GLWA
Great Lakes Water Authority

DRAFT

# CSO FACILITIES IMPROVEMENTS II
# ITA: 1024-1225
# 2026 CLEAN WATER STATE REVOLVING FUND PROJECT PLAN

MARCH 2025

WADE TRIM

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| Acronyms | |
|---|---|
| Acronym | Name |
| AACE | Association for the Advancement of Cost Engineering |
| AOR | Allowable Operating Region |
| AWT | Advanced Water Treatment |
| BAF | Biologically Active Filtration |
| BDF | Biosolids Dryer Facility |
| Bio P | Biological Phosphorus |
| CFS | Cubic Feet Per Second |
| COF | Central Off-Load Facility |
| CSO | Combined Sewer Overflow |
| DRO | Detroit River Outfall |
| DWF | Dry Weather Facility |
| DWSD | Detroit Water and Sewer Department |
| EB | Electrical Building |
| FEMA | Federal Emergency Management Agency |
| GLWA | Great Lakes Water Authority |
| GPF | Grit Processing Facility |
| HGL | Hydraulic Grade Line |
| HI | Hydraulic Institute |
| HP | Horsepower |
| HPO | High Purity Oxygen |
| HVAC | Heating, Ventilation, and Air Conditioning |
| HVOF | High Velocity Oxygen Fuel |
| HWL | High Water Level |
| ILP | Intermediate Lift Pump |
| LWL | Low Water Level |
| MAU | Makeup Air Unit |
| MBR | Membrane Bioreactor |
| MCFS | Minimum Continuous Stable Flow |
| MDEQ | Michigan Department of Environmental Quality |
| MF | Microfiltration |
| MG | Million Gallons |

| Acronyms | |
|---|---|
| mg/L | Milligrams per Liter |
| MGD | Million Gallons Per Day |
| MI-EGLE | Michigan Department of Environment, Great Lakes, and Energy |
| MLP | Main Lift Pump |
| MNFI | Michigan Natural Features Inventory |
| NPDES | National Pollution Discharge Elimination System |
| NTP | Notice to Proceed |
| O&M | Operation and Maintenance |
| OM&R | Operations, Maintenance and Repair |
| OC | Organochloride |
| OPCC | Opinion of Probable Construction Costs |
| POA | Pull-Out-Assemblies |
| POR | Preferred Operating Region |
| RAS | Return Activate Sludge |
| RO | Reverse Osmosis |
| RPM | Revolutions Per Minute |
| RRO | Rouge River Outfall |
| SCR | Screenings Capture Ratio |
| SEMCOG | Southeast Council of Governments |
| SFE | Screened Final Effluent |
| SHPO | State Historic Preservation Office |
| SOTR | Standard Oxygen Transfer Rate |
| SRF | State Revolving Fund |
| SWD | Side Water Depth |
| TDH | Total Dynamic Head |
| THPO | Tribal Historic Preservation Office |
| TKN | Total Kjeldahl Nitrogen |
| TMDL | Total Maximum Daily Load |
| TRC | Total Residual Chlorine |
| USFWS | United States Fish and Wildlife Services |
| VFD | Variable Frequency Drive |
| VSD | Variable Speed Drive |

| Acronyms | |
|---|---|
| VTSH | Vertical Turbine Solids Handling |
| WAS | Waste Activated Sludge |
| WRRF | Water Resource Recovery Facility |
| WTT | Wade Trim Team |

Wade Trim has used text and data from the following sources in the development of this Project Plan:

| Summary of Additional Sources of Data for the Project Plan | |
|---|---|
| Source | Description |
| CDM | GLWA Wastewater Master Plan |
| MNFI | Endangered, Threatened, or Candidate Species Survey |
| SEMCOG | Population Data |

# EXECUTIVE SUMMARY

The Great Lakes Water Authority (GLWA) provides regional wastewater collection, transport, and treatment services for approximately three million people in the City of Detroit and 76 other communities (see **Figure ES-1**). Wastewater from the service area is conveyed through a series of collection sewers, interceptors, and pump stations to the Water Resource Recovery Facility (WRRF) located at 9300 W. Jefferson, in the southwest corner of the City of Detroit near the confluence of the Detroit and Rouge Rivers (Town 2 South, Range 11 East, Wayne County). The WRRF is the largest single-site wastewater reclamation facility in North America.

The discharge of treated wastewater from the WRRF is authorized under the National Pollutant Discharge Elimination System (NPDES) Permit No. MI0022802, issued on June 28, 2019, and effective on July 18, 2019. The GLWA has operational responsibility for the regional sewer system including combined sewer overflow (CSO) control facilities, Screening Disinfection Facilities (SDF), and outfalls.

The City of Detroit and some of the older suburban communities utilize a combined sewer system to collect both sanitary wastewater and storm water runoff in a single pipe (see **Figure ES-2**). The newer suburban communities utilize a two-pipe system whereby the sanitary wastewater is transported through a sanitary sewer for treatment to a wastewater treatment plant and storm water drainage is conveyed and discharged directly to a receiving water with generally no treatment via a storm sewer. The combined sewer system within the City of Detroit is designed to convey the dry weather flow and a portion of wet weather flow to the WRRF for treatment. During significant storm events, sufficient flow can be generated such that the hydraulic capacity of the combined sewers and the treatment capacity of CSO control facilities is exceeded, and the excess flow is then discharged through one of the permitted combined sewer outfalls located along the Detroit and Rouge Rivers (see **Figure ES-3**). However, over 99% of the flow entering the GLWA system is treated to NPDES standards.

GLWA is pursuing State Revolving Fund (SRF) loans for improvements at nine (9) facilities. The project (CIP270006) improvements are divided into three parts:

1. **St. Aubin SDF – Disinfection, Screening, and Misc. Improvements** includes the following:
    - Chemical feed system improvements
    - Storage and mixing system improvements
    - Screen system improvements
    - Select HVAC improvements
    - Electrical power improvements
    - Lighting, and building system improvements
    - Instrumentation and controls (I&C) standardization improvements
    - Access hatch improvements
    - Incorporation of storage space within the Control Building

    These improvements will maintain the long-term reliability of this critical SDF.

2. **CSO Facility Safety Improvements and Building Rehabilitation** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.
    1. Seven Mile CSO (19272 Shiawassee Dr, Detroit, MI 48219)
    2. Puritan-Fenkell CSO (23673 Fenkell Ave, Detroit, MI 48223)
    3. Leib SDF (2188 Mt Elliott St, Detroit, MI 48207)
    4. Conner Creek CSO (11900 Freud St, Detroit, MI 48215)
    5. Belle Isle CSO (2 Pleasure Dr, Detroit, MI 48207)
    6. St. Aubin SDF (2200 Atwater St, Detroit, MI 48207)
    7. Baby Creek SDF (9524 Dix Ave, Dearborn, MI 48120)
    8. Hubble-Southfield CSO (16540 Rotunda Dr, Dearborn, MI 48120)
    9. Oakwood CSO (12082 Pleasant St, Detroit, MI 48217)

    Examples of improvements include but are not limited to extending guardrails, reorienting hatches, relocating ladders, and installing swing gates to reduce falling risk. Removing tripping hazards is also a focus of safety improvements to the facilities.

1. **Control System Upgrades at Baby Creek and Belle Isle CSO Facilities** implements a series of lighting and I&C system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

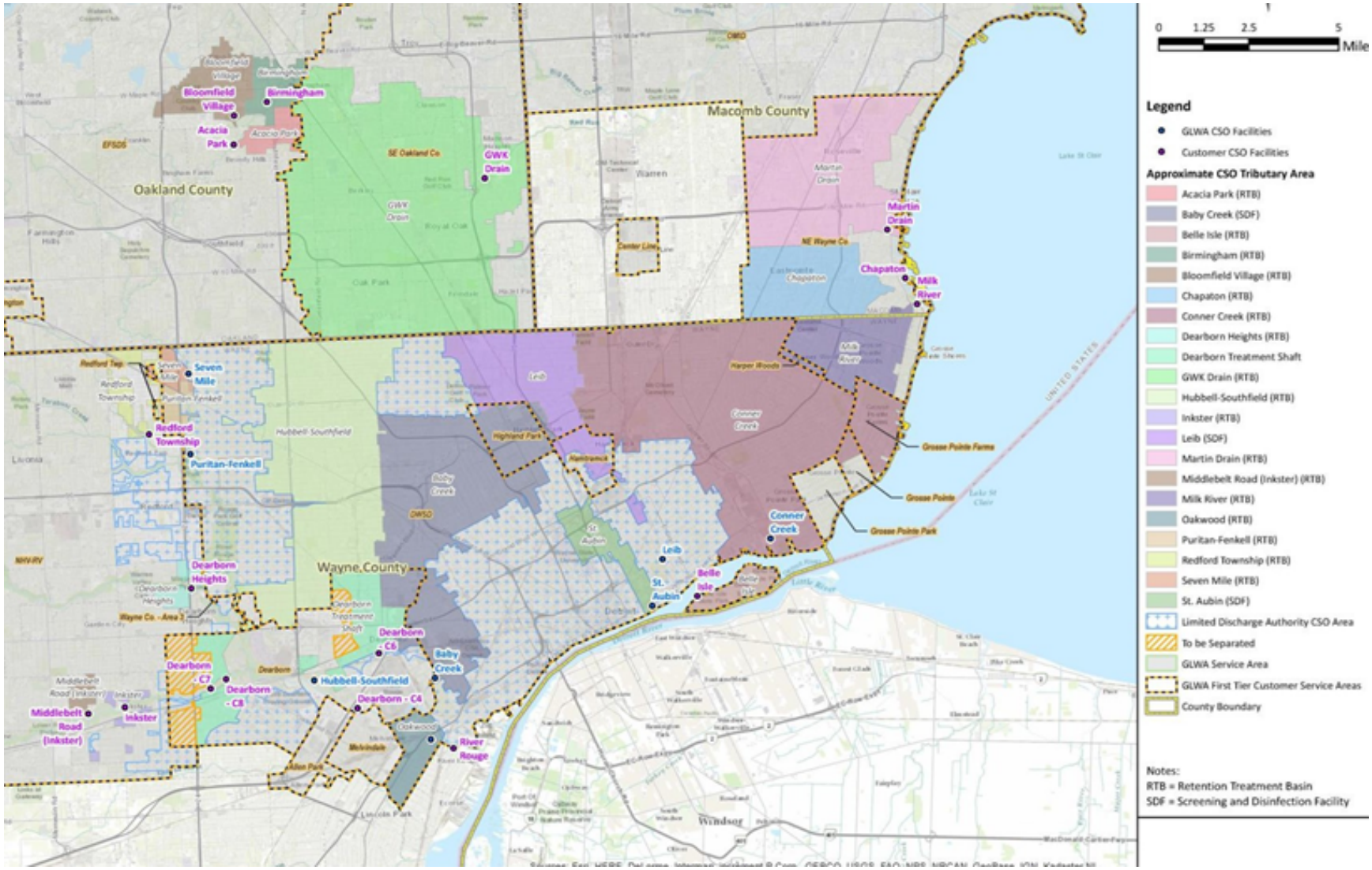
With one exception, the proposed work is completely confined to the repair or replacement of existing assets within or on the existing structures. One small area of ground disturbance is associated with the installation of a new manhole over the Baby Creek bypass sewer. The work will disturb the sewer's backfill; there is no environmental or cultural resource impact.

The project cost impacts are summarized in Table ES-1.

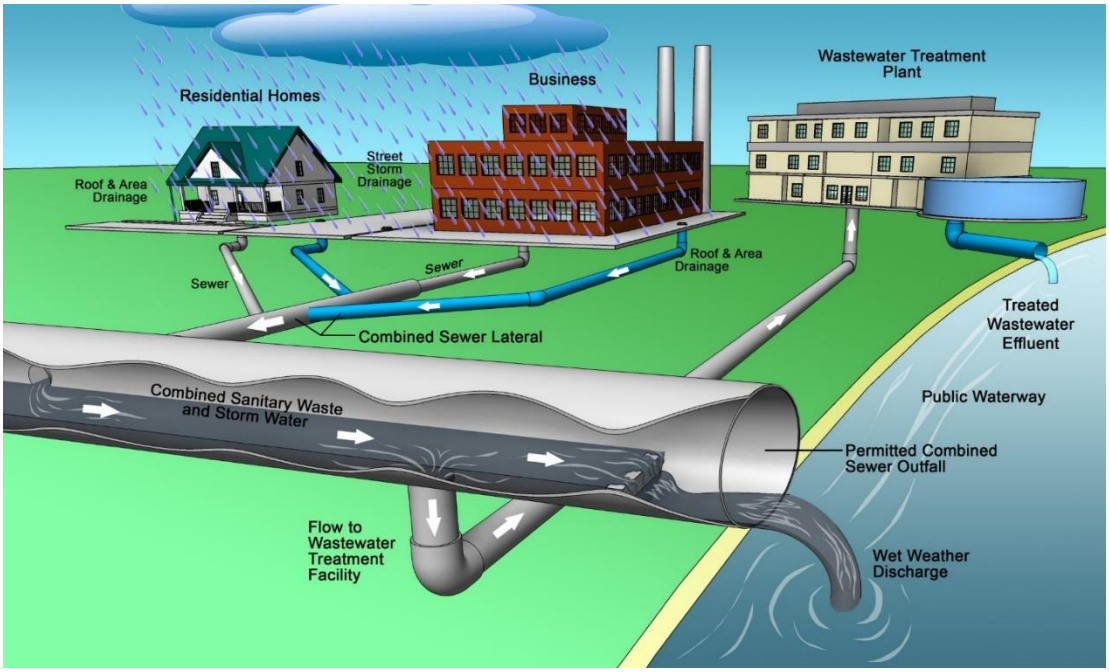
**Table ES-1 Summary of Project Costs**

| Project | Annual User Impact Cost | SRF Funding Requested |
|---|---|---|
| CSO Facilities Improvements II | $1.29 | $23,578,273 |

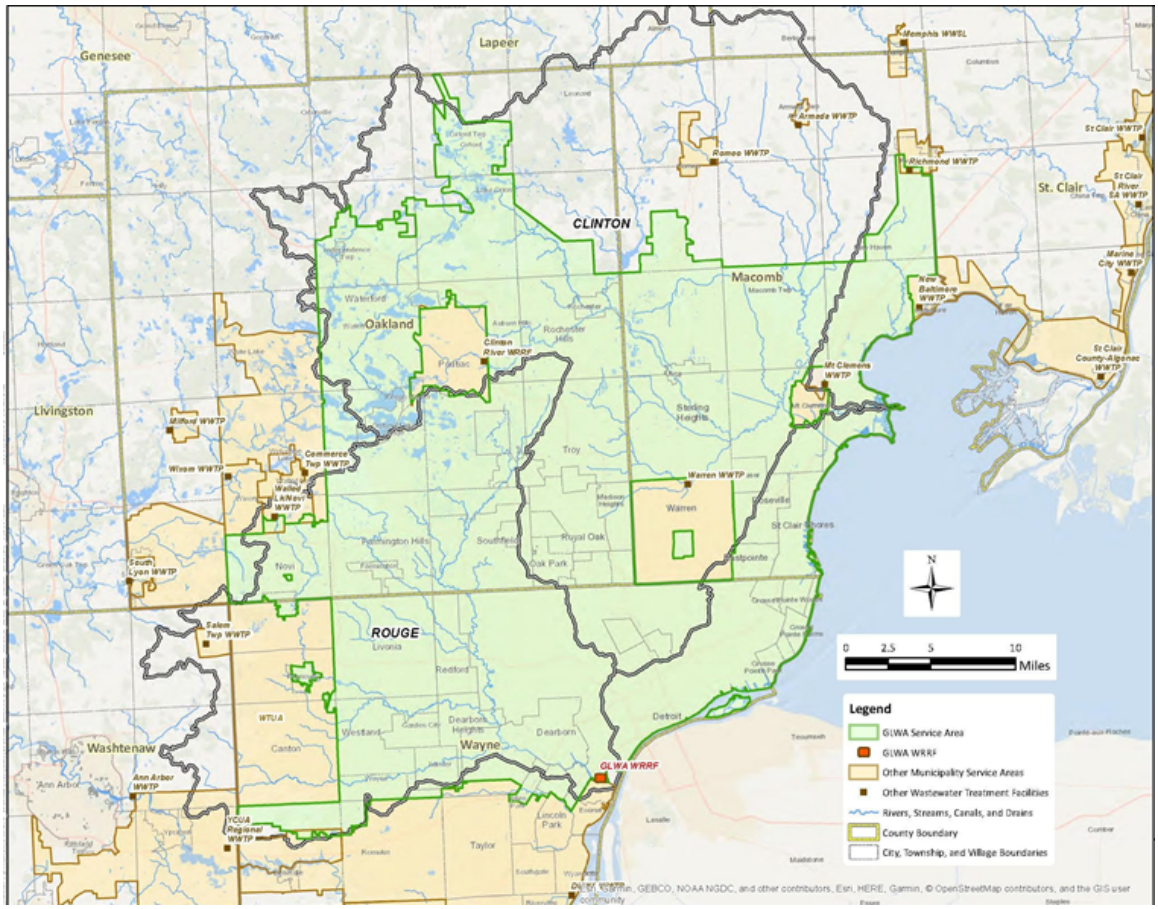
## Figure ES-1: GLWA Sewer Service Communities



## Figure ES-2: Combined and Separated Sewer Service Diagram




## Figure ES-3: GLWA Sewer Service Divided into Rouge River and Detroit River Areas



# 1.0 PROJECT BACKGROUND

## 1.1 Introduction and Purpose

This document has been prepared following the planning guidelines adopted by MI-EGLE for the SRF low-interest loan program. GLWA intends to seek low-interest loan assistance under the SRF program for the necessary improvements at the nine (9) CSO facilities. The improvements are necessary to provide safe, efficient, and reliable operations at those facilities. The CSO Facilities Improvements II Project Plan provides information on the status of the current operations related to the following three parts of the project:

**St. Aubin SDF – Disinfection, Screening, and Misc. Improvements Project** includes the following:

- Chemical feed system improvements
- Storage and mixing system improvements
- Screen system improvements
- Select HVAC improvements
- Electrical power improvements
- Lighting, and building system improvements
- Instrumentation and controls (I&C) standardization improvements
- Access hatch improvements; and
- Incorporation of storage space within the Control Building

