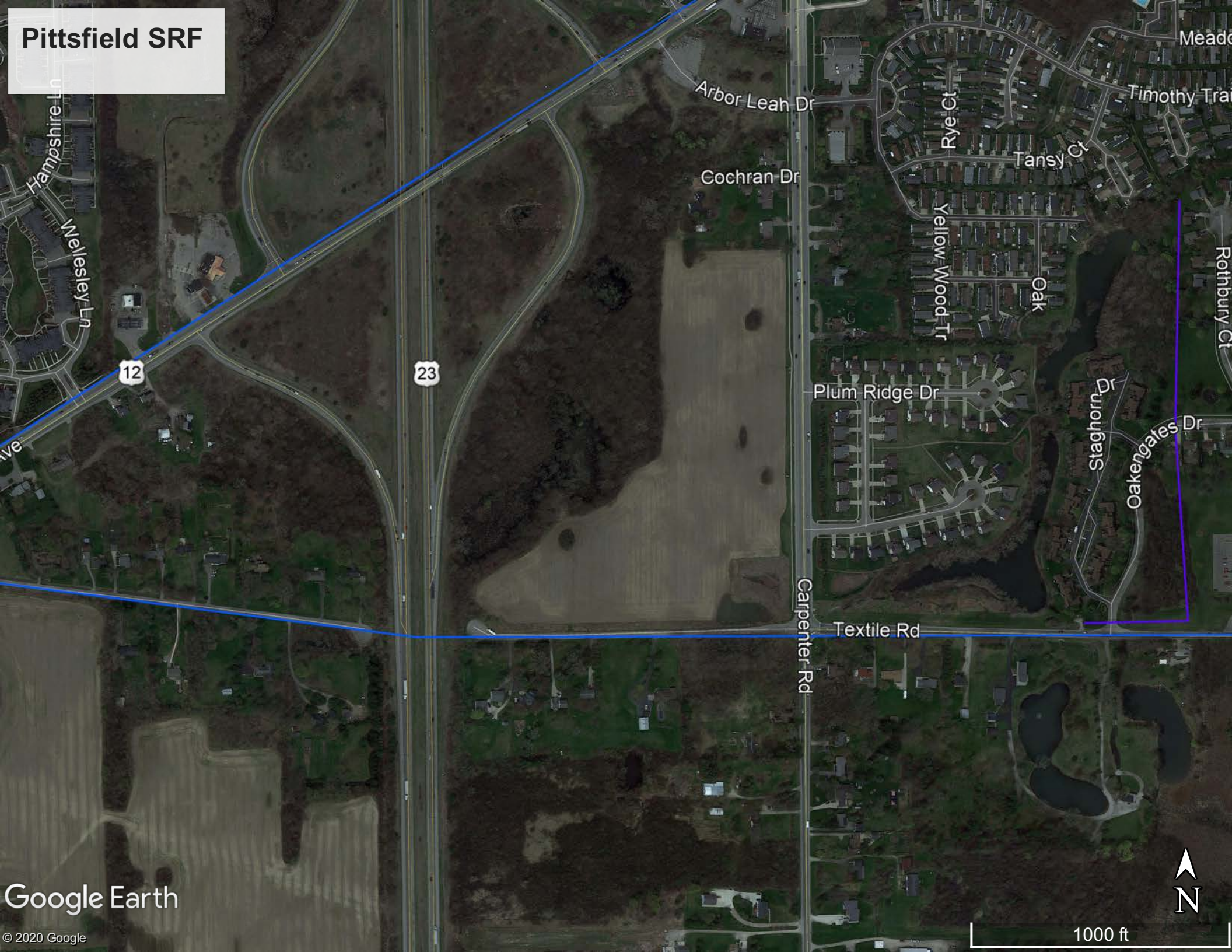


1000 ft

Pittsfield SRF



Pittsfield SRF





Stantec Consulting Michigan, Inc.
3754 Ranchero Drive
Ann Arbor, MI 48108

June 5, 2020
File: 2075139100

To Whom It May Concern:

**Reference: Notice and Opportunity to Comment
Pittsfield State Revolving Fund (SRF)
Pittsfield Charter Township, Washtenaw County**

Stantec Consulting Michigan Inc. (Stantec), working on behalf of Pittsfield Charter Township (Township), is preparing an application to fund improvements to the Township's sanitary collection system. This work is proposed for funding through the Michigan Department of Environment, Great Lakes, and Energy (EGLE) State Revolving Fund (SRF), starting in fiscal year 2021. The proposed project includes approximately 29,300 feet of construction of new interceptor sewer and rehabilitation of existing sewer, construction of a new pump station, and abandonment of three existing pump stations.

The project will be located in the Pittsfield Charter Township, Washtenaw County. Please refer to the actual work location in the attached project map.

This notice and opportunity to comment is being sent to you to fulfill Section 106 of the National Historic Preservation Act review process, which requires a federal agency or applicant to consult with Tribal Historical Preservation Officers (THPOs) and federally recognized Indian tribes. The purpose of this notice is to give you an opportunity to have your interests and concerns considered. Should you have any comments on potential impacts to known religious and/or culturally significant properties in the area of the proposed project, please provide them to us within 30 days of this notice.

Regards,

Stantec Consulting Michigan Inc.

Cassandra Winner
Engineer-in-Training
Phone: 734 214 1867
Fax: 734 761 1200
Cassandra.Winner@stantec.com

Stantec Consulting Michigan Inc.

Spencer Cain PE
Project Engineer
Phone: 734 214 1858
Fax: 734 761 1200
Spencer.Cain@stantec.com

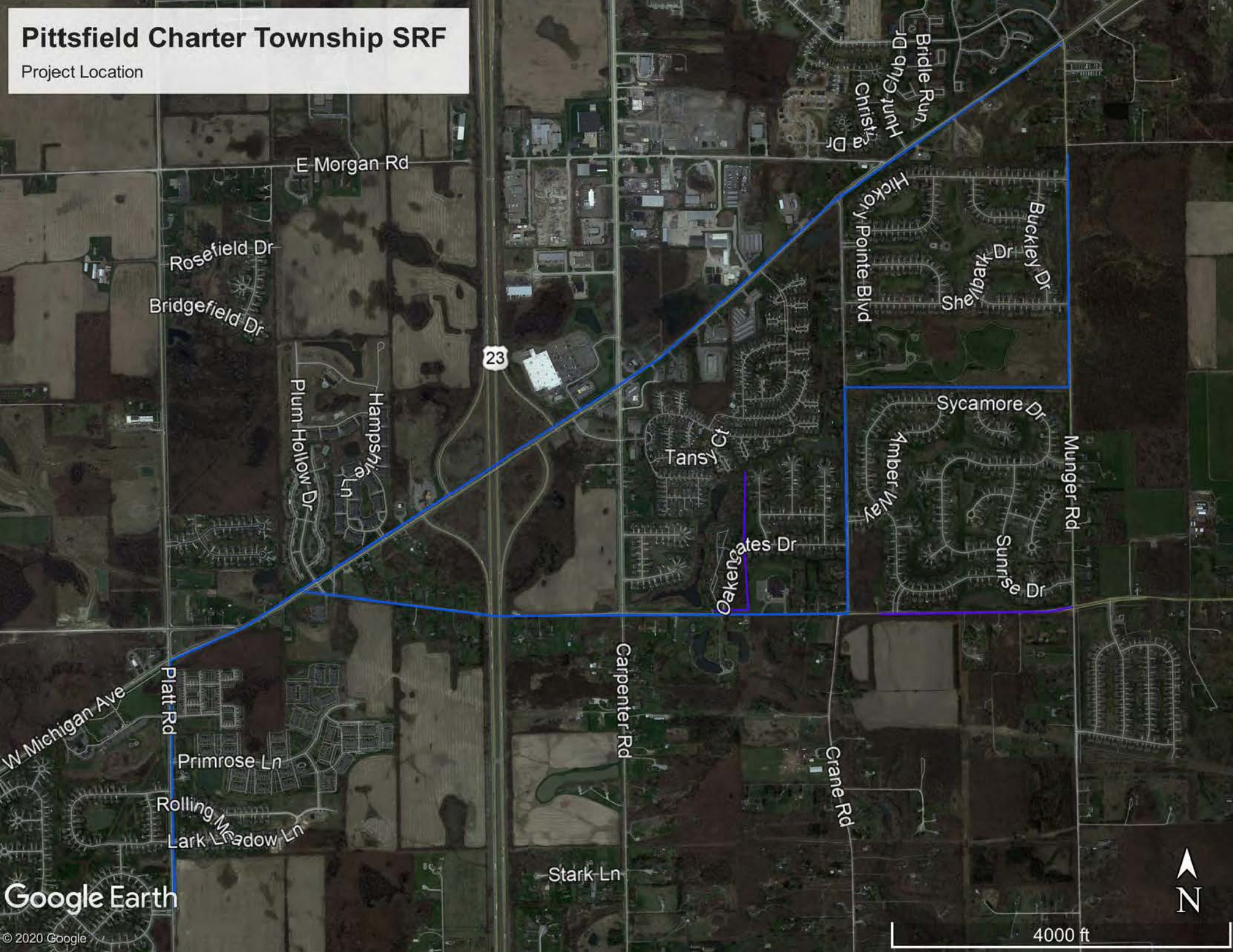
Attachment: Project Location Map

c. Pittsfield Charter Township
El-Gamal, Stantec

ed v:\2075\active\2075139100\analysis\SRF Planning\thpo\tr_thpo_notice to comment_20200605.docx

Pittsfield Charter Township SRF

Project Location



23

Google Earth

© 2020 Google

N

4000 ft

From: [Douglas Taylor](#)
To: [Winner, Cassandra](#); [Cain, Spencer](#)
Subject: Pittsfield Charter Township, Washtenaw County
Date: Wednesday, June 10, 2020 12:08:28 PM
Attachments: [image001.png](#)

Greetings,

Ref: Pittsfield Charter Township, Washtenaw County

Thank you for including the Nottawaseppi Huron Band of the Potawatomi in your consultation process. From the description of your proposed project, it does not appear as if any cultural or religious concerns of the Tribe's will be affected. We therefore have no objection to the project. Of course, if the project scope is significantly changed or inadvertent findings are discovered during the course of the project, please contact us for further consultation.

Very Respectfully
Douglas Taylor

Douglas R. Taylor | [Tribal Historic Preservation Officer \(THPO\)](#)

Pine Creek Indian Reservation

1301 T Drive S, Fulton, MI 49052

o: 269-704-8347 | c: 269-419-9434 | f: 269-729-5920

Douglas.Taylor@nhbp-nsn.gov | www.nhbpi.com



Please consider the environment before printing this email. This message has been prepared on resources owned by the Nottawaseppi Huron Band of the Potawatomi located in the State of Michigan. It is subject to the Electronic Communications Policy of Nottawaseppi Huron Band of the Potawatomi. This communication may contain confidential (including "protected health information" as defined by HIPAA) or legally privileged information intended for the sole use of the designated recipient(s). If you are not the intended recipient, please notify the sender immediately by reply e-mail and delete all copies of this communication and attachments without reading or saving them. If you are not the named addressee you are notified that disclosing, disseminating, copying, distributing or taking any action in reliance on the contents of this information is strictly prohibited



THPO

Saginaw Chippewa Indian Tribe of Michigan
Tribal Historic Preservation Office

6650 EAST BROADWAY, MT. PLEASANT, MI 48858
PHONE (989) 775-4751 • FAX (989) 775-4767

RECEIVED

JUL 20 2020

STANTEC CONSULTING

July 16, 2020

Spencer Cain
Stantec Consulting Michigan
3754 Ranchero Drive
Ann Arbor, MI 48108

RE: Pittsfield Charter Township

Dear Mr. Cain:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, I have reviewed the above-cited undertakings at the locations noted above. Based on the information provided for our review, it is the opinion of the Saginaw Chippewa Indian Tribe of Michigan's Tribal Historic Preservation Office (SCIT THPO) that there are no recorded resources within the area of potential effect. It is also the opinion of the SCIT THPO that the projects will have no effect on cultural resources.

This letter evidences that Stantec Consulting Michigan is in compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of Stantec Consulting Michigan's responsibility to notify the SCIT THPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4 (d) (1) "No historic properties affected."

If the scope of the work changes in any way please notify this office immediately.

If you have any questions, please contact Marcella Hadden, Tribal Historic Preservation Officer, at 989-775-4751 or by email at mlhadden@sagchip.org.

Miigwetch (thank you) for this opportunity to review and comment and for your cooperation.

Sincerely,

Marcella Hadden
Tribal Historic Preservation Officer
Saginaw Chippewa Indian Tribe of Michigan

7-20-20
emailed to
Spencer

From: [Winner, Cassandra](#)
To: ["mnfi@msu.edu"](mailto:mnfi@msu.edu)
Subject: Rare Species Review (Pittsfield Township SRF)
Date: Friday, June 05, 2020 4:03:00 PM
Attachments: [alternative 1 - Pittsfield SRF Concept 20200304.pdf](#)

Hello,

On behalf of Pittsfield Charter Township (Township), Stantec is requesting a rare species review for proposed improvements to the Township's sanitary collection system. Stantec is preparing an application to fund this work through the Michigan Department of Environment, Great Lakes, and Energy (EGLE) State Revolving Fund (SRF). The proposed project includes approximately 29,300 feet of construction of new interceptor sewer and rehabilitation of existing sewer, construction of a new pump station, and abandonment of three existing pump stations. This work resides in the road right-of-way where there is existing asphalt roadway, underground utilities, residential and commercial driveways, and light foliage. See the attached map showing the location of these improvements which are in T3S R6E Sections 13, 23-27.

Please let us know if you need more information.

Thank you,

Cassandra Winner

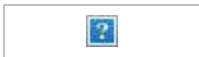
EIT

Direct: 734 214-1867

Mobile: 734 730-5136

Cassandra.Winner@stantec.com

Stantec



The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

Phone: (517) 351-2555 Fax: (517) 351-1443

<http://www.fws.gov/midwest/endangered/section7/s7process/step1.html>

In Reply Refer To:

June 05, 2020

Consultation Code: 03E16000-2020-SLI-1175

Event Code: 03E16000-2020-E-03666

Project Name: Pittsfield Charter Township State Revolving Fund (SRF)

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are several important steps in evaluating the effects of a project on listed species. Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions to help you determine if your project may affect listed species and lead you through the section 7 consultation process.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the ECOS-IPaC website (<http://ecos.fws.gov/ipac/>) at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Please see the “Migratory Birds” section below for important information regarding incorporating migratory birds into your project planning. Our Migratory Bird Program has developed recommendations, best practices, and other tools to help project proponents voluntarily reduce impacts to birds and their habitats. The Bald and Golden Eagle Protection Act prohibitions include the take and disturbance of eagles. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <https://www.fws.gov/midwest/eagle/permits/index.html> to help you avoid impacting eagles or determine if a permit may be necessary.

Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/administrative-orders/executive-orders.php>.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

(517) 351-2555

Project Summary

Consultation Code: 03E16000-2020-SLI-1175

Event Code: 03E16000-2020-E-03666

Project Name: Pittsfield Charter Township State Revolving Fund (SRF)

Project Type: WASTEWATER PIPELINE

Project Description: Sanitary system improvement project including approximately 29,300 feet of construction of new interceptor sewer and rehabilitation of existing sewer, construction of a new pump station, and abandonment of three existing pump stations. The construction limits will be mostly in the road right-of-way.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.20568712285929N83.67774815461038W>



Counties: Washtenaw, MI

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/1/office/31410.pdf	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/10043/office/31410.pdf	Threatened

Reptiles

NAME	STATUS
<p>Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> All Projects: Project is Within EMR Range <p>Species profile: https://ecos.fws.gov/ecp/species/2202</p> <p>General project design guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/design/population/7800/office/31410.pdf</p>	Threatened

Clams

NAME	STATUS
<p>Snuffbox Mussel <i>Epioblasma triquetra</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/4135</p> <p>Species survey guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/survey/population/5281/office/31410.pdf</p>	Endangered

Insects

NAME	STATUS
<p>Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/8062</p>	Endangered
<p>Poweshiek Skipperling <i>Oarisma poweshiek</i></p> <p>There is final critical habitat for this species. Your location is outside the critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/9161</p>	Endangered

Flowering Plants

NAME	STATUS
<p>Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/601</p>	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

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

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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

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

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Cerulean Warbler <i>Dendroica cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 21 to Jul 20
Dunlin <i>Calidris alpina arcticola</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Henslow's Sparrow <i>Ammodramus henslowii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

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

Probability of Presence (■)

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

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

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

Breeding Season (■)

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

Survey Effort (|)

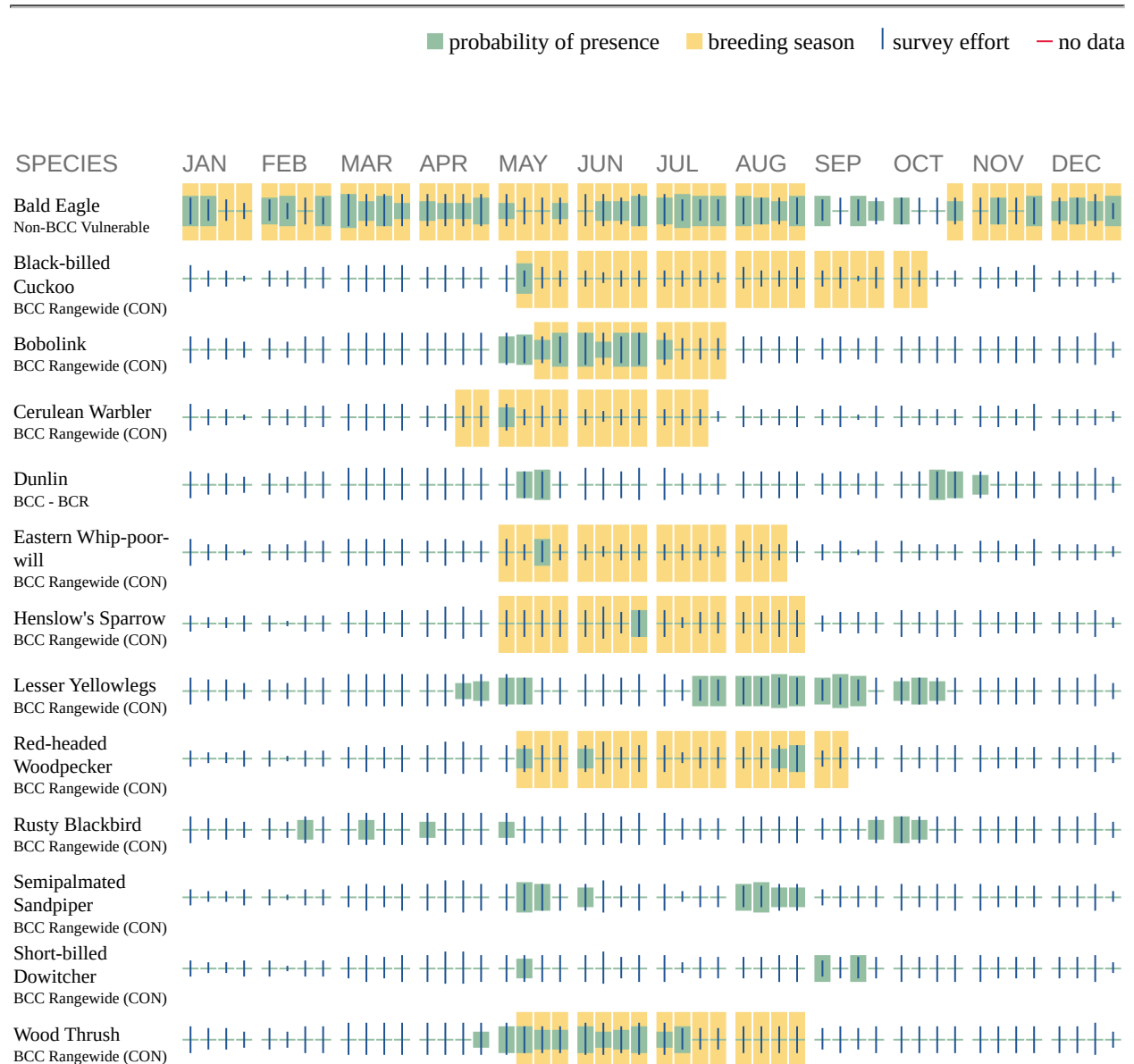
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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



Additional information can be found using the following links:

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

- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

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

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

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

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

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

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

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

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

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

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

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

What are the levels of concern for migratory birds?

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

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

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

Details about birds that are potentially affected by offshore projects

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

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

What if I have eagles on my list?

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

Proper Interpretation and Use of Your Migratory Bird Report

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

Wetlands

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

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

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

FRESHWATER EMERGENT WETLAND

- [PEM1C](#)
- [PEM1F](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1/SS1C](#)
- [PFO1C](#)
- [PSS1/EM1C](#)
- [PSS1F](#)

FRESHWATER POND

- [PUBGx](#)

RIVERINE

- [R5UBFx](#)
-

Appendix C COST ESTIMATES

DRAFT



STANTEC CONSULTING MICHIGAN - ENGINEER'S OPINION OF CONSTRUCTION COST



Pittsfield Township Wastewater Collection System Improvements Alternative 1 - Phase 1

Re-route Interceptor Sewer along Textile Road, Eliminate 3 Pump Stations

Conceptual	X
Preliminary	
Final (As Bid)	

Project Number: 2075139103
Prepared By: DEM/SZK
Checked By:
Date: 3/19/2021

DESCRIPTION		QUANT.	UNIT	UNIT COST	TOTAL COST
Work By Contractor					
1	Mobilization (5%)	1	LS	\$840,000	\$840,000
2	Soil Erosion and Control Measures (1%)	1	LS	\$170,000	\$170,000
3	Traffic Control	1	LS	\$150,000	\$150,000
4	36" Sanitary Sewer - Open Cut, 11' to 16' feet deep	4000	LF	\$550	\$2,200,000
5	36" Sanitary Sewer - Open Cut, 17' to 25' feet deep	8500	LF	\$610	\$5,185,000
6	36" Sanitary Sewer - Open Cut, >25' feet deep	3800	LF	\$750	\$2,850,000
7	36" Sanitary Sewer in 54" Steel Casing - Bore & Jack	200	LF	\$2,040	\$408,000
8	18" Sanitary Sewer - Open Cut, 11' to 16' feet deep	150	LF	\$370	\$56,000
9	18" Sanitary Sewer - Open Cut, 17' to 25' feet deep	2800	LF	\$385	\$1,078,000
10	10" Sanitary Sewer - Open Cut, 17' to 25' feet deep	1750	LF	\$240	\$420,000
11	12" Sanitary Sewer - Open Cut, 11' to 16' feet deep	600	LF	\$240	\$144,000
12	12" Sanitary Sewer - Open Cut, <11' feet deep	50	LF	\$210	\$11,000
13	8" Sanitary Sewer - Open Cut, 11' to 16' feet deep	75	LF	\$200	\$15,000
14	5' Dia Sanitary Manholes (<15 feet deep)	7	EA	\$12,000	\$84,000
15	5' Dia Sanitary Manholes (15-30 feet deep)	41	EA	\$14,400	\$590,000
16	5' Dia Sanitary Manholes (>30 feet deep)	1	EA	\$18,000	\$18,000
17	4' Dia Sanitary Manholes (<15 feet deep)	4	EA	\$8,400	\$34,000
18	4' Dia Sanitary Manholes (15-30 feet deep)	17	EA	\$11,400	\$194,000
19	Connect to Existing Sewers at Pump Stations	3	EA	\$24,000	\$72,000
20	Remove/Abandon Pump Stations	3	EA	\$36,000	\$108,000
21	Abandon 36" Sanitary Sewer and Fill with Grout	6200	LF	\$84	\$521,000
22	Abandon 8" Sanitary Sewer with Grout	1000	LF	\$24	\$24,000
23	Abandon 8" Sanitary Sewer Force Main and Fill with Grout	1900	LF	\$24	\$46,000
24	Abandon 6" Sanitary Sewer Force Main and Fill with Grout	2350	LF	\$20	\$47,000
25	By-Pass Pumping	1	LS	\$200,000	\$200,000
26	Dewatering	1	LS	\$500,000	\$500,000
27	Clearing and Tree Removal	1	LS	\$60,000	\$60,000
28	Remove and Replace Pavement, County Road	20000	SYD	\$70	\$1,400,000
29	Remove and Replace Pavement, MDOT Road	1000	SYD	\$90	\$90,000
30	Remove and Replace Driveway Approach	250	SYD	\$60	\$15,000
31	Greenbelt Restoration	22000	SYD	\$6	\$132,000

STANTEC CONSULTING MICHIGAN - ENGINEER'S OPINION OF CONSTRUCTION COST



Pittsfield Township Wastewater Collection System Improvements Alternative 1 - Phase 1

Re-route Interceptor Sewer along Textile Road, Eliminate 3 Pump Stations

Conceptual	<input checked="" type="checkbox"/>
Preliminary	<input type="checkbox"/>
Final (As Bid)	<input type="checkbox"/>

Project Number: 2075139103
Prepared By: DEM/SZK
Checked By:
Date: 3/19/2021

DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL COST
CONSTRUCTION SUBTOTAL				\$17,660,000
CONTINGENCIES			15%	\$2,649,000
ENGINEERING, INSPECTION, LAYOUT, CONSTRUCTION ADMINISTRATION			25%	\$4,415,000
TOTAL OPINION OF PROBABLE CONSTRUCTION COST				\$24,724,000

NOTE: The ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the CONTRACTOR's method of determining prices, or over competitive bidding or market conditions. Opinions of probable project costs and construction costs provided herein are made on the basis of the ENGINEER'S professional judgment and experience. The ENGINEER cannot and does not guarantee that proposals, bids or actual project or construction costs will not vary from the prepared opinion of probable cost. In addition, this Engineer's Opinion of Probable Cost assumes that there will not be any natural features, including and not limited to wetlands that will need to be removed and mitigated as part of the project.

STANTEC CONSULTING MICHIGAN - ENGINEER'S OPINION OF CONSTRUCTION COST



Pittsfield Township
Wastewater Collection System Improvements
Alternative 1 - Phase 2
CIPP Lining along Michigan Ave. Sewer

Conceptual	X
Preliminary	
Final (As Bid)	

Project Number: 2075139103
Prepared By: DEM/SZK
Checked By:
Date: 3/19/2021

DESCRIPTION		QUANT.	UNIT	UNIT COST	TOTAL COST
Work By Contractor					
1	Mobilization (5%)	1	LS	\$180,000	\$180,000
2	Soil Erosion and Control Measures (1%)	1	LS	\$36,000	\$36,000
3	Traffic Control	1	LS	\$100,000	\$100,000
4	36" Cured-in-Place Pipe Lining along Michigan Ave	3500	LF	\$324	\$1,134,000
5	27" Cured-in-Place Pipe Lining along Michigan Ave	2700	LF	\$225	\$608,000
6	24" Cured-in-Place Pipe Lining along Michigan Ave	3300	LF	\$192	\$634,000
7	18" Cured-in-Place Pipe Lining along Michigan Ave	9000	LF	\$124	\$1,116,000
8	Manhole Lining	930	VF	\$250	\$233,000
9	By-Pass Pumping	1	LS	\$400,000	\$400,000
10	Remove and Replace Pavement, MDOT Road	300	SYD	\$90	\$27,000
11	Remove and Replace Driveway Approach	100	SYD	\$60	\$6,000
12	Greenbelt Restoration	2500	SYD	\$6	\$15,000
CONSTRUCTION SUBTOTAL					\$4,490,000
CONTINGENCIES				15%	\$674,000
ENGINEERING, INSPECTION, LAYOUT, CONSTRUCTION ADMINISTRATION				25%	\$1,123,000
TOTAL OPINION OF PROBABLE CONSTRUCTION COST					\$6,287,000

NOTE: The ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the CONTRACTOR's method of determining prices, or over competitive bidding or market conditions. Opinions of probable project costs and construction costs provided herein are made on the basis of the ENGINEER'S professional judgment and experience. The ENGINEER cannot and does not guarantee that proposals, bids or actual project or construction costs will not vary from the prepared opinion of probable cost. In addition, this Engineer's Opinion of Probable Cost assumes that there will not be any natural features, including and not limited to wetlands that will need to be removed and mitigated as part of the project.

STANTEC CONSULTING MICHIGAN - ENGINEER'S OPINION OF CONSTRUCTION COST



Pittsfield Township Wastewater Collection System Improvements Alternative 2

Line existing sewer, upsize where needed along Mich. Ave., remove 1 Pump Station and rehab 2 Pump Stations

Conceptual	X
Preliminary	
Final (As Bid)	

Project Number: 2075139101
Prepared By: SNC
Checked By: CJE
Date: 5/21/2020

DESCRIPTION		QUANT.	UNIT	UNIT COST	TOTAL COST
Work By Contractor					
1	Mobilization (5%)	1	LS	\$755,000	\$755,000
2	Soil Erosion and Control Measures (1%)	1	LS	\$151,000	\$151,000
3	Traffic Control	1	LS	\$480,000	\$480,000
4	Rebuild/Rehabilitate Platt/Merritt PS	1	LS	\$1,680,000	\$1,680,000
5	Rebuild/Rehabilitate Ashford PS	1	LS	\$960,000	\$960,000
6	Abandon Meadowview PS	1	LS	\$100,000	\$100,000
7	Abandon 8" Sanitary Sewer and Fill with Grout	1000	LF	\$24	\$24,000
8	Abandon 8" Sanitary Sewer Force Main and Fill with Grout	1900	LF	\$24	\$46,000
9	Abandon 24" Sanitary Sewer and Fill with Grout	3260	LS	\$72	\$235,000
10	Abandon 36" Sanitary Sewer and Fill with Grout	1260	LF	\$84	\$106,000
11	15" Sanitary Sewer - Open Cut, 17' to 25' feet deep	2100	LF	\$336	\$706,000
12	42" Sanitary Sewer - Open Cut, 11' to 16' feet deep	2970	LF	\$618	\$1,835,000
13	42" Sanitary Sewer - Open Cut, 17' to 25' feet deep	1550	LF	\$684	\$1,060,000
14	36" Cured-in-Place Pipe Lining along Michigan Ave	8310	LF	\$324	\$2,692,000
15	27" Cured-in-Place Pipe Lining along Michigan Avenue	2700	LF	\$225	\$608,000
16	18" Cured-in-Place Pipe Lining along Platt Rd	2810	LF	\$124	\$348,000
17	18" Cured-in-Place Pipe Lining along Michigan Ave	9000	LF	\$124	\$1,116,000
18	6' Dia Sanitary Manholes (<15 feet deep)	9	EA	\$16,800	\$151,000
19	6' Dia Sanitary Manholes (15-30 feet deep)	5	EA	\$19,200	\$96,000
20	Manhole Lining	1400	VF	\$250	\$350,000
21	Connect to Existing Sewers	4	EA	\$24,000	\$96,000
22	By-Pass Pumping	1	LS	\$960,000	\$960,000
23	Dewatering	1	LS	\$600,000	\$600,000
24	Clearing and Tree Removal	1	LS	\$60,000	\$60,000
25	Remove and Replace Pavement, MDOT Road	14700	SYD	\$90	\$1,323,000
26	Remove and Replace Driveway Approach	300	SYD	\$60	\$18,000
27	Greenbelt Restoration	19000	SYD	\$6	\$114,000
CONSTRUCTION SUBTOTAL					\$16,670,000
CONTINGENCIES				15%	\$2,501,000
ENGINEERING, INSPECTION, LAYOUT, CONSTRUCTION ADMINISTRATION				25%	\$4,168,000
TOTAL OPINION OF PROBABLE CONSTRUCTION COST					\$23,339,000

NOTE: The ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the CONTRACTOR's method of determining prices, or over competitive bidding or market conditions. Opinions of probable project costs and construction costs provided herein are made on the basis of the ENGINEER'S professional judgment and experience. The ENGINEER cannot and does not guarantee that proposals, bids or actual project or construction costs will not vary from the

STANTEC CONSULTING MICHIGAN - ENGINEER'S OPINION OF CONSTRUCTION COST



Pittsfield Township Wastewater Collection System Improvements Alternative 2

Line existing sewer, upsize where needed along Mich. Ave., remove 1 Pump Station and rehab 2 Pump Stations

Conceptual	X
Preliminary	
Final (As Bid)	

Project Number: 2075139101
Prepared By: SNC
Checked By: CJE
Date: 5/21/2020

DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL COST
<p>professional judgment and experience. The ENGINEER cannot and does not guarantee that proposals, bids or actual project or construction costs will not vary from the prepared opinion of probable cost. In addition, this Engineer's Opinion of Probable Cost assumes that there will not be any natural features, including and not limited to wetlands that will need to be removed and mitigated as part of the project.</p>				



3959 Research Park Drive
Ann Arbor, Michigan 48108-
2219

**Pittsfield Charter Township SRF
FEASIBILITY ANALYSIS**

Alternative 1

Re-route Interceptor along Textile Road, Eliminate 3 Pump Stations

March, 2021

	TOTAL
Construction Cost:	\$22,150,000
Contingencies:	\$3,323,000
Engineering, Construction Admin./Obs:	\$5,538,000
Planning, Design and Construction Costs Subtotal:	\$31,011,000
Annual OM&R Costs:	\$36,000
Discount Rate:	2.125%
Life Expectancy:	50 years
Estimated Salvage Value:	\$0.00
Cost Recovery Period:	30 years

SALVAGE VALUE

Straight Line Depreciation:

$$D_x = \$620,220$$

$$V_n = \$12,404,400$$

$$(PW/F)_n^i = 0.5322$$

PW =	\$6,601,060
------	-------------

OM&R

$$(PW/A)_n^i = 22.016$$

PW =	\$792,585
------	-----------

TOTAL PRESENT WORTH

TPW = Construction Cost + Present Worth of OM&R - Present Worth of Salvage Value

TPW =	\$25,202,525
-------	--------------



3959 Research Park Drive
Ann Arbor, Michigan 48108-

Pittsfield Charter Township SRF FEASIBILITY ANALYSIS

Alternative 2

Line existing sewer, upsize where needed along Mich. Ave., remove 1 Pump Station and rehab 2 Pump
Stations
March, 2021

