FINAL

Delta Charter Township

2020 State Revolving Fund Project Plan

Wastewater Treatment Plant Major Capital Improvements

SRF Project No. 5725-01 and 5725-99

JULY 2020

PRESENTED TO

Delta Charter Township
7000 W. Willow Hwy.
Lansing, MI 48917

PRESENTED BY

Tetra Tech
401 S. Washington Square,
Suite 100
Lansing, MI 48933

P +1-(517)-316-3930
tetratech.com

Prepared by:

Krista M. Takacs, P.E. Date
Project Engineer

Reviewed by:

Gary J. Markstrom, P.E. Date
Vice President

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1.0 INTRODUCTION

Delta Township owns and operates the Delta Township Wastewater Treatment Plant (WWTP). The WWTP is located in the northern portion of the Township and serves a majority of the Township, local state complex, and industries. Wastewater entering the facility is processed in four general steps: preliminary treatment, primary treatment, secondary treatment, and disinfection, before being discharged to the Grand River in compliance with the WWTP's National Pollutant Discharge Elimination System (NPDES) permit.

The WWTP was originally constructed in 1965 and there were substantial expansions in 1972 and 1986. The WWTP has a design average capacity of 6.0 million gallons per day (MGD) and a peak hydraulic capacity of 17.4 MGD with flow equalization. The current average annual daily flow is 4.9 MGD with a maximum day peak flow of 13.9 MGD during wet weather events based on a review of 2019 monthly operating reports. The liquid treatment process consists of influent raw sewage pumping, screening and grit removal, primary settling, oxidation with intermediate clarification, activated sludge aeration, secondary clarification, ultraviolet disinfection, and effluent cascade aeration. The collected biosolids are thickened, digested and dewatered for land application.

The WWTP includes the following hydraulic and process elements:

- Raw Influent Pumps
- Influent Bar Screen
- Aerated Grit Tanks
- Equalization Basin
- Primary Clarifiers
- Primary Sludge Pumps
- Oxidation Towers
- Intermediate Clarifiers
- Aeration Tanks
- Secondary Clarifiers
- Return Activated Sludge Pumps
- Ultraviolet Disinfection
- Effluent Cascade Aeration
- Chemical Storage Tanks
- Odor Control System
- Waste Activated Sludge Thickening System
- Anaerobic Digesters
- Sludge Dewatering System
- Solids Storage
- Dewatered Solids Land Application

The Delta Township WWTP received a new NPDES Permit on October 1, 2019. NPDES Permit No. MI0022799 can be found in Appendix A. The NPDES Permit contains updated limits and a schedule of compliance that requires the WWTP to meet advanced wastewater treatment limits for carbonaceous biochemical oxygen demand (BOD) and ammonia-nitrogen. The lower BOD and ammonia-nitrogen limits are due to the Grand River not achieving attainment with the warm-water dissolved oxygen concentrations. In addition, the discharges from the Lansing, Delta Township, and Grand Ledge WWTPs are modeled together by EGLE due to their proximity along the Grand River. This project plan will analyze alternatives for improvements needed at the WWTP to meet the new NPDES permit limits and schedule of compliance.

In order to meet the advanced wastewater treatment limits in the new NPDES permit, EGLE is requiring that tertiary treatment be incorporated into the treatment process. In order to provide reliable operation of the WWTP,

meet the Schedule of Compliance contained in the NPDES Permit, and meet the new advanced wastewater treatment limits, Delta Township is applying for a loan under Michigan's Clean Water State Revolving Fund program.

2.0 PROJECT BACKGROUND

2.1 STUDY AREA CHARACTERISTICS

2.1.1 Location of Facilities

The WWTP is located at 7000 West Willow Highway in Lansing, MI. A map of the WWTP is included in Figure 2-1.

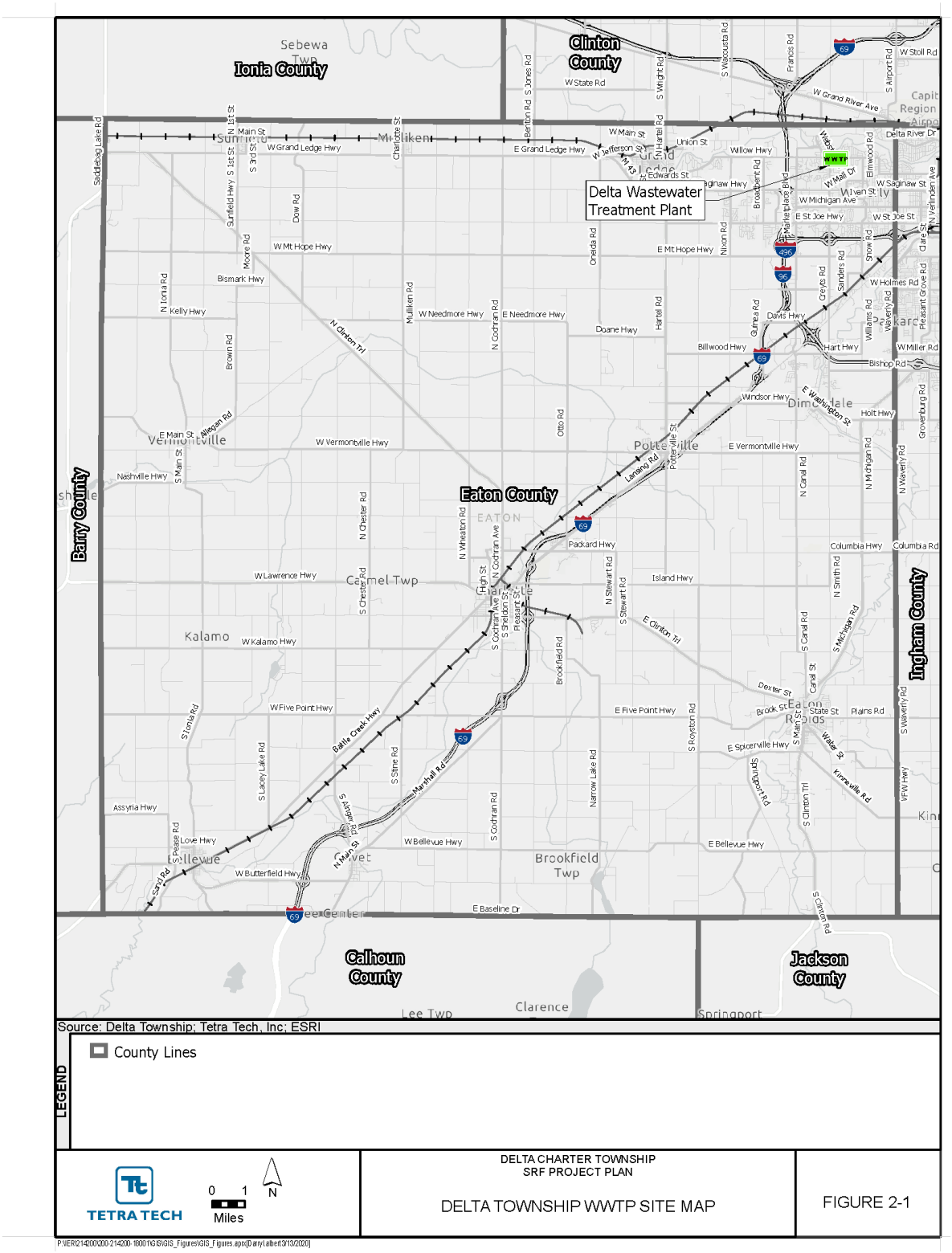

Figure 2-1. WWTP Location

2.1.2 Delineation of Study Area

The study area consists of the wastewater service area in Delta Charter Township with a primary focus on the Delta Township Wastewater Treatment Plant. The WWTP is located in the northern portion of the Township and serves a majority of area within the Township, local state complex, and industries. The service area is shown in Figure 2-2.

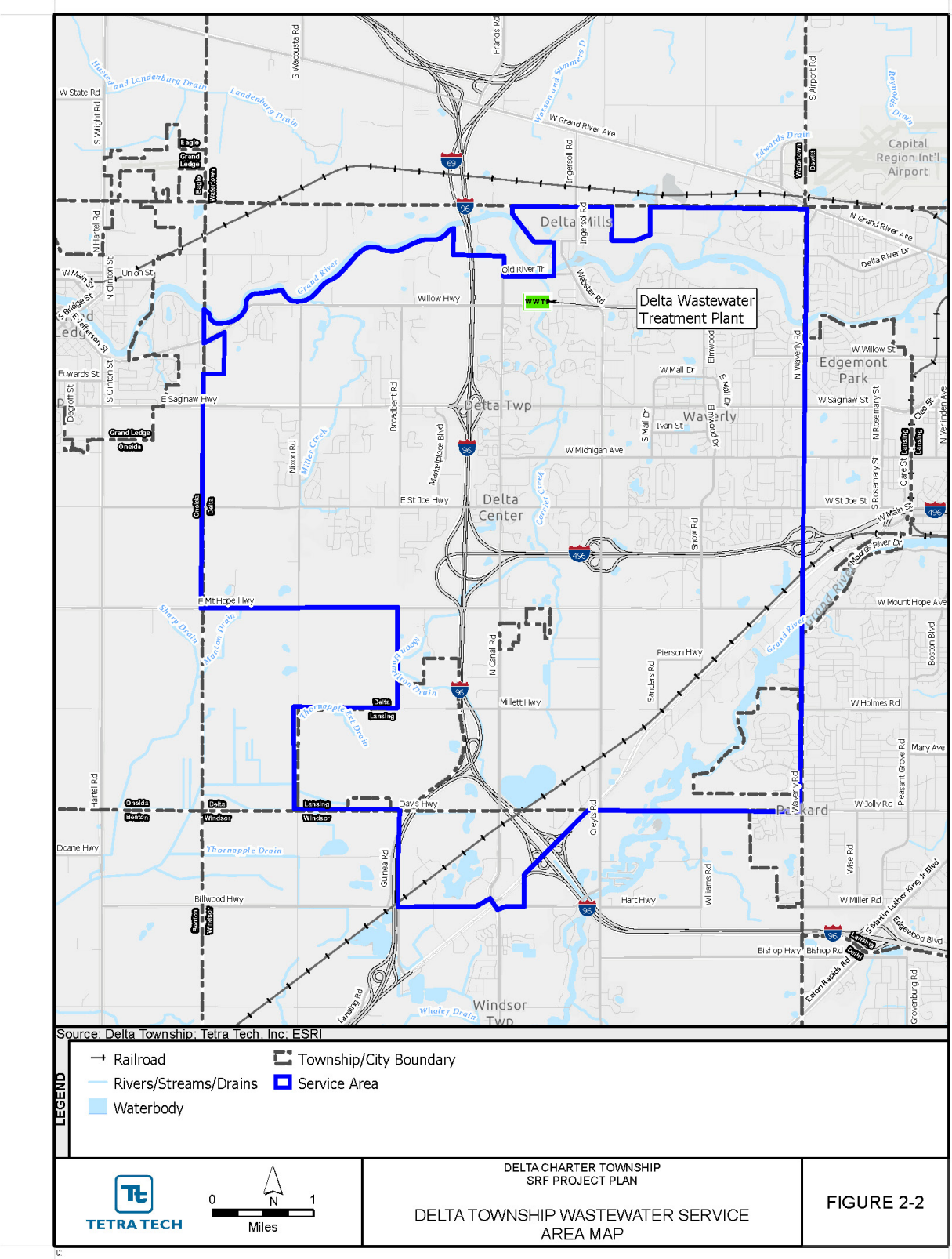

Figure 2-2. Service Area

2.2 ENVIRONMENTAL SETTING

This section is a synopsis of the environmental setting of the project and an analysis of the potential environmental and public health impacts of the various alternatives.

2.2.1 Cultural Resources

It is anticipated that the proposed project will not impact existing structures in Delta Charter Township outside of the WWTP. A small portion of the site is previously undisturbed property. It is not anticipated that there are historical or archaeological sites which would be impacted by the construction of the proposed project. To confirm this, the Michigan State Historic Preservation Office (SHPO) was contacted for the presence of known historical or archaeological sites. A copy of the letter and material sent to the SHPO is included in Appendix F.

2.2.2 The Natural Environment

2.2.2.1 Climate

The climate in Delta Charter Township is highly variable and is greatly influenced by the Great Lakes. Summer temperatures can be as high as 97°F and as low as -27°F in the winter [1]. Average temperatures in the summer range between 56°F and 82°F. Average winter temperatures range from 16° F to 35° F. Precipitation falls year-round, with snow being the main form of precipitation in the winter. Annual average precipitation is 16.75 inches.

2.2.2.2 Air Quality

National Ambient Air Quality Standards are health-based standards set by the United States Environmental Protection Agency. The entire State of Michigan is in attainment for carbon dioxide, lead, nitrogen dioxide, and particulate matter. Although there are non-attainment areas within Michigan for sulfur dioxide and ozone, Eaton County is in attainment for these pollutants. The proposed project is not anticipated to negatively impact the air quality in the vicinity of the WWTP.

2.2.2.3 Wetlands

Per Figure 2-3, Wetlands Map, there are no wetlands identified on the WWTP property. Although several wetlands exist in the study area, this project is intended to maintain the WWTP's water quality discharge to the Grand River. This project will only include in-fill development within the existing service area and is not anticipated to impact wetlands in any way.

Figure 2-3. Wetlands Map

2.2.2.4 Coastal Zones/Great Lakes Shoreline

The WWTP discharges to the Grand River, a tributary of Lake Michigan. The study area is not within a coastal zone, because of its distance from the shorelines of the Great Lakes and will therefore have no direct impact on the Coastal Barrier Resources System.

2.2.2.5 Floodplains

As shown in Figure 2-4, part of the WWTP is within the floodplain. The proposed projects will remove some of the process units from the floodplain and they will be rebuilt upland of the existing site. The rest of the process units will remain in the floodplain and the disturbed areas will be restored after the existing process units are removed.

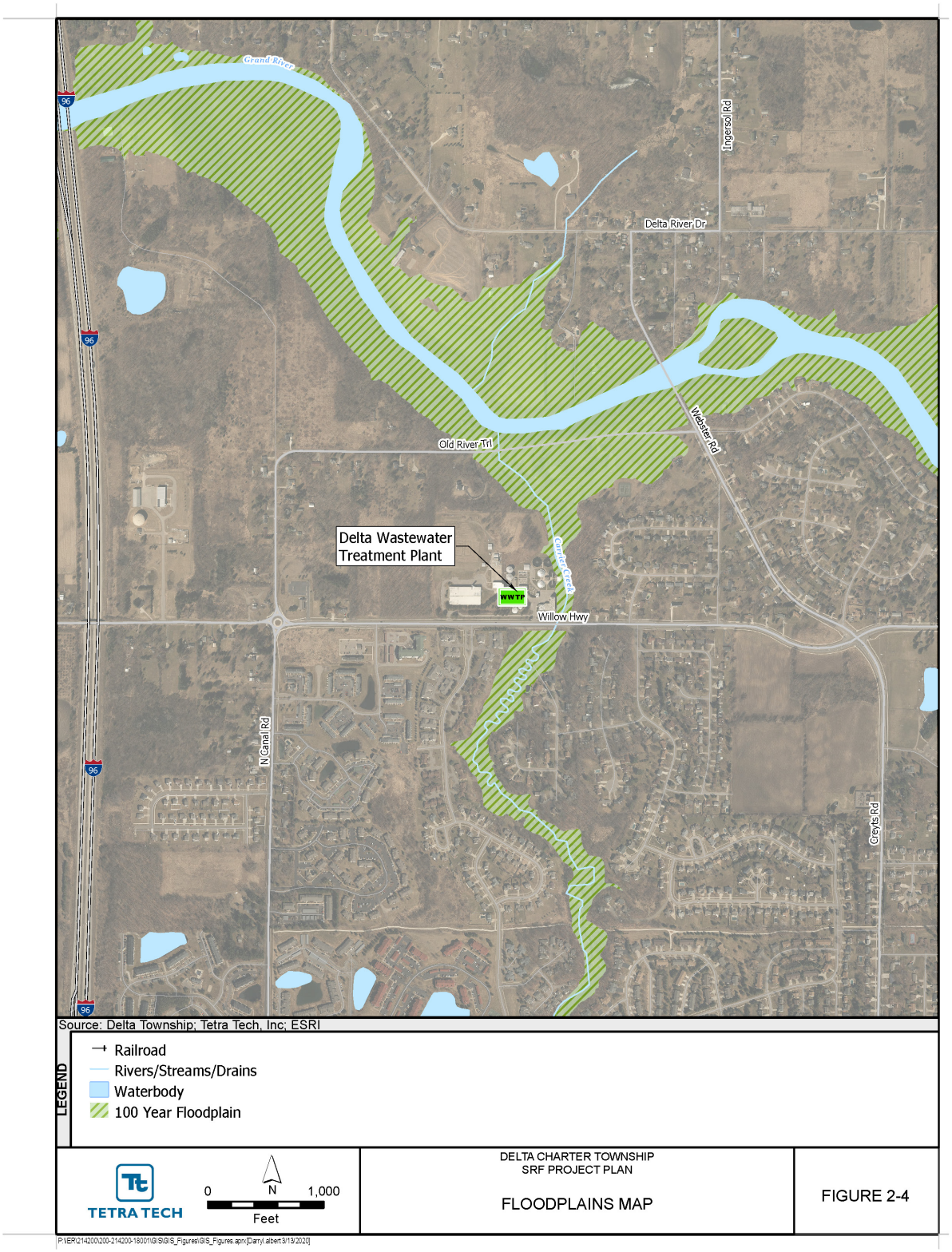

Figure 2-4. Floodplain Map

2.2.2.6 Natural or Wild and Scenic Rivers

The Grand River, which flows west to east through the southern portion of the Township and then east to west through the northern portion, is not designated as a State Natural River under the Natural Rivers Program of the Land and Water Management Division of the Michigan Department of Natural Resources. Additionally, the Grand River is not classified as a National Wild and Scenic River under the National Wild and Scenic Rivers System of the United States Fish and Wildlife Service.

2.2.2.7 Major Surface and Ground Waters

The major surface water within the vicinity of the study area is the Grand River. The Township lies within the Middle Grand River Watershed, which occupies approximately 258 square miles in mid-Michigan's Eaton, Ingham, Clinton, and Ionia counties. The Middle Grand River Watershed is part of the Grand River Watershed, the second largest watershed in Michigan. The Grand River is used within the Township for recreational purposes. There is an impoundment in Lansing to the east of the Township.

The Middle Grand River watershed management plan is available at:

https://www.eatoncd.org/middle-grand-river-watershed.html

The watershed is a tributary of Lake Michigan. The Grand River flows westerly through Michigan and discharges into Lake Michigan in Grand Haven. The Grand River is used for recreation such as paddling and fishing.

Delta Township, located in the Middle Grand River Watershed, has over 400 acres of ponds, rivers, and streams within its boundaries with the major surface water being the Grand River. The Middle Grand River Watershed is part of the greater Grand River Watershed. The Grand River occupies approximately 348 acres and stretches more than 10 miles through the Township. It flows east to west in the northern portion of the Township and west to east in the southern portion. The WWTP lies south of the Grand River on West Willow Highway. Effluent from the WWTP discharges directly into the northern portion of the Grand River, east of I-69, through an effluent outfall after ultraviolet disinfection and cascade aeration. The Grand River is used within the Township for recreational purposes. There is an impoundment in Lansing to the east of the Township.

Other surface water features in the Township include the Miller and Carrier Creeks which are both tributaries of the Grand River.

Delta Township uses groundwater as its drinking water source. The eastern portion of the Township, bounded roughly by Broadbent Road, is served by the City of Lansing Board of Water and Light (BWL). According to Delta Charter Township's Annual Drinking Water Quality Report for calendar year 2018 [2]:

Delta Township owns and operates its own water system. However, we do not have a water treatment plant. We purchase softened water from the Lansing Board of Water & Light. This approach allows our customers the advantage of clean, conditioned drinking water at a lesser cost than the Township could provide by building our own water treatment plant. And, instead of competing for use of the same resources, Delta Township and the BWL work together to share and protect our groundwater.

The BWL drinking water comes from 125 groundwater wells, that are approximately 400 feet deep. The source of this plentiful supply is an underground aquifer called the Saginaw Formation, which underlies much of the mid-Michigan region. Water from the wells is transported through large transmission mains to one of two conditioning plants. The plants soften the water by removing about 80 percent of the hardness. The softened water is then chlorinated, fluoridated, treated with corrosion control, filtered and stored in reservoirs for distribution to our customers.

Communities throughout mid-Michigan rely on the Saginaw Formation for their drinking water and are working cooperatively to manage and protect it. We're also working with other cities, townships and planning agencies to develop a regional wellhead protection plan. The plan is designed to keep pollution hazards away from current

and future well sites. During 2003, EGLE conducted an assessment of the vulnerability of our aquifer to impacts from human activities. Because there are several known and potential sources of contamination in and near the BWL wellhead protection areas, the aquifer in this region has been assessed as "highly susceptible" to contamination.

There are approximately 916 wells located in Delta Township. Six wells are owned by Delta Township and kept as an emergency water supply, although the Township is currently implementing an EGLE-approved plan to make a redundant emergency connection which will allow for the permanent abandonment of all of Delta's public wells in the near future. The type of groundwater wells located in Delta Township is summarized in Table 2-1.

Table 2-1. Groundwater Wells in Delta Township

Type of Well	Number of Wells
Type 1 Public Use (BWL or Delta Township)	6
Type 2 Public Use (School or Church)	20
Household	840
Industrial	3
Irrigation	23
Other	10
Unknown	4
Total	906

2.2.2.8 Recreational Facilities

A map of the existing parks and recreational facilities in the Township is shown in Figure 2-5. The proposed project will involve construction in the vicinity of Delta Mills Park but is not anticipated to impact the park property.

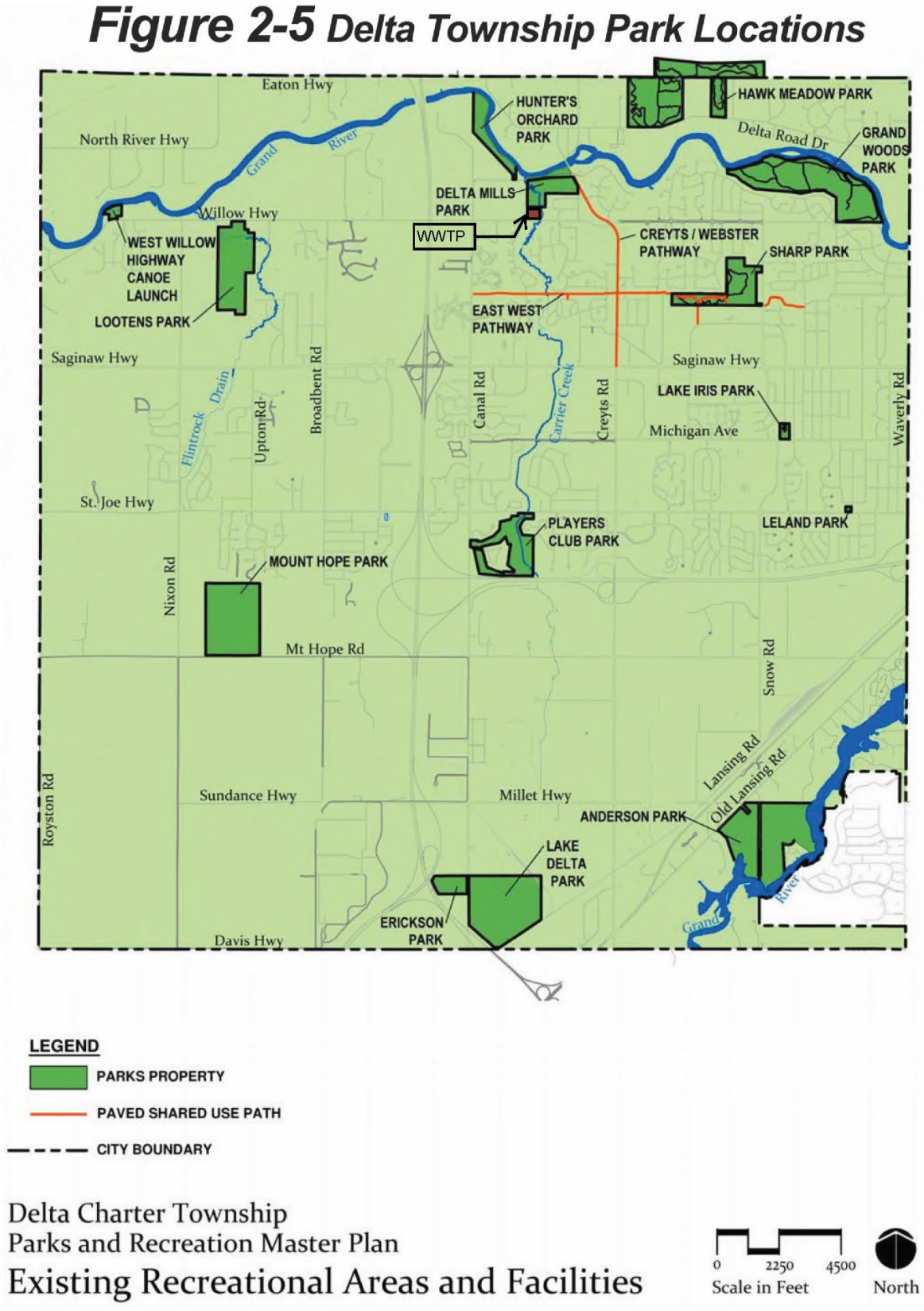

Figure 2-5. Delta Township Park Locations

2.2.2.9 Topography

The land in Delta Township is generally flat with little variation in elevation. The highest point in the Township is 890 feet above sea level near the Creyts Road/Lansing Road intersection. The lowest point in the Township is 800 feet where the northern course of the Grand River exits the western edge of the Township. Figure 2-6 shows a topographic map of the Township in the vicinity of the WWTP.

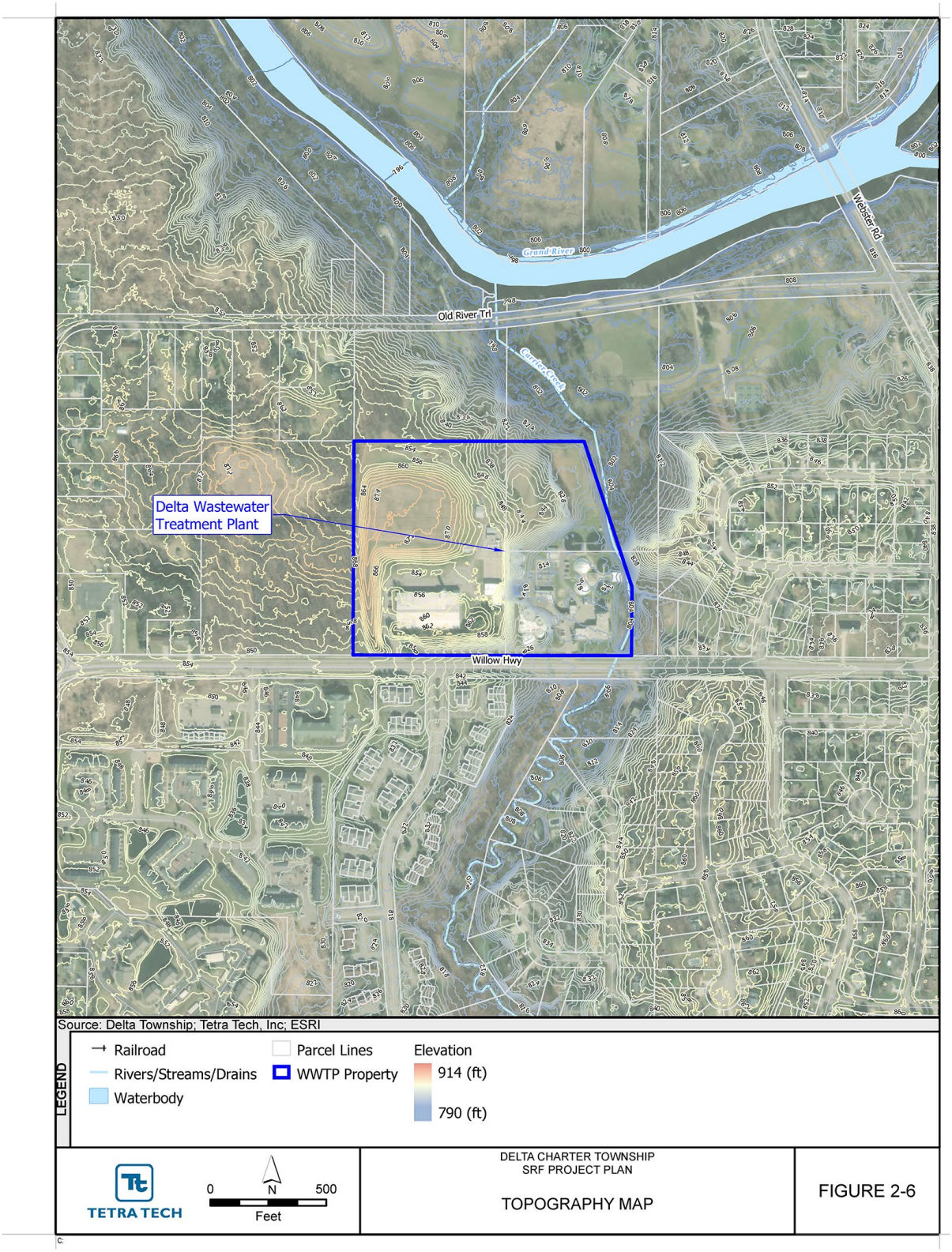

Figure 2-6. Topographic Map

2.2.2.10 Geology

The surface geological features in the study area are a result of outwash and deposition during the late Wisconsin glaciation, which occurred about 10,000 to 35,000 years ago [3]. When the ice sheet melted and receded, it left unconsolidated deposits of silt, sand, clay, and gravel.

The Saginaw Formation characterizes the bedrock geology in the Middle Grand River Watershed. The quaternary geology in the Watershed is medium textured glacial till.

2.2.2.11 Soils

A soils map for Delta Township can be found in Figure 2-7. The primary soil types in Delta Township are part of the Marlette-Capac and the Marlette-Capac-Owosso associations [3]. The former refers to soils classified as nearly level to gently undulating, well drained to somewhat poorly drained loamy soils on till plains. The latter refers to nearly level to hilly, well drained to somewhat poorly drained, loamy soils on moraines and till plains. As part of the final design process, previous soil borings will be reviewed, and additional borings made to determine whether any special considerations are needed during design and construction.

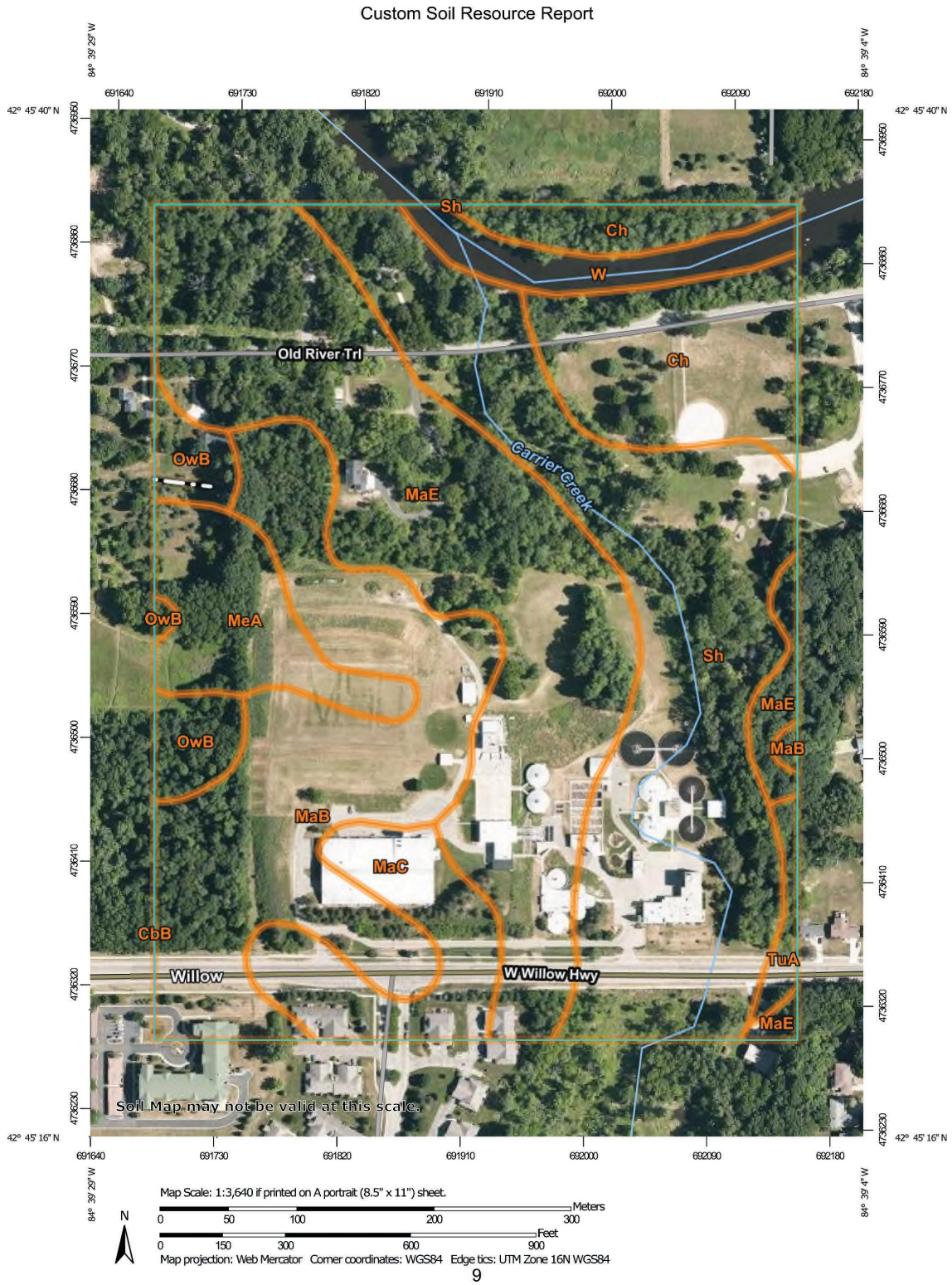

Figure 2-7. Soils Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eaton County, Michigan
Survey Area Data: Version 16, Sep 16, 2019

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

Date(s) aerial images were photographed: Jul 6, 2018—Jul 8, 2018

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

Soils Map Cont.

Custom Soil Resource Report

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CbB	Capac-Marlette loams, 1 to 6 percent slopes	0.0	0.0%
Ch	Cohoctah fine sandy loam, frequently flooded	7.1	10.0%
MaB	Marlette loam, 2 to 6 percent slopes	13.4	18.9%
MaC	Filer loam, 6 to 12 percent slopes	4.1	5.8%
MaE	Filer loam, 18 to 35 percent slopes	19.5	27.5%
MeA	Metamora-Capac sandy loams, 0 to 4 percent slopes	3.7	5.3%
OwB	Owosso-Marlette sandy loams, 1 to 6 percent slopes	2.1	3.0%
Sh	Shoals-Sloan loams	18.1	25.6%
TuA	Tuscola fine sandy loam, 0 to 4 percent slopes	0.6	0.9%
W	Water	2.1	2.9%
Totals for Area of Interest		**70.8**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They

Soils Map Cont.

2.2.2.12 Agricultural Resources

This project will sustain the water quality discharged to the Grand River by the WWTP and will only provide for in-fill development within the existing service area. The in-fill development is not anticipated to result in the development of any prime farmlands. The WWTP site, where the proposed improvements will occur, is not prime farmland.

2.2.2.13 Fauna and Flora

The study area is primarily urban or agricultural and contains few animals with economic or sport value. The proposed project will be constructed on the WWTP site. The Michigan Natural Features Inventory (MNFI) was contacted to comment on the existence of any rare, threatened or endangered species in the Delta Township area. MNFI indicated that several threatened (T) and endangered (E) species could be located within 1.5 miles of the study area. Animal species of particular concern included Purple Wartyback Mussel (T), Indiana Bat (E), and Slippershell (T). In addition, the Snowy Orchis (T) and Rock Cress (T) plant species were also noted. Special species of concern included the Little Brown Bat, Round Pigtoe Mussel, Fluted Shell Mussel, and Ellipse Mussel. In addition, a Great Blue Heron Rookery is also located within 1.5 miles of the project site. The MNFI response is included in Appendix F.

A review of protected species was also made in March 2020, using the U.S. Fish and Wildlife Service's website for Endangered Species Section 7(a)(2) Consultation Process. An endangered species listed as having a presence in the project area is the Indiana Bat. Threatened species include the Northern Long-Eared Bat and Eastern Massasauga. The Eastern Prairie Fringed Orchid is the only threatened flowering plant. No critical habitats were found at this location. The MNFI review indicated that there is no suitable habitat for the Eastern Prairie Fringed Orchid within the project area. In addition, there is no Tier 1 or Tier 2 habitat in the vicinity of the project site for Eastern Massasauga.

2.2.2.14 Unique Features

There are no known unique features which are not previously described.

2.2.3 Land Use in Study Area

Delta Township was platted in 1826 and incorporated as a Charter Township in 1962 by special election. The Township consists of primarily residential and agricultural uses in addition to commercial and industrial uses. The industrial area covers a triangular area generally bordered by I-496 to the north, I-96/I-69 to the west and Lansing Road to the east and south. The agricultural sections of the Township exist primarily west of Canal Road between Davis Highway and Eaton Highway. The other land use areas, such as residential and office, are scattered throughout Delta Township, as depicted in Figure 2-8.

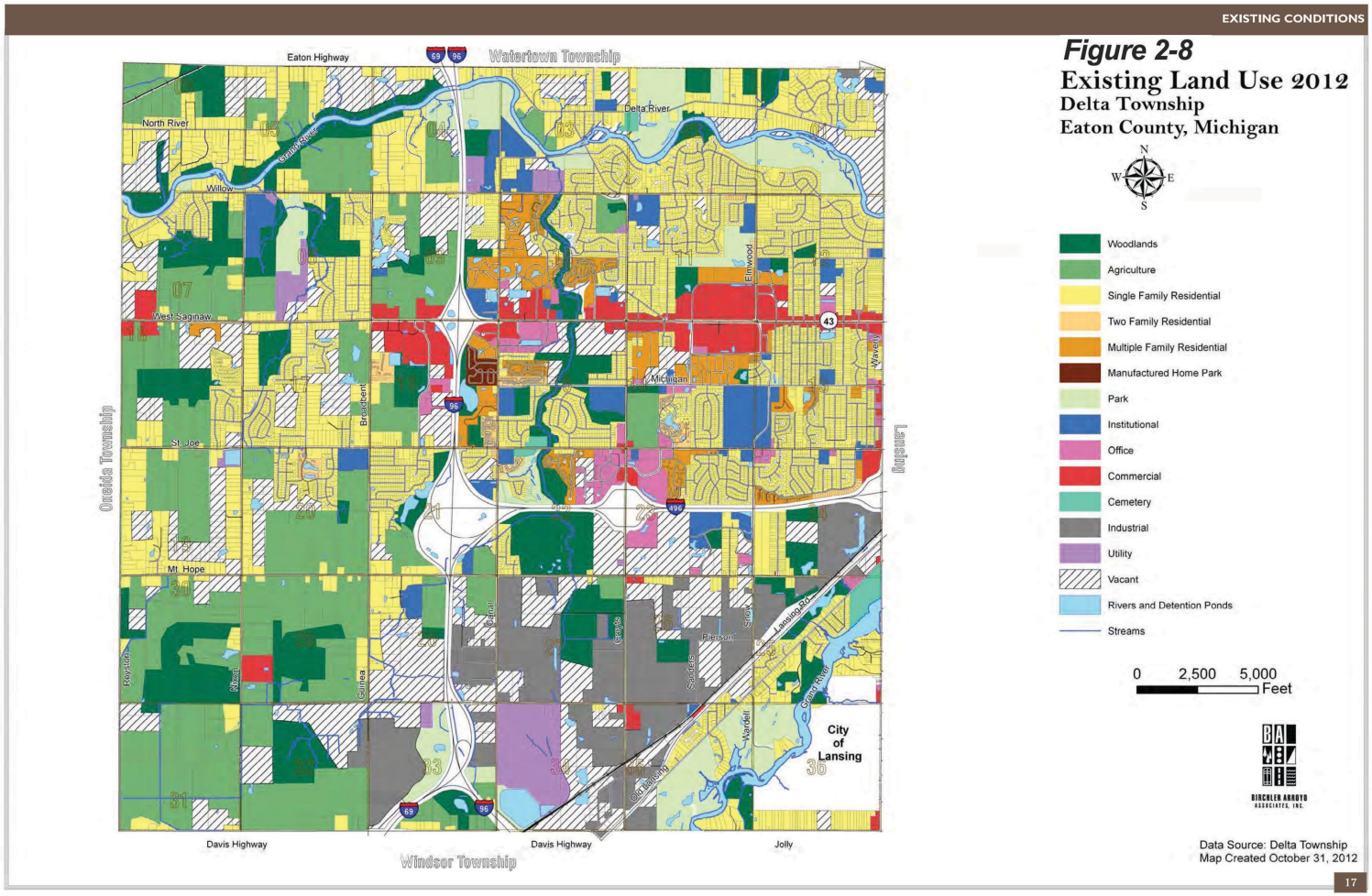

Figure 2-8. Current Land Use

Table 2-2 [3] lists the Delta Township land uses from 2010. The data in Table 2-2 are the most recent available. The Township is working on a new Master Plan, but the data were not available for public distribution at the time that this SRF Project Plan was prepared.

Table 2-2. 2010 Land Use

Category	Acres	Percent
Agriculture	3,596	18.0%
Single Family Residential	5,355	26.8%
Two Family Residential	136	0.7%
Multiple Family	547	2.7%
Manufactured Home Park	38	0.2%
Commercial	672	3.4%
Office	294	1.5%
Industrial	1,439	7.2%
Institutional	634	3.2%
Utility	385	1.9%
Park	1,086	5.4%
Woodlands	2,410	12.0%
Vacant	3,010	15.0%
Water / River	343	1.7%
Cemetery	67	0.3%
Total	**20,012**	**100.0%**

The future land use categories from Delta Township's 2013 Comprehensive Plan are:

- Agriculture
- Cemetery
- Low Density Residential
- Two Family Residential
- Multiple Family Residential
- Manufactured Home Park
- Park
- Institutional
- Office
- Commercial
- Industrial
- Utility
- PA 425 District
- Urban Services Boundary

Delta Township's 2013 Comprehensive Plan defined the intent of each land use category, presented below.

Agriculture

The Agriculture land use category, planned for 1,786 acres, is intended to preserve productive agricultural lands in the long-term and protect existing farm operations from encroachment by incompatible uses. The permitted density in the Agriculture category is one dwelling unit per 20 acres of land. The 20 acre minimum lot size requirement in southwest Delta Township was established by the Township's 1974 Zoning Ordinance.

Agricultural land uses are concentrated in sections 29, 30, & 31 of the Township. The Future Land Use Map, Map 7-1, depicts the Urban Service Boundary which excludes public water and sanitary sewer service to the southwest corner of the Township. Agricultural land is anticipated to decrease from 18.3% of the Township's total land area in 2010, but it's anticipated that it will continue to occupy approximately 10% of Township land in the future.

Cemetery

The Cemetery land use category, planned for 58 acres, encompasses the Township's two public cemeteries being the Delta Center Cemetery and Hillside Cemetery. Deepdale Cemetery, a privately owned facility, is located at the Waverly/Old Lansing Road intersection. Land in the Cemetery category is not expected to undergo significant changes in the future.

Institutional

The Institutional land use category, planned for 594 acres, includes public and governmental buildings and uses, libraries, schools, places of worship, and private clubs. Grand Ledge Schools and Waverly Schools each occupy more than 100 acres in the Township while private schools occupy over 80 acres. Institutional uses are widely dispersed throughout the Township and this category is not expected to undergo significant changes in the future. The Township's zoning ordinance mandates that most institutional uses be subjected to special land use permit approval prior to their development.

Office

The Office land use category, planned for 654 acres, encompasses land that accommodates a wide variety of office uses. Office building types range from single buildings on one parcel to unified office park developments to large corporate offices. Office land uses are concentrated in the center of the Township, primarily along West Saginaw and at the Creyts/I-496 interchange. Office areas have been designated in some locations to provide a transition between incompatible land uses.

Utility

The Utility land use category, planned for 378 acres, identifies lands that are used or planned for a variety of uses including water towers, electric sub-stations, a wastewater treatment plant and a power station producing electricity. The Lansing Board of Water & Light's Erickson Power Station on Canal Road occupies approximately 280 acres. Land in this category is widely dispersed throughout the Township.

PA 425 District

The PA 425 District land use category, planned for 1,019 acres, includes properties located in sections 27, 28, 32 & 33 of the Township which the Township co-manages with the City of Lansing. Public Act 425 of the Public Acts of 1984 permits two local units of government to conditionally transfer property for the purpose of an economic development project. The agreement provides details specifying governmental jurisdiction, permitted uses, zoning regulations, the sharing of taxes and other revenues, the provision of utilities, and the duration of the agreement. There are currently four PA 425 property agreements with the City of Lansing.

Urban Services Boundary

The Urban Service Boundary includes 18,192 acres. Lands inside the boundary allow for high density urban development with full utility services, while the area outside the boundary is restricted for lower density development unless otherwise noted on the Future Land Use Map. Thus, Delta Township generally will not support the development of residential subdivisions and high density growth outside of the designated boundary. Furthermore, public water and sanitary sewer services will not be provided to areas outside the boundary with the possible exception of serving existing development in adjacent communities which could be mutually beneficial to all parties.

Low Density Residential

The Low Density Residential land use category, planned for 9,240 acres, permits densities of 0.5 to 5.0 units per acre. The primary dwelling unit type in the Low Density Residential category is single family detached residences

located in subdivisions. However, other higher density housing types may be permitted including attached dwelling units.

Low Density Residential development is found throughout the Township but it's predominately located north of Mt. Hope Highway. The majority of the vacant land designated for Low Density Residential development is located west of I-96 and south of the northern course of the Grand River. It should be acknowledged that a significant amount of the land designated as Low Density Residential west of I-96 has been split into large acreage parcels of 1-5 acres with single family homes. Thus, the possibility of these properties being developed at greater densities in the future is highly unlikely. It's estimated that approximately half of the 9,240 acres designated for Low Density Residential development is not presently served by Township water and sanitary sewer service which is required for single family subdivisions.

Two Family Residential

The Two Family Residential land use category, planned for 146 acres, includes two-family and attached dwellings, most commonly in the form of duplexes and townhomes. In the past, two-family units were primarily rental units while today this form of housing is increasingly owner-occupied. The Two Family Residential category is found at various locations across the Township. There is very little vacant land which is designated for Two Family Residential development. Permitted densities in the Two Family Residential category range from 3.6 to 5.0 units per acre dependent on the zoning classification, the applicable special land use permit, and the approved site plan.

Multiple Family Residential

The Multiple Family Residential land use category, planned for 900 acres, provides appropriate locations for the Township's highest residential densities. Permitted densities range from 5.1 to 15.0 units per acre dependent on the zoning classification, possible special land use permits, and the approved site plan. Multiple Family Residential lands are located in the central portion of the Township between Willow Highway and I-496. The majority of the Multiple Family Residential land which is vacant is located west of I-96. Multiple Family Residential development is typically characterized by multi-family apartment buildings which are three stories or less in height although other dwelling types, such as attached townhomes are permitted. The majority of dwelling units in the Multiple Family Residential category are presently rental units which is a pattern expected to continue in the future. It's recommended that Multiple Family Residential Development be served by public water and sanitary sewer facilities.

Manufactured Home Park

The Manufactured Home Park land use category is planned for 35 acres on Canal Road between West Saginaw and St. Joe Highway which is occupied by the Century Park manufactured home community. The maximum permitted density for manufactured home developments is approximately 8.5 units per acre dependent on the housing type, lot configurations and approved site plan.

Commercial

The Commercial land use category, planned for 1,089 acres, is intended for a variety of retail and service businesses. The West Saginaw Highway area serves as the principal commercial corridor for the Township. Most of the West Saginaw retail buildings are one story and those constructed east of Elmwood Road were built in the 1960's and 1970's. Big-Box retailers were prevalent in the decades of the 1990's and 2000's, particularly in the West Saginaw/ Marketplace area.

Industrial

The Industrial land use category, planned for 2,206 acres (not including the PA 425 areas reviewed below) encompasses the existing industrial facilities in the southeastern quadrant of the Township, generally bordered by I-496 to the north, I-96/I-69 to the west and Lansing Road to the east and south. The industrial areas provide significant employment opportunities and help to diversify the Township's tax base. In 1958 approximately 2,000 acres were rezoned from an agricultural to an industrial zoning classification which established the Township's industrial base. The majority of the Township's industrially zoned properties are presently served by public water, storm drains, sanitary sewers, and all-weather roads. An exception is the 100 acre area located in the triangle formed by I-96 & I-69 fronting on Davis Highway in section 33 which has been designated for industrial development but is lacking public utilities. As of 2012 there were approximately 400 acres of vacant industrial land suitable for development, not including the PA 425 areas.

Parks and Recreation

The Parks & Recreation land use category, planned for 1,282 acres, includes mini-parks, neighborhood parks, community parks, large urban parks, natural resource areas and special use parks. The Township's park system consists of a dozen public parks. Four of the Township's parks, being Delta Mills, Grand Woods, Hunter's, and Anderson have significant frontage along the Grand River. The Parks & Recreation classification includes approximately 400 acres of open space in private ownership including properties owned by the Audubon Society (section 2), the Ingham County Conservation League (section 4), General Motors (section 29) and the Woldumar Nature Center.

The future land used, according to the 2013 Township Master Plan is shown in Figure 2-9.

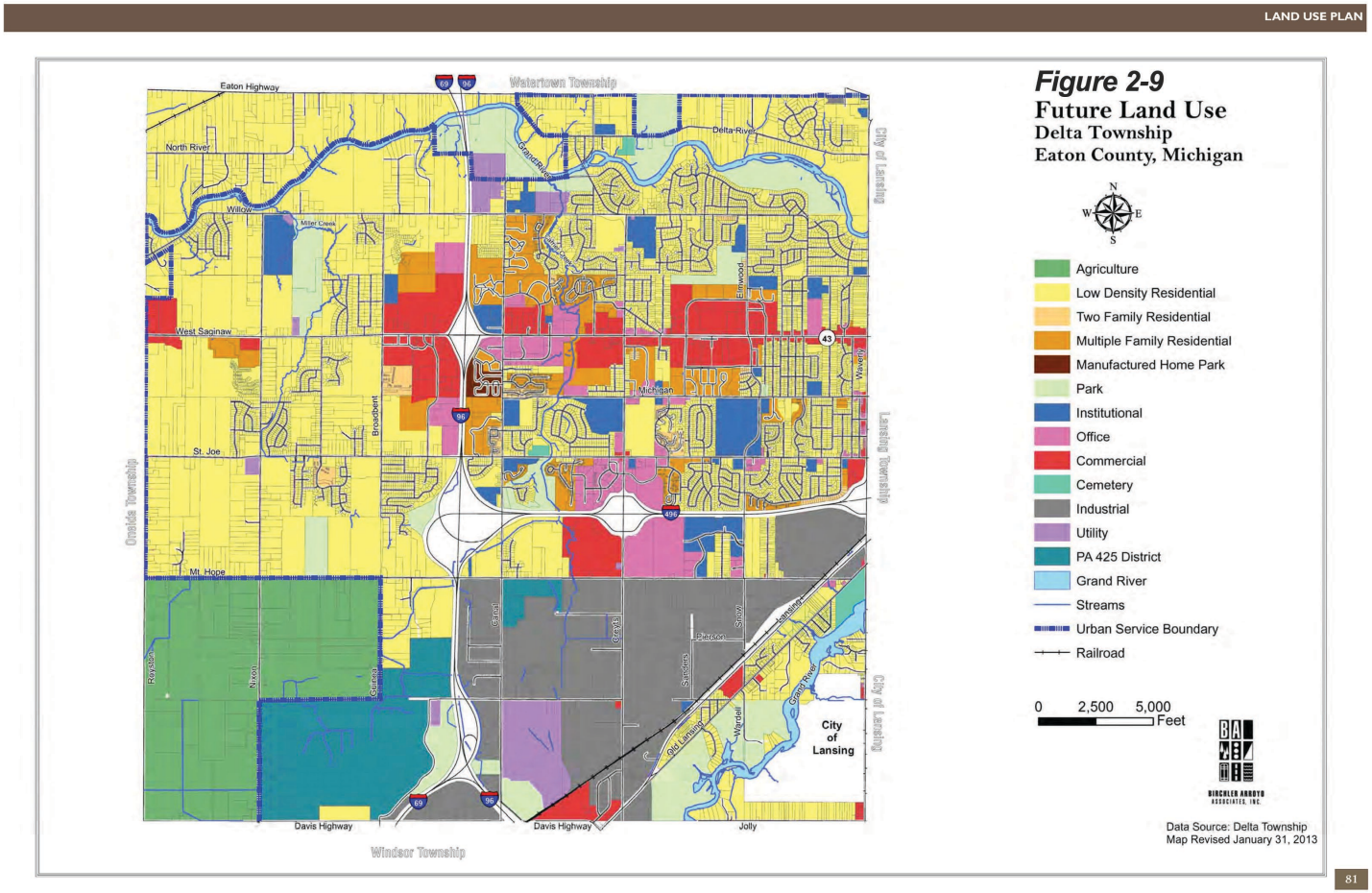

Figure 2-9. 20-Year Future Land Use

2.2.3.1 Land Use Projections

As part of the Wastewater Treatment Plant Master Plan, the future land use was used to project additional residential equivalent users (REUs) over the next 30 years. A summary of the in-fill development by REU is summarized in Table 2-3.

Table 2-3. Future Land Use Projections for REUs

	REUs
Estimated Service Connections	**21,333**
Additional Service Projections	
30-yr Total	12,148
Agricultural / Residential	196
Very Low Residential	34
Low to Moderate Residential	2,908
Multiple Family Residential	1,163
Office / Commercial / Industrial	7,847
Total REUs at 30 yrs	**33,481**

Note: Assumes 225 gpd/REU

2.3 POPULATION DATA

From 2010 to 2018, the population has increased approximately 2.6% according to the estimated 2018 population from the United States Census Bureau. Population projections were based on the residential portions of the future land uses (i.e., excluding the Office/Commercial/Industrial zoning). Based on Table 2-3, there are projected to be 4,301 REUs added in the next 30 years. Assuming that there are 2.5 people per REU, that would equal an additional 10,753 people by 2048 due to expected in-fill development. The population was projected for 10 and 20 years assuming linear growth. The current and projected population for the Delta Charter Township is provided in Table 2-4. The Township expects continued in-fill development within the service area over the planning period.

Table 2-4. Population Projections

Year	Population
2010	32,408
2018	33,256
2028	36,840
2038	40,424
2048	44,009

2.4 ECONOMIC CHARACTERISTICS

In the 2019 Delta Township Wastewater Treatment Plant Master Plan, development projections were made to consider growth of residential, commercial, and industrial and density of development to project REUs/acre. The population growth was considered as part of this analysis. The Master Plan indicated an increase in average daily flow of 56.9% in the next 30 years.

2.4.1 Economic Structure and Major Employers

One of the largest employers in Delta Charter Township is General Motors. The Lansing Delta General Motors Plant provides 3,200 jobs to Lansing and Delta Township residents. Related manufacturing companies in the area continue to grow and provide jobs to residents. The State of Michigan Secondary Complex and Auto Owners Insurance also provide many jobs to the area. The majority of Delta Township residents are employed in the service sector.

In addition, the Township serves as a housing area for people who work in other areas of the county or nearby counties. The Township lies within commuting distance of several metropolitan areas, including Lansing, Grand Rapids, Detroit, and Ann Arbor. The area is expected to continue to be developed for residential housing.

2.4.2 Median Household Income

The median annual household income (MHI) in Delta Charter Township, as reported by the US Census Bureau, was $66,361 from 2014 to 2018. The value is in 2018 dollars. According to the Census, 8.6 percent of Delta Charter Township residents live below the poverty line.

2.4.3 Economic Growth

According to the United States Census Bureau, Delta Charter Township underwent a 2.6 percent increase in population from 2010 (32,408) to 2018 (33,256). Nearly 65 percent of the population is in the civilian labor force. Approximately 2,100 manufacturing jobs have been added since 2008.

2.5 EXISTING FACILITIES

2.5.1 Wastewater Treatment

The WWTP is located in the northern portion of the Township and serves a majority of the Township and local state complex and industries. The WWTP was originally constructed in 1965 and underwent substantial expansion in 1972 and 1986. The WWTP has a design average flow capacity of 6.0 MGD and a peak hydraulic capacity of 17.4 MGD. The current average annual daily flow is 4.9 MGD with a maximum day peak flow of 13.9 MGD during wet weather events, based on a review of 2019 monthly operating reports. The liquid treatment process consists of influent raw sewage pumping, screening and grit removal, primary settling, oxidation with intermediate clarification, activated sludge aeration, secondary clarification, ultraviolet disinfection, and effluent cascade aeration. The collected biosolids are thickened, digested and dewatered for land application.

The facility has been maintained very well, achieving maximum useful life of its equipment. In most cases, the life expectancy has been greater than what is typically expected for equipment in this type of service.

A schematic showing the components of the WWTP is shown in Figure 2-10. An aerial view of the WWTP is shown in Figure 2-11.

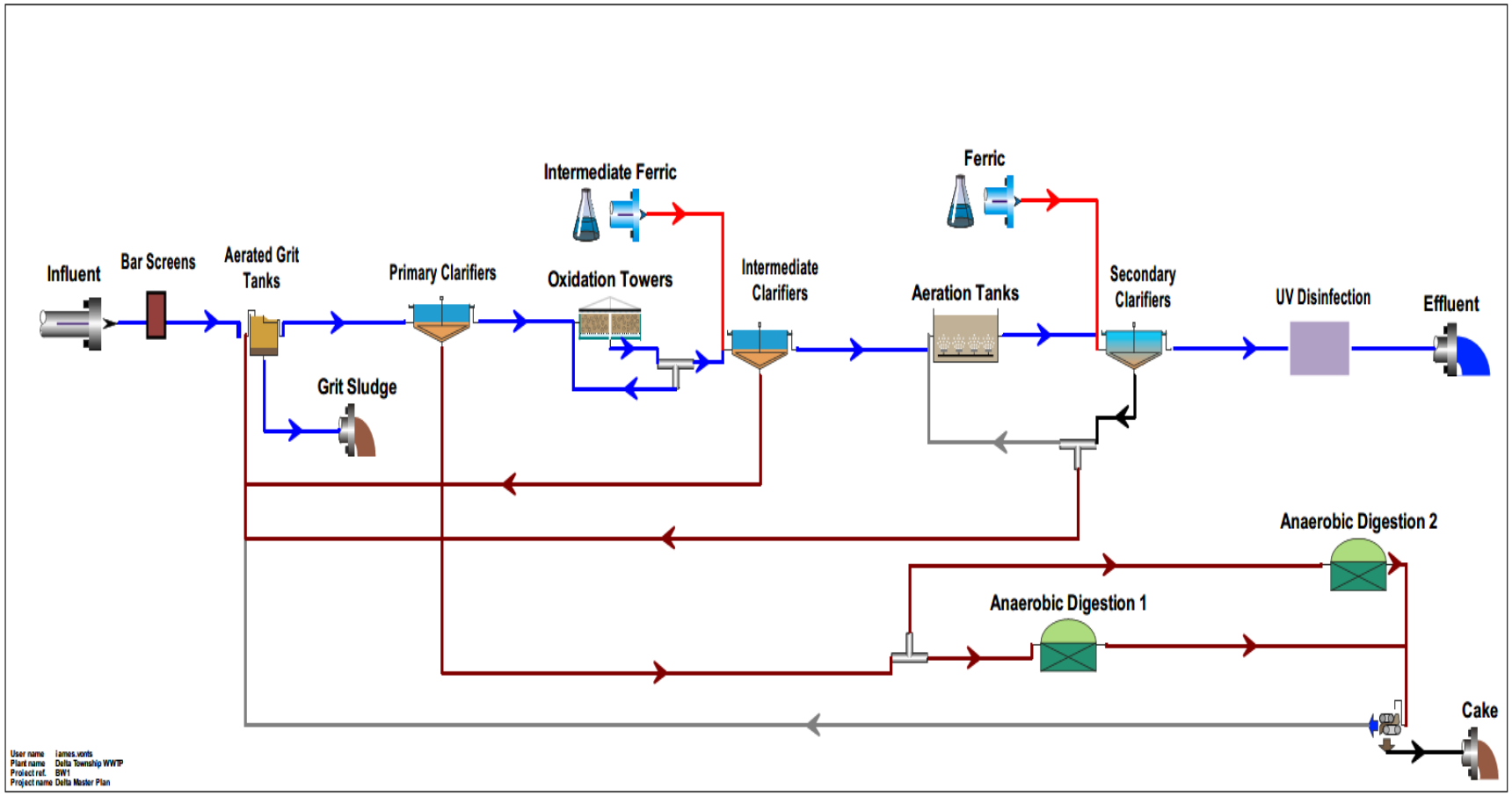

Figure 2-10. Schematic of Delta Charter Township WWTP

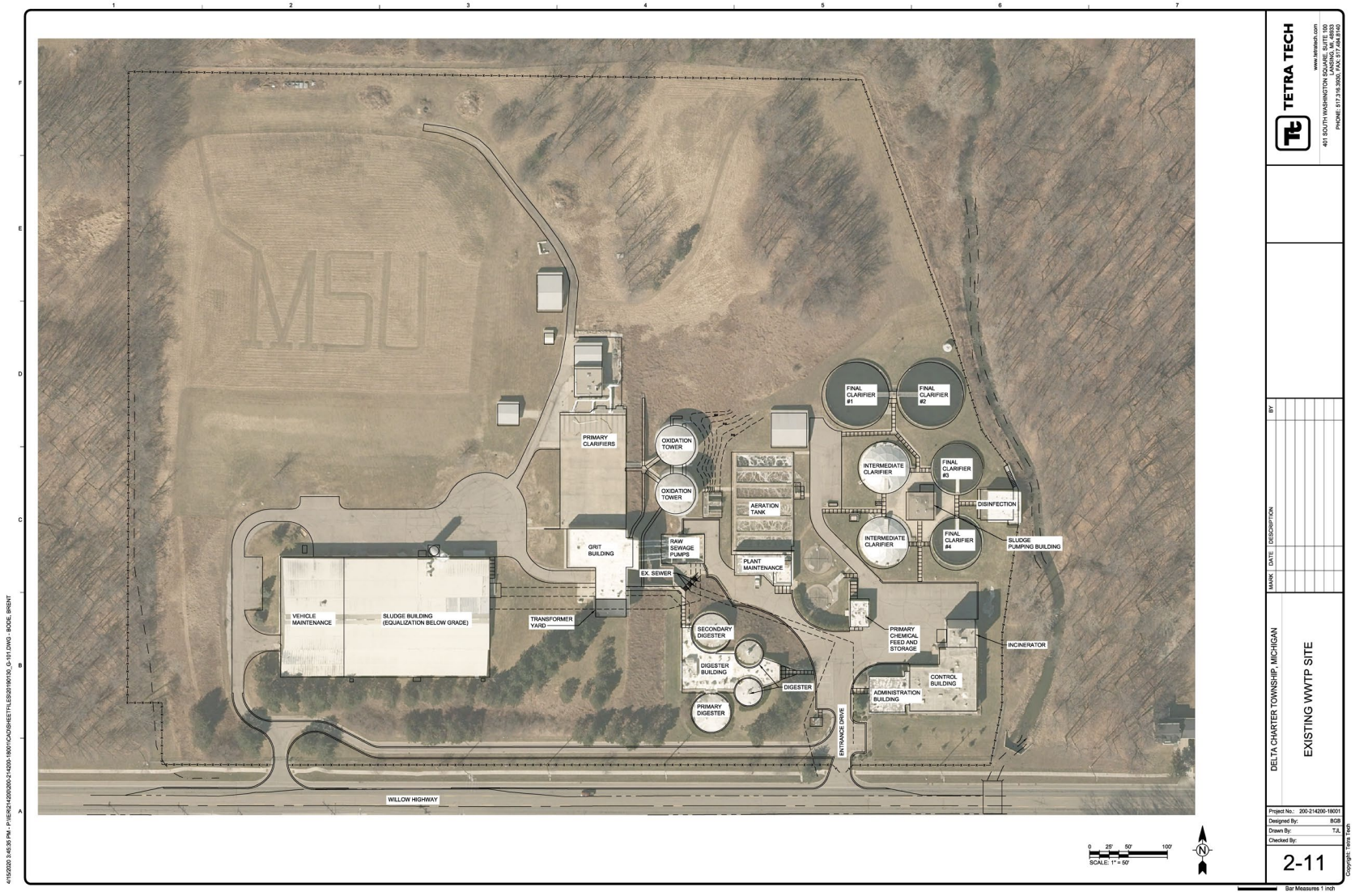

Figure 2-11. Aerial View of Delta Charter Township WWTP

The following is a summary of the wastewater treatment processes at the Delta Township WWTP.

2.5.1.1 Influent Raw Sewage Pump Station

Description and Capacity

The raw sewage flow is conveyed to the Delta WWTP by three gravity sewers to the influent raw sewage pump station. The influent flow is recorded by three Parshall flumes. The flumes then discharge into an influent channel which feeds the raw sewage pump wet wells.

Raw sewage is transferred by eight, 2,000 gallon per minute (gpm) submersible pumps to the influent screens at the WWTP. Four of the pumps are equipped with variable frequency drives (VFDs) and four are constant speed. Sets of two pumps are connected to a common 16-inch discharge header with a flow meter that then discharges to the screen influent channel. The pumps have a firm rated capacity of 17.4 MGD.

Table 2-5 summarizes the influent pump parameters in the Influent Raw Sewage Pump Station.

Table 2-5. Influent Pump Parameters

Item	Description
Pump Type	Submersible Centrifugal
Pump Capacity	2,000 gpm @ 75 feet TDH
No. of Pumps	8
Installation Date	2014, 2017
System Firm Capacity	17.4 MGD

Note: TDH – Total Dynamic Head

Condition

The pumps are in fair condition and the four pumps equipped with VFDs have been recently repaired or replaced. Only six of the pumps may operate at one time due to hydraulic limitations of the existing pump wet well configuration and the downstream screening and grit removal system. The piping, valves and pipe supports are in fair condition. The concrete structure is in fair condition; there are areas of concrete cracks and spalling that need to be repaired. The VFDs appear to be undersized for the pump load. The stop plates are not functional.

The current wet well configuration does not allow for additional pumps to be installed and WWTP staff tried to install higher capacity pumps in the existing location but that resulted in cavitation of the pumps because of the hydraulic limitations of the wet well. Therefore, the current pumping system is a limitation to capacity expansion at the WWTP. The limited wet well volume also results in pumps cycling on and off frequently during low flows. This results in high electricity demand due to the pump starting electrical in rush. This then results in higher electrical demand fees and cost.

2.5.1.2 Preliminary Treatment System

Description and Capacity

The screening and grit removal systems were constructed in 1986 as part of the WWTP expansion. The bar screens and grit equipment were replaced in the mid-2000s. These systems are in the upper level of the Grit Building at the west portion of the WWTP. The building also houses the primary sludge pumps, electrical equipment, and odor control unit.

The influent raw sewage flow is screened by two mechanical bar screens to remove large debris and rags. The screens have ½-inch spacing between the bars. The screenings are removed by a scraper system attached to a

chain. The scraper travels across the face of the bar screen, removing the debris. The submerged components of this type of mechanism are susceptible to wearing and jamming. The collected screenings are disposed on a serpentine conveyor belt that then deposits the material into a dumpster for disposal at a landfill. The collected screenings are not washed or compacted, resulting in higher than necessary hauling frequency due to uncompacted waste volume and increased cost of disposal due to high water content. The capacity of the existing screening and grit removal system is a limitation to WWTP expansion.

Table 2-6 summarizes the parameters for the screen equipment located in the Grit Building.

Table 2-6. Screen Equipment Parameter

Item	Description
Screen Type	Mechanical Bar Screen
Number of Units	2
Screen Width	4'-0"
Bar Spacing	½-inch
Unit Rated Capacity	8.65 MGD per Screen
System Firm Capacity	8.65 MGD

The screened wastewater then flows to two aerated grit tanks. The grit and heavier solids settle to the bottom of the tank. By removing this material, the system helps to protect downstream equipment and operations, preventing the plugging of piping and reducing the wear on pumping equipment. The material is conveyed by an air lift pump from the center of the tank to two grit washer units where organic material is cleaned off and drained back to the influent flow. The cleaned grit is then deposited on the serpentine conveyor with the material collected by the bar screens and then deposited in the roll-off dumpster to be taken to the landfill. The air for the grit tanks is provided by three grit blowers. The blowers are in the lower level of the Grit Building. The blowers are in fair condition.

Table 2-7 summarizes the grit equipment parameters.

Table 2-7. Grit Equipment Parameters

Item	Description
Grit Removal	Aerated Grit Tank with Air lift pump
Number of Tanks	2
Tank Size	21' x 21'x 14' side water depth (SWD)
Volume	46,200 gallons
Peak Capacity at 5 min Detention Time	11.1 MGD

Flow can be diverted from downstream of the bar screens or the primary clarifier tank effluent to the 5-million-gallon equalization basin. The basin is located below the Solids Handling Building and consists of four 91' x 75'-6" chambers with a depth of 24'-4". The basin is equipped with four mixing pumps to keep solids suspended. The stored flow is returned to the raw sewage influent pumps by a pneumatic control valve. The pumps are accessible from the stairway in the Solids Handling Building.

Table 2-8 summarizes the equalization basin parameters.

Table 2-8. Equalization Basin Parameters

Item	Description
Storage Capacity	5.0 million gallons
Tank Size	4 chambers, 91’ x 75’-6”
Pumps	4 Pumps (3,200 gpm @ 22’ TDH)

Condition

Equipment

The hydraulic capacity of the screens and grit system is a limitation to capacity expansion at the WWTP.

The mechanical bar screens were replaced in 2005 and are nearing the end of their expected life and replacement materials are obsolete. The units have been rebuilt every five years and after the last rebuild there isn’t adequate material left for another rebuild so the unit will need to be replaced. As a result of the ½-inch bar spacing, rags and other material pass through the screens. This results in operational issues in downstream processes, such as rag accumulation in the digester tanks. The screening units are critical to the WWTP operation and failure of the equipment will result in reduction of the capacity to treat influent flow. If the screening system were to fail, the face of the screen unit would be blinded off and the pumped raw sewage would not be able to flow to downstream treatment processes. This could result in service system backups and overflows. The equipment should be replaced before it reaches the point of failure, within the next five years.

The aerated grit equipment has reached the end of its expected life. The system maintains operation, but the equipment is in need of replacement. The use of air for mixing in the system releases odors and is inefficient. While they are still operational the units have seen an increase in maintenance and, given the age of the equipment, acquiring replacement parts has become more difficult. The classifier units will require replacement within the next five years.

The screening and grit pleated conveyor is in poor condition and has also reached the end of its expected life and is need of replacement. The WWTP has modified the conveyor system and fabricated their own replacement parts in the past to maintain operation.

The current sampler units are obsolete technology and should be replaced.

The odor control unit is located adjacent to the garage area within the building and treats the air from within the grit building. The unit control panel internals are corroded due to the environment where it is located. This unit has exceeded its useful life and needs to be replaced.

The equalization basin mix pumps appear to be operating well and have limited hours because they are only used when the basin is in operation. The pumps and mixing system should continue to be exercised, maintained, and monitored for condition. The system will need to be replaced in the next 10 to 15 years.

Structures

The grit building shows signs of age and deterioration. There are large structure cracks at the connection of the existing screw pump trough to the building. Within the grit removal portion of the building masonry block is showing signs of deterioration. Moisture has been found in the insulated space between the masonry block and face brick. This has led to the deterioration of both the masonry block and the face brick. This appears to be the result of the moist air within the building penetrating the masonry block and not draining because of inadequate weep holes on the exterior of the building. The large ventilation fans in the area were previously removed. Therefore, the screening and grit area have inadequate ventilation. Given the classification of this area and environment, additional ventilation is recommended. Structural and ventilation issues need to be addressed quickly to prevent further deterioration of the building.

Also within the building, the existing lintels are corroding and need to be cleaned and repainted, the doors need to be replaced or repainted, the building sealants need to be replaced, and spalled concrete needs to be repaired. The WWTP typically replaces the building doors every five years. The precast soffit panels on the exterior of the building are deteriorated at the top and need to be repaired. The building roof will also need to be replaced in the near future.

The equalization basin was inspected and found to be in good overall condition. The basin base slab and walls are in good condition with some concrete cracks. The upper slab has numerous cracks that show signs of leaching and efflorescence. The upper slab above the south cells has noticeably more cracks than the northern two cells. This is possibly due to the sludge cake storage area over this portion of the basin and the handling equipment operation.

Electrical

The WWTP main power supply from the Lansing Board of Water and Light (BWL) enters in the south side of the grit building. The WWTP primary switchgear and transformers are located on concrete pads under a canopy on the south side of the building. The main electrical gear is located in a room within the grit building adjacent to the odor control system and screenings dumpster area. As a result of the corrosive environment the electrical components have corroded.

The electrical system is in poor condition and the WWTP has experienced recent issues with shorting of the cables in the bus duct. There are also concerns with the influent power distribution feeds. The influent transformers and switchgear are more than 30 years old and have exceeded their expected life. The electrical gear and motor control center are beyond the normal service life for this type of equipment. The existing power factor unit is obsolete and no longer supported because the manufacturer has gone out of business. Due to the critical function of this electrical equipment, replacement should be planned in the immediate future.

2.5.1.3 Primary Treatment and Equalization

Description and Capacity

Effluent from the grit tanks flows to the four rectangular covered concrete primary clarifier tanks. The WWTP typically operates two of the primary tanks for primary treatment of the influent raw sewage, one primary tank is utilized for handling the supernatant flows from the digester and WWTP recycle flows before they are returned to the WWTP flow for treatment and the fourth tank is typically empty to serve as a standby during high flows or if other tanks need to be taken out of service.

At the north end of each tank are three sets of effluent launders. Flow overflows weirs in the tank into the troughs then combines into one channel that flows to the biological treatment processes. Primary clarifier effluent can also be diverted to the equalization basin for storage during high flows.

The WWTP utilizes the primary clarifiers for collection of primary solids from the influent raw sewage and to settle and collect waste activated sludge (WAS) collected and pumped from secondary clarifiers.

The solids settle within the primary clarifiers and are collected by a chain and flight mechanism that travels across the length of the tank. The collected material is then pushed into a cross-collector sump at the south end of the clarifier. Here the cross-collector auger pushes the solids into the inlet of the primary sludge pump suction pipe. The primary sludge is then pumped to the digester tank by air driven diaphragm pumps. The scum collected from the surface of the clarifier is sent to the head of the WWTP.