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

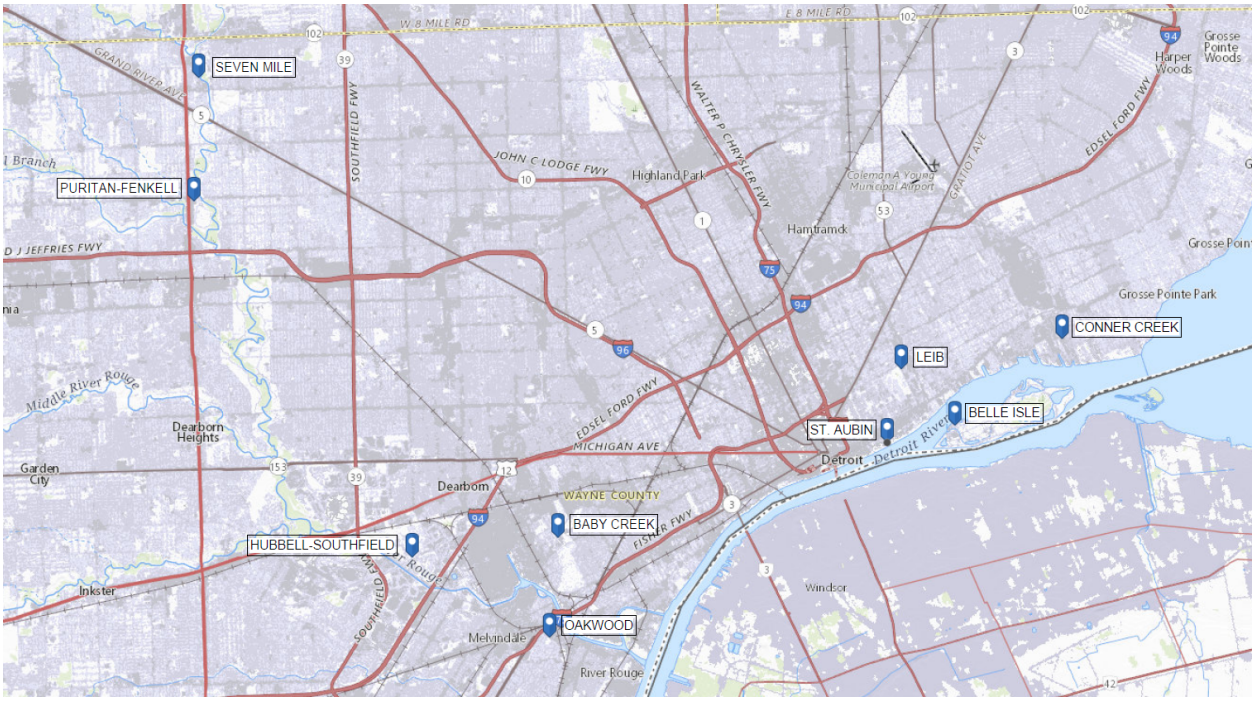
1. Seven Mile CSO (19272 Shiawassee Dr, Detroit, MI 48219)
2. Puritan-Fenkell CSO (23673 Fenkell Ave, Detroit, MI 48223)
3. Leib SDF (2188 Mt Elliott St, Detroit, MI 48207)
4. Conner Creek CSO (11900 Freud St, Detroit, MI 48215)
5. Belle Isle CSO (2 Pleasure Dr, Detroit, MI 48207)
6. St. Aubin SDF (2200 ATWATER ST, DETROIT, MI 48207)
7. Baby Creek SDF (9524 Dix Ave, Dearborn, MI 48120)
8. Hubble-Southfield CSO (16540 Rotunda Dr, Dearborn, MI 48120)
9. Oakwood CSO (12082 Pleasant St, Detroit, MI 48217)

Examples of improvements include but are not limited to extending guardrails, reorienting hatches, relocating ladders, and installing swing gates to reduce falling risk. Removing tripping hazards is also a focus of safety improvements to the facilities.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and I&C system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

The facilities' locations are as shown in **Figure 1-1.**

**Figure 1-1: Map of CSO Locations**

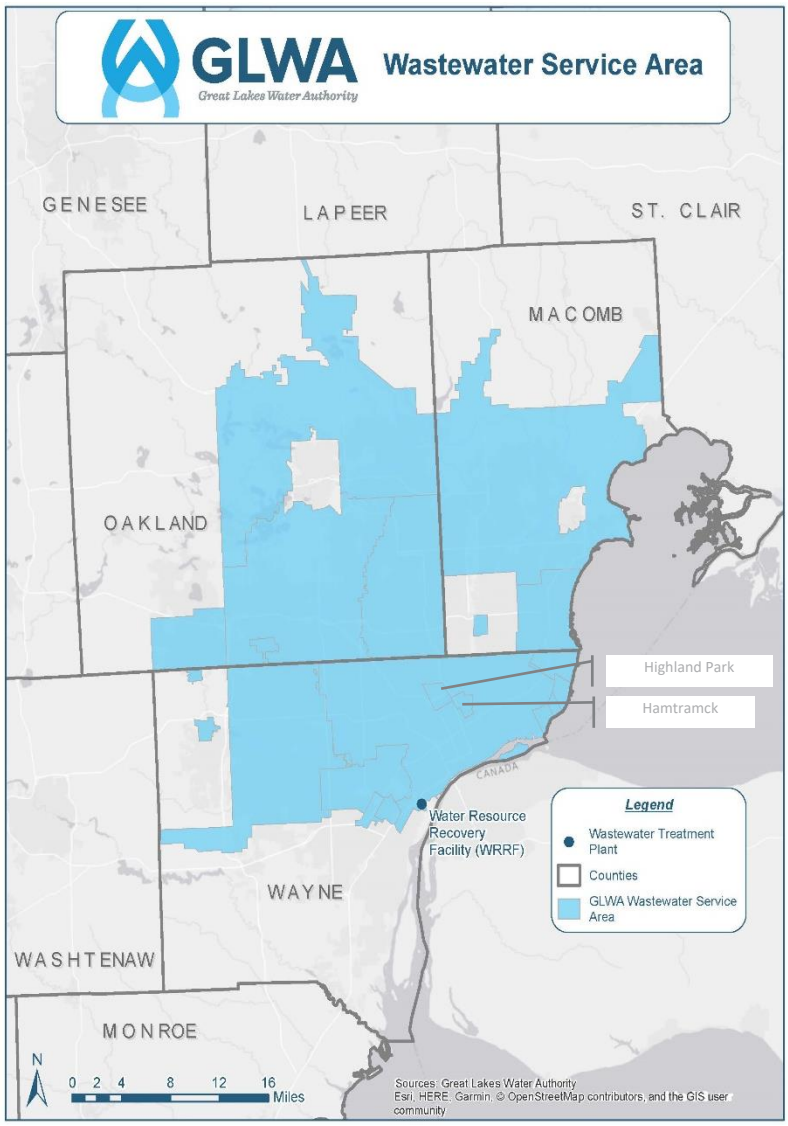



With one exception, the proposed work is completely confined to the repair or replacement of existing assets within or on the existing structures. One small area of ground disturbance is associated with the installation of a new manhole over the Baby Creek bypass sewer. The work will disturb the sewer's backfill; there is no environmental or cultural resource impact.

## 1.2 Delineation of Study Area

GLWA's wastewater service area includes the City of Detroit; 76 suburban communities; and Highland Park and Hamtramck, which are separate communities located completely within the City's corporate boundary as shown in **Figure 1-2**. The study area encompasses approximately 88,876 acres in the City of Detroit with a service population of approximately three million residents plus considerable commercial and industrial activity. Of this area, slightly less than half (39,300 acres) is in the Rouge River drainage area. The remainder (49,576 acres) is tributary to the Detroit River. The service area for the surrounding communities includes 277,007 acres in Wayne County, 283,178, acres in Oakland County, and 185,006 acres in Macomb County.

**Figure 1-2: GLWA Sewer System Service Area**




The nine CSO Facility project sites for the CSO Facilities Improvements II Project are located in Wayne County.

## 1.3 Cultural Resources

To complete the required Michigan State Historic Preservation Office (SHPO) consultation, consultation request letters were sent to 28 Federally designated tribes in Wayne County Michigan for their comment. At this time, no responses from this Tribal Historic Preservation Office (THPO) letter have been received. These letters and email correspondence can be found in **Appendix G.** A draft Application for SHPO Section 106 Consultation is included in **Appendix A.** The review should be completed by June 24, …. . The complete Section 106 consultation application should be submitted to the SHPO with the project's determination of effect by July 1, …. , as an addendum.

## 1.4 The Natural Environment

### 1.4.1 Air Quality

There are currently no air quality issues caused by or experienced at the CSO facilities. During construction of the project, it is possible that heavy machinery could perpetuate air-born dust. Procedures to minimize dust and other air-born particles caused by construction will be put into place as part of the contract documents.

### 1.4.2 Wetlands

Based on inspection of available National Wetland Inventory maps containing the CSO facilities and the surrounding area, there are no wetlands that will be disturbed by the construction of this project. The available map is available in **Appendix B**.

### 1.4.3 Coastal Zones

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

### 1.4.4 Floodplains

Based on inspection of the available Federal Emergency Management Agency (FEMA) FIRMette floodplain maps, there are no floodplains within the scope of the work for the CSO facilities. The available FIRMette maps are available in **Appendix B**.

### 1.4.5 Natural or Wild and Scenic Rivers

There are two rivers adjacent to the CSO facilities. These are the Rouge River and the Detroit River. Neither of these rivers are within the CSO facilities improvement boundaries and the scope does not impact either of the rivers' banks. Therefore, the project will have no effect on any natural or wild and scenic rivers. A map of surface waters surrounding the GLWA WRRF is available in **Appendix B**. Water quality issues of the surrounding area are discussed in Section 2.2.

### 1.4.6 Major Surface Waters

There are no major surface water adjacent to the CSO facilities other than the Rouge River and the Detroit River discussed in Section 1.4.5.

### 1.4.7 Topography

The CSO facilities are fully developed sites and are considered flat from a topographical perspective. The only ground disturbance for any work relating to the project is a 17' x 17' excavation for the addition of a new manhole over an existing drain. The impact will be temporary and will not result in any changes to the existing topography of the site.

### 1.4.8 Soils and Geology

All excavation for the project contained will take place in previously disturbed areas at the CSO facilities. It is expected that all soils encountered while excavating will be backfill materials from previous disturbances. If encountered, unsuitable soils, such as peat or marl, will be removed and replaced with appropriate granular backfill material. These materials and backfilling procedures will be detailed in the contract documents for each project.

### 1.4.9 Agricultural Resources

The CSO facilities are fully developed. There are no prime agricultural lands within the project boundary or the surrounding area. Therefore, there will be no effect on agricultural resources from any of the improvements within this project plan. **Appendix B** includes USGS Global Croplands Data maps of the areas.

### 1.4.10 Endangered Species

At the request of the Michigan Natural Features Inventory (MNFI) team at Michigan State University (MSU), the project boundary and surrounding area was divided into three areas resulting in three (3) requests to the MNFI for Rare Species Reviews. These correspondences can be found in **Appendix G.** According to the MNFI, there are multiple species of plants and animals registered as threatened, endangered, and special concern. To see the full list of species, refer to the MNFI response in **Appendix B**. This MNFI review has concluded several at-risk species have been documented within 0.5 miles of the project area and it is possible that negative impacts may occur. It was noted that a section of the Rouge River near the project area is a Group 2 mussel stream which means that state threatened, or state endangered mussels are expected to occur here and that certain surveys and possibly relocation procedures apply. MNFI also provided Section 7 comments in this review and indicated that eleven (11) federally listed/proposed/candidate species (8 endangered and 3 threatened species) have been identified by the U.S. Fish and Wildlife Service (USFWS) to occur in Wayne County, Michigan.

Species identified as federally endangered are the Indiana bat (*Myotis sodalist*), northern riffleshell (*Epioblasma torulosa-angiana*), Mitchell's Satyr Butterfly (Neonympha mitchellii mitchellii), piping plover (*Charadrius melodus)*, the snuffbox (Epioblasma triquetra), the rayed bean mussel (*villosa fabalis*), Karner blue butterfly (Lycaeides melissa samuelis), and the Northern long-eared bat (M. septentrionalis). It is noted that there are suitable habitats within 0.5 miles of the site for the Indiana bat, snuffbox, northern riffleshell, northern long-eared bat, and the rayed bean mussel. There does not

appear to be a suitable habitat within 0.5 miles of the project site for the piping plover, Mitchell's satyr butterfly, or the Karner blue butterfly.

Species identified as federally threatened are the Rufa red knot (*Calidris canutus rufa*), the eastern massasauga rattlesnake (*Sistrurus catenatus*), and the round hickory nut (Obovaria subrotunda). It was identified that there appears to be a suitable habitat within 0.5 miles of the project site for the rufa red knot and the round hickory nut. There does not appear to be a suitable habitat for the eastern massasauga rattlesnake within 0.5 mile of the project site. While there are no known hibernacula or roost trees that have been documented within 0.5 miles of the project site, it is within the designated WNS zone (i.e., within 150 miles of positive counties/districts impacted by WNS). In addition, suitable habitat does exist within 1.5 miles of the project.

As of December 15, 2020, the USFWS announced that listing the monarch butterfly (*Danaus plexipuss*) as endangered or threatened under the Endangered Species Act is warranted but precluded by higher priority listing actions.

The Rouge River is a habitat for state threatened or state endangered mussels. The reports make management recommendations for species such as the Eastern fox snake (Pantherophis gloydi), river redhorse (Moxostoma carinatum), snuffbox (Epioblasma triquetra), purple wartyback (Cyclonaias tuberculata), and the mudpuppy (Necturus maculosus). The full MNFI reports can be found in **Appendix B.**

Work of this project will not affect any waterways, woodlots, wet prairies or meadows, or caves. The improvements made to the facilities within the project area do not have an impact on endangered species or the natural environment.

## 1.5 Land Use

Seven of the nine CSO basins are in the City of Detroit, and two are in the City of Dearborn. The seven Detroit GLWA CSO Basins have multiple designations of land use while the facilities in Dearborn are designated as RA, "One Family Residential District". **Table 1-1** summarizes the zoning/land use for the facilities. The zoning maps containing the CSO basins is available in **Appendix C**. There are currently no plans by GLWA to change the land use of the site locations in the 20-year study period. The zoning is expected to remain the same for the 20-year planning period of the project.

**Table 1-1: Summary of Zoning/Land Use**

| CSO Facility Name | Zoning Code | Zoning Description |
|---|---|---|
| Seven Mile CSO | R1 (Detroit) | Single-Family Residential District |
| Puritan-Fenkell CSO | PR (Detroit) | Parks and Recreation District |

| Table 1-1: Summary of Zoning/Land Use | | |
|---|---|---|
| Leib SDF | M2 (Detroit) | Restricted Industrial District |
| Conner Creek CSO | M4 (Detroit) | Intensive Industrial District |
| Belle Isle CSO | NA (Detroit) | NA |
| St. Aubin SDF | PR (Detroit) | Parks and Recreation District |
| Baby Creek SDF | RA (Dearborn) | One Family Residential District |
| Hubbell-Southfield CSO | RA (Dearborn) | One Family Residential District |
| Oakwood CSO | M2 (Detroit) | Restricted Industrial District |

## 1.6 Population Projections

The GLWA CSO service area includes the City of Detroit and several other suburban communities as shown in **Figure 1-2,** and included **Appendix L**. The study area is approximately 745,191 acres. Southeast Michigan Council of Governments (SEMCOG) Census data for 2020 shows a total population of 3,108,478 for the service area of GLWA's Wastewater System. SEMCOG provided the service area population for the year 2023 and a projection for the year 2050, which is 3,091,095 and 3,260,193, respectively. **Table 1-3** summarizes the population data. The population data provided by SEMCOG for southeastern Michigan is presented in **Appendix L**.

## 1.7 Economic Characteristics

Although the service area for the GLWA Wastewater system includes many communities in Southeast Michigan, Detroit homes are most susceptible to a system failure. Detroit has an unemployment rate above regional averages. High unemployment rates have been a chronic problem in the areas surrounding the central business district. Compared to the regional averages, the City has a relatively low percentage of its population employed in professional occupations and has a higher-than-average incidence of unskilled workers. Prime employment categories include civil services, banking, real estate, and insurance. The median household income was found to be $36,453 in 2022 based on the "2022 American Community Survey 1-Year Estimates" from the U.S. Census Bureau data provided by SEMCOG. Based on population data and trends provided by SEMCOG, the population in southeastern Michigan is expected to increase at a steady rate in the 20-year planning period.

**Table 1-2: SEMCOG Population Data for Southeastern Michigan**

| Population and Households | ACS 2020 | Census 2010 | Change 2010-2020 | Pct Change 2010-2020 | SEMCOG July 2023 | SEMCOG 2050 | SEMCOG Predicted Change 2023-2050 | SEMCOG Predicted Pct Change 2023-2050 |
|---|---|---|---|---|---|---|---|---|
| Total Population | 3,108,478 | 3,057,757 | 50721 | 1.7% | 3,091,095 | 3,260,193 | 169,098 | 5.5% |
| Group Quarters Population | 34,643 | 34,196 | 447 | 1.3% | 40,425 | 48,760 | 8,335 | 20.6% |
| Household Population | 3,073,835 | 3,023,561 | 50274 | 1.7% | 3,050,670 | 3,211,433 | 160,763 | 5.3% |
| Housing Units | 1,352,890 | 1,355,631 | -2741 | -0.2% | 1,369,055 | | | |
| Households (Occupied Units) | 1,244,525 | 1,198,569 | 45956 | 3.8% | 1,275,737[1] | 1,314,620 | 38,883 | 3.0% |
| Residential Vacancy Rate | 8.0% | 11.6% | -3.6% | | 6.8% | | | |
| Average Household Size | 2.47 | 2.52 | -0.05 | -2.1% | 2.39 | 2.44 | 0.05 | 2.1% |

*Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates, and SEMCOG 2050 Regional Development Forecast*

[1] 1,275,737 Households used in calculation of User Impact Costs

## 1.8 Existing Facilities

Overall descriptions of the GLWA System and WRRF processes are presented as a part of this section. The project is located at the nine CSO facilities described in Section 1.8.7.