	TOTAL	Rebuild 2 PS, Abandon 1	Lining and Upsizing
Construction Cost:	\$16,670,000	\$2,740,000	\$13,930,000
Contingencies:	\$2,501,000	\$411,000	\$2,090,000
Engineering, Construction Admin./Obs	\$4,168,000	\$685,000	\$3,483,000
Planning, Design and Construction Costs Subtotal:	\$23,339,000	\$3,836,000	\$19,503,000
Annual OM&R Costs:		\$23,000	\$25,000
Discount Rate		2.215%	2.125%
Life Expectancy		30 years	50 years
Estimated Salvage Value		\$0.00	\$0.00
Cost Recovery Period		30 years	30 years

SALVAGE VALUE

Straight Line Depreciation:

$D_x =$	\$127,867	\$390,060
$V_n =$	\$0	\$7,801,200
$(PW/F)_n^i =$	0.5183	0.5322
PW =	\$4,151,445	\$0

OM&R

$(PW/A)_n^i =$	21.748	22.016
PW =	\$1,050,616	\$500,210

TOTAL PRESENT WORTH

TPW = Construction Cost + Present Worth of OM&R - Present Worth of Salvage Value

TPW =	\$20,238,171	\$4,336,210	\$15,901,961
--------------	---------------------	--------------------	---------------------

**PITTSFIELD CHARTER TOWNSHIP - SRF PROJECT PLAN
ESTIMATED IMPACT ON USER COST**

Alternative 1

		<u>Phase 1</u>	<u>Phase 2</u>
Total Construction Costs: \$	31,011,000	\$24,724,000	\$6,287,000
Interest Rate	2.125%	2.125%	2.125%
Cost Recovery Period	30 years	30 years	30 years

$$(A/P)_{30}^{2.25\%} = 0.045 \qquad 0.045 \qquad 0.045$$

$$A_{\text{Capital}} = \$1,408,551 \qquad \$1,122,989 \qquad \$285,562$$

Total Accounts= 7,183
Total Water Usage* (gal)= 1,257,480,004
Total Water Usage* (ccf)= 1,681,123

$A_{\text{Capital}} / 100 \text{ cubic feet (ccf)}$	\$ 0.84	\$ 0.67	\$ 0.17
---	---------	---------	---------

Selected Alternatives Total User Cost Per Year* = \$ 89.13 \$ 71.06 \$ 18.07

Selected Alternatives Total User Cost Per Month* = \$ 7.43 \$ 5.92 \$ 1.51

**based on 2017 Water Reliability Study; and 218 gal/day/household (approx 8-9 ccf/mo)*

Appendix D POPULATION PROJECTIONS

DRAFT



Community Profiles

YOU ARE VIEWING DATA FOR:

Pittsfield Township

6201 Michigan Ave
Ann Arbor, MI 48108-
9721
<http://www.pittsfield-mi.gov/>



Census 2010 Population:
34,663

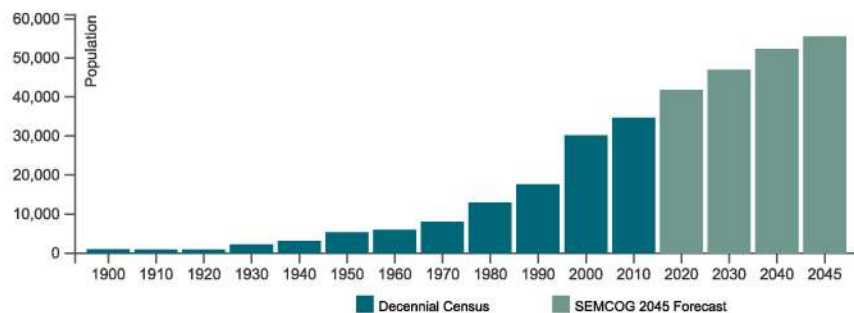
Area: 27.4 square miles

[VIEW COMMUNITY EXPLORER MAP](#)

Population and Households

Link to American Community Survey (ACS) Profiles: **Select a Year** **Social | Demographic**
Population and Household Estimates for Southeast Michigan, 2020

Population Forecast



Population and Households

Population and Households	Census 2010	Change 2000-2010	Pct Change 2000-2010	SEMCOG Jul 2020	SEMCOG 2045
Total Population	34,663	4,496	14.9%	40,360	55,486
Group Quarters Population	531	-1,089	-67.2%	2,389	3,125
Household Population	34,132	5,585	19.6%	37,971	52,361
Housing Units	14,808	2,471	20.0%	16,076	-
Households (Occupied Units)	14,021	2,204	18.7%	15,360	21,419
Residential Vacancy Rate	5.3%	1.1%	-	4.5%	-
Average Household Size	2.43	0.02	-	2.47	2.44

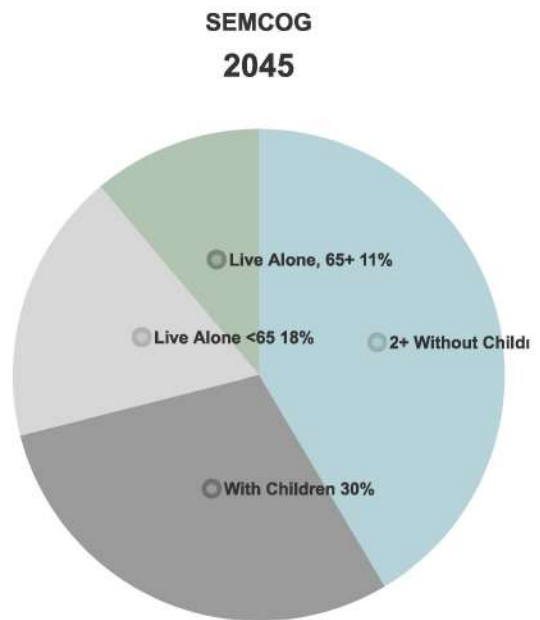
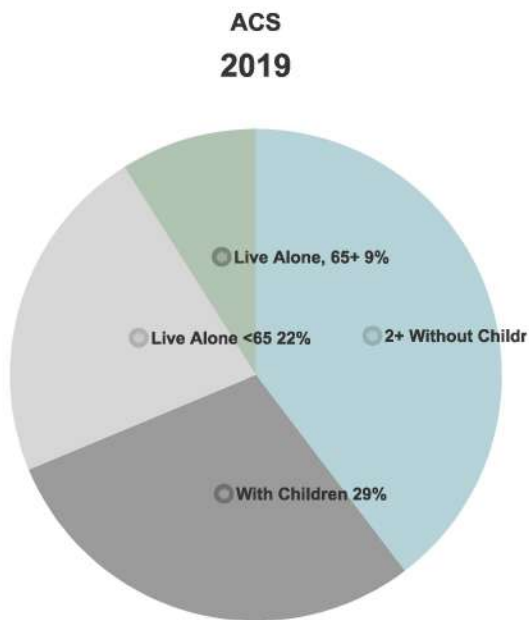
Source: **U.S. Census Bureau**, **SEMCOG Population and Household Estimates**, and **SEMCOG 2045 Regional Development Forecast**

Components of Population Change

Components of Population Change	2000-2005 Avg.	2006-2010 Avg.	2011-2018 Avg.
Natural Increase (Births - Deaths)	209	97	255
Births	350	242	432
Deaths	141	145	177
Net Migration (Movement In - Movement Out)	497	96	502
Population Change (Natural Increase + Net Migration)	706	193	757

Source: **Michigan Department of Community Health Vital Statistics**, **U.S. Census Bureau**, and **SEMCOG**

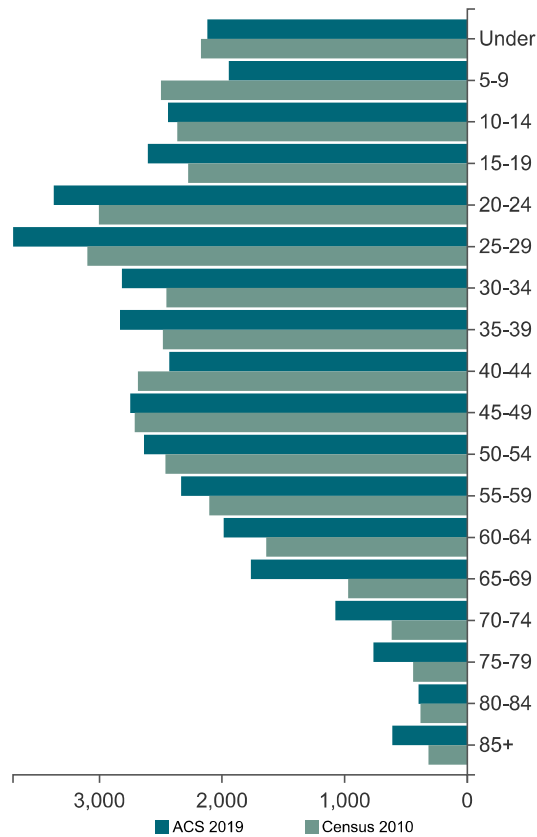
Household Types



Household Types	Census 2010	ACS 2019	Change 2010-2019	Pct Change 2010-2019	SEMOG 2045
With Seniors 65+	2,038	3,349	1,311	64.3%	8,438
Without Seniors	11,983	11,387	-596	-5%	12,981
Live Alone, 65+	791	1,323	532	67.3%	2,385
Live Alone, <65	3,573	3,287	-286	-8%	3,818
2+ Persons, With children	4,554	4,280	-274	-6%	6,333
2+ Persons, Without children	5,103	5,846	743	14.6%	8,883
Total Households	14,021	14,736	715	5.1%	21,419

Source: **U.S. Census Bureau, Decennial Census, 2015-2019 American Community Survey 5-Year Estimates, and SEMOG 2045 Regional Development Forecast**

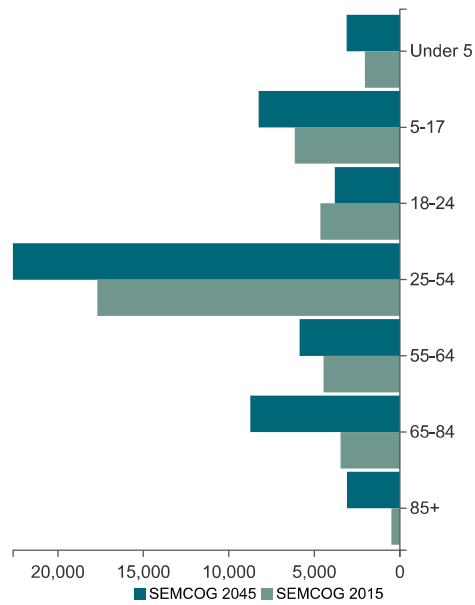
Population Change by Age, 2010-2019



Age Group	Census 2010	Change 2000-2010	ACS 2019	Change 2010-2019
Under 5	2,169	-69	2,118	-51
5-9	2,496	459	1,945	-551
10-14	2,364	506	2,439	75
15-19	2,274	544	2,603	329
20-24	3,004	73	3,371	367
25-29	3,098	-92	3,704	606
30-34	2,453	-669	2,815	362
35-39	2,481	-539	2,831	350
40-44	2,686	80	2,428	-258
45-49	2,711	521	2,747	36
50-54	2,460	674	2,634	174
55-59	2,102	1,023	2,333	231
60-64	1,639	981	1,988	349
65-69	972	478	1,765	793
70-74	616	179	1,076	460
75-79	441	108	764	323
80-84	381	151	396	15
85+	316	88	610	294
Total	34,663	4,496	38,567	3,904
Median Age	33.8	2.2	35.4	1.6

Source: U.S. Census Bureau, Decennial Census, and 2015-2019 American Community Survey 5-Year Estimates

Forecasted Population Change 2015-2045



Age Group	2015	2020	2025	2030	2035	2040	2045	Change 2015 - 2045	Pct Change 2015 - 2045
Under 5	2,040	2,308	2,562	2,742	2,906	3,139	3,113	1,073	52.6%
5-17	6,146	6,520	6,922	7,481	8,009	8,148	8,263	2,117	34.4%
18-24	4,650	4,251	3,819	3,546	3,504	3,448	3,805	-845	-18.2%
25-54	17,675	18,086	18,915	20,130	20,952	21,788	22,622	4,947	28%
55-64	4,456	5,056	4,999	4,950	4,881	5,309	5,868	1,412	31.7%
65-84	3,469	5,044	6,186	7,056	7,691	8,172	8,735	5,266	151.8%
85+	481	585	731	1,114	1,789	2,333	3,080	2,599	540.3%
Total	38,917	41,850	44,134	47,019	49,732	52,337	55,486	16,569	42.6%

Source: **SEMCOG 2045 Regional Development Forecast**

Older Adults and Youth Populations

Older Adults and Youth Population	Census 2010	ACS 2019	Change 2010-2019	Pct Change 2010-2019	SEMOG 2045
60 and over	4,365	6,599	2,234	51.2%	14,615
65 and over	2,726	4,611	1,885	69.1%	11,815
65 to 84	2,410	4,001	1,591	66%	8,735
85 and Over	316	610	294	93%	3,080
Under 18	8,454	7,851	-603	-7.1%	11,376
5 to 17	6,285	5,733	-552	-8.8%	8,263
Under 5	2,169	2,118	-51	-2.4%	3,113

Note: Population by age changes over time because of the aging of people into older age groups, the movement of people, and the occurrence of births and deaths.

Source: **U.S. Census Bureau, Decennial Census, 2015-2019 American Community Survey 5-Year Estimates**, and **SEMOG 2045 Regional Development Forecast**

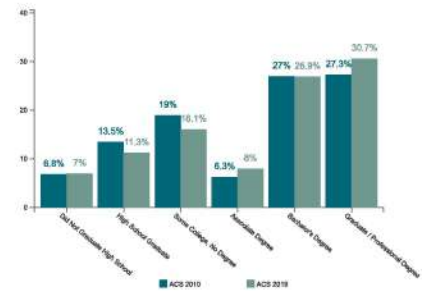
Race and Hispanic Origin

Race and Hispanic Origin	Census 2010	Percent of Population 2010	ACS 2019	Percent of Population 2019	Percentage Point Change 2010-2019
Non-Hispanic	32,393	93.5%	36,289	94.1%	0.6%
White	21,805	62.9%	24,276	62.9%	0%
Black	4,501	13%	4,499	11.7%	-1.3%
Asian	4,700	13.6%	5,482	14.2%	0.7%
Multi-Racial	1,162	3.4%	1,781	4.6%	1.3%
Other	225	0.6%	251	0.7%	0%
Hispanic	2,270	6.5%	2,278	5.9%	-0.6%
Total	34,663	100%	38,567	100%	0%

Source: **U.S. Census Bureau, Decennial Census**, and **2015-2019 American Community Survey 5-Year Estimates**

Highest Level of Education

Highest Level of Education*	ACS 2010	ACS 2019	Percentage Point Chg 2010-2019
Did Not Graduate High School	6.8%	7%	0.1%
High School Graduate	13.5%	11.3%	-2.2%
Some College, No Degree	19%	16.1%	-2.9%
Associate Degree	6.3%	8%	1.7%
Bachelor's Degree	27%	26.9%	-0.1%
Graduate / Professional Degree	27.3%	30.7%	3.3%
* Population age 25 and over			

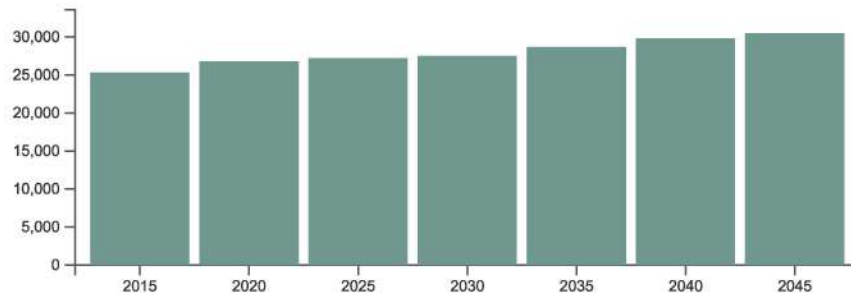


Source: **U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** 2015-2019 ▾ **Economic**

Forecasted Jobs



Source: **SEMOG 2045 Regional Development Forecast**

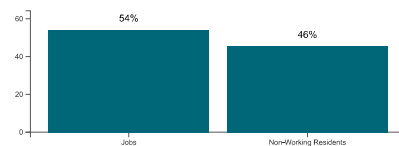
Forecasted Jobs by Industry Sector

Forecasted Jobs By Industry Sector	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045	Pct Change 2015-2045
Natural Resources, Mining, & Construction	1,093	1,200	1,184	1,155	1,191	1,217	1,258	165	15.1%
Manufacturing	2,082	1,967	1,899	1,779	1,754	1,782	1,750	-332	-15.9%
Wholesale Trade	1,386	1,302	1,218	1,246	1,309	1,322	1,314	-72	-5.2%
Retail Trade	4,025	4,312	4,352	4,084	4,111	4,079	3,987	-38	-0.9%
Transportation, Warehousing, & Utilities	545	542	521	522	536	570	602	57	10.5%
Information & Financial Activities	3,196	3,151	3,070	3,071	3,098	3,176	3,161	-35	-1.1%
Professional and Technical Services & Corporate HQ	3,369	4,084	4,418	4,754	5,149	5,472	5,685	2,316	68.7%
Administrative, Support, & Waste Services	1,526	1,611	1,632	1,647	1,737	1,823	1,908	382	25%
Education Services	448	460	463	471	486	498	510	62	13.8%
Healthcare Services	2,660	2,964	3,237	3,435	3,893	4,352	4,679	2,019	75.9%
Leisure & Hospitality	2,485	2,486	2,520	2,592	2,567	2,595	2,656	171	6.9%
Other Services	1,139	1,296	1,257	1,309	1,364	1,433	1,463	324	28.4%
Public Administration	1,405	1,448	1,470	1,492	1,521	1,548	1,558	153	10.9%
Total Employment Numbers	25,359	26,823	27,241	27,557	28,716	29,867	30,531	5,172	20.4%