The air in the space between the tank cover and water surface is collected and treated by a chemical odor control unit along with the air collected from the oxidation towers and intermediate clarifier. The air is blown into the odor unit from an inline fan in the ductwork adjacent to the building. The air flows through the odor control vessel where sodium hypochlorite is added to control odors and is then vented to the atmosphere. The odor control unit

is located in the building to the north of the primary clarifier tanks. The equipment was installed as part of the 1986 project.

The peak capacity of the tanks is determined based on Ten States Standards recommendation of 1,200 gallons per day per square foot (gpd/sf) for primary clarifiers that are used for co-settling waste activated sludge (WAS) from the secondary clarifiers with the primary sludge from the primary clarifiers. When tanks are used for co-settling operation there is a greater possibility that solids will be washed over the effluent weirs at higher flows because of the lighter nature of the WAS as compared to the heavier primary sludge. The capacity guidelines for a tank handling only raw sewage flow is 2,000 gpd/sf.

Table 2-9 provides a summary of the primary clarifier tank parameters.

Table 2-9. Primary Clarifier Tank Parameter

Item	Description
Number of Clarifiers	4
Length	145’
Width	20’
Side Water Depth	10.8’
Surface Area of Tank	29,000 sf
Volume of Tank	38,770 gallons
Ave Day Firm Capacity (1,000 gpd/sf)	8.7 MGD
Peak Hour Firm Capacity (1,200 gpd/sf)	10.4 MGD

Condition

Equipment

The WWTP has performed thorough maintenance on the existing equipment, servicing and repairing the sludge collector mechanisms and drives within the primary tanks. Given the overall age of the mechanism though the system flights and chains, drive units, gears, and shafts will need to be replaced within the next 5 to 10 years. The cross-collector mechanism drive and auger at the end of the tanks are original equipment and are in need of replacement. The scum collection trough and gear mechanisms are in poor condition and in need of replacement. The primary sludge pumps are air driven diaphragm pumps originally installed in 1986 and the WWTP has rebuilt the units. Given the age of the existing pumps and difficulty finding replacement parts, the existing pumps shall be replaced. The pneumatic actuators on the primary tank sludge suction lines are obsolete and in need of replacement because spare parts are no longer available.

The Odor Control unit and chemical feed system have exceeded their expected life and are need of replacement. The odor control system is also not operational during the winter because the ductwork and supply fan will freeze from the moisture in the air.

Structure

The interior of primary clarifier tank No. 2 was inspected in support of the Evaluation and Master Plan. The inspection found the bottom slab of the tank to be in good condition. The walls of the tank had vertical and diagonal cracks and at the south end of the tank there was a construction joint that was leaking. The top slab had traverse cracks every 2 to 6 feet. It appeared that some of these cracks were leaking. It is expected that the other tank conditions are similar. The current cracks should be repaired to prevent any further deterioration of the

concrete. The tank hatch frames and hinges are corroded and require repair or replacement. Addressing these concerns will restore the tanks to good condition.

The odor control ductwork is supported on wooden timber stands. The supports appear to be in fair condition, but they should be monitored, as the wood will deteriorate over time and require replacement.

The odor control building is in fair condition with some deterioration of surfaces due to the storage and pumping of the chemicals in the building. The roof is in need of replacement.

2.5.1.4 Oxidation Towers and Intermediate Clarifiers

Description and Capacity

The primary effluent flows to two, 50-foot-diameter oxidation towers. Each tower has a rotary distributor that feeds the flow across the surface of the tower media. The flow then travels down through the plastic media to the bottom of the tower.

As the flow travels through the media, a biofilm grows on the surface. Air travels through the media and is vented to the odor control system. The organisms within the biofilm remove BOD. As the biofilm grows, some is washed off the media and carried in the flow to the intermediate clarifiers. The clarifier has a rotating circular scraper mechanism that pushes the settled material to the center of the tank. The settled solids are pumped by the intermediate sludge pumps to the digester. The intermediate clarifiers have domes to maintain odor control.

The oxidation towers are a critical part of the WWTP process because they remove a portion of the BOD of the influent wastewater flow prior to the aeration tanks. Failure of the oxidation towers would stress the aeration system treatment capacity. If primary effluent flow were to be diverted around the oxidation towers the BOD and ammonia loadings would stress the capacity of the existing aeration system. This could result in failure to meet discharge limit requirements.

The effluent flow from the intermediate clarifiers flows to the splitter structure at the head of the aeration tanks.

Table 2-10 provides a summary of the oxidation tower and intermediate clarifier parameters.

Table 2-10. Oxidation Tower and Intermediate Clarifier Parameters

Item	Description
Number of Oxidation Towers	2
Oxidation Tower Diameter	50 feet
Oxidation Tower Volume	35,343 cubic feet (cf)/tower
Peak Hourly Firm Capacity	5.7 MGD
Number of Intermediate Clarifier	2
Intermediate Clarifier Diameter	60 feet
Ave Day Firm Capacity (1,200 gpd/sf)	3.4 MGD
Peak Hour Firm Capacity (1,500 gpd/sf)	4.2 MGD

Condition

Equipment

The oxidation tower media and rotary distributor for the oxidation towers have exceeded their useful life and are in poor condition and in need of replacement. The equipment was originally installed as part of the 1986 project. The plastic media is self-supporting, and the plastic is deteriorating which could result in a collapse of the

material. The rotary distributors are also showing deterioration. This equipment is critical to the treatment capacity of the existing WWTP and it should be replaced soon. If these components were to fail it would impact the WWTP treatment during high flows.

The intermediate clarifier mechanisms are also in need of replacement. The mechanism drives have exceeded their useful life and the mechanism steel is in need of rehabilitation or replacement.

The existing oxidation towers and intermediate clarifiers is a limitation to WWTP capacity and ability for expansion.

Structure

The oxidation towers were inspected and found to be in need of repairs. The original masonry block that the tower was constructed of has deteriorated and a concrete wall was constructed around the tower in 2010. The tower dome structure still bears on the masonry block and this needs to be repaired. There is a waterproof liner on the face of the masonry that is attached to the walls by fiberglass battens; a portion of this liner has come unattached. There are some areas of the concrete dome where the waterproofing has failed and concrete spalling and steel reinforcing is visible. The structure would need extensive rehabilitation that can only be completed with the removal of the tower media and cover. The interior liner should be replaced so that the deteriorating masonry block in the walls can be addressed. The upper portion of the tower wall where the cover bears on the masonry block should be replaced so that the weight of the cover is transferred to the exterior concrete wall instead of the block. As part of repairs to the towers the existing precast concrete cover should be replaced with an aluminum cover. This would reduce weight on the walls.

The clarifier structures were inspected for the Evaluation and Master Plan and found to be in fair condition. There are portions of spalled concrete that need to be repaired and cracks that need to be sealed. The sealant around the dome covers should also be replaced. The tank dome cover support legs need to be repaired.

2.5.1.5 Aeration System

Description and Capacity

Flow from the oxidation tower and intermediate clarifier and to Flow Split No. 3. The flow is mixed with the return activated sludge (RAS) from the secondary clarifier tanks by two vertical mixers. The flow is then split between the six aeration tanks by weir gates. During wet weather events a portion of the primary effluent flow can be diverted around the Oxidation Towers to the aeration tanks.

The aeration tanks were constructed in 1965 and 1972 and consist of six tanks with fine bubble diffusers. The air for the aeration system is supplied by five blowers. The four multistage blowers were installed as part of the 1986 expansion and one high speed turbo blower was installed in 2014.

The effluent from the aeration tanks then flows to Flow Split No. 6 where the flow is divided between the four secondary clarifier tanks.

Table 2-11 summarizes the aeration tank parameters.

Table 2-11. Aeration Tank Parameters

Item	Description
Number of Aeration Tanks	6
Tank Dimensions	20 ft x 72 ft x 17 ft
Tank Volume	24,480 cf
Average Day Firm Capacity	4.86 MGD

The aeration tank capacity is based on the Ten States Standards requirement for aeration system loading. For a system to meet nitrification requirements, it must be designed for a loading of 15 pounds (lb) BOD/1000 cf. The existing oxidation tower is assumed to provide 40 percent reduction in BOD based on monthly operating report (MOR) data and industry guidelines. Based on these criteria, the current average loading to the aeration tanks is 40 milligrams per liter (mg/L) BOD. Given this loading condition, the existing aeration system has an average daily capacity of 4.86 MGD. If the oxidation towers were not operational, the average daily capacity of the aeration system would be 3.24 MGD.

The aeration system is a critical part of the WWTP treatment process, and its operation needs to be maintained. The current system has redundancy in tanks and air sources within the tank but impacts to the main air header from the blowers would leave the system without air and inoperable; this would have the WWTP without secondary treatment and likely violation of the discharge permit requirements. Also, failure of the upstream oxidation tower equipment would greatly increase the loading to the aeration system.

Condition

Equipment

The aeration diffusers and piping appear to be in fair condition but are nearing the end of their expected life. Over time the piping becomes brittle and susceptible to cracking and the diffuser discs to plugging, requiring cleaning or replacement. The diffuser system will require replacement in the next 5 to 10 years. It should be noted that the replacement of the system will not increase the rated capacity.

The current piping appears to be in fair condition but there are some noticeable leaks which affect system operation. The flexible couplings on the main air header are steel construction and deteriorating. There is no means to replace these couplings without taking the entire system out of operation. Therefore, this is a critical operation item that should be addressed.

The aeration tank gates and frames between tanks are highly corroded and are in need of replacement.

The existing multistage blowers are nearing the end of their expected life and will need to be replaced within the next 10 years. Implementation of modern technology blowers such as the new high-speed turbo blower would significantly improve efficiency and operating costs. Potential efficiency gains could warrant earlier replacement. The new high-speed turbo blower is in good condition.

Structure

The existing concrete tanks are almost 50 years old and are showing considerable deterioration above the water surface and along the walkways around the tanks. There are also portions of deteriorated concrete and cracks below the water level. The concrete surfaces below the water line are also deteriorating. This concrete needs to be repaired to ensure the existing reinforcing steel is not further corroded and to maintain the structural integrity of the tanks.

The WWTP reconstructed Flow Split No. 6 as part of the 2014 project and this concrete is in good condition.

The blower/maintenance building roof is in poor condition and needs to be replaced. The building doors and windows are also deteriorating and in need of replacement.

The HVAC equipment within the building need to be replaced.

Electrical

The electrical gear within the blower building is nearing the end of its expected useful life and should be replaced. This will ensure reliable operation of the equipment and the safety of the staff.

2.5.1.6 Secondary Clarifiers and RAS Pumping

Description and Capacity

There are two sets of secondary clarifiers, two 60-foot-diameter tanks constructed in 1972 and two 80-foot-diameter clarifiers constructed in 1986. The flow to the clarifiers is split by weir gates in flow split structure No. 6 and is fed through 24- and 30-inch pipe to the center of each clarifier. The existing clarifier effluent troughs are very shallow and provide limited freeboard between the water surface in the troughs and the effluent weirs. During wet weather flows the effluent weirs can be become submerged as the result of the limited hydraulic capacity of the downstream UV system. This can result in solids carryover out of the clarifiers.

The clarifiers have a sludge suction header with orifice opening attached to the rotating mechanism. The header draws settled sludge off the bottom of the clarifier to the RAS pumps. The removal rate from each clarifier is controlled by telescoping valves located adjacent to the Sludge Pumping Building.

The RAS is pumped by three pumps back to the aeration tank Flow Split Structure No. 3.

Table 2-12 provides a summary of the secondary clarifier parameters.

Table 2-12. Secondary Clarifier Parameters

Item	Description
Number of Secondary Clarifiers	2 – 60 ft diameter 2 – 80 ft diameter
Peak Hour Firm Capacity (1,200 gpd/sf)	12.8 MGD

Condition

Equipment

The clarifier mechanism and drive equipment have exceeded their expected life and are in need of replacement. The WWTP recently repaired the drives on two of the mechanisms because of failures. The mechanisms are showing signs of wear and are in need of replacement. Though not inspected, the clarifier center columns are likely also deteriorating. The clarifier bridges and handrail should be repainted. The entire clarifier mechanisms including center column, motors, drives, scraper mechanism, skimmer arms, scum troughs and bridges should be replaced in the next 5 to 10 years.

The existing RAS pumps were installed in 1986 and the seals have been replaced but the pumps cannot be rebuilt, therefore they will need to be replaced in the next 5 years.

Structure

The tank structures were inspected in support of the Evaluation and Master Plan and found to be in fair condition. There are some concrete cracks that require repairs. The handrail on the 60-foot-diameter clarifier needs to be replaced. Inspection of Secondary Clarifier No. 3 found an impression on the concrete slab approximately 2' diameter by 4" deep to the south of the center column. There was standing water in the clarifier so a visual inspection of this area was not possible, but it is possible a portion of the grout topping has delaminated and broken loose.

The roof on the sludge pumping building is in poor condition and in need of replacement. The joints at the edge of the roof are separating. The floor drains within the building don't work. The building doors and windows need to be replaced.

Electrical

The electrical disconnects at the clarifier drives should be replaced. The electrical equipment in the sludge pumping building also needs to be replaced.

2.5.1.7 Disinfection Facilities

Description and Capacity

The secondary effluent from the clarifiers is disinfected before it is discharged to the Grand River. The UV Disinfection Building was constructed in 1986. In 2016, the WWTP replaced the original disinfection system with new, inline ultraviolet disinfection units. The final disinfected effluent then flows down a cascade to entrain oxygen into the water before it is discharged into the river.

Table 2-13 provides a summary of the ultraviolet disinfection parameters.

Table 2-13. Ultraviolet Disinfection Parameters

Item	Description
Number of UV Units	3
Installation	2014
Unit Capacity	5 MGD
Firm Capacity	10 MGD (8 MGD Hydraulically)

Condition

Equipment

The UV equipment is new and in good condition, but the capacity of the units appears to be hydraulically limited. This causes difficulties during high flows and causes the flow to back up into the secondary clarifier effluent troughs. This limits the treatment capacity of the WWTP. The existing system should be modified by adjusting the hydraulic profile or modifications to the equipment.

Structure

The UV building is in fair condition. The south wall has cracks in the masonry that need to be repaired. The building doors, windows and roof are in need of replacement.

Electrical

The electrical equipment is in good condition and was recently replaced as part of the UV system improvements.

2.5.1.8 Chemical Systems

Description and Capacity

The WWTP feeds ferric chloride for phosphorus removal. In addition, lime is fed for dewatering solids. The chemical storage tanks and feed pumps are located in the Chemical Feed Building, which was constructed in 1986. There are four chemical storage tanks, one chemical storage day tank, chemical transfer pumps, and chemical feed pumps. The ferric chloride is fed between the aeration tank effluent and secondary clarifiers. Lime is fed at the Solids Handling Building for solids dewatering. The storage tank sizes are summarized in Table 2-14.

Table 2-14. Chemical Tanks Parameter

Item	Description
Storage Tank No. 1 and 2	5,000 gals
Storage Tank No. 3 and 4	2,750 gals
Day Tank	1,040 gals

Condition

The existing chemical storage tanks have exceeded their useful life and should be replaced to prevent leaking of the chemicals. Given the construction of the building, the only way to remove the existing chemical tanks is to remove the building roof. The two 2,750-gallon tanks are also located below the floor of the building, so they would need to be rigged to slide over for removal through the roof or the existing concrete floor would also need to be removed. The chemical feed pumps have been replaced as needed over time.

2.5.1.9 Odor Control System

Description and Capacity

The WWTP controls odor on the site through the use of chemical odor control units. The units utilize sodium hypochlorite to oxidize the odorous compounds in the air stream. The air passes through a sealed fiberglass reinforced plastic (FRP) vessel. A sodium hypochlorite solution is sprayed into the vessel. As the air passes through, a chemical reaction occurs breaking down the odorous compounds. The solution is recirculated through the vessel. The system consists of ductwork to collect the air, fans, odor control vessel, chemical storage tanks, chemical feed pumps, brine tank, and recirculation pumps.

The WWTP has three odor control units to treat the air. One unit is located in the Grit Building and treats the air from the screening room and aerated grit tanks. Another unit is located in the building north of the primary clarifiers, the Salt Building, and treats the air from the covered primary clarifier tanks, oxidation towers, and intermediate clarifiers. The largest unit is in the Solids Handling Building to treat air from the sludge dewatering and storage rooms.

Table 2-15 summarizes the odor control system parameters.

Table 2-15. Odor Control System Parameters

Item	Description
Solids Handling Building System	44,000 cfm (2 – 22,000 cfm units)
Grit Building System	12,000 cfm
Primary Clarifiers and Oxidation Towers System	24,000 cfm

Note: cfm – cubic feet per minute

Condition

The existing units and equipment have exceeded their useful life and are providing limited effectiveness for odor control. Some of the odor vessels appear to be delaminating. The control systems are not functioning properly and are highly corroded. The three odor control systems should be replaced.

2.5.1.10 Waste Activated Sludge Thickening System

The WWTP has an existing WAS thickening centrifuge but it is not being used.

2.5.1.11 Digestion System

Description and Capacity

The WWTP utilizes two, 50-foot-diameter and two, 35-foot-diameter digesters for anaerobic digestion. The two smaller digesters were constructed in 1965 and the larger digesters in 1986. The solids collected in the primary clarifier tanks are pumped into the primary digesters. The anaerobic digester is a biological reactor where microorganisms convert a portion of the volatile suspended solids to methane and carbon dioxide, which decreases the volume of sludge to be dewatered and land applied. This gas is then burned either in the boiler unit or through the flare.

The digested solids are then pumped to the secondary digesters for storage prior to being pumped to the Solids Handling Building for dewatering.

Table 2-16 provides a summary of the digester parameters.

Table 2-16. Digester Parameter

Item	Description
50 ft Diameter Digesters Volume	2 – 345,000 gallons
35 ft Diameter Digesters Volume	2 – 168,000 gallons

Condition

Equipment

The digester system consists of many components: pumps, heat exchangers, boilers, valves, piping, gas compressors, blowers, and controls. The majority of this equipment was installed as part of the 1986 construction. This equipment is nearing or has exceeded its useful life and needs to be replaced in the next 5 to 10 years. As part of the equipment replacement newer, more energy-efficient components could be installed.

Currently the WWTP struggles with the accumulation of rags and other nonorganic material within the digester tanks. This material affects system performance and reduces the operating volume of the system. Improvements to the influent raw sewage screening will reduce the volume of the material in the future but the WWTP is struggling to remove what has currently collected in the tanks.

Structures

The internal portions of the tanks were not inspected. Based on the inspection of the exterior of the tanks and the digester building, structures appear to be in good condition with some concrete spalling and cracks that need to be repaired. The digester building has issues with drainage around the structure. The WWTP has modified the existing floor drains and constructed a sump pit. The tunnel between the digester and grit building leaks and is in need of repair. The roofs on the structures are poor and in need of repair. To facilitate future cleaning of the tanks new larger manway access openings should be provided in the tank walls above grade. These openings shall be leak proof and not compromise the tank structure.

2.5.1.12 Solids Handling System

Description and Capacity

Digested sludge is pumped to the Solids Handling Building, located over the northeast portion of the equalization basin. The sludge is dewatered by filter plate press units. Lime and ferric chloride are added to the sludge in the reactor tanks. The sludge is then pumped into the plate press unit at high pressure. The water is pressed out through the filter plates and the dewatered solids remain. At the end of the cycle, the plates are released and the dewatered material falls to a conveyor below. The conveyor then deposits the material in the adjacent dewatered cake room where the material is stored until it is land applied by a licensed contractor. Table 2-17 summarizes the filter plate press design parameters.

Table 2-17. Filter Plate Press Parameters

Item	Description
Type of Solids Dewatering Equipment	Filter Plate Press
Number of Units	2
Unit Capacity	950 lb/hr
Current Ave Feed Rate	876 lb/hr

Condition

Equipment

The equipment includes sludge feed pumps, filter plate press, conveyors, reactor tanks and mixers, chemical feed equipment, lime storage silo, and the odor control equipment. This has all exceeded its expected life and is in need of replacement. One of the filter presses had a recent failure and is currently scheduled for repair. This limits the WWTP redundant capacity for dewatering sludge. The chemical storage and feed system are also in poor condition and in need of replacement.

The building HVAC and electrical components are in poor condition and in need of replacement.

Structure

The building structure is in fair condition. The roof panels need to be replaced. The filter press platform was damaged during the equipment failure and will be further evaluated after the unit has been removed.

As part of the equalization basin inspection it was noted that there were noticeably more cracks in the upper slab under the dewatered sludge storage portion of the basin.

Electrical

The electrical components in the building are failing as a result of the corrosive environment and need to be replaced.

2.5.1.13 Laboratory, Control and Operations Building

Description and Capacity

The control building was originally constructed in 1972. The building was renovated and expanded in 1986 to include the administrative offices. The building has had small renovations since then. The building houses WWTP staff, operations, the control room, and the laboratory. Also located in the northeast portion of the building is the abandoned incinerator unit.

Condition

The building is in good condition but the space it is not effectively utilized. Due to the multiple renovations of the area there are winding hallways and office spaces. The access to and the location to facilities through the building are not ideal.

The abandoned incinerator unit should be removed to allow for better use of space and to remove any environmental risks.

The existing HVAC system has exceeded its expected life and is in need of replacement. This includes fans, heating pumps, air conditioners, and heating controls.

An evaluation of the laboratory facility improvements will need to be performed to identify the best arrangement to meet the analytical testing requirements and quality control for the WWTP operation.

The south building wall appears to be settling and separating from the interior walls. The building roof is in need of replacement.

2.5.1.14 Electrical and Instrumentation

An evaluation of the existing electrical and instrumentation system was performed.

Influent primary electrical feed comes into the WWTP at the Grit Building. Two 13.2 kV primary sources of power are provided by Lansing BWL. There are two separate metering cabinets located on the concrete pad outside the building with two 2000 KVA oil filled pad mount transformers that step the voltage down from 13.2 KV to 480 V/277 V. There are two load interrupter switches per transformer to allow for each transformer to be fed from either source. The switches are manually operated between the primary sources. The transformers have a wye primary and delta secondary. The transformer secondaries are ungrounded. Cable bus is used to connect the transformers to the low voltage unit substation in the electrical room.

The power is distributed at 480 V throughout the WWTP to various motor control centers (MCC) and a second lower level low voltage unit substation. The majority of the MCCs in major process areas are mechanically key interlocked with a tie connection. Automatic power factor correction capacitors are located on each low voltage service to provide for poor power factor correction. The power within the grit and digester building along with the raw sewage influent pumps is distributed by low voltage bus duct.

The existing SCADA control system consists of Rockwell programmable logic controllers. Most are SLC model on data highway plus, some are on Ethernet, and some are connected serially thru DF-1 protocol. The serial units are located at the remote lift stations and communicate via DF-1 protocol to a master SLC controller. The WWTP utilizes 4310 series radios from GEMDS operated on a 450 MHZ frequency to communicate back to the WWTP. The WWTP has been purchasing GEMDS SD-4 series radios to replace existing units. These are newer licensed radios that support serial and Ethernet communications, and are backward compatible with the existing 4310 series modulation scheme. Belden 9463 cabling (Blue Hose) is used for connecting the controllers. A Rockwell gateway consisting of a single control Logix rack with bridge cards connects the existing SLC controllers to the SCADA server via Ethernet. This gateway is a point of singularity in the control system.

The WWTP uses Ignition software for the SCADA application software interface. A single server currently exists for pulling data from the various controllers and pushes the data to numerous Ignition viewing nodes located throughout the WWTP. A second backup server is being installed to provide redundancy. The WWTP SCADA system is interconnected with the Delta Township business system.

The WWTP utilizes some multimode fiber optic cable for communication within the system. Rockwell PM-3000 power monitors are connected with fiber and Ethernet to the WWTP SCADA system.

The electrical system is in poor condition and the WWTP has experienced recent issues with shorting of the cables in the bus duct. There are also concerns with the influent power distribution feeds. The influent

transformers and switchgear are more than 30 years old and have exceeded their expected life. The electrical gear and motor control center are beyond the normal service life for this type of equipment. The existing power factor unit is obsolete and no longer supported because the manufacturer has gone out of business. Due to the critical function of this electrical equipment, replacement should be planned in the immediate future.

2.5.2 Wastewater Characteristics

The WWTP MORs from January to December 2019 were reviewed to identify the influent flow, BOD_5, total suspended solids (TSS), volatile suspended solids (VSS), ammonia-nitrogen (Ammonia-N), and total phosphorus (TP). The wastewater source is made up of domestic wastewater from residential and commercial sources, and industrial wastewater from several industrial facilities.

Average influent flows and strengths are shown in Table 2-18.

Table 2-18. 2019 Influent Flows and Strengths

Month	Influent Flow, Monthly Average, mgd	Influent MAX Flow Monthly Average, mgd	Influent BOD_5, mg/L	Influent TSS, mg/L	Influent Volatile SS, mg/L	Influent Total P, mg/L
January 2019	4.47	7.02	79	156	144	5.60
February 2019	5.53	7.59	63	141	125	3.30
March 2019	5.54	7.80	61	161	133	3.50
April 2019	5.20	7.40	60	160	139	3.80
May 2019	5.32	7.65	75	222	203	3.30
June 2019	6.61	9.27	76	136	121	2.80
July 2019	4.53	6.78	58	154	135	3.50
August 2019	3.83	6.29	51	134	118	3.90
September 2019	3.60	6.67	66	130	116	4.00
October 2019	4.31	7.36	80	142	129	3.50
November 2019	4.73	7.19	75	125	115	3.00
December 2019	5.05	7.63	62	130	120	2.90
Average	**4.89**	**7.39**	**67**	**149**	**133**	**3.59**

2.5.3 Major Industrial Users

The largest industrial users in Delta Charter Township is General Motors.

2.5.4 Collection System and Pump Stations

The collection system consists of approximately 163 miles of gravity sewer pipe, 7 lift stations, and 10 miles of pumped force main. The gravity sewer ranges in size between 8 inches and 42 inches in diameter. Of the 163 miles of gravity sewer main, approximately 22 miles of this piping is 15 inches and larger. The collection system is, and always has been, an entirely separated sanitary sewer system. The sanitary collection system is shown in Figure 2-12.

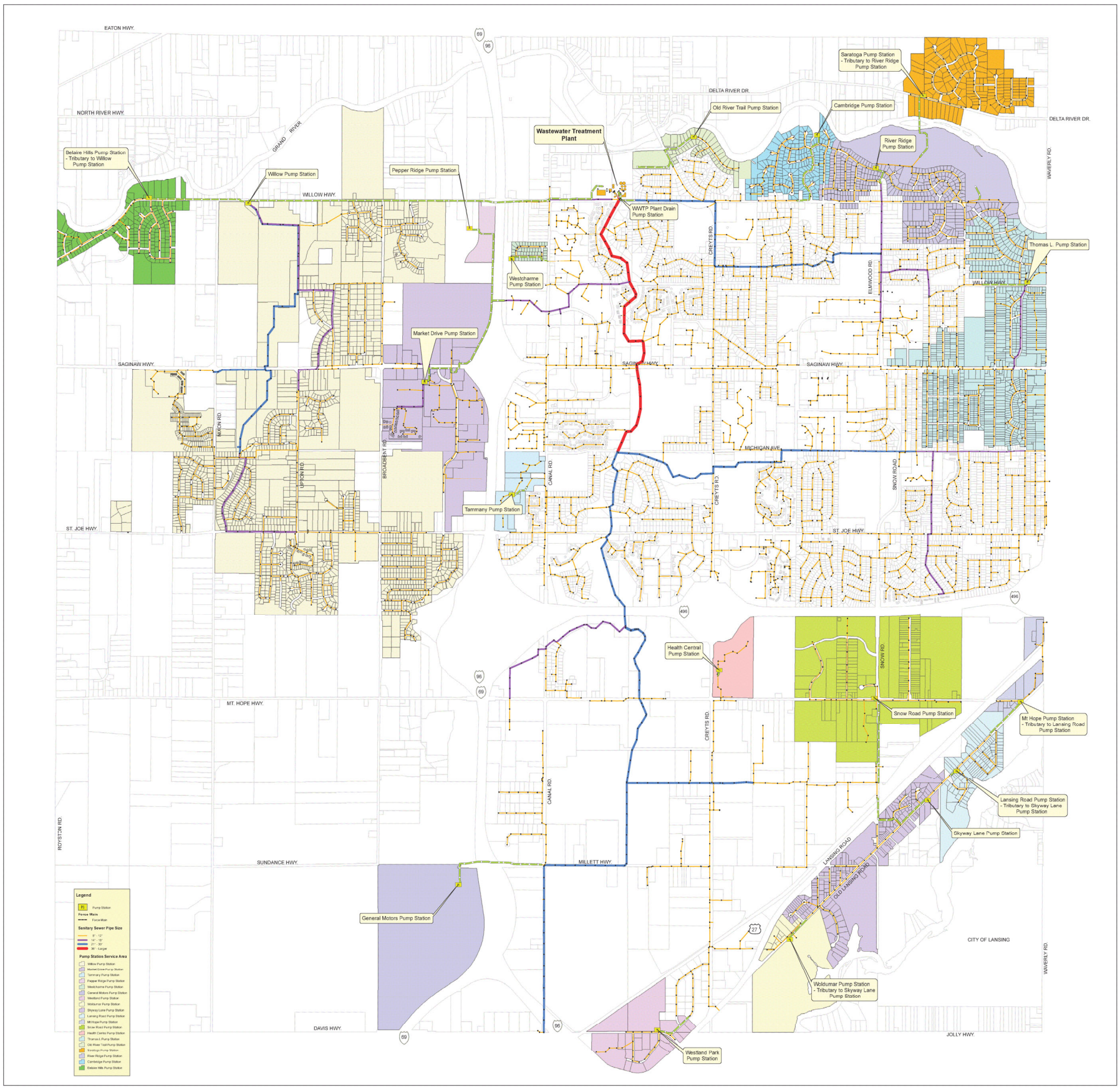

Figure 2-12. Sanitary Collection System and Pump Station Service Areas

The sewage collection system generally flows from the west and east sides of the Township toward the Carrier Creek Interceptor Sewer that lies near the center of the Township. This interceptor sewer flows from the southern end of the Township, north to the WWTP. The Carrier Creek Interceptor Sewer is approximately 5 miles in length and ranges in size between 24 inches and 42 inches. It is constructed of reinforced concrete pipe (RCP) and is generally located off road, following the Carrier Creek county drain.

The first sewers were constructed in 1965 in conjunction with the first WWTP. These sewers were constructed of vitrified clay pipe (VCP) in sizes 15 inches and smaller and of RCP in sizes larger than 15 inches. The system has been continuously expanded since the mid-1960s. Sewer pipe material transitioned from VCP to polyvinyl chloride (PVC) pipe in the 1980s.

A summary of the pipe material, size, and age is presented in Table 2-19.

Table 2-19. Sewer Collection System Parameters

Pipe Material	Length (ft)	Percent of Total
Vitrified Clay	302,230	35.15%
Reinforced Concrete	63,199	7.35%
PVC	446,954	51.98%
Ductile Iron	19,260	2.24%
Truss Pipe	28,147	3.27%
Total	**859,790**	**100.00%**
Pipe Diameter	**Length**	**Percent of Total**
Under 15-inch	741,773	86.27%
15 - 30-inch	107,817	12.54%
Over 30-inch	10,200	1.19%
Total	**859,790**	**100.00%**
Pipe Age	**Length**	**Percent of Total**
1965- 1970	241,652	28.11%
1971 - 1980	111,075	12.92%
1981 - 1990	225,302	26.20%
1991 -2000	147,315	17.13%
2001 - 2010	113,207	13.17%
2011 - 2020	21,239	2.47%
Total	**859,790**	**100.00%**

The Delta Township sanitary collection system contains seven lift stations. Table 2-20 provides the names and addresses of the lift stations along with their capacity, condition, and year of installation or rehabilitation. The pump station service areas were included in Figure 2-12.

Table 2-20. Pump Station Parameters

Name	Address	Discharge Capacity	Condition	Installed/ Updated
Arboretum	761 Arboretum Drive	50 gpm	Good. Includes on-site backup generator.	2005
Breconshire	441 Exeter Court	50 gpm	Good. Does not include on-site backup generator. Portable generator available.	2004
Huntington Woods	304 Huntington Woods	64 gpm	Good. Includes on-site backup generator.	2002
Industrial Park	1319 East Woodland	700 gpm	Good. Does not include on-site backup generator. Portable generator available.	2005
Maplewood Farms	6766 Maple Road	600 gpm	Good. Does not include on-site backup generator. Portable generator available.	1988
Southside	8865 South Ann Arbor Street	1,200 gpm	Good. Includes on-site backup generator.	2005
Sauk Trail	1233 Beach Court	360 gpm	Good. Does not include on-site backup generator. Portable generator available.	1998

The proposed project will not impact the existing collection system and therefore no improvements to the system are planned as part of the SRF program. The Township is conducting separate studies to assess the condition and capacity of the sanitary sewer system. Identified improvements are planned to be paid for by the Township without the aid of SRF loans.

2.5.5 Flow Analysis

The 2019 Delta Township Wastewater Treatment Plant Master Plan includes an analysis of the average day and max flow in addition to wet weather inflow and infiltration calculations. The existing average flow is 4.89 MGD with a maximum day flow rate of 15.3 MGD. Table 2-21 provides a summary of the existing average maximum day,

peak hourly flows, and the projected 30-year flows. The projected flows exceed the existing treatment capacity; therefore, improvements are required.

Table 2-21. WWTP Projection Flows

	Average Day (MGD)	Max Day (MGD)	Peak Hourly (MGD)
Current Plant Flows (MGD)	4.9	15.3	21.1
30-Year Projected Flow Growth	2.7	4.1	6.8
Total 30 Year Flow	***7.6***	***19.4***	***27.9***
Project Service Area Build-Out	1.5	2.3	3.8
Total Projected Flows	***9.1***	***21.7***	***31.7***

The Township does have inflow and infiltration (I/I) in the collection system. Average dry weather flows between March and May, as well as September through November, average 132 gallons per capita per day (gpcd). This value is above the state and federal threshold of 120 gpcd for dry weather flow. As previously described, the Delta Township WWTP has a 5-million-gallon equalization basin to accommodate elevated flows during wet weather. This excess infiltration is approximately equal to 4 million gallons (132 gpcd – 120 gpcd) * 33,526 current population = 4 million gallons).

The average daily flow for the six peak storms during 2019 was 7.30 MGD, or an average of 219 gpcd. This value is less than the state and federal threshold of 275 gpcd. The WWTP improvements are designed to be able to handle the projected flow rates over the next 30 years.

The selection of either of the principal alternatives described below will improve I/I retention and treatment as the plant improvements are designed to store and treat the flow. The existing equalization basin can store flow and the proposed project calls for the existing aeration basin to be modified to provide additional retention onsite.

2.5.6 Combined Sewers

There are no combined sewers in Delta Charter Township.

2.5.7 Combined Sewer Overflows (CSO)

There are no CSOs or bypasses in the Township's sanitary sewer collection system. Within the past five years there has been one sanitary sewer overflow in April 2018. The SSO was due to a broken vent pipe at a private residence and resulted in an estimated discharge of 10 gallons.

2.5.8 Climate Resiliency

The greatest wastewater threats to the Midwest Region, according to U.S. EPA's *Adaptation Strategies Guide for Water Utilities* are altered surface water quality due to increased temperatures and stratification due to temperature increases and high flow and flooding events due to larger precipitation events. The Delta Township WWTP discharges to the Grand River, which is unlikely to experience stratification.

Should elevated temperatures impact the dissolved oxygen concentration in the river, the WWTP should not be impacted. The minimum monthly average dissolved oxygen concentration in the WWTP effluent in 2019 was 12.1 mg/L, which is significantly higher than the current permitted limit of 5.0 mg/L during December through October.

The UV disinfection discharge to the Grand River is currently hydraulically limited, which could be impacted by rising levels. Delta Township is over 100 miles from the discharge location of the Grand River into Lake Michigan. Increases in the Lake Michigan elevation are unlikely to impact the Grand River at the point of the Delta Township WWTP effluent discharge. Larger precipitation events are anticipated to occur and occur more frequently. This could impact the Grand River by changing the channel width or depth and reduced low flows. The increased precipitation could also increase the designated floodplain area. Current 100-year flood elevation at WWTP is 812.0.

Given any electrical problems due to weather anomalies, the plant is equipped with a backup power generator that has sufficient capacity to run two raw sewage pumps. Currently, trailer mounted generators are brought onsite to run other processes. As part of the proposed improvement project, a generator will be installed to provide for all emergency power needs at the plant to maintain treatment during power outages.

2.6 FISCAL SUSTAINABILITY PLAN

The 2014 Water Resources Reform and Development Act (WRRDA) requires the completion and implementation of a Fiscal Sustainability Plan (FSP) as a condition of the SRF loan agreement. The FSP includes the following four items:

1. Inventory of critical assets that are part of the treatment works;
2. Evaluation of the condition and performance of inventoried assets or asset groupings;
3. Certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan; and
4. A plan for maintaining, repairing, funding, and as necessary, replacing the treatment works.

A Fiscal Sustainability Plan (FSP) for the assets described in the Project Plan are included in Appendix C. Delta Charter Township Developed an Asset Management Plan (AMP) in 2016 that contains information on the major assets at the WWTP. A condition assessment of the Delta Township WWTP was also conducted as part of the Wastewater Treatment Plant Master Plan in May 2019.

2.7 NEED FOR THE PROJECT

2.7.1 Orders

The NPDES Permit contains a Schedule of Compliance in Part I.A.9, as well as interim and final permit limits in Part I.A.1. A comparison of the current NPDES Permit limits during the growing season (May through October) for carbonaceous BOD and Ammonia-N to the limits that go into effect on October 1, 2027 is presented in Table 2-22.

Table 2-22. Future Advanced Wastewater Treatment Limits

Pollutant	Current Limit (mg/L)		October 1, 2027 Limit (mg/L)	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Carbonaceous BOD_5	17	26	4	10
Ammonia-N	--	2.0	0.5	2.0

The schedule of compliance is summarized in Table 2-23.

Table 2-23. Schedule of Compliance from NPDES Permit

Requirement	Date	Status
Submit an approvable preliminary engineering report and basis of design for achieving compliance with advanced wastewater treatment effluent limitations	October 1, 2019	Completed
Submit approvable final plans and specifications for achieving compliance with advanced wastewater treatment effluent limitation	October 1, 2023	Pending
Commence construction called for in the approved final plans and specifications	May 1, 2024	Pending
Complete construction called for in the approved final plans and specifications	October 30, 2026	Pending
Attain an operational level necessary to meet the advanced wastewater treatment limits specified in Part I.A.1	October 1, 2027	Pending

2.7.2 Water Quality Problems

The Grand River in Eaton County does have a Total Maximum Daily Limit (TMDL) for *Escherichia coli* (E. coli). The Delta Township WWTP is in full compliance with the disinfection requirements contained in the NPDES permit and is not subject to additional TMDL requirements. In addition, the Grand River, in the vicinity of the Delta Township WWTP, is listed as impaired on EGLE's 303(d) list and is subject to future development of TMDLs. Table 2-24 summarizes the pollutants that appear on the 303(d) list in the vicinity of the WWTP.

Table 2-24. TMDL Concerns for the Grand River near the Delta Township WWTP

Pollutant	TMDL Priority
Dissolved Oxygen	Low
Polychlorinated Biphenyls (PCBs)	Low
Mercury	Low

Compliance with the advanced wastewater treatment limits that go into effect on October 1, 2027 will decrease the BOD and ammonia-nitrogen discharged to the Grand River, which should improve the dissolved oxygen concentrations downstream of the WWTP. The WWTP does not discharge PCBs and is unlikely to be impacted by a future TMDL. The Delta Township WWTP has a 12-month rolling average mercury limit of 2.0 ng/L and is subject to mercury minimization requirements. The goal of the mercury minimization program is to achieve compliance with the water quality standard of 1.3 ng/L. EGLE has determined that end-of-pipe treatment is not financially feasible at this time. EGLE has developed Statewide TMDLs for PCBs and mercury. Delta Township is not subject to PCB limits and is in full compliance with the mercury conditions contained in the NPDES Permit.

Delta Township does not accept septage at the WWTP. The projects here refer to infill in the existing service area and do not contain any unsewered areas. Potential septage disposal problems within the area include lack of treatment plant willingness to accept septage which could result in improper discharge into the environment.

2.7.3 Compliance Status

The State of Michigan, in accordance with the provisions of the National Pollutant Discharge Elimination System (NPDES), has permitted the Delta Township WWTP to discharge municipal treated wastewater from the Township's WWTP to the Grand River. Treated wastewater is discharged in accordance with the discharge limits and monitoring requirements of NPDES Permit No. MI0022799, which was put into effect on October 1, 2019 by the Michigan Department of Environment Great Lakes and Energy (EGLE). A copy of the latest permit is included in Appendix A.

2.7.4 WWTP Performance and Condition

Table 2-25 summarizes the effluent quality for the Township's WWTP for 2019.

Table 2-25. 2019 WWTP Effluent Quality Summary

Month	Effluent BOD_5, mg/L		Effluent TSS, mg/L		Effluent Total P, mg/L		Effluent Ammonia-N, mg/L	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
January 2019	3.45	5.1	9	12	0.65	--	1.1	2.1
February 2019	4.05	4.8	13	15	0.58	--	2.8	4.5
March 2019	3.73	5.0	8	13	0.40	--	4.3	7.0
April 2019	2.26	3.1	6	8	0.30	--	1.0	1.0
May 2019	2.04	2.0	7	8	0.29	--	1.0	1.0
June 2019	2.55	3.2	10	12	0.43	--	1.0	1.0
July 2019	2.09	2.4	7	9	0.39	--	1.0	1.0
August 2019	2.00	2.0	7	8	0.55	--	1.0	1.0
Sept. 2019	2.32	3.1	7	8	0.60	--	1.0	1.1
October 2019	2.06	3.1	7	9	0.55	--	1.0	1.8
Nov. 2019	2.29	2.8	8	9	0.68	--	1.0	1.0
Dec. 2019	2.73	11.6	9	12	0.58	--	1.1	2.2
Average	**2.63**	**4.0**	**8**	**10**	**0.50**	**--**	**1.4**	**2.1**

The effluent quality is currently meeting the NPDES permit standards. While there are no existing effluent problems from the WWTP, the condition of the equipment is deteriorating with age and expected to fail. It is required that the existing process be upgraded to maintain the current level of treatment. In addition, the NPDES Permit requires that the WWTP achieve compliance with advanced wastewater treatment limits by October 1, 2027. The existing WWTP is not capable of achieving the required future permit limits, thus water quality will be adversely affected if the existing process is not upgraded.

A Wastewater Treatment Plant Master Plan was developed for the Township and released in October 2019 that provides a complete analysis of the WWTP's condition of equipment, process treatment capacities, and recommendations for improvement.

2.7.5 Projected Needs

Within the Township service area, the in-fill development is anticipated to increase by 12,148 resident equivalent units (REU) in the next 30 years according to the Wastewater Treatment Plant Master Plan completed in October 2019. The in-fill development includes all sectors, including residential, commercial, and industrial areas. The WWTP current average flow is 81.6% of the original design capacity. EGLE typically requires that a plant expansion evaluation be performed when the current facility flows reach 80% to 85% of the design condition. Currently a majority of the WWTP system does not have adequate firm capacity to meet the current maximum day flow conditions at the WWTP. Also, the majority of the system does not have adequate capacity to meet the projected average or maximum day condition for the 30-year in-fill development. Therefore, in addition to replacement of existing assets due to age and condition, the WWTP requires expansion to meet the anticipated in-fill development over the next 30-year planning period.

Table 2-26 provides a summary of the existing WWTP process firm capacities and provides a determination as to whether the existing WWTP process will be able to treat the projected flows in 2049.

Table 2-26. WWTP Processes and Future Capacities

Process	Firm Capacity	2018 Current Ave Day (4.8 MGD)	2018 Max Day (14.3 MGD)	2049 Design Ave Day (8.0 MGD)	2049 Design Max Day (19.4 MGD)
Influent Raw Sewage Pumping	17.4 MGD	Yes	Yes	Yes	No
Influent Screening	8.65 MGD	Yes	No	No	No
Grit Removal	11.1 MGD	Yes	No	No	No
Primary Clarifier Tanks	10.4 MGD	Yes	No	No	No
Equalization Basin	5.0 MG	Yes	No	No	No
Oxidation Tower	5.7 MGD	Yes	No	No	No
Intermediate Clarifier	4.2 MGD	No	No	No	No
Aeration Tank	4.86 MGD	Yes	No	No	No
Secondary Clarifier	10.7 MGD	Yes	No	Yes	No
Ultraviolet Disinfection	8.0 MGD	Yes	No	Yes	No
Digester Capacity	0.5 MG	Yes	Yes	No	No
Sludge Dewatering (8 hours/5-day operation)	6.0 MGD	Yes	Yes	No	No

The following design criteria were developed by the WWTP administration personnel as items to be addressed in the Project Plan:

- Utilize existing WWTP processes and structures to the maximum extent possible
- Improve treatment capacity (or firm capacity of individual processes)
- Implement efficient treatment technology
- Optimize operation and maintenance costs
- Optimize site layout

- Coordinate with existing processes
- Plan for reliable long-term function of the systems
- Allow for future expansion
- Cost effective construction

Two alternatives were evaluated based on the opinion of probable construction cost, estimated annual operation cost, and present worth analysis.

2.7.6 Future Environment Without the Proposed Project

Without the proposed project, the WWTP will not be able to adequately continue to treat the current flow rate given the aging infrastructure. Also, the WWTP does not have sufficient capacity to treat the anticipated in-fill development and will therefore not be able to comply with effluent discharge limits set forth in the plant's NPDES permit. Without the increased plant capacity, the water quality of the Grand River watershed would be downgraded as equipment begins to fail and treatment is interrupted. Lack of treatment capacity at the plant due to failed equipment will cause sanitary sewer overflows which in turn will cause adverse environmental contamination. In addition, the environment would be further adversely impacted by using older, less efficient process equipment that requires more energy and provides a greater carbon footprint.

There will be public dissatisfaction with the WWTP if it cannot adequately treat flows, which may impact support for future funding needs and will put the Township at a disadvantage in attracting new businesses and industrial companies to the area. If the WWTP is not able to be expanded, it would stunt growth and development in the township.

3.0 ANALYSIS OF ALTERNATIVES

3.1 IDENTIFICATION OF POTENTIAL ALTERNATIVES

3.1.1 No Action

Delta Charter Township recognizes the need to periodically make improvements at the WWTP. The “No Action” alternative was considered but will not allow the Township to address its current needs and will violate the Schedule for Compliance contained in Part I.A.9 of the NPDES permit (see Appendix A). In addition, many of the assets at the WWTP have exceeded their useful life and require replacement. If these improvements are not made, the WWTP will not be able to continue to comply with the existing NPDES Permit limits or the future advanced wastewater treatment limits that will go into effect on October 1, 2027. “No action” is not considered a viable alternative and is not considered in detail.

3.1.2 Optimum Performance of Existing Facilities

The existing WWTP is performing adequately given the constraints of the age of its equipment. System components are and will continue to be upgraded as necessary as the WWTP ages. Given the in-fill development anticipated to occur in the next 30 years, the future advanced wastewater treatment limits, and the need for increased capacity, this option is not addressed further.

3.1.3 Water and Energy Efficiency

The development of the proposed improvement alternative was focused on reducing the energy consumption at the WWTP by utilizing energy efficient technology and processes while also utilizing the existing site topography to eliminate intermediate pumping between processes. Constructing the proposed aeration system and secondary clarifier tanks at higher elevations on the WWTP site allows the flow from the clarifiers to the proposed tertiary filters to be by gravity, eliminating a need for influent pumping. Locating the tertiary filtration process within the existing WWTP configuration would require large tertiary filter influent pumps, operating continuously, to feed the filters. One of the alternatives proposes that the flow from the proposed tertiary filters can also then flow by gravity through the UV disinfection system to the Grand River without additional pumping.

Additional energy saving improvements include changing from aeration grit tanks to vortex design for the grit removal system. This provides energy savings by no longer requiring blowers for the grit removal system air. The proposed improvements also indicate a change in technology for the sludge dewatering system. The current filter plate press units require the biosolids to be pumped into the unit at a high pressure. The dewatering alternative technology has a considerably lower energy consumption because the flow is fed to the unit at low pressure and the equipment operates at a low horsepower. The proposed alternatives also include the incorporation of variable frequency drives for pumps and energy efficient blowers for providing air to the aeration system in order to reduce energy costs.

The Township also will evaluate the use of the heat from the plant effluent water for the building HVAC system.

In addition, plant effluent water will be available for use as process water, chemical dilution, and to clean tanks and other areas of the WWTP where potable water is not needed.

3.1.4 Regional Alternative

The nearest regional municipal WWTP to the Delta Township WWTP is the City of Lansing WWTP, located approximately 4.5 miles away. The Lansing WWTP has adequate capacity to handle the wastewater from Delta Township, however, the cost for construction of a new 30-inch force main from the WWTP, the cost of buying into

the existing Lansing collection system, the annual flow treatment costs, rehabilitation of the existing equalization basin, and other associated costs far exceed the costs for the other alternatives.

The estimated cost to construct the infrastructure necessary is $46,200,000. In addition, there would be an equity investment fee. This fee is calculated based on the City of Lansing's fee of $8,360 per acre that is a value (updated to 2020 dollars) from the City's June 1975 *Agreement for Construction and Maintenance of Sanitary Sewer System* document. The Delta Township service area is approximately 18,192 acres. It can be assumed that 70 percent of the service area will be included in the calculation. Thus, the equity investment fee equates to approximately $107,000,000.

This value also does not include costs for property/right-of-way acquisition. The present worth of the annual operating and treatment costs of this option are $81,000,000, for a total present worth value of the project of $234,000,000 which far exceeds the present worth of the project alternatives presented below. Additionally, it is not known if there could be an agreement between the communities for this alternative. The wastewater from Delta Township would be coming from a separated sewer system and discharge to the City of Lansing's collection system, which is combined and transports both stormwater and wastewater. The additional flow from Delta Township could result in additional combined sewer overflows within the City of Lansing collection system. For these reasons, this alternative was not selected as a principle alternative.

3.2 ANALYSIS OF PRINCIPAL ALTERNATIVES

3.2.1 Monetary Evaluation

A present-worth analysis has been completed for the principal alternatives as shown in the following tables. Detailed cost estimates are included in Appendix B. The actual engineering and construction cost would be the result of competitive bidding. The analysis assumed the following:

- Capital Costs: construction, construction contingencies, engineering, legal, and administrative costs.
- Salvage Value: equipment components will have useful life of 20 years and structural components 50 years.
- Operation and Maintenance costs are based on the current average day flow.
- Planning Period: 20 years
- Discount Rate: 0.3% for Fiscal Year 2020
- Present Worth Factor for O&M: 19.383624
- Present Worth Factor for Salvage Value: 0.94185

3.2.1.1 WWTP Expansion

Table 3-1 provides a summary of the design conditions for the WWTP expansion alternatives that were presented in the 2019 Delta Township Wastewater Treatment Plant Evaluation and Master Plan. The conditions were validated using a BioWin process model for the existing system.

Table 3-1. Basis of Design and WWTP Loading Conditions

Parameter	Current MOR Average Daily	Original Basis of Design Loading	BioWin Model Projections Loadings	WWTP Evaluation Loadings
Biochemical Oxygen Demand (BOD), mg/L (lb/day)	68 (2,697)	250 (12,500)	101 (4,145)	125 (7,920)
Total Suspended Solids (TSS), mg/L (lb/day)	171 (6,833)	250 (12,500)	142 (5,850)	150 (9,500)
Total Phosphorus, mg/L (lb/day)	4 (152)	8.5 (425)	4.1 (169)	4.5 (285)
Ammonia-Nitrogen, mg/L (lb/day)	21 (865)	20 (1,000)	23.1 (952)	25 (1,560)

Based on the needs identified from the evaluation of the WWTP, the following project alternatives are proposed.

Alternative A. WWTP Improvements with Fixed Film and Activated Sludge Treatment

The Township's Wastewater Treatment Plant Master Plan detailed that this alternative would consist of utilizing the existing WWTP treatment processes and includes construction of new oxidation towers, aeration tanks and secondary clarifiers. The existing 60-foot diameter secondary clarifiers would be converted to intermediate clarifiers and the current aeration process would be expanded. The unit processes would be sized based on fixed film and activated sludge treatment system such as is currently used at the WWTP.

Figure 3-1 is a site layout for Alternative A. The alternative includes the following items:

- Construct a new influent pump station on lower level of the WWTP site with ¼-inch mechanical bar screens and a new force main to existing grit buildings.
- Retrofit existing aerated grit tanks with new vortex grit tank technology.
- Repair existing primary clarifier tank equipment and construct a new primary tank train.
- Rehabilitate and repair existing oxidation tower and construct two new towers north of the existing tower.
- Rehabilitate and repair existing intermediate clarifiers and convert Secondary Clarifiers No. 3 and 4 to intermediate clarifiers.
- Demolish existing aeration tanks.
- Construct a new aeration tank north of the existing aeration tanks.
- Construct a new blower and RAS pumping building north of the existing aeration tanks.
- Rehabilitate and repair existing Secondary Clarifier Tanks No. 1 and 2. Construct three new 80-foot diameter clarifier tanks north of clarifiers No. 1 and 2.
- Construct a new tertiary filtration building south of the existing UV building. The building would include filter influent pumps to pump flow into the filters so it could flow by gravity to UV disinfection.
- Construct a new UV disinfection building south of the existing UV building.
- Convert existing biosolids handling system from land application to landfill disposal.
- Electrical and SCADA upgrades including a new standby generator.

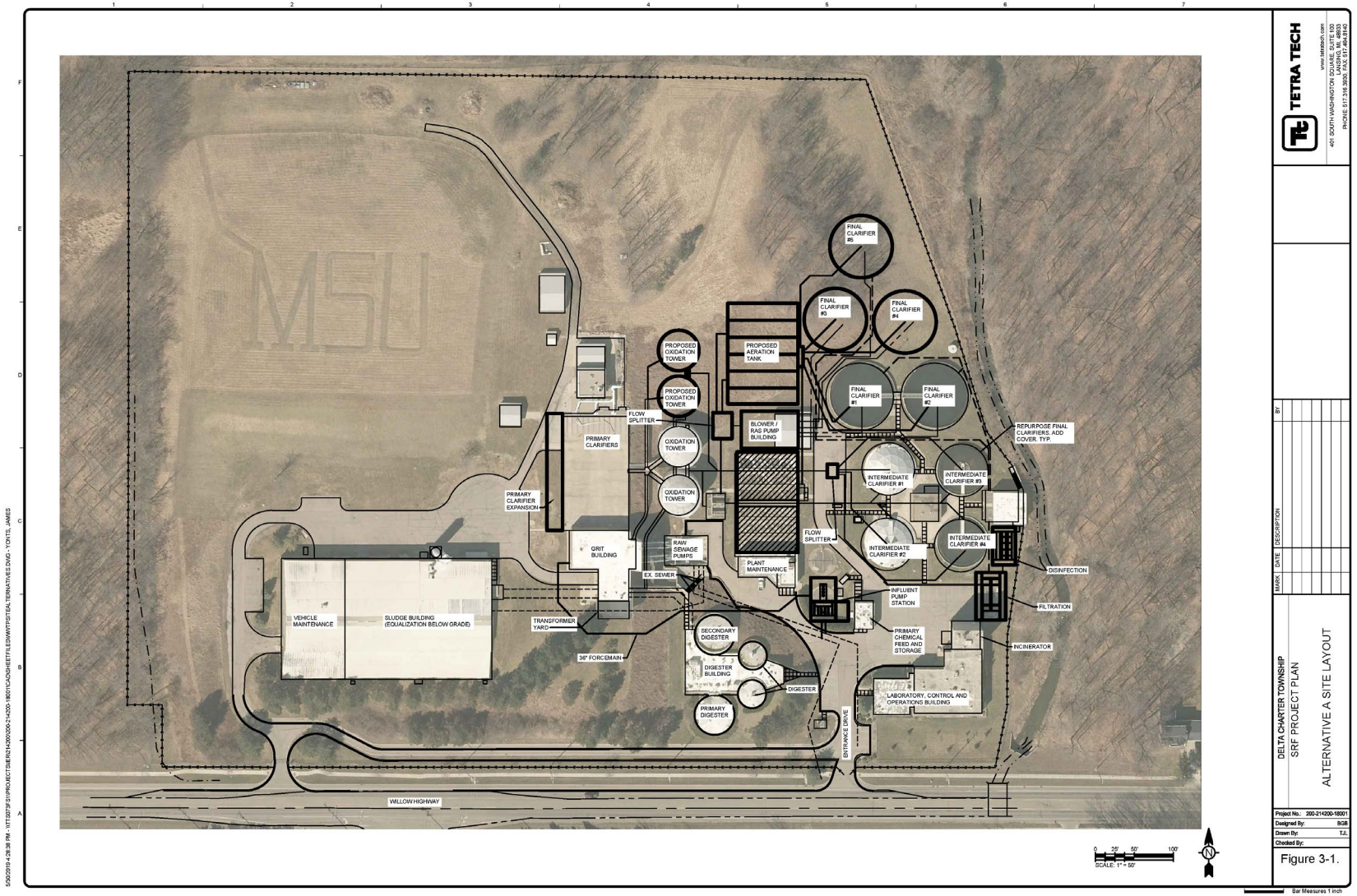

Figure 3-1. Alternative A Site Layout

Alternative B. WWTP Improvements with Activated Sludge Treatment

This alternative would consist of utilizing the existing WWTP treatment processes and construction of new aeration tanks and secondary clarifiers to better use the WWTP existing site topography to maximize the WWTP hydraulic profile. Under this alternative, the oxidation tower and intermediate clarifier would be removed from the process treatment and the system would be sized based on treatment with only activated sludge.

Figure 3-2 is a site layout for Alternative B. The alternative includes the following items:

- Construct a new influent pump station on lower level of the WWTP site with ¼-inch mechanical bar screens and a new force main to existing grit buildings.
- Retrofit existing aerated grit tanks with new vortex grit tank technology.
- Repair existing primary clarifier tank equipment and construct a new primary tank train.
- Demolish existing oxidation tower and intermediate clarifiers.
- Demolish existing aeration tank and diffuser equipment.
- Construct a new aeration tank north of primary tanks.
- Construct four new 100-foot-diameter clarifier tanks north of existing aeration on upper portion of ridge.
- Construct a new blower/RAS building north of the primary tanks.
- Demolish existing Secondary Clarifiers No. 1 through 4.
- Construct a new tertiary filtration building west of Secondary Clarifier No. 1. The building would not require filter influent pumps. Secondary clarifier effluent would flow by gravity through the tertiary filters to UV disinfection. This would eliminate construction and operation costs for the filter influent pumps.
- Construct a new UV disinfection building in the location of the existing Secondary Clarifier No. 3.
- Construct a new Laboratory, Control and Operations Building north of existing parking area in location of existing intermediate and secondary clarifiers.
- Convert existing aeration tanks to equalization or sludge storage tanks.
- Convert existing biosolids handling system from land application to landfill disposal.
- Electrical and SCADA upgrades including a new standby generator.

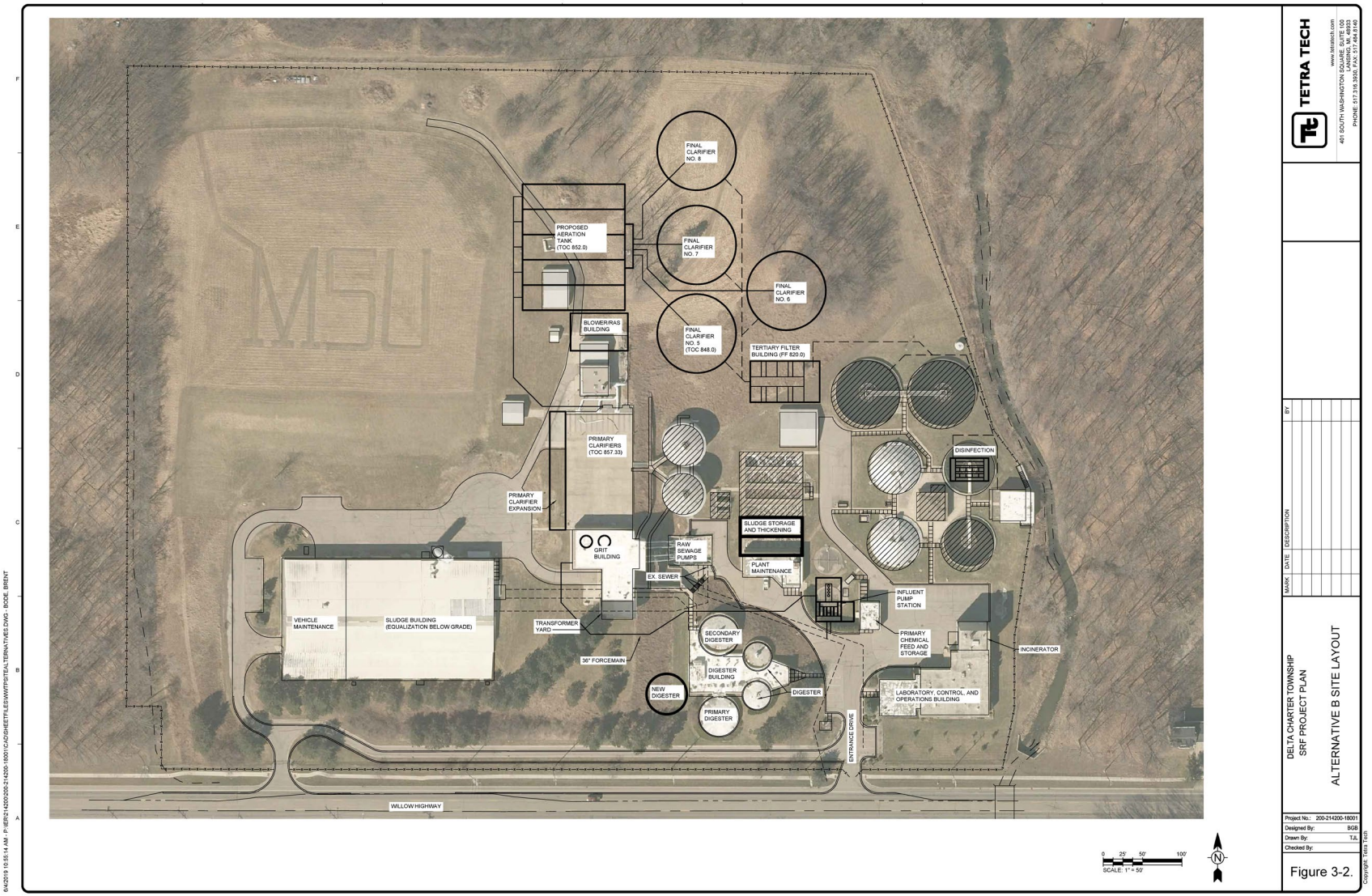

Figure 3-2. Alternative B Site Layout

Biosolids Handling

As part of the Evaluation and Master Plan the current WWTP solids handling approach was evaluated. It was determined that it was most cost effective for the WWTP to switch from their current solids dewatering and land application approach to landfill disposal. The landfill approach would reduce the current chemical costs when compared to the addition of ferric chloride and lime for the filter plate press operation. While the cost of landfill tipping fees is higher than the land application cost the present worth evaluation of the landfill approach including the cost of chemical, equipment replacement and operations were evaluated. The WWTP has flexibility to adjust their approach in the future because they are able to utilize the digesters. This will provide the WWTP with options if landfill regulations or availability change in the future.

Both Alternatives A and B would include a conversion of the existing biosolids handling system from land application to landfill disposal.

The upgrades proposed for the landfilling application would include the following:

- Install new sludge dewatering screw press or belt filter press. For the present worth calculation, a screw press was used, but the technology will be determined during the design phase.
- Rehabilitate the Digester Building and construct one new digester to increase digestion capacity.
- Install WAS thickening equipment.

Opinion of Project Cost

Opinions of probable project costs for Alternatives A and B, as well as the present worth analysis, can be found in Appendix B.

Table 3-2 summarizes the present worth for the WWTP Expansion Project, Alternatives A and B.

Table 3-2. WWTP Plant Expansion Alternatives Present Worth Analysis

Description	Alternative A	Alternative B
Influent Electrical, SCADA and Generator	$4,104,000	$4,104,000
Influent Raw Sewage Pumping and Headworks	$9,462,000	$9,462,000
Primary Clarifier Tanks	$6,256,000	$4,790,000
Oxidation Towers	$8,987,000	--
Intermediate Clarifiers	$2,085,000	--
Aeration System	$18,853,000	$15,349,000
Secondary Clarifiers	$8,631,000	$8,350,000
Tertiary Filtration	$11,725,000	$9,677,000
UV Disinfection	$4,913,000	$4,913,000
Dewatering Screw Press	$4,684,000	$4,684,000
Digester Building Rehab	$5,584,000	$5,584,000
3rd Digester Tank	$2,106,000	$2,106,000
WAS Thickening System	$2,234,000	$2,234,000
Convert Existing Aeration Tank to Equalization	$2,934,000	$2,934,000
Laboratory, Control and Operations Building	$3,808,000	$3,808,000
Total Construction Cost	$96,366,000	$77,995,000
Present Worth of Salvage Cost	$18,953,000	$15,860,000
Present Worth of O&M Costs	$10,332,000	$8,704,000
Total Present Worth	$87,745,000	$70,839,000

3.3 WWTP PROCESS IMPROVEMENTS ALTERNATIVES EVALUATION

3.3.1 Environmental Evaluation

Table 3-3 summarizes the impacts of the principal alternatives on the environment.

Table 3-3. Environmental Impact of Principal Alternatives

Cultural Resources	No impact
Climate	No impact
Air Quality	Minimal impact during construction from equipment
Wetlands	No impact
Coastal Zones	None in construction area
Floodplains	Improvement, some existing WWTP components will be moved out of the existing floodplain
Natural or Wild and Scenic Rivers	No impact
Major Surface Waters	No impact, soil erosion control measures will be in place to mitigate impact from construction
Recreational Facilities	No impact
Topography	Excavation required; area will be restored after construction to existing grades
Geology	No impact
Soils	Excavation required; soil borings will be done prior to starting project
Agricultural Resources	No impact
Fauna and Flora	Based on MNFI review, biological survey may be necessary to determine appropriate action, as suitable habitat is within 1.5 miles of project sites Trees will be removed to accommodate new facilities; removal will be scheduled between October and March to avoid negatively impacting bats.

3.3.2 Implementability and Public Participation

A public meeting was held on June 10, 2020. A summary of the meeting, including a copy of the slides presented at the meeting can be found in Appendix E. This project was reviewed at a public hearing on June 24, 2020, and the transcript of that public hearing is included in Appendix E.

3.3.3 Technical and Other Considerations

3.3.3.1 Infiltration/Inflow (I/I) Removal

The Township does have inflow and infiltration (I/I) in the collection system. Average dry weather flows between March and May, as well as September through November, average 132 gallons per capita per day (gpcd). This

value is above the state and federal threshold of 120 gpcd for dry weather flow. As previously described, the Delta Township WWTP has a 5-million-gallon equalization basin to accommodate elevated flows during wet weather. This excess infiltration is approximately equal to 4 million gallons (132 gpcd – 120 gpcd) * 33,526 current population = 4 million gallons).

The average daily flow for the six peak storms during 2019 was 7.30 MGD or an average of 219 gpcd. This value is less than the state and federal threshold of 275 gpcd. The WWTP improvements are designed to be able to handle the projected flow rates over the next 30 years.

The selection of either of the principal alternatives will improve I/I retention and treatment, as the plant improvements are designed to store and treat the flow. The existing equalization basin can store flow and the proposed project calls for the existing aeration basin to be modified to provide additional retention on site.

3.3.3.2 Sludge and Residuals

The selection of either of the principal alternatives will impact sludge production and residuals. There are upgrades proposed for solids handling including improvements to the existing screening process to decrease build-up in the digester.

In the 2019 Delta Township Wastewater Treatment Plant Master Plan, a detailed cost estimate was performed to determine if the existing approach to solids disposal was the most cost-effective option. The alternative proposed in the plan was to switch to landfill disposal. The landfill alternative was determined to be the most cost-effective option. The landfill approach will improve the digestion of the solids through the addition of a third digester, followed by new dewatering equipment, for ultimate disposal in a landfill. There will be an operational cost savings associated with landfilling the sludge due to reduced chemical costs. Landfilling is also a more environmentally friendly option, as a managed landfill does not provide as much opportunity for runoff and potential eutrophication of waterways. Landfilling also improves public safety, as it provides fewer opportunities for public contact with potential pathogens in the waste.

3.3.3.3 Industrial Pretreatment Program

The Township currently has an approved Industrial Pretreatment Program (IPP) in place for its industrial customers. The selection of any of the principal alternatives will not impact the Township's IPP.

3.3.3.4 Growth Capacity

The facilities proposed in this plan are sized to accommodate the existing plant processes and infill development in the existing service area for the next 30 years.

3.3.3.5 Unsewered Areas

The improvements to the WWTP will allow for infill development in the service area as currently defined. Increased availability for capacity outside of the existing service area is not included in the proposed projects.

3.3.3.6 Reliability

The proposed improvements would increase the reliability of the existing plant due to increased capacity to handle inflow and infiltration, simplified maintenance, and redundancy to allow for sustained treatment. Both alternatives include the addition of a standby generator to serve as an emergency power supply. The two current BWL power feeds to the WWTP are from the same source, so the existing redundancy is limited.

3.3.3.7 Alternative Sites

The proposed projects will take place at the existing WWTP, which has sufficient space to accommodate additional process tanks. As the existing site has sufficient space, no alternative sites were considered.

3.3.3.8 Combined Sewer Overflow (CSO)

The Township does not have any CSOs within its wastewater system. Within the past five years there has been one sanitary sewer overflow (SSO) in April 2018. The SSO was due to a broken vent pipe at a private residence and resulted in an estimated discharge of 10 gallons.

3.3.3.9 Contamination at Project Site

Although there are some contaminated sites located in Delta Township, none are located in the vicinity of the Delta Township WWTP. Located within the existing Laboratory, Control and Operations Building is the WWTP's abandoned incinerator unit. This unit contains an asbestos component. Delta Township intends to have the incinerator removed during the improvements. The materials from the removal will be properly handled and disposal will be via approved methods. Given the age of the facility, there is the possibility of asbestos building materials in different locations of the WWTP. These will all be properly handled and disposed of when encountered.

3.3.3.10 Green Project Reserve

An evaluation was performed to determine whether there are sufficient energy savings due to the proposed WWTP upgrades to qualify for Green Project Reserve funding. A copy of the Green Project Reserve funding document can be found in Appendix G. Energy use between Alternatives A and B are summarized in Table 3-4. Less energy would be required under Alternative B primarily due to the change in grit removal technology and the changes that eliminate the need for pumping to the new tertiary filters. In addition, Alternative B includes high efficiency aeration blowers, diffusers, and aeration system controls. There would also be energy savings as part of upgrades to the Sludge Handling System.

Table 3-4. Projected Annual Energy Usage for Alternatives A and B

Process	Alternative A Energy Usage	Alternative B Energy Usage
Influent Screens	65,323 kW-hr	65,323 kW-hr
Raw Sewage Pumps	1,087,567 kW-hr	942,558 kW-hr
Grit Removal System	317,471 kW-hr	16,331 kW-hr
Intermediate Clarifiers	26,129 kW-hr	N/A
Intermediate Sludge Pumping	19,989 kW-hr	N/A
Flow Split Mixing	130,647 kW-hr	130,647 kW-hr
Aeration Blowers	555,428 kW-hr	620,572 kW-hr
Final Clarifiers	13,065 kW-hr	20,903 kW-hr
RAS Pumps	417,233 kW-hr	372,530 kW-hr
WAS Pumps	33,380 kW-hr	19,597 kW-hr
Tertiary Influent Pumps	652,540 kW-hr	N/A

Process	Alternative A Energy Usage	Alternative B Energy Usage
Annual Energy Usage	3,318,594 kW-hr	2,188,461 kW-hr
Annual Energy Cost ($0.103/kWh)	$341,815	$225,411
Projected Energy Reduction %		34%
Projected Annual Energy Savings		$116,404

4.0 SELECTED ALTERNATIVE

4.1 DESCRIPTION

The selected WWTP Improvement approach for the Delta WWTP is to implement the changes and layout that are described as Alternative B, WWTP Improvements with Activated Sludge Treatment. These improvements will provide the WWTP with the firm design capacity of 8.0 MGD average day, 20.0 MGD max day and 28.0 MGD peak hour. Alternative B was selected based on the present worth cost, the construction implementation of the project, and the possible staging of the improvements.

Alternative B minimizes impacts on the existing WWTP during construction because it does not require existing processes to be taken out of service to make modifications or repairs. The alternative has reduced operating cost because it requires less pumping between processes by utilizing the existing site topography. Also, locating the aeration tanks and secondary clarifier on the high elevations of the WWTP site allows the secondary effluent flow through the proposed tertiary filters by gravity. The improvements in italics below provide energy savings.

The proposed project is comprised of the following cost-effective projects:

- Electrical and SCADA upgrades, including a new stand-by power generator.
- *Construct a new influent pump station on lower level of the WWTP site with ¼-inch mechanical bar screens and a new force main to existing grit buildings.*
- *Retrofit existing aerated grit tanks with new vortex grit tank technology.*
- Repair existing primary clarifier tank equipment and construct a new primary tank train.
- *Demolish existing oxidation tower and intermediate clarifiers.*
- *Demolish existing aeration tank and diffuser equipment.*
- *Construct a new aeration tank north of primary tanks.*
- *Construct four new 100-foot diameter secondary clarifier tanks north of existing aeration on upper portion of ridge.*
- Construction of new blower/RAS building north of the primary tanks.
- Demolish existing secondary clarifiers No. 1 through 4.
- *Construct a new tertiary filtration building west of Secondary Clarifier No. 1. The building would not require filter influent pumps. Secondary clarifier effluent would flow by gravity through the tertiary filters to UV disinfection. This would eliminate construction and operation costs for the filter influent pumps*.
- Construct a new UV disinfection building in the location of the existing Secondary Clarifier No. 3. This will improve hydraulic capacity and reduce impact of construction in the floodplain.
- Construct a new Laboratory, Control and Operations building north of the existing parking area in the location of existing intermediate and secondary clarifiers.
- *Convert existing aeration tanks to equalization or sludge storage tanks.*
- *Install new sludge dewatering screw press or belt filter press. For the present worth calculation, a screw press was used, but the technology will be determined during the design phase.*
- *Rehabilitate the Digester Building and construct one new digester to increase digestion capacity*.
- Install WAS thickening equipment.

Table 4-1 summarizes the proposed process unit improvements including the firm capacities.