### 1.8.1 Wastewater Treatment

GLWA is responsible for operation of one of the largest municipal WRRFs in the United States. The plant was initially placed into service in 1940 when it used primary treatment to remove approximately 50-70% of pollutants. The original plant also provided dewatering and incineration of the solids. In the 1970s, secondary treatment facilities were added to provide a higher degree of treatment. Solids handling facilities were added as the capacity of the plant expanded. The combination of primary and secondary treatment at the WRRF removes more than 85% of incoming pollutants, meeting and exceeding federal and state requirements.

The major processes at the WRRF include influent pumping which lifts the wastewater into the WRRF; primary treatment, which involves removal of material suspended in the wastewater (suspended solids); secondary treatment, which involves biological processes to remove pollutants that reduce the oxygen content (carbonaceous biochemical oxygen demand) in the Detroit River; disinfection, which involves the addition of chlorine to kill harmful bacteria; phosphorous removal, which involves the addition of chemicals to reduce the concentration of phosphorus, which has adverse impacts on the quality of water in the Detroit River and the downstream lakes; and solids handling and disposal, which involves the management and ultimate disposal of solid materials (sludge, ash, grit, and screenings), that are byproducts of wastewater treatment.

Wastewater from the Jefferson and Oakwood interceptors reaches the WRRF at PS-1, where eight (8) pumps lift the wastewater to begin the treatment process. PS-2, which came into operation in 1994, pumps water from GLWA's third major interceptor, the NI-EA, as well as a portion of the Oakwood Interceptor. PS-2 contains eight (8) pumps, each with a design capacity of 107 million gallons per day (MGD). Six (6) of the pumps have variable frequency drives, while two (2) have constant speed drives.

PS-1 pumps raw wastewater to eight (8) mechanically cleaned bar screens, which remove solids greater than 1 inch. PS-2 also pumps raw wastewater to eight (8) mechanically cleaned bar screens, removing solids larger 3/4 inch. Screenings are conveyed to dumpsters, which are trucked to landfills. After screening, the raw wastewater flows through eight (8) grit removal channels at each of the pump stations, where the flow is slowed to allow heavier inorganic solids such as sand, grit, and gravel to settle. The settled grit is removed by a conveyor system to dumpsters. Grit from PS-1 and PS-2 is typically landfilled.

12 rectangular and six (6) circular clarifiers provide primary clarification. All dry weather flow receives primary and secondary treatment and is disinfected prior to discharge. Wet weather flow, up to 930 MGD, receives primary and secondary treatment with disinfection prior to discharge.

Wet weather flow greater than 930 MGD, receives primary treatment and disinfection up to the discharge capacity of the Detroit River Outfall (DRO) (approximately 1,100 MGD). All remaining wet weather flows are discharged through the Rouge River Outfall (RRO) up to the 1,700 MGD capacity of the WRRF. The flow entering the plant is not metered but the influent volumes are estimated from pump operating curves. Effluent from the primary clarifiers is pumped to secondary treatment by a combination of five (5) pumps located in the Intermediate Lift Pump Station and proceeds through the remainder of the plant by gravity. All five (5) pumps have variable speed drive units.

The initial stage of secondary treatment consists of four (4) activated sludge aeration basins, all utilizing high purity oxygen (HPO). Prior to 2004, one of the activated sludge aeration basins utilized forced air. However, it was enclosed with construction of a new concrete deck and converted from air to HPO. Microorganisms in the activated sludge basins utilize the HPO to treat the wastewater. GLWA purchases HPO from an outside entity, Praxair.

GLWA operates 25 secondary clarifiers to settle out the biological mass after the aeration process. For purposes of defining firm capacity, two (2) of the 25 clarifiers are available to be out of service for preventative maintenance.

Chlorine is used for disinfection of the final effluent discharged to the Detroit River through the DRO (Outfall 049). The current plant effluent chlorine feed disinfection system has been in operation since 2003, and chlorine is fed into the treatment facility effluent to meet effluent bacteria limits. The permit establishes a daily maximum limit on total residual chlorine in the effluent of 0.11 milligrams per liter (mg/L), and the disinfection system includes de-chlorination facilities to meet this effluent limit.

The RRO (Outfall 050) is currently used during wet weather-induced high flow events when hydraulic conditions at the plant necessitate. Because discharges from the existing RRO are not currently disinfected, a Design-Build project to reconfigure the SE and PE conduits to disinfect and dechlorinate all discharges to the Rouge River is currently ongoing. The new outfall configuration will provide the hydraulic capacity to discharge 1,700 MGD of treated effluent and will meet effluent limits for bacteria and total residual chlorine (TRC).

To protect downstream water quality in the Detroit River and Lake Erie, phosphorous is removed from the treated wastewater prior to discharge. The monthly average discharge limit for total phosphorus is 0.7 mg/L for flows receiving secondary treatment since January 2015. Since October 2015, the six-month growing seasonal (April – September) average maximum limit for secondary treatment is 0.6 mg/L for phosphorous. By adding ferrous or ferric salts to the influent wastewater, the phosphorous is precipitated from the flow and settles in the primary clarifiers, so it can be processed with the primary sludge. A new ferric chloride feed system was installed at PS-1 and PS-2 between 2020 and 2022 to enhance phosphorous removal. Ferric chloride is added directly into the flow prior to it entering the primary clarifiers. While GLWA has made significant strides in phosphorous removal at the WRRF, more stringent phosphorus limits will be included in an upcoming NPDES Permit, lowering the allowable phosphorous limit to 0.4 mg/L.

### 1.8.2 Sludge Handling

Solids handling and disposal at the WRRF include sludge thickening, sludge blending, storage, belt filtration, centrifuging, incineration, ash disposal, and chemical stabilization. To adequately treat wastewater, solids contained in the wastewater must either be removed or converted to more stable forms. Both of these methods are utilized at the WRRF through sedimentation, biological treatment, incineration, and lime stabilization and landfilling. Solids handling, and disposal are a critical aspect of plant operation, and GLWA is engaged in an ongoing program to improve the capacity and reliability of its sludge processing and disposal facilities.

The 12 gravity sludge thickeners (six (6) in Complex A and six (6) in Complex B), and six (6) storage tanks thicken and inline blend both the primary and secondary sludges for optimum dewatering characteristics. The contents are stored until they are pumped to dewatering facilities. The capacity of these facilities is adequate for current loading rates. Eight (8) (four (4) in Complex A and four (4) in Complex B) thickeners have been rehabilitated, including the replacement of the pumps.

Sludge is dewatered at three (3) locations in the plant. Complex I contains ten (10) belt filter presses, and Complex II contains 12 belt filter presses (Upper Level) and four (4) centrifuges (Lower Level) for dewatering sludge prior to incineration or off-site disposal. In 2017, 20 of the belt filter presses were replaced in their entirety in Complex I and Complex II under Contract PC- 787. The four (4) Sharples centrifuges in Complex II have also been completely refurbished.

Incineration of blended dewatered sludge takes place in two (2) complexes containing a total of 14 multiple hearth incinerators: six (6) in Complex I and eight (8) in Complex II. Air quality standards for incinerator emissions require periodic testing of the emissions from the incinerators, which are regulated by a renewable operating permit issued by MDEQ. GLWA also utilizes the Central Off-load Facility (COF), a truck loading process which produces lime-stabilized sludge cake to be hauled to landfill.

GLWA's Biosolids Dryer Facility (BDF) directly across W. Jefferson Avenue from the WRRF was put in operation in August 2015. This BDF, which has a design capacity of approximately 400 dry tons per day, consists of four thermal dryer trains. Blended primary and secondary liquid sludge is pumped from the existing WRRF sludge storage tanks by sludge feed pumps through one of two underground force mains. This blended liquid sludge is being dewatered at the new BDF in one (1) of eight (8) centrifuges and the dewatered sludge processed through one of four (4) triple-pass thermal dryers. The Class A dried product is conveyed to one (1) of four (4) storage silos, where the material is offloaded to trucks for transport to customers. The product is primarily being utilized by famers in the Midwest as fertilizer.

### 1.8.3 Design Capacity

Wastewater flows in the GLWA system have been analyzed in the past for both dry and wet periods. For purposes of the analysis, dry weather flows were determined based on an examination of water

consumption, and metering data. Historical data collected over a three (3) year period in the 1990s showed a typical average consumption of 517 MGD. This value was used for planning purposes as an expected reasonable consumption value for the region over the 20-year planning period. Current consumption is reduced because of the overall economic downturn in the service area, but some recovery is expected as the economy stabilizes and eventually recovers. The 517 MGD reflects water production rates with adjustments for those municipalities who receive water from GLWA, but who do not discharge wastewater into the system. Adjustments have also been made, where appropriate, to account for communities such as Highland Park which discharge wastewater to the system, but which previously furnished their own domestic water supply. For planning purposes, an estimated 90% of the 517 MGD was assumed to be returned to the sewer system as wastewater. This flow quantity is then coupled with the estimated infiltration and inflow for the system to generate the total average dry weather flow. This approach includes industrial flows from a few facilities, which furnish their own water supply.

The WRRF has a primary treatment capacity of 1700 MGD, secondary treatment of 930 MGD. Wet weather flow greater than 930 MGD receives primary treatment and disinfection up to the discharge capacity of the DRO (approximately 1,100 MGD). All remaining wet weather flows are discharged through the RRO up to the 1,700 MGD capacity of the WRRF.

The limit on the current secondary treatment capacity is the hydraulic capacity of the secondary Aeration Decks. This process has been identified as a candidate for a proposed project to increase the treatment capacity. If the aeration decks secondary treatment capacity is increased, the wet weather secondary treatment capacity of the WRRF will increase as well.

### 1.8.4 Infiltration and Inflow (I/I) Problems

According to the GLWA Master Plan, the GLWA Wastewater system has a high rate of infiltration and inflow due to several instances of I/I issues in its collection system. The City of Highland Park experiences excessive infiltration in some areas likely because many manholes show signs of deterioration and sewers contain appreciable sediment deposits. In the case of Allen Park, the City enacted a recent program to disconnect downspouts and footing drains to reduce infiltration. Natural bodies of water in the service area like the Detroit River and Lake St. Clair affect the rates of infiltration and inflow in the collection system as well. When the water levels of these bodies increase, the infiltration into the system is increased as a result and the water backs up into the system through CSOs.

### 1.8.5 System Bypasses

An emergency bypass event occurs when the Wastewater system must discharge untreated water into the environment. This is during wet weather events when the level of the water at the influent of the facility exceeds a certain level, and it is carried out by emergency bypass gates opening to divert flow around the headworks of the facility to protect the facility from flooding. For example, at Baby

Creek SDF, the emergency bypass gates will open when the level reaches and elevation of 99 feet (Cit of Detroit datum) at the headworks facility.

The nine CSO Facilities operated by GLWA have an overflow outfall to divert water to in a bypass event. According to the GLWA 2024 Annual Consolidated Report, the reported 2023 annual untreated water discharge volume to the Detroit River was 1278 million gallons (MG), and five outfalls account for 95% of the discharge. Four of the outfalls that discharge into the Detroit River overflowed at a frequency of almost once per month during 2023. The 2023 annual untreated discharge volume to the Rouge River 525 MG, and four outfalls account for 83% of the discharge.

### 1.8.6 Existing Pump Stations

GLWA relies on nine (9) pumping stations that are located throughout the collection system as listed in **Table 1-3**. The pumping stations are used to lift the wastewater from the low points in the sewer system in order to convey it by gravity the rest of the way to the WRRF. All nine (9) pumping stations are designed to convey combined sanitary and storm flows.

Major stations are normally controlled remotely from GLWA's System Control Center via a telemetering system, but they can also be controlled locally. The major stations in the system include Bluehill, Conner Creek, Fairview, Freud, Northeast, Oakwood, and Woodmere. The remaining stations, Belle Isle and Fischer are referred to as minor stations; and they operate in the local automatic mode, controlled by level sensors. In addition to the nine (9) pumping stations, the Lighthouse Point Pumping Station and Brennan Pools also contribute flow to the system but are currently under the jurisdiction of the City of Detroit Recreation Department. Bluehill, Woodmere and Brennan Pools pump stations are managed by DWSD.

**Table 1-3: List of System Pump Stations**

| Station | Date Placed in Service | Type | Operator |
|---|---|---|---|
| Belle Isle | 1920s | Combined | DWSD |
| Bluehill | 1940s | Combined | DWSD |
| Conner Creek | 1928 | Combined | GLWA |
| Fairview | 1914 | Combined | GLWA |
| Fischer | 1940s | Combined | GLWA |
| Freud | 1950s | Combined | GLWA |
| Northeast | 1960s | Combined | GLWA |
| Oakwood | 1921 | Combined | GLWA |
| Woodmere | 1958 | Combined | DWSD |

GLWA relies on four (4) major pump stations at the WRRF: Pump Station 1, Pump Station 2, the Intermediate Lift Pump Station, and the SFE Pump Station. Wastewater from the Jefferson and Oakwood interceptors reaches the WRRF at PS-1, where eight (8) pumps lift the wastewater into the WRRF treatment processes. PS-2 pumps water from GLWA's third major interceptor, the NI-EA, as well as a portion of the Oakwood Interceptor. PS-2 contains eight (8) pumps, each with a design capacity of 107 MGD. Six (6) of the pumps have variable frequency drives, while two (2) have constant speed drives.

Effluent from the primary clarifiers is pumped to secondary treatment by a combination of five (5) pumps located in the Intermediate Lift Pump Station and proceeds through the remainder of the plant by gravity. All five (5) pumps have variable speed drive units. The aeration decks receive effluent from this pump station.

The existing SFE pump station provides SFE for various operations throughout the plant. The original capacity of the eight (8) pumps in the station, 124 MGD, far exceeds current average demand of 23 MGD.

### 1.8.7 Combined Sewer Overflow Facilities

Detroit began to construct CSO control projects in the 1990's. The first facilities were undertaken as part of the National Wet Weather Demonstration Grant Project for the Rouge River Basin, which helped finance CSO control facilities within Oakland County, Wayne County, Dearborn, as well as the City of Detroit. DWSD completed its original Long Term CSO Control Plan in 1996 and has prepared updates in 2008 and 2010. Detroit has undertaken numerous CSO control projects recommended in the long-Term Plan within both the Rouge River and Detroit River watersheds. The NPDES permit effective May 1, 2013, has recognized the substantial progress in controlling CSO.

GLWA has also installed in-system storage devices at 33 locations throughout the collection system to utilize excess pipe capacity to retain wet weather flows during small storm events. The in-system storage gates operate in a manner similar to those which were installed under the Rouge River National Wet Weather Demonstration Project.

GLWA has also installed an I&C system to provide real time information to system operators on flow levels, pump conditions, and overflow status. The information can be used to manage wet weather flows to maximize transport and treatment, and to minimize untreated CSO discharges. A summary of the CSO treatment facilities which are in service is shown in **Error! Reference source not found.**.

**Table 1-4 Summary of GLWA CSO Facilities**

| | Baby Creek | Belle Isle | Conner Creek | Hubbell-Southfield | Leib | Oakwood | Puritan-Fenkell | Seven Mile | St. Aubin |
|---|---|---|---|---|---|---|---|---|---|
| Facility Abbreviation | BC | BLI | CON | HS | LEIB | OKW | PF | SM | STA |
| Facility Type | SDF | RTB | RTB | RTB | SDF | RTB | RTB | RTB | SDF |
| Year of Startup | 2005 | 2007 | 2005 | 1996 | 2002 | 2012 | 1996 | 1997 | 2002 |
| Hydraulic Capacity (cfs) | 5,100 | 33 | 13,963 | 3,200 | 2,000 | 1,660 | 845 | 655 | 310 |
| Treatment Capacity (cfs) | 5,100 | 33 | 13,963/ 13,262 | 3,200/ 2,200[c] | 1,550 | 1,660 | 845 | 655 | 250 |
| Storage Volume (MG) | 3.0 | 0.3 | 30 | 22 | 9.9 | 9 | 2.8 | 2.2 | 2.4 |
| Screen Type (size of slot or opening) | Perforated Plate (6-mm) | Perforated Plate (6-mm) | Bar Screen (1.5-inch) | Bar Screen (1.5- inch) | Raked Vertical and Horizontal Bar Screens (4-mm) | Perforated Plate (6-mm) | Bar Screen (0.5-inch) | Bar Screen (0.5-inch) | Raked Vertical Bar Screens (4-mm) |
| Disinfection Type | Liquid Sodium Hypochlorite (NaOCl) | | | | | | | | |
| Receiving Water Body | Rouge River | Detroit River | Detroit River | Rouge River | Detroit River | Rouge River | Rouge River | Rouge River | Detroit River |
| Contact Time (min) | 10 | 10 | 5 | 22 | 10 | 10 | 30 | 30 | 10 |
| Storm Size | 10 yr – 1 hr | 10 yr – 1 hr | 10 yr – 1 hr | 1yr – 24 hr | 10 yr – 1 hr | 10 yr – 1 hr | 1 yr – 1 hr | 1 yr – 1 hr | 1 yr – 1 hr |
| Dewatering | Gravity | Pumped | Gravity & Pumped | Gravity & Pumped | Gravity & Pumped | Gravity & Pumped | Pumped | Pumped | Pumped |

[a] Treatment capacity refers to the design capacity of the screening and disinfection systems.
[c] Based on Hubbell-Southfield O&M Manual, the disinfection capacity is 2,200 cfs. The screening capacity is not specifically listed and is assumed to be equal to the hydraulic capacity.
Notes:
cfs = cubic feet per second, MG = million gallon(s), mm = millimeter(s), N/A = not applicable

### 1.8.8 Operation and Maintenance Issues

The project included herein is intended to address O&M "issues" that hinder the operation of the CSO facilities. The project will address safety, operational and maintenance improvement opportunities associated with new technology, and aging components. The project will improve reliability, ease of maintenance, and operational efficiency. The specific O&M improvement opportunities are discussed with in Section 2.0 Summary of Project Need.