Source: **SEMCOG 2045 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	21,710
Non-Working Residents	18,246
Age 15 and under	6,741
Not in labor force	10,567
Unemployed	938
Daytime Population	39,956



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

Where Workers Commute From 2016

Rank	Where Workers Commute From *	Workers	Percent
1	Pittsfield Twp	3,098	14.3%
2	Ann Arbor	2,560	11.8%
3	Ypsilanti Twp	2,520	11.6%
4	Out of the Region, Instate	1,542	7.1%
5	Ypsilanti	1,139	5.2%
6	Superior Twp	654	3%
7	Canton Twp	634	2.9%
8	Van Buren Twp	505	2.3%
9	York Twp	485	2.2%
10	Scio Twp	452	2.1%
-	Elsewhere	8,121	37.4%
* Workers, age 16 and over employed in Pittsfield Twp		21,710	100%

Source: **U.S. Census Bureau** - 2012-2016 CTPP/ACS Commuting Data and **Commuting Patterns in Southeast Michigan**

Where Residents Work 2016

Rank	Where Residents Work *	Workers	Percent
1	Ann Arbor	7,775	40.4%
2	Pittsfield Twp	3,098	16.1%
3	Dearborn	655	3.4%
4	Scio Twp	644	3.3%
5	Saline	579	3%
6	Ypsilanti	578	3%
7	Superior Twp	573	3%
8	Ann Arbor Twp	567	2.9%
9	Detroit	556	2.9%
10	Ypsilanti Twp	500	2.6%
-	Elsewhere	3,739	19.4%
* Workers, age 16 and over residing in Pittsfield Twp		19,264	100%

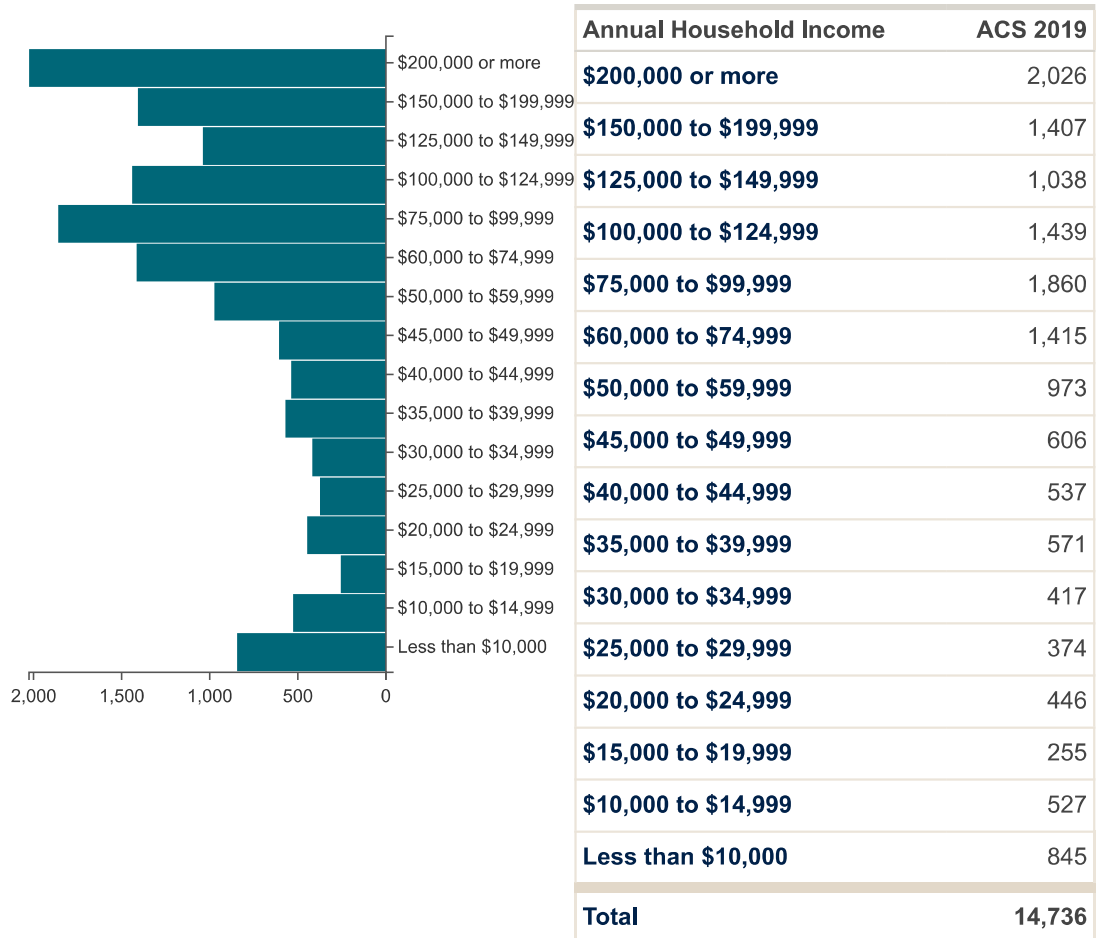
Source: **U.S. Census Bureau** - 2012-2016 CTPP/ACS Commuting Data and **Commuting Patterns in Southeast Michigan**

Household Income

Income (in 2019 dollars)	ACS 2010	ACS 2019	Change 2010-2019	Percent Change 2010-2019
Median Household Income	\$77,166	\$79,965	\$2,799	3.6%
Per Capita Income	\$40,844	\$42,763	\$1,919	4.7%

Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Annual Household Income



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

Poverty

Poverty	ACS 2010	% of Total (2010)	ACS 2019	% of Total (2019)	% Point Chg 2010-2019
Persons in Poverty	3,135	9.7%	3,082	8.5%	-1.2%
Households in Poverty	1,464	11.1%	1,590	10.8%	-0.3%

Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Housing

Link to American Community Survey (ACS) Profiles: **Select a Year** 2015-2019 ▾ **Housing**

Building Permits 2000 - 2021

Year	Single Family	Two Family	Attach Condo	Multi Family	Total Units	Total Demos	Net Total
2000	252	0	0	0	252	1	251
2001	235	0	0	179	414	1	413
2002	166	4	0	120	290	0	290
2003	179	0	202	0	381	3	378
2004	167	4	134	188	493	1	492
2005	128	0	90	24	242	0	242
2006	64	0	20	0	84	0	84
2007	25	0	27	0	52	0	52
2008	18	0	6	0	24	0	24
2009	33	0	0	0	33	0	33
2010	83	0	0	0	83	1	82
2011	78	0	0	0	78	0	78
2012	107	0	0	12	119	0	119
2013	137	0	18	148	303	0	303
2014	82	0	6	175	263	0	263
2015	62	0	0	30	92	0	92
2016	59	0	0	24	83	2	81
2017	61	0	0	0	61	3	58
2018	102	0	34	122	258	1	257
2019	77	0	37	93	207	2	205
2020	166	0	73	0	239	2	237
2021	19	0	7	0	26	0	26
2000 to 2021 totals	2,300	8	654	1,115	4,077	17	4,060

Source: **SEMCOG Development**

Note: Permit data for most recent years may be incomplete and is updated monthly.

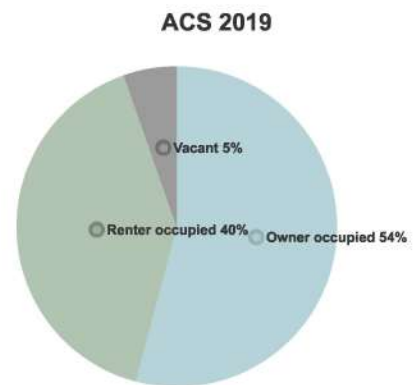
Housing Types

Housing Type	ACS 2010	ACS 2019	Change 2010-2019	New Units Permitted Since 2018
Single Unit	6,922	7,453	531	364
Multi-Unit	6,704	7,468	764	366
Mobile Homes or Other	655	652	-3	0
Total	14,281	15,573	1,292	730
Units Demolished				-5
Net (Total Permitted Units - Units Demolished)				725

Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates, SEMCOG Development

Housing Tenure

Housing Tenure	Census 2010	ACS 2019	Change 2010-2019
Owner occupied	8,071	8,436	365
Renter occupied	5,950	6,300	350
Vacant	787	837	50
Seasonal/migrant	77	103	26
Other vacant units	710	734	24
Total Housing Units	14,808	15,573	765



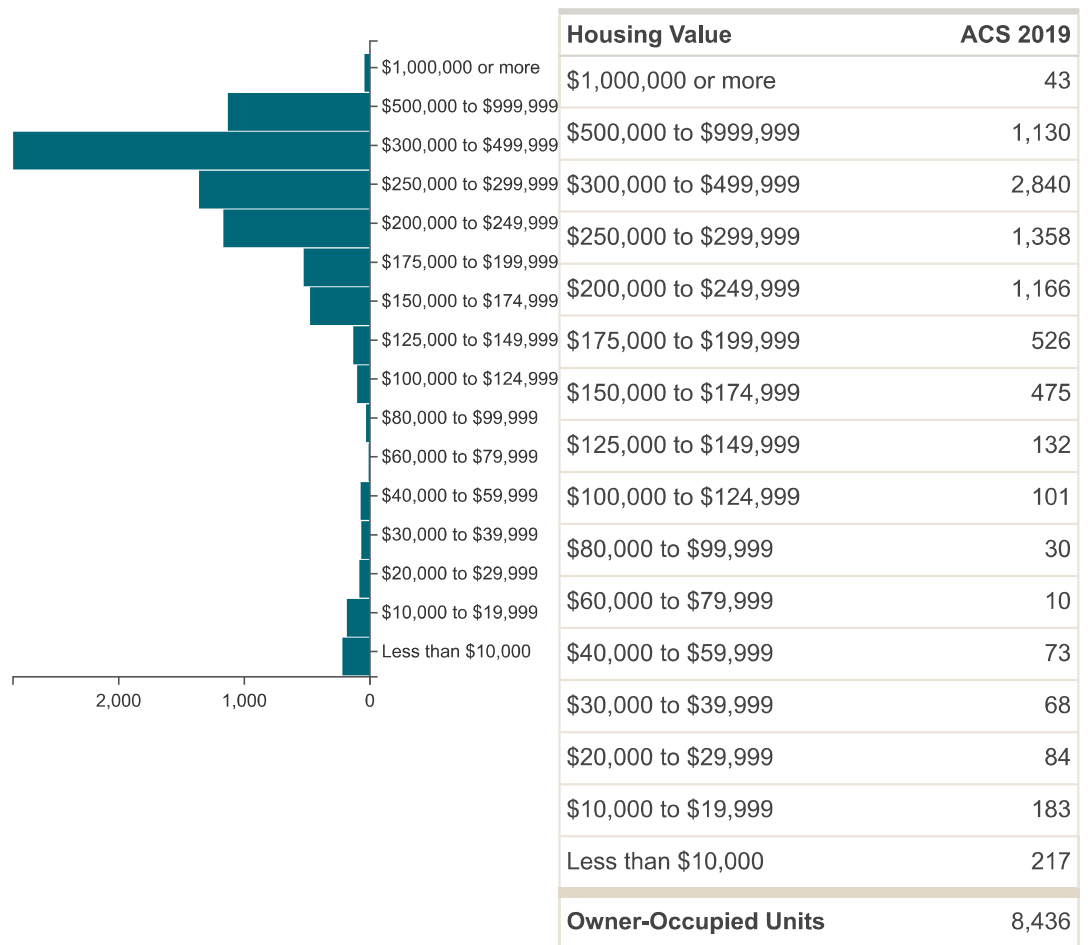
Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Housing Value and Rent

Housing Value (in 2019 dollars)	ACS 2010	ACS 2019	Change 2010-2019	Percent Change 2010-2019
Median housing value	\$298,719	\$292,500	\$-6,219	-2.1%
Median gross rent	\$1,034	\$1,138	\$104	10%

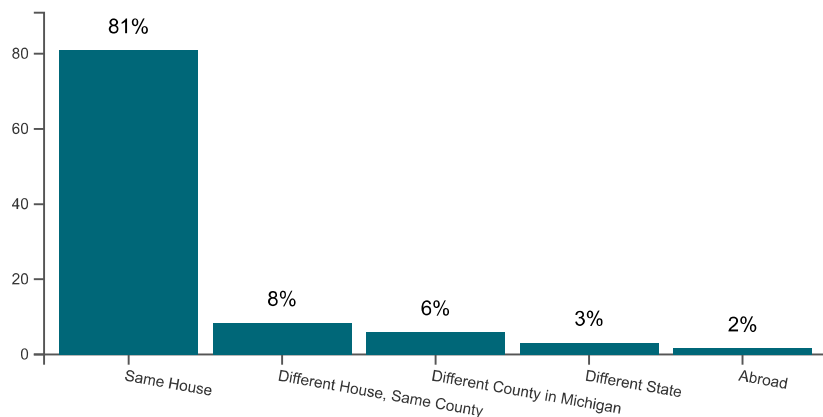
Source: U.S. Census Bureau, Census 2000, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Housing Value



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

Residence One Year Ago *



* This table represents persons, age 1 and over, living in Pittsfield Township from 2015-2019. The table does not represent person who moved out of Pittsfield Township from 2015-2019.

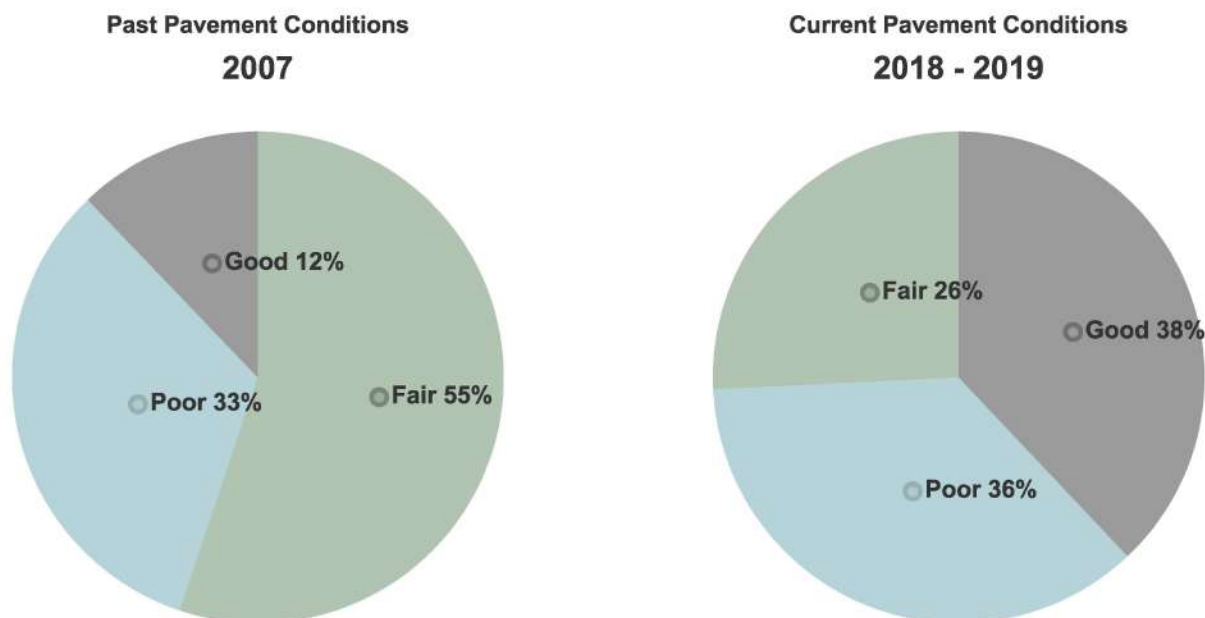
Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

Transportation

Miles of public road (including boundary roads): 172

Source: Michigan Geographic Framework

Pavement Condition (in Lane Miles)



Note: Poor pavements are generally in need of rehabilitation or full reconstruction to return to good condition. Fair pavements are in need of capital preventive maintenance to avoid deteriorating to the poor classification. Good pavements generally receive only routine maintenance, such as street sweeping and snow removal, until they deteriorate to the fair condition.