Table 4-1. Proposed Process Unit Improvements

Proposed Unit Process Improvements	Firm Capacity	2049 Design Ave Day (8.0 MGD)	2049 Design Peak Hr (28 MGD)
Raw Sewage Influent Pumps - 5 pumps @ 4,900 gpm	28.0 MGD	Yes	Yes
Screen Unit - Three units with 1/4-inch bar spacing – 14 MGD/each	28 MGD	Yes	Yes
Grit Removal Tanks - 2- 14 MGD Vortex Grit Tanks	28 MGD	Yes	Yes
Primary Clarifier Tanks (No Co-settling) 5 Tanks – 145’ x 20’ x 10’ Ave Loading – 1,000 gpd/sf Peak Loading – 2,000 gpd/sf	11.6 MGD 23.2 MGD	Yes	Yes
Aeration Tank - Five Tanks 130’x 32’ x20’ - Primary Effluent – 75 mg/L - 15 lb BOD/day/1000 cf	8.0 MGD (Ave)	Yes	Yes
Final Clarifiers - Four 100’ Diameter Tanks - Peak Loading – 1,200 gpd/sf	28.3 MGD	Yes	Yes
Tertiary Filtration - Coarse Media Sand Filter - 4 Filters - Two 14’x20’ Cells per Filter - 10 gpm/sf Peak Flow	24.2 MGD	Yes	Yes
Ultraviolet Disinfection - 4 units at 8 MGD each	24 MGD	Yes	Yes
Solids Handling - 2 Dewatering Units at 1,250 lb/hr	8.0 MGD (Ave)	Yes	Yes

These projects will be divided into three phases to facilitate the sequencing of construction, meeting the township funding schedule and to keep pace with expected growth. Phase I would include improvements to the raw influent, headworks, and secondary systems. Phase II would address primary treatment, tertiary treatment, disinfection, and solids handling improvements. Phase III would provide additional equalization capacity, as well as additional primary and secondary clarifiers. Phase III is not planned to be conducted within the five-year period for this SRF Project Plan. Table 4-2 summarizes the projects to be completed during each phase and the projected schedule.

Table 4-2. Project Phasing

Phase	Projects	Project Years
Phase I	Influent Electrical, SCADA and Generator Influent Raw Pumping and Headworks Aeration System with Blower, RAS, Chemical Building Three, 100-foot diameter Secondary Clarifiers	2022-2024
Phase II	Primary Clarifier Mechanism Replacement Tertiary Filtration UV Disinfection Dewatering Screw Press Digester Rehabilitation Construct Third Digester Tank Solids Thickening Laboratory, Control and Operations Building	2024-2026
Phase III	Construct one, 100-foot diameter Secondary Clarifier Convert Aeration to Equalization Primary Clarifier Expansion	Future

4.1.1 Relevant Design Parameters

This alternative will increase the firm treatment capacity to meet the expected infill development during the planning period and upgrade the aging infrastructure that has exceeded its expected useful life. This alternative will also allow the Township to continue to meet the requirements of the NPDES permit and achieve compliance with the future advanced wastewater treatment limits. The project will also improve the solids handling at the plant and decrease the cost of operations and disposal.

The improvements implementation and sequencing shall limit the impact on the WWTP operations and treatment capacity during construction and minimize the requirement for additional pumping between processes by effective utilization of site topography. In order to achieve this, the project will be implemented in three phases.

4.1.2 Maps

The location of the existing WWTP was shown in Figure 2-1. Figure 4-1 shows the layout of the proposed improvements.

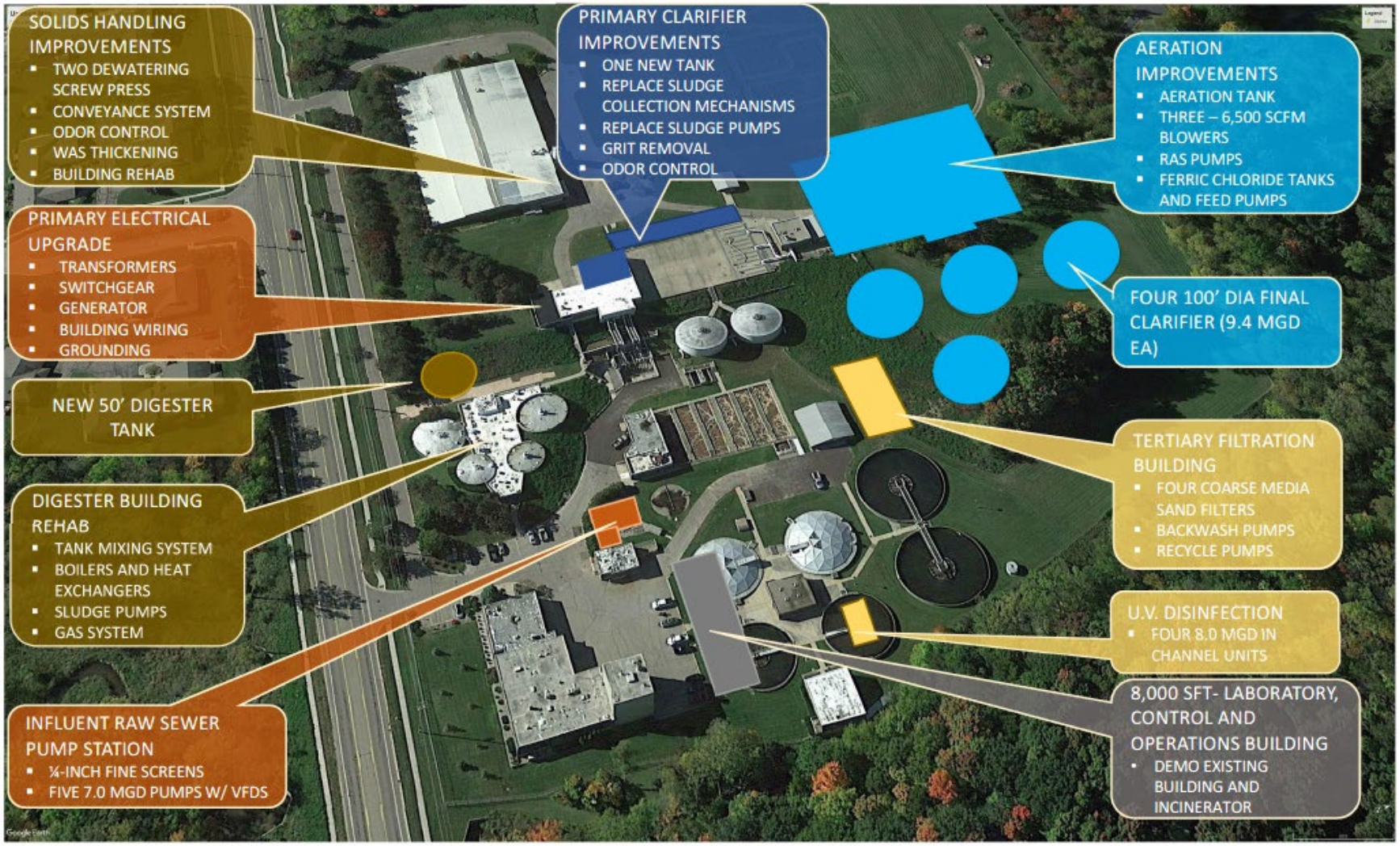

Figure 4-1. Proposed WWTP Improvements

4.1.3 Controlling Factors

The controlling factors are to ensure continued reliable operation of the WWTP by addressing the needs of the unit processes and by installing the best available cost-effective technology. The proposed projects will address the increasing service area population and anticipated changes to land use through the planning period, as presented in previous sections of this plan.

The NPDES Permit contains a Schedule of Compliance in Section I.A.9 that requires the Delta WWTP to meet advanced wastewater treatment limits by October 1, 2027. There are no other court orders, or local health department findings or directives that influence the design.

The permits required for construction of this alternative include:

- Part 41 Permit for wastewater system construction, to be obtained from EGLE.
- NPDES Permit for increased annual average flow capacity, including an antidegradation statement.
- Joint United States Army Corps of Engineering and EGLE permit for work within the floodplain.
- Soil Erosion and Sedimentation Control to be obtained from Eaton County Drain Office.
- Building permit, to be obtained from the local building inspector, along with local electrical, plumbing, and mechanical permits.

4.1.4 Special Assessment District Projects

There are no proposed special assessment districts associated with the selected alternative.

4.1.5 Sensitive Ecosystems

The MNFI review indicated that wetlands and endangered species habitats may exist on the property adjacent to where the construction activities will be located. Therefore, measures will be taken to mitigate any impact on these areas during the construction. There are no archeological or historical sites within the construction area. The State Historic Preservation Office was contacted to confirm that no archeological or historical sites are located at the WWTP and their response can be found in Appendix F.

4.1.6 Mitigation of Environmental Impacts

Based on review by MNFI, biological survey of the applicable study area may need to be performed and recommendations implemented to ensure no identified species are impacted during the construction. Bats will be protected by requiring all tree removal to occur between October and March. Impacts on the endangered and threatened mussel species are not anticipated, as soil and erosion control will be required. No work within Carrier Creek is included in the project. Additional siltation of Carrier Creek, and therefore the Grand River, where the mussels are located, is not anticipated due to the selected project. The MNFI response can be found in Appendix F.

4.1.7 Schedule for Design and Construction

Delta Township plans to pursue Second Quarter Funding for Phases I and II in Fiscal Year 2022.

Table ***4-3*** shows the target dates for implementing and constructing the proposed project, based on the current Fiscal Year 2021 financing schedule.

Table 4-3. Implementation Schedule

Item	Target Completion Date
Publish Notice of Public Hearing	May 24, 2020
Conduct Public Hearing on Project Plan	June 24, 2020
Receive EGLE and Public Comments	July 1, 2020
Respond to EGLE and Public Comments	July 15, 2020
Adoption of Project Plan by Township Board	July 20, 2020
Submit Final Project Plan to MDEGLE	August 1, 2020
Submit Draft Plans and Specifications and User Charge System to EGLE- Phase I	November 15, 2021
Advertise for Bids – Phase I	December 20, 2021
Open Construction Bids and Award Contract – Phase I	February 7, 2022
Construction Begins – Phase I	April 2022
Construction Complete – Phase I	July 2024
Submit Draft Plans and Specifications and User Charge System to MDEGLE- Phase II	July 2023
Advertise for Bids – Phase II	December 2023
Open Construction Bids and Award Contract – Phase II	February 2024
Construction Begins – Phase II	April 2024
Construction Complete – Phase II	September 2026

4.2 COST SUMMARY

Table 4-4 present a summary of opinion of probable construction costs, including planning, design, and construction of the selected alternative for Phases I through II. All costs are expressed in 2019 dollars. Appendix B contains a detailed breakdown of the cost opinions presented below.

Table 4-4. Opinion of Probable Costs

Item	Opinion of Probable Cost
Phase I:	
Influent Electrical, SCADA, and Generator	$4,104,000
Influent Raw Pumping and Headworks	$9,462,000
Aeration System w/ Blower, RAS, Chemical Building	$15,349,000
Construct Three, 100-foot diameter Secondary Clarifiers	$6,292,500
Subtotal Capital Cost for Phase I	**$35,177,500**
Phase II:	
Primary Clarifier Mechanism Replacement	$2,790,000
Tertiary Filtration	$9,677,000
UV Disinfection	$4,913,000
Dewatering Screw Press	$4,684,000
Digester Rehabilitation	$5,584,000
Construct Third Digester Tank	$2,106,000
Solids Thickening	$2,234,000
Laboratory, Control and Operations Building	$3,808,000
Subtotal Capital Cost for Phase II	**$35,796,000**
Total Project Cost	**$70,973,500**

4.3 AUTHORITY TO IMPLEMENT THE SELECTED ALTERNATIVE

Delta Charter Township has the necessary legal, institutional, financial, and managerial resources available to ensure the construction, operation, and maintenance of the proposed facilities.

4.4 USER COSTS

The current annual operation and maintenance (O&M) costs are approximately $470,000. The projected approximate annual O&M costs for the WWTP Improvements is $374,000. Therefore, the net annual O&M cost will be reduced by approximately $96,000. The user cost (for a typical residential customer's quarterly bill) is based on the Township paying for the eligible capital improvements construction costs through an SRF loan. The ineligible costs including the Project Plan and User Charge System costs will be paid for by other methods. The current wastewater rates for Delta Township are shown in Table 4-5. The Township is evaluating the current rates and may change them in the near future.

Table 4-5. Delta Township Wastewater Rates (Effective <July 1, 2019>)

Consumption Charge, per 100 cubic feet (ccf)	$3.438

Based on an assumed usage of 8 ccf per month a residential customer's wastewater bill is currently equal to: $27.50.

The Township plans to pay for these capital improvements costs through an SRF loan. The Project Plan and User Charge System costs will be paid from the current wastewater reserves and therefore will not affect the wastewater rates. The estimated additional costs to users for Phases I and II are summarized in Table 4-6.

Table 4-6. User Costs by SRF Project Phase

Category	Phase I	Phase II	Total
WWTP Capital Costs	$35,177,500	$35,796,000	$70,973,500
Annual Debt Service (@ 2% interest rate)	$2,154,962	$2,192,948	$4,347,910
Change in O&M	($32,000)	($32,000)	($64,000)
Effective Meter Equivalents per Year	13,728	13,728	--
Estimated Equivalent Sewer Billable Flow (in ccf)	659,804	659,804	--
Projected Monthly Increase per Typical Residential User	$4.58	$5.36	$9.94
Projected Typical Residential Customer Monthly Bill	$32.08	37.44	--

4.5 DISADVANTAGED COMMUNITY

Delta Township is not eligible for the benefits awarded to disadvantaged communities under the SRF Project Plan.

4.6 USEFUL LIFE

The useful life of the SRF Project Plan components was calculated for each proposed project and can be found in Appendix D. The following assumptions were made regarding the useful life of the assets:

- Site work and piping were assigned a useful life of 50 years.
- The structures and support were assigned a useful life of 50 years.
- Process, mechanical, and electrical assets were assigned a useful life of 20 years.

The asset life was multiplied by the cost of the asset to develop a calculated life value for each asset type. The sum of the calculated life values was divided by the sum of the asset costs for each project. The resulting weighted average project useful lives are summarized in Table 4-7. The average useful life for each phase is approximately 30 years.

Table 4-7: Average Useful Life by Project

Project	Average Useful Life (years)
Phase I	31.7
Phase II	29.5

Delta Township developed an asset management plan in 2016. As part of the process, the asset condition, remaining life, and anticipated replacement cost were developed. The asset management plan will assist the Township in maintaining the WWTP in good working order over the 20-year planning period, as required by this SRF Project Plan.

5.0 EVALUATION OF ENVIRONMENTAL IMPACTS

5.1 GENERAL

The proposed project was evaluated for the potential of beneficial and detrimental environmental effects. The project was evaluated for beneficial or adverse, short-term and long-term, and irreversible or irretrievable impacts, whether these impacts are direct, indirect, or cumulative.

5.2 ANALYSES OF IMPACTS

5.2.1 Direct Impacts

Direct impacts are environmental impacts directly attributed to the construction and operation of the project. The proposed project was evaluated for several different areas of potential direct impact. The results of the evaluation are presented below.

5.2.1.1 Historical and Archaeological Resources

As stated earlier in this report, SHPO has indicated that there are no known archaeological or architectural sites in the project area. It was noted that other potentially sensitive archaeological sites have been found in other locations along the Grand River. The areas along the Grand River in the floodplain have been previously disturbed. The northeast corner of the site has not been significantly disturbed. The trees are isolated from the trees surrounding the WWTP site.

5.2.1.2 Existing and Future Water Quality

The project will have a beneficial overall impact to the Grand River, as the WWTP will be complying with advanced wastewater treatment limits. In addition, tertiary filtration is included, which will provide better control of phosphorus discharges to the Grand River. Short term indirect impacts on water quality are possible. Appropriate measures will be taken during construction to avoid detrimental impact to surface waters through soil erosion and sedimentation controls. Proper precautions shall be taken during construction to deal with flows from subsurface dewatering at the site. This will include sedimentation basins and discharge point monitoring. All necessary permits will be obtained prior to the proposed activities. There are no impacts anticipated to the local groundwater.

5.2.1.3 Air Quality

There will be minimal direct impacts on local air quality during the construction phases of these projects. Any effects on air quality will be due to dust and emissions from construction equipment. Appropriate control measures will be taken to minimize dust on the site during construction. Odor Control equipment will be included as part of the improvements.

5.2.1.4 Natural Setting and Sensitive Ecosystems

The project will not have a direct impact on any wetlands, prime farmland, wild or scenic rivers, or endangered species. MNFI was contacted to comment on the existence of any rare, threatened or endangered species in the study area. MNFI indicated that several threatened and endangered species could be located within 1.5 miles of the study area. Species of particular concern included several species of bats and mussels. A U.S. Fish and Wildlife Service Section 7 online review was performed in conjunction with the MNFI response. Based on all work being performed within existing maintained landscape areas the evaluation indicated a “No Effect” result. As mentioned previously, tree removal will be limited to October through March to protect bat species. Mussel

species in the Grand River are unlikely to be impacted, as soil and erosion controls will be utilized during construction, minimizing siltation of Carrier Creek, which flows into the Grand River. The MNFI response and USFW results are included in Appendix F.

Work will be conducted in the floodplain. Some of the existing tanks will be removed from the floodplain. Other tanks will have additional height added to the tanks to reduce the possibility of flooding. Upon completion of the construction, the site will be restored to current elevations.

5.2.1.5 Consumption of Materials

The project will use building construction materials, mechanical and process equipment, and pipe. Impacts will be mitigated through specifications requiring the contractor to reduce, re-use, and recycle as much as feasible.

5.2.1.6 Human, Social, and Economic Impacts

The project will create a modest increase in rates as indicated in the user costs section (Section 4.4). There are no direct human impacts such as dislocation or employment from the proposed project, other than temporary construction jobs that may be created during project construction. Temporary jobs will follow Davis-Bacon wage rates in accordance with SRF requirements.

5.2.1.7 Operational Impacts

The construction area is isolated, and any disruption from construction will be minimal. Efforts will be taken to minimize the impact on plant operations during construction, including phasing construction to limit additional pumping requirements and maintain treatment capacity. In the long-term, the proposed project will improve the reliability and operations of the WWTP processes.

5.2.1.8 Other Impacts

There are no other foreseeable direct impacts of this project.

5.2.2 Indirect Impacts

5.2.2.1 Changes in Rate, Density or Type of Development

The improvements to the WWTP will allow for modest increase in the available capacity of the WWTP to accommodate infill development within the existing service area. The existing service area will not be increased by the proposed projects. Changes in zoning that would increase density are not anticipated as a result of this project.

5.2.2.2 Changes in Land Use

There is no planned development that would be impacted by the proposed construction. The proposed project will take place entirely on the site of the WWTP. As noted previously, a section of woods on the existing WWTP site will be cleared to allow for construction. No zoning changes will be required, as the site is already owned by the Township and has been designated for wastewater treatment use.

5.2.2.3 Changes in Air or Water Quality

The proposed project will not adversely impact the air or water quality in the area over time. There will be emissions during construction from construction equipment. Soil erosion and sediment control measures will be taken to mitigate potential water quality problems. The proposed project will prevent future water quality problems that may happen if the existing aging WWTP equipment is not replaced. The projects will increase the maximum flow rate that Delta Township can treat, reducing the possibility of sanitary sewer overflows.

5.2.2.4 Changes in the Natural Setting

There are a few trees in the northeast corner of the property. These trees are isolated and not part of the forest surrounding the WWTP property. In order to minimize the impact on any threatened bat species, any trees will be removed between October and March.

5.2.2.5 Impacts on Cultural, Human, Social and Economic Resources

There are no anticipated changes in cultural, human, social, or economic resources as part of the proposed project.

5.2.2.6 Resource Consumption and Waste Generation

The proposed project will eliminate the usage of lime and ferric chloride as a result of the upgrades to the solids handling process. This will decrease the need for hauling, thus reducing the carbon footprint of the process. The solids handling process will change from land application to landfill disposal.

5.2.2.7 Other Impacts

There are no other foreseeable indirect impacts of this project.

5.2.3 Cumulative Impacts

There are no other planned infrastructure improvements that would result in a cumulative impact from the proposed project.

6.0 MITIGATION

6.1 GENERAL

Where impacts cannot be avoided, mitigation of adverse impacts must be considered. Various impacts will be analyzed and mitigative measures addressed in the following sections.

6.2 SHORT-TERM CONSTRUCTION RELATED MITIGATION

The project will be constructed using methods designed to minimize construction-related impacts. These are briefly outlined below.

6.2.1 Dust Control

The contract documents will require that the contractor employ dust control measures as needed and determined by the onsite inspector. Dust control measures include the use of approved dust control chemicals, the use of water, and cleanup to minimize dust generation.

6.2.2 Noise Control

The construction times will be limited to normal daylight hours. Construction on Sundays will be prohibited in the contract documents. Noise on the construction sites will be generated by motorized vehicles, equipment and power tools. The noise from construction will not be excessive compared to normal building construction projects.

6.3 MITIGATION OF LONG-TERM IMPACTS

Every effort will be made during the planning and construction of the WWTP improvements to avoid long-term or irreversible adverse impacts.

6.3.1 General Construction

The WWTP site falls within the floodplain, however some of the existing WWTP components will be removed from the floodplain. The floodplain will be restored to existing elevations following completion of construction. The proposed project will not adversely impact water or air quality long-term.

6.3.2 Siting Decisions

The proposed improvements will occur at the WWTP. Some existing trees will need to be removed.

6.3.3 Operational Impacts

The proposed project is intended to improve long-term operations at the WWTP by simplifying maintenance, improving capacity, and adding redundancy. None of the proposed upgrades will generate excessive noise. Mufflers will be installed on the proposed generator. The potential for accidents resulting from the use of the proposed improvements is minimal. Odor control equipment is included as part of the improvements.

6.4 MITIGATION OF INDIRECT IMPACTS

As discussed above, secondary growth induced from this project is not anticipated. The 20-year design population includes population increases predicted by the future land use and infill development within the service area. The in-fill development is not anticipated to be significant within the 5-year planning period of this Project Plan.

6.4.1 Master Plan and Zoning

The Township has the 2013 Comprehensive Plan but is working on an update that is not available for publication at the time that this Project Plan was developed.

6.4.2 Ordinances

Significant in-fill development is not expected during the next five years. Ordinance changes are not needed at this time.

6.4.3 Staging of Construction

The selected alternative was divided into three project phases. Phase I addresses the headworks and secondary system. Phase II addresses the primary treatment, disinfection, and solids handling systems, as well as the addition of tertiary treatment. Phase III would increase the capacity of the WWTP, as in-fill development occurs. This is not anticipated within the 5-year planning period of this Project Plan.

7.0 PUBLIC PARTICIPATION

7.1 PUBLIC MEETING

A flyer was sent to all sewer customers and was also distributed through social media. A public meeting, advertised through the flyer was held on June 10, 2020. A copy of the flyer and a summary of the meeting can be found in Appendix E.

7.2 FORMAL PUBLIC HEARING ON SELECTED ALTERNATIVE

A public hearing on the Draft Project Plan was held on June 24, 2020. The public hearing included a discussion of the wastewater system needs, alternatives evaluated, projected impacts of the alternatives on the environment, the opinion of probable project costs, and monthly user costs for a typical residential customer. All Public Participation documentation can be found in Appendix E.

7.2.1 Public Hearing Advertisement

A notice of the public hearing was published in the local newspaper on May 24, 2020. The public hearing included a discussion of the wastewater system needs, alternatives evaluated, projected impacts of the alternatives on the environment, the opinion of probable project costs, and monthly user costs for a typical residential customer. All Public Participation documentation are included in Appendix E.

7.2.2 Public Display

The Draft Project Plan was made available for public review on May 24, 2020, which was 30 days prior to the June 24, 2020, public hearing on the Township website.

7.2.3 Public Hearing Transcript

A transcript of the public hearing is included in Appendix E of this document. A copy of the public hearing attendance list can also be found (sign-in sheet) in Appendix E.

7.2.4 Public Hearing Comments Received and Answered

The typed attendance list from the public hearing is included in Appendix E. The public comments to be recorded as part of the Public Hearing transcript can be found in Appendix E. Additional written comments received are also included in Appendix E, along with a written response to these comments. Comments received from EGLE's Clean Water State Revolving Loan Finance Section and MNFI are included in Appendix F. Changes requested by the Revolving Loan Finance Section have been incorporated.

7.3 ADOPTION OF PROJECT PLAN

7.3.1 Resolution

A resolution by the Delta Township Board selecting the proposed project was adopted at the meeting on July 20, 2020. A copy of the resolution adopting the proposed project and selecting an Authorized Representative for the Township can be found in Appendix E.

8.0 WORKS CITED

[1] "timeanddate.com," Time and Date AS, 2020. [Online]. Available: https://www.timeanddate.com/weather/@7254140/climate. [Accessed December 2019].

[2] "Delta Township 2018 Annual Water Quality Report," Delta Township, 2018.

[3] Delta Charter Township Planning Commission, "2013 Delta Township Comprehensive Plan for Land Use," Delta Township, 2013.

APPENDIX A: NPDES PERMIT

PERMIT NO. MI0022799

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

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, 33 U.S.C., Section 1251 *et seq*., as amended; Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2019-06,

Delta Township
7000 West Willow Highway
Lansing, MI 48917

is authorized to discharge from the **Delta Township Wastewater Treatment Plant** located at

7000 West Willow Hwy
Lansing, MI 48917

designated as **Delta Twp WWTP**

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

This permit is based on a complete application submitted on March 27, 2017, as amended through June 21, 2017.

This permit takes effect on October 1, 2019. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date, this permit shall supersede National Pollutant Discharge Elimination System (NPDES) Permit No. MI0022799 (expiring October 1, 2017).

This permit and the authorization to discharge shall expire at midnight on **October 1, 2022**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application that contains such information, forms, and fees as are required by the Michigan Department of Environment, Great Lakes, and Energy (Department) by **April 4, 2022**.

Issued July 26, 2019.

Original signed by Tarek Buckmaster (acting)
Christine Alexander, Manager
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the NREPA, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. Payment may be made electronically via the Department's MiWaters system. The MiWaters website is located at https://miwaters.deq.state.mi.us. Payment shall be submitted or postmarked by January 15 for notices mailed by December 1. Payment shall be submitted or postmarked no later than 45 days after receiving the notice for notices mailed after December 1.

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

In accordance with Section 324.3118 of the NREPA, the permittee shall make payment of an annual storm water fee to the Department for each January 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. Payment may be made electronically via the Department's MiWaters system. The MiWaters website is located at https://miwaters.deq.state.mi.us. Payment shall be submitted or postmarked by March 15 for notices mailed by February 1. Payment shall be submitted or postmarked no later than 45 days after receiving the notice for notices mailed after February 1.

In accordance with Section 324.3132 of the NREPA, the permittee shall make payment of an annual biosolids land application fee to the Department if the permittee land applies biosolids. The permittee shall submit the fee in response to the Department's annual notice. Payment may be made electronically via the Department's MiWaters system. The MiWaters website is located at https://miwaters.deq.state.mi.us. Payment shall be submitted or postmarked no later than January 31 of each year for notices mailed by December 15. Payment shall be submitted or postmarked no later than 45 days after receiving the notice for notices mailed after December 15.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Lansing District Office of the Water Resources Division. The Lansing District Office is located at 525 West Allegan Street, 1st Floor, South Tower, Lansing, MI 48933, Telephone: 517-284-6651, Fax: 517-241-3571.

CONTESTED CASE INFORMATION

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

PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 001A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater from Monitoring Point 001A through Outfall 001. Outfall 001 discharges to the Grand River at Latitude 42.76011, Longitude -84.65466. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Monitoring	Sample
Parameter	**Monthly**	**7-Day**	**Daily**	**Units**	**Monthly**	**7-Day**	**Daily**	**Units**	**Frequency**	**Type**
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)										
May – October -Through September 30, 2027	850	1300	(report)	lbs/day	17	---	26	mg/l	Daily	24-Hr Composite
-Beginning October 1, 2027	200	500	(report)	lbs/day	4	---	10	mg/l	Daily	24-Hr Composite
November – April	1300	2000	(report)	lbs/day	25	---	40	mg/l	Daily	24-Hr Composite
Total Suspended Solids (TSS)	1000	1500	(report)	lbs/day	20	30	(report)	mg/l	Daily	24-Hr Composite
Ammonia Nitrogen (as N)										
May – October -Through September 30, 2027	---	100	(report)	lbs/day	---	---	2.0	mg/l	Daily	24-Hr Composite
-Beginning October 1, 2027	25	100	(report)	lbs/day	0.5	---	2.0	mg/l	Daily	24-Hr Composite
November – March	350	---	(report)	lbs/day	7.0	---	(report)	mg/l	Daily	24-Hr Composite
April	(report)	---	(report)	lbs/day	(report)	---	(report)	mg/l	Weekly	24-Hr Composite
Total Phosphorus (as P)	50	---	(report)	lbs/day	1.0	---	(report)	mg/l	Daily	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	Daily	Grab
Total Mercury										
Corrected	(report)	---	(report)	lbs/day	(report)	---	(report)	ng/l	Quarterly	Calculation
Uncorrected	---	---	---	---	---	---	(report)	ng/l	Quarterly	Grab
Field Duplicate	---	---	---	---	---	---	(report)	ng/l	Quarterly	Grab
Field Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly	Preparation
Laboratory Method Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly	Preparation
	12-Month Rolling Avg				**12-Month Rolling Avg**					
Total Mercury	0.00010	---	---	lbs/day	2.0	---	---	ng/l	Quarterly	Calculation
					Minimum % Monthly		**Minimum % Daily**			
$CBOD_5$ Minimum % Removal										
November – April	---	---	---	---	85	---	(report)	%	Monthly	Calculation

PART I

Section A. Limitations and Monitoring Requirements

Parameter					Minimum Daily		Maximum Daily	Units	Monitoring Frequency	Sample Type
pH	---	---	---	---	6.5	---	9.0	S.U.	Daily	Grab
Dissolved Oxygen										
May – October	---	---	---	---	5.0	---	---	mg/l	Daily	24-Hr Composite
November – April	---	---	---	---	6.0	---	---	mg/l	Daily	24-Hr Composite

The following design flow was used in determining the above limitations, but is not to be considered a limitation or actual capacity: 6 MGD.

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Sampling Locations
Samples for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), Ammonia Nitrogen (as N), Total Phosphorus (as P), Fecal Coliform Bacteria, Total Mercury, pH, and Dissolved Oxygen shall be taken after disinfection. Samples for $CBOD_5$ shall be properly dechlorinated and seeded prior to analysis. The Department may approve alternate sampling locations that are demonstrated by the permittee to be representative of the effluent.

c. Quarterly Monitoring
Quarterly samples shall be taken during the months of January, April, July, and October. If the facility does not discharge during these months, the permittee shall sample the next discharge occurring during the period in question. If the facility does not discharge during the period in question, a sample is not required for that period. For any month in which a sample is not taken, the permittee shall enter "*G" on the Discharge Monitoring Report (DMR). (For purposes of reporting on the Daily tab of the DMR, the permittee shall enter “*G” on the first day of the month only).

d. Ultraviolet Disinfection
It is understood that ultraviolet light will be used to achieve compliance with the fecal coliform limitations. If disinfection other than ultraviolet light will be used, the permittee shall notify the Department in accordance with Part II.C.12. of this permit.

e. Percent Removal Requirements
This requirement shall be calculated based on the monthly (30-day) effluent $CBOD_5$ concentrations and the monthly influent concentrations for approximately the same period.

f. Final Effluent Limitation for Total Mercury
The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the WQBEL of 1.3 ng/l, pursuant to Rule 1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average, the calculation of which may be done using blank-corrected sample results. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to three (3) months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any quarter is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that quarter, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.4. of this permit.

PART I

Section A. Limitations and Monitoring Requirements

g. Total Mercury Testing and Additional Reporting Requirements

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry." The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

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

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

PART I

Section A. Limitations and Monitoring Requirements

2. Quantification Levels and Analytical Methods for Selected Parameters

Quantification levels (QLs) are specified for selected parameters in the table below. These QLs shall be considered the maximum acceptable unless a higher QL is appropriate because of sample matrix interference. Justification for higher QLs shall be submitted to the Department within 30 days of such determination. Where necessary to help ensure that the QLs specified can be achieved, analytical methods may also be specified in the table below. The sampling procedures, preservation and handling, and analytical protocol for all monitoring conducted in compliance with this permit, including monitoring conducted to meet the requirements of the application for permit reissuance, shall be in accordance with the methods specified in the table below, or in accordance with Part II.B.2. of this permit if no method is specified in the table below, unless an alternate method is approved by the Department. With the exception of total mercury, all units are in ug/l. The table is continued on the following page:

Parameter	QL	Units	Analytical Method
1,2-Diphenylhydrazine (as Azobenzene)	3.0	ug/l	
2,4,6-Trichlorophenol	5.0	ug/l	
2,4-Dinitrophenol	19	ug/l	
3,3'-Dichlorobenzidine	1.5	ug/l	EPA Method 605
4-Chloro-3-Methylphenol	7.0	ug/l	
4,4'-DDD	0.05	ug/l	EPA Method 608
4,4'-DDE	0.01	ug/l	EPA Method 608
4,4'-DDT	0.01	ug/l	EPA Method 608
Acrylonitrile	1.0	ug/l	
Aldrin	0.01	ug/l	EPA Method 608
Alpha-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Antimony, Total	1	ug/l	
Arsenic, Total	1	ug/l	
Barium, Total	5	ug/l	
Benzidine	0.1	ug/l	EPA Method 605
Beryllium, Total	1	ug/l	
Beta-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Bis (2-Chloroethyl) Ether	1.0	ug/l	
Bis (2-Ethylhexyl) Phthalate	5.0	ug/l	
Boron, Total	20	ug/l	
Cadmium, Total	0.2	ug/l	
Chlordane	0.01	ug/l	EPA Method 608
Chromium, Hexavalent	5	ug/l	
Chromium, Total	10	ug/l	
Copper, Total	1	ug/l	
Cyanide, Available	2	ug/l	EPA Method OIA 1677
Cyanide, Total	5	ug/l	
Delta-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Dieldrin	0.01	ug/l	EPA Method 608
Di-N-Butyl Phthalate	9.0	ug/l	
Endosulfan I	0.01	ug/l	EPA Method 608
Endosulfan II	0.01	ug/l	EPA Method 608
Endosulfan Sulfate	0.01	ug/l	EPA Method 608
Endrin	0.01	ug/l	EPA Method 608
Endrin Aldehyde	0.01	ug/l	EPA Method 608
Fluoranthene	1.0	ug/l	

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Parameter	QL	Units	Analytical Method
Heptachlor	0.01	ug/l	EPA Method 608
Heptachlor Epoxide	0.01	ug/l	EPA Method 608
Hexachlorobenzene	0.01	ug/l	EPA Method 612
Hexachlorobutadiene	0.01	ug/l	EPA Method 612
Hexachlorocyclopentadiene	0.01	ug/l	EPA Method 612
Hexachloroethane	5.0	ug/l	
Lead, Total	1	ug/l	
Lindane	0.01	ug/l	EPA Method 608
Lithium, Total	10	ug/l	
Mercury, Total	0.5	**ng/l**	EPA Method 1631E
Nickel, Total	5	ug/l	
PCB-1016	0.1	ug/l	EPA Method 608
PCB-1221	0.1	ug/l	EPA Method 608
PCB-1232	0.1	ug/l	EPA Method 608
PCB-1242	0.1	ug/l	EPA Method 608
PCB-1248	0.1	ug/l	EPA Method 608
PCB-1254	0.1	ug/l	EPA Method 608
PCB-1260	0.1	ug/l	EPA Method 608
Pentachlorophenol	1.8	ug/l	
Perfluorooctane sulfonate (PFOS)	2.0	ng/l	ASTM D7979 or an isotope dilution method (sometimes referred to as Method 537 modified)
Perfluorooctanoic acid (PFOA)	0.002	ug/l	ASTM D7979 or an isotope dilution method (sometimes referred to as Method 537 modified)
Phenanthrene	1.0	ug/l	
Selenium, Total	1.0	ug/l	
Silver, Total	0.5	ug/l	
Strontium, Total	1000	ug/l	
Sulfides, Dissolved	20	ug/l	
Thallium, Total	1	ug/l	
Toxaphene	0.1	ug/l	EPA Method 608
Vinyl Chloride	0.25	ug/l	
Zinc, Total	10	ug/l	

3. Additional Monitoring Requirements

As a condition of this permit, the permittee shall monitor the discharge from monitoring point 001A for the constituents listed below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in November 2019, May 2020, March 2021, and August 2021. Grab samples shall be collected for available cyanide, total phenols, and the Perfluoroalkyl and Polyfluoroalkyl Substances and Volatile Organic Compounds identified below. For all other parameters, 24-hour composite samples shall be collected.

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** *Ceriodaphnia dubia,* for a total of four (4) tests on each species. Testing and reporting procedures shall follow procedures contained in EPA-821-R-02-013, “Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms” (Fourth Edition). When the effluent ammonia nitrogen (as N) concentration is greater than 3 mg/l, the pH of the toxicity test shall be maintained at a pH of 8 Standard Units. Acute and chronic toxicity data shall be included in the reporting for the toxicity test results. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request. The permittee shall report to the Department any whole effluent toxicity test results greater than 1.0 TU_A or 1.0 TU_C within five (5) days of becoming aware of the result.

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

Whole Effluent Toxicity

acute toxicity	chronic toxicity

Hardness

calcium carbonate

Perfluoroalkyl and Polyfluoroalkyl Substances

Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)

Metals (Total Recoverable), Cyanide and Total Phenols

antimony	arsenic	available cyanide	barium
beryllium	boron	cadmium	chromium
copper	lead	nickel	selenium
silver	thallium	zinc	
total phenolic compounds			

Volatile Organic Compounds

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

Acid-Extractable Compounds

4-chloro-3-methylphenol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol
4,6-dinitro-o-cresol	2,4-dinitrophenol	2-nitrophenol	4-nitrophenol
Pentachlorophenol	phenol	2,4,6-trichlorophenol	

Base/Neutral Compounds

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

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4. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall continue to implement the Pollutant Minimization Program approved on May 28, 2008, and modifications thereto, to proceed toward the goal. The Pollutant Minimization Program includes the following:

a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;

b. a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and

c. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

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

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

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

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

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

In accordance with Section 324.3112a of the NREPA, if sanitary sewer overflow (SSO) or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located, that the discharge is occurring. The permittee shall also notify the Department via its MiWaters system on the form entitled “Report of Discharge (CSO\SSO\RTB).” The MiWaters website is located at https://miwaters.deq.state.mi.us. At the conclusion of the discharge, the permittee shall make all such notifications specified in, and in accordance with, Section 324.3112a of the NREPA, and shall notify the Department via its MiWaters system on the form entitled “Report of Discharge (CSO\SSO\RTB).”

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

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

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

6. Facility Contact

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

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

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

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

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7. Monthly Operating Reports

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

Within 30 days of the effective date of this permit, the permittee shall submit to the Department a revised treatment facility monitoring program to address monitoring requirement changes reflected in this permit, or submit justification explaining why monitoring requirement changes reflected in this permit do not necessitate revisions to the treatment facility monitoring program. The permittee shall implement the revised treatment facility monitoring program upon approval from the Department. Applicable forms and guidance are available on the Department's web site at http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html. The permittee may use alternate forms if they are consistent with the approved treatment facility monitoring program. Unless the Department provides written notification to the permittee that monthly submittal of operating reports is required, operating reports that result from implementation of the approved treatment facility monitoring program shall be maintained on site for a minimum of three (3) years and shall be made available to the Department for review upon request.

8. Asset Management

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

a. Asset Management Program Requirements

The permittee shall continue to implement the Asset Management Plan approved on March 14, 2016, and approved modifications thereto. The Asset Management Plan contains a schedule for the development and implementation of an Asset Management Program that meets the requirements outlined below in 1) – 4):

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

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

a) all sanitary sewer lines and related manholes;

b) all combined sewer lines, related manholes, catch basins and CSO regulators;

c) all known or suspected connections between the sanitary sewer or combined sewer and storm drain systems;

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d) all outfalls, including the treatment plant outfall(s), combined sewer treatment facility outfalls, untreated CSOs, and any known SSOs;

e) all pump stations and force mains;

f) the wastewater treatment facility(ies), including all treatment processes;

g) all surface waters (labeled);

h) other major appurtenances such as inverted siphons and air release valves;

i) a numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;

j) the scale and a north arrow;

k) the pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow; and

l) the manhole interior material, rim elevation (optional), and invert elevations.

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

a) The fixed asset inventory shall include the following:

(1) a brief description of the fixed asset, its design capacity (e.g., pump: 120 gallons per minute), its level of redundancy, and its tag number if applicable;

(2) the location of the fixed asset;

(3) the year the fixed asset was installed;

(4) the present condition of the fixed asset (e.g., excellent, good, fair, poor); and

(5) the current fixed asset (replacement) cost in dollars for year specified in accordance with approved schedules;

b) The fixed asset assessment shall include a “Business Risk Evaluation” that combines the probability of failure of the fixed asset and the criticality of the fixed asset, as follows:

(1) Rate the probability of failure of the fixed asset on a scale of 1-5 (low to high) using criteria such as maintenance history, failure history, and remaining percentage of useful life (or years remaining);

(2) Rate the criticality of the fixed asset on a scale of 1-5 (low to high) based on the consequence of failure versus the desired level of service for the facility; and

(3) Compute the Business Risk Factor of the fixed asset by multiplying the failure rating from (1) by the criticality rating from (2).

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4) *Operation, Maintenance & Replacement (OM&R) Budget and Rate Sufficiency for the Sewer System and Treatment Works.* The permittee shall complete an assessment of its user rates and replacement fund, including the following:

a) beginning and end dates of fiscal year;

b) name of the department, committee, board, or other organization that sets rates for the operation of the sewer system and treatment works;

c) amount in the permittee's replacement fund in dollars for year specified in accordance with approved schedules;

d) replacement fund strategy of all assets with a useful life of 20 years or less;

e) expenditures for maintenance, corrective action and capital improvement taken during the fiscal year;

f) OM&R budget for the fiscal year; and

g) rate calculation demonstrating sufficient revenues to cover OM&R expenses. If the rate calculation shows there are insufficient revenues to cover OM&R expenses, the permittee shall document, within three (3) fiscal years after submittal of the Asset Management Plan, that there is at least one rate adjustment that reduces the revenue gap by at least 10 percent. The permittee may prepare and submit an alternate plan, subject to Department approval, for addressing the revenue gap. The ultimate goal of the Asset Management Program is to ensure sufficient revenues to cover OM&R expenses.

b. Annual Reporting

The permittee shall develop a written report that summarizes asset management activities completed during the previous year and planned for the upcoming year. The written report shall be submitted to the Department on or before January 30 of each year. The written report shall include:

1) a description of the staffing levels maintained during the year;

2) a description of inspections and maintenance activities conducted and corrective actions taken during the previous year;

3) expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital improvement during the previous year;

4) a summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five (5) core elements and the Business Risk Factors;

5) a maintenance budget and capital improvement budget for the upcoming year that take into account implementation of an effective Asset Management Program that meets the five (5) core elements;

6) an updated asset inventory based on the original submission; and

7) an updated OM&R budget with an updated rate schedule that includes the amount of insufficient revenues, if any.

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Section A. Limitations and Monitoring Requirements

9. Schedule for Compliance

In order to achieve compliance with the State water quality standards in the Grand River at and immediately below the point of discharge during drought flow conditions as required by law, the discharge concentration of $CBOD_5$ and Ammonia Nitrogen (as N) must be reduced to achieve advanced waste treatment (AWT) final effluent limitations as specified in Part I.A.1. This shall be done in accordance with the following schedule. All submittals shall be to the Department.

a. On or before October 1, 2019, the permittee shall submit an approvable preliminary engineering report and basis of design for achieving compliance with AWT effluent limitations.

b. On or before October 1, 2023, the permittee shall submit approvable final plans and specifications for achieving compliance with AWT effluent limitations.

c. On or before May 1, 2024, the permittee shall commence construction called for in the approved final plans and specifications.

d. On or before October 30, 2026, the permittee shall complete construction called for in the approved final plans and specifications.

e. On or before October 1, 2027, the permittee shall attain an operational level necessary to meet the AWT limits specified herein.

10. Discharge Monitoring Report – Quality Assurance Study Program

The permittee shall participate in the Discharge Monitoring Report – Quality Assurance (DMR-QA) Study Program. The purpose of the DMR-QA Study Program is to annually evaluate the proficiency of all in-house and/or contract laboratory(ies) that perform, on behalf of the facility authorized to discharge under this permit, the analytical testing required under this permit. In accordance with Section 308 of the Clean Water Act (33 U.S.C. § 1318); and R 323.2138 and R 323.2154 of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, participation in the DMR-QA Study Program is required for all major facilities, and for minor facilities selected for participation by the Department.

Annually and in accordance with DMR-QA Study Program requirements and submittal due dates, the permittee shall submit to the Michigan DMR-QA Study Program state coordinator all documentation required by the DMR-QA Study. DMR-QA Study Program participation is required only for the analytes required under this permit and only when those analytes are also identified in the DMR-QA Study.

If the permitted facility's status as a major facility should change, participation in the DMR-QA Study Program may be reevaluated. Questions concerning participation in the DMR-QA Study Program should be directed to the Michigan DMR-QA Study Program state coordinator.

All forms and instructions required for participation in the DMR-QA Study Program, including submittal due dates and state coordinator contact information, can be found at http://www.epa.gov/compliance/discharge-monitoring-report-quality-assurance-study-program.

PART I

Section B. Storm Water Pollution Prevention

1. Final Effluent Limitations and Monitoring Requirements

The permittee is authorized to discharge storm water associated with industrial activity, as defined under 40 CFR 122.26(b)(14)(i-ix), to the surface waters of the state. Such discharge shall be limited and monitored by the permittee as specified below.

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Visual Assessment of Storm Water Discharges
To ensure that storm water discharges from the facility do not violate the narrative standard in the receiving waters, storm water discharges shall be visually assessed in accordance with this permit.

c. Implementation of Storm Water Pollution Prevention Plan
The permittee shall implement an acceptable Storm Water Pollution Prevention Plan (SWPPP) as required by this permit.

d. Certified Operator
The permittee shall have an Industrial Storm Water Certified Operator who has supervision over the facility's storm water treatment and control measures included in the SWPPP.

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Section B. Storm Water Pollution Prevention

The Storm Water Pollution Prevention Plan (SWPPP) is a written procedure to reduce the exposure of storm water to significant materials and to reduce the amount of significant materials in the storm water discharge. An acceptable SWPPP shall identify potential sources of contamination and describe the controls necessary to reduce their impacts in accordance with Part I.B.2. through Part I.B.8. of this permit.

2. Source Identification

To identify potential sources of significant materials that can pollute storm water and subsequently be discharged from the facility, the SWPPP shall, at a minimum, include the following:

a. A site map identifying:

1) buildings and other permanent structures;

2) storage or disposal areas for significant materials;

3) secondary containment structures and descriptions of the significant materials contained within the primary containment structures;

4) storm water discharge points (which include outfalls and points of discharge), numbered or otherwise labeled for reference;

5) location of storm water and non-storm water inlets (numbered or otherwise labeled for reference) contributing to each discharge point;

6) location of NPDES-permitted discharges other than storm water;

7) outlines of the drainage areas contributing to each discharge point;

8) structural controls or storm water treatment facilities;

9) areas of vegetation (with brief descriptions such as lawn, old field, marsh, wooded, etc.);

10) areas of exposed and/or erodible soils and gravel lots;

11) impervious surfaces (e.g., roofs, asphalt, concrete, etc.);

12) name and location of receiving water(s); and

13) areas of known or suspected impacts on surface waters as designated under Part 201 (Environmental Response) of the NREPA.

b. A list of all significant materials that could pollute storm water. For each material listed, the SWPPP shall include each of the following descriptions:

1) the ways in which each type of significant material has been, or has reasonable potential to become, exposed to storm water (e.g., spillage during handling; leaks from pipes, pumps, and vessels; contact with storage piles, contaminated materials, or soils; waste handling and disposal; deposits from dust or overspray; etc.);

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2) identification of the discharge point(s) and the inlet(s) contributing the significant material to each discharge point through which the significant material may be discharged if released; and

3) an evaluation of the reasonable potential for contribution of significant materials to storm water from at least the following areas or activities:

a) loading, unloading, and other significant material-handling operations;

b) outdoor storage, including secondary containment structures;

c) outdoor manufacturing or processing activities;

d) significant dust- or particulate-generating processes;

e) discharge from vents, stacks, and air emission controls;

f) on-site waste disposal practices;

g) maintenance and cleaning of vehicles, machines, and equipment;

h) areas of exposed and/or erodible soils;

i) Sites of Environmental Contamination listed under Part 201 (Environmental Response) of the NREPA;

j) areas of significant material residues;

k) areas where animals (wild or domestic) congregate and deposit wastes; and

l) other areas where storm water may come into contact with significant materials.

c. A listing of significant spills and significant leaks of polluting materials that occurred in areas that are exposed to precipitation or that discharge to a point source at the facility. The listing shall include spills that occurred over the three (3) years prior to the effective date of a permit authorizing discharge. The listing shall include the date, volume, and exact location of the release, and the action taken to clean up the material and/or prevent exposure to storm water or contamination of surface waters of the state. Any release that occurs after the SWPPP has been developed shall be controlled in accordance with the SWPPP and is cause for the SWPPP to be updated as appropriate within 14 calendar days of obtaining knowledge of the spill or loss.

d. A determination as to whether its facility discharges storm water to a water body for which an EPA-approved Total Maximum Daily Load (TMDL) has been established. If so, the permittee shall assess whether the TMDL requirements for the facility's discharge are being met through the existing SWPPP controls or whether additional control measures are necessary. The permittee's assessment of whether the TMDL requirements are being met shall focus on the effectiveness, adequacy, and implementation of the permittee's SWPPP controls.

e. A summary of existing storm water discharge sampling data (if available), describing pollutants in storm water discharges at the facility. This summary shall be accompanied by a description of the suspected source(s) of the pollutants detected.

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Section B. Storm Water Pollution Prevention

3. Nonstructural Controls

To prevent significant materials from contacting storm water at the source, the SWPPP shall, at a minimum, include each of the following nonstructural controls:

a. Written procedures and a schedule for routine preventive maintenance. Preventive maintenance procedures shall describe routine inspections and maintenance of storm water management and control devices (e.g., cleaning of oil/water separators and catch basins, routine housekeeping activities, etc.), as well as inspecting and testing plant equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to the storm sewer system or the surface waters of the state. The routine inspection shall include areas of the facility in which significant materials have the reasonable potential to contaminate storm water. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below.

b. Written procedures and a schedule for good housekeeping to maintain a clean, orderly facility. Good housekeeping procedures shall include routine inspections that focus on the areas of the facility that have a reasonable potential to contaminate storm water entering the property. The routine housekeeping inspections may be combined with the routine inspections for the preventive maintenance program. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below.

c. Written procedures and a schedule for **quarterly** comprehensive site inspections, to be conducted by the Industrial Storm Water Certified Operator. At a minimum, one inspection shall be performed within each of the following quarters: January-March, April-June, July-September, and October-December. The comprehensive site inspections shall include, but not be limited to, inspection of structural controls in use at the facility, and the areas and equipment identified in the routine preventive maintenance and good housekeeping procedures. These inspections shall also include a review of the routine preventive maintenance reports, good housekeeping inspection reports, and any other paperwork associated with the SWPPP. The permittee may request Department approval of an alternate schedule for comprehensive site inspections. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below, and the following shall be included on the comprehensive inspection form/report:

    1) Date of the inspection.

    2) Name(s), title(s), and certification number(s) of the personnel conducting the inspection.

    3) Precipitation information (i.e., a description of recent rainfall/snowmelt events).

    4) All observations relating to the implementation of control measures. Items to include if applicable:

        a) updates on corrective actions implemented due to previously identified pollutant and/or discharge issues;

        b) any evidence of, or the potential for, pollutants to discharge to the drainage system or receiving waters and the condition of and around the discharge point including flow dissipation measures needing maintenance or repairs;

        c) any control measures needing maintenance or repairs; and

        d) any additional control measures needed to comply with permit requirements.

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Section B. Storm Water Pollution Prevention

5) Any required revisions to the SWPPP resulting from the inspection.

6) A written certification stating the facility is in compliance with this permit and the SWPPP, or, if there are instances of noncompliance, they are identified.

7) Written procedures and a schedule for **quarterly** visual assessments of storm water discharges. At a minimum, one visual assessment shall be conducted within each of the following quarters: January-March, April-June, July-September, and October-December. These assessments shall be conducted as part of the comprehensive site inspection within one month of control measure observations made in accordance with 4), above. If the Department has approved an alternate schedule for the comprehensive site inspection, the visual assessment may likewise be conducted in accordance with the same approved alternate schedule.

The following are the requirements of the visual assessment. The permittee shall develop and clearly document, in writing, procedures for meeting these requirements:

a) Within six (6) months of the effective date of this permit, the permittee shall develop written procedures for conducting the visual assessment and incorporate these procedures into the SWPPP. If Qualified Personnel rather than an Industrial Storm Water Certified Operator will collect storm water samples, these procedures shall include a written description of the training given to these personnel to qualify them to collect the samples, as well as documentation verifying that these personnel have received this training. The first visual assessment shall be conducted in conjunction with the next occurring comprehensive inspection. If changes resulting in altered drainage patterns occur at the facility, the permittee shall modify the procedures for conducting the visual assessment in accordance with the requirements of Keeping SWPPPs Current, below, and these modifications shall be incorporated into the SWPPP prior to conducting the next visual assessment.

b) A visual assessment shall be conducted of a representative storm water **sample** collected **from each storm water discharge point**. Storm water samples shall be visually assessed for conditions that could cause a violation of water quality standards as defined in Water Quality Standards, below. The visual assessment shall be made of the storm water sample in a clean, clear glass or plastic container. Only an Industrial Storm Water Certified Operator shall conduct this visual assessment. Visual assessment of the storm water sample shall be conducted within 48 hours of sample collection.

Representative storm water samples shall be collected:

(1) from each storm water discharge point identified as set forth under Source Identification, above. These samples may be collected by one or more of the following: an Industrial Storm Water Certified Operator; and/or an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the sample (“Qualified Personnel”); and/or an automated sampling device; and

(2) within the first 30 minutes of the start of a discharge from a storm event and on discharges that occur at least 72 hours (3 days) from the previous discharge. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample shall be collected as soon thereafter as practicable, but not exceeding 60 minutes. In the case of snowmelt, samples shall be collected during a period with measurable discharge from the site.

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c) A visual assessment shall be conducted of the storm water **discharge at each storm water discharge point**. (If an automated sampling device is used to collect the storm water sample, this requirement is waived). Either an Industrial Storm Water Certified Operator and/or Qualified Personnel may conduct this visual assessment. This visual assessment may be conducted directly – by someone physically present at the storm water discharge at each storm water discharge point; or it may be conducted indirectly – through the use of a visual recording taken of the storm water discharge at each storm water discharge point. Direct visual assessment shall be conducted at the same time that the storm water sample is collected. Indirect visual assessment shall be conducted using a visual recording taken of the storm water discharge at the same time that the storm water sample was collected.

d) Visual assessments shall be documented. This documentation shall be retained in accordance with Record Keeping, below, and shall include the following:

(1) sampling location(s) at the storm water discharge point(s) identified on the site map (see Source Identification, above);

(2) storm event information (i.e., length of event expressed in hours, approximate size of event expressed in inches of precipitation, duration of time since previous event that caused a discharge, and date and time the discharge began);

(3) date and time of the visual assessment of each storm water **discharge** at each storm water discharge point;

(4) name(s) and title(s) of the Industrial Storm Water Certified Operator or Qualified Personnel who conducted the visual assessment of the storm water **discharge** at each storm water discharge point. If an automated sampling device was used to collect the storm water sample associated with this discharge point, this documentation requirement is waived;

(5) observations made during visual assessment of the storm water **discharge** at each storm water discharge point. If an automated sampling device was used to collect the storm water sample associated with this discharge point, this documentation requirement is waived;

(6) if applicable, any visual recordings used to conduct the visual assessment of the storm water **discharge** at each storm water discharge point;

(7) date and time of sample collection for each storm water **sample**;

(8) name(s) and title(s) of the Industrial Storm Water Certified Operator or Qualified Personnel who collected the storm water **sample**. If an automated sampling device was used to collect the storm water sample, the permittee shall document that, instead;

(9) date and time of the visual assessment of each storm water **sample**;

(10) name(s), title(s), and operator number(s) of the Industrial Storm Water Certified Operator(s) who conducted the visual assessment of each storm water **sample**;

(11) observations made during visual assessment of each storm water **sample**;

(12) full-color photographic evidence of the storm water **sample** against a white background;

(13) nature of the discharge (i.e., rainfall or snowmelt);

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(14) probable sources of any observed storm water contamination; and

(15) if applicable, an explanation for why it was not possible to collect samples within the first 30 minutes of discharge.

e) When adverse weather conditions prevent a visual assessment during the quarter, a substitute visual assessment shall be conducted during the next qualifying storm event. Documentation of the rationale for no visual assessment during a quarter shall be included with the SWPPP records as described in Record Keeping, below. Adverse conditions are those that are dangerous or create inaccessibility for personnel, such as local flooding, high winds, electrical storms, or situations that otherwise make sampling impractical such as drought or extended frozen conditions.

f) If the facility has two (2) or more discharge points that are believed to discharge substantially identical storm water effluents, the facility may conduct visual assessments of the discharge at just one (1) of the discharge points and report that the results also apply to the other substantially identical discharge point(s). The determination of substantially identical discharge points is to be based on the significant material evaluation conducted as set forth under Source Identification, above, and shall be clearly documented in the SWPPP. Visual assessments shall be conducted on a rotating basis of each substantially identical discharge point throughout the period of coverage under this permit.

d. A description of material handling procedures and storage requirements for significant materials. Equipment and procedures for cleaning up spills shall be identified in the SWPPP and made available to the appropriate personnel. The procedures shall identify measures to prevent spilled materials or material residues from contaminating storm water entering the property. The SWPPP shall include language describing what a reportable spill or release is and the appropriate reporting requirements in accordance with Part II.C.6. and Part II.C.7. The SWPPP may include, by reference, requirements of either a Pollution Incident Prevention Plan (PIPP) prepared in accordance with the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); a Hazardous Waste Contingency Plan prepared in accordance with 40 CFR 264 and 265 Subpart D, as required by Part 111 of the NREPA; or a Spill Prevention Control and Countermeasure (SPCC) plan prepared in accordance with 40 CFR 112.

e. Identification of areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion. Gravel lots shall be included. The SWPPP shall also identify measures used to control soil erosion and sedimentation.

f. A description of the employee training program that will be implemented on an annual basis to inform appropriate personnel at all levels of their responsibility as it relates to the components and goals of the SWPPP. The SWPPP shall identify periodic dates for the employee training program. Records of the employee training program shall be retained in accordance with Record Keeping, below.

g. Identification of actions to limit the discharge of significant materials in order to comply with TMDL requirements, if applicable.

h. Identification of significant materials expected to be present in storm water discharges following implementation of nonstructural preventive measures and source controls.

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Section B. Storm Water Pollution Prevention

4. Structural Controls

Where implementation of the measures required by Nonstructural Controls, above, does not control storm water discharges in accordance with Water Quality Standards, below, the SWPPP shall provide a description of the location, function, design criteria, and installation/construction schedule of structural controls for prevention and treatment. Structural controls may be necessary:

a. to prevent uncontaminated storm water from contacting, or being contacted by, significant materials; or

b. if preventive measures are not feasible or are inadequate to keep significant materials at the site from contaminating storm water. Structural controls shall be used to treat, divert, isolate, recycle, reuse, or otherwise manage storm water in a manner that reduces the level of significant materials in the storm water and provides compliance with water quality standards as identified in Water Quality Standards, below.

5. Keeping SWPPPs Current

a. The permittee and/or the Industrial Storm Water Certified Operator shall review the SWPPP annually after it is developed and maintain a written report of the review in accordance with Record Keeping, below. Based on the review, the permittee or the Industrial Storm Water Certified Operator shall amend the SWPPP as needed to ensure continued compliance with the terms and conditions of this permit. The written report shall be submitted to the Department on or before January 10th of each year.

b. The SWPPP developed under the conditions of a previous permit shall be amended as necessary to ensure compliance with this permit.

c. The SWPPP shall be updated or amended whenever changes at the facility have the potential to increase the exposure of significant materials to storm water, significant spills occur at the facility, or when the SWPPP is determined by the permittee or the Department to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Updates based on increased activity or spills at the facility shall include a description of how the permittee intends to control any new sources of significant materials, or respond to and prevent spills in accordance with the requirements of this permit (see Source Identification; Nonstructural Controls; and Structural Controls, above).

d. The Department may notify the permittee at any time that the SWPPP does not meet minimum requirements of this permit. Such notification shall identify why the SWPPP does not meet minimum requirements of this permit. The permittee shall make the required changes to the SWPPP within 30 days after such notification from the Department or authorized representative and shall submit to the Department a written certification that the requested changes have been made.

e. Amendments to the SWPPP shall be signed and retained on-site with the SWPPP pursuant to Signature and SWPPP Review, below.

6. Industrial Storm Water Certified Operator Update

If the Industrial Storm Water Certified Operator is changed or an Industrial Storm Water Certified Operator is added, the permittee shall provide the name and certification number of the new Industrial Storm Water Certified Operator to the Department. If a facility has multiple Industrial Storm Water Certified Operators, the names and certification numbers of all shall be included in the SWPPP.

PART I

Section B. Storm Water Pollution Prevention

7. Signature and SWPPP Review

a. The SWPPP shall be reviewed and signed by the Industrial Storm Water Certified Operator(s) and by either the permittee or an authorized representative in accordance with 40 CFR 122.22. The SWPPP and associated records shall be retained on-site at the facility that generates the storm water discharge.

b. The permittee shall make the SWPPP, reports, log books, storm water discharge sampling data (if collected), and items required by Record Keeping, below, available upon request to the Department. The Department makes the non-confidential business portions of the SWPPP available to the public.

8. Record Keeping

The permittee shall maintain records of all SWPPP-related inspection and maintenance activities. Records shall also be kept describing incidents such as spills or other discharges that can affect the quality of storm water. All such records shall be retained for three (3) years. The following records are required by this permit (see Nonstructural Controls; and Keeping SWPPPs Current, above):

a. routine preventive maintenance inspection reports;

b. routine good housekeeping inspection reports;

c. comprehensive site inspection reports;

d. documentation of visual assessments;

e. employee training records; and

f. written summaries of the annual SWPPP review.

9. Water Quality Standards

At the time of discharge, there shall be no violation of water quality standards in the receiving waters as a result of the storm water discharge. This requirement includes, but is not limited to, the following conditions:

a. In accordance with R 323.1050 of the Part 4 Rules promulgated pursuant to Part 31 of the NREPA, the receiving waters shall not have any of the following unnatural physical properties as a result of this discharge in quantities which are, or may become, injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits.

b. Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department, followed by a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition.

c. Any pollutant for which a level of control is specified to meet a TMDL established by the Department shall be controlled at the facility so that its discharge is reduced by/to the amount specified in the TMDL.

PART I

Section B. Storm Water Pollution Prevention

10. Prohibition of Non-Storm Water Discharges

Discharges of material other than storm water shall be in compliance with an NPDES permit issued for the discharge. Storm water shall be defined to include all of the following non-storm water discharges, provided pollution prevention controls for the non-storm water component are identified in the SWPPP:

a. discharges from fire hydrant flushing;

b. potable water sources, including water line flushing;

c. water from fire system testing and fire-fighting training without burned materials or chemical fire suppressants;

d. irrigation drainage;

e. lawn watering;

f. routine building wash-down that does not use detergents or other compounds;

g. pavement wash waters where contamination by toxic or hazardous materials has not occurred (unless all contamination by toxic or hazardous materials has been removed) and where detergents are not used;

h. uncontaminated condensate from air conditioners, coolers, and other compressors and from the outside storage of refrigerated gases or liquids;

i. springs;

j. uncontaminated groundwater;

k. foundation or footing drains where flows are not contaminated with process materials such as solvents; and

l. discharges from fire-fighting activities. Discharges from fire-fighting activities are exempted from the requirement to be identified in the SWPPP.

11. Tracer Dye Discharges

This permit does not authorize the discharge of tracer dyes without approval from the Department. Requests to discharge tracer dyes shall be submitted to the Department in accordance with Rule 1097 (R 323.1097 of the Michigan Administrative Code).

PART I

Section C. Industrial Waste Pretreatment Program

1. Federal Industrial Pretreatment Program

a. The permittee shall implement the Federal Industrial Pretreatment Program (FIPP) approved on March 29, 1985, and any subsequent modifications approved up to the issuance of this permit. Approval of substantial program modifications after the issuance of this permit shall be incorporated into this permit by minor modification in accordance with 40 CFR 122.63.

b. The permittee shall comply with R 323.2301 through R 323.2317 of the Michigan Administrative Code (Part 23 Rules), the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403), and the approved FIPP.

c. The permittee shall have the legal authority and necessary interjurisdictional agreements that provide the basis for the implementation and enforcement of the approved FIPP throughout the service area. The legal authority and necessary interjurisdictional agreements shall include, at a minimum, the authority to carry out the activities specified in R 323.2306(a).

d. The permittee shall develop procedures which describe, in sufficient detail, program commitments which enable implementation of the approved FIPP, 40 CFR Part 403, and the Part 23 Rules in accordance with R 323.2306(c).

e. The permittee shall establish an interjurisdictional agreement (or comparable document) with all tributary governmental jurisdictions. Each interjurisdictional agreement shall contain, at a minimum, the following:

1) identification of the agency responsible for the implementation and enforcement of the approved FIPP within the tributary governmental jurisdiction's boundaries; and

2) the provision of the legal authority which provides the basis for the implementation and enforcement of the approved FIPP within the tributary governmental jurisdiction's boundaries.

f. The permittee shall prohibit discharges that:

1) cause, in whole or in part, the permittee's failure to comply with any condition of this permit or the NREPA;

2) restrict, in whole or in part, the permittee's management of biosolids;

3) cause, in whole or in part, operational problems at the treatment facility or in its collection system;

4) violate any of the general or specific prohibitions identified in R 323.2303(1) and (2);

5) violate categorical standards identified in R 323.2311; and

6) violate local limits established in accordance with R 323.2303(4).

g. The permittee shall maintain a list of its nondomestic users that meet the criteria of a significant industrial user as identified in R 323.2302(cc).

h. The permittee shall develop an enforcement response plan which describes, in sufficient detail, program commitments which will enable the enforcement of the approved FIPP, 40 CFR Part 403, and the Part 23 Rules in accordance with R 323.2306(g).

i. The Department may require modifications to the approved FIPP which are necessary to ensure compliance with 40 CFR Part 403 and the Part 23 Rules in accordance with R 323.2309.

PART I

Section C. Industrial Waste Pretreatment Program

j. The permittee shall not implement changes or modifications to the approved FIPP without notification to the Department. Any substantial modification shall be subject to Department public noticing and approval in accordance with R 323.2309.

k. The permittee shall maintain an adequate revenue structure and staffing level for effective implementation of the approved FIPP.

l. The permittee shall develop and maintain, for a minimum of three (3) years, all records and information necessary to determine nondomestic user compliance with 40 CFR Part 403, Part 23 Rules and the approved FIPP. This period of retention shall be extended during the course of any unresolved enforcement action or litigation regarding a nondomestic user or when requested by the Department or the United States Environmental Protection Agency. All of the aforementioned records and information shall be made available upon request for inspection and copying by the Department and the United States Environmental Protection Agency.

m. The permittee shall evaluate the approved FIPP for compliance with the 40 CFR Part 403, Part 23 Rules and the prohibitions stated in item f. above. Based upon this evaluation, the permittee shall propose to the Department all necessary changes or modifications to the approved FIPP no later than the next Industrial Pretreatment Program Annual Report due date (see item o. below).

n. The permittee shall develop and enforce local limits to implement the prohibitions listed in item f above. Local limits shall be based upon data representative of actual conditions demonstrated in a maximum allowable headworks loading analysis. An evaluation of whether the existing local limits need to be revised shall be submitted to the Department by August 1, 2020. The submittal shall provide a technical evaluation of the basis upon which this determination was made which includes information regarding the maximum allowable headworks loading, collection system protection criteria, and worker health and safety, based upon data collected since the last local limits review.

The following pollutants shall be evaluated:

1) Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, and Zinc;

2) Pollutants that are subject to limits or monitoring in this permit;

3) Pollutants that have an existing local limit; and,

4) Other pollutants of concern which would reasonably be expected to be discharged or transported by truck or rail or otherwise introduced into the POTW.

o. On or before April 1st of each year, the permittee shall submit to the Department, as required by R 323.2310(8), an Industrial Pretreatment Program Annual Report on the status of program implementation and enforcement activities. The reporting period shall begin on January 1st and end on December 31st. At a minimum, the Industrial Pretreatment Program Annual Report shall include:

1) the Pretreatment Program Reports data identified in Appendix A to 40 CFR Part 127 – NPDES Electronic Reporting;

2) a summary of changes to the approved FIPP that have not been previously reported to the Department;

PART I

Section C. Industrial Waste Pretreatment Program

3) a summary of results of all the sampling and analyses performed of the wastewater treatment plant's influent, effluent, and biosolids conducted in accordance with approved methods during the reporting period. The summary shall include the monthly average, daily maximum, quantification level, and number of samples analyzed for each pollutant. At a minimum, the results of analyses for all locally limited parameters for at least one monitoring event that tests influent, effluent and biosolids during the reporting period shall be submitted with each report, unless otherwise required by the Department. Sample collection shall be at intervals sufficient to provide pollutant removal rates, unless the pollutant is not measurable; and

4) any other relevant information requested by the Department.

PART I

Section D. Residuals Management Program

1. Residuals Management Program for Land Application of Biosolids

The permittee is authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the permittee's approved Residuals Management Program (RMP) approved on September 27, 2000, and approved modifications thereto, in accordance with the requirements established in R 323.2401 through R 323.2418 of the Michigan Administrative Code (Part 24 Rules). The approved RMP, and any approved modifications thereto, are enforceable requirements of this permit. Incineration, landfilling and other residual disposal activities shall be conducted in accordance with Part II.D.7. of this permit. The Part 24 Rules can be obtained via the internet (http://www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on Biosolids Laws and Rules Information which is under the Laws & Rules banner in the center of the screen).

a. Annual Report
On or before October 30 of each year, the permittee shall submit an annual report to the Department for the previous fiscal year of October 1 through September 30. The report shall be submitted electronically via the Department's MiWaters system at https://miwaters.deq.state.mi.us. At a minimum, the report shall contain:

1) a certification that current residuals management practices are in accordance with the approved RMP, or a proposal for modification to the approved RMP; and

2) a completed Biosolids Annual Report Form, available at https://miwaters.deq.state.mi.us.

b. Modifications to the Approved RMP
Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.

c. Record Keeping
Records required by the Part 24 Rules shall be kept for a minimum of five years. However, the records documenting cumulative loading for sites subject to cumulative pollutant loading rates shall be kept as long as the site receives biosolids.

d. Contact Information
RMP-related submittals shall be made to the Department.

PART II

Part II may include terms and /or conditions not applicable to discharges covered under this permit.

Section A. Definitions

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Annual monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Authorized public agency means a state, local, or county agency that is designated pursuant to the provisions of section 9110 of Part 91 of the NREPA to implement soil erosion and sedimentation control requirements with regard to construction activities undertaken by that agency.

Best management practices (BMPs) means structural devices or nonstructural practices that are designed to prevent pollutants from entering into storm water, to direct the flow of storm water, or to treat polluted storm water.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Certificate of Coverage (COC) is a document, issued by the Department, which authorizes a discharge under a general permit.

Chronic toxic unit (TU_C) means 100/MATC or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Combined sewer system is a sewer system in which storm water runoff is combined with sanitary wastes.

PART II

Section A. Definitions

Daily concentration is the sum of the concentrations of the individual samples of a parameter divided by the number of samples taken during any calendar day. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations (except for pH and dissolved oxygen). When required by the permit, report the maximum calculated daily concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the Discharge Monitoring Reports (DMRs).

For pH, report the maximum value of any *individual* sample taken during the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs and the minimum value of any *individual* sample taken during the month in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. For dissolved oxygen, report the minimum concentration of any *individual* sample in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Daily monitoring frequency refers to a 24-hour day. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Department means the Michigan Department of Environment, Great Lakes, and Energy.

Detection level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

Discharge means the addition of any waste, waste effluent, wastewater, pollutant, or any combination thereof to any surface water of the state.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a discharge event. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR. If the period in which the discharge event occurred was partially in each of two months, the calculated monthly value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a reporting month. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

PART II

Section A. Definitions

Fecal coliform bacteria 7-day
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days of discharge during a discharge event. If the number of daily concentrations determined during the discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean value for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. If the 7-day period was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days in a reporting month. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. The first calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

Flow-proportioned sample is a composite sample with the sample volume proportional to the effluent flow.

General permit means a National Pollutant Discharge Elimination System permit issued authorizing a category of similar discharges.

Geometric mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

Grab sample is a single sample taken at neither a set time nor flow.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Illicit connection means a physical connection to a municipal separate storm sewer system that primarily conveys non-storm water discharges other than uncontaminated groundwater into the storm sewer; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

Illicit discharge means any discharge to, or seepage into, a municipal separate storm sewer system that is not composed entirely of storm water or uncontaminated groundwater. Illicit discharges include non-storm water discharges through pipes or other physical connections; dumping of motor vehicle fluids, household hazardous wastes, domestic animal wastes, or litter; collection and intentional dumping of grass clippings or leaf litter; or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-storm water waste directly into a separate storm sewer.

Individual permit means a site-specific NPDES permit.

Inlet means a catch basin, roof drain, conduit, drain tile, retention pond riser pipe, sump pump, or other point where storm water or wastewater enters into a closed conveyance system prior to discharge off site or into waters of the state.

PART II

Section A. Definitions

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference].

Land application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

Maximum extent practicable means implementation of best management practices by a public body to comply with an approved storm water management program as required by a national permit for a municipal separate storm sewer system, in a manner that is environmentally beneficial, technically feasible, and within the public body's legal authority.

MGD means million gallons per day.

Monthly concentration is the sum of the daily concentrations determined during a reporting period divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during a reporting period. The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMR.

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Municipal separate storm sewer means a conveyance or system of conveyances designed or used for collecting or conveying storm water which is not a combined sewer and which is not part of a publicly-owned treatment works as defined in the Code of Federal Regulations at 40 CFR 122.2.

PART II

Section A. Definitions

Municipal separate storm sewer system (MS4) means all separate storm sewers that are owned or operated by the United States, a state, city, village, township, county, district, association, or other public body created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as a sewer district, flood control district, or drainage district, or similar entity, or a designated or approved management agency under Section 208 of the Federal Act that discharges to the waters of the state. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Federal Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact cooling water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Outfall is the location at which a point source discharge enters the surface waters of the state.

Part 91 agency means an agency that is designated by a county board of commissioners pursuant to the provisions of section 9105 of Part 91 of the NREPA; an agency that is designated by a city, village, or township in accordance with the provisions of section 9106 of Part 91 of the NREPA; or the Department for soil erosion and sedimentation activities under Part 615, Part 631, or Part 632 pursuant to the provisions of section 9115 of Part 91 of the NREPA.

Part 91 permit means a soil erosion and sedimentation control permit issued by a Part 91 agency pursuant to the provisions of Part 91 of the NREPA.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's National Pollutant Discharge Elimination System permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Point of discharge is the location of a point source discharge where storm water is discharged directly into a separate storm sewer system.

Point source discharge means a discharge from any discernible, confined, discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock. Changing the surface of land or establishing grading patterns on land will result in a point source discharge where the runoff from the site is ultimately discharged to waters of the state.