### 1.8.9 Climate Resiliency

The GLWA collection and treatment system has been designed to provide climate resiliency for its operating processes. Operating equipment and processes including electrical aspects that are susceptible to temperature fluctuation are maintained in properly temperature-controlled and ventilated areas. This provides for the ability to maintain proper operation and treatment through changes internally and from the environment.

Critical processes at the CSO Facilities can run off backup power if necessary. The backup generators are regularly maintained as part of a preventative maintenance schedule. The generators give the plant operating security in the event of climate-related outages or outages to the primary electrical supply.

## 1.9 Fiscal Sustainability Plan

GLWA has implemented an asset management program which captures the inventory of the assets included in this Project Plan. A complete inventory can be made available upon request. **Table 1-5** summarizes the critical assets by facility. The Fiscal Sustainability Certification form is included in **Appendix D**.

**Table 1-5: Summary of Critical Assets**

| CSO Facility | Critical Asset(s) |
|---|---|
| Conner Creek RTB | Flushed solids pumps (4), Dewatering pumps (4), 95,000 gal. chemical storage tanks (4), Odor control system, Mechanically cleaned bar screens (10), Mixers (20), Screen gates (7), Chemical feed pumps (10) |
| Hubbell-Southfield RTB | Dewatering pumps (4), Sump pumps (2), Sample pumps (3), Mixers (4), Effluent flap gates (7), Influent bar screens (6), Chemical storage tanks (2), Odor control system |
| Seven Mile RTB | Dewatering pumps (3), Bar screens (2), 2400 gal. Chemical storage tank, Odor control system, Sampler system, Influent slide gates (6) |
| Puritan-Fenkell RTB | Dewatering pumps (3), Sanitary pumps (2), 3975 gal. chemical storage tanks (2), Mixers (3), Odor control system, Sampler system, Influent slide gates (6) |
| Oakwood RTB | Sanitary pumps (4), Storm pumps (8), Chemical feed pumps (8), Dewatering pump, Influent gates (6), Flushing gates (16), Odor control |

| CSO Facility | Critical Asset(s) |
|---|---|
| | system, Chemical storage tanks (2), Sampler system, Perforated plate screens (6) |
| Belle Isle RTB | Sanitary pumps (2); Stormwater pumps (3), Screening recirculation pumps (2), Perforated screens (2), Sampler system |
| Leib SDF | Dewatering pumps (2), Chemical feed pumps (8), Vertical screens (4), Horizontal screens (8), Chemical storage tanks (2), Mixers (16), Sampler system |
| St. Aubin SDF | Dewatering pumps (3), Vertical screens (2), Chemical storage tank (2), Chemical feed pumps (5), Mixers (7), Sampler system |
| Baby Creek SDF | Submersible flushing pumps (4), Dewatering pump, 36,000 gal. storage tanks (2), Bar screens (16), Odor control system, Mixers (32) |

# 2.0 SUMMARY OF PROJECT NEED

## 2.1 Regulatory Compliance Status

The current NPDES Permit GLWA Wastewater System can be found in **Appendix E.** GLWA is currently in compliance with all requirements set forth by the NPDES Permit. There are currently no active Administrative Consent Orders or Amended Active Consent Orders placed on GLWA for the CSO Facilities.

## 2.2 Water Quality Issues

### 2.2.1 Detroit River

The Detroit River is intensively developed, with extensive urban, commercial, and industrial complexes, particularly on the U.S. side. Over the past several decades significant improvements have been made in controlling conventional pollutant point sources in the Detroit River especially for discharges of oil and grease, and nutrients. Concentrations of other conventional pollutants including chloride, ammonia and phenols have declined substantially.

However, problems remain regarding certain toxic organics and metals. The Detroit River is the furthest downstream of the Upper Great Lakes Connecting Channels, and environmental conditions are impacted by upstream pollutant loadings as well as those contributed directly to the river and via tributaries to the river. Water and sediment entering the head of the Detroit River are subject to contamination from the St. Clair River (organic hydrocarbons, volatile organics, and mercury) and the Clinton River (PCBs, heavy metals and P).

The levels of mercury in Detroit River sediments remain a concern, despite improvements in industrial treatment facilities. Overall, aquatic biota, especially bottom dwelling organisms, show some impact from contamination of Detroit River sediments with organic and inorganic substances. Normal macrobenthic communities were found upstream of Zug Island and along the entire Canadian shoreline. Severely impacted communities were noted to occur along and immediately downstream of Zug Island. Communities displaying intermediate impacts were found along the remainder of the U.S. shore.

Data on contaminant levels in fish from the Detroit River is insufficient to determine trends. However, limited research has indicated high levels of PCBs and chlordane residues and gradual reductions in levels of DDT residues. Increased incidence of fish tumors were detected in the lower river.

The concentrations of several parameters were identified as exceeding Michigan Rule 57 criteria or Great Lakes Water Quality Objectives at one or more locations in the Detroit River: PCB's, hexachlorobenzene, PAHs, lead, and mercury.

Phosphorus concentrations in the river are below relevant guidelines, but the Detroit River is a contributor of P to Lake Erie. P concentrations from the GLWA WRRF have been consistently below authorized levels as set forth in GLWA's NPDES Permit. Mean concentrations of cadmium, copper, mercury, nickel, and zinc were significantly higher in the lower river, indicative of inputs from sources along the river. PCBs clearly show an increase in downstream concentrations with increase greatest on the U.S. shore. Organochlorine (OC) pesticides (e.g., chlordane, DDT, and dieldrin) were found in the upper river, however, significantly higher OC levels have been observed at many downstream stations. The MDEQ completed a Total Maximum Daily Load (TMDL) study for E Coli in the Detroit River in 2007. The purpose of these TMDL studies is to establish controls on pollutant sources so as to achieve in-stream water quality goals.

A review of the USGS 6-minute interval flow data for the Detroit River at Fort Wayne from October 2008 through August 2017, showed that the Detroit River had an average flow of 191,560 cubic feet per second (CFS). During this period, the river flow had a range of minimum 22,700 CFS to a maximum 286,000 CFS with a 95 percent exceedance flow of 154,000 CFS.

### 2.2.2 Rouge River

The Rouge River is also intensively developed, with little vacant land within the drainage area in the City of Detroit other than designated recreational areas and parks. North of the confluence of the Middle Branch, the development is primarily residential with small commercial outcroppings and a substantial area designated as park land along the riverbanks. After traversing the City of Dearborn, the River emerges into a predominantly industrialized portion within the City of Detroit until emptying into the Detroit River near Zug Island.

Relatively poor water quality has been documented in the Rouge River by numerous studies and publications including the Rouge River National Wet Weather Demonstration Project, the Remedial Action Plan, and various water quality assessments performed by MDEQ and others. However, recent monitoring shows that there has been measurable improvement in many areas for some pollutant parameters. These changes are likely the result of CSO control facilities and stormwater management efforts throughout the watershed.

The River receives municipal and industrial discharges as well as intermittent combined sewer overflows and stormwater discharges during and after wet weather periods. Biological investigations document that pollutant-tolerant species predominate in the River and that sludge beds are a problem.

High fecal coliform levels have been measured during both wet and dry weather periods, and the River has little assimilative capacity due to its shallow depth, slow velocity, and relatively low re-aeration rates. High concentrations of dissolved solids and Biochemical Oxygen Demand have been recorded. P levels were identified to exceed recommended state levels for tributary streams.

Toxic pollutants have been observed in samples from the Rouge River, particularly in sediments. The River supports a limited aquatic fishery of pollutant tolerant species and is considered to be a significant tributary load to the Detroit River and the Great Lakes.

The MDEQ completed two TMDL studies in 2007 for the Rouge River for Biota and E Coli. The E Coli TMDL was revised in 2011 to incorporate the allowable bacteria loadings from GLWA recommended CSO control facilities as identified in the modified NPDES Permit issued to GLWA. The purpose of these TMDL studies is to establish controls on pollutant sources so as to achieve in-stream water quality goals.

In addition to the Detroit and Rouge Rivers, several small tributary water courses are also located in the service area. These include Fox Creek, Conner Creek, and Baby Creek. Historically, these small tributaries provided drainage from areas within the City of Detroit to the Rouge and Detroit Rivers. As Detroit became more and more urbanized and developed, these tributaries have been enclosed over much of their length. Today, the water bodies consist of short channels at the outlet of the historic watershed. During dry weather periods, the enclosed drains from these areas are connected to the wastewater collection system. For this reason, the open water channels tend to be relatively stagnant bodies of water except during wet weather periods. These channels typically exhibit poor water quality as a result of sediment deposition and oxygen depletion, and relatively little interaction with the downstream receiving body.

## 2.3 Summary of Project Need

The GLWA combined sewer overflow (CSO) and screening and disinfection (SDF) facilities provide treatment of overflow water and provide safer water quality levels for the public and environment. The majority of the CSO facilities began operating in the 1990's and early 2000's. Due to age, they require system upgrades, rehabilitation, and maintenance. GLWA's Capital Improvement Plan (CIP) includes several projects with the following overarching goals:

- Improve operational efficiency through standardized CSO systems and equipment by coordinating with other ongoing GLWA CSO projects.
- Incorporate RCM/RCD (Reliability Centered Maintenance/Reliability Centered Design) into the design to reduce life-cycle costs and mitigate O&M difficulties.
- Provide safer facilities through fall protection, emergency eyewash improvements, and the removal of trip hazards.
- Rehabilitate buildings to address current architectural, electrical, and HVAC/plumbing deficiencies.

This project aims to address some of these needs through improvements in three areas: 1) disinfection, screening, and other improvements at the St. Aubin SDF; 2) CSO facility safety

improvements and building rehabilitation; and 3) control system upgrades at Baby Creek and Belle Isle. This project will improve the efficiency and reliability of the wastewater treatment system.

At St. Aubin SDF, the disinfection system has reached the end of its useful life. The chemical storage tanks are leaking and the chemical feed pumps require increased maintenance to keep the system operational. Increasing the screening efficiency will meet the operational needs of the facility. Also, the TRC levels will be kept within the permit goal range by optimized disinfection chemical injection when operating in automatic modes and utilizing disinfection control strategies. Improvements to the St. Aubin screening and disinfection systems will protect water quality in the Detroit River. The following goals are specific to the St. Aubin SDF:

- Long-term system reliability
- Simplified operations and maintenance (O&M)
- Improved operational efficiency through standardized parts and systems across the GLWA facilities, where practical
- Optimize disinfection efficiency by implementing on-line TRC analyzers with manual and automated chemical delivery

The following goals are specific to the CSO facility safety improvements and building rehabilitation scope:

- Remedy safety deficiencies (fall protection, eyewash, and emergency showers).
- Remedy architectural rehabilitation deficiencies (caulking, sealing, painting, and other building maintenance tasks intended to prevent continued deterioration of the building structure).

The following goals are specific to the control systems upgrades at Baby Creek and Belle Isle Facilities:

- Provide sufficient light levels per OSHA standards in all work areas and incorporate exterior power receptacles to assist maintenance and operation staff at the facility
- Provide flow meters and level sensors that reliably relate desired information to GLWA staff.
- At Belle Isle CSO, replace obsolete gas detection PLC with a standalone gas system controller, and upgrade the gas detection system controls and alarms.

Site visits to assess the existing conditions at the nine (9) CSO Facilities were conducted at the outset of this project by the Team to verify the observations documented in prior GLWA projects (specifically, the CS-299 Multidisciplinary Needs Assessment and St. Aubin 20% Design Projects). As part of the field assessment work, the Team documented existing conditions at all nine CSO facilities with an emphasis on safety compliance and building rehabilitation.

Between January and August of 2023, multiple workshops were held with the GLWA staff to present alternatives and recommend improvements. The detailed analysis of alternatives and key decisions are documented in the Basis of Design Report (BODR). The BODR is included in **Appendix K**.

## 2.4 Project Needs for the Next 20 Years

GLWA identified additional project needs at the WRRF that will address operation and capacity needs based on the 20-year population projection. A list of these identified projects is shown as a table in **Appendix F.** This table was taken from the GLWA 2020 Wastewater Master Plan. GLWA will continue to identify and implement projects that maintain and improve the treatment of wastewater at the WRRF, CSO Facilities, and the rest of the wastewater system. At the nine CSO facilities, barring unforeseeable circumstances, this project addresses efficiency, architectural, electrical, and HVAC/plumbing needs for the next 20 years.

# 3.0 ALTERNATIVE EVALUATION APPROACH

Project teams explored "Potential Alternatives" including the Regional Alternative and No Action Alternative to identify those that would provide a viable solution to the Project's Needs for the next 20 years. Those that were deemed viable were further analyzed as "Principal Alternatives". The costs and impacts of Principal Alternatives were evaluated as described in Section 3.3. The Regional and "No Action" alternatives are discussed below because they are not viable, and, therefore, not included in the evaluation with the Principal Alternatives.

## 3.1 Regional Alternative

A Regional Alternative in the context of this Project Plan is not applicable. GLWA operates the regional CSO and SDF facilities that receive combined sewer flows from several counties in the region. The proposed improvements presented in this Project Plan are all within the facilities' properties. The City of Detroit and numerous surrounding communities are serviced by GLWA. The function and capacity added to the system by the CSO and SDF facilities cannot be achieved by connecting with another system.

## 3.2 No Action Alternative

Consultants reviewed and evaluated building and process components of the nine CSO facilities for deficiencies in safety, structure/architecture, and process. The majority of the safety concerns are fall or trip hazards. They were evaluated on a case-by-case basis with input from GLWA staff to bring the areas into compliance with OSHA standards. Confined space access hatches will have permanent railings installed. Equipment access hatches will be equipped with nets because permanent railings are not practical. Double-leaf equipment openings will be provided with swing gates or temporary railings depending on the height of the hatch. Also, depending on the hatch conditions, davit arms and ladder grab bars will be installed. Some hatches will be reoriented to reduce fall risks. Ladders with fall-arrest systems are being installed. Other safety improvements, such as replacing missing portions of guard rail, improved lighting, and adding eye wash flow sensors into the existing Ovation systems are included. Specific information on safety improvements is included in the Basis of Design Report in **Appendix K**.

Regarding the safety improvements at the nine facilities, the "No Action" alternative would result in an increased risk of injury to staff and possibly in OSHA violations/fines. As the facilities age, the existing safety assets deteriorate. Many of the assets are beyond their expected useful life and may not provide the life-saving purpose for which they were installed.

Structurally/architecturally, the proposed work in this project will address defects with doors, windows, room finishes, floors/ceilings, and corrosion of steel members. Masonry control joints on the exterior and interior of the buildings are nearing the end of their useful life and are cracking. They will be replaced in this project. Weatherstripping on door jambs, heads, and sweeps reached the end of their useful life. Therefore, weatherstripping will be replaced.

Regarding the planned structural and architectural improvements, the "No Action" alternative will result in accelerated building deterioration, higher future costs, and an increased risk of damage to process or electrical equipment. If the process and electrical equipment is damaged, the facility may fail in its purpose. Facility failures may result in raw sewage overflows and sewage backups in basements.

The Baby Creek SDF, Belle Isle CSO, and St. Aubin facilities have process deficiencies that need to be addressed with instrumentation and control improvements, such as level sensor replacement, additional flow meters, and gas monitoring replacement. These improvements will replace insufficient or outdated systems. To measure bypass flow which circumvents the screens during extreme rain events, a new non-contact, removable flow meter will be installed in the Baby Creek SDF's emergency wet weather bypass channel. The flow meter will mitigate flooding concerns when the flow exceeds the facility's maximum capacity. Also, a new level sensor will be installed in the outfall chamber, and the level sensors for each chemical storage tank will be replaced. Unreliable level sensors in the chemical tanks could lead to insufficient chemical supply.

The "No Action" alternative for process improvements directly impacts the facilities' ability to trap, store, and treat wastewater. The level sensor and flow control improvements allow for the proper operation of the facilities. If these improvements are not made, it could result in accurate or inefficient control of the facility, which may result in either a) raw sewerage discharges to the environment, or b) release of over-chlorinated wastewater discharges to the environment.

Belle Isle's gas detection system is obsolete and will be upgraded. "No Action" could result in a failure of the existing gas detection system that would lead to gas buildup and highly hazardous conditions for staff and equipment.

St. Aubin has HVAC, electrical, and disinfection process concerns that are being addressed. An exhaust fan feeding the chemical room failed due to corrosion and will be replaced to restore proper ventilation. Additional outlets on the top of the basin will improve the ability of the staff to perform maintenance. The disinfection chemical feed system at St. Aubin is operating at a feed rate below the minimum required rates, which could lead to insufficient treatment of wastewater.

Each of the St. Aubin needs has unique and cascading consequences if the "No Action" alternative were selected for any of the needs. The HVAC system protects the electrical and I&C systems from premature failure caused by corrosive gasses. It also protects human health. The electrical and I&C systems protect the processes from failure. The process systems protect the environment. Failure of any one of these system increases the risk and rate of failure of the entire station. Because of the system interdependencies, the improvements are most effective when completed simultaneously.

For each of the identified needs, the "No Action" alternatives would not address the safety, reliability, control systems, and operations and maintenance needs experienced at the facilities. Not addressing the problems would erode the facility's reliability and ability of GLWA to meet current OSHA requirements and NPDES permit requirements. Postponing the improvements risks further degradation of the systems and potential negative environmental impacts. For the improvements discussed above, the "No Action" alternative is not considered viable, and it is not pursued further.

## 3.3 Principal Alternatives

A summary of the principal alternative is presented for the project in Section 4.0. The needs assessment of the principal alternatives was performed with the goal of achieving optimal performance. The approach considers the long-term impacts of the improvements. Improvements related to safety, architectural repairs, plumbing maintenance, and controls standardization are considered "base improvements" and need to be completed regardless of the selected alternative. Phrased differently, "base improvements" are included as part of every alternative because they are not dependent on the alternative selection, they are necessary, and they didn't require alternative analysis.

### 3.3.1 Optimal Performance

The alternatives discussed in the Basis of Design Report focus on the St. Aubin SDF's screening system and mixing chamber. The alternatives differ in approach and cost and were evaluated with the goal of obtaining "optimal performance" of the existing facilities. The evaluation approach compared refurbishment (extensive repairs), replacement in-kind (new horizontal Romag screens), and replacement in type/style/technology (such as perforated plate screens). In some cases, optimal performance required more than the replacement of existing equipment. For example, perforated plate screens would require the construction of a screen building to allow the staff to operate and maintain the equipment with protection from the elements. Operational changes and training are incorporated into the comparison.