Source: SEMCOG

Bridge Status

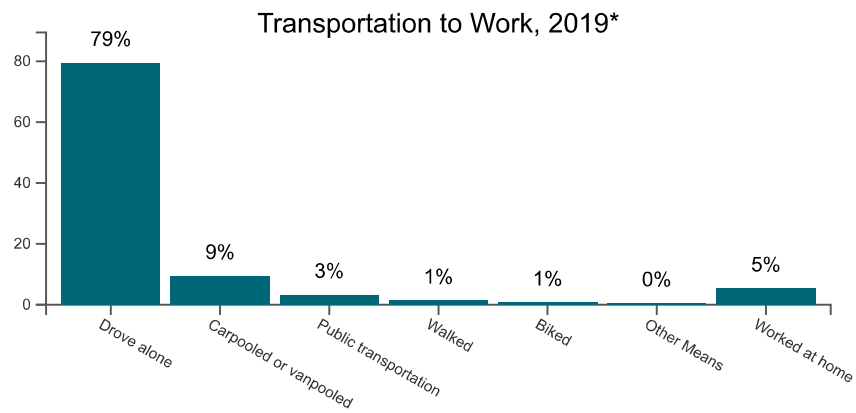
Bridge Status	2008	2008 (%)	2009	2009 (%)	2010	2010 (%)	Percent Point Chg 2008-2010
Open	9	100%	9	100%	25	100%	0%
Open with Restrictions	0	0%	0	0%	0	0%	0%
Closed*	0	0%	0	0%	0	0%	0%
Total Bridges	9	100.0%	9	100.0%	25	100.0%	0.0%
Deficient Bridges	1	11.1%	3	33.3%	6	24%	12.9%

* Bridges may be closed because of new construction or failed condition.

Note: A bridge is considered deficient if it is structurally deficient (in poor shape and unable to carry the load for which it was designed) or functionally obsolete (in good physical condition but unable to support current or future demands, for example, being too narrow to accommodate truck traffic).

Source: Michigan Structure Inventory and Appraisal Database

Detailed Intersection & Road Data



* Resident workers age 16 and over

Transportation to Work

Transportation to Work	ACS 2010	% of Total (ACS 2010)	ACS 2019	% of Total (ACS 2019)	% Point Chg 2010-2019
Drove alone	13,812	82.9%	15,586	79.4%	-3.5%
Carpooled or vanpooled	1,584	9.5%	1,855	9.5%	0%
Public transportation	367	2.2%	638	3.3%	1.1%
Walked	154	0.9%	267	1.4%	0.5%
Biked	12	0.1%	136	0.7%	0.6%
Other Means	70	0.4%	91	0.5%	0.1%
Worked at home	672	4%	1,049	5.3%	1.3%
Resident workers age 16 and over	16,671	100.0%	19,622	100.0%	0.0%

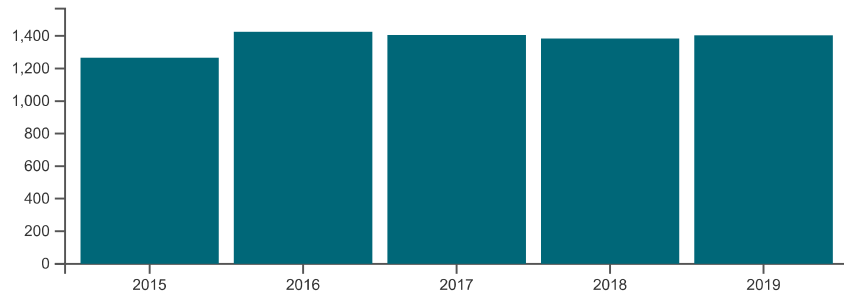
Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Mean Travel Time to Work

Mean Travel Time To Work	ACS 2010	ACS 2019	Change 2010-2019
For residents age 16 and over who worked outside the home	22.1 minutes	23.5 minutes	1.4 minutes

Source: U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates

Crashes, 2015-2019



Source: Michigan Department of State Police with the Criminal Justice Information Center and SEMCOG

Note: Crash data shown is for the entire city.

Crash Severity

Crash Severity	2015	2016	2017	2018	2019	Percent of Crashes 2015 - 2019
<u>Fatal</u>	3	2	2	1	1	0.1%
<u>Serious Injury</u>	4	14	19	16	13	1%
<u>Other Injury</u>	175	229	219	226	221	15.5%
<u>Property Damage Only</u>	1,085	1,181	1,166	1,142	1,170	83.4%
<u>Total Crashes</u>	1,267	1,426	1,406	1,385	1,405	100%

Crashes by Type

Crashes by Type	2015	2016	2017	2018	2019	Percent of Crashes 2015 - 2019
<u>Head-on</u>	14	13	8	13	13	0.9%
<u>Angle or Head-on/Left-turn</u>	235	269	249	271	281	18.9%
<u>Rear-End</u>	559	632	613	567	560	42.5%
<u>Sideswipe</u>	183	233	199	228	236	15.7%
<u>Single Vehicle</u>	245	233	271	242	260	18.2%
<u>Backing</u>	0	1	12	13	13	0.6%
<u>Other or Unknown</u>	31	45	54	51	42	3.2%

Crashes by Involvement

Crashes by Involvement	2015	2016	2017	2018	2019	Percent of Crashes 2015 - 2019
<u>Red-light Running</u>	12	13	22	19	22	1.3%
<u>Lane Departure</u>	163	174	195	161	177	12.6%
<u>Alcohol</u>	37	30	34	31	25	2.3%
<u>Drugs</u>	7	6	7	12	15	0.7%
<u>Deer</u>	71	54	65	60	67	4.6%
<u>Train</u>	0	0	0	0	0	0%
<u>Commercial Truck/Bus</u>	55	79	89	84	94	5.8%
<u>School Bus</u>	2	2	2	2	6	0.2%
<u>Emergency Vehicle</u>	5	3	4	3	4	0.3%
<u>Motorcycle</u>	10	7	9	7	9	0.6%
<u>Intersection</u>	444	484	403	383	369	30.2%
<u>Work Zone</u>	2	3	1	4	6	0.2%
<u>Pedestrian</u>	7	12	9	11	9	0.7%
<u>Bicyclist</u>	3	5	1	5	7	0.3%
<u>Distracted Driver</u>	0	72	141	125	120	6.6%
<u>Older Driver (65 and older)</u>	166	232	217	219	232	15.5%
<u>Young Driver (16 to 24)</u>	528	578	531	534	495	38.7%

High Frequency Intersection Crash Rankings

Local Rank	County Rank	Region Rank	Intersection	Annual Avg 2015-2019
1	1	4	<u>Ellsworth Rd W @ State Rd S</u>	66
2	2	29	<u>Carpenter Rd @ Washtenaw Ave</u>	45.2
3	3	75	<u>Carpenter Rd @ Packard St</u>	36.8
4	6	108	<u>Carpenter Rd @ Michigan Ave W</u>	33.8
5	7	113	<u>Washtenaw Ave @ Golfside Dr</u>	33.2
6	8	137	<u>Carpenter Rd @ Ellsworth Rd E</u>	31.2
7	16	217	<u>Michigan Ave E @ Platt Rd</u>	27
8	20	265	<u>Michigan Ave E @ Moon Rd</u>	25
9	21	269	<u>Ellsworth Rd E @ Platt Rd</u>	24.8
10	23	368	<u>Ann Arbor Saline Rd @ Lohr Rd W</u>	21.6

Note: Intersections are ranked by the number of reported crashes, which does not take into account traffic volume. Crashes reported occurred within 150 feet of the intersection.

Source: **Michigan Department of State Police with the Criminal Justice Information Center** and **SEMCOG**

High Frequency Road Segment Crash Rankings

Local Rank	County Rank	Region Rank	Segment	From Road - To Road	Annual Avg 2015-2019
1	1	16	<u>Washtenaw Ave</u>	Carpenter Rd - Golfside Dr	90.2
2	2	40	<u>Michigan Ave E</u>	State Rd S - Platt Rd	71.8
3	7	148	<u>Carpenter Rd</u>	Ellsworth Rd E - Packard St	50
4	9	171	<u>Michigan Ave E</u>	Old Creek Dr - Industrial Dr	47.6
5	11	209	<u>Carpenter Rd</u>	Packard St - Washtenaw Ave	45.2
6	12	225	<u>Michigan Ave W</u>	Carpenter Rd - Munger Rd	44.2
7	15	279	<u>Ellsworth Rd E</u>	Stone School Rd - Ellsworth Rd E	40.8
8	22	453	<u>Michigan Ave W</u>	Textile Rd E - Michigan/S US 23 Ramp	32.6
9	26	492	<u>Ellsworth Rd E</u>	Carpenter Rd - Golfside Dr	31.6
10	29	552	<u>Packard St</u>	Carpenter Rd - Packard Rd W	30.4

Note: Segments are ranked by the number of reported crashes, which does not take into account traffic volume.

Environment

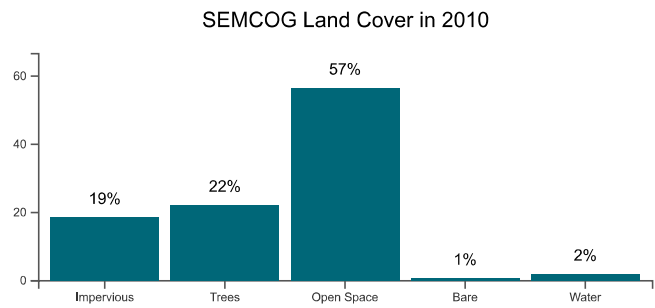
SEMCOG 2015 Land Use

SEMCOG 2015 Land Use	Acres	Percent
Single-Family Residential	4,935.3	28.3%
Multi-Family Residential	541	3.1%
Retail	512.7	2.9%
Office	359	2.1%
Hospitality	68.1	0.4%
Medical	101	0.6%
Institutional	494.1	2.8%
Industrial	702.6	4%
Agricultural	2,552	14.6%
Recreation / Open Space	2,096.5	12%
Cemetery	1.4	0%
Parking	24.9	0.1%
Extractive	0	0%
TCU	2,393.6	13.7%
Vacant	2,317.5	13.3%
Water	336.5	1.9%
Total	17,436.2	100%

Note: Land Cover was derived from SEMCOG's 2010 Leaf off Imagery.

Source: **SEMCOG**

Source Data
SEMCOG - Detailed Data



Type	Description	Acres	Percent
Impervious	buildings, roads, driveways, parking lots	3,240.7	18.6%
Trees	woody vegetation, trees	3,869.8	22.2%
Open Space	agricultural fields, grasslands, turfgrass	9,863.9	56.6%
Bare	soil, aggregate piles, unplanted fields	125.2	0.7%
Water	rivers, lakes, drains, ponds	336.5	1.9%
Total Acres		17,436.2	

Appendix E RESOURCES

DRAFT



To:	Mr. Clarence Jones	From:	Spencer Cain, PE Dima El-Gamal, Ph.D., PE, LEED® AP
	Michigan Department of Environmental Quality		Stantec Ann Arbor, Michigan Office
File:	2075128201	Date:	November 29, 2018

Reference: Pittsfield Charter Township SAW – Executive Summary

This document is intended to provide an executive summary of the Stormwater, Asset Management, and Wastewater (SAW) Asset Management Plan (AMP) that was completed for Pittsfield Charter Township (Township).

Grant Recipient

SAW Grant Project# - 1429-01

Pittsfield Charter Township
6201 West Michigan Avenue
Ann Arbor, MI 48108
<http://www.pittsfield-mi.gov>

Contact Person

Craig Lyon – Director of Utilities and Municipal Services
(734)822-3130
lyonc@pittsfield-mi.gov

EXECUTIVE SUMMARY

The Township was a third round SAW Grant recipient of \$1,263,416 with a local match of \$198,917. The overall scope of work for this Grant was to: improve upon the baseline inventory, conduct risk assessments of the pump station facilities and eligible components of the sewer system, develop a capital improvement plan, and coordinate the information collected with the Township's asset/work order management software. The Township's AMP addresses (will address) five core components:

1. Asset Inventory
2. Criticality/Risk Assessment
3. Level of Service (LOS)
4. Capital Improvement Plan (CIP)
5. Revenue Structure

TOWNSHIP ASSET MANAGEMNT TEAM (AMT)

This plan was developed in cooperation with the Township's Asset Management Team (AMT), which included:

- Craig Lyon – Director of Utilities and Municipal Services
- Billy Weirich – Utilities Superintendent
- Matt Catanzerite – GIS Manager
- Tracy Watkins – Township Financial Director

Design with community in mind

Reference: Pittsfield Charter Township SAW – Executive Summary

- Pittsfield Charter Township Board of Trustees
- Stantec - Asset Management Consultant and Rate Consultant

ASSET INVENTORY

The Township uses Cityworks for their work order management system, which interacts with and displays the asset inventory that they maintain using ESRI's ArcGIS. The inventory includes a record for 100% of the Township-owned sewer lines, manholes, force mains, and pump stations, as well as other appurtenances which may not be fully populated, such as laterals, fittings, etc. A review and update of this database was included in this project to ensure that the information was complete to the extent possible based on readily available information. This included further population of the attribute information for the manholes and pipes (i.e. ownership, material, install date, etc.), as well as updates to reflect the observed system configurations in the field. The pump station asset inventory was also developed further, including a vertical asset data structure for each, with several subsystems and components being related to each station (e.g., structural elements, valves, piping, etc.)

The Township will continue to update its GIS as additional areas develop or when existing wastewater system improvements are implemented. The Township will also continue the population of attributes related to existing assets as information becomes readily available.

LIST OF MAJOR ASSETS

- Approximately 705,500 feet of gravity sewer pipes from 4 to 36-inches in diameter;
- Approximately 3,578 manholes;
- Approximately 40,100 feet of force main pipes from 6 to 12-inches in diameter; and,
- Seven pump stations.

CRITICALITY/RISK ASSESSMENT

CONDITION ASSESSMENT

As part of the AMP development, a series of field visits were made by Stantec and Township operations staff in September of 2017. The goal of the inspections was to assess the condition of the seven pump station facilities. Information on each pump station condition was gathered from visual inspection, conversations with operations staff, and record drawings to assess the condition of the facilities and their equipment, and to advance the population of the asset inventory database as described earlier.

Township staff to carried out the condition assessment of the gravity sewer system in 2016-2017 using Closed Circuit Television (CCTV) inspection. Inspections were completed for approximately 52% of the system (over 376,000 linear feet of pipe and 1,137 manholes), that met the SAW eligibility requirement of being over 20 years old. The inspections were performed using the Pipe Assessment Certification Program (PACP) and Level 2 Manhole Assessment Certification Program (MACP) standards for condition ratings, which were developed by the National Association of Sewer Service

Reference: Pittsfield Charter Township SAW – Executive Summary

Companies (NASSCO). Stantec evaluated the inspection data that was provided for the Township's system and used it as the basis of the condition assessment for the collection system.

Though the pump station assets were all inspected for the condition assessment, only approximately 52% of the gravity sewer pipes, 30% of the manholes, and none of the force mains were physically inspected. For uninspected assets, the Township elects to track the condition of these items via desktop analysis methods. To assign a condition assessment rating to the uninspected assets, a condition score of 1-5 was assigned based primarily on the age (or elapsed time since last rehab), and capacity deficiency as appropriate. The maximum condition rating between those categories was then assigned as the overall apparent condition rating.

Also considered in evaluating the condition of the wastewater assets was the hydraulic capacity study performed by Stantec for the wastewater system (Pittsfield Charter Township Sanitary Collection System Capacity Study; dated October 17, 2018). The objectives of that study included identifying and evaluating the capacity of the existing sanitary collection system; evaluating Infiltration and Inflow (I/I) impacts on the system; making recommendations for improvements to the system that are necessary to meet present and future needs (20-year planning horizon) of the Township; and using recommendations from that study in the development of a comprehensive AMP.

Condition assessment ratings were used to determine the likelihood of failure for each asset and were assigned to the assets based on a scale from 1-5:

- 1 = Excellent: New or Excellent Condition - Only normal maintenance required;
- 2 = Good: Minor Deterioration - Minor maintenance required;
- 3 = Average: Moderate Deterioration - Moderate maintenance required;
- 4 = Fair: Significant Deterioration - Significant renewal/upgrade required;
- 5 = Poor: Asset Unserviceable - Replacement required OR asset poses safety risk.