Polluting material means any material, in solid or liquid form, identified as a polluting material under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

POTW is a publicly owned treatment work.

PART II

Section A. Definitions

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.
Public (as used in the MS4 individual permit) means all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, and construction contractors and developers.

Public body means the United States; the state of Michigan; a city, village, township, county, school district, public college or university, or single-purpose governmental agency; or any other body which is created by federal or state statute or law.

Qualified Personnel means an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the storm water sample.

Qualifying storm event means a storm event causing greater than 0.1 inch of rainfall and occurring at least 72 hours after the previous measurable storm event that also caused greater than 0.1 inch of rainfall. Upon request, the Department may approve an alternate definition meeting the condition of a qualifying storm event.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Regulated area means the permittee's urbanized area, where urbanized area is defined as a place and its adjacent densely-populated territory that together have a minimum population of 50,000 people as defined by the United States Bureau of the Census and as determined by the latest available decennial census.

Secondary containment structure means a unit, other than the primary container, in which significant materials are packaged or held, which is required by State or Federal law to prevent the escape of significant materials by gravity into sewers, drains, or otherwise directly or indirectly into any sewer system or to the surface or ground waters of this state.

Separate storm sewer system means a system of drainage, including, but not limited to, roads, catch basins, curbs, gutters, parking lots, ditches, conduits, pumping devices, or man-made channels, which is not a combined sewer where storm water mixes with sanitary wastes, and is not part of a POTW.

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process waste stream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

PART II

Section A. Definitions

Significant materials Significant Materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111 of the NREPA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills and significant leaks means any release of a polluting material reportable under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

Special-use area means secondary containment structures required by state or federal law; lands on Michigan's List of Sites of Environmental Contamination pursuant to Part 201, Environmental Remediation, of the NREPA; and/or areas with other activities that may contribute pollutants to the storm water for which the Department determines monitoring is needed.

Stoichiometric means the quantity of a reagent calculated to be necessary and sufficient for a given chemical reaction.

Storm water means storm water runoff, snow melt runoff, surface runoff and drainage, and non-storm water included under the conditions of this permit.

Storm water discharge point is the location where the point source discharge of storm water is directed to surface waters of the state or to a separate storm sewer. It includes the location of all point source discharges where storm water exits the facility, including *outfalls* which discharge directly to surface waters of the state, and *points of discharge* which discharge directly into separate storm sewer systems.

SWPPP means the Storm Water Pollution Prevention Plan prepared in accordance with this permit.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total maximum daily loads (TMDLs) are required by the Federal Act for waterbodies that do not meet water quality standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet water quality standards, and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity reduction evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of the NREPA, being R 323.1041 through R 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

WWSL is a wastewater stabilization lagoon.

WWSL discharge event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14 day period.

PART II

Section A. Definitions

3-portion composite sample is a sample consisting of three equal-volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily concentrations determined. If the number of daily concentrations determined during the WWSL discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the WWSL discharge event in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations in the reporting month. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

7-day loading
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily loadings determined. If the number of daily loadings determined during the WWSL discharge event is less than 7 days, the number of actual daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the WWSL discharge event in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days in a reporting month divided by the number of daily loadings determined. If the number of daily loadings determined is less than 7, the actual number of daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations in the reporting month. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

24-hour composite sample is a flow-proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period. A time-proportioned composite sample may be used upon approval of the Department if the permittee demonstrates it is representative of the discharge.

PART II

Section B. Monitoring Procedures

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Federal Act (40 CFR Part 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. **Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations**. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Manager of the Permits Section, Water Resources Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30458, Lansing, Michigan, 48909-7958. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of the NREPA (specifically Section 324.3110(7)); and R 323.2155(2) of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, allow the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self-Monitoring," the permittee shall submit self-monitoring data via the Department's MiWaters system.

The permittee shall utilize the information provided on the MiWaters website, located at https://miwaters.deq.state.mi.us, to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the Department no later than the 20th day of the month following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page (or otherwise authorized by the Department in accordance with the provisions of this permit) to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Department. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th (April 1st for animal feeding operation facilities) of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous year's monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

Retained self-monitoring may be denied to a permittee by notification in writing from the Department. In such cases, the permittee shall submit self-monitoring data in accordance with Part II.C.2., above. Such a denial may be rescinded by the Department upon written notification to the permittee. Reissuance or modification of this permit or reissuance or modification of an individual permittee's authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the NREPA or Rule 35 of the Mobile Home Park Commission Act (Act 96 of the Public Acts of 1987) for assurance of proper facility operation shall be submitted as required by the Department.

PART II

Section C. Reporting Requirements

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a *written* notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Federal Act, Parts 31 and 41 of the NREPA, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-Hour Reporting
Any noncompliance which may endanger health or the environment (including maximum and/or minimum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. Other Reporting
The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times, or, if not yet corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if the notice is provided after regular working hours, call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from **out-of-state** dial 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventive measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

PART II

Section C. Reporting Requirements

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset, shall notify the Department by telephone within 24 hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated and maintained (note that an upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation); and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

9. Bypass Prohibition and Notification

a. Bypass Prohibition
Bypass is prohibited, and the Department may take an enforcement action, unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass
If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass
The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the second page of this permit (if the notice is provided after regular working hours, use the following number: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

PART II

Section C. Reporting Requirements

d. Written Report of Bypass
A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.11. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of R 323.1098 and R 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

11. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, as soon as possible but no later than 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit, for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

PART II

Section C. Reporting Requirements

12. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under R 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.10.; and 4) the action or activity will not require notification pursuant to Part II.C.11. Following such notice, the permit or, if applicable, the facility's COC may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

For wastewater treatment facilities that serve the public (and are thus subject to Part 41 of the NREPA), Section 4104 of Part 41 and associated Rule 2957 of the Michigan Administrative Code allow the Department to require an Operations and Maintenance (O&M) Manual from the facility. An up-to-date copy of the O&M Manual shall be kept at the facility and shall be provided to the Department upon request. The Department may review the O&M Manual in whole or in part at its discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M Manual shall include the following information: permit standards; descriptions and operation information for all equipment; staffing information; laboratory requirements; record keeping requirements; a maintenance plan for equipment; an emergency operating plan; safety program information; and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

Certification of the existence and accuracy of the O&M Manual shall be submitted to the Department at least sixty days prior to start-up of a new wastewater treatment facility. Recertification shall be submitted sixty days prior to start-up of any substantial improvements or modifications made to an existing wastewater treatment facility.

PART II

Section C. Reporting Requirements

15. Signatory Requirements

All applications, reports, or information submitted to the Department in accordance with the conditions of this permit and that require a signature shall be signed and certified as described in the Federal Act and the NREPA.

The Federal Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

The NREPA (Section 3115(2)) provides that a person who at the time of the violation knew or should have known that he or she discharged a substance contrary to this part, or contrary to a permit, COC, or order issued or rule promulgated under this part, or who intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit or COC or in a notice or report required by the terms and conditions of an issued permit or COC, or who intentionally renders inaccurate a monitoring device or record required to be maintained by the Department, is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 per day and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of the effluent is in conformance with and obedient to a rule, order, permit, or COC of the Department. In addition to a fine, the attorney general may file a civil suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation.

16. Electronic Reporting

Upon notice by the Department that electronic reporting tools are available for specific reports or notifications, the permittee shall submit electronically all such reports or notifications as required by this permit, on forms provided by the Department.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit, more frequently than, or at a level in excess of, that authorized, shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the NREPA and/or the Federal Act and constitutes grounds for enforcement action; for permit or Certificate of Coverage (COC) termination, revocation and reissuance, or modification; or denial of an application for permit or COC renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the NREPA. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the NREPA.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

PART II

Section D. Management Responsibilities

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code). For a Publicly Owned Treatment Work (POTW), these facilities shall be approved under Part 41 of the NREPA.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the NREPA, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department, or the Regional Administrator, upon the presentation of credentials and, for animal feeding operation facilities, following appropriate biosecurity protocols:

a. to enter upon the permittee's premises where an effluent source is located or any place in which records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act and Rule 2128 (R 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit, shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act and Sections 3112, 3115, 4106 and 4110 of the NREPA.

10. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or the facility's COC, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the NREPA.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW shall be by permit issued under Part 41 of the NREPA.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Federal Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Federal Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environment, Great Lakes, and Energy permits, or approvals from other units of government as may be required by law.

APPENDIX B: OPINION OF PROBABLE COSTS

Delta Township WWTP
SRF Project Plan
Present Worth Back-up Calculations

The present worth calculations were performed using a discount factor of 0.3 percent over a 20 year period, which is the requested term of the SRF loan.

The salvage values were calculated by evaluating each line of the opinions of probable cost and classifying the item as one of the following:

- Civil/Site Work/Piping – site improvements, grading and piping
- Structures – includes new buildings and concrete tanks
- Mechanical – includes process equipment; pumps; and heating, ventilation, and air conditioning
- Electrical/Other – includes electrical equipment, instrumentation, and other items that do not fit into another category
- Engineering – costs associated with the design and construction
- Contingencies – additional costs to account for unknown factors prior to final design

The costs for each category were added for each process area. The service life assigned to each category is summarized in Table B-1.

Table B-1. Service Life by Category

Category	Service Life
Civil/Site Work/Piping	50
Structures	50
Mechanical	20
Electrical/Other	20
Engineering	20
Contingencies	20

The cost assignments are included with the opinions of probable costs, included herein (Appendix B).

Only those assets with a service life greater than 20 years were assigned a salvage value. Straight line depreciation was used to determine the value of the assets after 20 years. The present worth was then calculated using the 0.3 percent discount rate.

The O&M costs predominantly consist of energy usage. The assumptions used to develop the O&M costs for Alternatives A and B can be found in the tables that are included in this appendix (Appendix B).

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, Michigan	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative A	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative A

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$12,077,000	50	$12,077,000	$6,825,000	$5,252,000
Structures	$21,460,000	50	$21,460,000	$12,128,000	$9,332,000
Mechanical	$22,358,000	20	$22,358,000	$0	$22,358,000
Electrical/Other	$11,628,000	20	$11,628,000	$0	$11,628,000
Engineering	$10,329,000	20	$10,329,000	$0	$10,329,000
Contingencies	$18,514,000	20	$18,514,000	$0	$18,514,000
Total Capital Cost	$96,366,000			Total	$77,413,000

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$533,000	$10,332,000
	Total	$10,332,000

Net Present Worth	$87,745,000
Weighted Useful Life (years)	30.44

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
New Headworks to Ex Primary Tanks

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Other	Engineering	Contingencies
1												
2	Demolition of WAS Storage Tanks	1		$35,000.00	$35,000.00		$35,000					
3												
4	Excavation and Backfill	3,259		$25.00	$82,000.00		$82,000					
5												
6	Yard Piping Modifications	1		$60,000.00	$60,000.00		$60,000					
7												
8	Headworks Structure	1,285		$1,000.00	$1,285,000.00			$1,285,000				
9												
10	Headworks Building	2,325		$200.00	$465,000.00			$465,000				
11												
12	Screen Equipment	3		$175,000.00	$525,000.00				$525,000			
13												
14	Compactors	3		$81,250.00	$244,000.00				$244,000			
15												
16	RS Pumps	5		$105,000.00	$525,000.00				$525,000			
17												
18	Piping and Valves	1		$210,000.00	$210,000.00		$210,000					
19												
20	RS Discharge Pipe to Primary Tank	1		$960,000.00	$960,000.00		$960,000					
21												
22	Grit Tanks with Vortex at Ex Grit Tanks	199		$800.00	$160,000.00				$160,000			
23	Grit Mechanism and Handling	2		$227,500.00	$455,000.00				$455,000			
24	Building and Roof Rehab	1		$450,000.00	$450,000.00			$450,000				
25	24,000 SCFM Odor Control	1		$175,000.00	$175,000.00				$175,000			
26										$0		
27										$0		
28	Mechanical	5	%		$282,000.00				$282,000			
29	Electrical	15	%		$845,000.00					$845,000		
30	Contingency	30	%		$1,690,000.00							$1,690,000
31	Engineering	12	%		$1,014,000.00						$1,014,000	
TOTAL CONSTRUCTION COST					**$9,462,000.00**	**Total**	**$1,347,000**	**$2,200,000**	**$2,366,000**	**$845,000**	**$1,014,000**	**$1,690,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Primary Tank Expansion

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Other	Engineering	Contingencies
1												
2	Excavation	4,000		$25.00	$100,000.00		$100,000					
3												
4	Site Piping Modifications	1		$50,000.00	$50,000.00		$50,000					
5												
6	Tank Structure Expansion	1,244		$1,000.00	$1,244,000.00			$1,244,000				
7												
8	Primary Tank Mechanism Replacement	4		$253,500.00	$1,014,000.00				$1,014,000			
9												
10	New Primary Tank Mechanism	2		$253,500.00	$507,000.00				$507,000			
11												
12	Primary Sludge Pump Replacement	4		$55,000.00	$220,000.00				$220,000			
13												
14	Piping and Valves	1	LS	$125,000.00	$125,000.00		$125,000					
15												
16	Concrete Rehab	1	LS	$150,000.00	$150,000.00			$150,000				
17												
18	24,000 CFM Odor Control Replacement	1		$325,000.00	$325,000.00				$325,000			
19												
20												
21												
22												
23												
24												
25												
26	Mechanical	5	%		$187,000.00				$187,000			
27												
28	Electrical	10	%		$374,000.00					$374,000		
29												
30	Contingency	30	%		$1,289,000.00							$1,289,000
31	Engineering	12	%		$671,000.00						$671,000	
TOTAL CONSTRUCTION COST					**$6,256,000.00**	**Total**	**$275,000**	**$1,394,000**	**$2,253,000**	**$374,000**	**$671,000**	**$1,289,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Oxidation Tower Replacement

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Remove Existing Covers	2		$10,000.00	$20,000.00		$20,000.00					
3	Remove existing media and mechanism	2		$10,000.00	$20,000.00				$20,000.00			
4												
5	Modify Structure for New Cover	2		$55,000.00	$110,000.00			$110,000.00				
6	New Media Ex. Tower	2		$308,000.00	$616,000.00				$616,000.00			
7	New Mechanism Ex. Tower	2		$120,400.00	$241,000.00				$241,000.00			
8	New Cover Ex. Tower	2		$105,000.00	$210,000.00			$210,000.00				
9	New Tower Excavation	10,427		$45.00	$469,000.00		$469,000.00					
10	Retaining Wall	1		$83,333.33	$84,000.00			$84,000.00				
11	New Oxidation Tower Structure	2		$623,166.44	$1,247,000.00			$1,247,000.00				
12	New Media	2		$308,000.00	$616,000.00				$616,000.00			
13	New Mechanism	2		$120,400.00	$241,000.00				$241,000.00			
14	New Cover	2		$105,000.00	$210,000.00			$210,000.00				
15	Site Piping Modifications	1		$613,000.00	$613,000.00		$613,000.00					
16												
17	Intermediate Sludge Pump Replacement	3		$55,000.00	$165,000.00				$165,000.00			
18	Piping and Valves	1		$75,000.00	$75,000.00		$75,000.00					
19												
20												
21												
22												
23												
24												
25	Mechanical	5	%		$247,000.00				$247,000.00			
26												
27	Electrical	20	%		$988,000.00					$988,000.00		
28												
29	Contingency	30	%		$1,852,000.00							$1,852,000.00
30	Engineering	12	%		$963,000.00						$963,000.00	
31												
TOTAL CONSTRUCTION COST					**$8,987,000.00**	**Total**	**$1,177,000**	**$1,861,000**	**$2,146,000**	**$988,000**	**$963,000**	**$1,852,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Intermediate Clarifier Modifications

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2												
3	Replace Existing 60' Clarifier Mechanism	4		$175,000.00	$700,000.00				$700,000.00			
4	Replace 60' Weirs and Baffles	4		$32,500.00	$130,000.00				$130,000.00			
5	Structural Rehab	4		$25,000.00	$100,000.00			$100,000.00				
6	New Intermediate Cover	4		$105,000.00	$420,000.00			$420,000.00				
7												
8	Mechanical	1	%		$14,000.00				$14,000.00			
9	Electrical	5	%		$68,000.00					$68,000.00		
10	Contingency	30	%		$430,000.00							$430,000.00
11	Engineering	12	%		$223,000.00						$223,000.00	
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
TOTAL CONSTRUCTION COST					**$2,085,000.00**	**Total**	**$0**	**$520,000**	**$844,000**	**$68,000**	**$223,000**	**$430,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
New Aeration Tank - Lower Level with Oxidation Towers

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Excavation and Backfill	46,444		$45.00	$2,090,000.00		$2,090,000.00					
3	Retaining Wall	667		$800.00	$534,000.00			$534,000.00				
4	Site Piping Modifications	1		$630,000.00	$630,000.00		$630,000.00					
5	Demo Ex Aeration Tank	1		$40,000.00	$40,000.00			$40,000.00				
6	New Aeration Tank Structure	2,210		$1,000.00	$2,211,000.00			$2,211,000.00				
7	New Aeration Equipment	1		$432,000.00	$432,000.00				$432,000.00			
8	New Aeration Piping and Insulation	1		$478,400.00	$479,000.00		$479,000.00					
9												
10												
11	Flow Split Structure	133		$1,000.00	$134,000.00			$134,000.00				
12	Gates	4		$50,000.00	$200,000.00				$200,000.00			
13	New Aeration Blower and RAS Building Structure	549		$1,000.00	$549,000.00			$549,000.00				
14	New Aeration Blower and RAS Building	3,750		$200.00	$750,000.00			$750,000.00				
15	New Aeration Blowers - 6,500 CFM @ 8 psi	3		$350,000.00	$1,050,000.00				$1,050,000.00			
16	RAS Pump Replacement	4		$55,000.00	$220,000.00				$220,000.00			
17	RAS Piping and Valves	1		$274,000.00	$274,000.00		$274,000.00					
18	RAS Piping modifications	1		$570,000.00	$570,000.00		$570,000.00					
19	Flowmeter	5		$16,000.00	$80,000.00					$80,000.00		
20												
21	Chemical Feed and Storage	1		$115,000.00	$115,000.00				$115,000.00			
22												
23												
24												
25												
26	Mechanical	5	%		$518,000.00				$518,000.00			
27												
28	Electrical	20	%		$2,072,000.00					$2,072,000.00		
29												
30	Contingency	30	%		$3,885,000.00							$3,885,000.00
31	Engineering	12	%		$2,020,000.00						$2,020,000.00	
TOTAL CONSTRUCTION COST					**$18,853,000.00**	**Total**	**$4,043,000**	**$4,218,000**	**$2,535,000**	**$2,152,000**	**$2,020,000**	**$3,885,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Final Clarifier Modifications

DATE:
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	**Construct Two New 80' Dia Clarifier**											
3	Excavation	17,444		$45.00	$785,000.00		$785,000.00					
4	Concrete Structure	1,303		$1,000.00	$1,303,000.00			$1,303,000.00				
5	Mechanism	2		$217,000.00	$434,000.00				$434,000.00			
6	Wier and Baffles	2		$107,770.00	$216,000.00				$216,000.00			
7	Weir Cover	2		$111,540.00	$223,000.00				$223,000.00			
8	Influent Pipe	2		$70,000.00	$140,000.00		$140,000.00					
9	RAS Pipe	2		$35,000.00	$70,000.00		$70,000.00					
10	Effluent Pipe	2		$17,500.00	$35,000.00		$35,000.00					
11												
12												
13	**Modify Three Ex 80' Dia Clarifier**											
14	Sawcut Base of Piping Modification	3		$33,000.00	$99,000.00		$99,000.00					
15	Modify Eff Trough, Walls and Base Slab	809		$800.00	$648,000.00			$648,000.00				
16	Mechanism	3		$217,000.00	$651,000.00				$651,000.00			
17	Wier and Baffles	3		$107,770.00	$323,000.00				$323,000.00			
18	Weir Cover	3		$111,540.00	$335,000.00				$335,000.00			
19	Influent Pipe	3		$70,000.00	$210,000.00		$210,000.00					
20	RAS Pipe	3		$35,000.00	$105,000.00		$105,000.00					
21	Effluent Pipe	3		$5,000.00	$15,000.00		$15,000.00					
22												
23	Mechanical	1	%		$56,000.00				$56,000.00			
24	Electrical	5	%		$280,000.00					$280,000.00		
25	Contingency	30	%		$1,778,000.00							$1,778,000.00
26	Engineering	12	%		$925,000.00						$925,000.00	
27												
28												
29												
30												
TOTAL CONSTRUCTION COST					**$8,631,000.00**	**Total**	**$1,459,000**	**$1,951,000**	**$2,238,000**	**$280,000**	**$925,000**	**$1,778,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Coarse Media Tertiary Filter

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Oth	Engineering	Contingencies
1												
2	Demo Ex. Clarifiers	2		$20,000.00	$40,000.00		$40,000.00					
3	Excavation and Backfill	5,167		$25.00	$130,000.00		$130,000.00					
4	Site Piping	1		$50,000.00	$50,000.00		$50,000.00					
5												
5	Filtration Structure	1,660	CYD	$1,000.00	$1,660,000.00			$1,660,000.00				
6	Filtration Building	6,188	SFT	$250.00	$1,547,000.00			$1,547,000.00				
7												
8	Gates	4		$15,000.00	$60,000.00				$60,000.00			
9	Piping	1		$1,025,100.00	$1,026,000.00		$1,026,000.00					
10	Valves	1		$492,000.00	$492,000.00				$492,000.00			
11	Influent Pumps	3		$125,000.00	$375,000.00				$375,000.00			
12	Influent Pump Piping and Valves	1		$245,000.00	$245,000.00				$245,000.00			
13	Filter Underdrains	1		$386,400.00	$387,000.00				$387,000.00			
14	Filter Media	600		$347.30	$209,000.00				$209,000.00			
15	Media Installation	600		$320.00	$192,000.00				$192,000.00			
16	Backwash Pumps	2		$38,000.00	$76,000.00				$76,000.00			
17	Recycle pumps	2		$25,000.00	$50,000.00				$50,000.00			
18	Blowers	2		$145,000.00	$290,000.00				$290,000.00			
19	Air Piping and Valves	1		$240,000.00	$240,000.00		$240,000.00					
20	Troughs	1		$150,000.00	$150,000.00		$150,000.00					
21												
22												
23												
24	Mechanical	5	%		$361,000.00				$361,000.00			
25												
26	Electrical	10	%		$722,000.00					$722,000.00		
27												
28	Contingency	30	%		$2,166,000.00							$2,166,000.00
29	Engineering	12	%		$1,257,000.00						$1,257,000.00	
TOTAL CONSTRUCTION COST					**$11,725,000.00**	**Total**	**$1,636,000**	**$3,207,000**	**$2,737,000**	**$722,000**	**$1,257,000**	**$2,166,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
UV Disinfection

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Demo Ex. Clarifier Tank	1		$20,000.00	$20,000.00		$20,000.00					
3	Excavation and Backfill	1,867		$25.00	$47,000.00		$47,000.00					
4	Site Piping	1		$350,000.00	$350,000.00		$350,000.00					
5												
5	Disinfection Structure	600		$1,000.00	$600,000.00			$600,000.00				
6	Disinfection Building	2,400		$200.00	$480,000.00			$480,000.00				
7												
8	Gates	4		$15,000.00	$60,000.00				$60,000.00			
9	Piping and Valves	1		$125,000.00	$125,000.00		$125,000.00					
10												
11	UV Equipment (4 Units)	1		$780,000.00	$780,000.00							
12	Installation	1		$195,000.00	$195,000.00				$780,000.00			
13									$195,000.00			
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24	Mechanical	10	%		$266,000.00				$266,000.00			
25												
26	Electrical	25	%		$665,000.00					$665,000.00		
27												
28	Contingency	30	%		$798,000.00							$798,000.00
29	Engineering	12	%		$527,000.00						$527,000.00	
TOTAL CONSTRUCTION COST					**$4,913,000.00**	**Total**	**$542,000**	**$1,080,000**	**$1,301,000**	**$665,000**	**$527,000**	**$798,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Solids Handling - Screw Press with Landfill Disposal

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Remove Ex. Plate Press Equipment	1		$30,000.00	$30,000.00				$30,000.00			
3												
4	Expand Mezzanine	1		$50,000.00	$50,000.00			$50,000.00				
5												
6	1,000 lbs/hr Screw Press	2		$325,000.00	$650,000.00				$650,000.00			
7	Dewatered Cake Conveyance System	1		$425,000.00	$425,000.00				$425,000.00			
8	Sludge Feed Pumps	3		$45,000.00	$135,000.00				$135,000.00			
9	Polymer Feed System	1		$55,000.00	$55,000.00				$55,000.00			
10	Chemcial Storage Tanks	2		$15,000.00	$30,000.00				$30,000.00			
11	Recycle Pump	1		$25,000.00	$25,000.00				$25,000.00			
12	Piping and Fittings	1		$125,000.00	$125,000.00		$125,000.00					
13	Valves	1		$288,000.00	$288,000.00				$288,000.00			
14	24,000 CFM Odor Control	1		$425,000.00	$425,000.00				$425,000.00			
15	HVAC Improvements	1		$125,000.00	$125,000.00				$125,000.00			
16												
17	Building and Concrete Rehabilation	1		$250,000.00	$250,000.00			$250,000.00				
18												
19												
20												
21												
22												
23												
24												
25	Mechanical	5	%		$131,000.00				$131,000.00			
26												
27	Electrical	25	%		$654,000.00					$654,000.00		
28												
29	Contingency	30	%		$784,000.00							$784,000.00
30	Engineering	12	%		$502,000.00						$502,000.00	
31												
TOTAL CONSTRUCTION COST					**$4,684,000.00**	**Total**	**$125,000**	**$300,000**	**$2,319,000**	**$654,000**	**$502,000**	**$784,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Rehabilitation of Existing Digesters

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Concrete Repair	4	EA	$50,000.00	$200,000.00			$200,000.00				
3	Tank Modifications	2	EA	$65,000.00	$130,000.00			$130,000.00				
4	Digester 50ft Cover	2	ea	$258,750.00	$517,500.00			$518,000.00				
5	Digester 35ft Cover	2	ea	$195,000.00	$390,000.00			$390,000.00				
5	Digester Mixing System	4	ea	$170,000.00	$680,000.00				$680,000.00			
6	Heat Exchanger (750,000 btu/unit)	3	ea	$35,880.00	$108,000.00				$108,000.00			
7	Boiler (one/tank)	2	ea	$57,500.00	$115,000.00				$115,000.00			
8	Pipe/valves/fittings	1	ls	$375,000.00	$375,000.00		$375,000.00					
9	Sludge Pumps	5	EA	$45,000.00	$225,000.00				$225,000.00			
10	Flare Replacement	1	EA	$125,000.00	$125,000.00				$125,000.00			
11	Building Rehab	1	LS	$250,000.00	$250,000.00			$250,000.00				
12												
13												
14												
15												
16												
17												
18												
19												
20												
21	Mechanical	5	%		$156,000.00				$156,000.00			
22												
23	Electrical	25	%		$779,000.00					$779,000.00		
24												
25	Contingency	30	%		$935,000.00							$935,000.00
26	Engineering	12	%		$598,000.00						$598,000.00	
27												
TOTAL CONSTRUCTION COST					**$5,584,000.00**	**Total**	**$375,000**	**$1,488,000**	**$1,409,000**	**$779,000**	**$598,000**	**$935,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Construction of Third 50 ft diameter Digester

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Excavation	1,710		$35.00	$60,000.00		$60,000.00					
3	Concrete Foundation	157		$1,000.00	$158,000.00			$158,000.00				
4	Concrete Walls	196		$800.00	$157,000.00			$157,000.00				
5	Pipe/valves/fittings	1		$150,000.00	$150,000.00		$150,000.00					
6	Digester Cover	1		$258,750.00	$259,000.00			$259,000.00				
7	Digester Mixing System	1		$170,000.00	$170,000.00				$170,000.00			
8	Pumps	2		$45,000.00	$90,000.00				$90,000.00			
9	Boiler (one/tank)	1		$57,500.00	$58,000.00				$58,000.00			
10	Heat Exchanger (750,000 btu/unit, 3/tank)	2		$35,880.00	$72,000.00				$72,000.00			
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25	Mechanical	5	%		$59,000.00				$59,000.00			
26												
27	Electrical	25	%		$294,000.00					$294,000.00		
28												
29	Contingency	30	%		$353,000.00							$353,000.00
30	Engineering	12	%		$226,000.00						$226,000.00	
31												
TOTAL CONSTRUCTION COST					**$2,106,000.00**	**Total**	**$210,000**	**$574,000**	**$449,000**	**$294,000**	**$226,000**	**$353,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Thickener

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2												
3												
4	Thickener Feed Pump	2	EA	$55,000.00	$110,000.00				$110,000.00			
5	Piping and Valves	1	LS	$259,000.00	$259,000.00		$259,000.00					
5	Thickener Units	2	EA	$250,000.00	$500,000.00				$500,000.00			
6	Thickened Sludge Pump	2	EA	$75,000.00	$150,000.00				$150,000.00			
7	Polymer System	1	LS	$110,000.00	$110,000.00				$110,000.00			
8	Thickened Sludge Piping	1	LS	$150,000.00	$150,000.00		$150,000.00					
9	Sludge Hopper	1	LS	$50,000.00	$50,000.00				$50,000.00			
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23	Mechanical	5	%		$66,000.00				$66,000.00			
24												
25	Electrical	15	%		$200,000.00					$200,000.00		
26												
27	Contingency	30	%		$399,000.00							$399,000.00
28	Engineering	12	%		$240,000.00						$240,000.00	
29												
TOTAL CONSTRUCTION COST					**$2,234,000.00**	**Total**	**$409,000**	**$0**	**$986,000**	**$200,000**	**$240,000**	**$399,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Equalization in Existing Aeration Tank

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Rehab Aeration Tank to Equalization Tanks	1,067	CYD	$1,000.00	$1,067,000.00			$1,067,000.00				
3	Mixing System	1	LS	$200,000.00	$200,000.00				$200,000.00			
4	Dewatering Pumps	4	EA	$55,000.00	$220,000.00				$220,000.00			
5	Piping and Valves	1	LS	$259,000.00	$259,000.00		$259,000.00					
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23	Mechanical	5	%		$87,000.00				$87,000.00			
24												
25	Electrical	15	%		$262,000.00					$262,000.00		
26												
27	Contingency	30	%		$524,000.00							$524,000.00
28	Engineering	12	%		$315,000.00						$315,000.00	
29												
TOTAL CONSTRUCTION COST					**$2,934,000.00**	**Total**	**$259,000**	**$1,067,000**	**$507,000**	**$262,000**	**$315,000**	**$524,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
New Laboratory, Control and Operations Building

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Demo Ex. Laboratory, Control and Operations Building and Incinerator	1		$95,000.00	$95,000.00		$95,000.00					
3												
4	Site Improvements	1	LS	$125,000.00	$125,000.00		$125,000.00					
5												
5	New Laboratory, Control and Operations Building	8,000	SFT	$200.00	$1,600,000.00			$1,600,000.00				
6												
7	Furnishings	1		$50,000.00	$50,000.00				$50,000.00			
8												
9	HVAC Mechanical	1		$95,000.00	$95,000.00				$95,000.00			
10												
11	Electrical and SCADA Upgrades	1		$650,000.00	$650,000.00					$650,000.00		
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27	Contingency	30	%		$785,000.00							$785,000.00
28	Engineering	12	%		$408,000.00						$408,000.00	
29												
TOTAL CONSTRUCTION COST					**$3,808,000.00**	**Total**	**$220,000**	**$1,600,000**	**$145,000**	**$650,000**	**$408,000**	**$785,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Improvements with Oxidation Towers

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Electrical Upgrade				$4,104,000.00		$0.00	$0.00	$123,000.00	$2,695,000.00	$440,000.00	$846,000.00
3												
4	New Headworks with RS Pumps to Existing Primary Tank				$9,462,000.00		$1,347,000.00	$2,200,000.00	$2,366,000.00	$845,000.00	$1,014,000.00	$1,690,000.00
5												
6	Primary Tank Expansion				$6,256,000.00		$275,000.00	$1,394,000.00	$2,253,000.00	$374,000.00	$671,000.00	$1,289,000.00
7												
8	Oxidation Tower Expansion				$8,987,000.00		$1,177,000.00	$1,861,000.00	$2,146,000.00	$988,000.00	$963,000.00	$1,852,000.00
9												
10	Intermediate Clarifiers				$2,085,000.00		$0.00	$520,000.00	$844,000.00	$68,000.00	$223,000.00	$430,000.00
11												
12	New Aeration Tank				$18,853,000.00		$4,043,000.00	$4,218,000.00	$2,535,000.00	$2,152,000.00	$2,020,000.00	$3,885,000.00
13												
14	Final Clarifier Expansion and Improvements				$8,631,000.00		$1,459,000.00	$1,951,000.00	$2,238,000.00	$280,000.00	$925,000.00	$1,778,000.00
15												
16	Coarse Media Tertiary Filtration				$11,725,000.00		$1,636,000.00	$3,207,000.00	$2,737,000.00	$722,000.00	$1,257,000.00	$2,166,000.00
17												
18	UV Disinfection Improvements				$4,913,000.00		$542,000.00	$1,080,000.00	$1,301,000.00	$665,000.00	$527,000.00	$798,000.00
19												
20	Solids Handling - Screw Press				$4,684,000.00		$125,000.00	$300,000.00	$2,319,000.00	$654,000.00	$502,000.00	$784,000.00
21												
22	Digester Rehab				$5,584,000.00		$375,000.00	$1,488,000.00	$1,409,000.00	$779,000.00	$598,000.00	$935,000.00
23												
24	3rd Digester Tank				$2,106,000.00		$210,000.00	$574,000.00	$449,000.00	$294,000.00	$226,000.00	$353,000.00
25												
26	WAS Thickener to Digester				$2,234,000.00		$409,000.00	$0.00	$986,000.00	$200,000.00	$240,000.00	$399,000.00
27												
28	Ex. Aeration to Equalization				$2,934,000.00		$259,000.00	$1,067,000.00	$507,000.00	$262,000.00	$315,000.00	$524,000.00
29												
30	Laboratory, Control and Operations Building				$3,808,000.00		$220,000.00	$1,600,000.00	$145,000.00	$650,000.00	$408,000.00	$785,000.00
31												
32												
33												

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative A
Improvements with Oxidation Towers

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
TOTAL CONSTRUCTION COST					$96,366,000.00	Total	$12,077,000	$21,460,000	$22,358,000	$11,628,000	$10,329,000	$18,514,000

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township, MI SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, MI	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative B	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative B, Complete Project

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$9,381,000	50	$9,381,000	$5,302,000	$4,079,000
Structures	$18,682,000	50	$18,682,000	$10,558,000	$8,124,000
Mechanical	$15,266,000	20	$15,266,000	$0	$15,266,000
Electrical/Other	$11,532,000	20	$11,532,000	$0	$11,532,000
Engineering	$8,361,000	20	$8,361,000	$0	$8,361,000
Contingencies	$14,773,000	20	$14,773,000	$0	$14,773,000
Total Capital Cost	$77,995,000			Total	$62,135,000

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$449,000	$8,704,000
	Total	$8,704,000

Net Present Worth	$70,839,000
Weighted Useful Life (years)	30.79

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B - New Headworks with RS Pumps to Existing Primary Tank with New AT and 4 FT

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

NOTE:

QUANTITIES BY SHEET

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1					
2	ELECTRICAL UPGRADE				
3	Primary Electrical Replacement	1		$1,500,000.00	$1,500,000.00
4	Standby Generator	1		$500,000.00	$500,000.00
5					
6	SCADA Improvements	1		$450,000.00	$450,000.00
7	Mechanical	5	%		$123,000.00
8	Electrical	10	%		$245,000.00
9	Contingency	30	%		$846,000.00
10	Engineering	12	%		$440,000.00
11	Subtotal				**$4,104,000.00**
12					
13	INFLUENT SCREEN, PUMP STATION AND GRIT REMOVAL				
14	Demolition of WAS Storage Tanks	1		$35,000.00	$35,000.00
15	Excavation and Backfill	3,259		$25.00	$82,000.00
16	Yard Piping Modifications	1		$60,000.00	$60,000.00
17	Headworks Structure	1,285		$1,000.00	$1,285,000.00
18	Headworks Building	2,325		$200.00	$465,000.00
19	Screen Equipment	3		$175,000.00	$525,000.00
20	Compactors	3		$81,250.00	$244,000.00
21	RS Pumps	5		$105,000.00	$525,000.00
22	Piping and Valves	1		$210,000.00	$210,000.00
23	RS Discharge Pipe to Primary Tank	1		$960,000.00	$960,000.00
24	Grit Tanks with Vortex at Ex Grit Tanks	199		$800.00	$160,000.00
25	Grit Mechanism and Handling	2		$227,500.00	$455,000.00
26	Building and Roof Rehab	1		$450,000.00	$450,000.00
27	24,000 SCFM Odor Control	1		$175,000.00	$175,000.00
28					
29					
30	Mechanical	5	%		$282,000.00
31	Electrical	15	%		$845,000.00
32	Contingency	30	%		$1,690,000.00
33	Engineering	12	%		$1,014,000.00
34	Subtotal				**$9,462,000.00**
35					
36	PRIMARY TANK EXPANSION AND IMPROVEMENTS				
37	Excavation	4,000		$25.00	$100,000.00

			Salvage Value					
			Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
						$1,500,000		
						$500,000		
						$450,000		
					$123,000			
						$245,000		
								$846,000
							$440,000	
		Total	$0	$0	$123,000	$2,695,000	$440,000	$846,000
			Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
				$35,000				
			$82,000					
			$60,000					
				$1,285,000				
				$465,000				
						$525,000		
						$244,000		
						$525,000		
			$210,000					
			$960,000					
						$160,000		
						$455,000		
				$450,000				
						$175,000		
					$282,000			
						$845,000		
								$1,690,000
							$1,014,000	
		Total	$1,312,000	$2,235,000	$282,000	$2,929,000	$1,014,000	$1,690,000
	Phase II		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
			$100,000					

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B - New Headworks with RS Pumps to Existing Primary Tank with New AT and 4 FT

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

NOTE:

QUANTITIES BY SHEET

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT				Salvage Value					
38	Site Piping Modifications	1		$50,000.00	$50,000.00				$50,000					
39	Tank Structure Expansion	622		$1,000.00	$622,000.00					$622,000				
40	Primary Tank Mechanism Replacement	4		$253,500.00	$1,014,000.00	$1,014,000					$1,014,000			
41	New Primary Tank Mechanism	1		$253,500.00	$254,000.00							$254,000		
42	Primary Sludge Pump Replacement	4		$55,000.00	$220,000.00	$165,000					$220,000			
43	Piping and Valves	1	LS	$125,000.00	$125,000.00	$11,000			$125,000					
44	Concrete Rehab	1	LS	$150,000.00	$150,000.00	$150,000				$150,000				
45	24,000 CFM Odor Control Replacement	1		$325,000.00	$325,000.00	$325,000					$325,000			
46	Mechanical	5	%		$143,000.00	$84,000					$143,000			
47	Electrical	10	%		$286,000.00	$167,000						$286,000		
48	Contingency	30	%		$987,000.00	$575,000								$987,000
49	Engineering	12	%		$514,000.00	$299,000							$514,000	
50	Subtotal				**$4,790,000.00**			Total	$275,000	$772,000	$1,702,000	$540,000	$514,000	$987,000
51														
52	AERATION SYSTEM IMPROVEMENTS								Civil/Site Work/Pipin	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
53	Excavation and Backfill	22,259		$25.00	$557,000.00				$557,000					
54	Demo Ex. Oxidation Tower and Aeration Tank	3		$20,000.00	$60,000.00				$60,000					
55	Site Piping Modifications	1		$666,500.00	$667,000.00				$667,000					
56	New Aeration Tank Structure	2,763		$1,000.00	$2,763,000.00					$2,763,000				
57	New Aeration Equipment	1		$300,000.00	$300,000.00						$300,000			
58	New Aeration Piping and Valve	1		$598,000.00	$598,000.00				$598,000					
59	Gates	6		$25,000.00	$150,000.00						$150,000			
60	Flow Split Structure	133		$1,000.00	$134,000.00					$134,000				
61	New Aeration Blower/RAS Building Structure	549		$1,000.00	$549,000.00					$549,000				
62	New Aeration Blower Building	3,750		$200.00	$750,000.00					$750,000				
63	New Aeration Blowers - 6,500 CFM @ 8 psi	3		$350,000.00	$1,050,000.00						$1,050,000			
64	Chemical Feed System	1		$20,000.00	$20,000.00						$20,000			
65	Chemical Storage Tanks	2		$25,000.00	$50,000.00					$50,000				
66	Piping	1		$45,000.00	$45,000.00				$45,000					
67	RAS Pump	4		$45,000.00	$180,000.00						$180,000			
68	RAS Piping and Valves	1		$374,000.00	$374,000.00				$374,000					
69	RAS Piping (Clarifiers to AT)	1		$837,500.00	$838,000.00				$838,000					
70	Flowmeter	5		$16,000.00	$80,000.00							$80,000		
71	Mechanical	5	%		$459,000.00						$459,000			
72	Electrical	10	%		$917,000.00							$917,000		
73	Contingency	30	%		$3,163,000.00									$3,163,000
74	Engineering	12	%		$1,645,000.00								$1,645,000	

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B - New Headworks with RS Pumps to Existing Primary Tank with New AT and 4 FT

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

NOTE:

QUANTITIES BY SHEET

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
75	Subtotal				**$15,349,000.00**
76					
77	FINAL CLARIFIER IMPROVEMENTS - 100' DIA				
78	Excavation	11,723	CYD	$25.00	$294,000.00
79	Concrete Structure	3,442	CYD	$800.00	$2,754,000.00
80	Mechanism	4	EA	$227,500.00	$910,000.00
81	Wier and Baffles	4	EA	$111,410.00	$446,000.00
82	Weir Cover	4	EA	$104,650.00	$419,000.00
83	Influent Pipe	4	EA	$70,000.00	$280,000.00
84	RAS Pipe	4	EA	$35,000.00	$140,000.00
85	Effluent Pipe	4	EA	$17,500.00	$70,000.00
86	Demo Ex. 60' Dia Clarifiers	4	EA	$20,000.00	$80,000.00
87	Demo Ex. RAS Bldg	1	EA	$15,000.00	$15,000.00
88	Mechanical	1	%		$55,000.00
89	Electrical	5	%		$271,000.00
90	Contingency	30	%		$1,721,000.00
91	Engineering	12	%		$895,000.00
92	Subtotal				**$8,350,000.00**
93					
94					
TOTAL CONSTRUCTION COST					**$42,055,000.00**

			Salvage Value					
		Total	$3,139,000	$4,246,000	$2,159,000	$997,000	$1,645,000	$3,163,000
Phase I			Civil/Site Work/Pipin	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
$223,500			$294,000					
$2,060,000				$2,754,000				
$682,500					$910,000			
$335,000					$446,000			
$314,000					$419,000			
$210,000			$280,000					
$105,000			$140,000					
$52,500			$70,000					
$60,000			$80,000					
$15,000			$15,000					
$41,000					$55,000			
$203,000						$271,000		
$1,290,000								$1,721,000
$671,000							$895,000	
		Total	$879,000	$2,754,000	$1,830,000	$271,000	$895,000	$1,721,000

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Coarse Media Tertiary Filter

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Demo Ex. Clarifiers	2		$20,000.00	$40,000.00		$40,000.00					
3	Excavation and Backfill	5,167		$25.00	$130,000.00		$130,000.00					
4	Site Piping	1		$50,000.00	$50,000.00		$50,000.00					
5												
5	Filtration Structure	1,328	CYD	$1,000.00	$1,328,000.00			$1,328,000.00				
6	Filtration Building	4,950	SFT	$250.00	$1,238,000.00			$1,238,000.00				
7												
8	Gates	4		$15,000.00	$60,000.00				$60,000.00			
9	Piping	1		$1,025,100.00	$1,026,000.00		$1,026,000.00					
10	Valves	1		$492,000.00	$492,000.00				$492,000.00			
11												
12												
13	Filter Underdrains	1		$386,400.00	$387,000.00				$387,000.00			
14	Filter Media	600		$347.30	$209,000.00				$209,000.00			
15	Media Installation	600		$320.00	$192,000.00				$192,000.00			
16	Backwash Pumps	2		$38,000.00	$76,000.00				$76,000.00			
17	Recycle pumps	2		$25,000.00	$50,000.00				$50,000.00			
18	Blowers	2		$145,000.00	$290,000.00				$290,000.00			
19	Air Piping and Valves	1		$240,000.00	$240,000.00		$240,000.00					
20	Troughs	1		$150,000.00	$150,000.00		$150,000.00					
21												
22												
23												
24	Mechanical	5	%		$298,000.00				$298,000.00			
25												
26	Electrical	10	%		$596,000.00					$596,000.00		
27												
28	Contingency	30	%		$1,788,000.00							$1,788,000.00
29	Engineering	12	%		$1,037,000.00						$1,037,000.00	
TOTAL CONSTRUCTION COST					**$9,677,000.00**	**Total**	**$1,636,000**	**$2,566,000**	**$2,054,000**	**$596,000**	**$1,037,000**	**$1,788,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
UV Disinfection

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Demo Ex. Clarifier Tank	1		$20,000.00	$20,000.00		$20,000.00					
3	Excavation and Backfill	1,867		$25.00	$47,000.00		$47,000.00					
4	Site Piping	1		$350,000.00	$350,000.00		$350,000.00					
5												
5	Disinfection Structure	600		$1,000.00	$600,000.00			$600,000.00				
6	Disinfection Building	2,400		$200.00	$480,000.00			$480,000.00				
7												
8	Gates	4		$15,000.00	$60,000.00				$60,000.00			
9	Piping and Valves	1		$125,000.00	$125,000.00		$125,000.00					
10												
11	UV Equipment (4 Units)	1		$780,000.00	$780,000.00							
12	Installation	1		$195,000.00	$195,000.00				$780,000.00			
13									$195,000.00			
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24	Mechanical	10	%		$266,000.00				$266,000.00			
25												
26	Electrical	25	%		$665,000.00					$665,000.00		
27												
28	Contingency	30	%		$798,000.00							$798,000.00
29	Engineering	12	%		$527,000.00						$527,000.00	
TOTAL CONSTRUCTION COST					**$4,913,000.00**	**Total**	**$542,000**	**$1,080,000**	**$1,301,000**	**$665,000**	**$527,000**	**$798,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Solids Handling - Screw Press with Landfill Disposal

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Remove Ex. Plate Press Equipment	1		$30,000.00	$30,000.00				$30,000.00			
3												
4	Expand Mezzanine	1		$50,000.00	$50,000.00			$50,000.00				
5												
6	1,000 lbs/hr Screw Press	2		$325,000.00	$650,000.00				$650,000.00			
7	Dewatered Cake Conveyance System	1		$425,000.00	$425,000.00				$425,000.00			
8	Sludge Feed Pumps	3		$45,000.00	$135,000.00				$135,000.00			
9	Polymer Feed System	1		$55,000.00	$55,000.00				$55,000.00			
10	Chemcial Storage Tanks	2		$15,000.00	$30,000.00				$30,000.00			
11	Recycle Pump	1		$25,000.00	$25,000.00				$25,000.00			
12	Piping and Fittings	1		$125,000.00	$125,000.00		$125,000.00					
13	Valves	1		$288,000.00	$288,000.00				$288,000.00			
14	24,000 CFM Odor Control	1		$425,000.00	$425,000.00				$425,000.00			
15	HVAC Improvements	1		$125,000.00	$125,000.00				$125,000.00			
16												
17	Building and Concrete Rehabilation	1		$250,000.00	$250,000.00			$250,000.00				
18												
19												
20												
21												
22												
23												
24												
25	Mechanical	5	%		$131,000.00				$131,000.00			
26												
27	Electrical	25	%		$654,000.00					$654,000.00		
28												
29	Contingency	30	%		$784,000.00							$784,000.00
30	Engineering	12	%		$502,000.00						$502,000.00	
31												
TOTAL CONSTRUCTION COST					**$4,684,000.00**	**Total**	**$125,000**	**$300,000**	**$2,319,000**	**$654,000**	**$502,000**	**$784,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Rehabilitation of Existing Digesters

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Concrete Repair	4	EA	$50,000.00	$200,000.00			$200,000.00				
3	Tank Modifications	2	EA	$65,000.00	$130,000.00			$130,000.00				
4	Digester 50ft Cover	2	ea	$258,750.00	$517,500.00			$518,000.00				
5	Digester 35ft Cover	2	ea	$195,000.00	$390,000.00			$390,000.00				
5	Digester Mixing System	4	ea	$170,000.00	$680,000.00				$680,000.00			
6	Heat Exchanger (750,000 btu/unit)	3	ea	$35,880.00	$108,000.00				$108,000.00			
7	Boiler (one/tank)	2	ea	$57,500.00	$115,000.00				$115,000.00			
8	Pipe/valves/fittings	1	ls	$375,000.00	$375,000.00		$375,000.00					
9	Sludge Pumps	5	EA	$45,000.00	$225,000.00				$225,000.00			
10	Flare Replacement	1	EA	$125,000.00	$125,000.00				$125,000.00			
11	Building Rehab	1	LS	$250,000.00	$250,000.00			$250,000.00				
12												
13												
14												
15												
16												
17												
18												
19												
20												
21	Mechanical	5	%		$156,000.00				$156,000.00			
22												
23	Electrical	25	%		$779,000.00					$779,000.00		
24												
25	Contingency	30	%		$935,000.00							$935,000.00
26	Engineering	12	%		$598,000.00						$598,000.00	
27												
TOTAL CONSTRUCTION COST					**$5,584,000.00**	**Total**	**$375,000**	**$1,488,000**	**$1,409,000**	**$779,000**	**$598,000**	**$935,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Construction of Third 50 ft diameter Digester

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

QUANTITIES BY SHEET

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Excavation	1,710		$35.00	$60,000.00		$60,000.00					
3	Concrete Foundation	157		$1,000.00	$158,000.00			$158,000.00				
4	Concrete Walls	196		$800.00	$157,000.00			$157,000.00				
5	Pipe/valves/fittings	1		$150,000.00	$150,000.00		$150,000.00					
6	Digester Cover	1		$258,750.00	$259,000.00			$259,000.00				
7	Digester Mixing System	1		$170,000.00	$170,000.00				$170,000.00			
8	Pumps	2		$45,000.00	$90,000.00				$90,000.00			
9	Boiler (one/tank)	1		$57,500.00	$58,000.00				$58,000.00			
10	Heat Exchanger (750,000 btu/unit, 3/tank)	2		$35,880.00	$72,000.00				$72,000.00			
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25	Mechanical	5	%		$59,000.00				$59,000.00			
26												
27	Electrical	25	%		$294,000.00					$294,000.00		
28												
29	Contingency	30	%		$353,000.00							$353,000.00
30	Engineering	12	%		$226,000.00						$226,000.00	
31												
TOTAL CONSTRUCTION COST					**$2,106,000.00**	**Total**	**$210,000**	**$574,000**	**$449,000**	**$294,000**	**$226,000**	**$353,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Thickener

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2												
3												
4	Thickener Feed Pump	2	EA	$55,000.00	$110,000.00				$110,000.00			
5	Piping and Valves	1	LS	$259,000.00	$259,000.00		$259,000.00					
5	Thickener Units	2	EA	$250,000.00	$500,000.00				$500,000.00			
6	Thickened Sludge Pump	2	EA	$75,000.00	$150,000.00				$150,000.00			
7	Polymer System	1	LS	$110,000.00	$110,000.00				$110,000.00			
8	Thickened Sludge Piping	1	LS	$150,000.00	$150,000.00		$150,000.00					
9	Sludge Hopper	1	LS	$50,000.00	$50,000.00				$50,000.00			
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23	Mechanical	5	%		$66,000.00				$66,000.00			
24												
25	Electrical	15	%		$200,000.00					$200,000.00		
26												
27	Contingency	30	%		$399,000.00							$399,000.00
28	Engineering	12	%		$240,000.00						$240,000.00	
29												
TOTAL CONSTRUCTION COST					**$2,234,000.00**	**Total**	**$409,000**	**$0**	**$986,000**	**$200,000**	**$240,000**	**$399,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
Equalization in Existing Aeration Tank

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Rehab Aeration Tank to Equalization Tanks	1,067	CYD	$1,000.00	$1,067,000.00			$1,067,000.00				
3	Mixing System	1	LS	$200,000.00	$200,000.00				$200,000.00			
4	Dewatering Pumps	4	EA	$55,000.00	$220,000.00				$220,000.00			
5	Piping and Valves	1	LS	$259,000.00	$259,000.00		$259,000.00					
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23	Mechanical	5	%		$87,000.00				$87,000.00			
24												
25	Electrical	15	%		$262,000.00					$262,000.00		
26												
27	Contingency	30	%		$524,000.00							$524,000.00
28	Engineering	12	%		$315,000.00						$315,000.00	
29												
TOTAL CONSTRUCTION COST					**$2,934,000.00**	**Total**	**$259,000**	**$1,067,000**	**$507,000**	**$262,000**	**$315,000**	**$524,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B
New Laboratory, Control and Operations Building

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Demo Ex. Laboratory, Control and Operations Building and Incinerator	1		$95,000.00	$95,000.00		$95,000.00					
3												
4	Site Improvements	1	LS	$125,000.00	$125,000.00		$125,000.00					
5												
5	New Laboratory, Control and Operations Building	8,000	SFT	$200.00	$1,600,000.00			$1,600,000.00				
6												
7	Furnishings	1		$50,000.00	$50,000.00				$50,000.00			
8												
9	HVAC Mechanical	1		$95,000.00	$95,000.00				$95,000.00			
10												
11	Electrical and SCADA Upgrades	1		$650,000.00	$650,000.00					$650,000.00		
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27	Contingency	30	%		$785,000.00							$785,000.00
28	Engineering	12	%		$408,000.00						$408,000.00	
29												
TOTAL CONSTRUCTION COST					**$3,808,000.00**	**Total**	**$220,000**	**$1,600,000**	**$145,000**	**$650,000**	**$408,000**	**$785,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B Cost Summary
with Engineering

DATE: 6/5/2019
PROJECT NO.
ESTIMATOR:
CHECKED BY:
CURRENT ENR:

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT		Civil/Site Work/Piping	Structure	Process/Mechanical	Electrical/Other	Engineering	Contingencies
1												
2	Influent Electrical, SCADA, and Generator				$4,104,000.00		$0.00	$0.00	$123,000.00	$2,695,000.00	$440,000.00	$846,000.00
3												
4	Influent Raw Sewage Pumping and Headworks				$9,462,000.00		$1,312,000.00	$2,235,000.00	$282,000.00	$2,929,000.00	$1,014,000.00	$1,690,000.00
5												
6	Primary Tank Expansion and Improvements				$4,790,000.00		$275,000.00	$772,000.00	$1,702,000.00	$540,000.00	$514,000.00	$987,000.00
7												
8	Aeration Tank Improvements				$15,349,000.00		$3,139,000.00	$4,246,000.00	$2,159,000.00	$997,000.00	$1,645,000.00	$3,163,000.00
9												
10	Final Clarifier Improvements				$8,350,000.00		$879,000.00	$2,754,000.00	$1,830,000.00	$271,000.00	$895,000.00	$1,721,000.00
11												
12	Coarse Media Tertiary Filtration				$9,677,000.00		$1,636,000.00	$2,566,000.00	$2,054,000.00	$596,000.00	$1,037,000.00	$1,788,000.00
13												
14	UV Disinfection Improvements				$4,913,000.00		$542,000.00	$1,080,000.00	$1,301,000.00	$665,000.00	$527,000.00	$798,000.00
15												
16	Solids Handling - Screw Press				$4,684,000.00		$125,000.00	$300,000.00	$2,319,000.00	$654,000.00	$502,000.00	$784,000.00
17												
18	Digester Rehab				$5,584,000.00		$375,000.00	$1,488,000.00	$1,409,000.00	$779,000.00	$598,000.00	$935,000.00
19												
20	3rd Digester Tank				$2,106,000.00		$210,000.00	$574,000.00	$449,000.00	$294,000.00	$226,000.00	$353,000.00
21												
22	WAS Thickener to Digester				$2,234,000.00		$409,000.00	$0.00	$986,000.00	$200,000.00	$240,000.00	$399,000.00
23												
24	Ex. Aeration to Equalization				$2,934,000.00		$259,000.00	$1,067,000.00	$507,000.00	$262,000.00	$315,000.00	$524,000.00
25												
26	Laboratory, Control and Operations Building				$3,808,000.00		$220,000.00	$1,600,000.00	$145,000.00	$650,000.00	$408,000.00	$785,000.00
TOTAL CONSTRUCTION COST					**$77,995,000.00**	**Total**	**$9,381,000**	**$18,682,000**	**$15,266,000**	**$11,532,000**	**$8,361,000**	**$14,773,000**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township, MI SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, MI	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative B - Phase I	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative B Phase I

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$5,117,000	50	$5,117,000	$2,892,000	$2,225,000
Structures	$8,541,000	50	$8,541,000	$4,827,000	$3,714,000
Mechanical	$3,936,500	20	$3,936,500	$0	$3,936,500
Electrical/Other	$6,824,000	20	$6,824,000	$0	$6,824,000
Engineering	$3,770,000	20	$3,770,000	$0	$3,770,000
Contingencies	$6,989,000	20	$6,989,000	$0	$6,989,000
Total Capital Cost	$35,177,500			Total	$27,458,500

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$449,000	$8,704,000
	Total	$8,704,000

Net Present Worth	$36,162,500
Weighted Useful Life (years)	31.65

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township, MI SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, MI	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative B - Phase II	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative B Phase II

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$3,528,000	50	$3,528,000	$1,994,000	$1,534,000
Structures	$7,758,000	50	$7,758,000	$4,385,000	$3,373,000
Mechanical	$10,251,000	20	$10,251,000	$0	$10,251,000
Electrical/Other	$4,005,000	20	$4,005,000	$0	$4,005,000
Engineering	$3,837,000	20	$3,837,000	$0	$3,837,000
Contingencies	$6,417,000	20	$6,417,000	$0	$6,417,000
Total Capital Cost	$35,796,000			Total	$29,417,000

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$449,000	$8,704,000
	Total	$8,704,000

Net Present Worth	$38,121,000
Weighted Useful Life (years)	29.46

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT: Delta Township SRF Project Plan
LOCATION:
BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
WORK: Alternative B Phases I and II Capital Cost Summary

DATE: 6/5/2019
PROJECT NO. 200-214200-18001
ESTIMATOR:
CHECKED BY:
CURRENT ENR 11268

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT	Salvage Value	Civil/Site Work/Piping	Structure	Process/Mecha	Electrical/Other	Engineering	Contingencies
1												
2	Phase I											
3	Influent Electrical, SCADA, and Generator				$4,104,000.00		$0.00	$0.00	$123,000.00	$2,695,000.00	$440,000.00	$846,000.00
4	Influent Raw Pumping and Headworks				$9,462,000.00		$1,312,000.00	$2,235,000.00	$282,000.00	$2,929,000.00	$1,014,000.00	$1,690,000.00
5	Aeration System with Blower, RAS, Chemical Building				$15,349,000.00		$3,139,000.00	$4,246,000.00	$2,159,000.00	$997,000.00	$1,645,000.00	$3,163,000.00
6	Three, 100-foot diameter Final Clarifiers				$6,262,500.00		$666,000.00	$2,060,000.00	$1,372,500.00	$203,000.00	$671,000.00	$1,290,000.00
7	Subtotal				$35,177,500.00		$5,117,000.00	$8,541,000.00	$3,936,500.00	$6,824,000.00	$3,770,000.00	$6,989,000.00
8												
9	Phase II											
10	Primary Clarifier Mehanism Replacement				$2,790,000.00		$11,000.00	$150,000.00	$1,588,000.00	$167,000.00	$299,000.00	$575,000.00
11	Tertairy Filtration				$9,677,000.00		$1,636,000.00	$2,566,000.00	$2,054,000.00	$596,000.00	$1,037,000.00	$1,788,000.00
12	UV Disinfection				$4,913,000.00		$542,000.00	$1,080,000.00	$1,301,000.00	$665,000.00	$527,000.00	$798,000.00
13	Dewatering Scre Press				$4,684,000.00		$125,000.00	$300,000.00	$2,319,000.00	$654,000.00	$502,000.00	$784,000.00
14	Digester Rehabilitation				$5,584,000.00		$375,000.00	$1,488,000.00	$1,409,000.00	$779,000.00	$598,000.00	$935,000.00
15	Third Digester Tank				$2,106,000.00		$210,000.00	$574,000.00	$449,000.00	$294,000.00	$226,000.00	$353,000.00
16	Thickening				$2,234,000.00		$409,000.00	$0.00	$986,000.00	$200,000.00	$240,000.00	$399,000.00
17	Laboratory, Control and Operations Building				$3,808,000.00		$220,000.00	$1,600,000.00	$145,000.00	$650,000.00	$408,000.00	$785,000.00
18	Subtotal				$35,796,000.00							
19												
20												
21												
22												
TOTAL CONSTRUCTION COST					**$70,973,500.00**	**Total**	**$3,528,000**	**$7,758,000**	**$10,251,000**	**$4,005,000**	**$3,837,000**	**$6,417,000**

Delta Township WWTP
SRF Project Plan
Back-up Information for Operation and Maintenance Costs

Item	Units	Existing System	Alternative A Expand Existing System + Filter	Alternative B Expand w/ Activated Sludge
Raw Sewage Pumping				
Discharge Flow	gpm	3123.0	3123.0	3123.0
Discharge Head	ft	75.0	75.0	65.0
Pump HP	hp	98.6	98.6	85.4
Pump Kw		73.5	73.5	63.7
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	1764.3	1764.3	1529.0
Screening				
Units		2.0	2.0	2.0
Unit HP	hp	5.0	5.0	5.0
Kw		7.5	7.5	7.5
Run Time		24.0	24.0	24.0
Daily Power Consumption	kW-Hr	179.0	179.0	179.0
Grit Removal				
Units		2.0	2.0	2.0
Air Flow	cfm	160.0		
Discharge Pressure	psi	6.0	6.0	
Pump HP (calc)	hp	24.3	5.0	5.0
Pump Kw		36.2	7.5	7.5
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	869.8	179.0	179.0
Primary Tanks				
Units		3.0	3.0	3.0
Unit HP	hp	1.3	1.3	1.3
Pump Kw		2.8	2.8	2.8
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	67.1	67.1	67.1
Primary Sludge Pumps				
Units		3.0	3.0	3.0
Discharge Flow	gpm	50.0	50.0	50.0
Discharge Head	ft	75.0	75.0	75.0
Air HP (calc)	hp	3.1	3.1	3.1
Pump Kw		6.8	6.8	6.8
Run Time	hr	6.0	6.0	6.0
Daily Power Consumption	kW-Hr	41.1	41.1	41.1

Delta Township WWTP
SRF Project Plan
Back-up Information for Operation and Maintenance Costs

Item	Units	Existing System	Alternative A Expand Existing System + Filter	Alternative B Expand w/ Activated Sludge
Primary Odor Control				
Air Flow	CFM			
Discharge	psi			
Fan HP	hp	10.0	20.0	10.0
Pump Kw		7.5	14.9	7.5
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	179.0	357.9	179.0
Intermediate Clarification				
Units		2.0	4.0	
Drive HP	hp	2.0	2.0	
Drive Kw-Hr		3.0	6.0	
Run Time	hr	24.0	24.0	
Daily Power Consumption	kW-Hr	71.6	143.2	
Intermediate Sludge Pumping				
Discharge Flow	gpm	50.0	60.0	
Discharge Head	ft	75.0	75.0	
Air HP (calc)	hp	3.1	3.1	
Pump Kw-Hr		2.3	2.3	
Run Time	hr	24.0	24.0	
Daily Power Consumption	kW-Hr	54.8	54.8	
Flow Split Mixing		gear mixer	gear mixer	hydraulic mix
Mixer HP	hp	5.0	25.0	25.0
Pump Kw-Hr		3.7	18.6	18.6
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	89.5	447.4	447.4
Aeration Blower				
Discharge Press	psi			
Blower HP	hp	85.0	90.0	95.0
Blower Kw-Hr		63.4	67.1	70.8
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	1521.2	1610.7	1700.2
Final Clarification				
Units		4.0	4.0	3.0
Unit HP	hp	0.5	0.8	0.8
Pump Kw-Hr		1.5	2.4	1.7
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	35.8	57.3	40.3

Delta Township WWTP
SRF Project Plan
Back-up Information for Operation and Maintenance Costs

Item	Units	Existing System	Alternative A Expand Existing System + Filter	Alternative B Expand w/ Activated Sludge
RAS Pumping				
Discharge Flow	gpm	2342.3	2342.3	2342.3
Discharge Head	ft	28.0	30.0	25.0
Pump HP	hp	27.6	29.6	24.6
Pump Kw-Hr		20.6	22.1	18.4
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	494.0	529.3	441.1
WAS Pumping				
Discharge Flow	gpm	100.0	100.0	
Discharge Head	ft	60.0	60.0	
Pump HP	hp	5.1	5.1	3.0
Pump Kw		3.8	3.8	2.2
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	91.5	91.5	53.7
Tertiary Influent Pumping				
Flow			3123.0	
Discharge Head	ft		67.3	
Pump HP	hp		88.4	0.0
Pump Kw			65.9	0.0
Run Time	hr		24.0	1.0
Daily Power Consumption	kW-Hr	0.0	1582.0	0.0
Filter Backwash Blower				
Backwash Flow			1600.0	1600.0
Discharge Press	psi		6.0	6.0
Blower HP	hp		35.0	35.0
Blower Kw		0.0	26.1	26.1
Run Time	hr		0.7	0.7
Daily Power Consumption	kW-Hr		17.4	17.4
Backwash Pump per Wash				
Backwash Flow			3500.0	3500.0
Discharge Head	ft		35.0	35.0
Pump HP	hp		51.6	51.6
Pump Kw-Hr			38.4	38.4
Run Time	hr		1.0	1.0
Daily Power Consumption	kW-Hr		38.4	38.4

Delta Township WWTP
SRF Project Plan
Back-up Information for Operation and Maintenance Costs

Item	Units	Existing System	Alternative A Expand Existing System + Filter	Alternative B Expand w/ Activated Sludge
UV Units				
Units		3.0	2.0	2.0
UV Kw		45.0	15.0	15.0
Run Time		33.6	11.2	11.2
Run Time	hr	24.0	24.0	24.0
Daily Power Consumption	kW-Hr	805.4	268.5	268.5
Thickening				
Discharge Head	ft			
Thickener HP	hp		5.0	5.0
Pump Kw			7.5	7.5
Run Time			24.0	24.0
Daily Power Consumption	kW-Hr		179.0	179.0
Digester mixing				
Flow	cfm	200.0		
Discharge Head	ft	8.0		
Compressor HP	hp	5.8	25.0	25.0
Pump Kw		8.6	37.3	37.3
Run Time		24.0	24.0	24.0
Daily Power Consumption	kW-Hr	205.8	894.8	894.8
Digester Pumping				
Flow	gpm	100.0	100.0	100.0
Discharge Head	ft	60.0	60.0	60.0
Air HP	hp	5.1	5.1	5.1
Pump Kw		3.8	3.8	3.8
Run Time		24.0	24.0	24.0
Daily Power Consumption	kW-Hr	91.5	91.5	91.5
Dewatering Mixing				
Units		4.0	4.0	
Mixer HP	hp	2.0	2.0	
Pump Kw		6.0	6.0	
Run Time		24.0	24.0	
Daily Power Consumption	kW-Hr	143.2	143.2	

Delta Township WWTP
SRF Project Plan
Back-up Information for Operation and Maintenance Costs

Item	Units	Existing System	Alternative A Expand Existing System + Filter	Alternative B Expand w/ Activated Sludge
Dewatering Feed Pump				
Flow	gpm	135.0	135.0	135.0
Discharge Head	ft	520.0	25.0	25.0
Pump HP	hp	29.5	1.4	1.4
Pump Kw		22.0	1.1	1.1
Run Time		8.0	8.0	8.0
Daily Power Consumption	kW-Hr	176.3	8.5	8.5
Dewatering Press				
Press HP	hp	5.0	5.0	5.0
Pump Kw		3.7	3.7	3.7
Run Time		8.0	8.0	8.0
Daily Power Consumption	kW-Hr	29.8	29.8	29.8
Unit Costs				
electricity	$/kW-hr	0.1	0.1	0.1
water (FEW)	$/gals	0.0	0.0	0.0
NaOH	$/gals	1.0	1.0	1.0
Media Replacement	$/year	0.0	0.0	0.0
natural gas	$/ccf	6.5	6.5	6.5
fuel oil	$/gallon	3.0	3.0	3.0
labor	$/hr	27.5	27.5	27.5
Annual Operation Costs				
System electricity		$259,795	$269,187	$184,689
Chemical Feed		$127,000	$127,000	$127,000
Solids Handling		$201,000	$137,000	$137,000
Total Annual O&M		**$587,795**	**$533,187**	**$448,689**
Discount Rate (%)	0.3			
Planning Period (years)	20			
Present Worth Factor for	19.38362			
Present Value of Tertiary Pumping		**$1,152,811**		

Delta Township WWTP
SRF Project Plan
Operation and Maintenance Costs Back-up

Daily Electricity Consumption (kW-Hr)

	Alternative A Expanded Existing System w/ Tertiary Treatment	Alternative B Proposed Improvements
Raw Sewage Pumping	1764	1529
Screening	179	179
Grit Removal	179	179
Primary Tank	67	67
Primary Sludge Pumping	41	41
Primary Odor Control	358	179
Intermediate Clarification	143	N/A
Intermediate Sludge Pumping	55	N/A
Flow Split Mixing	447	447
Aeration Blower	1611	1700
Final Clarification	57	40
RAS Pumping	529	441
WAS Pumping	91	54
Tertiary Influent Pumping	1582	N/A
Filter Backwash Blower	17	17
Filter Backwash Pump	38	38
Total Electricity Consumption	7160	4913

Delta Township WWTP
SRF Project Plan
Operation and Maintenance Costs Back-up

Annual Electricity Consumption (kW-Hr)

	Alternative A Expanded Existing System w/ Tertiary Treatment	Alternative B Proposed Improvements
Raw Sewage Pumping	$643,954	$558,094
Screening	$65,323	$65,323
Grit Removal	$65,323	$65,323
Primary Tank	$24,496	$24,496
Primary Sludge Pumping	$14,992	$14,992
Primary Odor Control	$130,647	$65,323
Intermediate Clarification	$52,259	N/A
Intermediate Sludge Pumping	$19,989	N/A
Flow Split Mixing	$163,308	$163,308
Aeration Blower	$587,910	$620,572
Final Clarification	$20,903	$14,698
RAS Pumping	$193,186	$160,989
WAS Pumping	$33,380	$19,597
Tertiary Influent Pumping	$577,412	N/A
Filter Backwash Blower	$6,351	$6,351
Filter Backwash Pump	$14,033	$14,033
Total Electricity Consumption	$2,613,467	$1,793,099
Annual Energy Cost	$269,187	$184,689
Annual Chemical Cost	$127,000	$127,000
Annual Solids Handling Cost	$137,000	$137,000
Annual O&M Cost	$533,000	$449,000
Discount Rate (%)	0.3	0.3
Planning Period (years)	20	20
Present Worth Factor for O&M	19.384	19.384
Total Present Worth O&M	$10,332,000	$8,704,000
Annual electrical savings		$84,498
% Reduction		31%

APPENDIX C: FISCAL SUSTAINABILITY

DELTA TOWNSHIP FISCAL SUSTAINABILITY PLAN

Asset Service Assessment Examples
200% Heavy use-Run time or twice as much designed
100% Normal use-Used as designed
50% Light use-Half as much as designed
5% Little or no use

Condition-Performance Assessment Examples
5 Excellent Like new-Performs as designed
4 Good Minor wear- Acceptable performance
3 Fair Advanced wear- Will require overhaul in near future-Poor performance affects operation
2 Poor Unreliable due to wear-High maintenance required to remain in service
1 Useless Failed or imminent failure-Obsolete-Unacceptable performance

Typical Service Life
Land Permanent
Wastewater conveyance collection, outfalls, force mains: 50 years
Other structures: Plant Bldgs., Concrete Tanks, Basins, Lift stations: 30-50 years
Process equipment 15-30 years
Auxiliary equipment 10-15 years

Failure	Consequences of failure			
Probability	Minor			Severe
Unlikely	16	14	12	9
	15	11	7	6
	13	8	4	3
Likely	10	5	2	1

Equip ID	Asset Description	First in service date	Years in service	Service %	Condition	Engineer's Condition	Performance	Original Service life yrs.	Age Adjustment Factor	Round Age Adjustment Field	To convert to whole number	Adjust number of years	**Adjusted life years**	Replacement year	Replacement Cost,	Asset Importance	Field Notes
Raw Pit																	
364	Raw Sewage Pump 1A	2016	3	100	1	4	2	15	3	3	3	0.6	14	2030	$55,000.00	3	
365	Raw Sewage Pump 1B	2004	15	100	1	3	2	15	3	3	3	3.0	12	2016	$55,000.00	3	
366	Raw Sewage Pump 2A	2017	2	100	5	4	5	15	10	10	10	0.8	16	2033	$55,000.00	3	
367	Raw Sewage Pump 2B	2004	15	100	1	3	2	15	3	3	3	3.0	12	2016	$55,000.00	3	
368	Raw Sewage Pump 3A	2017	2	100	5	4	5	15	10	10	10	0.8	16	2033	$55,000.00	3	
369	Raw Sewage Pump 3B	2004	15	100	1	3	2	15	3	3	3	3.0	12	2016	$55,000.00	3	
370	Raw Sewage Pump 4A (Original Body)	2017	2	100	1	3	2	15	3	3	3	0.4	15	2032	$55,000.00	3	
371	Raw Sewage Pump 4B	2004	15	100	1	3	2	15	3	3	3	3.0	12	2016	$55,000.00	3	
495	Chain Hoist Raw Pump Hoist	2018	1	100	5	4	5	20	10	10	10	0.4	20	2038	$7,000.00	14	
	Stop Plate No. 1	1983	36			4									$5,000.00		
	Stop Plate No. 2	1983	36			4									$5,000.00		
	10-inch Plug Valve (8)	2004				3									$64,000.00		
	10-inch Check Valve (8)	2004				3									$96,000.00		Duckbills Leak
	16-inch Flowmeter (4)	2015				3									$80,000.00		
	16-inch Pipe	2004				3									$150,000.00		
	Pipe Supports	2004				3									$50,000.00		
	Electrical					2									$50,000.00		
	Subtotal														$947,000.00		
	General Conditions (10%)														$94,700.00		
	Contingency (30%)														$284,100.00		
	Total														$1,325,800.00		
Grit Building Upper																	
219	GRIT WASHER / AUGER South	2008	11	100	2	2	3	20	5	5	5	0.0	20	2028	$75,000.00	4	Max 5 Years left
220	GRIT WASHER / AUGER North	2006	13	100	2	2	3	20	5	5	5	0.0	20	2026	$75,000.00	4	Max 5 Years left
403	GRIT SWITCH GEAR	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$350,000.00	10	
404	MAIN SWITCH GEAR	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$450,000.00	10	
120	BarSreen North	2004	15	100	2	2	2	20	4	4	4	1.5	19	2023	$125,000.00	4	Last Rebuild
119	Bar Screen South	2005	14	100	2	2	2	20	4	4	4	1.4	19	2024	$125,000.00	4	Last Rebuild
148	Grit Conveyor	1986	33	25	3	2	3	20	10.5	11	11	13.2	33	2019	$100,000.00	8	