The St. Aubin disinfection system will be replaced with a pressure manifold-based approach that utilizes modulating valves to control the chemical feed to the various application points. The primary advantage of this approach is that it can cover a wider range of dosing rates to serve the large peaking factors associated with CSO facilities and allows for continuous low dosing rates. It is utilized at the Conner Creek CSO and the Baby Creek SDF. It has proven so successful and reliable that GLWA is standardizing on this approach. In addition to the St. Aubin facility, plans are underway to implement this approach at the Leib SDF, Hubbell-Southfield CSO, and Oakwood CSO. The 2019 Sodium Hypochlorite Storage and Feed System Assessment report, which is included in **Appendix K**, discusses the implementation of this disinfection approach design for the St. Aubin Facility. New level sensors and a new fill panel will be provided for the chemical tanks, and new TRC analyzers will be installed at the mixing chamber and discharge structure. The flowmeters on the feed lines also provide better control of chemical impacting the environment, and the new TRC analyzers will provide better control when operating automatically. For these reasons, no alternatives for the disinfection system approach, aside from the mixer evaluation in Section 3.5, were evaluated.

### 3.3.2 Principal Alternatives Approach

The evaluation of principal alternatives for the financial impact of the project, and the potential environmental impacts, to ensure that the project is sustainable. The Principal Alternatives serve the same immediate customers and provide the same end-of-planning-period capacity.

For this analysis, the present worth for each alternative was based on a 20-year loan at a discount rate of 2.0%, An interest rate of 2.5% is used in the calculation of interest during construction and replacement costs. Salvage values of structures and equipment were determined by using straight-line depreciation. It was assumed that interest during construction may be significant and, therefore, may influence the choice of alternatives and are included in the monetary evaluation. As a result, interest is calculated as one-half of the product of the construction period (in years), the total capital expenditures (in dollars), and the discount rate.

OM&R Costs are estimated to capture the net change in operations, maintenance, and repair costs compared to GLWA's existing costs. GLWA has conservatively assumed zero additional cost for OM&R where new processes/equipment replace existing high-cost processes/equipment. The improvements included in this project will reduce OM&R costs, i.e. result in a net negative compared to existing costs. Any other approach would inaccurately affect the User Impact Cost calculation.

Present worth is used to compare alternatives. It includes the initial capital, operation, maintenance, and replacement costs. The present worth calculation takes salvage into account.

GLWA is a water and wastewater service wholesaler. To estimate "User Impact Costs" this Project Plan assumes approximately 3 million customers in the service area. According to the SEMCOG, the average household size, as reflected in the 2023 data, was 2.39 occupants. Also, according to the SEMCOG data for 2023, approximately 1,275,737 housing units are estimated in the service area for GLWA.

## 3.4 Analysis of Alternatives for the St. Aubin Screening System Improvements

A summary of the potential alternatives is presented in this section. These alternatives differ in approach and cost, but share the following goals:

- Long-term system reliability
- Simplified operations and maintenance (O&M)
- Improve operational efficiency through standardized parts and systems across all GLWA CSO facilities, where practical.

The screening system alternatives were evaluated on the following design criteria:

- Peak capacity of 250 cfs
- Opening size of 4mm straight bar or equivalent
- Maximum headloss of 1.5 ft @250 cfs
- Screenings being removed via pumping through the Detroit River Interceptor (DRI) to the WRRF

The screening system alternatives considered were:

- Alternative 0 – No Action
- Alternative 1A – Rehabilitate Screens and Optimize Screenings Handling
- Alternative 1B – Rehabilitate Screens and Improve Screen Crossflow
- Alternative 2 – Install Perforated Trough Auger Screen Technology
- Alternative 3A – Install Perforated Plate Screens
- Alternative 3B – Install Perforated Plate Screens with Distribution Channel

### 3.4.1 Alternative 0 – No Action

St. Aubin has a screening system that has not met the needs of the facility. The existing conditions of the screening system are discussed in detail in the Basis of Design Report in **Appendix K.** The screening system is not reliable, and screening efficiency continues to degrade with time, negatively affecting water quality. Insufficient crossflow for optimal screen performance is not being met, and this results in material accumulating in front of the screens. This leads to decreased operational efficiency and can cause a decline in water quality over time. As part of the No Action alternative, GLWA considered whether the St. Aubin facility could continue to operate without improvements to the screening system. For this consideration, the dewatering pumps would operate in unison with the screens during wet weather events and the team would assess improvements in screenings removal. However, GLWA staff communicated that operation of the dewatering pumps during wet weather events while the DRI is flowing full may result in unintended consequences such as isolated flooding or overflows elsewhere in the collection system. The idea was abandoned, and the team determined the "No-action" alternative is not viable.

### 3.4.2 Alternative 1A – Rehabilitate Screens and Optimize Screenings Handling

In this alternative the existing screens would be rehabilitated by addressing the known issues with the rakes, adding a post-event flushing system, and maximizing removal during operation. The following items would be included in the summary of scope for this alternative:

- Rehabilitate Romag Screens (2 total)
    - Replace hydraulic power units
    - Replace damaged and wore mechanical screen components
    - Incorporation of control system upgrades
- Install automatic water flushing system to prevent material build-up on the backside of the screens

Advantages:

- Improves existing operation
- Lowest cost
- Less complicated construction sequencing and MOPO

Disadvantages:

- Current peak flow performance issues may remain

Costs for this alternative are included in **Appendix H**.

### 3.4.3 Alternative 1B – Rehabilitate Screens and Improve Screen Crossflow

This alternative will significantly increase the rate of crossflow to allow for enhanced screenings removal. This alternative would require a 25 cfs pump station to be constructed as well as a new 30" force main. The following is a summary of the scope of work for Alternative 1B:

- Rehabilitate Romag screens (2 total)
    - Replace hydraulic power units
    - Replace mechanical screen components
    - Control upgrades
    - Add screen flushing system
- Construct new screenings removal pump station in current dumpster area
- Install three (3) 200-HP chopper pumps (6000 gpm each)
- Install concentrated screenings piping
- Install 30" force main to DRI
- Upgrade electrical supply

Advantages:

- Estimated higher screenings capture at peak flow

Disadvantages:

- Increased flow to DRI during wet weather events
- Additional assets to maintain
- Work in right-of-way
- Potential conflicts with existing utilities when routing new 30" force main
- More complicated construction sequencing and MOPO

Costs for this alternative are included in **Appendix H**.

### 3.4.4 Alternative 2 – Install Perforated Trough Auger Screen Technology

This alternative involves removing the existing Romag screens and replacing them with 6mm perforated trough auger screens within the existing facility footprint. The dewatering wet well would be modified to accept screening directly from the perforated trough augers. This alternative is not being further considered due to the inability of the aforementioned screens to meet the desired design criteria.

### 3.4.5 Alternative 3A – Install Perforated Plate Screens

In this alternative, the existing Romag screens would be removed and replaced with 6mm perforated plate screens. These screens have been successfully installed in other CSO projects, and they have similar removal efficiencies to the existing screens. Screenings will be removed, discharged, and

conveyed to a dewatering pump station, and a new building would be constructed for the operation and maintenance of the screening system. The following is the scope of work for this alternative:

- Remove Romag screens (2 total)
    - Demo wall below screens
    - Demo hatches above screens
- Install three (3) new 6mm perforated plate bar screens for 250 cfs total capacity
- Install emergency overflow weir
- Install new screenings sluice trough and direct screenings to existing dewatering pumps
- Construct screen building
- Structural modifications to existing structure
- Plumbing modifications to provide screens wash water and sluice water
- Electrical modifications
- Control system upgrades

Advantages:

- Estimated higher screenings capture at peak flow
- Proven technology

Disadvantages:

- Unique screen arrangement due to retrofit which may impact screen performance/maintenance
- More complicated construction sequencing and MOPO

Costs for this alternative are included in **Appendix H**.

### 3.4.6 Alternative 3B – Install Perforated Plate Screens with Distribution Channel

This alternative is similar to 3A, except the new screens would be installed in a conventional arrangement, and a new influent distribution channel would be constructed near the entrance of the existing structure to ensure proper flow distribution between the screens. This alternative requires the most comprehensive changes to the facility. The scope for this alternative includes:

- Demo Romag screens (2 total)
    - Demo wall below screens
    - Demo hatches above screens
- Install three (3) new 6mm perforated plate screens oriented in-line to incoming flow
- Install new screenings sluice trough and direct screenings to existing dewatering pumps
- Construct screen building
- Expand structure to add influent distribution channel
- Reconstruct mixing chambers

- Install new post-event channel and tank flushing system
- Plumbing modifications to provide screens wash water and sluice water
- Electrical modifications
- Control system upgrades

Advantages:

- Estimated higher screenings capture at peak flow
- Proven technology
- Most comprehensive changes to the facility resulting in a more conventional screening process configuration when completed

Disadvantages:

- Most complicated construction sequencing and MOPO than other alternatives
- Requires complete redesign of post-event channel/tank flushing process and procedures
- Requires reconfiguration of mixing chambers

Costs for this alternative are included in **Appendix H**.

## 3.5 Analysis of Alternatives for the St. Aubin Mixing Chamber Optimization

A summary of the potential mixing chamber optimization alternatives is presented in this section. These alternatives differ in approach and cost, but share the following goals:

- Long-term system reliability
- Simplified operations and maintenance (O&M)
- Improve operational efficiency through standardized parts and systems across all GLWA CSO facilities, where practical.

The mixing chamber optimization alternatives meeting the following design criteria were evaluated on energy usage, operations and maintenance (O&M) requirements, and capital investment:

- Peak Design Flow = 250 cfs
- Pre-Chlorination Minimum Mean Mixing Velocity Gradient, G (1/sec) = 500/sec[2]
- No. of Mixing Chambers = 2
- Mixing Chamber Detention Time = 10 seconds
- Detention Time in Mixer Zone of Influence = 3 seconds

[2] Mixing design criteria established from Glover (1972), Drehwing (1979), Geisser and Garver (1977), Haas (1990), and White (1992).

- Mean Velocity Gradient per Chamber, G (1/sec) = 1000/sec[1]

The mixing chamber alternatives considered were:

- Alternative 0 – No Action
- Alternative 1 – Improved Pre-Chlorination Mixing and Reduce Mixer Power from 7.5 HP to 5 HP Each
- Alternative 2 – Two 10 HP Mixers Per Chamber Shifted Upstream
- Alternative 3 – Single 20 HP Mixer Per Chamber Sized for Sufficient Mixing

### 3.5.1 Alternative 0 – No Action

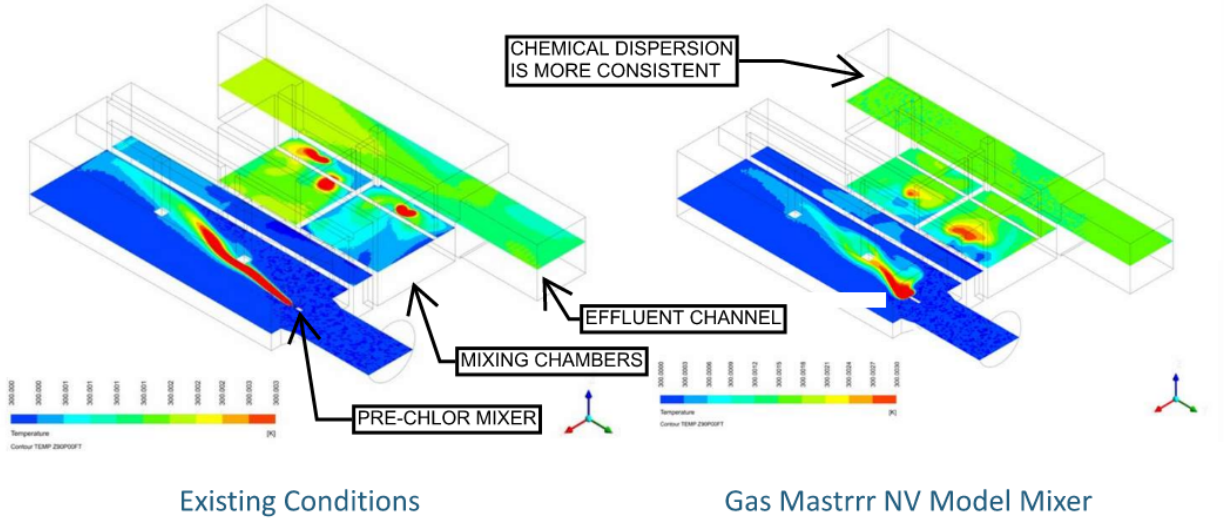
The existing mixing system at St. Aubin operates with pre-chlorination mixer in the influent chamber and three 7.5 hp mixers in each of two basins. The axial mixing pattern and counter-current arrangement of the pre-chlorination mixer makes the mixing inconsistent between the two chambers. The mixers in the mixing chambers are nearing the end of their useful life, and they will need to be replaced to maintain water quality and permit compliance. Continuing to operate the existing mixing system would lead to decreased reliability, lower water quality, and risk permit noncompliance.

### 3.5.2 Alternative 1 – Improved Pre-Chlorination Mixing and Reduce Mixer Power from 7.5 HP to 5 HP Each

This alternative includes reducing the mixer drive horsepower from 7.5 to 5 HP for the three mixers in each of the two mixing chambers and utilizing a new style of pre-chlorination mixer impeller. The number, location, depth, and direction of the mixers will remain the same.

Computational fluid dynamics (CFD) modeling determined the impact of the changes. The model compared the level of mixing using the existing equipment, see “Existing Conditions” in **Figure 3-1**, with the level of mixing achieved in the pilot, see “Gas Mastrrr NV Model Mixer” in **Figure 3-1**. The pilot test included reduced horsepower on the mixing chamber mixers and a new impeller style on the pre-chlorination mixer. Specifically, the impeller style disperses chemicals radially and should be less susceptible to ragging than traditional blade impellers. Dispersion modeling indicates that pilot conditions resulted in more consistent chemical dispersion in the effluent channel. See **Figure 3-1**.

**Figure 3-1: Comparison of Existing Conditions (Left) to Alternative 1 (Right)**




Based on the encouraging results of the CFD modeling, GLWA intends to pilot this new impeller technology. If the results are consistent with modeling, the new impeller will be adopted.

### 3.5.3 Alternative 2 – Two 10 HP Mixers Per Chamber Shifted Upstream

Alternative 2 would reduce the number of mixers from three (3) 7.5 HP mixers down to two (2) 10 HP mixers per mixing chamber and moving them closer to the baffle wall to reduce short circuiting. This alternative would require structural modeling, new supports, and new hatch openings. A similar level of mixing would occur with the two new radial mixers with optimized configuration, and this would reduce the number of assets and total mixing power required at St. Aubin.

### 3.5.4 Alternative 3 – Single 20 HP Mixer Per Chamber Sized for Sufficient Mixing

This alternative would reduce the number of mixers per chamber to one 20 HP mixer. This alternative would require the same amount of power as Alt. 2, but half of the facility's flow would not receive sodium hypochlorite doses if the only mixer in the chamber is out of service. Due to lack of redundancy, this alternative was eliminated prior to any modeling efforts were made.

# 4.0 PRINCIPAL ALTERNATIVE

## 4.1 Monetary Evaluation

Two present worth monetary evaluations were performed. The first compared the present worth costs for the St. Aubin Screening alternatives. The costs included in this evaluation focused only on the capital costs that differed between the alternatives. While cost and non-cost factors were included in the selection of the alternative that best satisfied the needs of the project, Alternative 1A, had the lowest present worth cost and the lowest construction sequencing impact. Alternative 1A was selected.

The second present worth monetary evaluation included the costs associated with St. Aubin's selected screening alternative, 1A, and the "base improvements" (the structure, architectural components, electrical components, HVAC, plumbing, and I&C, etc. will improve operations, reduce maintenance effort, and extend the useful life of the facilities). These were the complete project costs.

In these evaluations, $0 is assumed for Annual OM&R Costs. Salaries and Administrative, Energy, and Repair and Maintenance because the project is anticipated to reduce costs from current expenditures. $0 is assumed for Chemicals because no change in chemical usage will result from this project. These assumptions are necessary to prevent negatively affecting User Impact Cost.

The monetary evaluations are included in **Appendix H.**

The St. Aubin mixing system Alternative 1 met the project design criteria while reducing energy consumption and avoiding structural modifications. A present worth analysis was not completed for the alternatives for the mixing system. Alternative 1 is the selected alternative for the mixing chamber optimization and is included in the "base improvements".

## 4.2 Mitigation Cost

Short-term mitigation for the CSO Facilities Improvements Project II construction will be on an as needed basis and has not been evaluated for cost. There is not expected to be any long-term or indirect mitigation required in this project.

## 4.3 User Cost

Based on the SEMCOG data for the service area population, the annual user costs per household were estimated to be $1.29 for the 20-year planning period. User Impact Costs are included in the Present Worth (Lifecycle Cost) Calculation included in Appendix H, and the SEMCOG population data and projections are included in Appendix L.

## 4.4 Delivery Method

The intended delivery method for this project is the traditional Design-Bid-Build method. There will be no additional costs incurred based on the selected delivery method.

# 5.0 TECHNICAL CONSIDERATIONS FOR THE PROJECT ALTERNATIVES

The EGLE SRF Project Plan Preparation Guidance requires alternative evaluations include the following considerations, if applicable:

- Infiltration and Inflow (I/I) Removal
- Structural Integrity
- Sludge & Residuals
- Industrial Pre-Treatment
- Growth Capacity
- Areas Currently Without Sewers
- Reliability
- Alternative Sites and Routings
- Combined Sewer Overflows
- Contamination at the Project Site
- Green Project Reserve

The above considerations do not apply to the project except for Structural Integrity, Industrial Pre-Treatment, and Reliability.

## 5.1 Structural Integrity

The current condition of the CSO Facilities has been reviewed and evaluated, and recommendations for rehabilitation have been provided based on this evaluation. The project scope includes the structural improvements necessary to extend the useful life of the pump station another 20 years or more.