Pump Stations

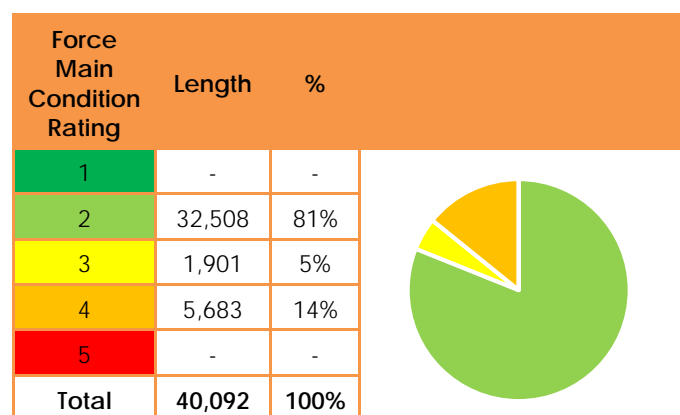
During the field investigations of the Township's pump stations it was found that the facilities are generally well kept and most of the system components range in condition from average to excellent. Each pump station currently contains between 33-48 tracked components, and when considering each pump station as a whole, the average component condition rating ranged between 1.15 and 3.15. The table below provides a depiction of the findings:

Reference: Pittsfield Charter Township SAW – Executive Summary

Pump Station Facility	Average Condition Rating	Total # of Inspected Components	Component Condition Ratings				
			1	2	3	4	5
			%	%	%	%	%
Ashford Village PS	2.7	40	-	27	73	-	-
Lohr Road PS	2.8	48	2	23	73	2	-
Meadowview PS	3.2	33	-	6	73	21	-
Michigan Ave/Saline PS	3.0	48	-	6	92	2	-
Moon Road PS	1.2	40	93	-	7	-	-
Platt and Merritt PS	3.0	48	2	14	67	17	-
Warner Creek PS	2.8	38	-	21	79	-	-

Force Main

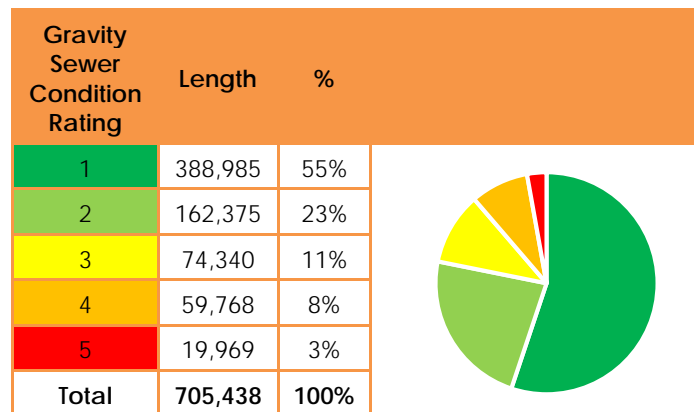
Based on desktop analysis methods, the inspected force mains were found to be generally in fair to good condition. Approximately 86% of the sewer pipes had a condition rating of better than 4. The chart below provides a depiction of the findings:



Reference: Pittsfield Charter Township SAW – Executive Summary

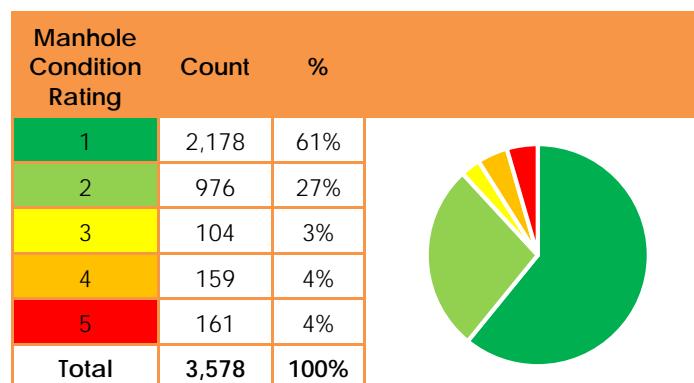
Gravity Sewers

Based on the inspection data collected by the Township staff and the desktop analysis, the inspected sewers were found to be generally in average to excellent condition. Approximately 89% of the sewer pipes had an overall condition rating of better than 4 (PACP Structural and/or Operation and Maintenance categories). The chart below provides a depiction of the findings:



Manholes

Based on the inspection data collected by the Township staff and the desktop analysis, the inspected manholes were found to be generally in good to excellent condition. Approximately 91% of the manholes had an overall condition rating of better than 4 (MACP Structural and/or Operation and Maintenance categories). The chart below provides a depiction of the findings:



Reference: Pittsfield Charter Township SAW – Executive Summary

CRITICALITY ASSESSMENT

A criticality rating system was developed to analyze the consequence of failure for the wastewater system assets and to determine the relative importance of the assets for the prioritization of future capital expenses. The criticality analysis was performed separately for the pump stations and the linear assets (gravity sewers/manholes and force mains), and uses a scale of 1-5, with 1 being the least critical, and 5 the most critical. Several key risk criteria were identified:

- Impact on Facility Operation
- Impact on Operator Health and Safety
- Cost of Repair
- Difficulty of Repair
- Pipe Size
- Wastewater Asset Location
- Environmental/Public Health Risk

Each of the criticality criteria were assigned a weighting factor according to their relative importance as determined by the AMT. The consequence of failure for each asset was evaluated within this framework based on the qualities they possess, and an overall criticality rating was assigned to each by summing the weighted criticality scores for each of the risk criteria. For example, a large diameter trunk sewer crossing a freeway would be considered more critical than a small diameter local collection sewer in an unimproved right-of-way. It should be noted that the criticality of the gravity sewer manholes was assigned based on the criticality of the adjacent pipe since those assets are essentially inseparable from the pipe and located in the same general vicinity of the critical features (i.e. major roads, railroads, wetlands, etc.).

LEVEL OF SERVICE (LOS)

LOS can be described as a qualitative measure of the requirements placed on a system or facility by a variety of entities that may be external (e.g. customers, legislators), or internal (management staff). Based on discussions with the Township's AMT, the LOS goal is to maintain all critical assets as well as some less critical assets to provide enhanced reliability, with an emphasis on meeting the regulatory requirements set by the MDEQ. This goal was identified by the AMT as the starting point for guiding CIP and maintenance expenditures.

Qualitatively, LOS can be described in three tiers: Low, Medium and High. With a Low LOS, only the most critical components in the system, or those with the highest risk, would be proactively maintained, and with a High LOS, every asset would be maintained proactively. The Township's LOS goals could be described as a Medium LOS, though in practice the Township consistently endeavors to offer a High LOS. Therefore, for the purposes of projecting CIP expenditures, a Medium LOS has been assumed.

The Township plans to review and update their stated LOS goals regularly and assess the performance of their system against those goals to identify any areas that may need improvement. The Township will also examine the impact of LOS on CIP projections and may alter the LOS goals as deemed necessary.

Reference: Pittsfield Charter Township SAW – Executive Summary

CAPITAL IMPROVEMENT PLAN (CIP)

A CIP has been developed using the results of the AMP analysis, including the RCT analysis, and Capacity Study, and is divided into Short/Medium-term (0-10 year), and Long-term (10-20 year) initiatives. A summary is provided in the table below with initial conceptual cost opinions in present day (2018) dollars. The source of the CIP recommendation is included in the description within parentheses. The Short/Medium-term projects listed below have been included in a financial analysis, but the Long-term projects may be subject to change as the actual dates and dollar values could vary. The Township will continue to review and refine these findings moving forward.

Timeframe	Project Name	Details	Justification	Year	Conceptual Opinion of Cost	Funding Source
Short/Medium Term Projects (0-10 years)	Meadowview PS	Station Rebuild (Ex. CIP)	Reliability; Nearing End of Service Life	2019	\$750,000	Fund Balance
	Force Main O&M	estimated non-specific maintenance and repair costs (Ex. CIP)	Routine Maintenance and Repairs	2019, 2020, 2021	\$250,000 annually	Fund Balance
	Gravity Sewer Upgrade	Bicentennial sewer lining by CIPP (AMSAT and Ex. CIP)	Reliability, Structural (H2S) Repair	2019	\$470,000	Fund Balance
	Gravity Sewer Upgrade	Technology park cross country sewer lining by CIPP (AMSAT)	Reliability, Structural (H2S) Repair	2019	\$200,000	Fund Balance
	Gravity Sewer Upgrade	Replace/upsized trunk sewer along Michigan Ave. from Platt Rd to Munger (Ex. CIP & Capacity Study)	Reliability, Capacity	2020-2025	\$10,000,000 total	Debt Funded
	Lohr Road PS	Electrical and Process upgrades (Ex. CIP)	Reliability; Nearing End of Service Life	2021	\$500,000	Fund Balance
	Michigan Ave/Saline PS	Process and Structural upgrades (Ex. CIP)	Reliability; Nearing End of Service Life	2022	\$550,000	Fund Balance
	Gravity Sewer Upgrade	Concourse Sewer Lining/Replacement (AMSAT, Ex. CIP, Capacity Study)	Reliability, Structural (H2S) Repair	2022, 2023	\$630,000 annually	Fund Balance
	Gravity Sewer Upgrade	Boulder Ridge Sewer repairs and lining by CIPP (Ex. CIP)	Reliability, Structural (H2S) Repair	2023	\$225,000	Fund Balance

Reference: Pittsfield Charter Township SAW – Executive Summary

	All Pump Stations	Total estimated maintenance and replacement (AMSAT)	Routine Maintenance and Repairs	2023-2028	\$1,100,000 total	Fund Balance
	Gravity Sewer Upgrade (I/I and Capacity)	Upsize and/or CIPP line and monitor reduction in flow from Carpenter to Blossom Hill (cost for upsize presented here) (AMSAT and Capacity Study)	Reliability, Capacity, I/I Reduction	2024	\$625,000	Fund Balance
	Michigan Ave/Saline Forcemain	Replace 12" force main (from CIP)	Reliability	2024	\$1,500,000	Fund Balance
	Gravity Sewer Upgrade (I/I and service life)	Washtenaw Heights Sewer repairs (AMSAT and Capacity study)	Reliability, Nearing End of Service Life, I/I Reduction	2026	\$560,000	Fund Balance
	Gravity Sewer Upgrade	Carpenter and Ellsworth area sewer repairs and lining (RCT)	Reliability, Structural Repairs	2026	\$170,000	Fund Balance
	Gravity Sewer Upgrade	Oak Park sewer repairs and lining (RCT)	Reliability, Nearing End of Service Life, Structural Repairs	2026	\$634,000	Fund Balance
	Gravity Sewer Upgrade	The Pines area sewer repairs and lining (RCT)	Reliability, Structural Repairs	2027	\$360,000	Fund Balance
	Gravity Sewer Upgrade (I/I)	Warner Creek area sewer repairs and lining (RCT)	Reliability, Structural Repairs, I/I Reduction	2028	\$180,000	Fund Balance
Long Term Projects (10-20 years)	All Pump Stations	Total estimated maintenance and replacement (AMSAT)	Reliability, Service Life, Routine Maintenance	2029-2038 (TBD)	\$580,000 total	TBD
	Moon Road Force Main	Replace or rehabilitate the 6-inch forcemain (cost for replacement shown here; from AMSAT)	Reliability, Service Life, Routine Maintenance	2031 (TBD)	\$708,000	TBD
	Meadowview Force Main	Replace or rehabilitate the 6-inch force main (cost for	Reliability, Service Life, Routine Maintenance	2031 (TBD)	\$252,000	TBD

Reference: Pittsfield Charter Township SAW – Executive Summary

		replacement shown here; from AMSAT)				
	Gravity Sewer Upgrade (I/I)	West Side Sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2029 (TBD)	\$590,000	TBD
	Gravity Sewer Upgrade (I/I)	Glencoe Sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2030 (TBD)	\$147,000	TBD
	Gravity Sewer Upgrade (I/I)	Oak Valley area sewer repairs and lining (RCT)	Reliability, Routine Maintenance, I/I Reduction	2032 (TBD)	\$400,000	TBD

REVENUE STRUCTURE

To satisfy the requirements of the SAW Grant, the Township has completed and submitted a financial gap analysis. This gap analysis was accepted by the Michigan Department of Environmental Quality (MDEQ) in a letter dated June 27, 2018, and meets the standard set by the MDEQ by showing that the Township's revenue sources currently meet the required expenditures.

Further analysis, to incorporate the CIP projections and ensure the sustainability of the AMP, was also completed with a rate study and evaluation of the Township's funding structure. The review addresses the following:

- Annual operating budget
- Current approved rate structure
- Documentation of legal authority for setting rates
- Discussion of anticipated costs (operations and capital) against revenue
- Documentation showing no funding gap, or a remedy to close gap if one exists.

To maintain the sustainability of the AMP, the Township plans to revisit the funding structure and rate methodology to ensure that the funding is available to meet the requirements of the Township's wastewater system.



November 29, 2018
Mr. Clarence Jones
Page 10 of 10

Reference: Pittsfield Charter Township SAW – Executive Summary

This Plan will be presented to the Township Board of Trustees as the current recommended plan of action.

STANTEC CONSULTING MICHIGAN INC.

A handwritten signature in black ink, appearing to read "Spencer Cain".

Spencer Cain, PE
Project Engineer
Phone: (734) 214-1858
Cell: (734) 546-6694
Spencer.Cain@stantec.com

A handwritten signature in black ink, appearing to read "Dima El-Gamal".

Dima El-Gamal, Ph.D., PE, LEED® AP
Senior Associate
Phone: 734-214-2516
Cell: 734-262-4857
Dima.El-Gamal@stantec.com

c. Craig Lyon, Pittsfield Charter Township

To: Craig Lyon
Pittsfield Charter Township

From: Stantec Consulting Michigan Inc.
3754 Ranchero Drive
Ann Arbor, MI 48108

File: 2075128201

Date: November 3, 2017

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

INTRODUCTION

As part of the Stormwater, Asset Management, and Wastewater (SAW) Grant program administered by the Michigan Department of Environmental Quality (MDEQ), Pittsfield Charter Township (Township) retained Stantec Consulting Michigan Inc. (Stantec) to address the following major tasks:

- Asset Inventory Assistance
- Condition Assessments
- Capital Improvement Plan (CIP) and Life Cycle Analysis
- Asset/Work Order Management Software Coordination

This memo summarizes the efforts undertaken by Stantec to assist the Township in developing an asset inventory and performing condition assessments for the Township's seven (7) wastewater pump stations. The asset inventory and pump station condition assessments are essential to the development of a comprehensive asset management plan as part of the SAW Grant program.

SYSTEM DESCRIPTION

The Township's sanitary sewer conveyance system contains seven (7) sanitary pump stations, all of which are of the steel can type except for the Moon Road Pump Station which was upgraded in 2016 to a submersible pump station. A summary of the pump station information is provided in the table below.

Table 1 - Pump Station Summary

Pump Station	Facility ID	Year Built	Firm Capacity (gpm)	Design TDH (ft)	Configuration	Backup Power
Lohr Road PS	SAN-19-1000	2007	1,270	114	Wetwell & Steel Can	Onsite Generator
Ashford Village PS	SAN-24-1000	2007	220	50	Wetwell & Steel Can	Onsite Generator
Meadowview PS	SAN-24-1001	1978	315	48	Wetwell & Steel Can	Portable Generator
Michigan Ave PS	SAN-32-1000	2007	1,430	111	Wetwell & Steel Can	Onsite Generator
Moon Road PS	SAN-29-1000	2016	200	72	Wetwell & Valve Vault	Onsite Generator
Platt & Merritt PS	SAN-26-1000	2007	1,600	75	Wetwell & Steel Can	Onsite Generator
Warner Creek PS	SAN-27-1000	2006	400	26	Wetwell & Steel Can	Onsite Generator

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

FIELD INVESTIGATIONS

For an asset management program and the resultant CIP to be successful and economically prudent, it is critical to understand the extent of the component inventory, and what condition those components are in. To accomplish this, multiple field visits to the pump stations were conducted by Stantec during the month of September of 2017, with the accompaniment of Township staff for steel can confined space entry. Information was gathered from visual inspection, conversations with operations staff, and record review.

ASSET INVENTORY ASSISTANCE

The Township's existing sanitary sewer data is managed within ESRI's ArcGIS software (GIS) and includes sewer lines, manholes, pump stations and other appurtenances. The GIS database is well populated and has been maintained with periodic updates as developments have occurred. This GIS database will be utilized as the asset inventory to fulfil the needs and sustain the Township's Asset Management Program(AMP).

The pump stations data which reside in GIS; however, were limited to point locations with fields including install date, number of pumps, etc. Representing the pump station data in GIS required the creation of a vertical asset data structure with several systems, subsystems and components being related to each pump station. This data structure also allowed for the use of ESRI's ArcCollector mobile application to catalogue, photograph, and assess the pump station components in the field. The system/subsystem/component breakdown summary as utilized in the GIS environment is presented below:

Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW

Table 2 – System/Subsystem/Component Breakdown Summary

System	Subsystem	Component
Civil	Site	Vehicle Access
		Lighting
		Collision Protection
		Security
Structural	Wetwell	Top Slab
		Access Hatch
		Hardware
		Main Structure
	Steel Can	Access Hatch
		Ladder
		Main Structure
		Hardware
Process	Steel Can	Pumps
		Pump Motors
		Forcemain Piping
		Link Seals
		Isolation Valves
		Check Valves
Mechanical	HVAC	Exhaust/Circulation Fan
		Louvers
		Sump Pump
		Heating
Electrical	Generator	Alternator
		Engine
		Fuel System
		Battery Charger
	Power	Transfer Switch
		Distribution Panel
		Variable Frequency Drive
		Starter
Instrumentation & Control	Instrumentation	Level Sensor
		Float Switch
	Control	RTU/PLC
		Control Panel

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

For each component, a series of fields were populated to the extent possible given the readily available information and/or the applicability to each component (e.g. capacity was not collected for structural elements). The inventory information collected for these components included the following:

Inspection Field	Description
Manufacturer	Manufacturer of component
Model	Model number or name
Serial No.	Serial number
Tag No.	Additional component identifier
Description	Description of component
Capacity	Capacity (gpm, hp, kW, etc...)
Material	Material of construction
Year Installed	Install date
Last Upgrade Date	Upgrade date, if known
Apparent Condition	1-5 condition rating based on visual inspection and/or staff feedback on operating condition
Comments	Any additional clarifying comments

CONDITION ASSESSMENT

During the site visits conducted in September 2017, Stantec and the Township staff examined the major components of the pump stations to determine an apparent condition for each component. This condition rating was determined based on visual inspection and the Township staff feedback regarding the component's historical operating condition. It should be noted that run tests, and/or capacity assessments, etc., were not performed as part of this project. Condition ratings for those components that were not visible were determined based on discussions with the Township staff regarding component performance, age, and history. The apparent condition rating was assigned based on a scale of 1-5 as follows:

- 1 = Excellent: New or Excellent Condition- Only normal maintenance required;
- 2 = Good: Minor Deterioration- Minor maintenance required (5%);
- 3 = Average: Moderate Deterioration- Significant maintenance required (10-20%);
- 4 = Fair: Significant Deterioration- Significant renewal/upgrade required (20-40%);
- 5 = Poor: Asset Unserviceable- Replacement required OR asset poses safety risk (>50%).