	Grit Chamber West Mechanism	2006	13	100	3	2	3	20	6	6	6	1.3	21	2027	$45,000.00	10	
	Grit Chamber East Mechanism	2007	12	100	3	2	3	20	6	6	6	1.2	21	2028	45000	10	
312	Grit OC Unit - 12,000 CFM	1986	33	100	4	2	4	25	8	8	8	9.9	35	2021	$250,000.00	12	Control Panel corroded
161	Grit Garage Overhead Door & operator	2015	4	50	3	2	2	20	7.5	8	8	1.2	21	2036	$5,000.00	14	Replace every 5 yrs
	Raw pump Generator & Transfer switch	1986	33	10	3	2	2	30	9.5	10	10	13.2	43	2029	$250,000.00	14	Undersized, Conduit poor
	Grating over channels	1986	33	100	2	2	2	35	4	4	4	3.3	32	2018	$20,000.00	12	
	Stop Gates (8)					1									$8,000.00		
	Valves					3									$50,000.00		
	Pipe					3									$37,500.00		
	Flowmeters					3											
	Electric Room cooling fan (EFIU-1)	1986	33	50		1	1	25	1.5	2	2	9.9	15	2001	$2,000.00	4	
	Electric room electric baseboard heat	1986	33	50		3	3	10	4.5	5	5	0.0	10	1996	$500.00	16	
	Odor Control Room Hot Water Unit Heater (UHIU-1)	1986	33	50		3	3	20	4.5	5	5	0.0	20	2006	$1,000.00	16	
	Odor Control Room Exhaust Fan (EFIU-2)	1986	33	50		2	2	25	3	3	3	6.6	18	2004	$1,000.00	16	
	Garage Unit Heater (UHIU-2)	1986	33	50		1	1	20	1.5	2	2	9.9	10	1996	$1,000.00	16	
	Exterior Brick Masonry	1986	33	100		2	4	70	4	4	4	3.3	67	2053		12	
	Exterior Sealants	1986	33	100		1	1	15	1	1	1	9.9	5	1991		5	
	Steel Lintels	1986	33	100		2	4	35	4	4	4	3.3	32	2018		12	
	Concrete Soffit Panels	1986	33	100		2	3	60	3	3	3	6.6	53	2039		4	Panels deteriorated at roof
	Exterior Doors	1986	33	100		2	3	30	3	3	3	6.6	23	2009		11	
	Aluminum Windows	1986	33	100		3	3	30	3	3	3	6.6	23	2009		11	
	Concrete Foundation walls	1986	33	100		3	4	70	4	4	4	3.3	67	2053		9	
	Metal Canopy Roof and Framing	1986	33	100		3	3	35	3	3	3	6.6	28	2014		7	
	Concrete Steps (Exterior)	1986	33	100		2	3	45	3	3	3	6.6	38	2024		11	
	Electrical					2									$640,000.00		
	Subtotal														$2,656,000.00		
	General Conditions (10%)														$265,600.00		
	Contingency (30%)														$796,800.00		
	Total														$3,718,400.00		
Grit Building Lower																	
143	AIR COMPRESSOR	1986	33	10	5	2	5	30	19	19	19	13.2	43	2029	$4,000.00	16	not functional
216	GRIT BLOWER #1	2015	4	100	4	3	4	20	8	8	8	1.2	21	2036	$15,000.00	10	
217	GRIT BLOWER #2	2004	15	85	3	3	3	20	6.9	7	7	3.0	23	2027	$15,000.00	10	
218	GRIT BLOWER #3	2015	4	100	4	3	4	20	8	8	8	1.2	21	2036	$15,000.00	10	
241	HOT WATER CIRC. PUMP 1	1986	33	100	4	2	3	20	7	7	7	6.6	27	2013	$1,000.00	11	
242	HOT WATER CIRC. PUMP 2	1986	33	100	4	2	3	20	7	7	7	6.6	27	2013	$1,000.00	11	
243	HOT WATER CIRC. PUMP 3	1986	33	100	4	2	3	20	7	7	7	6.6	27	2013	$1,000.00	11	
244	HOT WATER CIRC. PUMP 4	1986	33	100	4	2	3	20	7	7	7	6.6	27	2013	$1,000.00	11	
348	GRIT PRESSURE WASHER	1986	33	10	5	2	5	30	19	19	19	13.2	43	2029	$500.00	16	
358	PRIMARY SLUDGE PUMP #1	1986	33	25	4	3	4	30	14	14	14	13.2	43	2029	$15,000.00	8	
359	PRIMARY SLUDGE PUMP #2	1986	33	25	4	3	4	30	14	14	14	13.2	43	2029	$15,000.00	8	
360	PRIMARY SLUDGE PUMP #3	1986	33	25	4	3	4	30	14	14	14	13.2	43	2029	$15,000.00	8	
377	PRIMARY SAMPLER					3									$4,000.00		
378	RAW SAMPLER					3									$4,000.00		obselete technology
508	Raw Pump Control Panel	2004	15	100	4	3	4	30	8	8	8	4.5	35	2039	$55,000.00	12	
532	Primary Sludge flow meter	1986	33	100	3	3	2	20	5	5	5	0.0	20	2006	$5,000.00	12	
	Raw Pump 1 A VFD	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$55,000.00	10	
	Raw Pump 2 A VFD	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$55,000.00	10	
	Raw Pump 3 A VFD	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$55,000.00	10	
	Raw Pump 4 A VFD	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$55,000.00	10	

	Raw Pump 1 A Filter	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$4,000.00	10	
	Raw Pump 2 A Filter	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$4,000.00	10	
	Raw Pump 3 A Filter	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$4,000.00	10	
	Raw Pump 4 A filter	2004	15	25	3	3	3	20	10.5	11	11	6.0	26	2030	$4,000.00	10	
	Power factor unit	1986	33	100	4	2	4	30	8	8	8	9.9	40	2026	$7,000.00	8	No longer supported
467	ELECTRIC WATER HEATER #1	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$1,800.00	16	
468	ELECTRIC WATER HEATER #2	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$1,800.00	16	
266	Hot Water Unit Heater	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
	Hot Water Unit Heater	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
255	Hot Water Unit Heater	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
254	Hot Water Unit Heater	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
258	Hot Water Unit Heater	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
	Valves					3									$380,000.00		Actuators need replacement
	Pipe					3									$940,000.00		
	Flowmeters					3									$45,000.00		
	Electrical					2											
	Subtotal														$1,788,100.00		
	General Conditions (10%)														$178,810.00		
	Contingency (30%)														$536,430.00		
	Total														$2,503,340.00		
Primary Tanks																	
350	SLUDGE COLLECTOR 1, PRIM.	2008	11	100	1	2	1	20	2	2	2	3.3	17	2025	$95,000.00	8	
351	SLUDGE COLLECTOR 2, PRIM.	2010	9	100	1	2	1	20	2	2	2	2.7	17	2027	$95,000.00	8	
352	SLUDGE COLLECTOR 3, PRIM.	2014	5	100	1	2	1	20	2	2	2	1.5	19	2033	$95,000.00	8	
353	SLUDGE COLLECTOR 4, PRIM.	2011	8	100	1	2	1	20	2	2	2	2.4	18	2029	$95,000.00	8	
354	CROSS COLLECTOR, PRI TANK 1	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$55,000.00	8	
355	CROSS COLLECTOR, PRI TANK 2	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$55,000.00	8	
356	CROSS COLLECTOR, PRI TANK 3	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$55,000.00	8	
357	CROSS COLLECTOR, PRI TANK 4	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$55,000.00	8	
	Primary parshall flume	1986	33	100	4	3	4	20	8	8	8	9.9	30	2016	$5,000.00	14	
	PRIMARY TANK #1 STRUCTURE	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		13	
	PRIMARY TANK #2 STRUCTURE	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		13	
	PRIMARY TANK #3 STRUCTURE	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		13	
	PRIMARY TANK #4 STRUCTURE	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		13	
	Primary Clarifier Top Slab	1986	33	100	4	4	4	50	8	8	8	9.9	60	2046		12	
	Odor Control - 24,000 CFM					2									$325,000.00		2nd Fan, 3rd motor, Controls p
	Effluent Trough and Baffles					3									$540,000.00		
	Scum Trough					2											Material thin, mechanism poor
	Hatches					2											Hinges and Frames deteriorate
	Subtotal														$1,470,000.00		
	General Conditions (10%)														$147,000.00		
	Contingency (30%)														$441,000.00		
	Total														$2,058,000.00		
Intermediate Biological Process																	
	North Bio tower Media	1986	33	100	3	2	3	20	6	6	6	3.3	23	2009	$222,000.00	8	
	South Bio tower Media	1986	33	100	3	2	3	20	6	6	6	3.3	23	2009	$222,000.00	8	
	North Bio tower distribution arm mechanism	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$90,000.00	4	Leaks
	South Bio tower distribution arm mechanism	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006	$90,000.00	4	
	Bio-Tower Structure -North	1986	33	100	4	3	4	20	8	8	8	9.9	30	2016		14	
	Bio-Tower Structure -South	1986	33	100	4	3	4	20	8	8	8	9.9	30	2016		14	
	Dome North	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$110,000.00	12	

	Dome South	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$110,000.00	12	
286	NORTH INTERMEDIATE CLAIR. #2	1972	47	100	4	2	4	20	8	8	8	14.1	34	2006	$125,000.00	8	
	North Intermediate Clarifier WEST Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
437	North Intermediate Clarifier CENTER Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
434	North Intermediate Clarifier EAST Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
287	SOUTH INTERMEDIATE CLAIR. #1	1972	47	100	4	2	4	20	8	8	8	14.1	34	2006	$125,000.00	8	
438	South Intermediate Clarifier WEST Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
436	South Intermediate Clarifier CENTER Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
435	South Intermediate Clarifier EAST Exhaust Fan	1988	31	5	4	3	4	25	15.6	16	16	12.4	37	2025	$2,000.00	12	
	Geodesic Dome North	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$110,000.00	12	
	Geodesic Dome South	1986	33	100	5	3	5	20	10	10	10	13.2	33	2019	$110,000.00	12	
	Subtotal														$1,326,000.00		
	General Conditions (10%)														$132,600.00		
	Contingency (30%)														$397,800.00		
	Total														$1,856,400.00		
Flow Split Structure 3																	
113	Flow Split 3 STRUCTURE	1965	54	100	3	3	3	50	6	6	6	5.4	55	2020		12	
	mixer 1					3									$35,000.00		gear box replaced
	mixer 2					3									$35,000.00		gear box replaced
	Sluice Gates (3)					2									$36,000.00		
	Subtotal														$106,000.00		
	General Conditions (10%)														$10,600.00		
	Contingency (30%)														$31,800.00		
	Total														$148,400.00		
Secondary Biological Process																	
113	AIR TANK 1 STRUCTURE	1965	54	100	3	2	3	50	6	6	6	5.4	55	2020		12	
114	AIR TANK 2 STRUCTURE	1965	54	100	3	2	4	50	7	7	7	10.8	61	2026		12	
115	AIR TANK 3 STRUCTURE	1972	47	100	3	2	3	50	6	6	6	4.7	55	2027		12	
116	AIR TANK 4STRUCTURE	1972	47	100	2	2	3	50	5	5	5	0.0	50	2022		12	
117	AIR TANK 5 STRUCTURE	1972	47	100	2	2	3	50	5	5	5	0.0	50	2022		12	
118	AIR TANK 6 STRUCTURE	1972	47	100	2	2	3	50	5	5	5	0.0	50	2022		12	
	AIR TANK #1 DOME GRID	1986	33	100	5	3	5	30	10	10	10	13.2	43	2029	$25,000.00	10	
	AIR TANK #2 DOME GRID	1986	33	100	5	3	5	30	10	10	10	13.2	43	2029	$25,000.00	10	
	AIR TANK #3 DOME GRID	1986	33	100	5	3	5	30	10	10	10	13.2	43	2029	$25,000.00	10	
	AIR TANK #4 DOME GRID	1986	33	100	5	3	5	30	10	10	10	13.2	43	2029	$25,000.00	10	
	AIR TANK #5 DOME GRID	1986	33	100	5	3	5	30	10	10	10	13.2	43	2029	$25,000.00	10	
	AIR TANK #6 DOME GRID	2013	6	100	5	3	5	30	10	10	10	2.4	32	2045	$25,000.00	10	
	Air Tank #1 Domes	2013	6	100	5	3	5	20	10	10	10	2.4	22	2035	$15,000.00	8	
	Air Tank #2 Domes	2014	5	100	5	3	5	20	10	10	10	2.0	22	2036	$15,000.00	8	
	Air Tank #3 Domes	2014	5	100	5	3	5	20	10	10	10	2.0	22	2036	$15,000.00	8	
	Air Tank #4 Domes	2014	5	100	5	3	5	20	10	10	10	2.0	22	2036	$15,000.00	8	
	Air Tank #5 Domes	2014	5	100	5	3	5	20	10	10	10	2.0	22	2036	$15,000.00	8	
	Air Tank #6 Domes	2014	5	100	5	3	5	20	10	10	10	2.0	22	2036	$15,000.00	8	
	Aeration Tank Steel Guardrail	1972	47	100	3	2	2	15	5	5	5	0.0	15	1987		8	

	Valves					3									$150,000.00	
	Main Header					2										Couplings corroded
	Pipe					3									$390,000.00	
	Flowmeters					3										
	DO Probe (1)															
	Subtotal														$780,000.00	
	General Conditions (10%)														$78,000.00	
	Contingency (30%)														$234,000.00	
	Total														$1,092,000.00	
Flow Split Structure 6																
113	Flow Split 6 STRUCTURE	2016	3	100	3	5	3	50	6	6	6	0.3	50	2066		12
	Sluice Gate (2)	2016				4									$30,000.00	
	Stop Gate (5)	2016				4									$5,000.00	
	Subtotal														$35,000.00	
	General Conditions (10%)														$3,500.00	
	Contingency (30%)														$10,500.00	
	Total														$49,000.00	
Blower Building																
126	AERATION BLOWER #3	1972	47	10	3	3	3	20	11.4	11	11	18.8	39	2011	$45,000.00	8
127	AERATION BLOWER #4	1986	33	10	3	3	3	20	11.4	11	11	13.2	33	2019	$45,000.00	8
128	AERATION BLOWER #5	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$75,000.00	8
129	AERATION BLOWER #6	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$75,000.00	8
	Turbo Aeration Blower #1	2014	5	100	5	4	5	20	10	10	10	2.0	22	2036	$150,000.00	8
393	SUMP PUMP (BLOWER)	1986	33	10	5	4	5	30	19	19	19	13.2	43	2029	$5,000.00	12
	Air Intake Header	1986	33	100	4	3	5	30	9	9	9	0.0	30	2016	$15,000.00	11
	5,000 cfm Exhaust Fan (EF7-3)	1986	33	100	3	2	3	15	6	6	6	3.3	18	2004	$1,500.00	11
	5,600 cfm Exhaust Fan (EF7-2)	1986	33	100	3	2	3	15	6	6	6	3.3	18	2004	$1,500.00	11
	140 cfm Exhaust Fan (EF7-1)	1986	33	100	3	2	3	25	6	6	6	3.3	28	2014	$500.00	11
	Packaged Terminal AC Unit (AC7-1)	1986	33	50	2	2	2	15	6	6	6	3.3	18	2004	$2,000.00	11
	Cabinet Hot Water Unit Heater (C7-1)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
	Cabinet Hot Water Unit Heater (C7-2)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
	Cabinet Hot Water Unit Heater (C7-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
	Cabinet Hot Water Unit Heater (C7-4)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
	BLOWER BUILDING STRUCTURE	1965	54	100	5	3	5	50	10	10	10	21.6	72	2037		14
	Exterior Brick Masonry	1965	54	100	4	3	4	70	8	8	8	16.2	86	2051		12
	Exterior Sealants	1965	54	100	1	1	0	15	1	1	1	16.2	-1	1964		5
	Steel Lintels	1965	54	100	4	4	4	35	8	8	8	16.2	51	2016		12
	Concrete Soffit Panels	1965	54	100	4	4	4	60	8	8	8	16.2	76	2041		7
	Exterior Doors	1965	54	100	3	3	3	30	6	6	6	5.4	35	2000		11
	Aluminum Windows	1965	54	100	3	3	3	30	6	6	6	5.4	35	2000		11
	Roof					2										
	Valves					3									$150,000.00	
	Pipe					3									$390,000.00	
	Flowmeters					3										
	Electrical					3									700000	
	Subtotal														$1,659,500.00	
	General Conditions (10%)														$165,950.00	
	Contingency (30%)														$497,850.00	
	Total														$2,323,300.00	

(Sludge) Pumping Building																
191	FLOCCULATION BLOWER #1	1986	33	33	5	3	5	20	16.7	17	17	13.2	33	2019	$15,000.00	10	
192	FLOCCULATION BLOWER #2	1986	33	33	5	3	5	20	16.7	17	17	13.2	33	2019	$15,000.00	10	
193	FLOCCULATION BLOWER 3	1986	33	33	5	3	5	20	16.7	17	17	13.2	33	2019	$15,000.00	10	
288	INTERMEDIATE SLUDGE PUMP #1	1986	33	100	4	3	4	30	8	8	8	9.9	40	2026	$15,000.00	5	
289	INTERMEDIATE SLUDGE PUMP #2	1986	33	100	4	3	4	30	8	8	8	9.9	40	2026	$15,000.00	5	
361	RETURN ACT. SLUDGE PUMP #1	1986	33	33	3	2	2	30	8.35	8	8	9.9	40	2026	$45,000.00	8	Seals Rebuild but pump cannot
362	RETURN ACT. SLUDGE PUMP #2	1986	33	33	5	2	5	30	16.7	17	17	13.2	43	2029	$45,000.00	8	Seals Rebuild but pump cannot
363	RETURN ACT. SLUDGE PUMP #3	1986	33	33	3	2	2	30	8.35	8	8	9.9	40	2026	$45,000.00	8	Seals Rebuild but pump cannot
397	SUMP PUMP (PUMPING)	1986	33	10	4	3	4	30	15.2	15	15	13.2	43	2029	$5,000.00	10	
	15 kW Electric Unit Heater	1986	33	50	4	4	4	13	12	12	12	13.2	26	2012	$700.00	11	
	Propeller exhaust fan	1986	33	100	3	3	3	15	6	6	6	3.3	18	2004	$500.00	11	
	15 kW Electric Unit Heater	1986	33	50	4	4	4	13	12	12	12	13.2	26	2012	$700.00	11	
	Valves					3									$350,000.00		
	Pipe					3									$500,000.00		
	Flowmeters	1986				2									$40,000.00		
	Exterior Brick Masonry+P346A387B342:O346A387B342:C	1972	47	100	4	4	3	70	7	7	7	9.4	79	2051		12	
	Exterior Sealants	1972	47	100	2	2	0	10	2	2	2	14.1	-4	1968		5	
	Steel Lintels	1972	47	100	3	3	4	35	7	7	7	9.4	44	2016		12	
	Concrete Soffit Panels	1972	47	100	4	4	4	60	8	8	8	14.1	74	2046		7	
	Exterior Doors	1972	47	100	3	3	3	30	6	6	6	4.7	35	2007		11	
	Roof					2											Gaps at edge of roof
	Electrical					3									$140,000.00		
	Subtotal														$1,246,900.00		
	General Conditions (10%)														$124,690.00		
	Contingency (30%)														$374,070.00		
	Total														$1,745,660.00		
Final Clarifiers																	
187	FINAL CLARIFIER MECHANISM 1	1986				2									$125,000.00		Gearbox leaks
188	FINAL CLARIFIER MECHANISM 2	1986				2									$125,000.00		
189	FINAL CLARIFIER MECHANISM 3	1972				2									$155,000.00		
109	FINAL CLARIFIER MECHANISM 4	1972				2									$155,000.00		
	Final Clarifier #1 (West) Concrete	1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		12	
	Final Clarifier #1 (West) Aluminum Guardrail & Bridge	1972	47	100	4	4	4	30	8	8	8	14.1	44	2016		16	
	Final Clarifier #2 (East) Concrete	1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		12	
	Final Clarifier #2 (East) Aluminum Guardrail & Bridge	1972	47	100	4	4	4	30	8	8	8	14.1	44	2016		16	
	Final Clarifier #3 Concrete	1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		12	
	Final Clarifier #3 Steel Guardrail & Bridge	1972	47	100	4	4	4	30	8	8	8	14.1	44	2016		16	
	Final Clarifier #4 Concrete	1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		12	
	Final Clarifier #4 Steel Guardrail & Bridge	1972	47	100	4	4	4	30	8	8	8	14.1	44	2016		16	
	Subtotal														$560,000.00		
	General Conditions (10%)														$56,000.00		
	Contingency (30%)														$168,000.00		
	Total														$784,000.00		
U.V. (Disinfection) Building																	
152	OVERHEAD CRANE & TROLLY	1986	33	10	5	3	5	50	19	19	19	13.2	63	2049	$16,000.00	14	
175	FINAL EFFLUENT PUMP 1	2006	13	50	2	3	2	20	6	6	6	1.3	21	2027	$6,000.00	8	
176	FINAL EFFLUENT PUMP 2	2010	9	50	2	3	2	20	6	6	6	0.9	21	2031	$6,000.00	8	

177	FINAL EFFLUENT PUMP 3	2008	11	50	4	3	4	20	12	12	12	4.4	24	2032	$6,000.00	10	
186	Final Effluent Flume	1986	33	100	5	3	5	50	10	10	10	13.2	63	2049		8	
375	FINAL SAMPLER	1986	33	100	5	3	5	50	10	10	10	13.2	63	2049	$600.00	6	
409	U.V. UNIT #1	2015	4	100	5	4	4	20	9	9	9	0.0	20	2035	$125,000.00	6	
410	U.V. UNIT #2	2015	4	100	5	4	4	20	9	9	9	0.0	20	2035	$125,000.00	6	
411	U.V. UNIT #3	2015	4	100	5	4	4	20	9	9	9	0.0	20	2035	$125,000.00	6	
	Gate Valves (6)					4									$150,000.00		
	Pipe					4									$274,500.00		
	AERATING CASCADE	1986	33	100	5	4	5	50	10	10	10	13.2	63	2049		12	
	15 kW Electric Unit Heater	1986	33	50	4	4	4	13	12	12	12	13.2	26	2012	$700.00	11	
	Propeller exhaust fan	1986	33	100	3	3	3	15	6	6	6	3.3	18	2004	$2,000.00	11	
	15 kW Electric Unit Heater	1986	33	50	4	4	4	13	12	12	12	13.2	26	2012	$700.00	11	
	Exterior Brick Masonry	1972	47	100	4	3	4	70	8	8	8	14.1	84	2056		12	South wall cracks
	Exterior Sealants	1972	47	100	1	1	0	10	1	1	1	14.1	-4	1968		5	
	Steel Lintels	1972	47	100	3	3	4	35	7	7	7	9.4	44	2016		12	
	Concrete Soffit Panels	1972	47	100	4	4	4	60	8	8	8	14.1	74	2046		7	
	Exterior Doors	1972	47	100	3	3	3	30	6	6	6	4.7	35	2007		11	
	Aluminum Windows	1972	47	100	3	3	2	30	5	5	5	0.0	30	2002		11	
	Subtotal														$837,500.00		
	General Conditions (10%)														$83,750.00		
	Contingency (30%)														$251,250.00		
	Total														$1,172,500.00		
Digester Building																	
100	Air Compressor #4	1998	21	60	2	2	3	20	7	7	7	4.2	24	2022	$13,000.00	8	
101	Air Compressor #5	1995	24	60	4	2	3	20	9.8	10	10	9.6	30	2025	$13,000.00	8	new motor
102	Air Compressor #6	1995	24	50	2	2	3	20	7.5	8	8	7.2	27	2022	$13,000.00	8	
190	LARGE DIGESTER BOILER	1986	33	100	2	2	3	30	5	5	5	0.0	30	2016	$70,000.00	6	
131	SMALL DIGESTER BOILER	1986	33	100	2	2	3	30	5	5	5	0.0	30	2016	$70,000.00	6	
156	DIGESTER SLUDGE PUMP #3	1986	33	100	2	3	3	30	5	5	5	0.0	30	2016	$15,000.00	8	no scan label
157	DIGESTER SLUDGE PUMP #4	1986	33	100	2	3	3	30	5	5	5	0.0	30	2016	$15,000.00	8	
158	DIGESTER SLUDGE PUMP #5	1986	33	100	2	3	3	30	5	5	5	0.0	30	2016	$15,000.00	8	
159	DIGESTER SLUDGE PUMP #6	1986	33	100	2	3	3	30	5	5	5	0.0	30	2016	$15,000.00	12	
160	DIGESTER SLUDGE PUMP #7	1986	33	100	2	3	3	30	5	5	5	0.0	30	2016	$15,000.00	12	no scan label
200	DIGESTER GAS COMPRESSOR 1					3											
201	DIGESTER GAS COMPRESSOR 2					3											
202	DIGESTER GAS COMPRESSOR 3					2											not running
203	WASTE GAS METER #1	2010	9	100	3	5	4	20	7	7	7	1.8	22	2032	$4,000.00	10	
204	GENERATOR GAS METER #2	2010	9	100	4	3	4	20	8	8	8	2.7	23	2033	$4,000.00	12	
205	BOILER GAS METER #3	2010	9	100	4	3	4	20	8	8	8	2.7	23	2033	$4,000.00	10	
213	GENERATOR DIGESTER	1986	33	20	3	2	3	30	10.8	11	11	13.2	43	2029	$60,000.00	12	
214	PLANT GENERATOR RADIATOR	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$1,000.00	12	
227	HOT WATER CIRC. PUMP 1	1986	33	100	3	2	3	10	6	6	6	3.3	13	1999	$1,000.00	12	new motor
228	HOT WATER CIRC. PUMP 2	1986	33	100	3	2	3	10	6	6	6	3.3	13	1999	$1,000.00	12	new motor
229	HOT WATER CIRC. PUMP 3	1986	33	100	3	2	3	10	6	6	6	3.3	13	1999	$1,000.00	12	new motor
230	HOT WATER CIRC. PUMP 4	1986	33	100	3	2	3	10	6	6	6	3.3	13	1999	$1,000.00	12	
237	PRIMARY HOT WATER PUMP 5	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$1,000.00	12	new motor
238	PRIMARY HOT WATER PUMP 6	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$1,000.00	12	
239	PRIMARY HOT WATER PUMP 7	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$1,000.00	12	
240	PRIMARY HOT WATER PUMP 8	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$1,000.00	12	
246	SLUDGE CIRC. HEAT EX. 1	1986	33	100	4	3	4	30	8	8	8	9.9	40	2026	$35,000.00	8	
247	SLUDGE CIRC. HEAT EX. 2	2012	7	100	4	3	4	30	8	8	8	2.1	32	2044	$35,000.00	8	no scan label
248	SLUDGE CIRC. HEAT EX. 3	1986	33	100	4	3	4	30	8	8	8	9.9	40	2026	$35,000.00	8	
249	DIGESTER SLUDGE HEAT EX. 1	2011	8	100	4	3	4	20	8	8	8	2.4	22	2033	$35,000.00	8	

250	DIGESTER SLUDGE HEAT EX. 2	2012	7	100	4	3	4	20	8	8	8	2.1	22	2034	$35,000.00	8	
251	DIGESTER SLUDGE HEAT EX. 3	2013	6	100	4	3	4	20	8	8	8	1.8	22	2035	$35,000.00	8	
290	JOY AIR COMPRESSOR 1					1									$25,000.00		
291	JOY AIR COMPRESSOR 2					1									$25,000.00		
292	JOY AIR COMPRESSOR 3					1									$25,000.00		
	WASTE GAS REGULATOR VALVE	1986	33	100	2	2	3	30	5	5	5	0.0	30	2016	$9,000.00	4	
346	PRE-HEAT TRANSFER PUMP	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019	$1,800.00	4	no scan label
347	PRE-HEAT TRANSFER PUMP	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019	$1,800.00	4	no scan label
538	SUMP PUMP (DIG) {AIR}	2016	3	100	5	4	5	30	10	10	10	1.2	31	2047	$5,000.00	5	
399	SUMP PUMP (DIG) {ELECT}	1986	33	100	2	3	3	20	5	5	5	0.0	20	2006	$2,000.00	5	
400	SUPERNANT PUMP	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019	$5,000.00	8	
401	SUPERNANT PUMP	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019	$5,000.00	8	
402	DIGESTER SWITCH GEAR	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019	$200,000.00	10	
427	EXHAUST FAN ROOF	1986	33	100	4	3	4	20	8	8	8	9.9	30	2016	$300.00	12	
432	EXHAUST FAN ROOF	1986	33	100	4	3	4	20	8	8	8	9.9	30	2016	$600.00	12	
489	Air Flask	1986	33	100	2	2	3	20	5	5	5	0.0	20	2006		7	
522	Refrigerated Air Dryer #1 North	2011	8	50	4	4	4	20	12	12	12	3.2	23	2034	$6,000.00	9	no scan label
523	Refrigerated Air Dryer #2 South	2010	9	50	4	4	4	20	12	12	12	3.6	24	2034	$6,000.00	9	
534	Air Compressor Grimmer Schmidt	2004	15	10	5	4	5	30	19	19	19	6.0	36	2040		10	
	35 Ft Secondary Digester Gas Cover	1986	33	100	3	3	3	50	6	6	6	3.3	53	2039	$300,000.00	6	
	35 Ft Secondary Digester Gas Cover	1986	33	100	3	3	3	50	6	6	6	3.3	53	2039	$300,000.00		
	50 Ft Secondary Digester Gas Cover	1986	33	100	3	3	3	50	6	6	6	3.3	53	2039	$400,000.00	6	
	50 Ft Secondary Digester Gas Cover	1986	33	100	3	3	3	50	6	6	6	3.3	53	2039	$400,000.00		
	35 Ft Digester Tank Structure	1965	54	100	3	3	3	50	6	6	6	5.4	55	2020		10	
	50 Ft Digester Tank Structure	1986	33	100	3	3	3	50	6	6	6	3.3	53	2039		10	
	Roof Exhuast Fan (EF3-1)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
	Roof Exhuast Fan (EF3-2)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$1,500.00	11	
	Roof Exhuast Fan (EF3-3)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$1,000.00	11	
	Roof Exhuast Fan (EF3-4)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$1,000.00	11	
	Roof Exhuast Fan (EF3-5)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$2,000.00	11	
432	Roof Exhuast Fan (EF3-6)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$5,000.00	11	
	Roof Exhuast Fan (EF3-7)	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009	$1,000.00	11	
	Digester Tank (South) Structure	1965	54	100	3	3	3	50	6	6	6	5.4	55	2020		8	Some leaks on interior
	Digester Tank (North) Structure	1965	54	100	3	3	3	50	6	6	6	5.4	55	2020		8	
	Seconday Digester (North) Structure	1972	47	100	3	3	3	50	6	6	6	4.7	55	2027		8	
	Primary Digester (South) Structure	1972	47	100	3	3	3	50	6	6	6	4.7	55	2027		8	
	Roof					2											
	Tunnel Structure					3											The top slab leaks
	Floor Drains					2											Drains don’t work properly
	Flare					3											
	Gas Safety					3											
	Valves					3									$500,000.00		
	Pipe					3									$950,000.00		
	Flowmeters					3									$64,000.00		
	Electrical					3									$600,000.00		
	Subtotal														$4,390,000.00		
	General Conditions (10%)														$439,000.00		
	Contingency (30%)														$1,317,000.00		
	Total														$6,146,000.00		
Press Building																	
105	ABLE SLUDGE PUMP 1	1986	33	50	4	3	4	30	12	12	12	13.2	43	2029	$75,000.00	8	
106	ABLE SLUDGE PUMP 2	1986	33	50	4	3	4	30	12	12	12	13.2	43	2029	$75,000.00	8	

135	CAKE PUMP-CENTRIFUGE	1986	33	0	5		5	30	20	20	20	13.2	43	2029		16	
136	FEED GRINDER-CENTRIFUGE	1986	33	0	5		5	30	20	20	20	13.2	43	2029		16	
137	FEED PUMP-CENTRIFUGE	1986	33	0	5		5	30	20	20	20	13.2	43	2029		16	
138	CENTRIFUGE	1986	33	0	5		5	30	20	20	20	13.2	43	2029	$435,000.00	16	
140	OIL PUMP CENTRIFUGE	1986	33	0	5		5	30	20	20	20	13.2	43	2029		16	
145	AIR COMPRESSOR	1986	33	50	4	2	4	20	12	12	12	13.2	33	2019	$4,000.00	9	Tanks poor
146	AIR COMPRESSOR	1986	33	50	4	2	4	20	12	12	12	13.2	33	2019	$4,000.00	9	Tanks poor
149	SLUDGE PRESS CONVEYOR	1986	33	25	3	2	3	30	10.5	11	11	13.2	43	2029	$52,000.00	12	
150	CONVEYOR VIBRATOR	1986	33	25	3	3	3	30	10.5	11	11	13.2	43	2029		6	
155	OVERHEAD CRANE & TROLLY	1986	33	10	5	2	5	50	19	19	19	13.2	63	2049	$20,000.00	14	
163	OVERHEAD OPERATOR UNIT and DOOR	1986	33	15	4	3	4	25	14.8	15	15	13.2	38	2024	$4,000.00	14	
178	FERRIC PUMP	1986	33	40	3	3	3	20	9.6	10	10	13.2	33	2019	$5,000.00	8	
179	FERRIC PUMP	2016	3	40	4	4	4	20	12.8	13	13	1.2	21	2037	$5,000.00	8	
293	Lime Silo and Make up	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$750,000.00	6	
298	MAKE-UP AIR UNIT-EAST (MUA4-2)	1986	33	10	3	2	3	18	11.4	11	11	13.2	31	2017	$25,000.00	10	
299	MAKE-UP AIR UNIT-WEST (MUA4-1)	1986	33	10	3	2	3	18	11.4	11	11	13.2	31	2017	$25,000.00	10	
302	SLUDGE CONDITIONING MIXER TANK #1	1986	33	50	3	3	3	30	9	9	9	0.0	30	2016	$8,000.00	8	
303	SLUDGE CONDITIONING MIXER TANK #2	1986	33	50	3	3	3	30	9	9	9	0.0	30	2016	$8,000.00	8	
305	REACTION TANK #1 LIGHTING MIXER	1993	26	50	2	3	3	15	7.5	8	8	7.8	23	2016	$8,000.00	8	
306	REACTION TANK #2 LIGHTING MIXER	2005	14	50	4	3	3	15	10.5	11	11	5.6	21	2026	$8,000.00	8	
313	PRESS ODOR CONTROL UNIT Press - 44,000 CFM	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019	$850,000.00	9	
322	PRESS BLOWER/FAN UNIT- A	1986	33	50	3	3	3	30	9	9	9	0.0	30	2016	$1,900.00	10	
323	PRESS BLOWER/FAN UNIT- B	1986	33	50	3	3	3	30	9	9	9	0.0	30	2016	$1,900.00	10	
324	PRESS OC UNIT BRINE TANK MIXER (PRESS)	1986	33	5	3	2	3	30	11.7	12	12	13.2	43	2029	$1,200.00	10	
325	PRESS OC UNIT CELL RECYCLE PUMP A	1986	33	50	3	2	3	30	9	9	9	0.0	30	2016	$1,600.00	9	
326	PRESS OC UNIT CELL RECYCLE PUMP B	1986	33	50	3	2	3	30	9	9	9	0.0	30	2016	$1,600.00	9	
327	PRESS OC UNIT TOWER RECYCLE PUMP	1986	33	50	3	2	3	30	9	9	9	0.0	30	2016	$2,000.00	9	
328	PRESS OC UNIT TOWER RECYCLE PUMP	1986	33	50	3	2	3	30	9	9	9	0.0	30	2016	$2,000.00	9	
387	SLUDGE PRESS 1	1986	33	50	4	1	4	30	12	12	12	13.2	43	2029	$400,000.00	8	
388	SLUDGE PRESS 2	1986	33	50	4	3	4	30	12	12	12	13.2	43	2029	$400,000.00	8	
169	E.B. TANK RECIRC. PUMP 1	1986	33	5	4	2	4	30	15.6	16	16	13.2	43	2029	$50,000.00	10	
170	E.B. TANK RECIRC. PUMP 2	1986	33	5	4	2	4	30	15.6	16	16	13.2	43	2029	$50,000.00	10	
171	E.B. TANK RECIRC. PUMP 3	1986	33	5	4	2	4	30	15.6	16	16	13.2	43	2029	$50,000.00	10	
172	E.B. TANK RECIRC. PUMP 4	1986	33	5	4	2	4	30	15.6	16	16	13.2	43	2029	$50,000.00	10	
	PRESS/SLUDGE STORAGE/COLLECTION BUILDING	1986	33	100	4	3	4	50	8	8	8	9.9	60	2046		12	
	EQ BASIN TANK	1986	33	100	5	4	5	50	10	10	10	13.2	63	2049		12	
	Hot Water Unit Heater (Horizontal -UH4-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$2,000.00	11	
	Hot Water Unit Heater (Horizontal -UH4-4)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$2,000.00	11	
	Hot Water Unit Heater (Vertical -UH4-2)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$2,000.00	11	
	Hot Water Unit Heater (Vertical -UH4-1)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$2,000.00	11	
	Concrete Foundation walls	1986	33	100	4	4	4	70	8	8	8	9.9	80	2066		12	
	Metal Panel Siding	1986	33	100	3	3	3	40	6	6	6	3.3	43	2029		8	
	Roof	1986	33	100	3	2	3	35	6	6	6	3.3	38	2024		4	
	Hollow Metal Doors	1986	33	100	3	3	3	30	6	6	6	3.3	33	2019		13	
	Gutters and Downspouts	1986	33	100	0	0	0	30	0	0	0	9.9	20	2006		5	
	EB Pump Crane					2											
	Acid Tank					2											Cracked
	Mix Header					3											Support brackets poor
	Valves					3									$300,000.00		
	Pipe					3									$500,000.00		
	Flowmeters					3									$64,000.00		
	Electrical					2									240000		
	Subtotal														$4,485,200.00		

	General Conditions (10%)													$448,520.00	
	Contingency (30%)													$1,345,560.00	
	Total													$6,279,280.00	
Chemical Feed and Storage															
	5500 gal Chemical Storage Tank				3									$ 15,000.00	
	5500 gal Chemical Storage Tank				3									$ 15,000.00	
	2750 Chemical Storage Tank				3									$ 10,000.00	
	2750 Chemical Storage Tank				3									$ 10,000.00	
	Chemical Day Tank				3									$ 5,000.00	
	Chemical Transfer Pump				3									$ 3,000.00	
	Chemical Transfer Pump				3									$ 3,000.00	
	Chemical Transfer Pump				3									$ 3,000.00	
	Chemical Feed Pump				3									$ 2,000.00	
	Chemical Feed Pump				3									$ 2,000.00	
	Chemical Feed Pump				3									$ 2,000.00	
	Chemical Feed Pump				3									$ 2,000.00	
	Concrete Stairs and Landings	1972	47	100	3	3	4	45	7	7	7	9.4	54	2026	11
	Aluminum Railings	1972	47	100	4	4	4	30	8	8	8	14.1	44	2016	8
	Exterior Brick Masonry	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056	12
	Exterior Sealants	1972	47	100	1	1	0	10	1	1	1	14.1	-4	1968	5
	Steel Lintels	1972	47	100	3	3	3	35	6	6	6	4.7	40	2012	12
	Concrete Soffit Panels	1972	47	100	4	4	4	60	8	8	8	14.1	74	2046	7
	Loading Dock and Bumpers	1972	47	100	4	4	4	50	8	8	8	14.1	64	2036	7
	Exterior Doors	1972	47	100	3	3	3	30	6	6	6	4.7	35	2007	11
	Roof					2									
253	Hot water unit heater (horizontal flow)	1985	34	50	2	2	3	20	7.5	8	8	10.2	30	2015	$ 1,000.00	8
252	Hot water unit heater (vertical flow)	1985	34	50	2	2	3	20	7.5	8	8	10.2	30	2015	$ 1,000.00	8
426	Propeller Exhaust Fan	1985	34	50	3	3	3	15	9	9	9	0.0	15	2000	$ 1,500.00	11
	Electrical and Controls					2									
Vehicle Maintenance															
	MAKE-UP AIR UNIT- (MUA4-3)	1986	33	50	3	3	3	18	9	9	9	0.0	18	2004	$ 25,000.00	5
198	Furnace	2012	7	50	4	4	4	18	12	12	12	2.8	21	2033	$ 3,000.00	5
471	Gas Water Heater	1986	33	100	2	2	2	25	4	4	4	3.3	22	2008	$ 2,000.00	5
	PTAC Unit	1986	33	50	2	2	2	10	6	6	6	3.3	13	1999	$ 1,000.00	5
Maintenance															
	Maintenance Building Structure	1986	33	100	4		4	50	8	8	8	9.9	60	2046		12
153	OVERHEAD CRANE & TROLLY	1986	33	5	4		4	50	15.6	16	16	13.2	63	2049	$16,000.00	14
	Welder ARC	1986	33	5	5		5	30	19.5	20	20	13.2	43	2029	$5,000.00	14
	Welder wire	1996	23	5	5		5	30	19.5	20	20	9.2	39	2035	$6,000.00	14
	Sandblaster	1986	33	5	4		4	30	15.6	16	16	13.2	43	2029	$3,000.00	14
	Wash sink	1986	33	20	5		5	30	18	18	18	13.2	43	2029	$5,000.00	14
	Work Benches & Cabinets	1986	33	100	4		4	30	8	8	8	9.9	40	2026	$10,000.00	16
	Metal band saw	1986	33	100	3		3	30	6	6	6	3.3	33	2019	$2,000.00	14
271	Hot Water Unit Heater (UH7-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
270	Hot Water Unit Heater (UH7-2)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
269	Hot Water Unit Heater (UH7-1)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11
439	Welding Fume Exhaust Fan	1986	33	20	3	3	3	20	10.8	11	11	13.2	33	2019	$1,000.00	11
267	Hot Water Unit Heater (UH7-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11

	1.5 kW (6 gal) Electric Domestic Water Heater	2013	6	50	4	4	4	15	12	12	12	2.4	17	2030	$1,000.00	16	
268	Hot Water Unit Heater (UH7-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11	
	Hot Water Unit Heater (UH7-3)	1986	33	50	3	3	3	20	9	9	9	0.0	20	2006	$1,000.00	11	
	9 gpm circulation pump	1986	33	50	3	3	3	10	9	9	9	0.0	10	1996	$500.00	11	
	9 gpm circulation pump	1986	33	50	3	3	3	10	9	9	9	0.0	10	1996	$500.00	11	
	Exterior Brick Masonry	1986	33	100	4	4	4	70	8	8	8	9.9	80	2066		12	
	Exterior Sealants	1986	33	100	1	1	1	15	2	2	2	9.9	5	1991		5	
	Steel Lintels	1986	33	100	4	4	4	35	8	8	8	9.9	45	2031		12	
	Concrete Soffit Panels	1986	33	100	4	4	4	60	8	8	8	9.9	70	2056		7	
	Exterior Doors	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019		11	Rotted
	Aluminum Windows	1986	33	100	3	2	3	30	6	6	6	3.3	33	2019		11	Rotted
Laboratory, Control and Operations Building																	
103	AIR CONDITIONING AIR HANDLER ~~CONDENS~~	1986	33	100	3	1	4	20	7	7	7	6.6	27	2013	$20,000.00	10	Uses R-22 refrigerant (obsolete
104	AIR CONDITIONING CONDENSER	1986	33	100	3	1	4	20	7	7	7	6.6	27	2013	$10,000.00	10	Uses R-22 refrigerant (obsolete
510	Condensing unit Hall/Breakroom AC	1999	20	100	3	1	4	20	7	7	7	4.0	24	2023	$10,000.00	10	Uses R-22 refrigerant (obsolete
110	COMPRESSED AIR DRYER1	1986	33	100	3	3	4	30	7	7	7	6.6	37	2023	$5,000.00	10	When AC unit is replaced remo
112	Air Conditioner Hall/Breakroom	1999	20	100	3	3	4	20	7	7	7	4.0	24	2023	$10,000.00	10	Uses R-22 refrigerant (obsolete
154	OVERHEAD CRANE & TROLLY	1986	33	5	4		4	50	15.6	16	16	13.2	63	2049	$16,000.00	14	
162	OVERHEAD OPERATOR UNIT	1986	33	100	2		3	30	5	5	5	0.0	30	2016	$600.00	14	
195	FUME HOOD EXHAUST FAN 2	1986	33	20	4	4	4	25	14.4	14	14	13.2	38	2024	$400.00	12	
196	FUME HOOD EXHAUST FAN 3	1986	33	20	4	4	4	25	14.4	14	14	13.2	38	2024	$400.00	12	
197	FUME HOOD EXHAUST FAN 4	1986	33	20	4	4	4	25	14.4	14	14	13.2	38	2024	$400.00	12	
272	HYDRONIC UNIT HEATER (Receiving)	1972	47	20	2	2	2	20	7.2	7	7	9.4	29	2001	$1,500.00	10	Non-code compliant wiring
284	HVAC UNIT ADMIN #1	1986	33	100	3	1	3	20	6	6	6	3.3	23	2009	$12,000.00	12	
300	MAKE-UP AIR UNIT-Mech RM	1986	33	20	3	1	3	18	10.8	11	11	13.2	31	2017	$30,000.00	12	Unit no longer in use as a heati
413	VACUUM PUMP-Mech RM	1986	33	5	5	3	5	30	19.5	20	20	13.2	43	2029	$2,500.00	16	No longer needed.
469	ELEC WATER HEATER	2010	9	100	4	4	4	15	8	8	8	2.7	18	2028	$1,500.00	10	
512	Admin Generator	2003	16	20	5	5	5	30	18	18	18	6.4	36	2039	$125,000.00	10	
526	Air conditioner #4	2004	15	100	1	1	1	20	2	2	2	4.5	16	2020	$2,000.00	8	nonfunctional and redundant
527	Air Conditioner #5	2011	8	100	4	4	4	20	8	8	8	2.4	22	2033	$2,000.00	10	
	Hydronic heating piping	1969	50	50	1	1	2	30	4.5	5	5	0.0	30	1999	$100,000.00	5	Recommend complete replacer
	Heating water circulation pump (P5-3)	1969	50	50	2	2	3	20	7.5	8	8	15.0	35	2004	$1,000.00	5	Recommend complete replacer
	Heating water circulation pump (P5-4)	1969	50	50	2	2	3	20	7.5	8	8	15.0	35	2004	$1,000.00	5	Recommend complete replacer
	Heating water circulation pump (P5-1)	1986	33	50	2	2	3	20	7.5	8	8	9.9	30	2016	$1,000.00	5	Recommend complete replacer
	Heating water circulation pump (P5-2)	1986	33	50	2	2	3	20	7.5	8	8	9.9	30	2016	$1,000.00	5	Recommend complete replacer
	fin-tube baseboard heating	1986	32	50	3	2	3	20	9	9	9	0.0	20	2006	$100/foot	5	Recommend complete replacer
	Flooring Vinyl and carpet	1986	33	100	3		3	20	6	6	6	3.3	23	2009	$40,000.00	14	
	Laboratory Counters-Black	1986	33	100	3		3	30	6	6	6	3.3	33	2019	$20,000.00	14	
	Laboratory Counters-Brown	1972	47	100	2		3	30	5	5	5	0.0	30	2002	$20,000.00	14	
	Exterior Brick Masonry	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		12	South wall has gap with interio
	Concrete Soffit Panels	1972	47	100	4	4	4	60	8	8	8	14.1	74	2046		7	
	Aluminum Frame Windows	1972	47	100	3	3	4	40	7	7	7	9.4	49	2021		11	
	Exterior Sealants	1972	47	100	1	1	0	10	1	1	1	14.1	-4	1968		5	
	Concrete Foundation Walls	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		12	
	Wood Egress Stairs	1972	47	100	3	3	3	10	6	6	6	4.7	15	1987		8	
	Metal Panel Siding	1972	47	100	4	4	4	60	8	8	8	14.1	74	2046		11	
	Aluminum and Hollow Metal Exterior Doors	1972	47	100	4	4	4	35	8	8	8	14.1	49	2021		11	
	Gutters and Downspouts	1972	47	100	2	2	2	20	4	4	4	4.7	15	1987		5	
	Loading Dock and Dock Bumpers	1972	47	100	2	2	3	50	5	5	5	0.0	50	2022		7	
	Roof					2											
	Floor Drains					2											
Misc.																	
	Parking lot Asphalt Upper	1996	23	100	2		3	30	5	5	5	0.0	30	2026	$80,000.00	12	

	Parking lot Asphalt Lower				3											
	Plant Drain Lift Station	2009	10	100	5		3	30	8	8	8	3.0	33	2042		10	
	Foam Roofing insulation and coatings	2010	9	100	3		3	20	6	6	6	0.9	21	2031	$240,000.00	9	
	Salt Building Structure	1986	33	100	4		4	50	8	8	8	9.9	60	2046			
	Salt O.C. Unit	1986	33	100	4		4	25	8	8	8	9.9	35	2021		12	
Odor Control Building (Ductwork Connected to Upper Grit Building Primary Clarifiers)																	
	5kW "Dayton" Electric Unit Heater	1990	29	100	3	3	2	13	5	5	5	0.0	13	2003	$ 1,000.00	11	Age is approximate
260	"Trane" Electric Unit Heater	1990	29	100	3	3	2	13	5	5	5	0.0	13	2003	$ 1,000.00	11	Age is approximate
Metal Storage Building																	
	Asphalt Shingles	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		7	
	T1-11 Siding	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009		11	
	Drip Edge / Wood Trim	1986	33	100	3	3	4	20	7	7	7	6.6	27	2013		15	
	Roll-up door	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009		5	
	Roll-up door trim / framing	1986	33	100	2	2	2	20	4	4	4	3.3	17	2003		5	
Raw Sewage Pumping																	
	Concrete Stairs	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		12	
	Concrete Slabs	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		6	
	Concrete Walls	1972	47	100	3	3	4	70	7	7	7	9.4	79	2051		6	
	Steel Framing	1972	47	100	3	3	4	50	7	7	7	9.4	59	2031		3	
Site Paving, Sidewalks, Curbing																	
	Asphalt Paving	1972	47	100	4	4	4	25	8	8	8	14.1	39	2011		12	
	Concrete Sidewalks	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		6	
	Concrete Curbs	1972	47	100	4	4	4	70	8	8	8	14.1	84	2056		6	
Misc. Wood Storage Building (upper level, NW area of site)																	
	Asphalt Shingles	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		7	
	T1-11 Siding	1986	33	100	3	3	3	20	6	6	6	3.3	23	2009		11	
	Drip Edge / Wood Trim	1986	33	100	3	3	4	20	7	7	7	6.6	27	2013		15	
	Man Door and/or Roll-up Door	1986	33	100	4	4	4	20	8	8	8	9.9	30	2016		5	
	Corner trim	1986	33	100	2	2	2	20	4	4	4	3.3	17	2003		10	
Misc Masonry Building (upper level, NW are of site)																	
	Exterior Brick Masonry	1986	33	100	4	4	3	70	7	7	7	6.6	77	2063		12	
	Exterior Sealants	1986	33	100	2	2	0	10	2	2	2	9.9	0	1986		5	
	Steel Lintels	1986	33	100	3	3	4	35	7	7	7	6.6	42	2028		12	
	Concrete Soffit Panels	1986	33	100	4	4	4	60	8	8	8	9.9	70	2056		7	
	Exterior Doors	1986	33	100	3	3	4	30	7	7	7	6.6	37	2023		11	
Waste Sludge Storage (North) Top Concrete Slab		1986	33	100	4	4	4	50	8	8	8	9.9	60	2046		11	
Waste Sludge Storage (South) Top Concrete Slab		1986	33	100	4	4	4	50	8	8	8	9.9	60	2046		11	
Oxidation Tower (North) Structure		1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		11	Exterior Conc Wall 2009
Oxidation Tower (South) Structure		1972	47	100	4	4	4	50	8	8	8	14.1	64	2036		11	Exterior Conc Wall 2009
Yard Piping																	
	Boiler Supply Lines																Have Leaks
	Eff Water Piping																Buired Galvanized Pipe

APPENDIX D: USEFUL LIFE CALCULATION

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 **Telephone: (517) 316-3930 FAX: (517) 484-8140**

PROJECT: Delta Township SRF Project Plan **DATE:** 6/5/2019

LOCATION: **PROJECT NO.** 200-214200-18001

BASIS FOR ESTIMATE: [ ] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL **ESTIMATOR:**

WORK: Alternative B Phases I and II Capital Cost Summary **CHECKED BY:**

CURRENT ENI 11268

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1					
2	Phase I				
3	Influent Electrical, SCADA, and Generator				$4,104,000.00
4	Influent Raw Pumping and Headworks				$9,462,000.00
5	Aeration System with Blower, RAS, Chemical Building				$15,349,000.00
6	Three, 100-foot diameter Final Clarifiers				$6,262,500.00
7	Subtotal				$35,177,500.00
8					
9	Phase II				
10	Primary Clarifier Mehanism Replacement				$2,790,000.00
11	Tertairy Filtration				$9,677,000.00
12	UV Disinfection				$4,913,000.00
13	Dewatering Scre Press				$4,684,000.00
14	Digester Rehabilitation				$5,584,000.00
15	Third Digester Tank				$2,106,000.00
16	Thickening				$2,234,000.00
17	Laboratory, Control and Operations Building				$3,808,000.00
18	Subtotal				$35,796,000.00
19					
20					
21					
22					
TOTAL CONSTRUCTION COST					**$70,973,500.00**

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township, MI SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, MI	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative B	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative B Phase I

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$5,117,000	50	$5,117,000	$2,892,000	$2,225,000
Structures	$8,541,000	50	$8,541,000	$4,827,000	$3,714,000
Mechanical	$3,936,500	20	$3,936,500	$0	$3,936,500
Electrical/Other	$6,824,000	20	$6,824,000	$0	$6,824,000
Engineering	$3,770,000	20	$3,770,000	$0	$3,770,000
Contingencies	$6,989,000	20	$6,989,000	$0	$6,989,000
Total Capital Cost	$35,177,500			Total	$27,458,500

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$236,494	$4,585,000
	Total	$4,585,000

Net Present Worth	$32,043,500
Weighted Useful Life (years)	31.65

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

OPINION OF PROBABLE CONSTRUCTION COST

TETRA TECH

401 South Washington Square, Suite 100, Lansing, MI 48933 Telephone: (517) 316-3930 FAX: (517) 484-8140

PROJECT:	Delta Township, MI SRF Project Plan	DATE:	3/12/2020
LOCATION:	Delta Township, MI	PROJECT NO.	200-214200-18001
BASIS FOR ESTIMATE:	[X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL	ESTIMATOR:	KMT
WORK:	Alternative B	CHECKED BY:	
	WWTP Improvements	CURRENT ENR:	10823

Design Summary

Alternative B Phase II

Construction and Equipment Costs Summary

	Total Project Costs	Service Life	Present Worth of Capital Investments	Salvage Value at End of Planning Period (NPW)	Net Present Worth (Cost)
Civil/Site Work/Piping	$3,528,000	50	$3,528,000	$1,994,000	$1,534,000
Structures	$7,758,000	50	$7,758,000	$4,385,000	$3,373,000
Mechanical	$10,251,000	20	$10,251,000	$0	$10,251,000
Electrical/Other	$4,005,000	20	$4,005,000	$0	$4,005,000
Engineering	$3,837,000	20	$3,837,000	$0	$3,837,000
Contingencies	$6,417,000	20	$6,417,000	$0	$6,417,000
Total Capital Cost	$35,796,000			Total	$29,417,000

Annual Costs (O&M) Summary

Type	Annual Cost	Net Present Worth of O&M
O&M	$236,494	$4,585,000
	Total	$4,585,000

Net Present Worth	$34,002,000
Weighted Useful Life (years)	29.46

Assumptions:

Present Worth Factor Salvage Value	0.941849127
Present Worth Factor O&M	19.38362432
Discount Rate (%)	0.3
Planning Period (years)	20

Weighted Useful Life = ((Item Cost A * Service Life A)+(Item Cost B * Service Life B) + (etc.)) / (Total Capital Cost)

APPENDIX E: PUBLIC HEARING DOCUMENTS

Virtual Public Information Meeting

Wednesday, June 10 at 6:00 p.m.

To participate visit https://zoom.us/

Meeting ID: 832 5520 5313 **Password**: 963871

Virtual Public Hearing

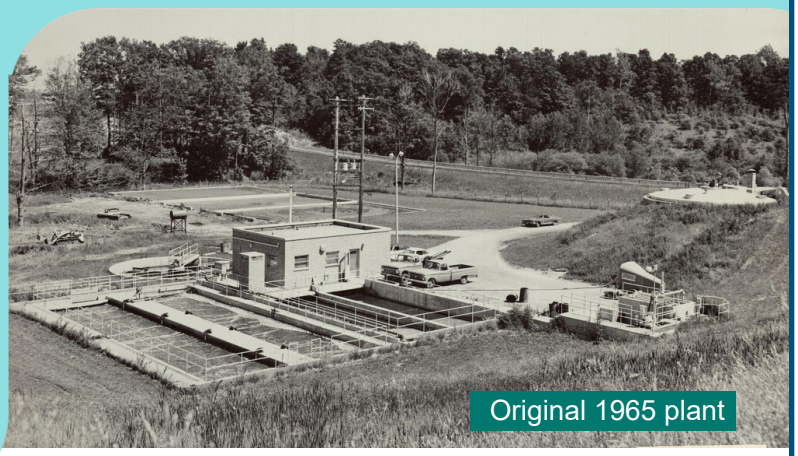
Wednesday, June 24 at 6:00 p.m.

To participate visit https://zoom.us/

Meeting ID: 822 1926 5511 **Password**: 414679

Dial-by-Phone Options below:

+1 312 626 6799 | +1 646 876 9923 | +1408 638 0968
+1 669 900 6833 | +1 253 215 8782 | +1 301 715 8592
International numbers available at **https://zoom.us**



Original 1965 plant

For the hearing impaired, please call 711 to access the FCCs phone relaying service and provide one of the U.S. numbers listed.

If you need assistance connecting, please contact IT Director David Marquette at dmarquette@deltami.gov.

In addition to the public hearing, residents may comment **in writing** on the project prior to July 1, 2020 in one of three ways, by email at WWTPProject@deltami.gov, by mail at 7710 West Saginaw Hwy., Lansing, Michigan 48917 or by hand delivery in the drop box located on the north side of the Township Hall at 7710 West Saginaw Hwy., Lansing, MI 48917.

Wastewater Treatment Plant (WWTP)

Major Capital Improvements

Public Discussion

Why is this major capital improvement project necessary?

1). **The plant is at the end of its useful life**

Delta Township's WWTP was constructed 55 years ago, with expansions in 1972 and 1986, which means the newest equipment is 34 years old. The equipment and structures are worn out and the plant is experiencing frequent and costly equipment failures.

2). **The plant needs new equipment to meet future water quality requirements**

While the plant has historically met or surpassed required treatment standards, in 2019 the Michigan Department of Environment, Great Lakes and Energy (EGLE) added tougher treatment standards to our discharge permit in an effort to improve water quality in the Grand River. This requires a new treatment process that the existing plant does not have.

3). **The plant is nearing capacity**

With approximately 10,300 residential, commercial, and industrial customers, including the State Secondary Complex and General Motors, the plant currently treats almost 5 million gallons of raw sewage per day, which is over 80% of its design capacity. A modest increase in capacity will allow for continued growth in the Township.

What are the proposed improvements?

Two main alternatives (A & B) are being considered to address the issues. After identifying the large cost, construction difficulty, and inefficient operation of the plant associated with repairing and retrofitting the plant, Delta Township's project team developed a plan to reconstruct the plant on the same site. Reconstruction was found to be more cost effective to both build and operate and is anticipated to use 34% less energy than repairing and retrofitting the plant.

Alternative A:
Repairing and retrofitting the existing outdated plant by expanding capacity and inserting a new treatment process creates an inefficient and costly design.

Alternative B:
Reconstructing a new plant with additional treatment capability and capacity provides improved efficiency and is more cost effective to construct.

DELTA TOWNSHIP

View the 2020 DRAFT State Revolving Fund (SRF) Project Plan at:
www.deltami.gov/2020DraftSRF

The project will be constructed in phases. The first phase is planned for construction in 2022 and a second phase will immediately follow in 2024. The first two phases will allow the WWTP to meet tougher discharge limits that take effect in 2027.

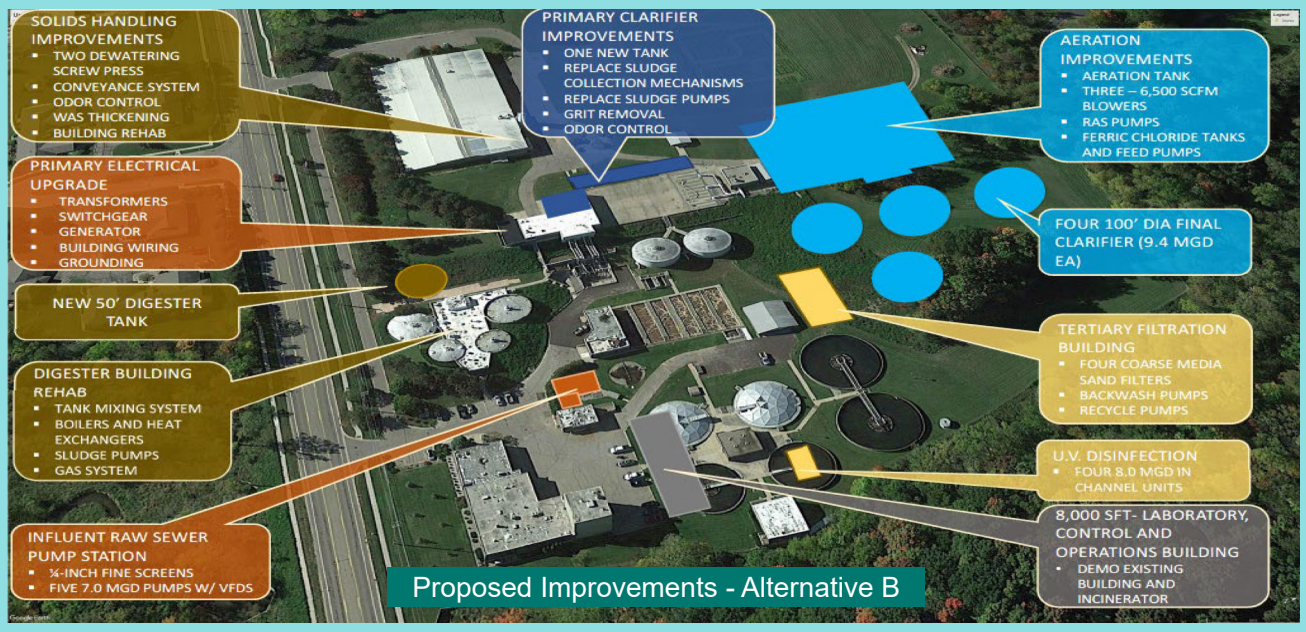
All work will occur at the existing WWTP on Willow Highway, inside the existing fenced WWTP site. No offsite work or expansion of the current plant boundary is anticipated.


Current Plant

What Will It Cost and How Will the Township Pay For It?

The total cost of all necessary improvements is estimated at approximately $78 million and the project will be constructed in multiple phases. The Township is planning to apply for low interest loans (est. 2 - 2.5%) from the Clean Water State Revolving Fund (SRF) to finance construction of the WWTP improvements.

The Township is pursuing principal forgiveness funds that are available for energy efficient "green" infrastructure that is offered through the SRF program.



Proposed Improvements - Alternative B

The loans would be repaid over 20-years with revenue collected from sewer bills. In order to have sufficient revenue to repay the loans and continue to fund operation of the sewer collection and treatment system, sewer rates are expected to increase. Currently, a typical residential sewer customer bill is $27.50 per month, which is one of the lowest rates in the greater Lansing region. The Township is in the process of conducting a professional rate study, which will guide the Township in rate setting in the future. However, as part of the SRF funding application process, the Township is required to develop an initial estimate of the impact of the proposed project on sewer rates. The Township's initial estimate is that rates will need to increase by an average of 6% per year over 6 years. At the end of that six-year period the estimated residential monthly bill will have increased by approximately $10 a month.. There are many variables associated with this estimate and actual rates may vary from this estimate. Even at this level, however, Delta Township's sewer rates would remain competitive within the region.

Because the project will be constructed within the current fenced in boundary of the WWTP, it is not expected to have any significant negative environmental or social impacts. An overall improvement to energy efficiency and increased level of treatment prior to discharging to the Grand River are significant positive environmental impacts.

For more information or for questions, please contact the Delta Township Engineering Department at 517-323-8540.

DELTA TOWNSHIP

AFFIDAVIT OF PUBLICATION
LSJ MEDIA
300 S. Washington Square, Suite 300, Lansing, MI 48933

State of Michigan, County of Macomb } *ss*

IN THE MATTER OF: ORDINANCE-DWCN/GLI4200694

DELTA CHARTER TOWNSHIP

DELTA CHARTER TOWNSHIP
7710 W SAGINAW HWY

LANSING, MI 48917

Being duly sworn, says that he/she is authorized by the publisher of Delta-Waverly Commty News, to swear that a certain notice, a copy of which is annexed here to, was published in the following publication:

1. Published in the English language for the dissemination of general and/or legal news, and
2. Has a bonfide list of paying customers or has been published at least once a week in the same community without interruption for at least 2 years, and
3. Has been established, published and circulated at least once a week without interruption for at least one (1) year in the community where the publication is to occur.

Delta-Waverly Commty News, 05/24/20

Susan Totoraitis

SUBSCRIBED AND SWORN TO BEFORE ME THIS 26th DAY OF May, 2020

GINA ANNE HUFF
Notary Public State of Michigan
County of Livingston
My commission expires March 9, 2023

Acting in the County of Macomb

0004200694, LSJ-L03477

LSJ-LSJ-Delta-Waverly Commty News

DELTA CHARTER TOWNSHIP
7710 W. Saginaw Highway
Lansing, Michigan 48917
517-323-8500

NOTICE OF PROJECT PLAN PUBLIC HEARING

Delta Township will hold a virtual public hearing on the proposed 2020 State Revolving Fund (SRF) Project Plan for the Wastewater Treatment Plant (WWTP) Major Capital improvements project for the purpose of receiving comments from interested persons.

The hearing will be held at 6:00 p.m. on Wednesday, June 24, 2020 by video/telephone conference.

To participate in the hearing by video, visit https://zoom.us/ and use Meeting ID: 822 1926 5511 and Meeting Password: 414679.

To participate in the hearing by phone, use one of the phone numbers below.

1 (312) 626-6799 or 1 (646) 876-9923 or 1 (408) 638-0968 or 1 (669) 900-6833 or 1 (253) 215-8782 or 1 (301) 715-8592

For the hearing impaired, please call 711 to access the FCCs phone relaying service and provide one of the U.S. numbers listed above.

If you need assistance connecting, please contact IT Director David Marquette at dmarquette@deltami.gov.

The purpose of the proposed project is to make major capital improvements to the Delta Township WWTP, located at 7000 West Willow Highway, Lansing, Michigan. Major capital improvements are required to address failing infrastructure that is in excess of 30-years old, add a tertiary treatment process that is required to meet new discharge limits required by the Michigan Department of Environment, Great Lakes and Energy (EGLE) and to expand treatment capacity to accommodate continued development within the Township.

Project construction will involve all treatment processes at the WWTP. The improvements will be constructed in multiple phases. The SRF Project Plan will encompass the improvements identified as Phases I and II of the project. Phase I would include improvements to the plant electrical and control system, raw sewage pumping, primary treatment, and secondary treatment systems. Phase II would include primary clarifier equipment replacement, tertiary treatment, disinfection, sludge thickening, sludge digestion and sludge dewatering systems and a new laboratory, control and operations building. Construction of Phases I and II is planned to begin in 2022 and be completed by the end of 2026. Construction activities will be confined within the existing WWTP boundary fence.

Beneficial impacts of the proposed improvements include improved plant discharge and receiving stream quality, improved energy efficiency and plant reliability. Adverse impacts are all short term, including temporary disturbance of the surrounding areas due to construction activities such as earth disturbance, dust, and noise. Some tree removals within existing WWTP boundary fence are required to accommodate the new construction. Some work will occur within the floodplain of the Carrier Creek but will not negatively affect the floodplain. There are no expected, long-term, negative impacts from the improvements.

Currently, a typical residential sewer customer bill is $27.50 per month, which is one of the lowest rates in the greater Lansing region. The Township is in the process of conducting a professional rate study, which will guide the Township in rate setting in the future. However, as part of the SRF funding application process, the Township is required to develop an initial estimate of the impact of the proposed project on sewer rates. Our initial estimate is that rates will need to increase to $37.50 per month over a 6-year period. There are many variables associated with this estimate and actual rates may vary from this estimate. Even at this level, however, Delta Township's sewer rates would remain competitive within the region.

An electronic copy of the plan detailing the proposed project is available at the following link: www.deltami.gov/2020DraftSRF. Persons wishing to view a printed copy of the document may contact the Delta Township Engineering Department at 517-323-8540.

In addition to the public hearing, residents may comment on the project to the Delta Township Engineering Department, **in writing**, prior to July 1, 2020. Comments can be submitted in one of three ways, by email to WWTPProject@deltami.gov, by mail to 7710 West Saginaw Hwy., Lansing, Michigan 48917 or by hand delivery in the township drop box located on the north side of the Township Hall, which is located at 7710 West Saginaw Hwy., Lansing, MI 48917. Written comments received prior to the close of the public comment period will receive responses in final project plan.

CHARTER TOWNSHIP OF DELTA
MARY R. CLARK, TOWNSHIP CLERK

DWCN/GLI-4200694 05/24/2020

DELTA CHARTER TOWNSHIP
7710 W. Saginaw Highway
Lansing, Michigan 48917
517-323-8500

304.11
INTRODUCTION TO PROPOSED ZONING ORDINANCE AMENDMENT
601 North Waverly Rezoning Request
Case No. 3-20-1

The Delta Township Board of Trustees will consider adoption of this Ordinance at its regular meeting scheduled for 6:00 PM on Monday, June 1, 2020.

The following Ordinance was introduced by the Board of Trustees at its regular meeting held on Monday, May 18, 2020.

AN ORDINANCE TO AMEND THE ZONING ORDINANCE AND ZONING MAP AT DELTA CHARTER TOWNSHIP PROPERTY:

SECTION 1: That the Delta Charter Township Zoning Ordinance be amended and that the zoning district map be changed to indicate a change in zoning from O, Office, to C-Commercial, on the following described parcel:

The following described property is located approximately 0.1 Mile south of the intersection of W. Saginaw Highway/N. Waverly Road; in Section 13 of Delta Township.

The East 375 Feet of Lot 11. Parkview Acres Plat. T4N, R3W, Delta Township, Eaton County, MI

SECTION 2: Severability Provision.

If any section, paragraph, clause, or part of this Charter Township of Delta Ordinance, is for any reason held invalid by any court of competent jurisdiction, or any agency, department, or commission empowered for such purpose, such decision shall not affect the validity of the remaining provisions of any ordinance of Delta Charter Township; and the application of those provisions to any person or circumstances shall not be effected thereby.

SECTION 3: Repealer Provision.

All ordinances or parts of ordinances of the Charter Township of Delta inconsistent herein are hereby repealed so far as they may be inconsistent with the provisions of this Ordinance.

SECTION 4: Effective Date Provision.

Said ordinance shall become effective upon the date of final publication.

CHARTER TOWNSHIP OF DELTA
MARY R. CLARK, TOWNSHIP CLERK

Copies of this ordinance may be inspected in the office of the Township Clerk from 8:00 AM to 5:00 PM, Monday through Friday except holidays.
DWCN/GLI-4200647 05/24/2020

CHARTER TOWNSHIP OF DELTA
7710 W. Saginaw Highway
Lansing, Michigan 48917
(517) 323-8500

TOWNSHIP BOARD
Synopsis of Meetings

MONDAY, MAY 4, 2020 – REGULAR BOARD MEETING
Supervisor Fletcher called the meeting to order at 6:00 P.M. Supervisor Kenneth Fletcher, Clerk Mary R. Clark, Treasurer Howard A. Pizzo, Trustee Fonda Brewer, Trustee Andrea M. Cascarilla, Trustee Dennis R. Fedewa and Trustee Karen J. Mojica. Others Present: Manager Brian T. Reed, Lt. Ross Tyrell, Assistant Township Manager Alannah Doak, Parks/Recreation/Cemetery Director Marcus Kirkpatrick, Fire Chief Greg Ginebaugh, Finance Director Jeff Anderson, Planning Director Gary Bozek, Technology Director Dave Marquette, Township Engineer Ernie West, Utilities Director Rick Kane

PRESENTATIONS AND PROCLAMATIONS

PUBLIC HEARINGS

COMMUNICATIONS

PUBLIC COMMENTS

INTRODUCTION OF ORDINANCES

PASSAGE OF ORDINANCES

CONSENT AGENDA
1. Bills and Financial Transactions - $1,913,270.32
2. Minutes- April 13, 2020 – Regular Digital Board Meeting Minutes

ITEMS OF BUSINESS
3. Wastewater Treatment Plant Major Capital Improvements – State Revolving Fund Project Plan

MANAGER'S REPORT

COMMITTEE OF THE WHOLE

Meeting adjourned at 7:44 p.m.

MONDAY, MAY 11, 2020 – COMMITTEE OF THE WHOLE MEETING - CANCELLED

MONDAY, MAY 18, 2020 – REGULAR BOARD MEETING
Supervisor Kenneth R. Fletcher, Treasurer Howard A. Pizzo, Clerk Mary R. Clark, Trustee Andrea M. Cascarilla, Trustee Fonda J. Brewer, Trustee Dennis R. Fedewa, and Trustee Karen J. Mojica Others Present: Manager Brian T. Reed, Assistant Township Manager Alannah Doak, Parks/Recreation/Cemetery Director Marcus Kirkpatrick, Finance Director Jeff Anderson, Planning Director Gary Bozek, Technology Director Dave Marquette, Township Engineer Ernie West, Utilities Director Rick Kane

PRESENTATIONS AND PROCLAMATIONS
1. Annual Audit Report Presentation

PUBLIC HEARINGS

COMMUNICATIONS

PUBLIC COMMENTS

INTRODUCTION OF ORDINANCES

PASSAGE OF ORDINANCES

CONSENT AGENDA
2. Bills and Financial Transactions - $726,484.83
3. May 4, 2020 Regular Digital Board Meeting Minutes
4. Approval of the Operating and Paramedic/Firefighter 2020 – Tax Rates for form L-4029 for the Delta Township Winter Tax Roll and the City of Lansing Summer Tax Roll
5. 2020 Sidewalk Raising Program Bid Results and Recommendation for Award
6. 2020 Sidewalk Replacement Program Bid Results and Recommendation for Award

ITEMS OF BUSINESS
7. Introduction of 601 North Waverly Road Rezoning Request in Case 3-20-1
8. Final Consideration of SPR Properties, L.L.C. Drive-Up/Drive-Through Restaurant Special Land Use Permit Request in Case No. 1-20-1

MANAGER'S REPORT

COMMITTEE OF THE WHOLE
9. Wastewater Treatment Plant (WWTP) Major Capital Improvements – 2020 DRAFT State Revolving Fund (SRF), Project Plan Discussion

Meeting adjourned at 7:42 PM
DWCN/GLI-4200589 05/24/2020

CITY OF GRAND LEDGE
NOTICE OF PUBLIC HEARING
ZONING BOARD OF APPEALS

The City of Grand Ledge Zoning Board of Appeals will hold a public hearing on Thursday, June 11, 2020 at 7:00 p.m. The subject of the public hearing will be the consideration of a request for variances to Sections 220-68(C)(a) & (b) of the Zoning Ordinance which limit the height of front yard fences to 3 feet and require that they be at least 50% visually open. The applicant is requesting variances to these requirements to permit a 6 foot high, opaque, vinyl fence that would extend 18 feet, 4 inches into the Green Street front yard of the corner property at 314 W. Kent Street.