## 5.2 Industrial Pre-Treatment

The existing screening system technology at the St. Aubin SDF Facility is inefficient. The poor screen performance is likely the result of insufficient crossflow per the manufacturer's input. A further evaluation of the poor screening system performance can be found in the Basis of Design Report in Appendix K. The project involves the rehabilitation of the screening system, which consists of replacement of worn and damaged mechanical components, installation of post event screen washdown system to remove grit and providing space for grit to flow for proper drainage.

## 5.3 Reliability

The project's improvements will contribute to the long-term reliability of the CSO Facilities and the GLWA wastewater system. Upgrades to the screening and disinfection systems at the St. Aubin SDF Facility will help discharges from the plant to stay within the permit range which improves the reliability of the system. Structural rehabilitation of the CSO sites prevents continued deterioration of the building structure, increasing the ability of the facilities to operate without failure. Control system upgrades to the Baby Creek and Belle Isle CSO Facilities, and the incorporating of RCM and RCD into the project design improves the reliability of the system as well.

# 6.0 SELECTED ALTERNATIVE FOR THE CSO FACILITIES II IMPROVEMENTS PROJECT

## 6.1 Project Description

The GLWA CSO Facilities constructed between the 1990s and early 2000s need system upgrades, architectural rehabilitation, and safety improvements. The alternatives evaluation in Section 3.0 describes the overall alternatives to the project including an explanation for why the "regional alternatives" and "no action" alternatives were not included. The improvements are divided into "base improvements" (which are necessary and do not require alternative analysis) and the selected alternative.

### 6.1.1 Base Improvements

Improvements related to safety, architectural repairs, plumbing maintenance, and controls standardization, and improved mixing efficiency are considered "base improvements" and were included in the selected alternative.

The safety improvements and building rehabilitation work include improving safety and building conditions at the nine (9) CSO Facilities. The following safety improvements will be made at one or multiple CSO facilities:

- Replacing/installing Eyewash stations and emergency showers
- Installing permanent and temporary railings
- Extending rails to remove fall hazards
- Adding nets, chains, and grating to hatch openings
- Installing swing gates to double-leaf hatches
- Installing fall protection davit arms
- Re-orienting hatch openings
- Installing ladder fall arrest systems
- Removing concrete slabs that have been deemed potential trip hazards
- Replacing hatches with sufficient recesses.
- Replacing access covers and grating
- Installing conduit ramps to reduce trip hazards
- Installing stairs to reduce trip hazards

Building architectural deficiencies will be addressed through caulking, sealing, tuckpointing, painting, and other building maintenance tasks that prevent continued deterioration of the structure. The following architectural/structural improvements will be made at one or multiple CSO facilities:

- Sealant joint repairs
- Masonry repairs

- Door repairs – door, frames, and hardware; exterior, interior, and overhead doors
- Coating system repairs
- Ceiling tile replacement
- Improvements to reduce leaking and ponding of water
- Floor coating replacement
- Flashing replacement
- St. Aubin will be removing and replacing its chemical storage tanks (knock-out wall removal, tank removal/replacement, wall reconstruction, painting)

The Baby Creek SDF and Belle Isle CSO control system upgrades will improve the reliability of the facilities. Sufficient lighting and exterior power receptacles will be added to all work areas. Flow meters and level sensors will be installed to reliably relay data to the plant staff. The control system upgrades will improve the staff's ability to operate and maintain the plant and will lead to increased reliability.

At the St. Aubin SDF, to conserve power while still meeting mixing requirements, three 7.5 HP mixer drives are being replaced with 5 HP mixer drives.

### 6.1.2 St. Aubin SDF Screening Selected Alternative

Rehabilitation of the existing screens and optimization of screenings handling, Alternative 1A, was determined to be the most cost-effective solution while also achieving the desired higher screening efficiency. This alternative includes rehabilitating the existing Romag screens and installing an automatic water flushing system to prevent screen buildup. The alternatives analysis for the St. Aubin screening improvements was discussed in Section 3.4.

A summary of the project scope can be found in the Basis of Design Report in **Appendix K**.

## 6.2 Project Schedule

The CSO Facilities II Improvements project is currently at the 90% Design Milestone. The Project Schedule for each milestone of the project is shown below as **Table 6-2**. Construction of the improvements will be started once a Contractor is selected. The full construction schedule can be found in **Appendix K.**

**Table 6-2: CSO Facilities Improvements Project Milestone Schedule**

| Milestone | Milestone Date |
|---|---|
| Notice to Proceed | Q4 2025 |
| Construction Begins | Q4 2025 |
| Final Completion | Q1 2028 |

## 6.3 Cost Estimate

An opinion of probable construction costs (OPCC) was developed for the CSO Facilities Improvements II Project based on the 90% design submittal. The OPCC is included in **Appendix H** along with the Present Worth (Lifecycle Cost) Calculation. The estimated total cost of the project, which includes the work to be performed at the nine CSO facilities as well as the estimated cost of the work for the selected St. Aubin screening system alternative, is $18,901,452.

## 6.4 Implementability of Selected Alternative

GLWA has the appropriate Management, Engineering, Maintenance, and Operations staff and budgets to implement this proposed project; no increase in OM&R budgets is necessary. They can obtain technical support as needed for the design and planning of the project. If this project is funded from MI-EGLE with low-interest loan funding, GLWA is ready to implement, construct, operate, and maintain the proposed project.

## 6.5 Disadvantaged Community Status

The population assessed for the costs for construction in this project have a median household income of $36,453, which, according to the SEMCOG data, is significantly less than the statewide median household income from the US Census Bureau of $69,183. However, based on the criteria for overburdened communities, the service area does not qualify as overburdened based on the user costs of the project of $1.29 per year per household.

## 6.6 Useful Life Evaluation

The evaluation of the selected alternative took into consideration the expected useful life of the proposed project components. Typical useful life spans for each project aspect were given based on either known lifespan, such as process equipment where a lifespan can be provided by a manufacturer, or standard item lifespans that have been accepted, such as the useful life of a structure. The structural components constructed in this project are expected to have a useful life of 50 years. The site civil work and the proposed process equipment both have an estimated useful life of 20 years. The electrical, instrumentation, and controls have a useful life of 15 years. Estimated useful life is used in the Present Worth (Lifecyle Cost) Calculations presented in **Appendix H.**

## 6.7 Analysis of Impacts

### 6.7.1 Direct Impacts

The construction of the CSO Facilities Improvements II project is not expected to have an adverse impact on archaeological, cultural, or historical areas. The construction for this project will occur within the CSO boundaries and in areas that have been previously disturbed. This project is not anticipated to detrimentally affect water quality, air quality, wetlands, endangered species, wild and scenic rivers, or unique agricultural lands in the area.

The total user costs have been evaluated on an individual project basis and can be found in **Appendix H.** These evaluations returned a total user cost impact of $0.55 which is not unreasonably high and so it is not considered an adverse direct impact from the implementation of this project.

### 6.7.2 Indirect Impacts

The improvements made as part of the CSO Facilities Improvements II Project are not expected to have an impact on the growth and development capacity in the surrounding residential, commercial, or industrial areas. The project is also not anticipated to have an impact on cultural, human, social, or economic resources in the surrounding area.

### 6.7.3 Cumulative Impacts

The proposed CSO Facilities Improvements II Project will increase the functional life of the facilities by replacing and rehabilitating buildings and some systems. Proper functionality of the CSOs will reduce the likelihood of combined sewer overflows and allow GLWA to meet the NPDES permit discharge requirements. There is a possibility of fiscal impacts on the municipality and its citizens from multiple wastewater system projects occurring simultaneously.

## 6.8 Mitigation of the Selected Alternative

Where adverse impacts cannot be avoided, mitigation methods will be implemented. Mitigating measures for the project, such as soil erosion control, will be utilized following applicable laws. Details will be further specified in the construction contract documents used for the project.

### 6.8.1 Short-Term Mitigation

The CSO Facilities Improvements II Project is expected to have unavoidable short-term impacts due to construction activities such as equipment shutdowns, dust, noise, and possibly traffic. Efforts to minimize dust such as giving plants paving and access drives used in the construction area a dust-preventive treatment or periodically watering these areas will be implemented. Work will be scheduled and conducted in a manner to minimize the level of noise escaping the site, especially at nights and on weekends. These measures will be detailed in the contract project specifications.

### 6.8.2 Long-Term Mitigation

The CSO Facilities Improvements II Project is not expected to have adverse long-term impacts. Therefore, no long-term mitigation is expected for this project.

### 6.8.3 Indirect Impact Mitigation

The CSO Facilities Improvements Project II will not require mitigative measures for indirect impacts. The construction of the improvements will be located within the boundaries of the CSO sites and does not promote growth in the surrounding areas that are not serviced by GLWA. There are also no

pressures on historical features or neighborhoods, agricultural land, or sensitive natural features that will occur from this project.

# 7.0 PUBLIC PARTICIPATION

GLWA and the Project Design Teams have identified municipalities, agencies, and government entities that may regulate the work or require permits for the construction required for the project in this Project Plan. Other stakeholders or interested parties, who may be affected by the proposed project, have also been identified. Communications will be made as needed through the design and construction of this project.

## 7.1 Public Hearing Advertisement

GLWA advertised a Public Hearing Meeting to be held on April 23, 2025 (See **Appendix I**). This advertisement was published to alert parties interested in this Project Plan and request input prior to its adoption. In addition, a direct mail notification was sent to the potentially interested parties included on a mailing list provided by GLWA (See **Appendix I**). This direct mail notice included an invitation to comment. Along with these direct mailings, the Project Plan was advertised in the local newspaper and on the GLWA website. Copies of the Draft Project Plan were available for download and the public's review on the GLWA website.

## 7.2 Public Hearing Contents

The Public Hearing was held to review the work associated with this Project Plan and the "2026 Clean Water State Revolving Fund Projects Plan Summary" which can be found in **Appendix I**. The hearing reviewed information presented in the Draft Project Plan, including estimated user costs. The Public Hearing Presentation and transcript are available in **Appendix I**.

## 7.3 Public Comments Received and Answered

Representatives from GLWA and Consultant project teams were present at the public hearing to address public comments.

There were no verbal comments or questions received from the GLWA Board, the public, or any other parties regarding the Project Plan, nor were there any written questions or comments submitted to GLWA or the project team.

## 7.4 Resolution and Adoption of the Plan

GLWA has made a formal resolution regarding this Project Plan at the Board Meeting held on May 25th, 2022. An executed copy of the resolution is included in **Appendix J**. This resolution authorizes GLWA to proceed with the filing of this Project Plan for the purpose of securing low interest loan assistance under the SRF Program.

# Appendix A.
# Supporting Resources for Cultural Evaluation

# Appendix A.1
# Application for State Historic Preservation Office (SHPO) Section 106 Consultation

# APPLICATION FOR SHPO SECTION 106 CONSULTATION

**Submit one application for each project for which comment is requested. Consult the *Instructions for the Application for SHPO Section 106 Consultation Form* when completing this application.**

**Submit application materials online at www.michigan.gov/shposection106 or mail to: Michigan State Historic Preservation Office, 300 North Washington Square, Lansing, MI 48913**

## I. GENERAL INFORMATION

☒ New submittal
☐ More information relating to SHPO ER# SHPO Project #
☐ Submitted under a Programmatic Agreement (PA)
PA Name/Date: PA name/date, if applicable

a. **Project Name: GLWA CSO Facilities Improvements II CWSRF**

b. **Project Location(s):**

If there is more than one location for your project, additional rows may be added to the table below. Township, Range, Section/Private Claim refer to the public land survey sections. Each Township/Range group must have its own row in the table below and must include the corresponding county and municipal unit.

| County | Municipality | Street Address | Township (N/S) | Range (E/W) | Section(s) or Private Claim |
|---|---|---|---|---|---|
| Wayne | Dearborn, MI | 9545 Dix Ave. (Baby Creek) | 02S | 11E | 03-D |
| Wayne | Detroit, MI | 2 Pleasure Dr. (Belle Isle) | 02S | 12E | 46-H |
| Wayne | Detroit, MI | 11900 Freud St.(Conner Creek) | 01S | 13E | 54-F |
| Wayne | Dearborn, MI | 16540 Rotunda Dr. (Hubble-Southfield) | 02S | 10E | 12-I |
| Wayne | Detroit, MI | 2188 Mt Elliott St. (Lieb) | 02S | 12E | 47-D |
| Wayne | Detroit, MI | 12220 Pleasant St. (Oakwood) | 02S | 11E | 72-E |
| Wayne | Detroit, MI | 23751 Fenkell Ave. (Puritan-Fenkell) | 01S | 10E | 120-B |
| Wayne | Detroit, MI | 19300 Shiawassee Dr (Seven Mile). | 01S | 10E | 123-E |
| Wayne | Detroit, MI | 2600 Atwater St. (St. Aubin) | 02S | 12E | 38-E |

## II. FEDERAL AGENCY INVOLVEMENT AND RESPONSE CONTACT INFORMATION

a. **Federal Agency:** U.S. Environmental Protection Agency Region 5
**Contact Name:** Mr. Andrew Lausted
**Contact Address:** 77 West Jackson Blvd. **City:** Chicago **State:** Illinois **Zip:** 60604
**Email:** lausted.andrew@epa.gov
**Specify the federal agency involvement in the project:** Funding

b. **If HUD is the Federal Agency: 24 CFR Part 50 ☐ or Part 58 ☐**
**Responsible Entity (RE):** Not Applicable
**Contact Name:** Not Applicable
**Contact Address:** **City:** **State:** **Zip:**
**RE Email:** **Phone:**

c. **State Agency Contact (*if applicable*):** Michigan EGLE
**Contact Name:** Jonathan Berman
**Contact Address:** Constitution Hall, P.O. Box 30457 **City:** Lansing **Zip:** 48909-7957
**Email:** bermanj@michigan.gov **Phone:** 517-897-3634

d. **Applicant (if different than federal agency):** Great Lakes Water Authority

**Contact Name:** Brooke Ballard, PE, Engineer
**Contact Address:** 9300 W Jefferson Ave, Detroit, MI 48209 **City:** Detroit **State:** MI **Zip:** 48209
**Email:** brooke.ballard@glwater.org **Phone:** 313-949-6960

e. **Consulting Firm (if applicable):** Wade Trim
Contact Name: Dave Delia, PE
Contact Address: 500 Griswold, Suite 2500 **City:** Detroit **State:** MI **Zip**: 48226
**Email:** ddelia@wadetrim.com Phone: 313-961-3650

## III. PROJECT INFORMATION

a. **Project Work Description**
Describe all work to be undertaken as part of the project:
The CSO Facilities Improvements II project consists of CSO facility capital improvement projects involving combined sewer overflow (CSO) facilities including St. Aubin Screening Disinfection Facility (SDF), safety improvements and building rehabilitation at all 9 CSO facilities, and control system upgrades at Baby Creek and Belle Isle CSO Facilities. At St. Aubin, improvements will be made to the disinfection, screening, electrical, HVAC systems as well as various site improvements. Safety improvements at all CSO facilities includes improved fall protection, upgraded eyewash stations, and miscellaneous improvements based on site-specific requirements. Controls upgrades at Baby Creek and Belle Isle will install new flow monitoring, upgrade gas monitoring, and upgrade controls communications equipment. The proposed improvements will increase facility reliability, flexibility, operation, maintenance, and safety, and decrease maintenance across the 9 CSO facilities.

The temporary impact of construction activities will be minimized as all work is planned to occur within existing buildings and facilities. Regardless of construction work, proper facility operation will be ensured in cases of wet weather events.

Adverse impacts on historical, archaeological, geographic, or cultural areas are not expected. However, if any potential impacts arise, construction will be halted, and the proper steps will be taken to proceed following all appropriate guidelines.

b. **Project Location and Area of Potential Effect (APE)**

i. **Maps.** Please indicate all maps that will be submitted as attachments to this form.
☒Street map, clearly displaying the direct and indirect APE boundaries
☒Site map
☐USGS topographic map Name(s) of topo map(s): N/A
☒Aerial map
☐Map of photographs
☐Other: N/A

ii. **Site Photographs**

Figure 1. Aerial Photo of Baby Creek Ground Disturbance Location

iii. **Describe the APE:**
The Project Area is assumed to be the area of potential effects (APE) for archaeological resources (Archaeological APE). This area includes the work areas in which ground disturbing activities are planned to occur.

Nine CSO and SDF Facilities will have improvements made in this project. The scope of this project is largely the rehabilitation or replacement of existing equipment, replacement or addition of additional safety features, improvements to instrumentation and controls, architectural rehabilitation, and upgrades to electrical, HVAC, and plumbing. With the exception of a manhole to be installed at Baby Creek CSO, with estimated groundwork dimensions of 17'x17'x6', there will be no ground disturbed in the scope of the project. The location of this groundwork, which will be above a previously constructed bypass sewer, is included in Figure 1.

iv. **Describe the steps taken to define the boundaries of the APE:**
The APE in this project will consist of the installation of a manhole at Baby Creek CSO as no other work will require disturbing ground. This area was determined by referencing design drawings for the location of the work.

## IV. IDENTIFICATION OF HISTORIC PROPERTIES

a. **Scope of Effort Applied**

i. **List sources consulted for information on historic properties in the project area** (including but not limited to SHPO office and/or other locations of inventory data).

The project area is contained within former GLWA project boundaries and consists of improvements to Facilities that were constructed no earlier than 1998. No SHPO inventory data was consulted to identify historic properties in the project area.

ii. Provide documentation of previously identified sites as attachments.
iii. **Provide a map** showing the relationship between the previously identified properties and sites, your project footprint and project APE.
iv. Have you reviewed existing site information at the SHPO: ☐Yes ☒ No
v. Have you reviewed information from non-SHPO sources: ☐Yes ☒ No

b. **Identification Results**

i. **Above-ground Properties**

A. **Are you submitting above-ground identification information?** ☐ Yes ☒ No

B. **If yes, please indicate level:**

☐ Literature Review ☐ Reconnaissance Survey Report ☐ Intensive Survey Report

C. **Total number of properties surveyed:** N/A

D. **Total number of previously identified Historic Properties in your APE:** N/A

E. **Total number of newly identified properties recommended eligible for listing in the National Register of Historic Places: N/A**

F. **Summarize, briefly, your findings for above-ground resources**.

There are no historic properties or resources older than 50 years in the project area.