For all pump station facilities, an overall station condition was also developed. The overall station condition is an average of all the apparent condition ratings attributed to each of the components within the pump station.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

CRITICALITY ANALYSIS

Criticality is essentially an indicator of the Township's risk tolerance related to the failure of a particular asset. The criticality of each of the pump stations will form the basis for the prioritization of future capital expenditures. To this end, a criticality rating will be developed later through collaboration and discussion between Stantec and Township representatives.

PUMP STATION CONDITION EVALUATION SUMMARY

A brief summary of the condition evaluation for each pump station facility is provided below which includes an overall station condition and a list of observations. Photos that are described in the summaries that follow can be referenced in the attached Appendix A.

LOHR ROAD PUMP STATION

Overall Station Condition: Good – Average

Station Condition Rating Average: (2.79)

Description

The Lohr Road Pump Station is a can type pump station located at 5320 Lohr Road. It was fully refurbished in 2007 with new electrical and controls, hardware, pumps, and a backup generator. The station currently operates with three (3) vertical solids handling pumps (ITT industries - Allis-Chalmers), each with a nominal capacity of 1,090 gpm. The configuration of the facility includes an above ground controls cabinet, steel can, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

Lohr Road Pump Station was refurbished in 2007 and all components have been well maintained. However, moderate deterioration consistent with the pump station's age was noted on most of the system components. Field observations are summarized below:

Civil:

- Generally appeared in average condition; moderate wear was observed.
- The access road is in need of regrading (see Photo 1 in Appendix A).

Structural:

- Generally appeared in good condition; normal wear was observed.
- The interior coating system of the steel can has failed in the tube and in several locations inside the steel can. There is oxidation occurring at all pipe penetrations and at the base of the wall (see Photo 2 in Appendix A). The coating system should be repaired to prevent further oxidation from occurring and increase the operational lifespan of the steel can.
- One set of lights is not working inside the steel can (see Photo 3 in Appendix A). The lighting fixture should be repaired or replaced for employee safety.

Process:

- Generally appeared in average condition; moderate wear
- Forcemain piping paint system has failed in locations and the piping shows signs of oxidation, and the pipe penetrations show signs of leaking (see Photo 4 in Appendix A). The forcemain

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

pipings should be repainted, and the pipe penetrations resealed to increase the operational life span of the steel can.

Electrical:

- Generally appeared in average condition; moderate wear was observed.
- All components have been maintained well, but were assigned a conditional assessment grade of 3 based on their age. Pump No. 2's variable frequency drive (VFD) was assigned an apparent condition grade 1 of based on the unit's 2017 installation date.

Mechanical:

- Generally appeared in average condition; moderate wear was observed.
- The dehumidifier did not appear to be operational (see Photo 5 in Appendix A) and needs to be replaced. The new unit should be operated continuously to reduce the occurrence of oxidation inside the steel can.
- The sump pump was not operational at the time of inspection and the sump was full of water (see Photo 6 in Appendix A). The sump pump should be repaired or replaced.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed. The control panel cabinet has minor surface oxidation, and the paint system is failing on the floor underneath the VFD (see Photo 7 in Appendix A). The control cabinet should be repainted to increase its operational life span.

ASHFORD VILLAGE PUMP STATION

Overall Station Condition: Good – Average

Station Condition Rating Average: (2.81)

Description

The Ashford Village Pump Station is a can type pump station located at 4561 Textile Road. It was refurbished in 2007 with new electrical and controls, hardware, pumps, and a backup generator. The station currently operates with two (2) Vaughan Chopper Pumps, each with a nominal capacity of 220 gpm. The configuration of the facility includes a controls cabinet, steel can, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

This pump station was refurbished in 2007, and all components have been maintained well, however, moderate deterioration consistent with the pump station age was noted on most components. Field observations are summarized below:

Civil:

- Generally appeared in average condition; moderate wear was observed.
- The access road is in need of regrading (see Photo 8 in Appendix B).

Structural:

- Generally appeared in good condition; normal wear was observed.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

- The access hatch coating system has failed (see Photo 9 in Appendix B). The access hatch should be repainted.
- The steel can access ladder's second landing hatch sticks and is difficult to open and close. The landing hatch should be repaired for safety reasons.
- The interior coating system of the steel can has failed in the tube and in several locations inside the steel can. Minor oxidation can be seen on the can's walls (see Photo 10 in Appendix B). The coating system should be repaired to prevent further oxidation from occurring, to increase the operational lifespan of the steel can.
- It appears that water is seeping up through the floor or the base of the wall based on observed areas of oxidation that are moist to the touch (see Photo 11 in Appendix B). The steel can should be thoroughly inspected to determine the structural integrity and evaluate repair or replacement options as follows:
 - Perform ultrasonic testing of designated can sections to evaluate existence of corrosion on the exterior walls. Measurements will be taken in uniform locations on each section.
 - Destruction and removal of the coating may be necessary to ensure meaningful test results.
 - Where interior floor and walls appear heavily pitted, estimate the amount and severity of pits. Where possible, the depths of pits will be need to be measured to determine the deepest pits.
- One of the light fixtures was flickering. The light fixture should be inspected further to determine if the fixture needs to be replaced or if it just needs new bulbs installed.

Process:

- Generally appeared in average condition; moderate wear was observed.
- The pipe penetration for the forcemain line is leaking (see Photo 12 in Appendix B). The pipe penetration should be resealed using chemical grout to increase the operational life span of the steel can.

Electrical:

- Generally appeared in good condition; normal wear was observed.

Mechanical:

- Generally appeared in average condition; moderate wear was observed.
- The dehumidifier did not appear to be operational (see Photo 13 in Appendix B). The dehumidifier needs to be replaced, and the new unit should be operated continuously to reduce the occurrence of oxidation inside the steel can to increase the operational life span of the steel can.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed
- The flow meter has debris landing on it from the leaking discharge pipe penetration, and the unit's hardware is showing signs of oxidation (see Photo 14 in Appendix B). The unit should be cleaned and the hardware changed after the leaking pipe penetration is repaired.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

MEADOWVIEW PUMP STATION

Overall Station Condition: Average – Fair

Station Condition Rating Average: (3.13)

Description

The Meadowview Pump Station is a can type pump station located at 4197 Textile Road. It was constructed in 1978. The station currently operates with two (2) ITT-AC vertical solids handling pumps, each with a nominal capacity of 315 gpm. The configuration of the facility includes a steel can, wet well, and generator receptacle with manual transfer switch on-site for portable generator connection.

Condition Assessment Summary

The pump station was constructed in 1978, and all components have been maintained well, however, significant deterioration consistent with the pump station age was noted on most components.

Civil:

- Generally appeared in average condition; moderate wear was observed.
- The access parking area is in need of regrading (see Photo 15 in Appendix C).

Structural:

- Generally appeared in fair condition; significant wear was observed.
- The anchor bolts for the float rack in the wet well show signs of serious oxidation (see Photo 16 in Appendix C). The anchor bolts should be replaced with new 316 SS anchor bolts.
- The can's floor has significant oxidation along the base of the walls, and underneath the pumps and process piping and was soft and moist to the touch. Water appears to be in the early stages of entering the can through the floor and at the bottom wall seam (see Photo 17 in Appendix C).
- The steel can should be thoroughly inspected as follows to determine the structural integrity and evaluate repair or replacement options.
 - Have the can cleaned for the thorough review of the interior surfaces for coating evaluation and assessment of corrosion damage.
 - Review the tank's interior coating for remaining intact and anticipated life.
 - Perform ultrasonic testing of designated can sections. Measurements will be taken in spot locations on each section. Measurements will be taken in uniform locations to determine whether corrosion of exterior walls exists and to what extent. Destruction and removal of the coating may be necessary to ensure meaningful test results.
 - Where interior floor and walls appear heavily pitted, estimate the amount and severity of pits. Where possible, the depths of pits will be measured to determine the deepest pits.

Process:

- Generally appeared in fair condition; significant wear

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

- Pump No. 1's check valve body and hardware show serious signs of oxidation, and the metal is delaminating. This valve is also leaking (see Photo 18 in Appendix C). The check valve should be refurbished or replaced.

Electrical:

- Generally appeared in average condition; moderate wear was observed.

Mechanical:

- Generally appeared in average condition; moderate wear was observed.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed.

MICHIGAN AVE PUMP STATION

Overall Station Condition: Good – Average

Station Condition Rating Average: (2.92)

Description

The Michigan Ave. Pump Station is a steel can type pump station located in Saline just off Michigan Avenue at 7222 Wapiti Way. It was refurbished in 2007 with new electrical and controls, hardware, pumps, and a backup natural gas generator. The station currently operates with three (3) ITT-AC vertical solids handling pumps, each with a nominal capacity of 1,190 gpm. The configuration of the facility includes a controls cabinet, steel can, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

The pump station was refurbished in 2007, and all components have been maintained well, however, moderate deterioration consistent with the pump station age was noted on most components.

Civil:

- Generally appeared in average condition; moderate wear was observed.
- The access road is in need of regrading (see Photo 19 in Appendix D).

Structural:

- Generally appeared in average condition; moderate wear was observed.
- The steel can's interior floor paint system has failed (see Photo 20 in Appendix D). The coating system should be repaired to prevent further oxidation from occurring, to increase the operational life span of the steel can.
- One set of lights is not working inside the steel can. The lighting fixture should be repaired or replaced for employee safety.
- The wet well's float rack has significant deterioration from oxidation (see Photo 21 in Appendix D). The float rack and anchor bolts should be replaced with a new 316 SS float rack and anchor bolts.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW****Process:**

- Generally appeared in average condition; moderate wear was observed.
- Pump No. 2's check valve has minor surface oxidation, and is leaking fluid at the swing arm connection (see Photo 22 in Appendix D). The check valve should be refurbished or replaced.
- The steel can's link seals appear to have some seepage at the suction pipe penetrations. The pipe penetrations should be resealed using chemical grout to increase the operational life span of the steel can.

Electrical:

- Generally appeared in average condition; moderate wear was observed.
- The natural gas line's paint system has failed, and the piping has some surface oxidation (see Photo 23 in Appendix D). The supply line should be repainted to increase its operational life span.

Mechanical:

- Generally appeared in average condition; moderate wear was observed.
- The dehumidifier appeared to be in poor condition (see Photo 24 in Appendix D). The dehumidifier needs to be replaced, and the new unit should be operated continuously to reduce the occurrence of oxidation inside the steel can.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed.
- The controls cabinet appears to have some oxidation occurring inside on the floor and around the doors (see Photo 25 in Appendix D). Also, the exterior coating appears to be chalking. The control cabinet should be repainted to increase its operational life span.

MOON ROAD PUMP STATION

Overall Station Condition: Excellent – Good

Station Condition Rating Average: (1.18)

Description

The Moon Road Pump Station is a submersible type pump station located on Moon Road with an address of 6995 State Street. It was upgraded in 2016. The station currently operates with two (2) Flygt submersible solids handling pumps, each with a nominal capacity of 200 gpm. The configuration of the facility includes a controls cabinet, valve vault, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

The pump station was upgraded in 2016, and all components have been maintained well.

Civil:

- Generally appeared in excellent condition; very little wear was observed.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW****Structural:**

- Generally appeared in excellent condition; very little wear was observed. The valve vaults coating system has failed (see Photo 26 in Appendix E).

Process:

- Generally appeared in excellent condition; very little wear was observed.

Electrical:

- Generally appeared in excellent condition; very little wear was observed.
- Natural gas smell was possibly detected at the gas meter. The Owner was notified to investigate this issue further prior to the issuance of this report.

Instrumentation and Controls:

- Generally appeared in excellent condition; very little wear was observed.

PLATT & MERRITT PUMP STATION

Overall Station Condition: Average – Fair

Station Condition Rating Average: (3.06)

Description

The Platt & Merritt Pump Station is a can type pump station located on the corner of Platt & Merritt Road with an address of 6685 Platt Road. It was fully refurbished in 2007 with new electrical and controls, hardware, pumps, and a backup generator. The station currently operates with three (3) Vaughan Chopper Pumps, each with a nominal capacity of 700 gpm. The configuration of the facility includes a steel can, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

The pump station was refurbished in 2007, and all components have been maintained well, however, moderate deterioration consistent with the pump station age was noted on most components.

Civil:

- Generally appeared in average condition; moderate wear
- The access road is in need of regrading (see Photo 27 in Appendix F).

Structural:

- Generally appeared in fair condition; significant wear
- The steel can access ladder's bottom connections have failed due to oxidation (see Photo 28 in Appendix F). The ladder needs to be remounted to the can wall for the safety of the field personnel.
- The steel can access ladder's lowest safety platform has failed, has broken hardware and shows signs of oxidation (see Photo 29 in Appendix F). The platform should have a new hatch installed, or if not practical, replace the entire platform to ensure the safety of the field personnel.
- The steel can inlet tube and base of interior walls show signs of significant oxidation and areas of delamination, and the interior lining system has failed (see Photo 30 in Appendix F).

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

The areas of oxidation need to be cleaned to near white metal and a new coating system applied.

- The steel can floor shows signs of oxidation and has what sounds like a hollow area/void underneath the floor near the station's center pump.
- The light fixture on the north side is not working (see Photo 31 in Appendix F). The light fixture should be repaired or replaced as required to ensure the safety of the field personnel.
- The access hatch has areas of severe oxidation with numerous holes in it (see Photo 32 in Appendix F). The steel can access hatch should be repaired to keep water from entering the structure, and increase the operational life span of the steel can.
- The steel can should be thoroughly inspected as follows to determine the structural integrity and evaluate repair or replacement options.
 - Have the can cleaned for the thorough review of the interior surfaces for coating evaluation and assessment of corrosion damage.
 - Review the tank's interior coating for remaining intact and anticipated life.
 - Perform ultrasonic testing of designated can sections. Measurements will be taken in spot locations on each section. Measurements will be taken in uniform locations to determine whether corrosion of exterior walls exist and to what extent. Destruction and removal of the coating may be necessary to ensure meaningful test results.
 - Where interior floor and walls appear heavily pitted, estimate the amount and severity of pits. Where possible, the depths of pits will be measured to determine the deepest pits.
- Wet well observations:
 - The top slab has three large cracks that appear to go through the entire slab (see Photo 33 in Appendix F). The cracks should be monitored and the slab replaced when required or when the station is refurbished again in the future.
 - The bypass pump line and hardware all show signs of considerable oxidation (see Photo 34 in Appendix F). Due to the condition of the bypass line it should be a priority to replace the line in the near future.
 - The access hatch shows signs of corrosion on the lift assists and one of the lift assists is missing from the hatch (see Photo 35 in Appendix F). The missing lift assist should be replaced and the remaining monitored for eventual replacement when required.

Process:

- Generally appeared in average condition; moderate wear was observed.
- The forcemain's paint system has failed (see Photo 36 in Appendix F). The forcemain should be repainted to extend the life span of the forcemain.

Electrical:

- Generally appeared in average condition; moderate wear was observed.
- There is some oxidation on the engine's exhaust system, and there are signs of fluid (oil and coolant) leaks underneath the engine on the slab (see Photo 37 in Appendix F). The engine leaks should be monitored or repaired to increase the operational life span of the generator engine.
- The natural gas piping paint system has failed (see Photo 38 in Appendix F). The natural gas line should be repainted.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW****Mechanical:**

- Generally appeared in fair condition; significant wear was observed.
- The exhaust fan's blower and blower support system are showing signs of oxidation (see Photo 39 in Appendix F). The blower and supports system should be scheduled for replacement to ensure the safety field personnel.
- The space heater appears to be in poor condition (see Photo 40 in Appendix F). heater should be replaced with a new unit.
- The dehumidifier appears to be in poor condition (see Photo 41 in Appendix F). The dehumidifier needs to be replaced, and the new unit should be operated continuously to reduce the occurrence of oxidation inside the steel can.
- The sump is full of debris, and the pump has signs of surface oxidation (see Photo 42 in Appendix F). The debris should be immediately cleaned from the sump to increase the sump pumps operational life span.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed.

WARNER CREEK PUMP STATION

Overall Station Condition: Good – Average

Station Condition Rating Average: (2.85)

Description

The Warner Creek Pump Station is a can type pump station located in a residential neighborhood off of Platt Road at 6491 Sauk Trail. It was fully refurbished in 2006 with new electrical and controls, hardware, pumps, and a backup generator. The station currently operates with two (2) Vaughan Chopper Pumps, each with a nominal capacity of 400 gpm. The configuration of the facility includes a controls cabinet, steel can, wet well, and onsite natural gas backup generator.

Condition Assessment Summary

The pump station was refurbished in 2006, and all components have been maintained well, however, moderate deterioration consistent with the pump station age was noted on most components.

Civil:

- Generally appeared in good condition; minor wear was observed.