The meeting will be conducted via Zoom online teleconferencing. The meeting can be accessed through the following link: https://us02web.zoom.us/j/87064815437 or by dialing (312) 626-6799 using Meeting ID #: 870 6481 5437.

All information related to the variance request is available on the City's website at www.cityofgrandledge.com. Written comments can be mailed to the Grand Ledge City Hall, 310 Greenwood Street, Grand Ledge, MI 48837, placed in the drop box in front of City Hall or emailed to sstachowiak@cityofgrandledge.com. All comments will be considered if received by 5:00 p.m. the day of the hearing. Please call (517) 627-2149 for further information.

Gregory L. Newman, Clerk
City of Grand Ledge
GLI-4203406 05/24/2020

DELTA CHARTER TOWNSHIP
7710 W. Saginaw Highway
Lansing, Michigan 48917
517-323-8500

NOTICE OF PROJECT PLAN PUBLIC HEARING

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An electronic copy of the plan detailing the proposed project is available at the following link: www.deltami.gov/2020DraftSRF. Persons wishing to view a printed copy of the document may contact the Delta Township Engineering Department at 517-323-8540.

In addition to the public hearing, residents may comment on the project to the Delta Township Engineering Department, in writing, prior to July 1, 2020. Comments can be submitted in one of three ways, by email to WWTPProject@deltami.gov, by mail to 7710 West Saginaw Hwy., Lansing, Michigan 48917 or by hand delivery in the township drop box located on the north side of the Township Hall, which is located at 7710 West Saginaw Hwy., Lansing, MI 48917. Written comments received prior to the close of the public comment period will receive responses in final project plan.

CHARTER TOWNSHIP OF DELTA
MARY R. CLARK, TOWNSHIP CLERK

DWCN/GLI-4200694 05/24/2020

Apartments & Lofts

Don't Miss This One

Lansing, $810.00, 2 bdrm, 1 ba, Refrigerator, Stove and Dishwasher, c/a, d/w, DR, gas ht, laundry rm, L.R, off-st pkg, refrig., w/w carpeting, cats allowed, small dogs allowed, *Move in by 04/30/2020 and receive up to $810.00 in FREE Rent!
We are a luxury senior 55+ community with beautiful apartment homes for rent in Lansing, MI. Conveniently located near several shopping centers, our 3-story building is equipped with an elevator, library, beauty salon , community rooms, fitness center, game room, on-site activities and more!* Come check out our amenities., 48917 (517)323-2800

Transportation

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Autos Wanted

PAYING TOP DOLLAR for SCRAP CARS & TRUCKS.
269-967-5744

Find your new job HERE!

Heavy Equipment

2000 Caterpillar 416C, TURBO Tractor, Loader, Backhoe w/Hyd. Front Coupler, 1,418 HRS. Price $16,400. Call 313-451-6614

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Legal Notices

Notice of Foreclosure by Advertisement
Notice is given under section 3212 of the revised judicature act of 1961, 1961 PA 236, MCL 600.3212, that the following mortgage will be foreclosed by a sale of the mortgaged premises, or some part of them, at a public auction sale to the highest bidder for cash or cashier's check at the place of holding the circuit court in Eaton County, starting promptly at 10:00 AM, on June 25, 2020. The amount due on the mortgage may be greater on the day of sale. Placing the highest bid at the sale does not automatically entitle the purchaser to free and clear ownership of the property. A potential purchaser is encouraged to contact the county register of deeds office or a title insurance company, either of which may charge a fee for this information:
Name(s) of the mortgagor(s): Fred E. Lauback and Lavonne M. Lauback, husband and wife
Original Mortgagee: Mortgage Electronic Registration Systems, Inc., as nominee for lender and lender's successors and/or assigns
Foreclosing Assignee (if any): Selene Finance LP
Date of Mortgage: July 25, 2013
Date of Mortgage Recording: August 9, 2013
Amount claimed due on date of notice: $99,027.65
Description of the mortgaged premises: Situated in City of Charlotte, Eaton County, Michigan, and described as: The West 1/2 of the following described Parcel; That part of Lots 48 and 49 in McClure's Addition to the Village (now City) of Charlotte according to the recorded plat thereof, described as follows; Commencing 135 feet West of the Northeast corner of said Lot 49; thence South 161.50 feet; thence West to a point 300.81 feet East of the West line of said Lot 48; thence North 161.50 feet; thence East to the place of beginning, Eaton County Records.
Common street address (if any): 121 Maple St, Charlotte, MI 48813-1255
The redemption period shall be 6 months from the date of such sale, unless determined abandoned in accordance with MCL 600.3241a; or, if the subject real property is used for agricultural purposes as defined by MCL 600.3240(16).
If the property is sold at foreclosure sale under Chapter 32 of the Revised Judicature Act of 1961, pursuant to MCL 600.3278 the borrower will be held responsible to the person who buys the property at the mortgage foreclosure sale or to the mortgage holder for damaging the property during the redemption period.
Attention homeowner: If you are a military service member on active duty, if your period of active duty has concluded less than 90 days ago, or if you have been ordered to active duty, please contact the attorney for the party foreclosing the mortgage at the telephone number stated in this notice.
This notice is from a debt collector.
Date of notice: May 24, 2020
Trott Law, P.C.
31440 Northwestern Hwy, Suite 145
Farmington Hills, MI 48334
(248) 642-2515

1415543
(05-24)(06-14)
GLI-4197965 5/24, 5/31, 6/7, 6/14

Legal Notices

STATE OF MICHIGAN
PROBATE COURT
COUNTY OF EATON
PUBLICATION OF NOTICE

In the matter of Marjorie Ann McIntyre, Deceased

TO ALL INTERESTED PERSONS *and creditors (known and unknown)**

Whose address(es) is/are unknown and whose interest in the matter may be barred or affected by the following:

TAKE NOTICE: that Marjorie Ann McIntyre died on April 11, 2020 and that claims should be submitted to Sara Koroniotis, Trustee of the Amended and Restated Revocable Living Trust of Marjorie A. McIntyre dated July 19, 2019 at the following address 2155 Holly Drive, Charlotte, Michigan 48813, or to the attorney for Trustee, Stephen L. Hicks, of Hicks, Millbrook & Cwayna, PLLC at 11973 Sweetwater Drive, Grand Ledge, Michigan 48837.

05/20/2020

Attorney:
Stephen L. Hicks – P69221
11973 Sweetwater Drive
Grand Ledge, MI 48837
(517) 622-1900

Petitioner:
Sara Koroniotis
2155 Holly Drive
Charlotte, MI 48813
(517) 930-6241
GLI-4202286 05/24/2020

WATERTOWN CHARTER TOWNSHIP
BOARD MEETING MINUTES AVAILABLE

The Watertown Charter Township Board of Trustees held a regular meeting on May 18, 2020 . Copies of meeting minutes are available in the office of the Township Clerk: 12803 S. Wacousta Road, Grand Ledge, MI 48837, (517) 626-6593. Office hours are 9AM to 5 PM, Monday through Friday. Copies of minutes are also available on the township's website: www.WatertownTownship.com

Deborah G. Adams
Watertown Charter Township Clerk
DBR-4201198 5/24/2020

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lsj.com/placead

Hauling

Lawn & Garden Care

BROCK'S TREE SERVICE
trimming, removal, stump grinding, complete yard cleanups. Insured
517-455-2238

Masonry & Concrete

MASONRY RESTORATION
Res/comm., historic. Repair brick, block & stone. Fndn/chimney repair/new. Lic. & Ins. 517-647-5380

We can sell it in CLASSIFIED!

By Phone: Monday - Friday 8:30 am - 5 pm
Toll Free: 877-475-SELL or 877-391-SELL
Online: 24 hours a day, 7 days a week at www.sourceads.com
By Fax: 24 hours a day, 7 days a week 517-482-5476

You may also submit ads in person, Monday through Friday from 9 am to 5 pm at the downtown Lansing office at 300 South Washington Square, Suite 300, Lansing, MI 48933. The deadline for classified liners is Thursday at 5 pm. The deadline for classified display ads is Tuesday at 5 pm.

LCN Lansing Community Newspapers

CLASSIFIEDS

The Marketplace

Service Directory

Cleaning, Repairs, Lawn Care, Remodeling & More...

Find More Classifieds Online lsj.com/placead

Hauling

- Appliances
- Brush
- Carpet
- Furniture
- Metal
- Wood
- Concrete
- Shingles

Senior Discount
327-6001

Lawn & Garden Care

BROCK'S TREE SERVICE trimming, removal, stump grinding, complete yard cleanups. Insured 517-455-2238

Masonry & Concrete

MASONRY RESTORATION Res/comm., historic. Repair brick, block & stone. Fndn/chimney repair/new. Lic. & Ins. 517-647-5380

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Community Announce

announcements, events...

Assorted Items

all kinds of things...

Special Notices

DONATE YOUR CAR TO CHARITY. Receive maximum value of write off for your taxes. Running or not! All conditions accepted. Free pickup. Call for details. 855-413-9672

CASH FOR CARS: We Buy Any Condition Vehicle, 2002 and Newer. Competitive Offer! Nationwide FREE Pick Up! Call Now For a Free Quote! 888-366-5659

DONATE YOUR CAR TO UNITED BREAST CANCER FOUNDATION! Your donation helps education, prevention & support programs. FAST FREE PICKUP - 24 HR RESPONSE - TAX DEDUCTION 1-855-567-6393

Hale Groves' Spring Basket Box of oranges fresh from the grove, delicious cookies and candies delivered to your door! Only $29.99 plus FREE Shipping! Great gift for Easter and Mother's Day! Call 1-844-806-4993 to order item 836 or visit halegroves.com/MB00064 (Mention promo code SPG20 for free shipping.)

ENJOY 100% Perfectly Tender and Guaranteed! 20 Main Courses PLUS get 4 FREE Burgers Order The Butcher's Bundle - ONLY $69.99. Call 1-866-945-7269 mention code:61086MXW or visit www.omahasteaks.com/dinner302

Meet singles right now! No paid operators, just real people like you. Browse greetings, exchange messages and connect live. Try it free. Call now: 855-247-5909

Electronics

DIRECTV - Switch and Save! $39.99/month. Select All-Included Package. 155 Channels. 1000s of Shows/Movies On Demand. FREE Genie HD DVR Upgrade. Premium movie channels, FREE for 3 mos! Call 1-888-351-0154

High-Speed Internet. We instantly compare speed, pricing, availability to find the best service for your needs. Starting at $39.99/month! Quickly compare offers from top providers. Call 1-844-290-4041

Earthlink High Speed Internet. As Low As $14.95/month (for the first 3 months.) Reliable High Speed Fiber Optic Technology. Stream Videos, Music and More! Call Earthlink Today 1-844-275-3510

DISH Network $59.99 For 190 Channels! Add High Speed Internet for ONLY $19.95/month. Call Today for $100 Gift Card! Best Value & Technology. FREE Installation. Call 1-866-950-6757 (some restrictions apply)

COMPUTER ISSUES? GEEKS ON SITE provides FREE diagnosis REMOTELY 24/7 SERVICE DURING COVID19. No home visit necessary. $40 OFF with coupon 86407! Restrictions apply. 855-779-9814

General Merchandise

METAL ROOFING regular and shingle style, HALF OFF ON SPECIAL COLORS! Also, lifetime asphalt shingles available. Licensed and insured builders. Quality work for 40 years! 517-575-3695.

AMISH BUILT mini cabins or storage sheds delivered to your site anywhere in Michigan! Starting at $2,500.00. mynextbarn.com 989-832-1866

Yard and Outdoor

2019 Bad Boy Zero Turn, 54 inch deck, My Magnum 725 cc, Koehler 7000 series engine, 30.8 hours run time on mower. $3,000.00. Moved from 12 acre lot in Ohio to condo in Lansing area so no need for mower., (419)344-0632 deborah_frontiera@comcast.net

Make A Bid Auctions

auto, farm, general...

General Auctions

AUCTION

LIVE AUCTION Saturday, **May 30**, 2020, 10:00 A.M. 215 N. Farr St. Ashley, MI. John Deere riding lawnmower; Golf Cart; Bombardier 4-wheeler; Firearms; Garage/Shop equipment; Hunting & Fishing; Household. www.SherwoodAuctionService LLC.com 989-763-7157

LIVE AUCTION! FULL LIQUIDATION OF HOPPS LUMBER YARD AND HARDWARE, 408 Ohmer Rd. Mayville, MI. Saturday, **June 6**, 2020, 10:00 A.M. Large inventory; store fixtures/equipment; used/rental equipment; vehicles/forklifts. Masks recommended & social distancing. Details at www.FurloAuction.com 989-835-1581.

Real Estate Homes

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MOBILE HOME in U.P., south of Newberry. 14x70 + annex, 2 BR 1.5 BA, paved road, good recreational trails, good well, $20,000 CASH. 989-763-7804

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Apartments & Lofts

Lansing, $810.00, 2 bdrm, 1 ba, Refrigerator, Stove and Dishwasher, c/a, d/w, DR, gas ht, laundry rm, LR, off-st pkg, refrig., w/w carpeting, cats allowed, small dogs allowed, "Move in by 04/30/2020 and receive up to $810.00 in FREE Rent! We are a luxury senior 55+ community with beautiful apartment homes for rent in Lansing, MI. Conveniently located near several shopping centers, our 3-story building is equipped with an elevator, library, beauty salon , community rooms, fitness center, game room, on-site activities and more!" Come check out our amenities., 48917 (517)323-2800

Transportation Wheels

best deal for you...

Autos Wanted

PAYING TOP DOLLAR for SCRAP CARS & TRUCKS. 269-967-5744

Heavy Equipment

2000 Caterpillar 416C, TURBO Tractor, Loader, Backhoe w/Hyd. Front Coupler, 1,418 HRS. Price $16,400. Call 313-451-6614

Your Source Legals

for the latest...

Legal Notices

WATERTOWN CHARTER TOWNSHIP ZONING BOARD OF APPEALS
NOTICE OF PUBLIC HEARING
WEDNESDAY, JUNE 10, 2020 at 7:00 PM
WATERTOWN CHARTER TOWNSHIP HALL
12803 S. Wacousta Road, Grand Ledge, MI 48837
(517) 626-6593 FAX: (517) 626-6405

This notice is to inform you that pursuant to the Court's January 31, 2020 order in Clinton County Circuit Court Case No. 18-11772AA, Monroe v. Watertown Charter Township, (ZBA Case No. 18-15) and the Circuit Court's subsequent denial of a motion for reconsideration on February 21, 2020, a public hearing will be held before the Zoning Board of Appeals on Wednesday June 10, 2020 to determine if day and time restrictions for loading/unloading activities should be imposed and, if so, what those restrictions should be. The Zoning Board of Appeals may modify or supplement its earlier findings and decision or may affirm the original decision to approve the site plan.
The hearing involves Parcel No. 19-150-035-100-005-05, Section 35, T5N, R3W; the property address being 16130 Grove Road, Lansing, MI 48906. Written comments, which may be sent to the address or fax above, will be received until the time of the public hearing and will become a part of the official public hearing record.
Due to the circumstances of the COVID-19 pandemic and the possible extension of Executive Orders cur-

Your Source Legals

for the latest...

Legal Notices

CHARTER TOWNSHIP OF DELTA
7710 W. Saginaw Highway
Lansing, Michigan 48917
(517) 323-8500

TOWNSHIP BOARD
Synopsis of Meetings

MONDAY, MAY 4, 2020 – REGULAR BOARD MEETING
Supervisor Fletcher called the meeting to order at 6:00 P.M. Supervisor Kenneth Fletcher, Clerk Mary R. Clark, Treasurer Howard A. Pizzo, Trustee Fonda Brewer, Trustee Andrea M. Cascarilla, Trustee Dennis R. Fedewa and Trustee Karen J. Mojica. Others Present: Manager Brian T. Reed, Lt. Ross Tyrell, Assistant Township Manager Alannah Doak, Parks/Recreation/Cemetery Director Marcus Kirkpatrick, Fire Chief Greg Ginebaugh, Finance Director Jeff Anderson, Planning Director Gary Bozek, Technology Director Dave Marquette, Township Engineer Ernie West, Utilities Director Rick Kane

PRESENTATIONS AND PROCLAMATIONS

PUBLIC HEARINGS

COMMUNICATIONS

PUBLIC COMMENTS

INTRODUCTION OF ORDINANCES

PASSAGE OF ORDINANCES

CONSENT AGENDA
1. Bills and Financial Transactions - $1,913,270.32
2. Minutes- April 13, 2020 – Regular Digital Board Meeting Minutes

ITEMS OF BUSINESS
3. Wastewater Treatment Plant Major Capital Improvements – State Revolving Fund Project Plan

MANAGER'S REPORT

COMMITTEE OF THE WHOLE

Meeting adjourned at 7:44 p.m.

MONDAY, MAY 11, 2020 – COMMITTEE OF THE WHOLE MEETING - CANCELLED

MONDAY, MAY 18, 2020 – REGULAR BOARD MEETING
Supervisor Kenneth R. Fletcher, Treasurer Howard A. Pizzo, Clerk Mary R. Clark, Trustee Andrea M. Cascarilla, Trustee Fonda J. Brewer, Trustee Dennis R. Fedewa, and Trustee Karen J. Mojica Others Present: Manager Brian T. Reed, Assistant Township Manager Alannah Doak, Parks/Recreation/Cemetery Director Marcus Kirkpatrick, Finance Director Jeff Anderson, Planning Director Gary Bozek, Technology Director Dave Marquette, Township Engineer Ernie West, Utilities Director Rick Kane

PRESENTATIONS AND PROCLAMATIONS
1. Annual Audit Report Presentation

PUBLIC HEARINGS

COMMUNICATIONS

PUBLIC COMMENTS

INTRODUCTION OF ORDINANCES

PASSAGE OF ORDINANCES

CONSENT AGENDA
2. Bills and Financial Transactions - $726,484.83
3. May 4, 2020 Regular Digital Board Meeting Minutes
4. Approval of the Operating and Paramedic/Firefighter 2020 – Tax Rates for form L-4029 for the Delta Township Winter Tax Roll and the City of Lansing Summer Tax Roll
5. 2020 Sidewalk Raising Program Bid Results and Recommendation for Award
6. 2020 Sidewalk Replacement Program Bid Results and Recommendation for Award

ITEMS OF BUSINESS
7. Introduction of 601 North Waverly Road Rezoning Request in Case 3-20-1
8. Final Consideration of SPR Properties, L.L.C. Drive-Up/Drive-Through Restaurant Special Land Use Permit Request in Case No. 1-20-1

MANAGER'S REPORT

COMMITTEE OF THE WHOLE
9. Wastewater Treatment Plant (WWTP) Major Capital Improvements – 2020 DRAFT State Revolving Fund (SRF), Project Plan Discussion

Meeting adjourned at 7:42 PM
DWCN/GLI-4200589 05/24/2020

DELTA CHARTER TOWNSHIP
7710 W. Saginaw Highway
Lansing, Michigan 48917
517-323-8500

304.11
INTRODUCTION TO PROPOSED ZONING ORDINANCE AMENDMENT
601 North Waverly Rezoning Request
Case No. 3-20-1

The Delta Township Board of Trustees will consider adoption of this Ordinance at its regular meeting scheduled for 6:00 PM on Monday, June 1, 2020.

The following Ordinance was introduced by the Board of Trustees at its regular meeting held on Monday, May 18, 2020.

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MegaMarket Statewide Classified Ad! Over 1.9 million weekly in-home circulation just $249 per week! Buy 3 ads – Get 1 Free! Call 800.783.0267

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Vacation Cabins for Rent in Canada. Fish for abundant walleye, perch, northern pike. Boats, motors, gasoline included. For free brochure call Hugh 1-800-426-2550 www.CanadianFishing.com

BOY SCOUT COMPENSATION FUND - Anyone that was inappropriately touched by a Scout leader deserves justice and financial compensation! Victims may be eligible for a significant cash settlement. Time to file is limited. Call Now! 855-221-2258

Recently diagnosed with LUNG CANCER and 60+ years old? Call now! You and your family may be entitled to a SIGNIFICANT CASH AWARD. Call 855-603-1125 today. Free Consultation. No Risk.

If you or a loved one were diagnosed with OVARIAN CANCER or MESOTHELIOMA after use of TALCUM products such as BABY POWDER or SHOWER TO SHOWER, you may be entitled to compensation. Contact Charles H. Johnson 1-800-535-5727

Adjustable Bed Brand New with Mattress Set Memory Foam mattress. Retail Cost $3,995.00, sacrifice for $575.00. Call for showing or delivery: 989-615-2951.

Stay in your home longer with an American Standard Walk-In Bathtub. Receive up to $1,500 off, including a free toilet, and a lifetime warranty on the tub and installation! Call us at 1-855-271-8452

GENERAC Standby Generators. The weather is increasingly unpredictable. Be prepared for power outages. FREE 7-year extended warranty ($695 value!) Schedule your FREE in-home assessment today. Call 1-855-922-0420 Special financing for qualified customers.

Pond/Lake Weed Removal Tools (The #1 alternative to chemicals.) Performs C.P.R. Cuts-Pulls-Rakes. Made in Michigan. 989-529-3992. WeedgatorProducts.com Enter promo code GATORMI for discount.

VIAGRA and CIALIS USERS! 100 Generic Pills SPECIAL $99.00 FREE Shipping! 100% guaranteed. 24/7 CALL NOW! 888-835-7273 Hablamos Espanol

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Great Buys
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Mason, 332 East Dexter Trail. 5/23 9a-6-p. Boat, Tools, Furn, Fishing Equip, Traps, Dishes & Kabota Mower with Snow Blower.

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Pets
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Domestic Pets

Beagle - AKC, female, 3 yrs old, 15", tri colored. $750. Male 5 yrs, pure breed, 15", tri colored, $600. Kenneled hunting dogs. Garmin tracking collar, like new, $300. 2 Tri-Tronics shock collars, rebuilt, $200. 810-241-2254

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Education & Training

TRAIN ONLINE TO DO MEDICAL BILLING! Become a Medical Office Professional online at CTI! Get Trained, Certified & ready to work in months! Call 877-929-5461. (M-F 8am-6pm ET)

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Family in place which prohibits public meetings, this meeting may be either converted to an electronic meeting or cancelled, in which case a notice of the same will be posted on the Township Website at www.Watertown Township.com at least 18 hours prior to the meeting.
Mark Zarkovich, Vice-Chair, Zoning Board of Appeals
Individuals with disabilities needing special accommodations to fully participate in the meeting may contact the Clerk to request the necessary assistance. This request must be made at least two days prior to the public hearing.
DWN-4200096 5/24/2020

AN ORDINANCE TO AMEND THE ZONING ORDINANCE AND ZONING MAP AT DELTA CHARTER TOWNSHIP PROPERTY:

SECTION 1: That the Delta Charter Township Zoning Ordinance be amended and that the zoning district map be changed to indicate a change in zoning from O, Office, to C-Commercial, on the following described parcel:

The following described property is located approximately 0.1 Mile south of the intersection of W. Saginaw Highway/N. Waverly Road, in Section 13 of Delta Township.

The East 375 Feet of Lot 11. Parkview Acres Plat. T4N, R3W, Delta Township, Eaton County, MI

SECTION 2: Severability Provision.

If any section, paragraph, clause, or part of this Charter Township of Delta Ordinance, is for any reason held invalid by any court of competent jurisdiction, or any agency, department, or commission empowered for such purpose, such decision shall not affect the validity of the remaining provisions of any ordinance of Delta Charter Township; and the application of those provisions to any person or circumstances shall not be effected thereby.

SECTION 3: Repealer Provision.

All ordinances or parts of ordinances of the Charter Township of Delta inconsistent herein are hereby repealed so far as they may be inconsistent with the provisions of this Ordinance.

SECTION 4: Effective Date Provision.

Said ordinance shall become effective upon the date of final publication.

CHARTER TOWNSHIP OF DELTA
MARY R. CLARK, TOWNSHIP CLERK

Copies of this ordinance may be inspected in the office of the Township Clerk from 8:00 AM to 5:00 PM, Monday through Friday except holidays.
DWCN/GLI-4200647 05/24/2020

DELTA CHARTER TOWNSHIP
7710 W. Saginaw Highway
Lansing, Michigan 48917
517-323-8500

NOTICE OF PROJECT PLAN PUBLIC HEARING

Delta Township will hold a virtual public hearing on the proposed 2020 State Revolving Fund (SRF) Project Plan for the Wastewater Treatment Plant (WWTP) Major Capital Improvements project for the purpose of receiving comments from interested persons.

The hearing will be held at 6:00 p.m. on Wednesday, June 24, 2020 by video/telephone conference.

To participate in the hearing by video, visit https://zoom.us/ and use Meeting ID: 822 1926 5511 and Meeting Password: 414679.

To participate in the hearing by phone, use one of the phone numbers below.

1 (312) 626-6799 or 1 (646) 876-9923 or 1 (408) 638-0968 or 1 (669) 900-6833 or 1 (253) 215-8782 or 1 (301) 715-8592

For the hearing impaired, please call 711 to access the FCCs phone relaying service and provide one of the U.S. numbers listed above.

If you need assistance connecting, please contact IT Director David Marquette at dmarquette@deltami.gov.

The purpose of the proposed project is to make major capital improvements to the Delta Township WWTP, located at 7000 West Willow Highway, Lansing, Michigan. Major capital improvements are required to address failing infrastructure that is in excess of 30-years old, add a tertiary treatment process that is required to meet new discharge limits required by the Michigan Department of Environment, Great Lakes and Energy (EGLE) and to expand treatment capacity to accommodate continued development within the Township.

Project construction will involve all treatment processes at the WWTP. The improvements will be constructed in multiple phases. The SRF Project Plan will encompass the improvements identified as Phases I and II of the project. Phase I would include improvements to the plant electrical and control system, raw sewage pumping, primary treatment, and secondary treatment systems. Phase II would include primary clarifier equipment replacement, tertiary treatment, disinfection, sludge thickening, sludge digestion and sludge dewatering systems and a new laboratory, control and operations building. Construction of Phases I and II is planned to begin in 2022 and be completed by the end of 2026. Construction activities will be confined within the existing WWTP boundary fence.

Beneficial impacts of the proposed improvements include improved plant discharge and receiving stream quality, improved energy efficiency and plant reliability. Adverse impacts are all short term, including temporary disturbance of the surrounding areas due to construction activities such as earth disturbance, dust, and noise. Some tree removals within existing WWTP boundary fence are required to accommodate the new construction. Some work will occur within the floodplain of the Carrier Creek but will not negatively affect the floodplain. There are no expected, long-term, negative impacts from the improvements.

Currently, a typical residential sewer customer bill is $27.50 per month, which is one of the lowest rates in the greater Lansing region. The Township is in the process of conducting a professional rate study, which will guide the Township in rate setting in the future. However, as part of the SRF funding application process, the Township is required to develop an initial estimate of the impact of the proposed project on sewer rates. Our initial estimate is that rates will need to increase to $37.50 per month over a 6-year period. There are many variables associated with this estimate and actual rates may vary from this estimate. Even at this level, however, Delta Township's sewer rates would remain competitive within the region.

An electronic copy of the plan detailing the proposed project is available at the following link: www.deltami.gov/2020DraftSRF. Persons wishing to view a printed copy of the document may contact the Delta Township Engineering Department at 517-323-8540.

In addition to the public hearing, residents may comment on the project to the Delta Township Engineering Department, **in writing**, prior to July 1, 2020. Comments can be submitted in one of three ways, by email to WWTPProject@deltami.gov, by mail to 7710 West Saginaw Hwy., Lansing, Michigan 48917 or by hand delivery in the township drop box located on the north side of the Township Hall, which is located at 7710 West Saginaw Hwy., Lansing, MI 48917. Written comments received prior to the close of the public comment period will receive responses in final project plan.

CHARTER TOWNSHIP OF DELTA
MARY R. CLARK, TOWNSHIP CLERK

DWCN/GLI-4200694 05/24/2020

WWTP Major Capital Improvements

PUBLIC

HEARING

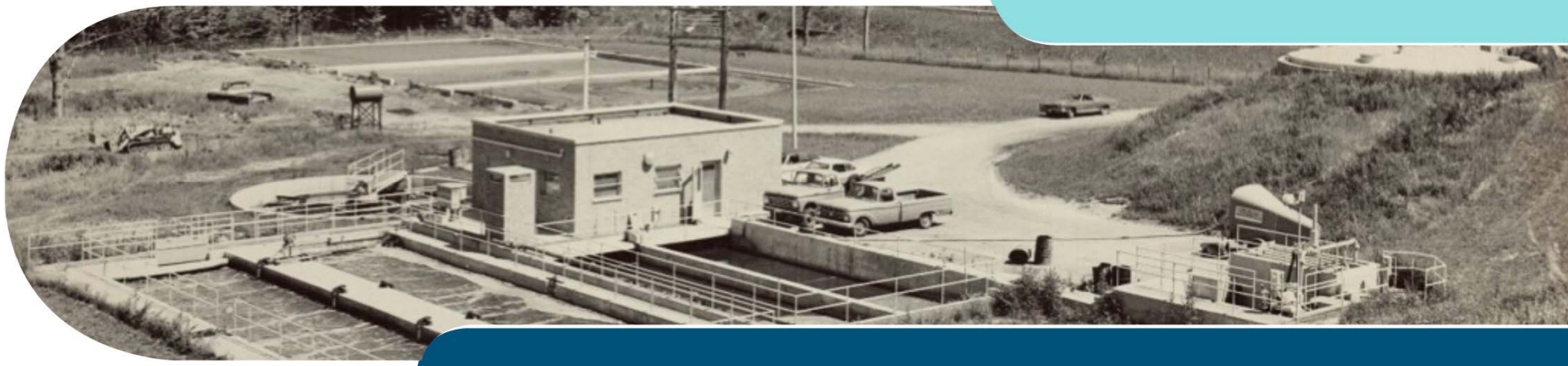
June 24, 2020

Rules for the Discussion

- Questions and comments will be addressed after the presentation is complete.
- All attendees are required to conduct themselves in a courteous and respectful manner.
- Attendees will be muted until they request to speak and are called on by the presenter.
- Each speaker will state and their full name and address, and spell out their name for the court recorder before making a comment or asking a question.
- Each speaker will be limited to three minutes, which cannot be shared with other speakers.
- The meeting will be recorded and a verbatim transcription will be made by a court recorder for inclusion in the final SRF plan.
- A copy of the video recording will also be made available on the Township's website.

The Need

Why is this major capital improvement project necessary?



Steps Taken

January 2017
Board Directive to evaluate wastewater system

August 2018
Began WWTP evaluation

June 2019
Complete WWTP evaluation

September 2019
EGLE confirms new permit limits

October 2019
Completed peer review of master plan

June 2020
Public Information and Comment Period

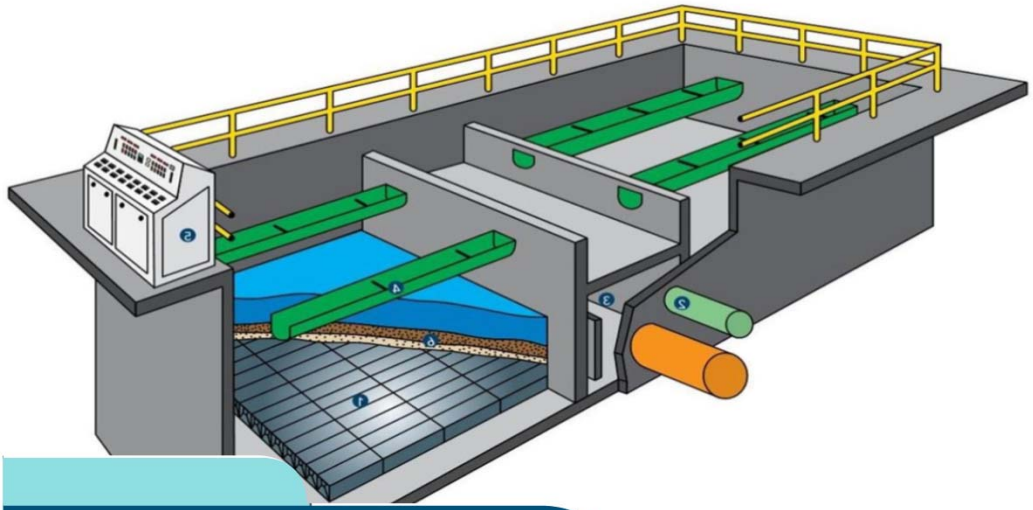
May 2020
Draft SRF project plan available to public

November 2019
Board authorizes preparation of SRF project plan

October 2019
Began utility rate study

Age of Facility

- WWTP originally constructed 55 years ago with the last major upgrade 34 years ago
- WWTP is at the end of its useful life – equipment and structures are worn out and experiencing failures
  - 2009 Natural Gas Service
  - 2010 Hot Water Heating System
  - 2015 Primary Electrical Service
  - 2016 Sludge Storage Odor Control System
  - 2017 Clarifier Equipment
  - 2017 Electrical Transformer
  - 2018 Secondary Electrical Service
  - 2018 Sludge Dewatering Press
  - 2018Control Building Cooling
  - 2019 Raw Pumping Speed Control
  - 2020 Multiple Clarifier Equipment
  - 2020 Aeration Blower



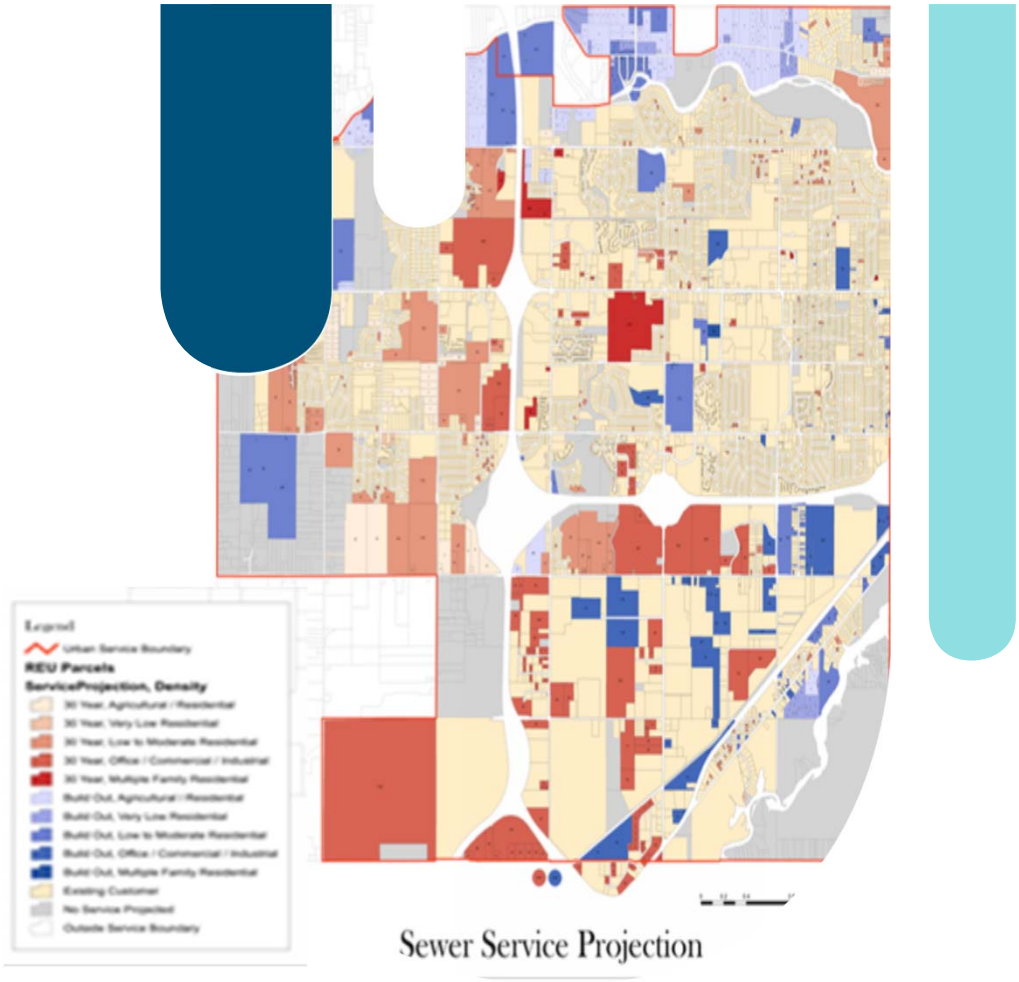
Tougher Treatment Standards

- In 2019 the Michigan Department of Environment, Great Lakes and Energy (EGLE) added tougher treatment standards to our discharge permit in an effort to improve water quality in the Grand River.
- These standards go into effect in 2027.
- This requires a new treatment process that the existing plant does not have.
- Tertiary Treatment is a final filtration process just prior to disinfection that further reduces solids and other pollutants in the treated water

Treatment Capacity

- On average, flows to the plant are over 80% of design capacity
- During wet weather, many current processes see flows higher than design capacity

Current Unit Process	Firm Capacity	2019 Current Ave Day (4.9 MGD)	2019 Max Day (14.3 MGD)	2049 Design Ave Day (8.0 MGD)	2049 Design Max Day (20.0 MGD)
Influent Raw Sewage Pumping	17.4 MGD	Yes	Yes	Yes	No
Influent Screening	8.65 MGD	Yes	No	No	No
Grit Removal	11.1 MGD	Yes	No	No	No
Primary Clarifier Tanks	10.4 MGD	Yes	No	No	No
Equalization Basin	5.0 MG	Yes	No	No	No
Oxidation Tower	5.7 MGD	Yes	No	No	No
Intermediate Clarifier	4.2 MGD	No	No	No	No
Aeration Tank	4.86 MGD	Yes	No	No	No
Secondary Clarifier	10.7 MGD	Yes	No	Yes	No
Ultraviolet Disinfection	8.0 MGD	Yes	No	Yes	No
Digester Capacity	0.5 MG	Yes	Yes	No	No
Sludge Dewatering (8 hours/5 day operation)	6.0 MGD	Yes	Yes	No	No



Additional Treatment Capacity

To provide capacity for continued growth in the township, a modest expansion of treatment capacity is needed

Flows	Average Day (MGD)	Max Day (MGD)	Peak Hourly (MGD)
Current Plant Flows (MGD)	4.9	15.3	21.1
30-Year Projected Flow Growth	2.7	4.1	6.8
Projected Total 30 Year Flow	**7.6**	**19.4**	**27.9**
30 Year Design Conditions	**8.0**	**20.0**	**28.0**

Proposed Improvements

What are the proposed improvements?

Alternatives Considered

***Do nothing** – not feasible*

B ***Reconstructing modified system***

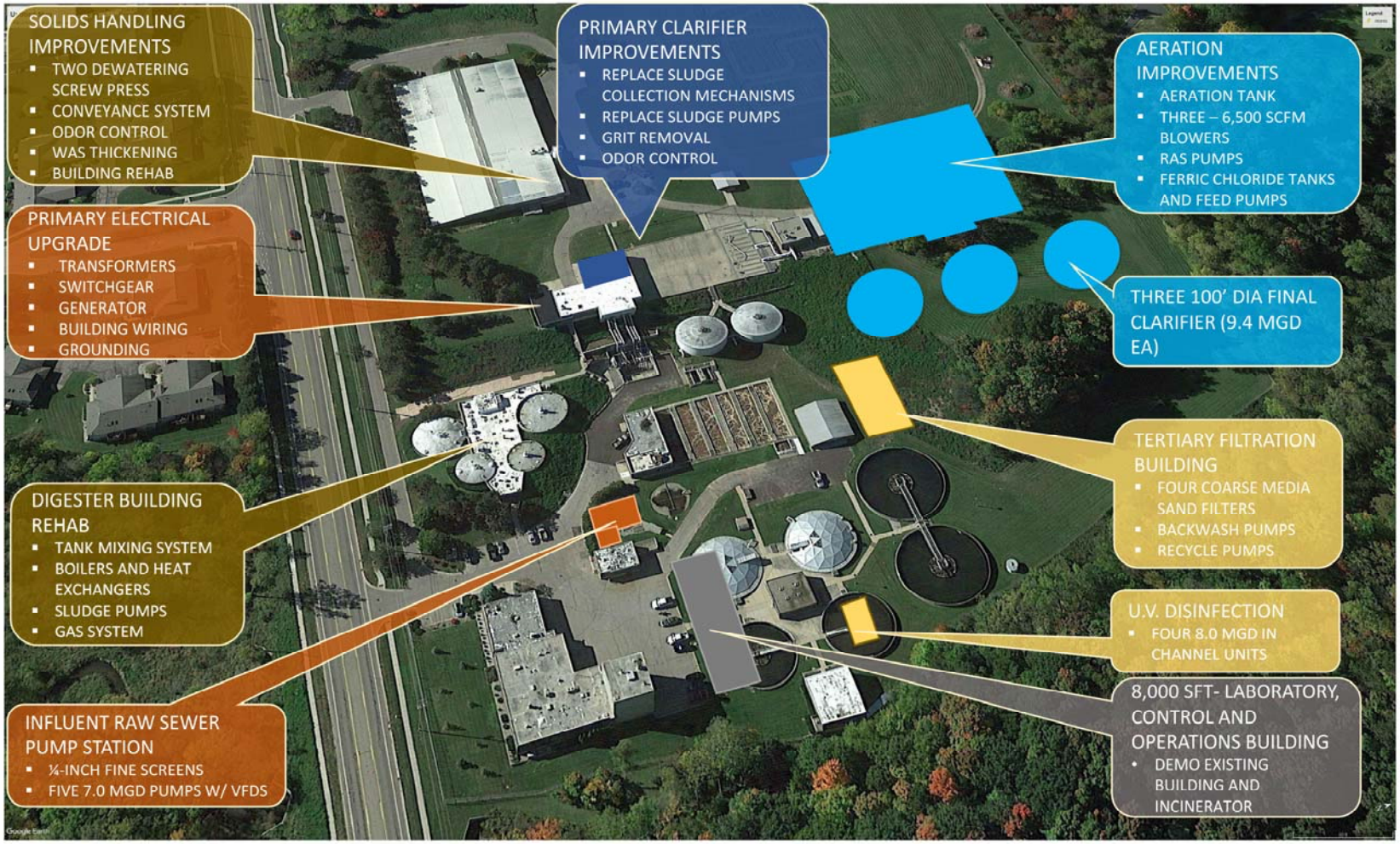
A ***Repairing and retrofitting existing system***

***Regional Alternative -** prohibitively expensive & complicated*

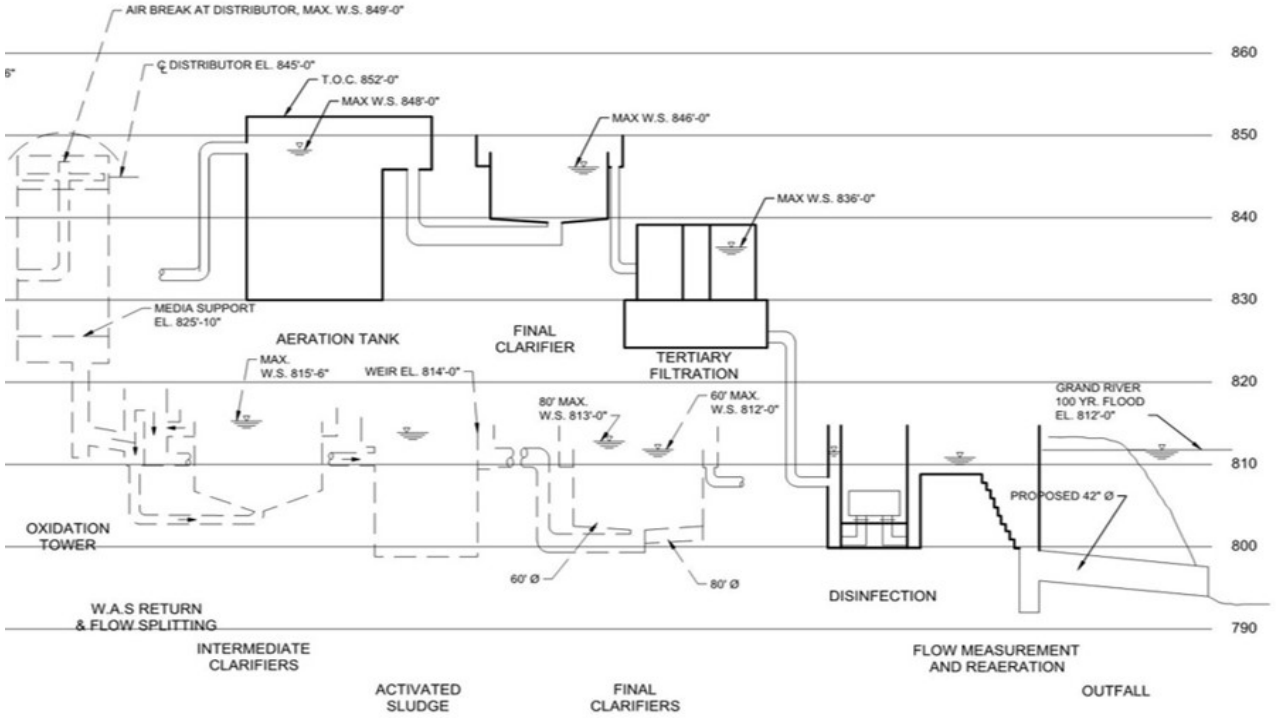
After identifying the large cost, construction difficulty, and inefficient operation of the plant associated with **repairing and retrofitting** the plant, Delta Township's project team developed a plan to **reconstruct** the plant on the same site.

Reconstruction was found to be more cost effective to both build and operate and is anticipated to use 34% less energy as compared to than **repairing and retrofitting** the plant.

Proposed Improvements



Let Gravity Do the Work



Save Energy

The Township is pursuing principal forgiveness funds that are available for energy efficient "green" projects based on the energy efficiency of the chosen alternative

	Expansion of Existing WWTP w/ Tertiary Filtration	Proposed WWTP Improvements
Influent Screens	65,323 kW-hr	65,323 kW-hr
Raw Sewage Pumps	1,087,567 kW-hr	942,558 kW-hr
Grit Removal System	317,471 kW-hr	16,331 kW-hr
Intermediate Clarifiers	26,129 kW-hr	N/A
Intermediate Sludge Pumping	19,989 kW-hr	N/A
Flow Split Mixing	130,647 kW-hr	130,647 kW-hr
Aeration Blowers	555,428 kW-hr	620,572 kW-hr
Final Clarifiers	13,065 kW-hr	20,903 kW-hr
RAS Pumps	417,233 kW-hr	372,530 kW-hr
WAS Pumps	33,380 kW-hr	19,597 kW-hr
Tertiary Influent Pumps	652,540 kW-hr	N/A
Annual Energy Usage	3,318,594 kW-hr	2,188,461 kW-hr
Annual Energy Cost ($0.103/kWh)	$341,815	$225,411
Projected Energy Reduction %		34%
Projected Annual Energy Savings		$116,404

Estimated Cost

What will it cost and how will the Township pay for it?

Phase I & II Cost Estimates

Item	Opinion of Probable Cost
Phase I:	
Influent Electrical, SCADA, and Generator	$4,104,000
Influent Raw Pumping and Headworks	$9,462,000
Aeration System w/ Blower, RAS, Chemical Building	$15,349,000
Construct Three, 100-foot diameter Secondary Clarifiers	$6,292,500
Subtotal Capital Cost for Phase I	**$35,177,500**
Phase II:	
Primary Clarifier Mechanism Replacement	$2,790,000
Tertiary Filtration	$9,677,000
UV Disinfection	$4,913,000
Dewatering Screw Press	$4,684,000
Digester Rehabilitation	$5,584,000
Construct Third Digester Tank	$2,106,000
Solids Thickening	$2,234,000
Laboratory, Control and Operations Building	$3,808,000
Subtotal Capital Cost for Phase II	**$35,796,000**
Total Project Cost	**$70,973,500**

- Phase III – approximately $7 million is not part of the SRF project plan as it is more than 5 years out and is flow dependent
- Project cost estimates include engineering and contingency allowances

Estimated User Cost Impacts

- The Township is in the process of applying for low interest loans (est. 2 - 2.5%) from the Clean Water State Revolving Fund (SRF). This program is used by most municipalities to fund large projects.
- The loans would be repaid over 20-years with revenue collected from sewer bills.
- In order to have sufficient revenue to repay the loans and continue to fund operation of the sewer collection and treatment system, sewer rates are expected to increase.
- Currently, a typical residential sewer customer bill is $27.50 per month, which is one of the lowest rates in the Greater Lansing Region.
- The Township's initial estimate is that rates will need to increase by an average of 6% per year over 6 years.
- At the end of that six-year period the estimated residential monthly bill will have increased by approximately $10 a month.
- Even at this level, however, Delta Township's sewer rates would remain competitive within the region.

User Cost Analysis				
Category	**Current**	**Phase I**	**Phase II**	**Total**
WWTP Capital Costs	-	$35,177,500	$35,796,000	$70,973,500
Annual Debt Service (@ 2% interest rate)	-	2,154,962	2,192,948	4,347,910
Change in O&M	-	($32,000)	($32,000)	($64,000)
Effective Meter Equivalents per Year	13,278	13,728	13,728	-
Estimated Equivalent Sewer Billable Flow (in ccf)	659,804	659,804	659,804	-
Projected Monthly Increase per Typical Residential User	-	$4.58	$5.36	$9.94
Projected Typical Residential Customer Monthly Bill	$27.50	$32.08	$37.44	

Project Impacts

What are the anticipated impacts of the project?

Archeological and Historical Resources

There are no known archeological or historical resources that will be impacted by the project. A State Historic Preservation Office (SHPO) review underway to confirm.

Water & Air Quality

Water Quality

- Beneficial impact on water quality in the Grand River from adding tertiary treatment process
- Short-term construction impacts to water quality will be mitigated through soil erosion and sedimentation control measures

Air Quality

- Odor control system replacement to help mitigate odors from plant operations
- Dust control processes will be used to mitigate dust issues during construction

Natural Setting and Sensitive Ecosystems

- All work will occur within existing maintained landscape areas
- No direct impact on wetland, prime farmland, wild or scenic rivers
- No effect on endangered species finding issued by US Fish and Wildlife
- Tree removal limited to October through March to mitigate impact on bat habitat
- Soil erosion and sedimentation controls to mitigate impact to mussels
- Work will occur in the floodplain, but will not impact floodplain elevations, some structures currently in the floodplain will be relocated out of the floodplain

Consumption of Materials for Project

Steps will be taken to reduce or recycle construction waste during construction

Human, Social and Economic Impacts

- Project will be funded with modest rate increases spread out over time
- Building on existing Township-owned property that has been a WWTP since 1965, no additional land area needed
- Beneficial temporary impact of construction jobs during project
- Construction jobs will pay Davis-Bacon Act wage rates

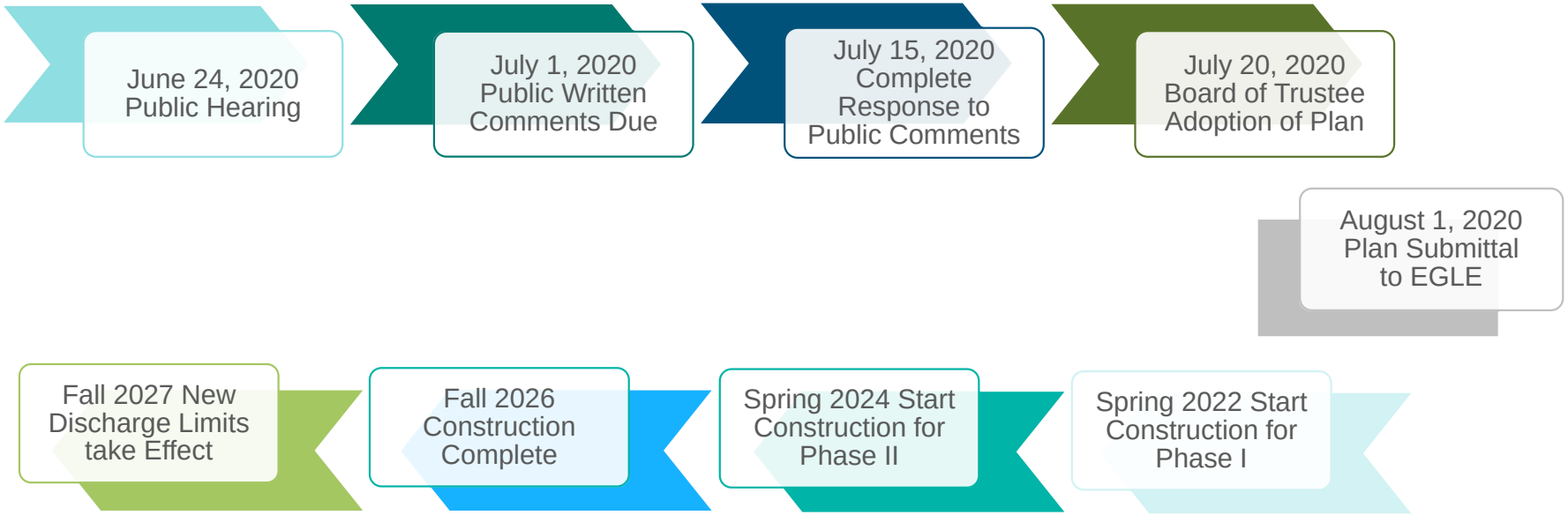
Operational Impacts

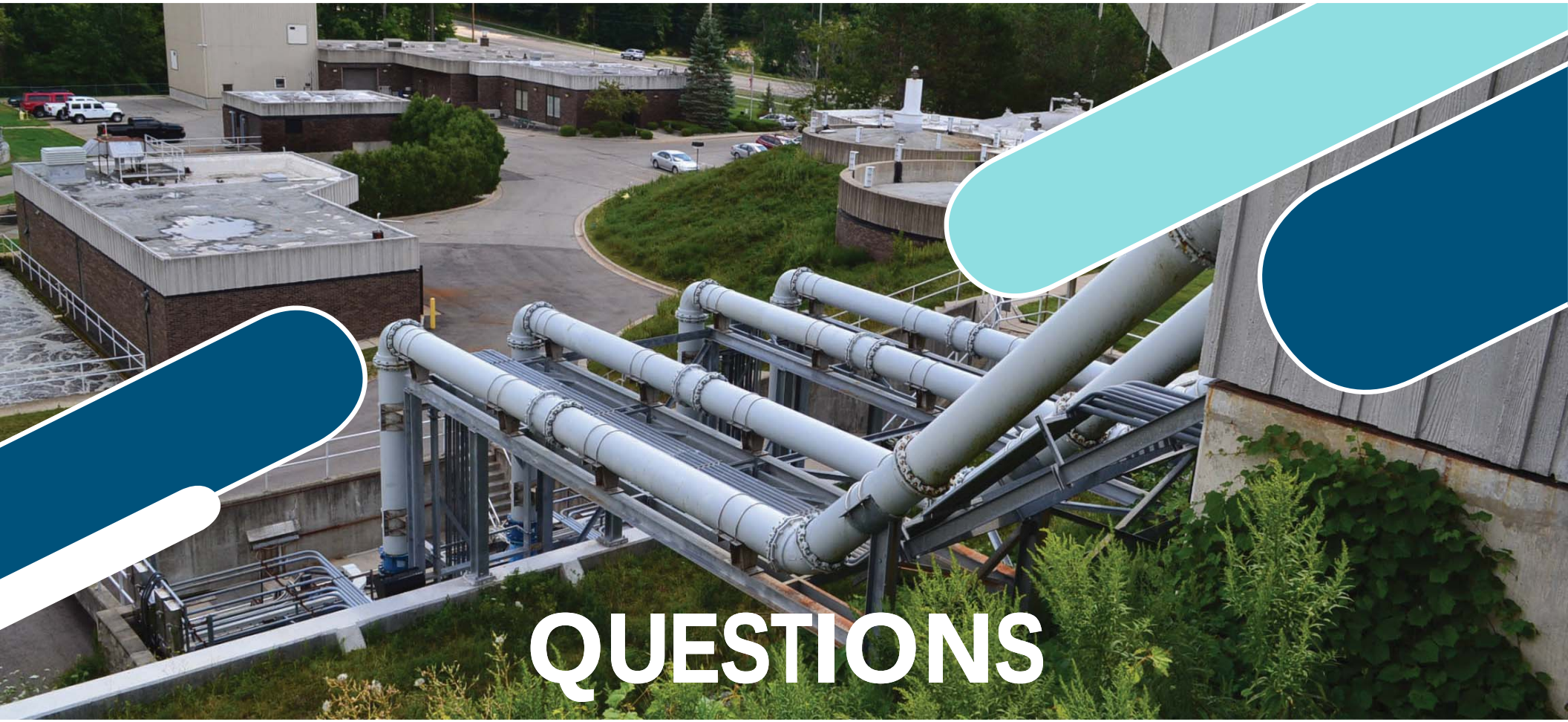
- Chosen alternative facilitates continued operation of the plant during construction
- Plant operational reliability will be improved by the project
- Chosen alternative improves energy efficiency by approximately 34% over the other alternative, reducing energy use and saving operating costs

Project Schedule

How long will the project take to complete?

Estimated Project Schedule





QUESTIONS

Contact us at: WWTPProject@deltami.gov | Phone: 517-323-8540

Public comments for the project will be taken until July 1, 2020.

Delta Township Wastewater Treatment Plant (WWTP) Major Capital Improvements

2020 State Revolving Fund (SRF) Public Hearing

List of Attendees (13 people)

Name	Address
1. Ernie West	7710 W. Saginaw Highway, Lansing, MI 48917
2. Brian Reed	7710 W. Saginaw Highway, Lansing, MI 48917
3. Rick Kane	7000 W. Willow Highway, Lansing, MI 48917
4. Alannah Doak	7710 W. Saginaw Highway, Lansing, MI 48917
5. Mary Worland	7710 W. Saginaw Highway, Lansing, MI 48917
6. Jennifer Bernardin	7710 W. Saginaw Highway, Lansing, MI 48917
7. Dave Marquette	7710 W. Saginaw Highway, Lansing, MI 48917
8. Kristen Shankleton, Court Reporter	101-A North Lewis Street, Saline, MI 48176
9. Gary Markstrom	401 S. Washington Sq. Suite 100, Lansing, MI 48933
10. Brent Bode	401 S. Washington Sq. Suite 100, Lansing, MI 48933
11. Chris Keck	5405 S. MLK, Lansing, MI 48911
12. Howard Pizzo	7710 W. Saginaw Highway, Lansing, MI 48917
13. Jeffrey Edwards	1121 Camden, Lansing, MI 48917

STATE OF MICHIGAN

STATE REVOLVING FUND PROJECT PLAN PUBLIC HEARING

DELTA TOWNSHIP

HELD VIA ZOOM VIDEOCONFERENCE

_____/

Date: Wednesday, June 24, 2020 - 6:00 p.m.

Broadcasted from: Township Hall
7710 West Saginaw Highway
Lansing, Michigan 48917-9712

PRESENTED BY:
ERNIE WEST
Township Engineer

REPORTED BY:
KRISTEN SHANKLETON (CER 6785)
Modern Court Reporting, & Video L.L.C.
SCAO Firm No. 08228
101-A North Lewis Street
Saline, Michigan 48176
(734) 429-9143/krs

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Lansing, Michigan

Wednesday, June 24, 2020 - 6:00 p.m.

MR. WEST: Well, good evening everyone. I've got 6:00. We'll start the public hearing. You're here for a public hearing on the Waste Water Treatment Plant Major Capital Improvements Project. This is the next step in our public engagement process for the project. The public comment period is open until July 1, but this is a virtual public meeting, public hearing.

Unfortunately, if you attended last time, we'll cover a lot of the same content in order to make sure everyone is aware of the project and some of the details. So I'll go through a presentation similar to last time if you joined us for the public hearing, or public meeting rather.

With that we'll -- some rules for the discussion tonight; we're going to hold off questions and comments until after the presentation is complete. We need to make sure that when you want to speak that you state your full name and address. That's important for our court reporter who is doing a transcript of tonight's meeting for inclusion in the project plan.

In addition, we'd ask you to keep yourselves on mute until you request to speak just to avoid any background noise. We're going to try to, if it becomes

necessary, we'll limit each speaker to three minutes, and we won't share time with other speakers.

As I noted, we'll do -- the meeting is being recorded. We'll do a verbatim transcription for the SRF Plan, and we'll also make a copy of the video available on the website, similar to the informational meeting.

Dave Marquette, our IT director is on the line if we have any technical issues. He'll give us a hand.

I think everyone I'm seeing on the screen has their name and not just a phone number, so I appreciate that, so we can identify who we're speaking with.

I'd like to also introduce some other players in the project. Delta Township staff, Rick Kane, our utilities director. We also have Brian Reed, the township manager on the call. Alannah Doak, our assistant township manager. Mary Worland in the manager's office. Jennifer Bernardin in the engineering department. Additionally, we have consultants from Tetra Tech, Gary Markstrom and Brent Bode to assist with the presentation and answer any questions.

So why do we need to do a major capital improvement project of the waste water plant? Sorry. This photo dates to 1965. It's the original waste water treatment plant construction which served the original version of the sewage collection system in the township.

It's located at the site of the current -- current plan, and if you're curious, this is looking southeast towards Willow Highway, which is in the background. The site has been a waste water plant since 1965 with a couple of major expansions in '76 -- '72 and '86.

Just a little background on what we've done to really determine that A, we need improvements, and B, what the improvements needed to be, over the last three years we've really done a lot of study and planning to determine the age, the condition of the system. Beginning back in January of 2017 there was some board directive to conduct evaluation and that set forth a series of steps, beginning with a thorough evaluation in 2018, which was conducted by Tetra Tech. We completed that in June of 2019 with a presentation to the board, and out of that came a master plan that identified deficiencies and needed improvements to serve us for the next 30 years.

In 2019 we, September, the Department of Environment, Great Lakes, and Energy, confirmed some new permit limits that were going to be placed on our plant to treat, that would require us to treat to a higher level than we are currently treating, so that introduced another wrinkle. We kind of knew it was coming, but September of 2019 we had a little more concrete information on what that was going to look like.

In October of 2019 we completed a peer review of all the work that was done no the master plan by an independent consultant just to make sure that nothing was missed or, you know, there were no -- nothing overlooked that should have been considered, and that came back and showed that we were on the right track. Also in October of last year we began a very thorough rate study to determine, you know, what -- what are rate structure needed to look like and going to be able to support some improvements and to get us in a position where we would be able to move forward.

Back in November we, the board author -- staff came to the board with a recommendation to pursue State Revolving Fund funding for the project, which really initiated this process. SRF, as we like to call it, requires a very thorough plan be put together, and public engagement process, and a submittal, final submittal after that occurs, and that's kind of where we're at right now is in that -- that step.

So in May, Tetra Tech provided a draft SRF project plan. We made that available publically and presented it to the board. We have some good interaction with the board to kind of discuss how this public engagement would look. We conducted two weeks ago a public information meeting. We also sent out flyers in

the sewer bills to advertise for these events and kind of summarize at a high level the project that was coming. And so that's where we're at is this public information and comment period, and we're going to talk about what's planned, hopefully answer your questions, and take comments if you have them on the project.

So from all of the study and evaluation efforts that we've done in the last three years, we came away with three main drivers for the need to upgrade the waste water treatment plant. The first is the age of the facility. It was originally constructed 55 years ago, and the last major upgrade was -- was over 34 years ago, and basically it's worn out. We are experiencing routine failures of pieces of equipment, different processes. Really every year since 2015 we've had one or more significant equipment issues that staff have had to overcome in order to keep the plan operational. This aerial photo on the right is what the second iteration of the plant looked like from the, after the 1972 upgrade and expansion. So unfortunately everything was last kind of built in 1986, and it's now all kind of wearing out at the same time.

Second driver of the project is the tougher treatment standards that I mentioned from EGLE. Basically, they are implementing a higher level of treatment prior to discharging the water into the Grand

River. These standards go in effect in 2027, and that's going to require a treatment process that the current plant just doesn't have. Really, the goal of EGLE in implementing this is to, you know, improve the water quality in the Grand River, increasing dissolved oxygen content, lowering the solids that are discharged to the river. And really that, you know, that's, as our residents use that river more and more for recreational purposes and the township invests in canoe launches and other park improvements along the river, you know, that's -- that's a good thing, but it does come at a cost, and certainly this waste water treatment plant needs to be upgraded to be able to comply with those permit requirements.

The third major driver is treatment capacity. Currently we're at around 80 percent of our design capacity on an average basis, but during wet weather we often exceed our capacity. This chart, there's a lot going on here, but it kind of looks at the different individual processes in the plant along the left side, and then along the top of the chart shows some of the different flow conditions that we have to look at. And the areas in red, the processes in red illustrate where we don't have enough capacity either for current conditions or in future conditions, and you can see in the 2049,

we're going to be beyond our ability to treat for almost all processes at the plant.

Once we look at doing the project, we want to make sure that we look at a 30 year design life and build in some ability to add that additional capacity. To determine how much capacity to add, we worked with staff to look at land use, future land use projections, zoning. And this map here on the left illustrates some of the work that went into that; the areas in tan being already served by the sewer system, and the areas in red and blue being properties that are likely to be served in the future that are within the service area. The ones in red are likely to build out in a 30 year period, and the ones in blue are likely to build out but in maybe a longer period. So as we look at designing improvements for the next iteration of the plant, we want to build in some modest expansions of treatment capacity so it'll serve us for the next 30 years.

Later on I'll talk about how we've build into our planning the ability to add some growth as the demand comes and not build it all up front, which allows us to, you know, to delay some of that cost until it's really needed and not -- not overbuild the plant. But you can see the chart shows the increases from what our current flows on an average max and peak amount of flow, and those

are a million gallons per day. So we're looking from, at an increase up to about eight million gallons per day, and currently we see around five million gallons per day, so. Again, this plant, as we look to build it, we want it to -- to serve us for another 30 years, so we need to have the capacity to take on some continued growth. That's the third main driver for the project.

What are the improvements? Like I said, because almost all of the equipment is from the 1986 upgrade, unfortunately almost all of it's wearing out at the same time, and almost all, almost the entire plant needs some amount of work. When we talk about these alternatives, these are kind of generalized, but just keep in mind almost every area of the plant is going to need some work out there.

As we considered alternatives, there's some alternatives that EGLE requires us to look at, such as do nothing. That's just not a feasible option given the age and condition of the plant; the issues we're having in keeping it running.

The second alternative would be a regional alternative. You know, can we partner with a local municipality and share resources, and we did take a look at that but found it to be prohibitively expensive and overly complicated. So we kind of set that -- that off to

the side.

And then in between A and B here, we really developed seven or eight different variations with, between staff and our consultants, with lots of different kind of sub-options, but really it got boiled down to two for the purposes of this SRF Plan. One, the first, A, being repairing and retrofitting the existing plant, working basically with what we have already in place, you know, repairing it, bringing it up to working condition and then adding onto it in the case of adding capacity.

The other option, B, which is the recommended option, is reconstructing a significant portion of the system. It doesn't mean reconstructing the entire plant. There would still be rehabilitation, but some significant areas of the process will be reconstructed in a new location, and I'll get into that in a minute.

After we've reviewed all these options and did lifecycle cost analysises (sic), and looked at, looked really hard at them, you know, the repair and retrofit option was -- was looking like it was going to be very inefficient, lead to an inefficient operation of the plant, and being very costly, even more costly than construct -- reconstructing a significant part of it new. So reconstruction was found to be more cost effective, both to build and to operate, and we're expecting it to

use 34 percent less energy as compared to the repair and retrofit option, and I'll go over that a little bit more in a moment. So we are recommending Alternative B, reconstructing a modified system.

So this graphic shows the, at a high level, the proposed improvements, and I'll go through, starting on the left, and just to illustrate, so like the solids handling improvements would be a rehab. We would rehab equipment, replace equipment, but keep the processes in the same area. The electrical upgrades will be new construction. The digester building will be a rehab. The influent raw sewer pump station will be a new structure.

Moving across the top, the primary clarifier and grit removal will be a rehab.

This area in blue and this rectangle in yellow here is the most significant portion of the reconstruction plan. That's the aeration system, the final clarifiers, and the tertiary filter. This would be the new process right here that is being required to meet the new permit requirements.

Finally, UV disinfection would be a new -- new construction within the footprint of an old tank, and then a new laboratory control and operations building.

What I'd like to point out is you can see that this kind of mowed area is the existing waste water

treatment plant site. This expansion into unbuilt areas is still all within the maintained waste water treatment plant site.

The other benefit to building off to the side that I would point out is we were able to build this equipment, these processes, and get them up and running while the old process is still treating wastewater, and at the point that they're ready to run, then we can then connect the system to the new tanks and take the old systems out -- out of service, and that helps us maintain -- maintain treatment during construction, which is very important because we're not given any -- any leeway in our permit requirements during construction.

So that's a high-level overview of the improvements. Obviously there's a lot that goes into all of those, but that's the conceptual layout of the chosen alternative.

So the main reason Alternate B was -- was recommended is, really has to do with the efficiency and the energy savings, as well as the initial cost to build. We have an opportunity with the site that we have, and this is standing kind of what I'll call the lower level, this photo looking uphill, the plant really kind of sits on two levels of elevation.

This lower picture would be on top of the hill

looking back down across -- across these tanks. This graph here on the right is a, kind of a vertical representation of the flow of water through the plant, and what you're seeing is these towers right here, water flows into these towers and it trickles down through the water, through the -- through the tower down to this level; that's about 34 feet of fall. And at that point it has to make its way out to the river down at this lower level. And it's -- in all -- there's not a whole lot of fall through there. And one of the reasons we can achieve 34 percent energy savings with reconstructing up here at this higher level, these ones in bold, is because if we had to insert this tertiary filtration process into the process basically right here at this lower level, we don't have the fall to do that, and we would have to basically re- -- we would have to re-pump all of the water that's leaving the plant up, lift it up high enough for it to go through this tertiary filtration.

So by reconstructing some of these processes up on this hill up in, up in this area, we're able to let gravity do that work for us and avoid the cost of not only building the pumps and the piping -- or the pumps and the electrical system, but also the ongoing electricity cost which is, you know, those pumps that would be pumping 24 hours a day, seven days a week for the life of the plant.

So really this is the key to the difference in the two alternatives.

We talk about saving energy. This is a comparison of the two different alternatives, the left column being if we had to re-pump because we didn't reconstruct it at the higher level, versus reconstructing at the higher level. And so we're able to eliminate some of the electrical usage of different -- different systems, and it's going to save over a million kilowatt hours a year in electrical, which equates to over 106 -- $115,000 of annual energy savings from, just from that.

This energy efficiency also allows us to apply for some green project principal forgiveness grants through the SRF program. They look for projects that are green in nature and are, you know, show that -- can show that we're wisely constructing things that are going to be efficient to operate, and that makes us eligible for some -- some loan forgiveness through that program, and we're actually in the process right now of pursuing that, so that'll be, if we can obtain some of that funding, that will help offset, you know, some of the cost of the project.

So what is -- what are the costs? So it's a very large project, and it's a phased, a phased -- it's going to be a phased approach. What you see here is a two

phase, Phase I and II, roughly each about 35 million dollars. And what I would describe as Phase I would be our most pressing needs, our most urgent needs in order to keep addressing concerns with reliability and breakdown of equipment, but it also sets us up, it's kind of the first step into getting us ready to add that tertiary filtration.

The tertiary filtration comes in Phase II, but these are phases that are very close together. There's not a lot of -- there's almost no time planned between them because we do have the hard deadline of the, of 2027 to be meeting the -- meeting the tougher discharge standards from EGLE.

What's not really depicted here and what you'll see in the master plan if you were to go back and see the master plan that Tetra Tech put together, there's another roughly 7 million dollars of improvements that were identified that are more flow dependent than treatment level or condition dependent. So we determined we were able to defer those until really the flow increases to the point that that's needed, and so that's what we're deeming a Phase III, and we think that's well five years out or longer, which the five year timeframe is what the SRF Plan will cover. So anything beyond five years they don’t -- they don’t want in this plan. It would have to come in

another plan. But we're -- by bringing some of those in as flow is needed, we think that's a better way to build and not overbuild upfront and have, you know, processes or equipment sitting underutilized when that's not really needed, so I would point that out.

The other thing I'd point out is these are, you know, conceptual cost estimates. We've tried to be conservative and build in things like costs for engineering and contingency allowances, but these are all, get dialed in as we move through design and ultimately when we -- when we bid the projects we'll have more firm numbers, but this is -- this is what is being presented to EGLE at this point.

So how are we going to pay for it? The township board is, at the recommendation of staff, has had us pursue Clean Water State Revolving Loan funds. That's a federally funded program that's administered through the state. There is some state match, grant matching, but they're basically low -- low interest loans. We're looking at a 20 year loan, loan period that basically will pay back those loans with revenues collected from sewer bills. So certainly those sewer, that revenue has to be able to cover the debt payment in addition to our ongoing operating cost of the plant.

So I mentioned the township board has authorized

a comprehensive rate study that is underway and is nearing finalization. That'll help guide the board in rate setting in order to meet our financial requirements, both for the project and our ongoing operations. But no doubt with the expenditures we're talking about sewer rates are -- are most likely to have to increase. We've gone through an analysis required by EGLE to try to estimate what that is at this point, and that's what this chart represents. Currently our typical residential bill is around $27.50 a month, which is one of the lowest rates in the Lansing region. With these Phase I and Phase II projects, we're anticipating needing to increase rates around six percent per year for six years to get to the point where we'll have the revenue required to make the debt payments and cover operations.

At the end, so at the end of the six year period, it'd be around a $10 a month increase above that 27.50 that's the current average bill. But even at that rate, we would still remain competitive within the region. Even today we'd be competitive.

This analysis doesn't assume any new users or flow. It also doesn't account for any of the potential loan forgiveness that we got for the green projects. So we believe it's a conservative analysis and hopefully, you know, we'll be able to do -- to do better, but this is

what's being presented at this time with our best estimation of where -- where rates will head.

So project impacts. There's several categories of project impacts that EGLE wants us to look at as part of this process, and I'll go through each of these briefly.

One, the first being archeological and historical resources. We don't have any known archeological or historical resources at the site. There is a state historic preservation office review under way that will hopefully confirm that. I would note, again, with the site being a waste water treatment plant since 1965 and there's been three iterations of construction, there really is nothing known that hasn't been turned over in the past. So we're expecting a no impact finding. Until that comes through, we'll -- we'll stay tuned.