G. **Attach the appropriate Michigan SHPO Architectural Identification Form for each resource or site 50 years of age or older in the APE.** Refer to the *Instructions for the Application for SHPO Section 106 Consultation Form* for guidance on this.

H. **Provide the name and qualifications of the person who made recommendations of eligibility for the above-ground identification forms.**

**Name** Dave Delia, PE **Agency/Consulting Firm:** Wade Trim

Is the individual a 36CFR Part 61 Qualified Historian or Architectural Historian ☐ Yes ☒ No

Are their credentials currently on file with the SHPO? ☐ Yes ☒ No

*If NO* attach this individual's qualifications form and resume.

ii. **Archaeology**
Submit the following information using attachments, as necessary.

A. **Are you submitting archaeological information?** ☐ Yes ☒ No

B. **If yes, please indicate:** ☐ Assessment (Desktop Review) ☐ Archeological Report

C. **Width(s), length(s), and depth(s) of proposed ground disturbance(s):** The APE for the installation of the new manhole is 17 feet, 17 feet, 6 feet. The project area has most likely been disturbed in the past during the original construction of the bypass sewer.

D. **Is a portion of the APE underwater?** ☐ Yes ☒ No
**If the assessment did not include the underwater portions of the APE, please briefly justify:**
There are no underwater portions of the APE.

E. **Potential to adversely affect significant archaeological resources**:
☒ Low ☐ Moderate ☐ High

**Is fieldwork recommended?** ☐ Yes ☒ No
**Briefly justify the recommendation:**
Fieldwork is not recommended as the APE consists of a ground that has previously been disturbed in the facility's construction.

F. **Have you attached an Archaeological Sensitivity Map?** ☐ Yes ☒ No

G. **Summary of previously reported archaeological sites and surveys:**
N/A

H. **Summarize past and present land use:**
The land is currently on the site of the Baby Creek CSO Facility, and it has been above the bypass sewer since the facility's construction in 2006.

I. **If archaeological fieldwork has been conducted, please attach a copy of the report copy and provide full report reference here**:

N/A

J. **Provide the name and qualifications of the person who provided the information for the Archaeology section:**
**Name:** Dave Delia, PE **Agency/Firm:** Wade Trim
Is the person a 36CFR Part 61 Qualified Archaeologist? ☐ Yes ☒ No
Are their credentials currently on file with the SHPO? ☐ Yes ☒ No
*If NO,* attach this individual's qualifications form and resume.

***Archaeological site locations are legally protected.***
***This application may not be made public without first redacting sensitive archaeological information.***

## V. IDENTIFICATION OF CONSULTING PARTIES

a. **Provide a list of *all* consulting parties,** including Native American tribes, local governments, applicants for federal assistance/permits/licenses, parties with a demonstrated interest in the undertaking, and public comment:
Great Lakes Water Authority
Hazen and Sawyer
Wade Trim
Detroit Historic District Commission
Detroit Historic Designation Advisory Board

Michigan's 12 Federally designated Indian tribes

b. **Provide a summary of consultation with consultation parties:**
A correspondence letter and with a summary and attached site plans and project work will be sent out to consultation parties. The contents of this letter can be found in the attachments to this application.

c. **Provide summaries of public comment and the method by which that comment was sought:**
A public hearing is scheduled for April 23, 2025. Comments will be sent shortly thereafter.

## VI. DETERMINATION OF EFFECT

**Guidance for applying the Criteria of Adverse Effect can be found in *the Instructions for the Application for SHPO Section 106 Consultation Form*.**

a. **Basis for determination of effect**:
It has been determined that no historic properties can be found within the APE, and therefore no historic properties will be affected by the project work.

b. **Determination of effect**

☒ **No historic properties will be affected**

☐ **Historic properties will be affected** and the project will (check one):

☐ have **No Adverse Effect** on historic properties within the APE.

☐ have an **Adverse Effect** on one or more historic properties in the APE and the federal agency, or federally authorized representative, will consult with the SHPO and other parties to resolve the adverse effect under 800.6.

☐ **More Information Needed:** We are initiating early consultation. A determination of effect will be submitted to the SHPO at a later date, pending results of survey.

Federally Authorized Signature:_____ Date:_____

Type or Print Name: ___

Title: _____

## ATTACHMENT CHECKLIST

**Identify any materials submitted as attachments to the form:**

☐ Additional federal, state, local government, applicant, consultant contacts

☒ Maps of project location

Number of maps attached: 10

☒ Site Photographs

☐Map of photographs

☐ Plans and specifications

☐ Other information pertinent to the work description: Identify the type of materials attached

☐ Updated documentation of previously identified historic properties

☐ New Architectural Properties Identification Forms

☐ Map showing the relationship between identified historic properties, your project footprint, and project APE

☐ Above-ground qualified person's qualification form and resume

☐ Above-ground survey report

☐ Archaeological sensitivity map

☐ Archaeology survey report

☐ Archaeologist and Historian qualifications and resume- if not on file already.

☒ Other: Consultation Parties Correspondence Letter; Site layouts are included in attachment

Correspondence Letter and Site Layouts Attachment

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 4, 2025

[redacted]

Attention: [redacted]

Re: CSO Facilities Improvements II Project CWSRF

Dear [redacted]

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

This application is intended to secure low-interest loan funding through the Michigan Department of Environment, Great Lakes, and Energy (MI-EGLE) CWSRF, with distribution starting in fiscal year 2027.

This notice of opportunity to comment is being sent to you to fulfill the consultation requirement of Section 106 of the National Historic Preservation Act review process. Should you have any comments on potential impacts to known areas of religious, historic, and/or cultural significance in the area of the proposed project, please provide them before April 23rd, 2025. Any comments or concerns received will be included in the Final Project Plan.

The following are brief descriptions of the proposed projects:

**St. Aubin SDF – Disinfection, Screening, and Misc. Improvements Project** includes the following:

- Chemical feed system improvements;
- Storage and mixing system improvements;
- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
- Belle Isle CSO
- St. Aubin SDF
- Baby Creek SDF
- Hubble-Southfield CSO
- Oakwood CSO

Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

The complete draft project plan will be available to the public on April 8th, 2025, on the **GLWA Website:** https://www.glwater.org/. Of you require a bound printed copy, please contact me and we can arrange for a physical copy to be mailed.

If you have any questions on this request or need further information to complete a review of the proposed projects, please contact me at 313.961.3650 or at ddelia@wadetrim.com. Please direct any written communications to my office at 500 Griswold Street, Suite 2500, Detroit, MI 4826, with the subject heading *2026 GLWA Clean Water State Revolving Fund (CWSRF) CSO Facilities Improvements II Project*.

Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

# 2026 GLWA CSO Improvements II
# Clean Water State Revolving Fund (CWSRF)

The State Revolving Fund (SRF) funding application is for the following three areas of the CSO Facilities Improvements II project (CIP270006) located at nine CSO basins in GLWA's system:

1. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements.

Figure 1 depicts the location of the nine facilities.

*Figure 1 Map of CSO/SDF Facilities*

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Baby Creek SDF ..... 2
Belle Isle CSO ..... 3
Conner Creek CSO ..... 4
Hubbell-Southfield CSO ..... 5
Leib SDF ..... 6
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Puritan Fenkell CSO ..... 8
Seven Mile CSO ..... 9
St. Aubin SDF ..... 10

## Baby Creek SDF

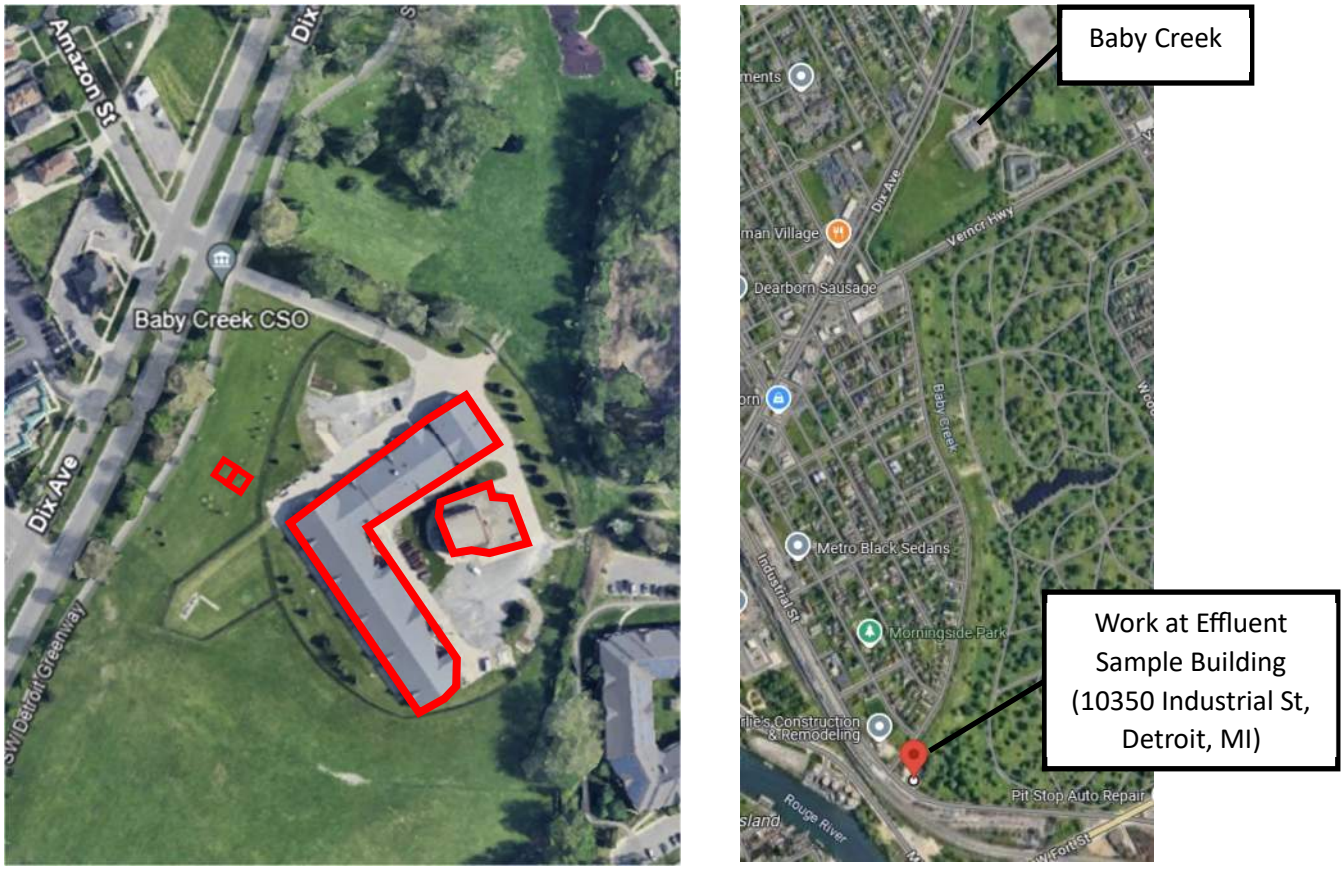



*Figure 2 Baby Creek SDF Limits of Construction*

## Baby Creek SDF Summary of Work

- Safety improvements such as fall protection.
- Architectural building rehabilitation consisting of sealant repairs, masonry repairs, interior/exterior and overhead door and door frame renovations, coating systems reapplications, and guardrail repairs throughout the facility.
- Plumbing work consisting of replacing emergency eyewash stations with combination eyewash shower units, adjusting piping and valves to new eyewash/shower units, and installing a new electric water heater to supply new eyewash/shower units.
- Instrumentation and Control (I+C) improvements focused on additional flow and level monitoring, and local indication for the chemical tank levels.
- Electrical work consisting of power improvements, lighting improvements, and new emergency eyewash station flow switch wiring.

*Figure 3 - Belle Isle CSO Limits of Construction*

## Belle Isle CSO Summary of Work

- Safety improvements such as fall protection gates, removing a concrete slab that is a tripping hazard, and reorienting basin access hatches to reduce chances of falling.
- Architectural building rehabilitation consisting of sealant joint repairs, tucking of pointing of concrete parapet caps, applying a water repellent to coping caps, coatings repair, and window glazing replacement throughout the facility.
- Instrumentation and Control (I+C) improvements focused on the gas detection system (Gas system controller, sensors, remote annunciator panels) and local control stations for the gates.
- Electrical work consisting of installing additional exterior LED lighting, additional exit signs and emergency units, and remote hand stations.

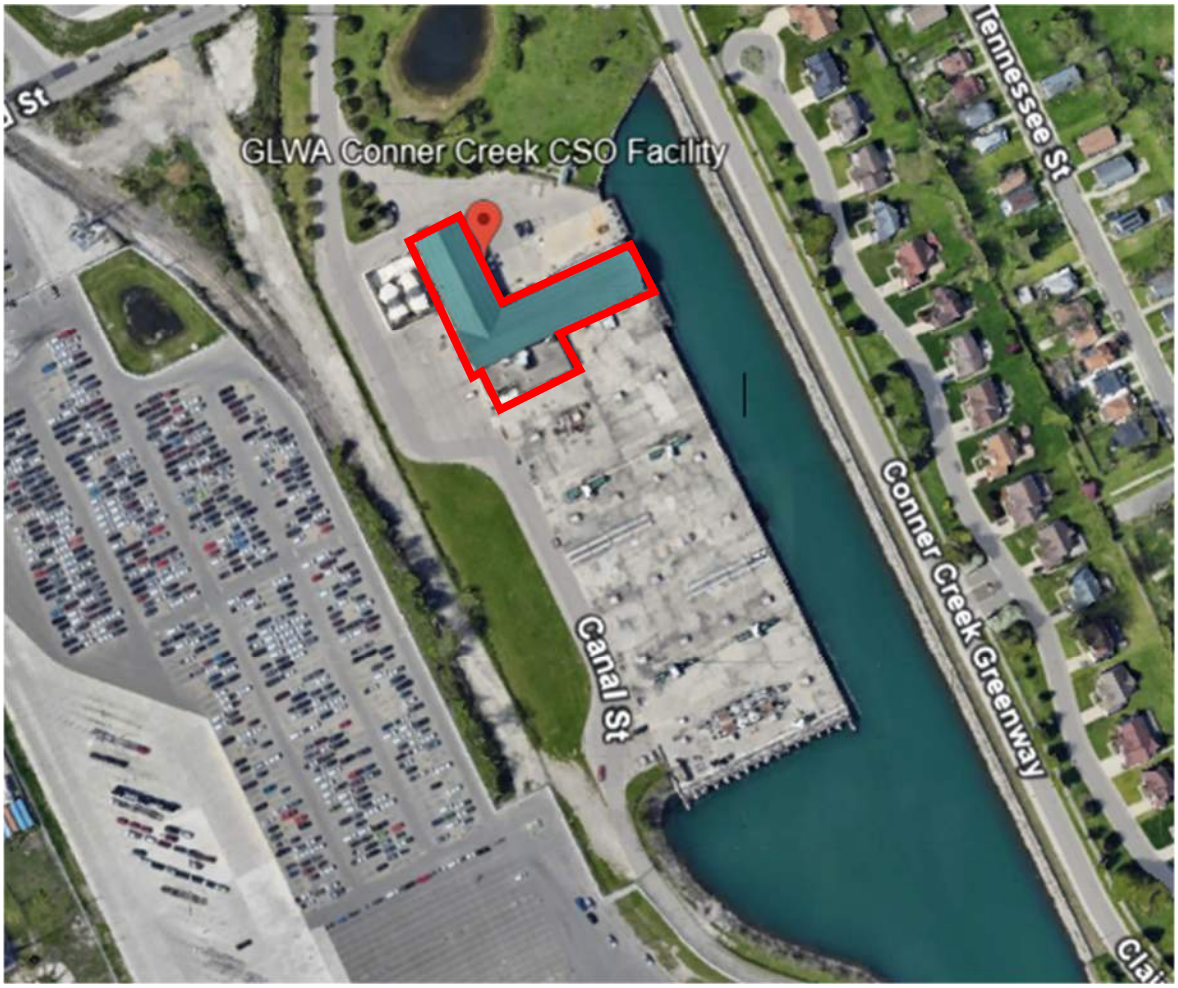



*Figure 4 – Conner Creek CSO Limits of Construction*

### Conner Creek CSO Summary of Work

- Safety improvements such as fall protection (railing extension).
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, Reapplying paints and coatings, ceiling tile replacement, installing exterior columns at the gate operators, and installing ponding.
- Electrical work consisting of installing new LED lighting due to ceiling tile replacement.

## Hubbell-Southfield CSO

*Figure 5 Hubbell-Southfield CSO Limits of Construction*

### Hubbell-Southfield CSO Summary of Work

- Safety improvements consisting of guardrail extensions, toe plate replacements, and installation of swing gates to decrease fall risks. Other repairs will be the replacement of hatches, access covers/grating, and the movement of a ladder/gate.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, coating replacement, and ceiling tile replacement.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing PLC System.
- Electrical work consisting of new emergency eyewash station flow switch wiring, new LED lighting, new wiring/monitoring to power for a new heater, and new flow sensors.

*Figure 6 – Leib SDF Limits of Construction*

## Leib SDF Summary of Work

- Safety improvements consisting of guardrail extensions to reduce fall risk.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, and repairs to interior/exterior and overhead doors.

*Figure 7 – Oakwood CSO Limits of Construction*

## Oakwood CSO Summary of Work

- Safety improvements consisting of rail extensions, fall protection gates, step platforms, and a catwalk to reduce fall risk, and the installation of conduit ramps to eliminate trip hazard.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, coating replacement, roof and flashing repairs, and masonry wall flashing repairs.
- Plumbing work consisting of replacing emergency eyewash stations with combination eyewash shower units, adjusting piping and valves to new eyewash/shower units, and installing a new electric water heater to supply new eyewash/shower units.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new emergency eyewash station flow switch wiring.

*Figure 8 – Puritan-Fenkell CSO Limits of Construction*

## Puritan-Fenkell CSO Summary of Work

- Safety improvements consisting of temporary stair replacement with permanent stairs to eliminate trip hazard.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, repairs to interior/exterior and overhead doors, coating replacement, and ceiling tile replacement.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new LED lighting and new emergency eyewash station flow switch wiring.