Structural:

- Generally appeared in average condition; moderate wear was observed.
- The hinges on the access hatch do not operate properly (see Photo 43 in Appendix G). The hinges on the steel can's access hatch needs to be repaired or replaced if required.
- The paint system on the steel can's floor has failed (see Photo 44 in Appendix G). The interior of the can should be cleaned and repainted to increase the operational life span of the steel can.

**Reference: Wastewater Pump Station Condition Assessments
Pittsfield Charter Township SAW**

- The bases of the unistruts for the lighting have deteriorated (see Photo 45 in Appendix G). The unistruts should be replaced to increase the operational life span of the can lighting system.

Process:

- Generally appeared in average condition; moderate wear was observed.
- Both check valves have significant rusting on the swing arm, and appear to be leaking by the arm (see Photo 46 in Appendix G). The check valves should be refurbished if possible or replaced.

Electrical:

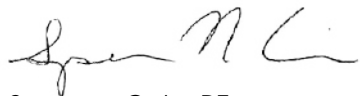
- Generally appeared in average condition; moderate wear was observed.

Mechanical:

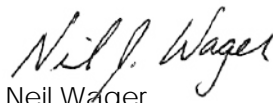
- Generally appeared in average condition; moderate wear was observed.
- The steel can's heater does not operate properly as the fan starts and stops (see Photo 47 in Appendix G). The heater should be replaced.

Instrumentation and Controls:

- Generally appeared in average condition; moderate wear was observed.

STANTEC CONSULTING MICHIGAN INC.

Spencer Cain, PE
Project Engineer
Phone: (734) 214-1858
Cell: (734) 546-6694
Spencer.Cain@stantec.com

STANTEC CONSULTING MICHIGAN INC.

Neil Wager
Process Designer
Phone: (734) 214-1831
Fax: (734) 223-6582
Neil.Wager@stantec.com

c. Dima El-Gamal, PHD, PE, LEED AP; Stantec

APPENDIX A
Lohr Road Pump Station
Photographs



Photo 1: Access Road



Photo 2: Steel Can Coating System



Photo 3: Steel Can Lighting



Photo 4: Forcemain Piping Paint System



Photo 5: Dehumidifier



Photo 6: Sump Pump



Photo 7: Control Cabinet Floor Paint System

APPENDIX B
Ashford Village Pump Station
Photographs



Photo 8: Access Road



Photo 9: Steel Can Access Hatch



Photo 10: Steel Can Interior Coating System



Photo 11: Steel Can Floor



Photo 12: Forcemain Penetration



Photo 13: Dehumidifier



Photo 14: Flow Meter

APPENDIX C
Meadowview Pump Station
Photographs



Photo 15: Access Road



Photo 16: Wet Well Anchor Bolts



Photo 17: Steel Can Floor



Photo 18: Check Valve

APPENDIX D
Michigan Ave Pump Station
Photographs



Photo 19: Access Road



Photo 20: Steel Can Floor



Photo 21: Wet Well Float Rack



Photo 22: Check Valve



Photo 23: Natural Gas Line



Photo 24: Dehumidifier



Photo 25: Control Cabinet

APPENDIX E
Moon Road Pump Station
Photographs



Photo 26: Valve Vault

APPENDIX F
Platt & Merritt Pump Station
Photographs



Photo 27: Access Road



Photo 28: Steel Can Access Ladder



Photo 29: Steel Can Lowest Safety Platform



Photo 30: Steel Can Interior Walls



Photo 31: Steel Can Lighting



Photo 32: Steel Can Access Hatch



Photo 33: Wet Well Top Slab



Photo 34: Wet Well Bypass Pump Line



Photo 35: Wet Well Access Hatch



Photo 36: Forcemain Paint System



Photo 37: Engine



Photo 38: Natural Gas Line



Photo 39: Exhaust Fan



Photo 40: Space Heater



Photo 41: Dehumidifier



Photo 42: Sump Pump

APPENDIX G
Warner Creek Pump Station
Photographs



Photo 43: Steel Can Access Hatch



Photo 44: Steel Can Floor



Photo 45: Steel Can Lighting



Photo 46: Check Valve



Photo 47: Space Heater

To:	Craig Lyon	From:	Neil Wager / Ken Jewison
	6201 W. Michigan Ave.		3754 Ranchero Drive
	Ann Arbor, MI 48108		Ann Arbor, MI 48108-2771
File:	2075139100	Date:	April 24, 2018

Reference: Sewerage System Monitoring**BACKGROUND**

Pittsfield Charter Township (Township) requested that Stantec Consulting Michigan Inc. (Stantec) investigate and monitor the hydrogen sulfide (H₂S) levels in manholes SAN-13-1003, SAN-13-1248, and SAN-13-1004 along Michigan Avenue due to the January 19, 2018, collapse of SAN-13-1003. It is believed that H₂S corrosion caused the damage that resulted in the failure of this structure. Manhole SAN-13-1003 was previously replaced in 2010. Due to the relatively young age of the manhole structure and field observations, the Township requested Stantec to monitor and document H₂S levels in SAN-13-1003 and two nearby manholes to better understand the extent that H₂S may be affecting the sewerage infrastructure in this area of the Township's collection system.

FIELD TESTING

Stantec monitored H₂S levels at the following three (3) manholes:

- SAN-13-1003
- SAN-13-1248
- SAN-24-1001

Stantec utilized an Odialog H₂S data logger to continuously monitor and record H₂S levels present within the manhole structures for a period of 5-7 days at manholes SAN-13-1003, SAN-13-1248, and SAN-24-1001. Stantec could not install the Odialog in manhole SAN-13-1004 as originally intended due to the height of the manhole chimney. As a result, manhole SAN-24-1001 was monitored instead. Data output graphs generated by the Odialog H₂S logger are attached for your reference.

On February 13, 2018, Stantec collected raw sewage grab samples from Manhole SAN-13-1003 to determine the wastewater characteristics for pH, Dissolved Oxygen (DO), Dissolved Sulfides (DS), Five (5) Day Biochemical Oxygen Demand (BOD₅), and Chemical Oxygen Demand (COD). Stantec also measured the approximate velocity of the flowing sewage in each reach of sewer during the sampling event. Raw wastewater characteristics at the time of sampling are as follows:

SAN-13-1003

- pH: 5.0
- DO (mg/L): 3.43
- DS (mg/L): 0.80
- BOD₅ (mg/L): 210
- COD (mg/L): 350
- V_{ave} (ft/s): 3.08
- Ave H₂S (ppm): 9
- Max H₂S (ppm): 50

Reference: Sewerage System Monitoring

From February 22, 2018, to March 14, 2018, Stantec monitored H₂S levels using the Odialog unit in Manholes SAN-13-1248 and SAN-24-1001. The results of this monitoring event are as follows:

SAN-13-1248 "Downstream Manhole"

- pH: 5.0
- Ave H₂S (ppm): 1
- Max H₂S (ppm): 5

SAN-24-1001 "Upstream Manhole"

- pH: 4.0
- Ave H₂S (ppm): 0
- Max H₂S (ppm): 2

SUMMARY OF FINDINGS

The H₂S concentrations recorded by the Odialog unit were not particularly high considering Stantec's field observations of the SAN-13-1003 manhole structure collapse and the structure's young age. The highest concentration recorded by the Odialog was 50 ppm during the monitoring period at manhole SAN-13-1003. The levels in SAN-13-1003 were considerably higher than in the other two (2) manholes monitored. Higher H₂S concentrations are common in drop manholes as H₂S release is accelerated due to sewage turbulence in the structure. Stantec also observed that during a large storm event on February 20, 2018, H₂S levels in this manhole dropped to zero. This would indicate an increase in flow created by inflow and/or infiltration (I&I) that significantly diluted the sewage. In general, the H₂S concentrations in these manholes should increase in the summer when the weather is much warmer. During this time, it is possible that H₂S levels become high enough to cause physical damage to the manhole structures.

What we found that was particularly interesting were the low pH levels of the sewage tested, which indicates that the sewage may be aggressive. Sewage with a pH of 6 or lower promotes the release of H₂S. Stantec believes that persistent sewage of an aggressive nature may have contributed to the collapse of manhole SAN-13-1003. The acidic nature of low pH sewage could contribute to the attack and deterioration of the calcium hydroxide within the concrete, increasing the damage created by the H₂S. The question is where the sewage is becoming acidic within the Township's collection system. Since SAN-13-1003 is a drop type manhole, and the structure had considerable moisture on the interior walls, we believe that H₂S corrosion combined with the potentially acidic characteristics of the sewage likely contributed to the structure's premature collapse.

PROPOSED NEXT STEP

Stantec believes that H₂S levels contributed to the collapse of SAN-13-1003. Stantec would like to also rule out industrial sources of the aggressive sewage and/or isolate H₂S sources. Stantec suggests a quick and cost-effective method to narrow down the origin(s) of the apparent pH issue in your collection system:

- Visit 10 to 12 strategically located manholes
- Take pH readings at the manholes
- Perform a visual inspection of the manholes
- Write a summary of the findings for the Township

This testing should only take a day and be performed when there have been no recent rain events. By better defining the Township's problem area(s) within the collection system, the Township may then direct limited resources to addressing the problem areas and benefitting the entire sewerage system.



April 24, 2018
Craig Lyon
Page 3 of 3

Reference: Sewerage System Monitoring

Stantec looks forward to meeting with the Township to discuss the sewage characteristics that we observed and sampled, and to discuss further testing locations to provide you with a better understanding of your sewerage collection and conveyance system. If you have any immediate questions or concerns, please feel free to contact us.

Stantec Consulting Michigan, Inc.

A handwritten signature in blue ink, reading "Neil Wager", positioned above a horizontal line.

Neil Wager
Process Designer

Phone: 734-214-1831
Fax: 734-761-1200
neil.wager@stantec.com

A handwritten signature in blue ink, reading "Ken Jewison", positioned above a horizontal line.

Kenneth D. Jewison, PE
Project Manager

Phone: (734) 892-9041
Fax: (734) 761-1200
ken.jewison@stantec.com

Attachment: Odalog Data Plots
Maps of Proposed pH Testing Manholes

c. file – Stantec



**Pittsfield Charter Township
Sanitary Collection System
Capacity Study**

Final Report

October 17, 2018

Prepared for:

Pittsfield Charter Township

Prepared by:

Stantec Consulting Michigan Inc.

Executive Summary

Pittsfield Charter Township retained Stantec to perform a Sanitary Collection System Capacity Study (SCSCS) to update findings of its 2010 SCSCS. The objectives of the SCSCS included identifying and evaluating the capacity of the existing sanitary collection system; evaluating infiltration and inflow (I/I) impacts on the system; making recommendations for improvements to the system that are necessary to meet present and future needs (20-year planning horizon) of the Township; and using recommendations from this study along with SAW/CIP results to fulfill development of a comprehensive Asset Management Plan.

Under the 25-year 24-hour design event, eight potential areas at risk of basement and/or surface flooding were identified when the system was subjected to existing and future loadings. Proposed infrastructure upgrades (**Table A**) may be supplemented with I/I reduction measures in areas with appreciable I/I (FM07 and PITT04) to optimize the extent and size of sewer upgrades. If a 50% I/I reduction is successful in these areas, the size of some of the upgrades (approx. 1,180 ft of sewers) may be further optimized.

Table A. Proposed Infrastructure Upgrades (with and without I/I reduction).

Area at Risk	Location	Sewer ID		Diameter (in)			Total Length (ft)
		From	To	Existing	Proposed	Proposed (with I/I Reduction)	
FM02B	Easement west of 1201 E Ellsworth Rd	SAN-09-1004	SAN-09-1006	21	24	24	909
	Easement west of 1201 E Ellsworth Rd	SAN-16-1002	SAN-16-1003	18	24	24	156
	Intersection of S State St & Concourse Dr to easement west of 1201 E Ellsworth Rd	SAN-16-1036	SAN-16-1059	18	21	21	4,536
	S State Rd (between Airport Dr & Concourse Dr)	SAN-16-1003	SAN-16-1006	18	21	21	1,229
	Airport Dr	SAN-17-1027	SAN-17-1033	15	18	18	1,258
FM12B	W Michigan Ave (between Crane Rd & E Morgan Rd)	SAN-24-1002	SAN-24-1001	24	36	30	681
	W Michigan Ave (between Arbor Meadow Dr & Crane Rd)	SAN-24-1350	SAN-24-1005	36	42	42	1,236
PITT02	Between Randolph Ct and Blossom Hill Trl	SAN-12-1335	SAN-12-1187	15	18	18	1,259



PITTSFIELD CHARTER TOWNSHIP SANITARY COLLECTION SYSTEM CAPACITY STUDY: FINAL REPORT

Area at Risk	Location	Sewer ID		Diameter (in)			Total Length (ft)
		From	To	Existing	Proposed	Proposed (with I/I Reduction)	
	Between intersection of Scenic Lake Dr & Woodland Hills Dr and Rudolph Ct	SAN-12-1366	SAN-12-1350	12	21	21	538
	Between Carpenter Rd and intersection of Scenic Lake Dr & Woodland Hills Dr	SAN-12-1276	SAN-12-1251	12	18	18	1,785
	Carpenter Rd (north of Chester Dr)	SAN-11-1025	SAN-12-1278	10	15	15	1,347
PITT04-2	W Michigan Ave (between Hunt Club Dr & Munger Rd)	SAN-13-1131	SAN-13-1075	24	36	30	1,177
	Bridle Run Dr (between Hunt Club Dr and W Michigan Ave)	SAN-13-1140	SAN-13-1132	10	18	12	1,156

Four (4) Township pump stations were also identified as being under capacity for both existing and future conditions when subject to the 25-year 24-hour design event. With optimization, it is proposed to upgrade three (3) of these stations to provide adequate conveyance capacity to handle growth loadings without causing additional basement flooding. These stations include Michigan Ave./Saline, Moon Rd, and Warner Creek.

The effectiveness of reducing I/I is not guaranteed and would warrant further investigation into the source(s) within the sewersheds to determine achievable targets. It is also recommended that a 6-month (minimum) flow monitoring program be initiated in a further attempt to validate the model behavior and confirm the preliminary sizing and extent of sewer upgrades identified in this assessment.



Appendix F PUBLIC HEARING ADVERTISEMENT

DRAFT



**PUBLIC HEARING NOTICE
PITTSFIELD CHARTER TOWNSHIP
SANITARY COLLECTION SYSTEM IMPROVEMENT PROJECT**

NOTICE IS HEREBY GIVEN that the Pittsfield Charter Township Board of Trustees, located at 6201 W. Michigan Avenue, Ann Arbor, MI 48108, will hold an electronic public hearing on Wednesday, May 26, 2021 at 6:30 p.m. regarding the proposed sanitary collection system improvement project for the purpose of receiving comments from interested residents.

In accordance with the Washtenaw County Board of Commissioners' declared State of Emergency, and in order to reduce the risk of exposure to person with the COVID-19 virus, the Pittsfield Township Board of Trustees will conduct the public hearing electronically.

To participate as a member of the public:

- For videoconferencing, visit <https://zoom.us/j/99017107459?pwd=YktjNDIxSzBKYTNOOXh2R0tBWjZtQT09> and enter password 930540
- Call (929) 205-6099 or (877) 853-5257 (toll-free) and enter meeting ID: 990 1710 7459, and password: 930540
- iPhone one-tap: +19292056099,,99017107459#,,,930540#

If you have any issues accessing the meeting, please call (734) 822-3120.

Further instructions on participating in public comment will be provided once the meeting has been called to order in order to ensure two-way communication between the Board and members of the public.

The purpose of the proposed project is to provide the Township's sanitary sewer customers with a more dependable sanitary collection system by implementing improvements, repairs, and replacement of its aging system infrastructure. The improvements are a result of the Township's asset management and capital improvement plans. The project includes construction of a new interceptor sewer along Platt Road, US-12, Textile Road, Crane Road, Hickory Woods Park, and Munger Road. The project also includes abandonment of three existing pump stations (Platt/Merritt, Ashford Village, and Meadowview), abandonment of an existing interceptor sewer below the US-23 and US-12 interchange, and rehabilitation of the remaining interceptor sewer along US-12.

Impacts of the proposed project include those experienced by typical construction projects including dust, noise, and disruptions in local road usage. The impacts are expected to be temporary in nature and, after construction, the affected areas will be restored to normal conditions.

The average equivalent cost opinion to residential users for the proposed project is estimated to be \$7.43 per month.

A copy of the project plan can be accessed electronically on the Township's website at www.pittsfield-mi.gov. Hard copy of the project plan report detailing the proposed project can be reviewed by appointment only at the above address between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, beginning on April 26, 2021 until May 26, 2021 by calling (734) 822-2105.

Written comments received before May 26, 2021 at 4:00 p.m. will receive responses on the final project plan. Written comments should be sent via mail to the Utilities Department, 6201 W. Michigan Avenue, Ann Arbor, MI 48108 or via email to utilities@pittsfield-mi.gov. Individuals with disabilities may participate in the meeting by contacting the Clerk's Office at clerk@pittsfield-mi.gov or (734) 822-3120 sufficiently in advance of the meeting to make accommodations.


Michelle L. Anzaldi, Clerk
Pittsfield Charter Township

Published: April 25, 2021

Appendix G TOWNSHIP RESOLUTION

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Appendix H PUBLIC HEARING INFORMATION

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