Water and air quality, certainly important impacts to look at. We believe there to be a beneficial impact on water quality in the Grand River from adding the tertiary process. That's a long-term, ongoing improvement to the area. Short-term though, water quality, we would look at trying to mitigate any impacts to water quality from, basically from the construction process through best practices for soil erosion and sedimentation control to prevent any kind of runoff from leaving the construction

site.

And I guess again on water quality, as the community tend -- trends towards more and more water recreation on the Grand River, we certainly believe that to be a very big benefit of the project.

Air Quality. Odor control systems would be probably a primary, long-term concern. The plant currently has financial odor control systems. Any -- all our design efforts -- design efforts will keep continued, the replacement of this equipment with new modern equipment as forefront in our design process to help mitigate odors from the neighbors.

There's also a change, the change in the process by eliminating those trickling filters. Those are one of the more significant odor generators, and that's -- that entire process would be eliminated. So we certainly don't expect a negative impact on odor in the area based on the work that we do out there.

And then again, short-term with construction, dust control will be -- will be considered to try to mitigate any dust from leaving the site during construction.

Natural settings and sensitive ecosystems. Again, I mentioned all work is going to occur within the existing fenced and maintained areas in the plant on the

plant site. We're not going to impact any wetlands, farmland or wild or scenic rivers. We've already received a no effect on endangered species finding from the U.S. Fisheries and Wildlife. There is a potential for impacting bat habitat, and that will be mitigated through limiting tree removals to the timeframe of October to March, which is a current best practice to avoid mating season disruption for bats.

Soil erosion and sedimentation control I mentioned would be used to keep sediment from leaving the site. That will also be a key in mitigating impacts to mussels found on waterways.

And then finally the floodplain. I pointed out the floodplain I believe on that graph showing the flow through the plant. Several of the structures of the current plant are in the floodplain. Certainly we'll have work within the floodplain, but the new plan to reconstruct some of those upland will actually pull some of that equipment and buildings out of the floodplain. And so certainly we think it'll be a net positive impact on the floodplain when we're done.

Consumption of materials. Obviously consumptions of materials is required to build anything. We are going to be cognizant of recycling and reducing waste during construction, and that's really done through

specifications written for the contractor to follow, following kind of best practices for green-type building. That's a pretty well-established area of specifications now in the last 10 to 15 years especially.

Human, social, and economic impacts. Our goal, again with the slow, slow and modest rate increases spread out over time to minimize impact of the rate increases. Building on the township, existing township-owned property that has been a waste water treatment plant since 1965, we're not sprawling out to adjacent properties and requiring additional property to build the project.

There will be a beneficial temporary impact of construction jobs during the projects -- during the project. A lot of, a large amount of skilled labor and manufacturing is required to build a project like this, and the construction jobs will pay a Davis-Bacon Act wage, which is a requirement through the federal funding of the project for successful through the SRF Plan, and the township will ensure the enforcement of those wage rates.

Finally, operational impacts. We have a great staff of dedicated employees that work hard to run and operate that plant, maintain that plant, and they've done a very well, very good job of -- I frequently encounter people that comment on how clean and professional looking the plant is. Things just don’t simply last forever, even

with good maintenance. So this, the chosen alternative we feel facilitates the continued operation of the plant during construction by building off to the side and then -- and then connecting when things are ready to run instead of trying to, you know, remodel -- remodel right in the middle of what you're trying to keep -- keep in operation. Certainly plan operational reliability will be improved with the new structures, new equipment beyond what we're currently experiencing with frequent failures.

And then finally, it'll be an efficient design expected to improve efficiency by 34 percent over the other option. And really being more efficient than it is now. So we want to give all those tools to our operators out there that keep this place running and keep the water clean as it goes into the Grand River.

So project schedule. It's a very long project; that's what I'll say. Here's a high-level overview. Again, we're almost three years into the planning to just to get to this point. Here we are tonight on the public hearing. We'll take our -- take all the public comments until July 1, and then we'll have a couple weeks to pull them into our -- into our project plan and present that to the board of trustees for adoption on July 20th. That's kind of the short-term; the top row there.

Getting that plan adopted and turned in by

August 1st, that'll kind of set the stage for the next longer term schedule, and really between the August 1st, 2020 and spring of 2022 we've got a lot of work to do on design, designing all the details of the new plant and then soliciting bids from contractors to build it. So there's lots to work, lots of milestones that'll fill in between those, but really we're trying to get -- we're underway in Phase I in the spring of 2022, followed by Phase II in the spring of 2024, wrapping up all construction of Phases I and II in fall of 2026, and that gives us about a year to get up and running, get the bugs worked out, and be meeting the new discharge limits that are -- that go into effect in the fall of 2027.

So that is my presentation. Thank you all for joining us to learn more about it. Again, I apologize if you had to sit through it a second time.

PUBLIC COMMENT

MR. WEST: At this point we'll open it up to questions and comments. I'll just have you somehow get my attention, and then I'll call on you, and when you start to speak, again, I'd have you state your first and last name and spell it for Kristen, our court reporter, and then also your address so that we can have that for the record.

Anyone want to start?

(At 6:41 p.m., no response)

MR. WEST: Gary, Rick, or Brent, did I miss anything that I should have covered in the presentation? Maybe I'll start there.

MR. KANE: No, Ernie. I think everything was pretty well covered. I'd just like to reinforce this, that we will be providing full process and treatment, full compliance during all this construction. And I also strongly believe we have an excellent team in place in-house and consulting to make this a very successful project, and build it for the -- for the future.

MR. WEST: Is there any public questions or comments we can address?

(At 6:42 p.m., pause; waiting for any public comment)

MR. WEST: Going once. Going Twice. Gone.

Okay, well, I appreciate everyone that signed in and listened to me ramble on. Just to reiterate, I guess if anyone watches this later on, we will be taking questions or comments and -- and well really we'll always take questions and comments, but until July 1st they will be included in the SRF Plan and we'll have the, EGLE will have a chance to see those when we turn that in. You can best comment or reach out to us at my email at wwtpproject@deltami.gov. And written comments would be

most appreciated so that we have a good way to track those. We'll also, I'm sure, be putting out much more information as the project progresses through. We have a website set up that we'll continue to post information. So unless anyone has anything else, then we'll conclude the public hearing.

(At 6:44 p.m., no response)

MR. WEST: Thank you everyone.

(At 6:44 p.m., hearing concluded; off the record)

STATE OF MICHIGAN)

COUNTY OF WASHTENAW)ss.

I certify that this transcript is a complete, true, and correct transcript to the best of my ability of the STATE REVOLVING FUND PROJECT PLAN PUBLIC HEARING, held Wednesday, June 24, 2020.

I also certify that I am not a relative or employee of the parties involved and have no financial interest in this matter.

DATED: June 25, 2020

Kristen Shankleton

Transcription provided by:

Kristen Shankleton (CER6785)

Modern Court Reporting & Video, L.L.C.

Collette Henderson
720 Arbor Vitae Dr.
Lansing. mi
48917

Delta Township Water Dept.

Thank you for the
excetant water servce
and semage Dept servce.
The plans going into
the future as EXCELANT!
Wonderful plan!
Water and semage
one of socitys most
needed, yet taken for granted,
health and Safty Concerns.
Thank you for
looking ahead and
taking action now
& suport the plan
completion, Price is
very reasonalle.

Sincerly Collette Henderson

From: Bo Kelly
To: WWTP Project
Subject: Comments on WWTP Project
Date: Tuesday, May 26, 2020 4:10:48 PM

Fully support...$10 month increased residential cost small price to pay!

Other concerns:

---new Cannabis companies need to pay their fair share! Also, suggest one time fee for any delta township business that has just started in last 3 years.....they need to understand they received a very well financed system when they opened up shop! This includes upgraded Meier Company operations.
---Need additional homeowner and lawn care companies and their depositing/blowing of chemicalized grass clippings in sewer stream...also, will help to extend new street sewer repairs on my street.
---Greater transparency of the types of equipment needs to be replaced and if the new standards afforded by upgraded equipment and if finished system meets or exceeds the current and future WWTP industry laws and practices.

Thanks for your efforts!

Bo Kelly
Delta Township

From: CBond
To: WWTP Project
Subject: Support of Your Proposal
Date: Saturday, May 30, 2020 2:37:54 PM

Based on the description of Alternative B, it definitely appears to be the proper choice. Retrofitting the existing plant would likely lead to many additional costs and delays as unexpected problems arise. And I expect, at the conclusion of the project, we would still have many components that are 30 – 50 years old.

For what's it's worth, I fully support your recommendation.

Carl Bond
7119 Glen Terra Dr

From: Robert Spagnuolo
To: WWTP Project
Subject: Wastewater Treatment Plan Public Comment
Date: Wednesday, June 10, 2020 7:34:36 PM

Good evening!

I have had the opportunity to read about the proposed improvements to the Delta Township Wastewater Treatment plant, and attended the Zoom meeting tonight. Given everything I have seen and read, I wanted to provide my support for this project. The project is absolutely necessary to make needed and required upgrades and improvements, and the plan seems reasonable. The Township has always done a great job managing its resources, and this is another example that demonstrates the great management of those resources.

Great job communicating this and putting together a comprehensive plan that will help us now and into the future!

Rob Spagnuolo
5311 Greenbriar Road
Lansing, MI 48917

From: WWTP Project
To: WWTP Project
Subject: Automatic reply: Support of Your Proposal
Date: Monday, June 1, 2020 8:40:37 AM

Thank you for submitting your comments on the wastewater treatment plant major capital improvements project. If you would like to learn more about the project, please visit www.deltami.gov/WWTPProject. There is an upcoming public informational meeting scheduled for June 10 and a public hearing on June 24. Details of these events are included on the website.

The deadline for submitting any final comments on the project plan is July 1, 2020. Comments that are received prior to July 1, 2020 will be taken into consideration in the final project plan.

Response to Comments Received During Public Comment Period

Delta Township appreciates the positive comments and support for the proposed SRF Project Plan provided in the written comments.

The Township offers the following response to the other concerns provided in an e-mail from Bo Kelly received on May 26, 2020:

- The Township appreciates your comment concerning new cannabis companies and other recently opened businesses. The Township utility rate structure includes classifications for non-residential users based on the amount of flow expected to be discharged to the system. The rate structure also includes capital charges for new construction sites that connect to the system.
- The Township has separate sanitary sewers and storm sewers. Grass clippings would enter the storm sewer, not the sanitary sewer. The Eaton County Drain Commissioner is responsible for stormwater collection on roads and has permit requirements that address public education related to reducing stormwater pollutants.
- The SRF Project Plan provides details on the specific Wastewater Treatment Plant (WWTP) process equipment. The improvements to the WWTP have been selected and will be designed to meet the new discharge requirements issued by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) that are scheduled to go into effect in 2027. The final improvements will meet or exceed these discharge standards.

CHARTER TOWNSHIP OF DELTA

EATON COUNTY, MICHIGAN

RESOLUTION ADOPTING A FINAL PROJECT PLAN

FOR WASTEWATER SYSTEM IMPROVEMENTS

AND

DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

At a regular meeting of the Township Board of the Charter Township of Delta, Eaton County, Michigan (the "Township"), held on the 20th day of July, 2020 at 6:00 p.m.:

PRESENT: Trustees: Kenneth R. Fletcher, Supervisor, Mary R. Clark, Clerk, Howard A. Pizzo, Treasurer, Fonda J. Brewer, Trustee, Andrea M. Cascarilla, Trustee, Dennis R. Fedewa, Trustee and Karen J. Mojica, Trustee

ABSENT: Trustees: None

The following resolution was offered by Trustee _Mary R. Clark, Clerk_ and seconded by Trustee _Howard A. Pizzo, Treasurer:

WHEREAS, the Charter Township of Delta recognizes the need to make improvements to its existing wastewater treatment plant; and

WHEREAS, Delta Township authorized Tetra Tech to prepare an SRF Project Plan, which recommends the construction of Phases I and II of the Wastewater Treatment Plant Major Capital Improvements project; and

WHEREAS, said SRF Project Plan was presented at a Public Hearing held on June 24, 2020 and all public comments have been considered and addressed; and

NOW THEREFORE BE IT RESOLVED, that the Charter Township of Delta formally adopts said Project Plan and agrees to implement the selected Alternative No. B.

BE IT FURTHER RESOLVED, that the Township Manager, a position currently held by Brian Reed, is designated as the authorized representative for all activities associated with the

project referenced above, including the submittal of said Project Plan as the first step in applying to the State of Michigan for a revolving fund loan to assist in the implementation of the selected alternative.

AYES: Trustees: Kenneth R. Fletcher, Supervisor, Mary R. Clark, Clerk, Howard A. Pizzo, Treasurer, Fonda J. Brewer, Trustee, Andrea M. Cascarilla, Trustee, Dennis R. Fedewa, Trustee and Karen J. Mojica, Trustee

NAYS: Trustees: None

RESOLUTION DECLARED ADOPTED.

Mary R. Clark
Delta Township Clerk

STATE OF MICHIGAN)
) ss:
COUNTY OF EATON)

I hereby certify that the foregoing is a true and complete copy of a resolution adopted by the Township Board of the Charter Township of Delta, Eaton County, Michigan, at a regular meeting held on July 20, 2020, the original of which resolution is on file in my office.

Mary R. Clark
Delta Township Clerk

APPENDIX F: CORRESPONDENCE

Takacs, Krista

From: Haylett, Gina
Sent: Tuesday, March 10, 2020 2:28 PM
To: mnfi@msu.edu
Cc: Markstrom, Gary; Takacs, Krista
Subject: MNFI Rare Species Review Request
Attachments: MI_Wacousta_277460_1965_24000_geo historical map with State Plane coordinates.pdf

Good afternoon,

I am requesting a rare species review through MNFI and have provided the pertinent information below. Please let me know if any additional information is needed.

Name of Organization Making Request: Tetra Tech on behalf of Delta Charter Township
Proposed Project Description: The project involves improvements to the existing Delta Charter Township Wastewater Treatment Plant. The proposed improvements include construction of a new influent pump station, a new aeration tank, four new 100' diameter clarifiers, a new blower/RAS building, a new tertiary filtration building, new digester, and a new administration building. The project will also include demo of existing process areas including the existing oxidation towers, the existing aeration tank and diffuser equipment, and demo of the existing intermediate and final clarifiers. The project will also include retrofitting of existing tanks with new technology.
Description of Existing Facilities: The proposed project will take place on the site of the existing wastewater treatment plant. The site has buildings, tanks, and process equipment. Some of the existing tanks will be removed and new facilities will be constructed in those places.
Location: The project is located at 7000 W. Willow Hwy in Lansing, MI. A USGS map is attached.

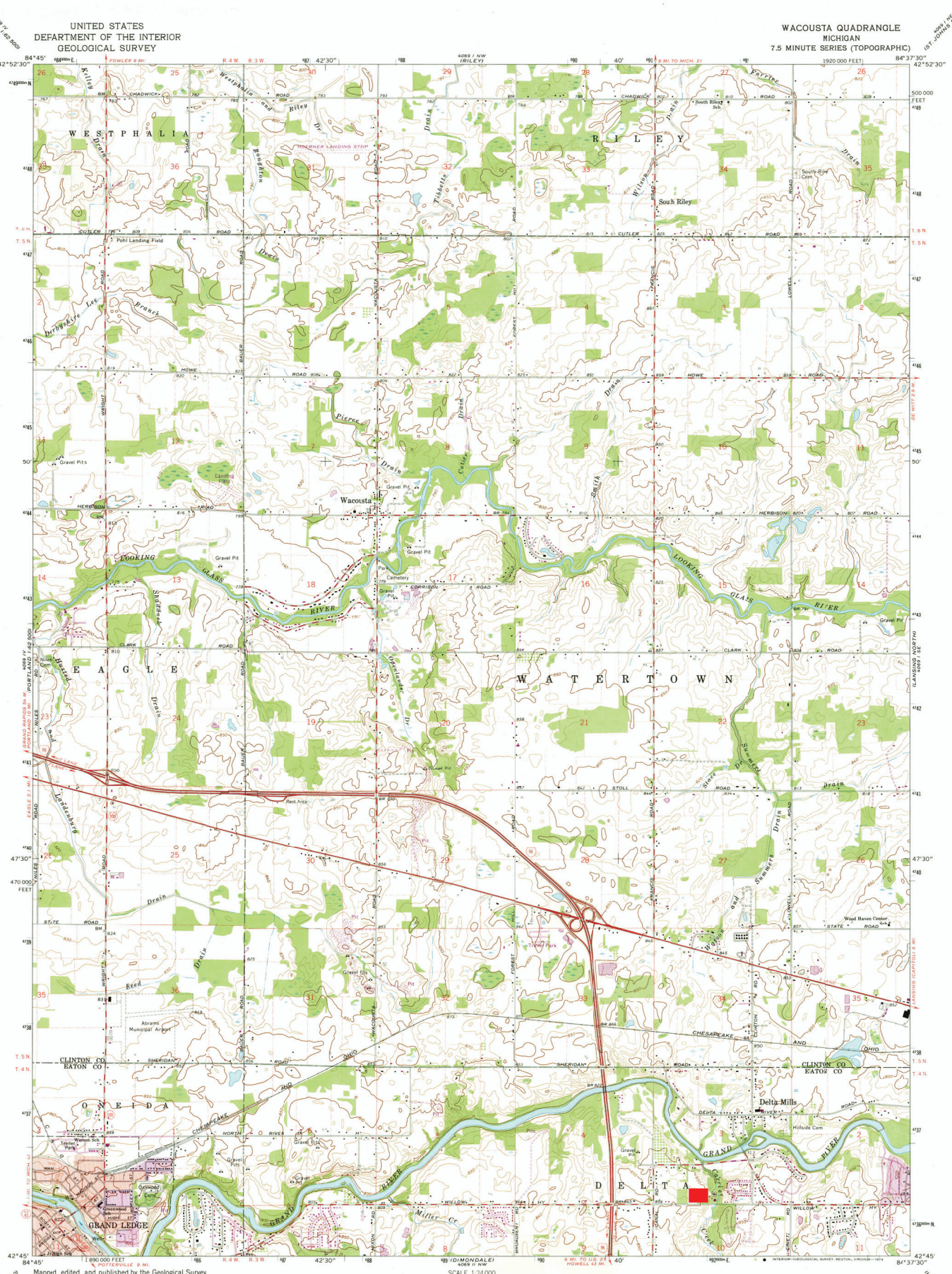
Township: T4N
Region: R3W
Section: 3

Rush Order: A rush order is not needed at this time.

Thank you,
Gina Haylett

Gina Masell Haylett, EIT, MSE | Environmental Engineer II
Cell (248)-200-6077 | gina.haylett@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | **Bioenergy Group**
710 Avis Dr. Suite 100 | Ann Arbor, MI 48108 | tetratech.com


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WACOUSTA QUADRANGLE
MICHIGAN
7.5 MINUTE SERIES (TOPOGRAPHIC)
WESTPHALIA
RILEY
EAGLE
WATERTOWN
ONEIDA
DELTA
GRAND LEDGE
Wacousta
South Riley
Delta Mills
Pohl Landing Field
Abrams Municipal Airport
Wood Haven Center
Hillside Cem
CLINTON CO
EATON CO
LOOKING GLASS RIVER
GRAND RIVER
CHESAPEAKE AND OHIO
Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial photographs taken 1964. Field checked 1966
Polyconic projection. 1927 North American datum
10,000-foot grid based on Michigan coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue
Red tint indicates areas in which only landmark buildings are shown
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked
Revisions shown in purple compiled from aerial photographs taken 1973. This information not field checked
Purple tint indicates extension of urban areas
SCALE 1:24000
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
Project Location- Delta Twp. WWTP
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
Interstate Route
State Route
QUADRANGLE LOCATION
USGS
HISTORICAL FILE
TOPOGRAPHIC DIVISION
WACOUSTA, MICH.
N4245—W8437.5/7.5
1965
PHOTOREVISED 1973
SEP 12 1974
3000

Takacs, Krista

From: Sanders, Mike (DNR-Contractor) <SandersM1@michigan.gov>
Sent: Friday, April 17, 2020 10:40 AM
To: Haylett, Gina
Subject: RE: MNFI Rare Species Review Request
Attachments: RSR_2571_Section 7 Comments_Eaton County.pdf; RSR #2571 Response Letter.pdf

Hi Gina,

Please find our response letter for Rare Species Review #2571 in Eaton County, Michigan.
Also included are comments for projects involving federal funding or a federal agency authorization.

Please let me know if you have questions or comments.

Thank you,

Mike Sanders

Michael A. Sanders
Rare Species Review Specialist/Zoologist
Michigan Natural Features Invtentory
Michigan State University Extension
PO Box 13036
Lansing, MI 48901
Office: 517-284-6215

From: Haylett, Gina <Gina.Haylett@tetratech.com>
Sent: Wednesday, April 15, 2020 11:07 AM
To: Sanders, Mike (DNR-Contractor) <SandersM1@michigan.gov>
Cc: Adkins, Ashley <hurdashl@anr.msu.edu>; Carter, Sarah (DNR-Contractor) <CarterS24@michigan.gov>
Subject: RE: MNFI Rare Species Review Request

Hi Mike,

The invoice was paid by check and the agreement is attached.

Thanks,
Gina

Gina Masell Haylett, EIT, MSE | Environmental Engineer II
gina.haylett@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | **Bioenergy Group**
710 Avis Dr. Suite 100 | Ann Arbor, MI 48108 | tetratech.com

From: Sanders, Mike (DNR-Contractor) <SandersM1@michigan.gov>
Sent: Friday, March 13, 2020 1:05 PM
To: Haylett, Gina <Gina.Haylett@tetratech.com>
Cc: Adkins, Ashley <hurdashl@anr.msu.edu>; Carter, Sarah (DNR-Contractor) <CarterS24@michigan.gov>
Subject: RE: MNFI Rare Species Review Request

Gina,

Thank you for allowing MNFI to evaluate this activity for possible impacts to protected species.
Attached is the project invoice plus our standard Information Agreement (IA) detailing how our data can be used/shared.

Please let me know if you have questions. We will begin processing this request once payment is received and the signed IA is returned.

V/r,

Mike Sanders

Michael A. Sanders
Rare Species Review Specialist/Zoologist
Michigan Natural Features Invtentory
Michigan State University Extension
PO Box 13036
Lansing, MI 48901
Office: 517-284-6215

From: Haylett, Gina <Gina.Haylett@tetratech.com>
Sent: Tuesday, March 10, 2020 2:28 PM
To: mnfi@msu.edu
Cc: Markstrom, Gary <Gary.Markstrom@tetratech.com>; Takacs, Krista <Krista.Takacs@tetratech.com>
Subject: MNFI Rare Species Review Request

Good afternoon,

I am requesting a rare species review through MNFI and have provided the pertinent information below. Please let me know if any additional information is needed.

Name of Organization Making Request: Tetra Tech on behalf of Delta Charter Township
Proposed Project Description: The project involves improvements to the existing Delta Charter Township Wastewater Treatment Plant. The proposed improvements include construction of a new influent pump station, a new aeration tank, four new 100' diameter clarifiers, a new blower/RAS building, a new tertiary filtration building, new digester, and a new administration building. The project will also include demo of existing process areas including the existing oxidation towers, the existing aeration tank and diffuser equipment, and demo of the existing intermediate and final clarifiers. The project will also include retrofitting of existing tanks with new technology.
Description of Existing Facilities: The proposed project will take place on the site of the existing wastewater treatment plant. The site has buildings, tanks, and process equipment. Some of the existing tanks will be removed and new facilities will be constructed in those places.
Location: The project is located at 7000 W. Willow Hwy in Lansing, MI. A USGS map is attached.

Township: T4N
Region: R3W
Section: 3

Rush Order: A rush order is not needed at this time.

Thank you,
Gina Haylett

Gina Masell Haylett, EIT, MSE | Environmental Engineer II
Cell (248)-200-6077 | gina.haylett@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | **Bioenergy Group**
710 Avis Dr. Suite 100 | Ann Arbor, MI 48108 | tetratech.com

MICHIGAN STATE UNIVERSITY | Extension

Gina Masell Haylett, EIT, MSE
Tetra Tech Inc.
710 Avis Drive, Suite 100
Ann Arbor, MI 48108

April 16, 2020

Re: Rare Species Review #2571 – Wastewater Treatment Improvements, Delta Charter Township, Eaton County, MI (T4N R3W Section 3).

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, …fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

Several at-risk species have been documented within 1.5 miles of the project site the and **it is possible that negative impacts will occur**. Keep in mind that MNFI cannot fully evaluate this project without visiting the project site. MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders

Michael A. Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

Comments for Rare Species Review #2571: It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Casey Reitz, Wildlife Division, Michigan Department of Natural Resources, 517-284-6210, or ReitzC@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Carrie Tansy, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8375, or Carrie_Tansy@fws.gov.

Special concern species and natural communities are not protected under endangered species legislation, but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

NOTE: Michigan rivers and streams have been grouped according to existing information of mussel distribution and individual species conservation status. Sections of the Grand River through Lansing are designated as a Group 1 and Group 2 mussel stream which means that state special concern species and state threatened, or endangered mussels are expected to occur here and that certain surveys and possibly relocation procedures apply. This project is located near Carrier Creek a tributary to the Grand River and increased sedimentation and other alterations to Carrier Creek may possibly impact rare freshwater mussels in the Grand River.
I encourage you to read the ***Michigan Freshwater Mussel Survey Protocols and Relocation Procedures*** publication if in-stream work and/or land clearing activities occur that result in streambed disturbance and erosion and sedimentation into either water body. A copy of the publication is being provided to you in this mailing.

NOTE: Several rare freshwater mussels have been documented throughout the project area. Freshwater mussels (*Unionida*) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. As zebra mussel (*Dreissena polymorpha*) infestation has led to the extirpation of many native mussel communities, boat hulls and trailers, fishing gear and scuba equipment should be thoroughly cleaned before moving between waterbodies, to prevent the spread of zebra mussel larvae and adults.

Please consult MNFI's Rare Species for additional information regarding the listed species.

Table 1: Occurrences of threatened & endangered species within 1.5-miles of RSR #2571

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Animal	*Cyclonaias tuberculata*	Purple wartyback		T	G5	S2	1996	1996-08-24
Animal	*Myotis sodalis*	Indiana bat	LE	E	G2	S1	1974	1974-10-11
Animal	*Alasmidonta viridis*	Slippershell		T	G4G5	S2S3	2016-04-08	2016-04-08
Plant	*Galearis spectabilis*	Showy orchis		T	G5	S2	1877	1877
Plant	*Boechera dentata*	Rock cress		T	G5	S1	2016-05-13	2016-05-13

Comments for Table 1:
Purple wartyback mussel - the state threatened purple wartyback mussel *(Cyclonaias tuberculata)* has been known to occur in the Grand River. The purple warty back mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the yellow bullhead *(Ameiurus natalis)* and channel catfish *(Ictalurus punctatus)*, in addition there may be others. If allowed to, purple wartybacks likely live to over 25 years of age. Freshwater mussels (*Unionida*) require a fish host to

complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. The purple wartyback is a summer breeder with fertilized eggs and glochidia released during one summer.

Management and Conservation: like other mussels, threats are varied and include: habitat degradation, poor water quality, flow alterations, water temperature changes, heavy metals, organic pollution, sedimentation, and siltation. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of these threats. Control of zebra mussels is critical to preserving native mussels. As with all mussels, fish host requirements also need to be considered.

Slippershell - the state threatened slippershill (*Alasmidonta viridis*) has been known to occur in the Grand River. Slippershell mussels typically inhabit creeks and the headwaters of rivers in sandy or gravel substrates, but it is occasionally found in muddy substrates. Host fish in Michigan include the johnny darter (*Etheostoma nigrum*) and mottled sculpin *(Cottus bairdii)*. The slippershell mussel is likely a long-term breeder, holding the larvae internally for about a year. Dates of spawning are unknown.

Management and Conservation: slippershells requires clear, clean water and substrates for survival. Like other mussels, threats include siltation, poor water quality, point and non-point source pollution, and alteration of natural flow regimes. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from these threats. Additionally, zebra mussels and other exotic species are a major threat to all mussels. Hence, control and management of exotic species also help protect native mussel species. And as with all mussels, protection of their hosts habitat is also crucial.

Table 2: Occurrences of special concern species and other rare natural features within 1.5 miles of RSR #2571

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Animal	*Myotis lucifugus*	Little brown bat		SC	G3	S1	1957-04-12	1958
Animal	*Pleurobema sintoxia*	Round pigtoe		SC	G4G5	S3	2016-04-08	2016-04-08
Animal	*Lasmigona costata*	Flutedshell		SC	G5	SNR	2016-04-08	2016-04-08
Animal	*Venustaconcha ellipsiformis*	Ellipse		SC	G4	S3	2016-04-08	2016-04-08
Other	Great Blue Heron Rookery	Great Blue Heron Rookery			G5	SU	1991	1991

Comments for Table 2:

Round pigtoe - the special concern round pigtoe mussel (*Pleurobema sintoxia*) has been known to occur in the Grand River. Round pigtoe mussels inhabit medium sized to large rivers. They are found on sand or mud in sparsely vegetated areas with a moderate current. Bluegill (*Lepomis macrochirus*) are believed to be the host fish for round pigtoe.

Management and Conservation - like other mussels, threats include natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of their threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts habitat is also crucial.

Flutedshell – the state special concern flutedshell mussel (*Lasmigona costata*) has been known to occur in the Grand River. Fluted-shell mussels inhabit medium to large rivers in sand, mud, or fine gravel in areas with slow to moderate flow.

Management and Conservation – threats to the species include water pollution, industrial and residential discharge, siltation, increased water temperatures and non-native species. All projects should implement proper upland managements such as contour farming and other soil erosion control methods.

Ellipse mussel – the state special concern ellipse mussel *(Venustaconcha ellipsiformis)* has been known to occur in the Grand River. The ellipse mussel inhabits small to medium streams and can be found in firm sand and gravel where moderate currents prevail. The host fish is unknown. The ellipse is known only from the Midwest United States and has declined considerably in its historic distribution and abundance due to habitat alterations, modification in river flows, and pollution.

Management and Conservation - like other mussels, threats to the ellipse include natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of their threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts habitat is also crucial.

Table Codes:

State Protection Status Code Definitions (SPROT)
E: Endangered
T: Threatened
SC: Special concern

Federal Protection Status Code Definitions (USESA)
LE = listed endangered
LT = listed threatened
LELT = partly listed endangered and partly listed threatened
PDL = proposed delist
E(S/A) = endangered based on similarities/appearance
PS = partial status (federally listed in only part of its range)
C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)
The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)
The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).
S4 = apparently secure in state, with many occurrences.
S5 = demonstrably secure in state and essentially ineradicable under present conditions.
SX = apparently extirpated from state.

Section 7 Comments - Rare Species Review #2571
Tetra Tech
WWTP Improvements
Delta Township
Eaton County, MI
April 17, 2020

For projects involving Federal funding or a Federal agency authorization

The following information is provided to assist you with Section 7 compliance of the Federal Endangered Species Act (ESA). The ESA directs all Federal agencies "to work to conserve endangered and threatened species. Section 7 of the ESA, called "Interagency Cooperation, is the means by which Federal agencies ensure their actions, including those they authorize or fund, do not jeopardize the existence of any listed species."

The project falls within the range of four (4**)** federally listed/proposed species which have been identified by the U.S. Fish and Wildlife Service (USFWS) to occur in Eaton County, Michigan:

Federally Endangered

Indiana bat - there appears to be suitable habitat within our standard 1.5-mile search buffer. The state and federally endangered Indiana bat (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood.

Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Management and Conservation: the suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Federally Threatened

Northern long-eared bat – although no known hibernacula or roost trees have been documented within 1.5 miles of the project sites, this activity occurs within the designated WNS zone (i.e., within 150 miles of positive counties/districts impacted by WNS. In addition, suitable habitat does exist in and outside of our 1.5 mile search buffer. The USFWS has prepared a dichotomous key to help determine if this action may cause prohibited take of this bat. Please consult the USFWS Endangered Species Page for more information.

Northern long-eared bat (*Myotis septentrionalis*) numbers in the northeast US have declined up to 99 percent. Loss or degradation of summer habitat, wind turbines, disturbance to hibernacula, predation, and pesticides have contributed to declines in Northern long-eared bat populations. However, no other threat has been as severe to the decline as White-nose Syndrome (WNS). WNS is a fungus that thrives in the cold, damp conditions in caves and mines where bats hibernate. The disease is believed to disrupt the hibernation cycle by causing bats to repeatedly awake thereby depleting vital energy reserves. This species was federally listed in May 2015 primarily due to the threat from WNS.

Also called northern bat or northern myotis, this bat is distinguished from other *Myotis* species by its long ears. In Michigan, northern long-eared bats hibernate in abandoned mines and caves in the Upper Peninsula; they also

commonly hibernate in the Tippy Dam spillway in Manistee County. This species is a regional migrant with migratory distance largely determined by locations of suitable hibernacula sites.

Northern long-eared bats typically roost and forage in forested areas. During the summer, these bats roost singly or in colonies underneath bark, in cavities or in crevices of both living and dead trees. These bats seem to select roost trees based on suitability to retain bark or provide cavities or crevices. Common roost trees in southern lower Michigan included species of ash, elm and maple. Foraging occurs primarily in areas along woodland edges, woodland clearings and over small woodland ponds. Moths, beetles and small flies are common food items. Like all temperate bats this species typically produces only 1-2 young per year.

*Management and Conservation***:** when there are no known roost trees or hibernacula in the project area, we encourage you to conduct tree-cutting activities and prescribed burns in forested areas during October 1 through March 31 when possible, but you are not required by the ESA to do so. When that is not possible, we encourage you to remove trees prior to June 1 or after July 31, as that will help to protect young bats that may be in forested areas but are not yet able to fly.

Eastern prairie fringed orchid – there does not appear to be suitable habitat within 1.5-miles of the project site. The federal threatened and state endangered prairie fringed orchid *(Platanthera leucophaea)* occurs in two distinct habitats in Michigan - wet prairies and bogs. It thrives best in the lakeplain wet or wet-mesic prairies that border Saginaw Bay and Lake Erie. This species frequently persists in degraded prairie remnants, ditches, railroad rights-of-ways, fallow agricultural fields, and similar habitats where artificial disturbance creates a moist mineral surface conducive to germination. Unlike many other *Platanthera* species, *P. leucophaea* is long-lived, with individuals documented to live more than 30 years. Flowering occurs during late June through early July. The white blossoms produce a heavy fragrance at dusk that attracts many moths, including the primary pollinators of *P. leucophaea*, hawkmoths (Lepidoptera: Sphingidae). Hawkmoths are likely co-adapted pollinators, since their tongues are long enough to reach the nectar that lies deep in the spur of the flower. Capsules mature in September, releasing hundreds of thousands of airborne seeds. Plants may not flower every year but frequently produce only a single leaf above ground, possibly even becoming dormant when conditions are unsuitable, such as the onset of drought.

Management and Conservation: this species requires the maintenance of natural hydrological cycles and open habitat. Activities such as shrub removal are likely to benefit the species, but other management such as prescribed fire is not well understood. Caution and proper monitoring should be employed if using prescribed fire in occupied habitat. Spring fires should be conducted prior to emergence (mid-April). Poaching is also a threat.

Eastern massasauga rattlesnake - the project falls outside Tier 1 and Tier 2 eastern massasauga habitat as designated by the U.S. Fish & Wildlife Service (USFWS). The federally threatened and state special concern eastern massasauga rattlesnake *(Sistrurus catenatus)* is Michigan's only venomous snake occurring in a variety of wetland habitats including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. Eastern massasaugas occur throughout the Lower Peninsula but are not found in the Upper Peninsula. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known from lowland coniferous forests, such as cedar swamps. These snakes normally overwinter in crayfish or small mammal burrows often close to the groundwater level and emerge in spring as water levels rise. During late spring, these snakes move into adjacent uplands they spend the warmer months foraging in shrubby fields and grasslands in search of mice and voles, their favorite food.

Often described as "shy and sluggish", these snakes avoid human confrontation and are not prone to strike, preferring to leave the area when they are threatened. However, like any wild animal, they will protect themselves from anything they see as a potential predator. Their short fangs can easily puncture skin and they do possess potent venom. Like many snakes, the first human reaction may be to kill the snake, but it is important to remember that all snakes play vital roles in the ecosystem. Some may eat harmful insects. Others like the massasauga consider rodents a delicacy and help control their population. Snakes are also a part of a larger food web and can provide food to eagles, herons, and several mammals.

Management and Conservation: any sightings of these snakes should be reported to the Michigan Department of Natural Resources, Wildlife Division. If possible, a photo of the live snake is also recommended.

USFWS Section 7 Consultation Technical Assistance can be found at:

https://www.fws.gov/midwest/endangered/section7/index.html

The website offers step-by-step instructions to guide you through the Section 7 consultation process with prepared templates for documenting “no effect.” as well as requesting concurrence on "may affect, but not likely to adversely affect" determinations.

Please let us know if you have questions.

Mike Sanders
Environmental Review Specialist/Zoologist
Sander75@msu.edu
517-284-6215

U.S. Fish & Wildlife Service

General Project Design Guidelines (3 Species)

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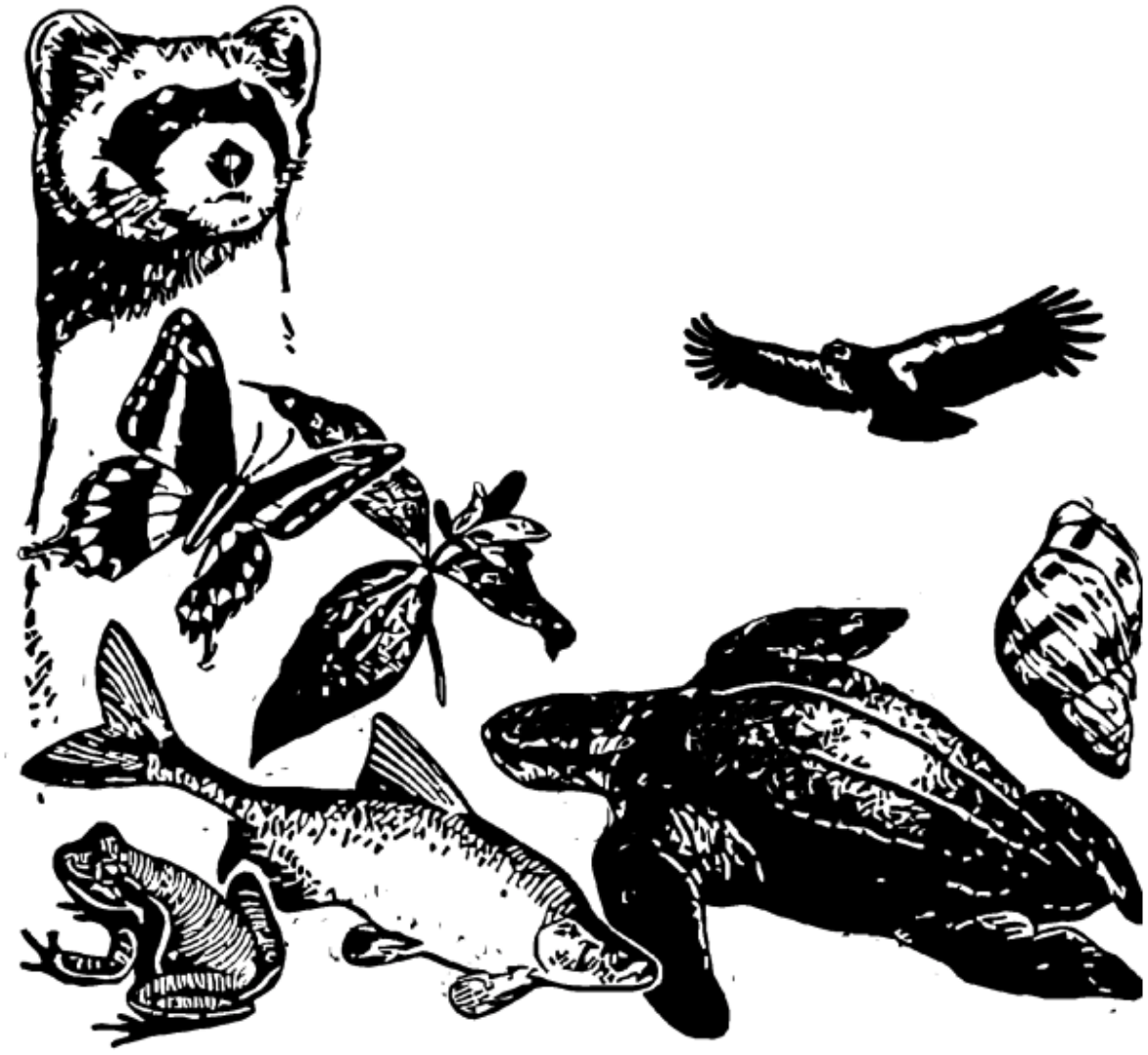

IPaC - Information for Planning and Consultation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

Table of Contents

Species Document Availability

Species with general design guidelines

Eastern Massasauga (=rattlesnake) *Sistrurus catenatus*

Indiana Bat *Myotis sodalis*

Northern Long-eared Bat *Myotis septentrionalis*

Species without general design guidelines available

Eastern Prairie Fringed Orchid *Platanthera leucophaea*

Environmental Screening for Eastern Massasauga Rattlesnake in Michigan

March 14, 2017

Background

The Eastern Massasauga Rattlesnake (EMR) is listed as a threatened species under the U.S. Endangered Species Act (Act). The Act protects the EMR and their habitat by prohibiting "take" and may require agencies to coordinate with the U.S. Fish and Wildlife Service (Service) before authorizing or funding an activity affecting the species. To streamline coordination, the Service's Michigan Ecological Services Field Office has developed a set of Best Management Practices (BMPs) for specific activities potentially impacting EMR in Michigan. These BMPs are voluntary and just one of the ways that compliance with the Act may be achieved.

Projects may…

- have no effect to EMR and no need for additional ESA compliance considerations.
- have potential for adverse effects, but use BMPs to avoid adverse effects (i.e., "not likely to adversely affect" EMR) or minimize the adverse effects.
- use surveys to confirm probable absence of EMR (contact the Service for survey guidance).
- use "Informal Consultation" with Service (for actions requiring a Federal permit or funding).
- use "Formal Consultation" with Service (for actions requiring a Federal permit or funding).
- develop a Habitat Conservation Plan and seek an ESA permit, if adverse effects cannot be avoided.

For activities not listed in the BMPs, please contact the Service for project-specific recommendations. In some cases implementation of BMPs may not be sufficient to avoid all adverse impacts to EMR and additional consultation with the Service may be required. The Service can assist planners in determining whether adverse effects are likely as a result of proposed projects, and whether implementation of BMPs is sufficient to remove the risk of adverse effects.

Additional information on compliance with the Act can be found:

For Federal actions/section 7 consultation:
https://www.fws.gov/midwest/Endangered/section7/s7process/index.html

For non-Federal actions:
https://www.fws.gov/midwest/endangered/permits/index.html

For questions or comments you may contact the Service below:

U.S. Fish and Wildlife Service
Michigan Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
Phone: (517)351-2555
Email: eastlansing@fws.gov

Definitions

Active Season: The active season begins in the spring when snakes emerge from hibernation, generally when maximum air temperatures are above 50°F, and ends in the fall when EMR have returned to their hibernacula and temperatures are consistently below 45°F. In Michigan, the active season is generally April through October. The active season dates will vary by location and weather. **Contact the Service for project-specific dates based on location when work in EMR habitat is planned near the start or end of the active season**.

Affecting hydrology: We consider "affecting hydrology" to include projects that are likely to appreciably change the elevations of surface water upstream or downstream, or in the local ground water (as estimated pre-project vs. post-project). The concern is for changes to local hydrology (e.g., creating new ditches, creating a new impoundment) that might harm EMR hibernating at or near ground water, or actions that significantly alter available suitable habitat either through flooding or drying of EMR wetlands.

Hibernacula: Areas suitable for EMR to overwinter. For most EMR populations, the locations of hibernacula are not known, but these areas are critical to protect. Unfortunately, we lack information on how to reliably identify these areas. EMR usually hibernate below the frost line in crayfish or small mammal burrows, tree root networks or rock cervices in or along the edge of wetlands or in adjacent upland areas with presumably high water tables (areas where the soil is saturated but not inundated). Following egress from hibernacula in the spring, EMR typically remain aboveground in the vicinity for a week or two, and return to these areas in the fall for several weeks prior to entering hibernation. Surveys in the spring (shorting following egress) or fall (prior to ingress) when snakes are congregating in the vicinity may help identify these important areas. Maintaining stable hydrology of these areas is important during the inactive season.

IPaC: "Information for Planning and Conservation" is a project planning tool available on-line to the public that streamlines the Service's environmental review process.

EMR Habitat: "Eastern Massasaugas have been found in a variety of wetland habitats. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are known from open wetlands and lowland coniferous forests, such as cedar swamps. Some populations of Eastern Massasaugas also utilize open uplands and/or forest openings for foraging, basking, gestation and parturition (i.e., giving birth to young). Massasauga habitats generally appear to be characterized by the following: (1) open, sunny areas intermixed with shaded areas, presumably for thermoregulation; (2) presence of the water table near the surface for hibernation; and (3) variable elevations between adjoining lowland and upland habitats." From Michigan Natural Features Inventory (Website: mnfi.anr.msu.edu)

Tier 1 Habitat: Areas known to be occupied by EMR or highly likely to be occupied by EMR.

Tier 2 Habitat: Areas with high potential habitat and may be occupied by EMR.

Within the known range: EMR can occur throughout the Lower Peninsula and on Bois Blanc Island in Mackinac County. Areas within the known range but outside of Tier 1 and Tier 2 are considered less likely to be occupied. EMR is highly secretive and cryptic in nature, and can persist in low densities, which makes them difficult to detect. Further, there are extensive areas of the state that have never been surveyed. It is likely that there are additional and yet-unknown occurrences throughout the Lower Peninsula of Michigan. Mapped habitats are subject to change based on new information identifying current Tier 1 and 2 areas as unsuitable, or based on discovery of new EMR occurrences.

EMR Environmental Screening Step-wise Process

Step 1. Determine if EMR may be present in the action area

- ✓ Determine whether the project is in potential EMR habitat using https://ecos.fws.gov/ipac
  - o You can search for your project location and define the action area by drawing a polygon or uploading a shapefile.
  - o IPaC will give you a list of species that may be present in the area you identified. If you click on the thumbnail for EMR, it will tell you if your project is within Tier 1 or Tier 2 habitat, or within the known range of EMR. If EMR is not listed, you do not need to consider this species. Effects to other listed species should also be considered; contact the Service if you need assistance.
  - o If EMR is listed, it does not necessarily mean that the entire action area is potential habitat, only that some potential habitat is within the action area entered. For large-scale (e.g., county-wide or multi-county projects) consider coordinating the Michigan Ecological Services Field Office for direct assistance.

If your project is within the known range of EMR, including Tier 1 or Tier 2 habitat, continue to step 2:

Step 2. Determine if the project has the potential to affect EMR

Projects have no effect on EMR when…

- ✓ There is no suitable EMR habitat in the project area and no potential impact off-site (e.g., water discharge into adjacent EMR habitat). If project site conditions are determined to be wholly unsuitable for EMR (e.g., project is in regularly mowed turf grass, row crop, graveled lot, existing building, or industrial site), it is not suitable EMR habitat.
- ✓ The project occurs within suitable habitat, but the action will have absolutely no effect on the habitat or EMR.
- ✓ In suitable EMR habitat, but the site is entirely unoccupied by the species. This is typically confirmed through surveys (contact the Service for more information). In some cases it may be easier to assume EMR are present and use BMPs than to conduct surveys for the species.

For projects where there is a potential for effects to EMR, continue to the section of the document as follows:

For projects with a combination of Tier 1 and Tier 2 habitat, follow the instructions for Tier 1.

Tier 1 Habitat

Tier 1: Project will not affect EMR if all of the following apply:

1. Project will not result in any changes to suitable EMR habitat quality, quantity, availability or distribution, including changes to local hydrology
2. If EMR are present in the project area, they are not likely to have any response as a result of exposure to the action or any environmental changes as a result of the action
3. Project includes all General Best Management Practices:
   a. Use wildlife-safe materials for erosion control and site restoration (see Erosion Control Resources side panel). In Tier 1 habitat, immediately eliminate use of erosion control products containing plastic mesh netting or other similar material that could entangle EMR.
   b. To increase human safety and awareness of EMR, those implementing the project should first watch MDNR's "60-Second Snakes: The Eastern Massasauga Rattlesnake" video (available at https://youtu.be/-PFnXe_e02w), or review the EMR factsheet (available at https://www.fws.gov/midwest/endangered/reptiles/eama/pdf/EMRfactsheetSept2016.pdf or by calling 517-351-2555.
   c. Require reporting of any EMR observations, or observation of any other listed threatened or endangered species, during project implementation to the Service within 24 hours.

Tier 1: Project Not Affecting EMR Coordination Recommendation: No pre-project coordination with Service needed. Document the steps above for your records.

Tier 1: All Other Projects: For any other projects in Tier 1 habitat that may affect EMR or its habitat, contact the Service for assistance in evaluating potential impacts. Best Management Practices (starting on page 8) are included for many actions to help with project planning, but may not be sufficient to avoid all adverse impacts. The Service can determine whether additional measures are necessary after a project-specific review.

Erosion Control Resources

There are a variety of products that can be used for soil erosion and control requirements. These products may incorporate plastic mesh netting to help maintain form and function. This plastic netting has been demonstrated to entangle a wide variety of wildlife from birds to small mammals. In Michigan, soil erosion control netting has resulted in the documented mortality of a number of imperiled amphibian and reptile species including the EMR and the Eastern Fox Snake (State Threatened).

Several products for soil erosion and control exist that do not contain plastic netting including net-less erosion control blankets (for example, made of excelsior), loose mulch, hydraulic mulch, soil binders, unreinforced silt fences, and straw bales. Others are made from natural fibers (such as jute) and loosely woven together in a manner that allows wildlife to wiggle free. For more information regarding wildlife-safe erosion control measures contact the USFWS Michigan Ecological Services Field Office.

Tier 2 Habitat

Tier 2: Project is not likely to adversely affect EMR if all of the following apply:

1. Project does not impact more than 1 acre of wetland habitat and includes all applicable activity-specific BMPs (starting on page 8), and
2. Project will not appreciably affect hydrology
3. Project includes all General Best Management Practices:
    a. Use wildlife-safe materials for erosion control and site restoration (See Erosion Control Resources side panel, page 4). In Tier 2 habitat, eliminate the use of erosion control products containing plastic mesh netting or other similar material that could ensnare EMR as soon as is feasible but no later than January 1, 2018.
    b. To increase human safety and awareness of EMR, those implementing the project should first watch MDNR's "60-Second Snakes: The Eastern Massasauga Rattlesnake" video (available at https://youtu.be/-PFnXe_e02w), or review the EMR factsheet (available at https://www.fws.gov/midwest/endangered/reptiles/eama/pdf/EMRfactsheetSept2016.pdf or by calling 517-351-2555.
    c. Require reporting of any EMR observations, or observation of any other listed threatened or endangered species, during project implementation to the Service within 24 hours.

Tier 2: Project Not Likely to Adversely Affect EMR Coordination Recommendation: Informal consultation with Service for actions requiring a Federal permit or funding. For non-Federal projects, document the steps above for your records, but no pre-project coordination with the Service needed.

Tier 2: All Other Projects: Coordinate with the Service for a project-level review to determine potential impacts and whether additional conservation measures are needed to avoid adverse effects.

Within the known range of EMR

For projects within the known range of EMR, but outside of Tier 1 and Tier 2 habitat:

To help ensure your project is unlikely to affect EMR:

1. Project applies the General Best Management Practices:
    a. Use wildlife-safe materials for erosion control and site restoration (See Erosion Control Resources side panel, page 4). By January 1, 2019, eliminate the use of erosion control products containing plastic mesh netting or other similar material that could ensnare EMR (within the known range but outside of Tier1 or Tier 2 habitat).
    b. To increase human safety and awareness of EMR, those implementing the project should first watch MDNR's "60-Second Snakes: The Eastern Massasauga Rattlesnake" video (available at https://youtu.be/-PFnXe_e02w), or review the EMR factsheet (available at https://www.fws.gov/midwest/endangered/reptiles/eama/pdf/EMRfactsheetSept2016.pdf or by calling 517-351-2555.
    c. Require reporting of any EMR observations, or observation of any other listed threatened or endangered species, during project implementation to the Service within 24 hours.
2. Project will not have significant impacts to dispersal, connectivity, or hydrology of existing EMR potential habitat, i.e., filling less than 1 acre of wetland habitat or converting less than 20 acres of uplands of potential EMR habitat (uplands associated with high quality wetland habitat) to other land uses.

Within the Known Range, but Outside Tier 1 or 2 Coordination Recommendation:
Document the steps above for your records and no pre-project coordination with the Service needed. If you cannot implement the General Best Management Practices contact the Service for assistance in evaluating potential impacts.

Activity-Specific Best Management Practices

For Tier 1, BMPs are included; however, even with implementation of the BMPs, project-specific review may be needed to determine whether they are sufficient to avoid all adverse impacts

- In Tier 1 habitat, contact the Service regarding the potential applicability of surveys to determine EMR absence in suitable habitat. In Tier 2, surveys can be conducted to confirm the presence of suitable habitat and/or the presence/probable absence of EMR. If onsite habitat is determined to be wholly unsuitable via desktop analysis (e.g., entirely mowed lawn, row crop, graveled lot, and industrial site), then it can be classified as unoccupied and the BMPs will not be necessary.
- Minimize work in Tier 1 and Tier 2 EMR habitat. When feasible, do not route new construction projects, such as pipelines, facilities, or access roads, through potential EMR habitat. Implement the use of wildlife-friendly corridors (e.g., oversized culverts) into new road design to maintain or enhance habitat connectivity.
- Projects should be designed to minimize the potential for disturbance to EMR during project activities.

Maintenance Activities (includes nominal modifications to existing roads and infrastructure)

1. Ground Disturbing Activities
    a. All
        i. No known EMR hibernacula are destroyed or disturbed at any time of year. Because these areas are often not known:
            1. For Tier 1: contact the Service to determine whether adverse impacts are likely as a result of ground disturbing work in Tier 1 habitat.
            2. For Tier 2: when operating in potential hibernation areas (e.g., EMR wetlands and adjacent areas with crayfish burrows, rodent holes, small mammal burrows, etc.), work is conducted well within the active season (June – August) to avoid when snakes are likely to be present. During this time, they are most likely to be able to move out of the way of disturbance and have greater chances to find alternative hibernation sites. Destroying potential hibernacula may still impact snakes indirectly. Potential hibernation areas should be avoided to the extent possible.
    b. Grading
        i. When working during EMR active season, use exclusionary fencing to separate EMR habitat from the work site to prevent EMR from accessing the disturbance area. For example, in linear projects exclusionary fencing should run parallel to the disturbance, creating a barrier to snake movement. Each end of the exclusionary fencing should be angled away from the area of disturbance to direct snakes traveling along fencing away from the site. The

exclusionary fencing will typically be traditional silt fence that is set up outside of all areas of disturbance and other types of fencing (i.e., snow fence used to delineate the work zone). Do not use fencing materials that can entangle or injure snakes.

ii. Any areas using exclusionary fencing should first be "cleared" by a qualified individual[1] before beginning construction activities. Fencing should be installed a minimum of 1 day before construction activities occur and walked weekly to ensure the integrity of the fence. If snakes are seen within the work zone, activity should stop until the snake can be safely moved, and the fence examined for breeches.

iii. Revegetate all disturbed Tier 1 and Tier 2 habitat with appropriate plant species (i.e., native species or other suitable non-invasive species present on site prior to disturbance). Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary to ensure restorations are of equal to or better habitat quality than previous conditions.

iv. In Tier 1 and Tier 2, avoid spread of invasive species into EMR habitat by following best practices. This includes inspecting and cleaning equipment and vehicles between work sites as needed to avoid the spread of invasive plant materials.

c. Trenching

i. In Tier 1 and Tier 2, avoid trenching in EMR wetlands when possible. In Tier 1, if open trenching is required install exclusionary fencing (follow measures 1(b)(i)-(iv)) and ensure the area is clear prior to trenching.

d. Fill

i. In Tier 1 and Tier 2, ensure all imported fill material is free from contaminants or invasive species could affect the species or habitat through acquisition of materials at an appropriate quarry or other such measures.

ii. In Tier 1 and Tier 2, use exclusionary fencing around the area to be filled and have the site "cleared" prior to placing fill by a qualified individual (as in 1(b)(i)-(ii).

e. Ditching

i. For Tier 1 and Tier 2, conduct work well within the active season (June-August) when snakes are not likely to be near hibernation sites and can escape disturbance, or contact Service for project specific recommendations.

ii. For Tier 1, use exclusionary fencing around the area to be cleared/graded and have the site cleared by a qualified individual prior to construction activities.

iii. For Tier 1, contact the Service for work greater than 200' for project specific recommendations.

[1] A qualified individual is someone who has received training on the identification and life history of EMR.

2. Site Access with vehicles (both Tiers)
    a. Limit operating vehicles/equipment, clearing trees, etc., in EMR habitat to the inactive season when the ground is frozen. During this time, under these conditions, EMR are most likely underground and will not be impacted by these activities. When possible, use low-impact equipment such as light weight track mounted vehicles with low ground pressure. In Tier 1, if the ground isn't completely frozen (due to weather conditions during the inactive season or if working near seeps and springs that are less likely to freeze), or if working near potential hibernacula, manual access (on foot) may be required.
    b. Strictly control and minimize vehicle activity in known/presumed occupied EMR habitat to the extent possible. During EMR active season, speed limits at facilities and access roads (i.e., 2-track and gravel) in occupied habitat should be <15 MPH.
    c. In Tier 1 and Tier 2 habitat areas, drivers should be aware of the potential danger to the driver of swerving to intentionally drive over snakes as well as legal and conservation implications.

3. Heavy Equipment (both Tiers)
    a. Spill Prevention for oils/fluids
        i. Site staging areas for equipment, fuel, materials, and personnel at least 100 feet from the waterway, if available, to reduce the potential for sediment and hazardous spills entering the waterway. If sufficient space is not available, a shorter distance can be used with additional control measures (e.g., redundant spill containment structures, on-site staging of spill containment/clean-up equipment and materials). If a reportable spill has impacted occupied habitat:
            1. Follow spill response plan;
            2. Call MDEQ and the National Response Center (800-424-8802), and the Service's Michigan Ecological Services Field Office (517-351-2555) to report the release.
    b. Do not use large equipment or perform earth-moving activities, water withdrawal and discharge for hydrostatic testing, or other activities that substantially affect the ground or water levels in potential EMR hibernacula areas. Avoidance measures may include, but are not limited to, re-routing of pipeline and appurtenance facilities, boring or drilling, and timing/weather-related restrictions. Measures will be determined on a site-specific basis, based on local habitat conditions, contact Service for more information.

4. Hydrology impacts (both Tiers)
        i. Water levels in known/presumed occupied habitats should not be artificially manipulated during the inactive season.

ii. Where applicable, water levels should be allowed to flow naturally and not be artificially stabilized. This allows for the restoration of early successional habitats.

Habitat Management and Restoration

5. Vegetation Management
    a. Mowing
        i. In Tier 1, mow during the inactive season.
        ii. For Tier 2, mowing is unrestricted during the inactive season. During the active season, follow daytime mowing restrictions and mow during times of day when snakes are less likely to be active (Figure 1). Increase mower deck height to >8 inches to reduce likelihood of injury to snakes. Higher deck height will reduce the risk of death or injury to snakes in the area.
        iii. In areas with turf grass or areas where trying to discourage EMR (e.g., in areas around buildings), mow regularly and keep grass relatively short (less than 4-6 inches) to reduce its suitability for EMR. If starting with longer grass (greater than 6 inches), mow during the inactive season initially, and then maintenance mowing can occur during the active season (as long as it is regularly maintained and kept shorter than 4-6 inches, so that EMR is unlikely to use those areas). Unmaintained/longer grass may be used by snakes and make them vulnerable to mortality during the next mowing event.

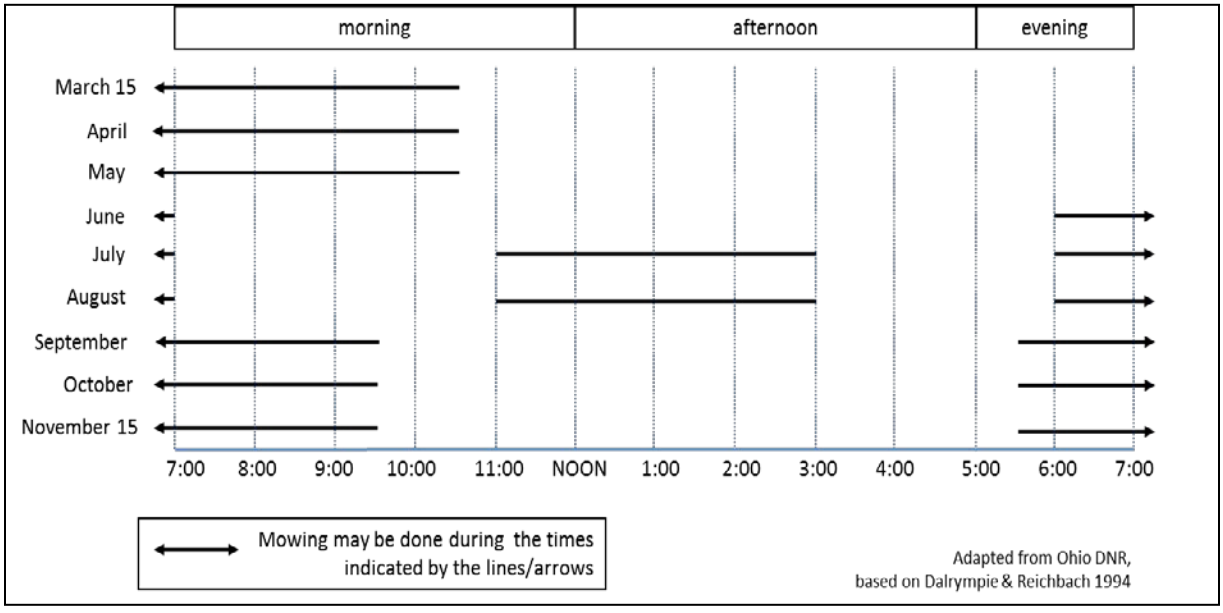

Figure 1. EMR Active season mowing schedule (NiSource Biological Opinion, page 273, USFWS 2015)

b. Cultivation (e.g., disking)
    i. In Tier 1 habitat, disking should be limited to the inactive season, and areas within 50 m of known or potential hibernacula should be avoided. In Tier 2, disking can occur in the active season if area is mowed during the inactive season and maintained shorter than 4-5 inches.
c. Brush/Tree Removal
    i. In Tier 1, conduct brush or tree removal in known/presumed EMR habitat during the inactive season, when the ground is frozen (such that soils can be left undisturbed).
    ii. Use low impact harvest methods in Tier 1 and Tier 2 wetlands to cut and remove individual trees. This includes using low-impact equipment such as light weight track mounted vehicles with low ground pressure. In Tier 1, if the ground isn't completely frozen (due to weather conditions during the inactive season or if working near seeps and springs that are less likely to freeze), or if working near potential hibernacula, use hand tools and access site on foot.
    iii. In Tier 1 and Tier 2, do not burn brush piles during the active season. Dispose of brush offsite or leave in place.
d. Herbicides
    i. Follow all appropriate label instructions regarding which herbicide formulation to use in potential EMR habitat. Avoid spray drift beyond the target species/area (observing label instructions regarding optimal wind speed and direction, boom height, droplet size calibration, precipitation forecast, etc.).
    ii. Avoid broadcast applications of herbicides in Tier 1. Spot spraying or wicking can be used to control invasive plants in occupied habitat. If using broadcast spray in Tier 2, limit the area of exposure to less than half of the available EMR habitat to allow for untreated areas to provide potential areas of refugia from exposure. Contact the Service if you need help in determining this.
e. Prescribed burning (Tier 1 and Tier 2)
    i. Conduct prescribed burns during the inactive season before snakes emerge from hibernation. Walk the burn unit following the burn and report any dead or injured EMR to the Service within 24 hours. Burn only a portion (e.g., one-third) of available EMR habitat in any year to leave suitable cover for EMR and its prey.
    ii. Establish fire breaks using existing fuel breaks (roads, rivers, trails, etc.) to the greatest extent possible. Cultivation (disking or roto-tilling) of burn breaks will be minimized to the extent that human health and safety are not jeopardized. Cultivation and mowing to establish fire breaks will occur during the inactive season.

6. Erosion control
    a. Use wildlife-safe erosion control blankets (without plastic mesh netting in the layers of material) as required in the general BMPs. Remove all silt fence used for erosion control once soils are stable to reduce barriers to EMR movement.
7. Revegetation
    a. Revegetate all disturbed Tier 1 and Tier 2 habitat with appropriate plant species (i.e., native species or other suitable non-invasive species present on site prior to disturbance). Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary to ensure restorations are of equal to or better habitat quality than previous conditions.
8. Invasive species
    a. In Tier 1 and Tier 2, avoid spread of invasive species into EMR habitat by following best practices. This includes inspecting and cleaning equipment and vehicles between work sites as needed to avoid the spread of invasive plant materials.
9. Wetland restoration
    a. Restoring natural hydrology in areas that have been drained by tiling and ditching may greatly benefit EMR habitat. Conduct tile breaking or excavation well within the active season to avoid potential hibernacula. Have a qualified individual walk in front of the equipment to clear the area. Work with the Service for Tier 1 habitat to ensure no indirect adverse effects are expected as a result of restoration efforts.
10. Water-level manipulation
    a. Water levels should not be artificially manipulated during the inactive season to avoid impacts to hibernating snakes. Contact the Service in Tier 1 habitat when water levels will be manipulated during the inactive season or will result in significant alterations to EMR habitat during the active season.

Indiana Bat Project Review in Michigan

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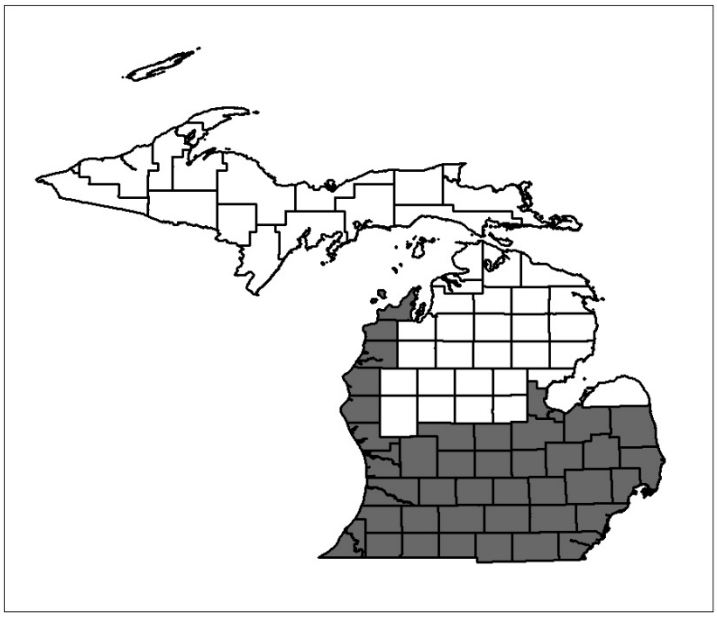
I. BACKGROUND INFORMATION

The Indiana bat was listed as endangered under the Endangered Species Act (ESA) in 1967 due to episodes of people disturbing hibernating bats in caves during winter, which resulted in the death of substantial numbers of bats. Indiana bats are vulnerable to disturbance because they hibernate in large numbers in only a few sites, with major hibernacula supporting 20,000 to 50,000 bats. Since it was listed as endangered, the range-wide Indiana bat population has declined by nearly 60%. Several threats are believed to have contributed to the Indiana bat's decline, including the commercialization of caves, loss and degradation of forested habitat, pesticides and other contaminants, and most recently, the disease white-nose syndrome (WNS).

Indiana Bat in Michigan

Indiana bats have been documented at many sites in Lower Michigan and are believed to range throughout the southern five county tiers, as well as parts of the thumb and the western coastal counties up to (and including) the Leelanau peninsula (see range map below). Michigan is home to a single known Indiana bat hibernaculum: a hydroelectric dam in Manistee County. Although the dam supports about 20,000 hibernating bats, Indiana bats comprise less than 1% of the winter population. Research suggests that the majority of the Indiana bats that summer in Michigan migrate to hibernacula in adjacent states, such as Indiana and Kentucky.

Like their overwintering sites, Indiana bats exhibit strong fidelity to their summer home ranges; however, we do not have knowledge of all of these summering areas in Michigan. Therefore, unless presence/absence surveys conducted in accordance with U.S. Fish and Wildlife Service (Service) guidelines (https://www.fws.gov/MIDWEST/Endangered/mammals/inba/inbasummersurveyguidance.html, and also available via IPaC) indicate the probable absence of the species, Indiana bats are considered potentially present wherever suitable habitat exists within their range.



Range of the Indiana Bat in Michigan

Suitable Habitat for Indiana Bats:

During the winter, Indiana bats hibernate in caves, mines, or similar structures. Most major hibernacula for the species are found in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia, and critical (winter) habitat has been designated in these states. Michigan is home to a single known Indiana bat hibernaculum, in Manistee County, and there is no designated critical habitat for the species in Michigan.

Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats, such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches dbh that have exfoliating bark or cracks/crevices), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1000 feet of other forested/wooded habitat. Southern Michigan maternity roost trees are typically dead or dying trees in open areas exposed to solar radiation. Infrequently, Indiana bats are observed roosting in human-made structures, such as buildings, barns, bridges, and bat boxes.

II. VOLUNTARY CONSERVATION MEASURES

Voluntary conservation measures that benefit the Indiana bat include protecting, creating, and enhancing mature forest, particularly hardwood/mixedwood stands containing standing snags, dying trees, vertical complexity, midstory/understory flight space, and waterbodies such as streams, ponds, and forested wetlands. As Indiana bats are known to avoid traversing large open areas outside of migration, preserving wooded corridors (such as tree lines) can be extremely beneficial in connecting fragmented patches of suitable roosting/foraging habitat.

Conserving Indiana bat habitat likely benefits the Federally threatened northern long-eared bat (*Myotis septentrionalis*) and other native bat species, several of which are experiencing recent population declines as a result of WNS and/or other factors. As significant predators of nocturnal insects, including many crop and forest pests, bats are important to Michigan's agriculture and forests. For example, Whitaker (1995)[1] estimated that a single colony of 150 big brown bats (*Eptesicus fuscus*) would eat nearly 1.3 million pest insects each year. Boyles et al. (2011)[2] noted that the "loss of bats in North America could lead to agricultural losses estimated at more than $3.7 billion/year," and using their data for Michigan alone, we totaled the estimated value at over $500 million per year (assuming standard crop pest survival). Taking proactive

[1] Whitaker, J.O. 1995. Food of the Big Brown Bat *Eptesicus fuscus* from Maternity Colonies in Indiana and Illinois. American Midland Naturalist 134(2):346-360.

[2] Boyles, J.G., P.M. Cryan, G.F. McCracken, and T.H. Kunz. 2011. Economic Importance of Bats in Agriculture. Science 332:41-42.

steps to help protect bats may be valuable to agricultural and timber producer yields and pest management costs.

Continue to the following sections for ESA guidance on Federal and non-Federal projects in Michigan. For more information on the Indiana bat, including life history information, designated critical habitat and draft recovery plan, please visit: https://www.fws.gov/midWest/endangered/mammals/inba/

III. ESA GUIDANCE: PRIVATE LANDOWNERS/NON-FEDERAL PROJECTS

The Service does not require private landowners to conduct surveys for ESA-listed bats on their lands in Michigan. However, the bats and the habitats where they are known to occur are protected by the ESA. Under Section 9 of the ESA, it is unlawful for any person to "take" an endangered species. The term "take" is defined as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harm" is further defined to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impacting essential behavioral patterns, including breeding, feeding, or sheltering."

In general, activities that impact suitable Indiana bat habitat have the potential to result in take. One of the most common activities impacting Indiana bat habitat is tree clearing during the summer season. Typically, incidental take associated with tree removal (i.e., trimming, cutting, girdling, burning) can be avoided by scheduling these activities during the winter hibernation period (October 1 through March 31), when Indiana bats have departed from summer habitat. As long as the scope of winter tree removal, in terms of acres, is not significant enough to constitute "harm," effects to Indiana bats can be kept minimal or beneficial.

Permits and authorizations are required whenever incidental take of Indiana bats is reasonably certain to occur. If your project is likely to result in the take of Indiana bats, please contact the Michigan Ecological Services Field Office to determine if a permit pursuant to the ESA is warranted. For general information about take permits, visit: https://www.fws.gov/Midwest/endangered/permits/index.html.

As a means to determine the likelihood of take, project proponents may be interested in documenting whether potential habitat is, in fact, occupied by Indiana bats. In such cases, presence/absence surveys conducted in accordance with current Service guidelines (https://www.fws.gov/MIDWEST/Endangered/mammals/inba/inbasummersurveyguidance.html and also available via IPaC) can inform project-specific conservation measures and the need for a permit.

Please note that projects that require State permits or authorizations that implement Federal laws or are supported by Federal funds (e.g., Clean Water Act, transportation projects) may have additional requirements under or similar to Section 7 of the ESA, as described in the following section: IV. ESA GUIDANCE: FEDERAL PROJECTS.

IV. ESA GUIDANCE: FEDERAL PROJECTS

1. Standard Section 7 Consultation:

Under the ESA, requirements for Federal projects (i.e., projects funded, authorized, permitted, or implemented by a Federal agency) are different than requirements for wholly private or otherwise non-Federal projects. The ESA mandates all Federal departments and agencies to conserve listed species and to utilize their authorities in furtherance of the purposes of the ESA. Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they conduct, including those they fund or authorize, do not jeopardize the existence of any listed species.

Federal agencies must request a list of species and designated critical habitat that may be present in the project area from the Service (i.e., via IPaC, on our website at https://www.fws.gov/midwest/Endangered/section7/sppranges/MIs7listrequest.html, or by contacting our office). Then they must determine whether their actions may affect those species or critical habitat. If a listed species or critical habitat may be affected, consultation with the Service is required.

Please note that Section 7 or similar obligations may also apply to State permits or authorizations that implement Federal laws or projects that are supported by Federal funds (e.g., Clean Water Act, transportation projects).

For general guidance on Section 7 obligations for Federal projects, and step-by-step instructions on the process, visit: https://www.fws.gov/midwest/Endangered/section7/s7process/index.html.

2. Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat (optional for Federal transportation projects that may affect Indiana Bats):

The U.S. Fish and Wildlife Service and Federal Highway Administration (FHWA) have standardized their approach to assessing impacts to Indiana bats and northern long-eared bats (NLEB) from highway construction and expansion projects; then avoiding, minimizing and mitigating those impacts. This landscape-level conservation strategy encompasses the ranges of both bat species and provides transparency and predictability to FHWA and state Departments of Transportation (DOTs) through proactive planning. Information provided by this consultation and conservation strategy allows transportation agencies to strategically avoid projects in high impact or high-risk areas for the Indiana bat and NLEB. For projects that cannot avoid impacts, project proponents receive information on ways to minimize impacts and preclude the need to revise projects later in their development. For large-scale projects or projects with greater impacts, priority conservation areas may be identified to offset and minimize the impacts of the take. This approach is intended to increase the consistency of both project design and review, reduce consultation process timeframes and delays, and contribute meaningfully to the conservation of both species.

Please note that use of the Range-wide Programmatic Consultation for Indiana Bat and NLEB is optional for Federal transportation projects, and transportation agencies may choose to follow standard section 7 procedures instead. For more information on the Range-wide Programmatic Consultation for Indiana Bat and NLEB, including User Guide and Project Submittal Form documents, visit:
https://www.fws.gov/Midwest/endangered/section7/fhwa/index.html

V. MICHIGAN ECOLOGICAL SERVICES FIELD OFFICE CONTACT INFORMATION

Please contact the Michigan Ecological Services Field Office for more information on potential impacts to listed bats as a result of any projects occurring in Michigan.

U.S. Fish and Wildlife Service
Michigan Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
Phone: 517-351-2555
Fax: 517-351-1443
TTY: 1-800-877-8339 (Federal Relay)
e-mail: EastLansing@fws.gov

Northern Long-eared Bat Project Review in Michigan

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I. BACKGROUND INFORMATION

The northern long-eared bat (NLEB) is one of the species of bats most impacted by the disease white-nose syndrome (WNS). Due to declines caused by WNS and continued spread of the disease, the NLEB was listed as threatened under the Endangered Species Act (ESA) on April 2, 2015. The U.S. Fish and Wildlife Service (Service) also developed a final 4(d) rule, which was published in the *Federal Register* on January 14, 2016. The 4(d) rule specifically defines "take" prohibitions for the species.

For more information on NLEB, its listing and the 4(d) rule, visit:
https://www.fws.gov/Midwest/endangered/mammals/nleb/

NLEB in Michigan

The NLEB is documented in many Michigan counties and is believed to range throughout the entire state. Therefore, unless presence/absence surveys conducted in accordance with Service guidelines (https://www.fws.gov/MIDWEST/Endangered/mammals/inba/inbasummersurveyguidance.html, and also available via IPaC) indicate the probable absence of the species, NLEB are considered potentially present wherever suitable habitat exists within the state.

Suitable Habitat for NLEB:

During the winter, NLEB hibernate in mines, caves, or similar structures. Many NLEB hibernacula have been documented in Michigan; however, our knowledge of these overwintering areas throughout the state is likely incomplete.

Suitable summer habitat for NLEB consists of a wide variety of forested habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats, such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roost trees (i.e., live trees and/or snags ≥3 inches DBH that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1000 feet of other forested/wooded habitat. NLEB have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat boxes; therefore, these structures should also be considered potential summer habitat.

For more information on NLEB, its listing and the 4(d) rule, visit:
https://www.fws.gov/Midwest/endangered/mammals/nleb/

II. VOLUNTARY CONSERVATION MEASURES

NLEB benefit from the promotion of mature forest habitat, particularly hardwood/mixedwood stands containing standing snags, dying trees, and waterbodies such as streams, ponds, and forested wetlands. As NLEB are known to avoid traversing large open areas outside of migration, the protection and creation of wooded corridors (such as tree lines) can be extremely beneficial in connecting fragmented patches of suitable roosting/foraging habitat.

In general, projects that involve the trimming, burning, girdling, or clearing of suitable roost trees are encouraged to schedule these activities outside of the summer roosting period, which is generally April through September in Michigan. When winter tree removal is not feasible, avoiding the months of June and July (period when young bats are unable to fly) likely offers some protection for roosting NLEB that may be present.

Implementing conservation measures for NLEB helps to protect other native bat species, several which are experiencing recent population declines as a result of WNS and/or other factors. As significant predators of nocturnal insects, including many crop and forest pests, bats are important to Michigan's agriculture and forests. For example, Whitaker (1995)[1] estimated that a single colony of 150 big brown bats (*Eptesicus fuscus*) would eat nearly 1.3 million pest insects each year. Boyles et al. (2011)[2] noted that the "loss of bats in North America could lead to agricultural losses estimated at more than $3.7 billion/year," and using their data for Michigan alone, we totaled the estimated value at over $500 million per year (assuming standard crop pest survival). Taking proactive steps to help protect bats may be valuable to agricultural and timber producer yields and pest management costs.

Continue to the following sections for ESA guidance for Federal and non-Federal projects in Michigan.

III. ESA GUIDANCE: PRIVATE LANDOWNERS/NON-FEDERAL PROJECTS

NLEB use a wide variety of forested habitats but are not found in all wooded areas in Michigan. The species' local distribution and abundance is influenced by both the distance to hibernacula and the quality of available habitat. Although it can be difficult to predict where the species may occur, once NLEB colonize a forest habitat for raising their young (pups), they will often return to the same areas annually.

As a result of this fidelity to specific locations, the Service's approach to implementation of the ESA is based in part on "known" locations where important habitat for NLEB has been documented; namely, hibernacula and maternity roost trees.

[1] Whitaker, J.O. 1995. Food of the Big Brown Bat *Eptesicus fuscus* from Maternity Colonies in Indiana and Illinois. American Midland Naturalist 134(2):346-360.

[2] Boyles, J.G., P.M. Cryan, G.F. McCracken, and T.H. Kunz. 2011. Economic Importance of Bats in Agriculture. Science 332:41-42.

Please note that projects that require State permits or authorizations that implement Federal laws, or are supported by Federal funds (e.g., Clean Water Act, transportation projects), may have additional requirements under or similar to Section 7 of the ESA, as described in section: IV. ESA GUIDANCE: FEDERAL PROJECTS.

Additionally, please contact the Michigan Ecological Services Field Office (contact information at the end of this document) for project-specific recommendations for wind development projects. Utility-scale wind turbines may attract and cause mortality of NLEB and warrant additional considerations.

In Michigan, what is required if there are no known NLEB hibernacula or roost trees near my project?

The Service does not require private landowners to conduct surveys for ESA-listed bats on their lands, nor do we require our guidelines for NLEB to be followed on lands where no roosts or hibernacula are known to occur. However, our records of these locations in Michigan are limited, and we expect NLEB roosts to be present in many locations in addition to those listed in this document.

NLEB 4(d) Rule Take Prohibitions

The definition of "take" pursuant to the ESA includes to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect (see 50 CFR 17.3 for details). Our implementing regulations further define the term "harm" to include any act which actually kills or injures fish or wildlife, and emphasize that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.

The final 4(d) rule for the NLEB (50 CFR 17.40(o)) was published on January 14, 2016. Under the final rule, prohibitions in Michigan include:

- Actions that result in the incidental take of NLEB in known hibernacula.
- Actions that result in the incidental take of NLEB by altering a known hibernaculum's entrance or interior environment if it impairs an essential behavioral pattern, including sheltering NLEB.
- Tree-removal activities that result in the incidental take of NLEB when the activity: (1) occurs within 0.25 mile of a known hibernaculum; or (2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius of the maternity roost tree, during the pup season (June 1 through July 31).

Please note that not all tree-removal activities within the buffer of a hibernaculum or maternity roost tree will result in take. The timing and extent of tree removal may be an important consideration in those circumstances; please contact the Michigan Ecological Services Field Office to discuss your project plans in more detail. If your activity may result in incidental take that is prohibited based on the above, we will work with you to determine whether a permit pursuant to the ESA may be applicable.

Michigan Known Hibernacula and Roost Tree Locations for NLEB

We have compiled location information for NLEB hibernacula and known roosts trees in Michigan. This information can be used to help project planners in determining the applicability of provisions of the NLEB final 4(d) rule under the ESA. Please use the tables below to see if we have information that may be applicable to your project.

If you are planning a project that may impact suitable habitat in the Michigan townships below, please contact our office with more specific information on the location of your project, and we will confirm for you whether there are any known hibernacula within ¼ mile of your project or any known roost trees within 150 feet of your project.

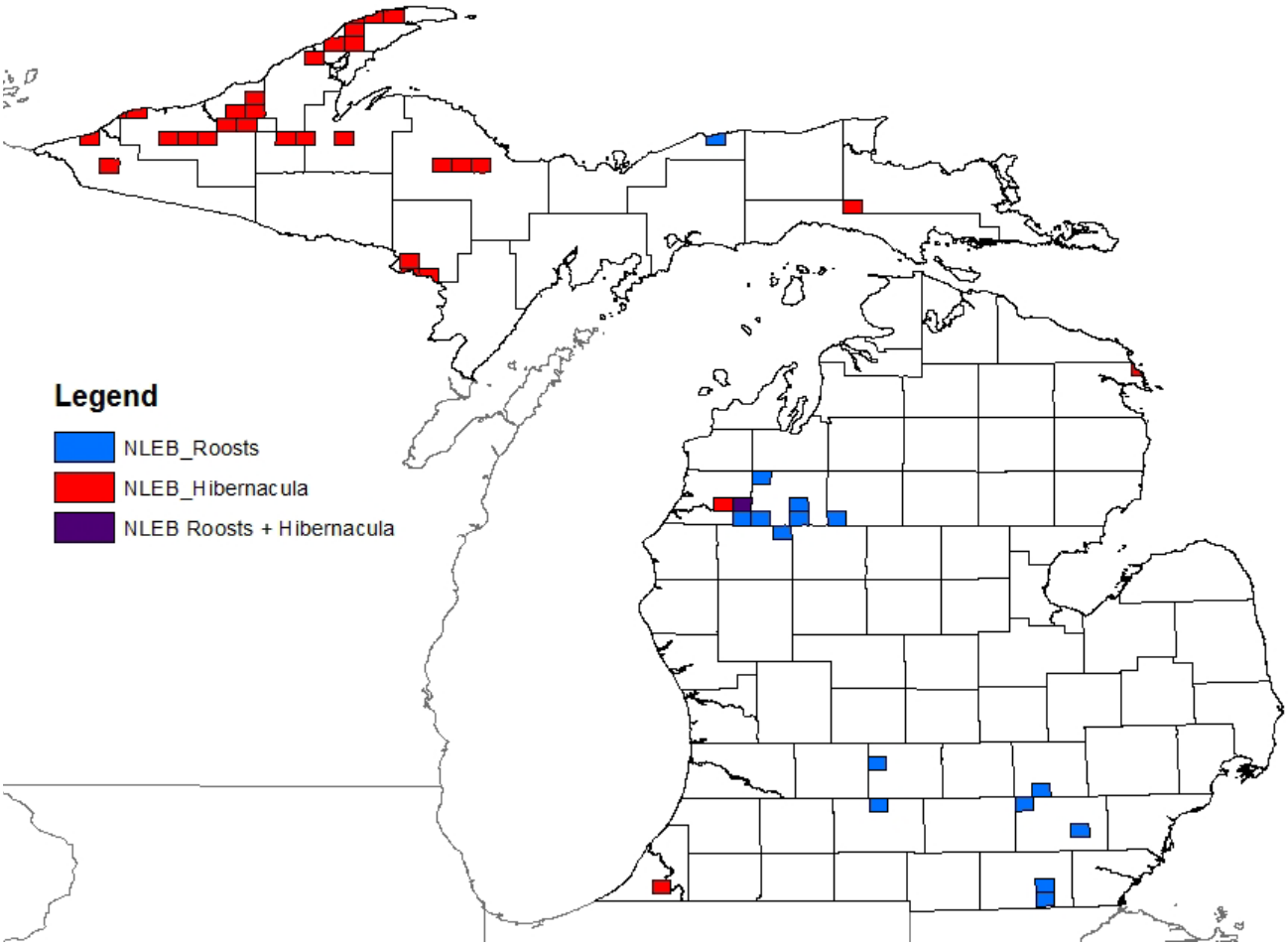
Where are the known NLEB hibernacula in Michigan?

Known NLEB in Michigan			
County	**Townships Containing Hibernacula and/or Buffer Areas**	**Number of Hibernacula**	**Landownership Within Buffer(s)**
Alpena	Alpena (T32NR9E)	1	Public
Baraga	L'Anse (T49NR33W)	1	Private
Berrien	Buchanan (T7SR18W)	1	Private
Dickinson	Breitung (T40NR30W, T39NR30W), Norway (T39NR29W)	8	Private (8)
Gogebic	Ironwood (T49NR46W); Bessemer/Wakefield (T47NR45W)	2	Private (1), public (1)
Houghton	Adams/Quincy/Franklin/Stanton (T55NR34W); Calumet (T56NR33W); Laird (T49NR35W, T49NR36W); Schoolcraft (T56NR32W)	3	Private (1), public (2)
Keweenaw	Allouez (T57NR32W, T58NR32W); Eagle Harbor/Grant (T58NR30W); Eagle Harbor/Houghton (T58NR31W)	10	Private (9), private + public (1)
Mackinac	Hendricks (T44NR7W)	4	Public (4)
Manistee	Dickson (T22NR14W, T22NR13W)	1	Private + public
Marquette	Ely (T47NR28W); Tilden (T47NR27W); Richmond (T47NR26W)	3	Private (3)
Ontonagon	Bohemia (T52NR37W); Carp Lake (T51NR44W, T51NR43W); Greenland (T51NR37W, T51NR38W, T50NR38W); Matchwood (T49NR41W, T49NR42W); Rockland (T50NR39W, T49NR40W)	42	Private (20), public (8), private + public (16)

Where are the known NLEB roost trees in Michigan?

Known NLEB Roost Tree Locations in Michigan			
County	**Townships Containing Roosts and/or Buffer Areas**	**Number of known roosts**	**Landownership Within Buffer(s)**
Alger	Burt (T49NR14W)	5 (all female)	Public (5)
Calhoun	Convis (T1SR6W)	1	Public (1)
Eaton	Vermontville (T3NR6W)	1 (female)	Private (1)
Lake	Dover (T20NR11W)	4 (all female)	Public (4)
Lenawee	Ogden (T8SR4E), Palmyra (T7SR4E)	81	Private (81)
Livingston	Putnam (T1NR4E)	2 (1 female)	Private (1), public (1)
Manistee	Dickson (T22NR13W), Norman (T21NR13W)	4 (all female)	Private (2), public (2)
Missaukee	Richland (T21NR8W)	4 (all female)	Private (4)
Washtenaw	Lyndon (T1SR3E), Pittsfield (T3SR6E)	3 (2 female)	Private (2), public (1)
Wexford	Cherry Grove (T21NR10W), Selma (T22NR10W), South Branch (T21NR12W), Wexford (T24NR12W)	20 (16 female)	Private (17), public (3)

Map of Known NLEB Occurrence, Roosts, and Hibernacula in MI



***Map last updated 7/22/2016. Map will be updated as additional information becomes available.**

IV. ESA GUIDANCE: FEDERAL PROJECTS

1. Standard Section 7 Consultation:

Under the ESA, requirements for Federal projects (i.e., projects funded, authorized, permitted, or implemented by a Federal agency) are different than requirements for wholly private or otherwise non-Federal projects. The ESA mandates all Federal departments and agencies to conserve listed species and to utilize their authorities in furtherance of the purposes of the ESA. Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they conduct, including those they fund or authorize, do not jeopardize the existence of any listed species. Federal agencies must request a list of species and designated critical habitat that may be present in the project area from the Service (i.e., via IPaC, on our website at https://www.fws.gov/midwest/Endangered/section7/sppranges/MIs7listrequest.html, or by contacting our office). Then they must determine whether their actions may affect those species or critical habitat. If a listed species or critical habitat may be affected, consultation with the Service is required. For general guidance on Section 7(a)(2) obligations for Federal projects, and step-by-step instructions on the process, please visit: https://www.fws.gov/midwest/Endangered/section7/s7process/index.html

Please note that Section 7 obligations or similar requirements may also apply to State permits or authorizations that implement Federal laws or projects that are supported by Federal funds (e.g., Clean Water Act, transportation projects).

2. NLEB Streamlined Consultation (optional for Federal projects that may affect but will not involve prohibited take of NLEB):

Federal actions that involve incidental take not prohibited under the final 4(d) rule for the NLEB may still result in effects to individual NLEB. As discussed above, section 7 of the ESA requires consultation with the Service if a Federal agency's action may affect a listed species. This requirement does not change when a 4(d) rule is implemented. However, for the NLEB 4(d) rule, the Service has provided a framework to streamline section 7 consultations when Federal actions may affect the NLEB but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework.

For more information on the NLEB Streamlined Consultation process and to download a Streamlined Consultation Form, visit:
https://www.fws.gov/Midwest/endangered/mammals/nleb/s7.html

Please note that use of the streamlined framework is optional, and an agency may choose to follow standard section 7 procedures instead. Even when take of NLEB is exempt, we encourage Federal agencies to implement voluntary conservation measures (i.e., winter tree removal) and avoid adverse effects to the species whenever possible.

If your project may result in prohibited take of NLEB (see "NLEB 4(d) Rule Take Prohibitions" above), standard section 7 procedures apply and this framework cannot be used.

3. Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat (optional for Federal transportation projects that may affect NLEB):

The U.S. Fish and Wildlife Service and Federal Highway Administration (FHWA) have standardized their approach to assessing impacts to Indiana bats and NLEB from highway construction and expansion projects; then avoiding, minimizing and mitigating those impacts. This landscape-level conservation strategy encompasses the ranges of both bat species and provides transparency and predictability to FHWA and state Departments of Transportation (DOTs) through proactive planning. Information provided by this consultation and conservation strategy allows transportation agencies to strategically avoid projects in high impact or high risk areas for the Indiana bat and NLEB. For projects that cannot avoid impacts, project proponents receive information on ways to minimize impacts and preclude the need to revise projects later in their development. For large-scale projects or projects with greater impacts, priority conservation areas may be used to offset and minimize the impacts of the take. This approach is intended to increase the consistency of both project design and review, reduce consultation process timeframes and delays, and contribute meaningfully to the conservation of both species.

Please note that use of the Range-wide Programmatic Consultation for Indiana Bat and NLEB is optional for Federal transportation projects, and transportation agencies may choose to follow standard section 7 procedures instead. For more information on the Range-wide Programmatic Consultation for Indiana Bat and NLEB, including User Guide and Project Submittal Form documents, visit: https://www.fws.gov/Midwest/endangered/section7/fhwa/index.html

V. MICHIGAN ECOLOGICAL SERVICES FIELD OFFICE CONTACT INFORMATION

Please contact the Michigan Ecological Services Field Office for more information on any projects occurring in Michigan.

U.S. Fish and Wildlife Service
Michigan Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
Phone: 517-351-2555
Fax: 517-351-1443
TTY: 1-800-877-8339 (Federal Relay)
e-mail: EastLansing@fws.gov

TETRA TECH

April 29, 2020

Douglas Taylor, THPO
Nottawaseppi Huron Band of the Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Re: Delta Charter Township, Eaton County
Wastewater Treatment Plant Improvements

Dear Mr. Taylor,

Tetra Tech, Inc., working on behalf of Delta Charter Township, is preparing a Michigan Clean Water State Revolving Fund (SRF) Project Plan for the construction of improvements to the existing Delta Township Wastewater Treatment Plant (WWTP). The project consists of improvements at the existing WWTP including construction of a new influent pump station, a new aeration tank, four new 100 foot diameter clarifiers, a new blower/RAS building, a new tertiary filtration building, new digester, and a new laboratory, control, and operations building. The project will also include demolition of existing process areas including the existing oxidation towers, the existing aeration tank and diffuser equipment, and the existing intermediate and final clarifiers. The project will also include retrofitting of existing tanks with new technology.

The work at the WWTP will all occur within the existing property boundaries, shown in Figure 1. The project is located in Eaton County. Much of the proposed construction consists of removing existing tanks and constructing new buildings or tanks in their place. The work requiring excavation of previously undisturbed areas includes construction of the new clarifiers, new digester, new tertiary filter building, and new aeration tank. The proposed changes can be seen in Figure 2.

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 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 contact us.

Tetra Tech
401 South Washington Square, Suite 100, Lansing, MI 48933
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

If you have any questions, please call me at or email me at krista.takacs@tetratech.com.

Sincerely,

Krista Takacs, P.E.
Project Engineer

Source: Delta Township; Tetra Tech, Inc; ESRI

LEGEND

County Lines

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DELTA CHARTER TOWNSHIP
SRF PROJECT PLAN

DELTA TOWNSHIP WWTP SITE MAP

FIGURE 1

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TETRA TECH
www.tetratech.com
401 SOUTH WASHINGTON SQUARE, SUITE 100
LANSING, MI 48933
PHONE: 517.316.3930, FAX: 517.484.8140

MARK	DATE	DESCRIPTION	BY

DELTA CHARTER TOWNSHIP

SRF PROJECT PLAN

PROPOSED PROJECTS SITE LAYOUT

Project No.:	200-214200-18001
Designed By:	BGB
Drawn By:	TJL
Checked By:	

Figure 2

Bar Measures 1 inch

Takacs, Krista

From: Douglas Taylor <Douglas.Taylor@nhbp-nsn.gov>
Sent: Wednesday, April 29, 2020 1:11 PM
To: Takacs, Krista
Subject: RE: Delta Township SRF Project Plan - THPO Review

Greetings,

Ref: Delta Township SRF Project Plan

Thank you for including the Nottawaseppi Huron Band of the Potawatomi in your consultation process. From the description of your proposed project, it appears that this project is outside of the Tribes Historical area of interest. 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.

Very Respectfully
Douglas R. 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

NOTTAWASEPPI HURON BAND OF THE POTAWATOMI
A FEDERALLY RECOGNIZED TRIBAL GOVERNMENT

From: Takacs, Krista <Krista.Takacs@tetratech.com>
Sent: Wednesday, April 29, 2020 11:53 AM
To: Douglas Taylor <Douglas.Taylor@nhbp-nsn.gov>
Cc: Ernie West <EWest@deltami.gov>; Worthington, David (EGLE) <WORTHINGTOND@michigan.gov>; Markstrom, Gary <Gary.Markstrom@tetratech.com>
Subject: Delta Township SRF Project Plan - THPO Review

***** EXTERNAL EMAIL WARNING - USE CAUTION *****

Mr. Taylor,

Attached is a letter requesting a Tribal Historical Preservation Officer Review for the Delta Township SRF Project Plan. As described in the letter, all projects will occur at the Wastewater Treatment Plant, which is located in the northeast quarter of Eaton County, along Carrier Creek. A hard copy of the letter will follow.

If you have any comments on the proposed project, please reply to this e-mail or respond in writing to the address listed below.

We appreciate your time in the review of this matter.

Sincerely,
Krista Takacs

Krista Takacs, P.E | Project Engineer
Direct **+1 (734) 213-5016** | Business **+1 (734) 665-6000** | Fax **+1 (734) 213-3003** | krista.takacs@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | United States Infrastructure
710 Avis Drive, Suite 100 | Ann Arbor, MI 48108 | tetratech.com

While we are operating remotely in response to COVID-19, Tetra Tech teams remain fully connected and hard at work servicing our clients and ongoing projects. We also would like to wish health and wellness to you and your family.

TETRA TECH

April 29, 2020

Marcella Hadden, THPO
Ziibiwing Center for Anishinabe Culture and Lifeways
6650 East Broadway
Mt. Pleasant, MI 48858

Re: Delta Charter Township, Eaton County
Wastewater Treatment Plant Improvements

Dear Ms. Hadden,

Tetra Tech, Inc., working on behalf of Delta Charter Township, is preparing a Michigan Clean Water State Revolving Fund (SRF) Project Plan for the construction of improvements to the existing Delta Township Wastewater Treatment Plant (WWTP). The project consists of improvements at the existing WWTP including construction of a new influent pump station, a new aeration tank, four new 100 foot diameter clarifiers, a new blower/RAS building, a new tertiary filtration building, new digester, and a new laboratory, control, and operations building. The project will also include demolition of existing process areas including the existing oxidation towers, the existing aeration tank and diffuser equipment, and the existing intermediate and final clarifiers. The project will also include retrofitting of existing tanks with new technology.

The work at the WWTP will all occur within the existing property boundaries, shown in Figure 1. The project is located in Eaton County. Much of the proposed construction consists of removing existing tanks and constructing new buildings or tanks in their place. The work requiring excavation of previously undisturbed areas includes construction of the new clarifiers, new digester, new tertiary filter building, and new aeration tank. The proposed changes can be seen in Figure 2.

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 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 contact us.

Tetra Tech
401 South Washington Square, Suite 100, Lansing, MI 48933
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

If you have any questions, please call me at or email me at krista.takacs@tetratech.com.

Sincerely,

Krista Takacs, P.E.
Project Engineer

Source: Delta Township; Tetra Tech, Inc; ESRI

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DELTA CHARTER TOWNSHIP
SRF PROJECT PLAN

DELTA TOWNSHIP WWTP SITE MAP

FIGURE 1

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TETRA TECH
www.tetratech.com
401 SOUTH WASHINGTON SQUARE, SUITE 100
LANSING, MI 48933
PHONE: 517.316.3930, FAX: 517.484.8140

MARK	DATE	DESCRIPTION	BY

DELTA CHARTER TOWNSHIP

SRF PROJECT PLAN

PROPOSED PROJECTS SITE LAYOUT

Project No.:	200-214200-18001
Designed By:	BGB
Drawn By:	TJL
Checked By:	

Figure 2

Bar Measures 1 inch

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

July 6, 2020

Krista Takacs
Tetra Tech
401 South Washington Sq., Ste. #100
Lansing, MI 48933

RE: Delta Charter Township, Eaton County,
Wastewater Treatment Plant Improvements

Dear Ms. Takacs:

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 Tetra Tech is in compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the Tetra Tech'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

Revised August 22, 2019

STATE HISTORIC PRESERVATION OFFICE
Application for Section 106 Review

SHPO Use Only
☐ IN Received Date ____ / ____ / ____ Log In Date ____ / ____ / ____
☐ 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: Delta Township Wastewater Treatment Plant Improvements
b. Project Address (if available): 7000 W. Willow Hwy. Lansing, MI 48917
c. Municipal Unit: Delta Township County: Eaton
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*.): United States Environmental Protection Agency, Clean Water State Revolving Fund, Office of Wastewater Management, 1200 Pennsylvania Avenue, NW (Mailcode 4204M), Washington, D.C. 20460
e. State Agency (if applicable), Contact Name and Mailing Address: Michigan Department of Environment, Great Lakes, and Energy, Water Infrastructure Financing Section, David Worthington, P.O. Box 30817, Lansing, MI 48909-8311
f. Consultant or Applicant Contact Information (if applicable) *including mailing address*: Krista Takacs (Consultant), 734-213-5016 - Tetra Tech 710 Avis Drive Suite 100, Ann Arbor, Michigan 48108

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.

See Figure 1.

a. USGS Quad Map Name: Wacousta
b. Township: T4N Range: R3W Section: 3
c. Site plan showing limits of proposed excavation. Description of width, length and depth of proposed ground disturbing activity: See Figure 2.
d. Previous land use and disturbances: Excavation for WWTP processes
e. Current land use and conditions: The Delta Township Wastewater Treatment Plant was constructed on the site in 1965 and contains process equipment, buildings, and tanks.
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): The project involves improvements to the existing wastewater treatment plant. The project will consist of the construction of a new influent pump station, demolition of the existing oxidation tower and intermediate clarifiers,

demolition of the existing aeration tank and diffuser equipment, demolition of the existing final clarifiers, and construction of a new aeration tank, four new 100' clarifier tanks, a new blower building, new tertiary building, new UV disinfection building, and new adminstraiton building.

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. See Figure 3.
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. The APE is defined as the existing site of the Delta Township Wastewater Treatment Plant at 7000 West Willow Hwy. Lansing, MI. The projects will occur entirely within the WWTP site owned by Delta Township. Some buildings at the WWTP are over 50 years of age, but none are considered of a historical nature within the APE. See Attachment 1.

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:

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: SHPO was contacted concerning the APE (see Attachments 2 and 3). No historical buildings were noted in the APE. The following tanks and buildings were constructed in 1965: Flow Split Structure 3, Air Tanks Structures 1 and 2, Blower Building, 35 foot Digester Tank, Digester Tank North, and Digester Tank South. None of these tanks or building are considered historical in nature.

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: n/a

---

V. PHOTOGRAPHS

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

a. Provide photographs of the site itself. See Attachments 4 and 5.

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**. See Attachment 1.

☐ 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

Attachment 1.

The APE is limited to the existing Delta Township WWTP. The project is to remove existing process equipment and tanks and install new process equipment, buildings, and tanks. As the location is wholly within the limits of the existing wastewater treatment plant, there were not determined to be any historic properties within the project location.

TETRA TECH

Attachment 2.

MEMO

To:	**SHPO**
From:	**Krista Takacs**
Date:	**April 21, 2020**
Subject:	**Section 106 Application – Delta Township Wastewater Plant Improvements**

The SHPO was contacted to aid in determining if there were archaeological artifacts or historical buildings in the area of potential effects (APE). The e-mail response can be found in Attachment 3. The site is entirely within the property of the existing Delta Township Wastewater Treatment Plant. Some of the tanks and buildings were con structed in 1965 as part of the original Plant. However, none of the buildings are of a historic nature. Therefore, no additional architectural research is warranted.

The response indicated that no archaeological sites or architectural sites were previously reported within the APE. However, archaeological artifacts have been found along the Grand River in other locations. The Grand River is located north of the Delta Township WWTP site. No work is planned along the banks of the Grand River. Given that no archeological sites have been previously reported in the area, the Township would like to move forward with the project immediately stopping if any artifacts are discovered during construction. If any artifacts are uncovered during excavation, SHPO will be contacted and an archeological study will be conducted.

Tetra Tech
401 South Washington Square #100, Lansing, MI 48933
Tel 517-316-3930 www.tetratech.com

Attachment 3.

Takacs, Krista

From: MSF-SHPOResearch <MSF-SHPOResearch@michigan.gov>
Sent: Tuesday, March 10, 2020 11:58 AM
To: Haylett, Gina
Cc: Takacs, Krista
Subject: RE: Research Appointment Scheduling Request

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning,
We do not have any previously reported archaeological or architectural sites in the project area provided but please be aware that there were numerous sites in the TRS provided and the areas along the Grand River have been previously known to be potentially sensitive archaeological areas. The potential need for archaeological survey should be addressed in your application. The absence of previously recorded sites in your project area doesn't indicate a lack of potential sites. If you have additional questions please feel free to utilize an archaeological consultant found here: https://www.miplace.org/490db0/globalassets/documents/shpo/programs-and-services/archaeology/archaeology-in-michigan/archaeologist-historian-and-architectural-historian-consultant-list.pdf.pdf. Or contact Stacy Tchorzynski in our office for additional clarification. Also please be aware that identifying previously reported sites is only one part of the identification required for an adequately documented Section 106 application. If you have questions for how to document architectural sites in your APE that we don't have information on please let me know and I will be happy to discuss with you.

Thank you,

Katie Kolokithas
Survey Coordinator
State Historic Preservation Office
Michigan Economic Development Corporation
300 N. Washington Square | Lansing, MI 48913
Office: 517.335.9840 | Desk: 517.241.6062
kolokithask1@michigan.gov

From: Haylett, Gina <Gina.Haylett@tetratech.com>
Sent: Tuesday, March 10, 2020 9:33 AM
To: MSF-SHPOResearch <MSF-SHPOResearch@michigan.gov>
Cc: Takacs, Krista <Krista.Takacs@tetratech.com>
Subject: FW: Research Appointment Scheduling Request

Hello,

I would like to schedule a research appointment to review the archeological and architectural files for the following location.

Delta Township, Michigan
Township: T4N, Range: R3W, Section 3

A USGS 7.5 minute series map is attached and has the location indicated.

Thank you,
Gina Haylett

Gina Masell Haylett, EIT, MSE | Environmental Engineer II
Cell (248)-200-6077 | gina.haylett@tetratech.com

Tetra Tech | Complex World, Clear Solutions™ | **Bioenergy Group**
710 Avis Dr. Suite 100 | Ann Arbor, MI 48108 | tetratech.com

Attachment 4.

Delta WWTP

Picture 1: Facing east, north of existing Chemical Storage Building

Picture 2: Facing east, north of Administration Building parking lot

Picture 3: Facing southwest

Picutre 4: Facing east by south side of Final Clarifier 1

Picture 5: Facing north on east side of Solids Handling Building

Picture 6: Facing northeast

Picture 7: Facing east, north of Primary Clarifiers

Picture 8: Facing east, west of Digester building

Picture 9: Facing northeast, on Primary clarifiers next to exterior stair case

Picture 10: Facing southeast, on Primary clarifiers next to exterior stair case

Picture 11: Facing east on northeast corner of Primary Clarifiers

Picture 12: Facing east, northeast of Final Clarifier 2

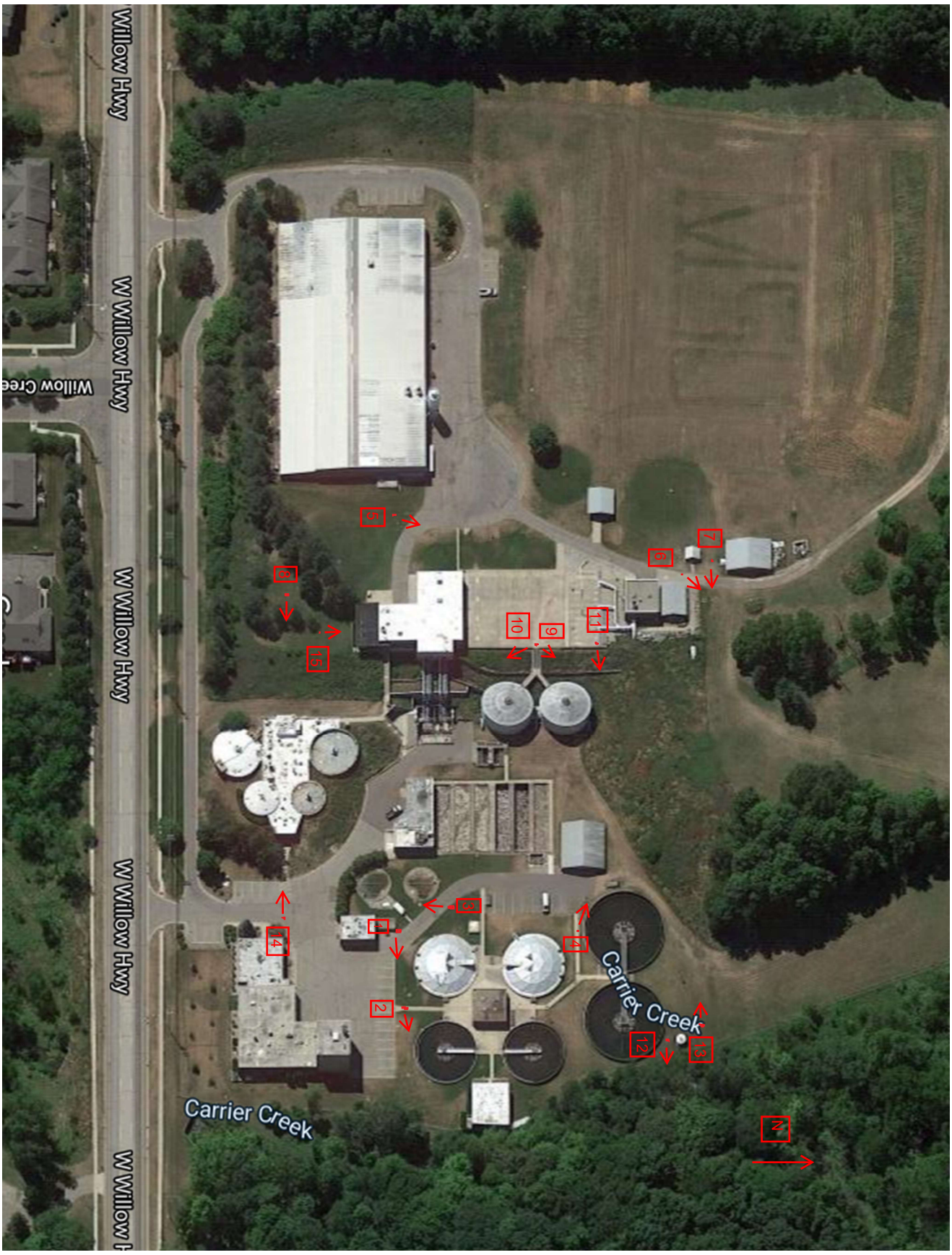
Picture 13: Facing west, north of Final Clarifier 2

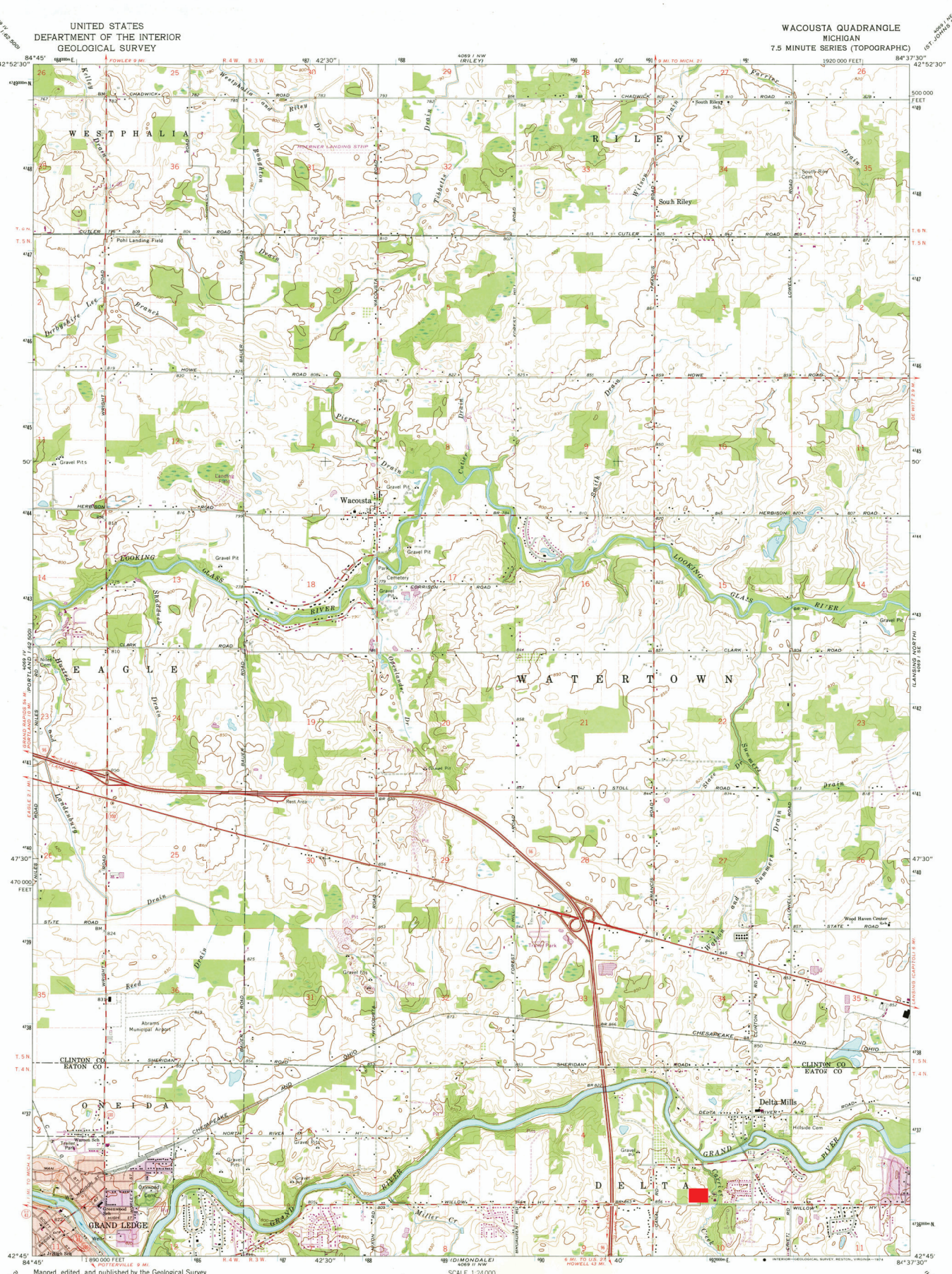
Picture 14: Facing west, east side of Digester Building

Picture 15: Facing north, south of Primary Clarifier Building, transformer yard

Additional site photos are available upon request.

Attachment 5.




UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WACOUSTA QUADRANGLE
MICHIGAN
7.5 MINUTE SERIES (TOPOGRAPHIC)
WESTPHALIA
RILEY
EAGLE
WATERTOWN
ONEIDA
DELTA
GRAND LEDGE
Wacousta
South Riley
Delta Mills
Pohl Landing Field
Abrams Municipal Airport
Wood Haven Center
Hillside Cem
CLINTON CO
EATON CO
LOOKING GLASS RIVER
GRAND RIVER
CHESAPEAKE AND OHIO
Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial photographs taken 1964. Field checked 1966
Polyconic projection. 1927 North American datum
10,000-foot grid based on Michigan coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue
Red tint indicates areas in which only landmark buildings are shown
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked
Revisions shown in purple compiled from aerial photographs taken 1973. This information not field checked
Purple tint indicates extension of urban areas
SCALE 1:24000
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
Project Location- Delta Twp. WWTP
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
Interstate Route
State Route
QUADRANGLE LOCATION
USGS
HISTORICAL FILE
TOPOGRAPHIC DIVISION
WACOUSTA, MICH.
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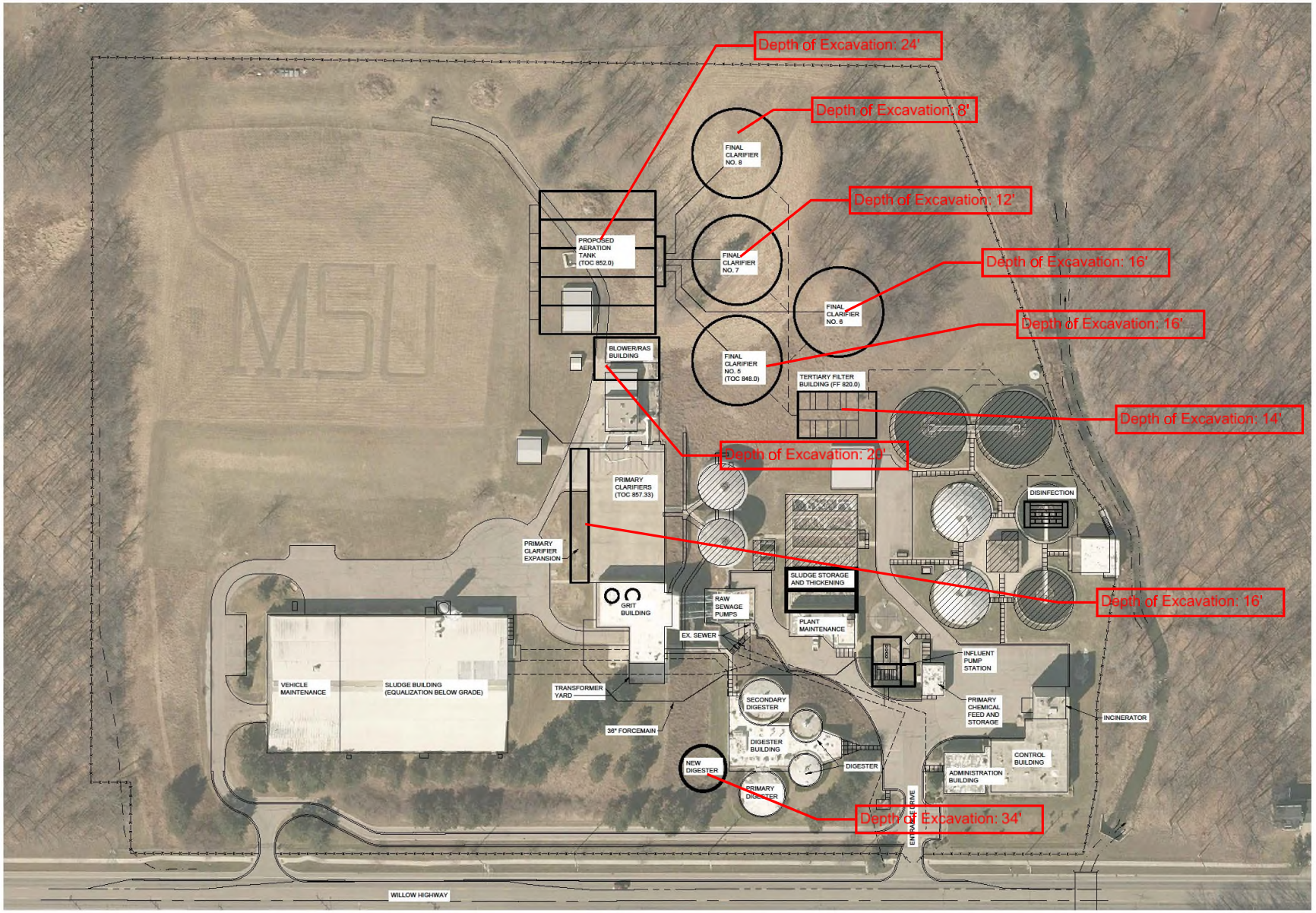


TETRA TECH
www.tetratech.com
401 SOUTH WASHINGTON SQUARE, SUITE 100
LANSING, MI 48933
PHONE 517.316.3930 FAX 517.484.6549

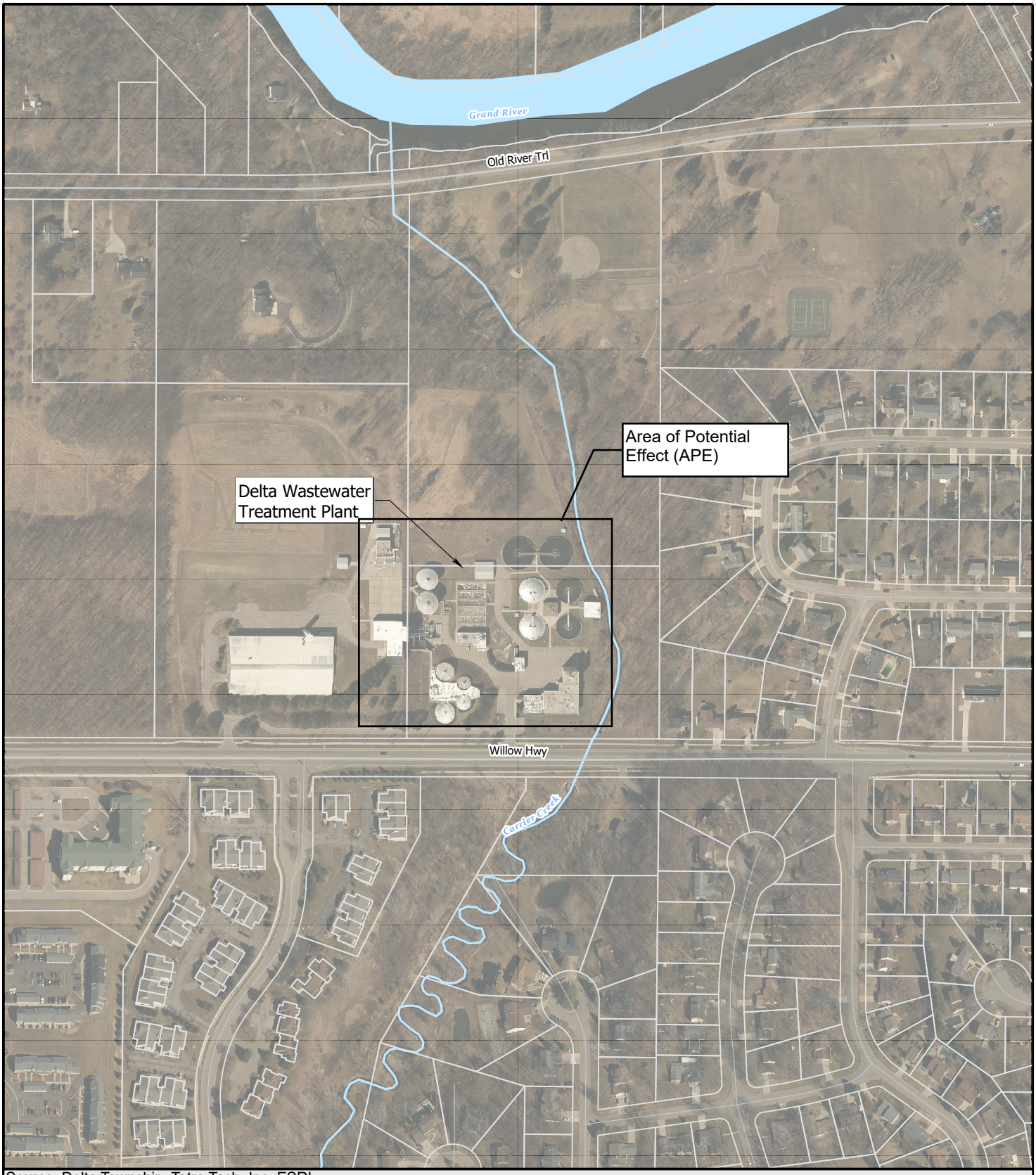
MARK	DATE	DESCRIPTION	BY

DELTA CHARTER TOWNSHIP
SRF PROJECT PLAN

SITE LAYOUT

Project No.:	200-214200-18001
Designed By:	BGB
Drawn By:	TJL
Checked By:	

Figure 2



Source: Delta Township; Tetra Tech, Inc; ESRI

LEGEND

- Parcel Lines
- Rivers/Streams/Drains
- Waterbody

TETRA TECH

0 N 400

Feet

DELTA CHARTER TOWNSHIP
SRF PROJECT PLAN

AERIAL VIEW OF WWTP

FIGURE 3

P:\IER\214200\200-214200-18001\GIS\GIS_Figures\GIS_Figures.aprx[Darryl.albert 3/13/2020]

STATE OF MICHIGAN
MICHIGAN STRATEGIC FUND
STATE HISTORIC PRESERVATION OFFICE

GRETCHEN WHITMER
GOVERNOR

MARK A. BURTON
PRESIDENT

July 15, 2020

DAVID WORTHINGTON
MICHIGAN DEPARTMENT OF ENVIRONMENT GREAT LAKES AND ENERGY
WATER INFRASTRUCTURE FINANCING
FINANCE DIVISION
PO BOX 30817
LANSING MI 48909-8311

RE: ER20-765 Delta Township Wastewater Treatment Plant Improvements, 7000 Willow Highway, Sec. 3, T4N, R3W, Delta Township, Eaton County (EPA)

Dear Mr. Worthington:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Coordinator, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Coordinator

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Krista Takacs, Tetra Tech

Takacs, Krista

From: Jennifer Bernardin <JBernardin@deltami.gov>
Sent: Wednesday, July 8, 2020 12:37 PM
To: Takacs, Krista
Subject: FW: Delta Township SRF Draft Plan Comments: 5725-01 (FY21); 5725-99 (future phases)
Attachments: Project Plan Submittal Form.doc; Discharge Data Form.doc

FYI – I didn't see you copied below.

From: Ernie West <EWest@deltami.gov>
Sent: Wednesday, July 8, 2020 12:34 PM
To: Jennifer Bernardin <JBernardin@deltami.gov>; Rick Kane <RKane@deltami.gov>; Brian Reed <BReed@deltami.gov>; Alannah Doak <ADoak@deltami.gov>; Jeffrey Anderson <JAnderson@deltami.gov>; Dave DHaene <DDHaene@deltami.gov>; Mike McKane <MMcKane@deltami.gov>
Subject: FW: Delta Township SRF Draft Plan Comments: 5725-01 (FY21); 5725-99 (future phases)

FYI

We'll address with TetraTech.

Ernest (Ernie) A. West, P.E.
Township Engineer
Delta Charter Township
7710 W. Saginaw Hwy
Lansing, MI 48917
ewest@deltami.gov
www.deltami.gov
P: (517) 816-8290
M: (517) 719-5497

From: Worthington, David (EGLE) <WORTHINGTOND@michigan.gov>
Sent: Wednesday, July 8, 2020 12:04 PM
To: Ernie West <EWest@deltami.gov>
Cc: Bode, Brent (Brent.Bode@tetratech.com) <Brent.Bode@tetratech.com>; Bennett, Charles (EGLE) <BENNETTC4@michigan.gov>
Subject: Delta Township SRF Draft Plan Comments: 5725-01 (FY21); 5725-99 (future phases)

Ernie,

The following represent some comments I have on the Delta Township project plan. Sorry I am late with these. They are not in any specific order of importance:

1. Will a floodplain permit be needed? If you are not sure, contact Ms. Donna Cervelli (CervelliD@michigan.gov) for an evaluation with a description/site map;
2. Have there been any complaints of odor from the facility?
3. SRF plans are required to be comprehensive, either addressing 20-year or 30-year needs depending on the expected term of financing. As such, though your focus is clearly on the treatment plant, you must include a discussion of the wastewater collection system, i.e., what is known of the age, type, material, size, condition, and needs, etc., of the conveyance pipes as well as pump stations. Has an asset management plan been prepared on the collection system? Is there a capital improvements plan in place that addresses collection system needs? Are there concerns with structural integrity of specific sewer segments? Is the O&M budget keeping up the requirements of maintenance on the system? Do pump stations have adequate capacity to handle expected future development? If there are existing plans that cover this topic adequately, you may insert the information via "cut and paste" of text/tables, etc., or append it to the plan. If "other funding" is intended for collection system needs, you can note that fact but the basic discussion above is still required ;
4. I have noted that the township has some collection system infiltration that is above the standard of what is considered "excessive." There appear to be no operational issues associated with the I/I levels at present; i.e., no surcharging, backups, SSO in the collection system according to the report. Also, as the plan explains, adequate equalization storage capacity currently exists to treat this extraneous flow. My main concern is that the situation could change in the future and perhaps should be monitored carefully– particularly in older sewers, I/I could increase to the point of creating operational issues or making it more cost-effective to eliminate excess flow vs. continuing to treat it by building more equalization storage capacity at the plant. If additional equalization capacity is intended/proposed to accommodate future flows, this proposed design will have to be reviewed by Lansing District Office engineering staff (Chuck Bennett) as to whether it can be justified as a treatment need without first attempting I/I removal;
5. Indirect development impacts from "in-filling" need to be carefully evaluated for environmental assessment, particularly for the future phases that result in additional capacity at the plant. Ideally, much of that information is in an existing master plan. It will be necessary to ensure no environmental concerns such as SHPO, endangered species, wetlands, etc., will be encountered through this indirect development. It may be possible to address this matter in a future phase plan supplement and to include maps from the master plan as to where the in-fill will occur;
6. It is noted that a biological survey will likely become necessary during preliminary design. Advise also the approximate number and species of trees to be removed on site from the wooded area adjacent to the proposed improvements;
7. In the present worth analyses, please show/describe your backup calculations/assumptions used to generate the present worth of O&M costs and salvage values in the alternatives tables;
8. If a 30-year financing term is chosen, this might necessitate revisions to the present worth analyses and user cost impact analyses. It appears the correct discount rate is being used for a 20-year term;
9. I am attaching a couple of forms that should be included with the final plan submittal.

Feel free to contact me if you have questions concerning the above comments.

Sincerely yours,

David J. Worthington
Senior Project Manager
Michigan Department of Environment, Great Lakes, and Energy
Finance Division, Water Infrastructure Financing Section
517-284-5423 | worthingtond@michigan.gov
Follow Us | **Michigan.gov/EGLE**

Response to Comments Received from EGLE on Draft SRF Project Plan

Delta Township received the comments below from EGLE. Responses are listed after each comment.

1. *Will a floodplain permit be needed? If you are not sure, contact Ms. Donna Cervelli (CervelliD@michigan.gov) for an evaluation with a description/site map.*

   RESPONSE: A floodplain permit is anticipated to be required, as noted on pages 9, 69, 75, and 77 of the SRF Project Plan, due to the removal of several secondary clarifier tanks that are located in the floodplain. An application for the floodplain permit will be prepared as part of the design process.

2. *Have there been any complaints of odor from the facility?*

   RESPONSE: The Delta Township WWTP had received odor complaints in the past. In response, the Township added the existing odor control system to the facility. The WWTP has not received any recent odor complaints. The removal of the oxidation towers and the new proposed odor removal facility is anticipated to maintain odor control complaints to a minimum.

3. *SRF plans are required to be comprehensive, either addressing 20-year or 30-year needs depending on the expected term of financing. As such, though your focus is clearly on the treatment plant, you must include a discussion of the wastewater collection system, i.e., what is known of the age, type, material, size, condition, and needs, etc., of the conveyance pipes as well as pump stations. Has an asset management plan been prepared on the collection system? Is there a capital improvements plan in place that addresses collection system needs? Are there concerns with structural integrity of specific sewer segments? Is the O&M budget keeping up the requirements of maintenance on the system? Do pump stations have adequate capacity to handle expected future development? If there are existing plans that cover this topic adequately, you may insert the information via "cut and paste" of text/tables, etc., or append it to the plan. If "other funding" is intended for collection system needs, you can note that fact but the basic discussion above is still required.*

   RESPONSE: Delta Township is pursuing 20-year funding. A summary of the sanitary sewer system and including pump stations has been added to the SRF Project Plan. The sanitary sewer information can be found in Section 2.5.2. The pump station information is included in Section 2.5.8. The Township has divided the sanitary sewer system into subareas and is evaluating these areas and developing plans for improvement. The Township plans to make improvements using cash on hand and does not plan to utilize SRF loans for the developed projects.

4. *I have noted that the township has some collection system infiltration that is above the standard of what is considered "excessive." There appear to be no operational issues associated with the I/I levels at present; i.e., no surcharging, backups, SSO in the collection system according to the report. Also, as the plan explains, adequate equalization storage capacity currently exists to treat this extraneous flow. My main concern is that the situation could change in the future and perhaps should be monitored carefully– particularly in older sewers, I/I could increase to the point of creating operational issues or making it more cost-effective to eliminate excess flow vs. continuing to treat it by building more equalization storage capacity at the plant. If additional equalization capacity is intended/proposed to accommodate future flows, this proposed design will have to be reviewed by Lansing District Office engineering staff (Chuck Bennett) as to whether it can be justified as a treatment need without first attempting I/I removal;*

RESPONSE: You are correct that there are no operational issues associated with I/I levels at the present (i.e., no SSOs). The Township has adequate equalization capacity in place at the WWTP and at the Thomas L Lift Station site to mitigate wet weather flow peaks. The Township is in the process of collecting flow data in the system and in particular areas of higher peak flow. The Township is conducting hydraulic modeling to identify areas that may need further studies and/or be investigated to determine if I/I reduction could be achieved. Efforts are also underway to inspect older sewers in these areas to identify sewers that need rehabilitation or replacement due to structural and infiltration issues. These areas are suspected to be footing tile connections in older subdivisions that lack adequate storm sewer infrastructure and will likely be difficult and costly to achieve I/I reduction. The basis of design for the WWTP upgrades provides additional capacity for development and will accommodate wet weather flow without the need for additional equalization capacity. Additional equalization capacity may be considered in a future phase, but mainly as a way to re-use process tanks at the WWTP that are eliminated from use as part of the Phase I & II upgrades. The Township's on-going sewer system evaluation and assessment are being funded directly by sewer funds and are not included in the SRF project plan.

5. *Indirect development impacts from "in-filling" need to be carefully evaluated for environmental assessment, particularly for the future phases that result in additional capacity at the plant. Ideally, much of that information is in an existing master plan. It will be necessary to ensure no environmental concerns such as SHPO, endangered species, wetlands, etc., will be encountered through this indirect development. It may be possible to address this matter in a future phase plan supplement and to include maps from the master plan as to where the in-fill will occur*

   RESPONSE: All in-fill development within the Delta Township wastewater service area will be required to meet the conditions of the zoning ordinances and future land use plan. Developments will need to be reviewed by the Township Planning Commission and be presented to the Township Board. Environmental assessments, zoning reviews, and building reviews will occur as developments are proposed. Development that does not meet zoning or other Township rules will not be approved.

6. *It is noted that a biological survey will likely become necessary during preliminary design. Advise also the approximate number and species of trees to be removed on site from the wooded area adjacent to the proposed improvements;*

   RESPONSE: Delta Township is planning to perform a survey during the design process. However, the results are not currently available. The survey will identify all trees that are greater than 6 or 8 inches in diameter. The results of the survey and the number, size, and species of trees will be shared with EGLE once available.

7. *In the present worth analyses, please show/describe your backup calculations/assumptions used to generate the present worth of O&M costs and salvage values in the alternatives tables;*

   RESPONSE: Backup calculations for the O&M costs and salvage values will be included in the Final SRF Project Plan in Appendix B.

8. *If a 30-year financing term is chosen, this might necessitate revisions to the present worth analyses and user cost impact analyses. It appears the correct discount rate is being used for a 20-year term;*

RESPONSE: Delta Township plans to select a 20-year financing term.

9. *I am attaching a couple of forms that should be included with the final plan submittal.*

RESPONSE: Thank you for providing copies of the forms. The forms will be completed and submitted with the Final SRF Project Plan by August 1, 2020.

APPENDIX G: GREEN PROJECT RESERVE

TETRA TECH

MEMO

To:	Rick Kane – Delta Township Utility Director Ernie West – Delta Township Engineer
From:	Brent Bode, Tetra Tech Jimmy Yonts, Tetra Tech
Date:	April 30, 2020
Subject:	Delta Charter Township WWTP Major Capital Improvements Project Green Project Reserve Eligible Items

1.0 SUMMARY

Starting in 2010 the US EPA required funding be made available to State Revolving Fund programming addressing green infrastructure, water, or energy efficiency improvements, and other environmentally innovative activities. Green Project Reserve (GPR) projects are funded in the form of subsidies by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) through SRF principal forgiveness, when funds are available. Federal guidelines require the state to solicit and identify GPR projects on the draft project priority lists. The following is a description of the GPR components for the proposed Major Capital Improvements project at the Delta Charter Township Wastewater Treatment Plant (WWTP). Phase I of the WWTP improvements will include construction of a new Headworks Facility with fine mechanical bar screens, raw sewage pumps with high efficiency motors and variable frequency drives (VFD's), influent flow monitoring, vortex grit removal, new aeration tanks with fine pore diffusers and high efficiency blowers, secondary clarifiers, blower and RAS pumping building, removal of the oxidation towers and intermediate clarifiers and electrical system improvements. The improvements will provide for a reconfiguration of the process flow path through the WWTP to better utilize the site topography and allow the addition of tertiary filtration without requiring filter influent pumping.

2.0 DESIGN FLOW

The Delta Township WWTP has a current annual average flow of 4.9 million gallons per day (MGD) with a max day flow of 15.3 MGD. The township expects continued growth over the next 30 years. Table 1 provides a summary of the current and project flows to the WWTP.

Table 1. WWTP Current and Projected Flows

Condition	Current Flow (MGD)	Projected Design Flows (MGD)
Annual Average Daily Flow	4.9	7.6
Maximum Day Average Flow	15.3	19.4
Peak Hour Flow	21.1	27.9

Tetra Tech
401 S. Washington Square, Suite 100, Lansing MI 48933
Tel 517.316.3940 tetratech.com

3.0 OVERVIEW OF EXISTING TREATMENT PROCESS

3.1 EXISTING PRELIMINARY AND PRIMARY TREATMENT PROCESS

The WWTP was originally constructed in 1965 and underwent substantial expansion in 1972 and 1986. The WWTP has a design average flow capacity of 6.0 MGD and a peak hydraulic capacity of 17.4 MGD. The liquid treatment process consists of influent raw sewage pumping, screening and grit removal, primary settling, oxidation with intermediate clarification, activated sludge aeration, secondary clarification, ultraviolet disinfection, and effluent cascade aeration. The collected biosolids are thickened, digested and dewatered for land application.

The raw sewage pump station consists of eight 75 HP pumps, four with VFDs, that are rated for 2000 gpm at 75' TDH. The raw sewage pumps must frequently cycle on and off because the wet well is undersized. This directly leads to surges of electricity demand which the WWTP is charged for. The pumps discharge into the Grit Building where the raw sewage flow is then screened by two 5 HP mechanical bar screens to remove large debris and rags. Downstream of the screens are two aerated grit tanks which each consume 160 scfm of air for mixing and to pump the settled grit. Three 10 HP positive displacement blowers supply the air for the aerated grit tanks.

The wastewater then flows to the four enclosed primary tanks or to the equalization basin as necessary. The equalization basin is mixed hydraulically with four 25 hp pumps rated for 3,200 gpm at 22' TDH each and the stored wastewater is returned to the raw pumping station by gravity. The primary tanks are each equipped with a sludge collection mechanism that consumes approximately 1 HP. The enclosed air within the primary tanks is collected and sent to an odor control system with a 10 HP fan. Primary sludge is pumped via three air powered double diaphragm primary sludge pumps rated for 50 gpm at 75' TDH, each requiring 30 SCFM of air at 40 PSIG to operate.

3.2 EXISTING SECONDARY TREATMENT PROCESS

Following primary treatment, the wastewater flows to the oxidation towers. This process consumes approximately 35 ft of hydraulic fall as the flow passes through the tower and media. The flow is then routed to the two intermediate clarifiers, which each feature 2 HP sludge collection mechanisms. The intermediate sludge is pumped via two air powered double diaphragm pumps rated for 50 gpm at 75' TDH, each requiring 30 SCFM of air at 40 PSIG to operate.

The intermediate clarifier effluent enters a flow split structure where the flow is routed to the six aeration tanks. The flow split structure features a 5 HP gear mixer. Five blowers, two 2,400 SCFM, two 650 SCFM multistage, and one 2,825 SCFM high speed turbo, are utilized to maintain mixing and remove biochemical oxygen demand and ammonia within the aeration tanks. The design demand air flow is 3,000 cfm.

The four final clarifiers are each equipped with a sludge collection mechanism which consumes approximately 0.5 HP. Mixed liquor is recirculated to the aeration tank influent by three 30 HP centrifugal RAS pumps rated for 2080 gpm at 37' TDH. The WAS is pumped using three air powered double diaphragm pumps rated for 100 gpm at 60' TDH, each requiring 50 SCFM of air at 40 PSIG to operate. For disinfection, the WWTP utilizes three 45 kW UV units.

4.0 EGLE NPDES PERMIT CHANGES AND PROCESS ADDITION

The latest NPDES Permit from EGLE requires that the WWTP achieve compliance with advanced wastewater treatment limits by October 1, 2027. These more stringent requirements necessitate the addition of a tertiary

treatment process to the WWTP process train. To implement this change within the existing WWTP treatment process and fit within the available space on site would require the construction of a Tertiary Filtration building south of the existing UV Building. Given the existing WWTP hydraulic profile, the flow from the secondary clarifiers would need to be diverted from the UV disinfection treatment process to the proposed Tertiary Filtration building. The flow would then require pumping to feed the coarse media filters which would be constructed above grade. The flow would then travel by gravity through the filters. The tertiary effluent flow would then flow by gravity to UV disinfection.

The proposed 175 hp Tertiary Influent pumps would operate continuously to pump all the WWTP flow through the filter system. At the design average daily flow that would be an energy consumption of 1,800 kW-hr per day, which would cost $67,000/year at the design annual average flow rate.

5.0 PROPOSED HEADWORKS AND PRELIMINARY TREATMENT IMPROVEMENTS

The following are descriptions of the proposed improvements at the WWTP that meet the GPR requirements. The improvements reduce energy consumption at the WWTP and improve treatment system performance.

5.1 PROCESS TREATMENT CONFIGURATION CHANGES

As part of the proposed improvements to the WWTP, the process flow configuration will be modified. Some of the existing treatment process such as the Oxidation Tower and Intermediate Clarifiers will be eliminated and replaced with new larger aeration tanks. The existing aerated grit removal tanks will be replaced with vortex grit removal to provide energy savings.

The replacement of the oxidation tower and intermediate clarifiers with new aeration tanks eliminates the need for the approximately 35 ft of hydraulic fall through the tower and media. This allows the WWTP to more efficiently utilize the existing site topography. The proposed aeration tanks will be constructed adjacent to the existing primary clarifiers. Then, the proposed secondary clarifier will be constructed at a higher elevation to the north of the existing tanks. Elevating this process tank permits the proposed Tertiary Filter Building to be constructed such that the flow from the secondary clarifiers to feed the filter units is by gravity, eliminating the required intermediate pumping. This will save the WWTP approximately $67,000 a year in pumping cost to the filters at design average day flows. This is a present worth savings of $1.3 million over the 20-year project life. The higher elevation of the Tertiary Filter building will also allow the dirty wash water from the filter backwash process to be drained to the influent by gravity also, eliminating the need for additional pumping as well as energy and maintenance costs.

The proposed and existing hydraulic profiles are shown in Figure 1. Note that the hydraulic profiles of the proposed and existing configurations will be nearly identical upstream of the oxidation towers and downstream of tertiary treatment. The existing hydraulic profile not utilized within the proposed configuration is shown dashed. It is clear that without the proposed process treatment configuration changes, additional intermediate pumping will be required to implement tertiary filtration.

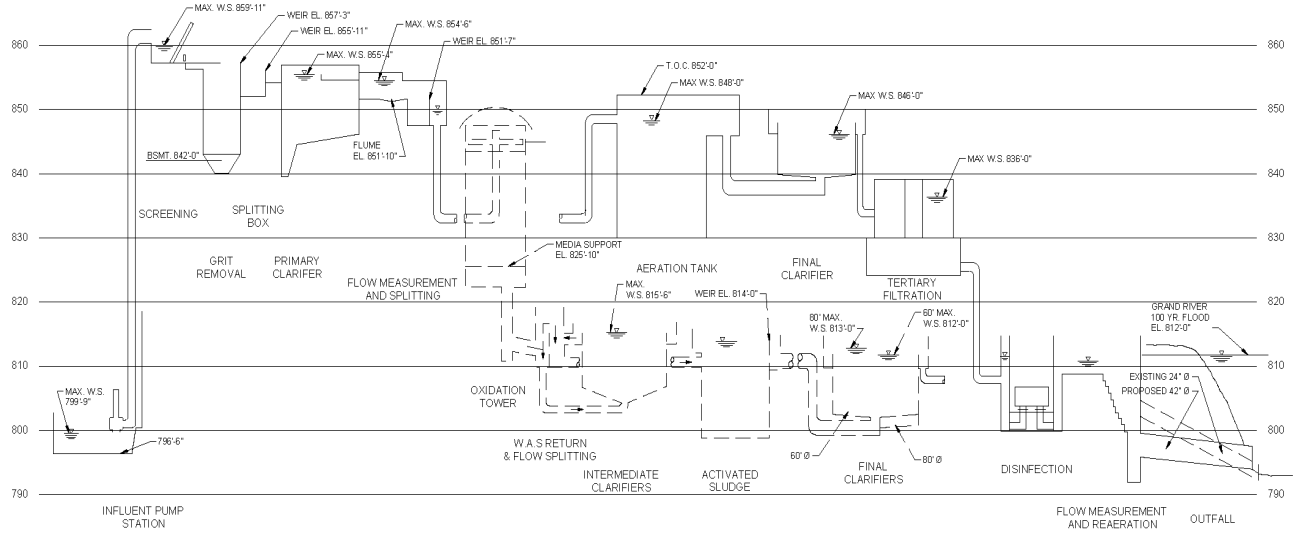


Figure 1. WWTP Existing and Proposed Hydraulic Profile

5.2 HEADWORKS AND PRELIMINARY TREATMENT IMPROVEMENTS

A new pump station will be constructed on the lower level of the WWTP site to pump an average design influent flow of 5,300 gpm at 65' TDH. The static head for these pumps will be similar to the existing pumps, but the upgraded force main will reduce friction losses. The larger wet well will also reduce pump cycling and the associated surges in electricity demand. The influent force main will discharge the raw sewage to three new 5 HP mechanical screening units located upstream of the raw sewage pumps. This will allow debris to be removed from the influent flow prior to pumping. This will improve the pumping efficiency and reduce wear on the pumps.

The pumps will discharge to the new vortex grit tanks that will be constructed within the footprint of the existing aerated grit tanks. The vortex grit tanks do not require air for mixing but will each require a 5 HP pump that operates intermittently to pump the settled grit. The proposed improvements do not include changes to the existing primary tanks.

5.3 SECONDARY TREATMENT IMPROVEMENTS

Primary effluent will enter a flow splitting structure to route the flow to the five new aeration tanks. The splitting structure will feature a 25 HP hydraulic mixing system. The average daily air demand for treatment in the aeration tanks will be 2,800 cfm. The aeration tank blowers will consume 1,700 kW-hr per day to provide air to maintain mixing and remove biochemical oxygen demand and ammonia within the aeration tanks.

The four new final clarifiers will each feature a sludge collection mechanism which consumes approximately 0.8 HP. Mixed liquor will be recirculated to the aeration tank influent by RAS pumps designed for 5,420 gpm at 25' TDH, which will consume 57 HP. The WAS pumps will be designed for 200 gpm, and consume approximately 3 HP.

Table 2. Total Project Annual Operations Savings

	Expansion of Existing WWTP w/ Tertiary Filtration	Proposed WWTP Improvements
Influent Screens	65,323 kW-hr	65,323 kW-hr
Raw Sewage Pumps	1,087,567 kW-hr	942,558 kW-hr
Grit Removal System	317,471 kW-hr	16,331 kW-hr
Intermediate Clarifiers	26,129 kW-hr	N/A
Intermediate Sludge Pumping	19,989 kW-hr	N/A
Flow Split Mixing	130,647 kW-hr	130,647 kW-hr
Aeration Blowers	555,428 kW-hr	620,572 kW-hr
Final Clarifiers	13,065 kW-hr	20,903 kW-hr
RAS Pumps	417,233 kW-hr	372,530 kW-hr
WAS Pumps	33,380 kW-hr	19,597 kW-hr
Tertiary Influent Pumps	652,540 kW-hr	N/A
Annual Energy Usage	3,318,594 kW-hr	2,188,461 kW-hr
Annual Energy Cost ($0.103/kWh)	$341,815	$225,411
Projected Energy Reduction %		34%
Projected Annual Energy Savings		$116,404

5.4 PROPOSED PROJECT COST

The opinion of proposed project construction cost is presented in Table 3.

Table 3. WWTP Major Capital Improvements Construction Cost

Description	Proposed Improvements
Influent Raw Sewage Pumping and Headworks	$9,462,000
Aeration System	$15,349,000
Secondary Clarifiers	$8,350,000
Total Construction Cost	$33,161,000

6.0 SUMMARY

The proposed improvements and changes to the WWTP process flow configuration provide the WWTP with potential for considerable energy savings. As indicated in Table 2, the proposed improvements to the Headworks, Preliminary, and Secondary treatment processes provide a reduction in annual energy consumption of approximately 1.1 million kW-Hrs, corresponding to $116,000 annually. The changes to the WWTP process treatment configuration allow the secondary clarifier effluent to flow to the proposed tertiary filters by gravity instead requiring influent pumps. This will provide the WWTP with 652,540 kW-Hrs of annual energy potential savings if the proposed improvements are implemented to achieve the required advanced wastewater treatment limits. These savings represent a 34 percent overall reduction in electricity consumption compared to the alternative of incorporating Tertiary Filtration into the WWTP existing process treatment configuration. The proposed improvements also allow for the removal of the oxidation tower and intermediate clarifier process and the related energy consumption.

Based on the projected energy savings of the proposed improvements exceeding 20 percent when compared with the alternative, the project meets the categorical energy requirements eligibility. The proposed improvements will also eliminate intermediate pumping requirements for the treatment flow.