*Figure 9 – Seven Mile CSO Limits of Construction*

## Seven Mile CSO Summary of Work

- Safety improvements consisting of fall protection improvements.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, repairs to interior/exterior and overhead doors, and coating replacement throughout the facility.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new emergency eyewash station flow switches.

*Figure 10 – St. Aubin SDF Limits of Construction*

## St. Aubin SDF Summary of Work

- Process Mechanical Work:
  - Remove and replace screening systems including new screen components, a washdown station, and screening control system upgrades.
  - Replace existing Hypochlorite storage tanks with two FRP tanks of the same size.
  - Replace 5 existing chemical feed diaphragm pumps with 2 mag-drive centrifugal pumps and install modulating control valves.
  - Adding control valves to the feed pump discharge configurations to incorporate a pressurized recirculation loop.
  - Replace 6 total pre-chlorination 7.5 hp mixers with 6 new 5 hp mixers.
  - Update disinfection control strategy to target higher total residual chlorine (TRC).
  - Installing a colorimetric TRC analyzer.
- Safety Improvement work consists of relocating valves, installing guard rails, and adding netting to open hatches to reduce fall risk.

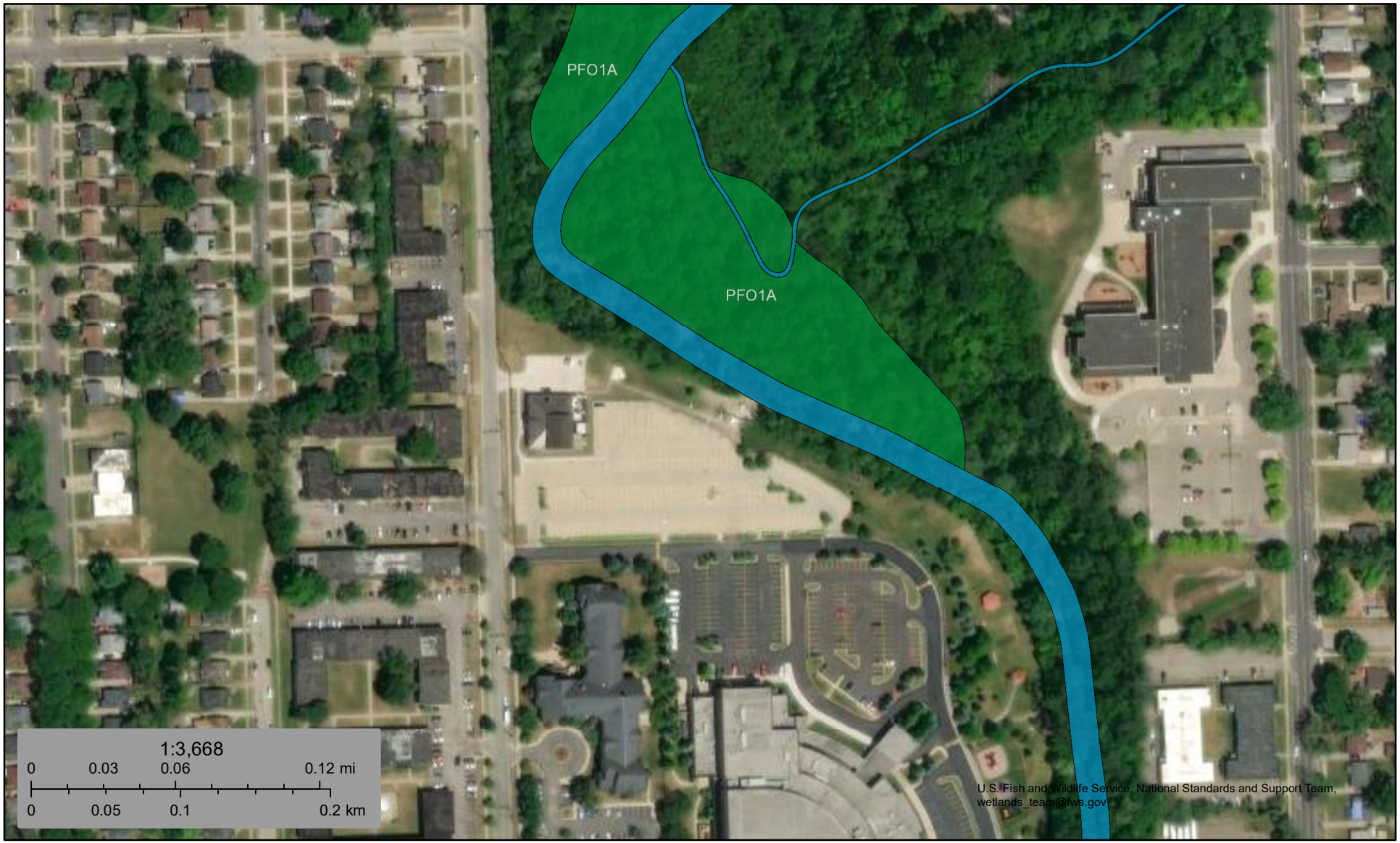
- Architectural building rehabilitation consisting of sealant joint repairs, painting of interior/exterior and overhead doors/frames/jambs/trim, and coating replacement in the Chemical Storage Room.
- HVAC improvement through the replacement of an exhaust fan for chemical storage.
- Instrumentation work consisting of new chemical system equipment controls, new level sensors, fill panel, and flow meters for the chemical tanks and feed lines in the disinfection system, and four new control valves for the washdown system.
- Electrical improvements consisting of new LED lighting on the interior/exterior of the basin, installing outlets on the exterior of the basin, removal of feed pump control panels, new quick disconnects for existing dewatering pumps and new mixers and sample pumps, installation of starters for chemical feed pumps and sample pumps, replacement of thermal units on existing mixer starters, and refeeding of ventilation/exhaust units to a different motor control center.

# Appendix B.
# Supporting Resources for the Natural Environment

# Appendix B.1
# Wetlands

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Seven Mile




June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Puritan-Fenkell

June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Leib

June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service

# National Wetlands Inventory

## Conner Creek

June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Belle Isle

June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service

# National Wetlands Inventory

## St. Aubin

June 21, 2024

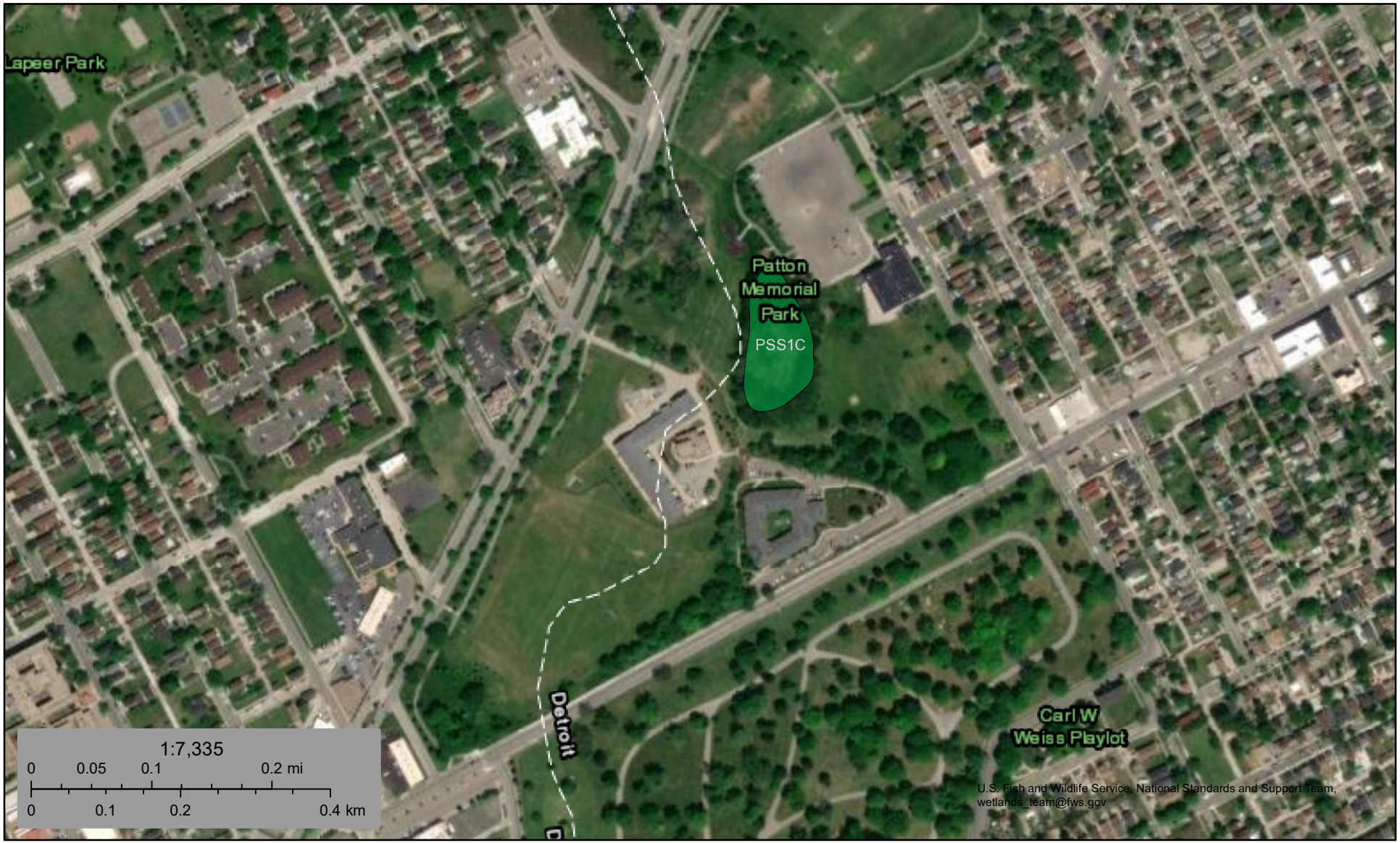
**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Baby Creek




June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Hubbell-Southfield

June 21, 2024

**Wetlands**

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

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Oakwood

June 21, 2024

**Wetlands**

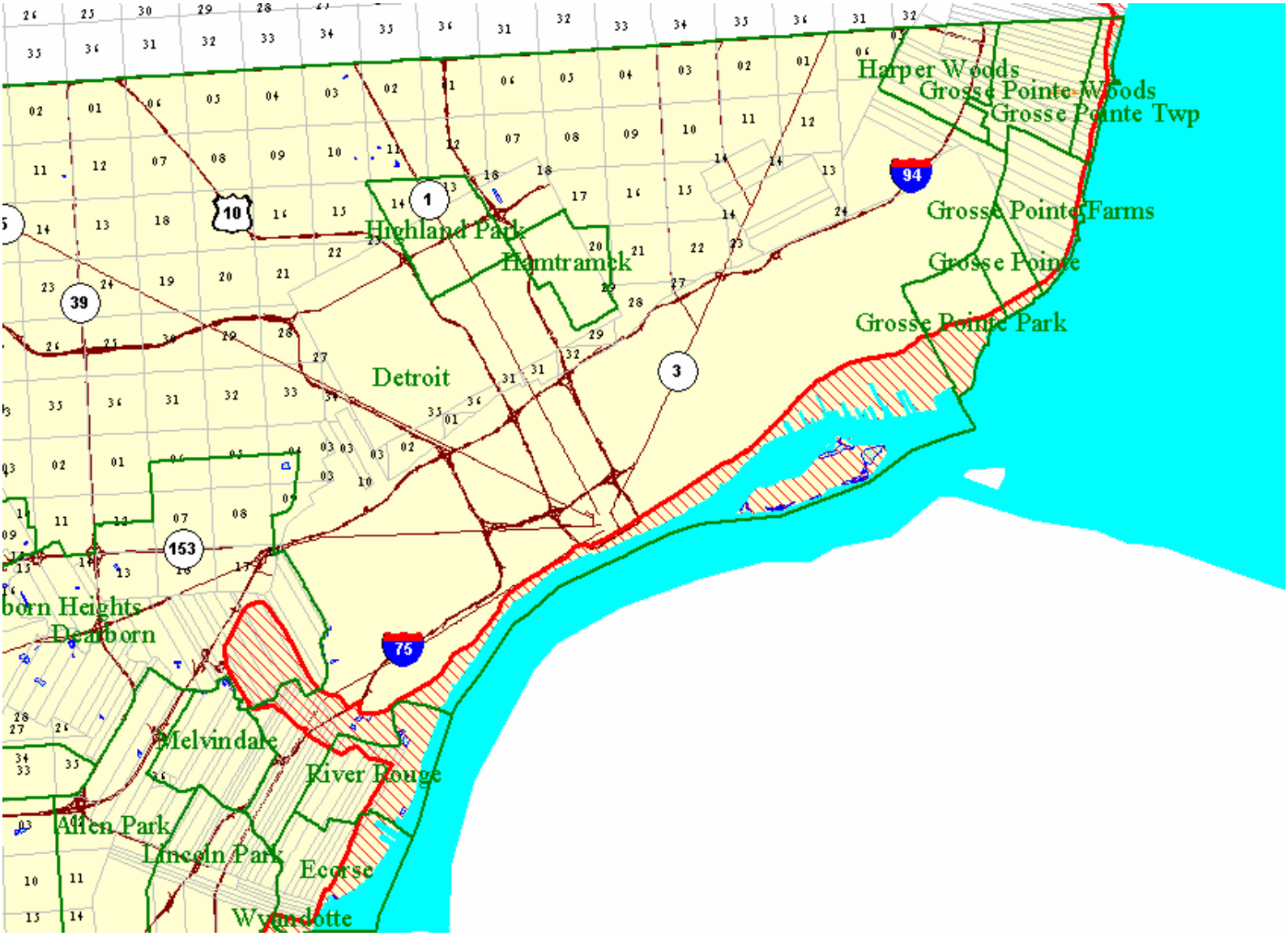
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# Appendix B.2
# Coastal Zones

**Wayne County**
**Grosse Point Township, Grosse Point Woods, Grosse Point Farms**
**Grosse Point, Grosse Point Park, and Detroit, T1S R14E**
**Detroit, T1S R14E, T2S R13E, andT2S R12E**
**River Rouge, T2S R11E**

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



# Appendix B.3
# Floodplains

# National Flood Hazard Layer FIRMette

FEMA

83°16'39"W 42°26'7"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

83°16'2"W 42°25'41"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

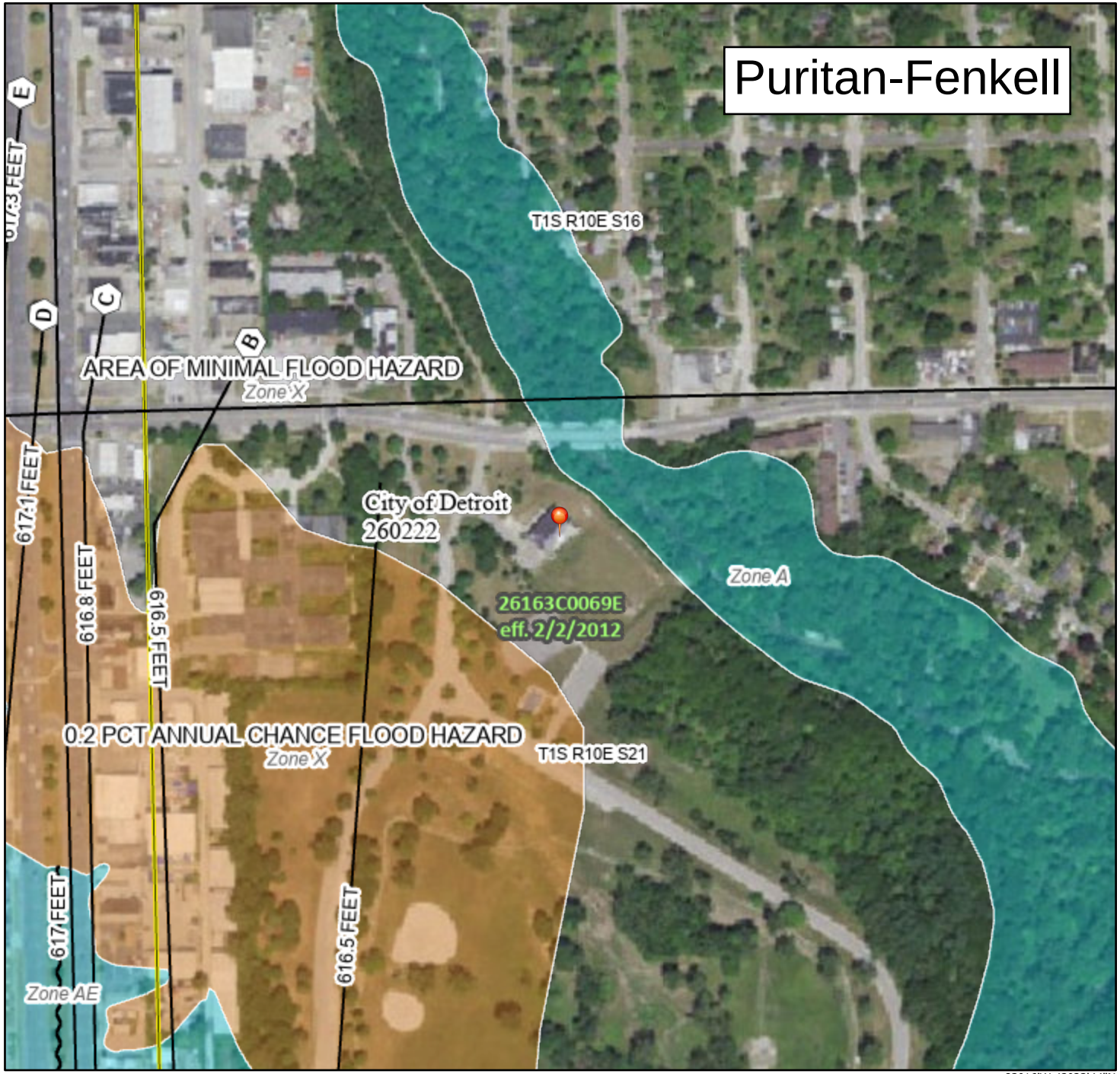
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:49 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°16'37"W 42°24'11"N




0 250 500 1,000 1,500 2,000 Feet

1:6,000

83°16'W 42°23'44"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

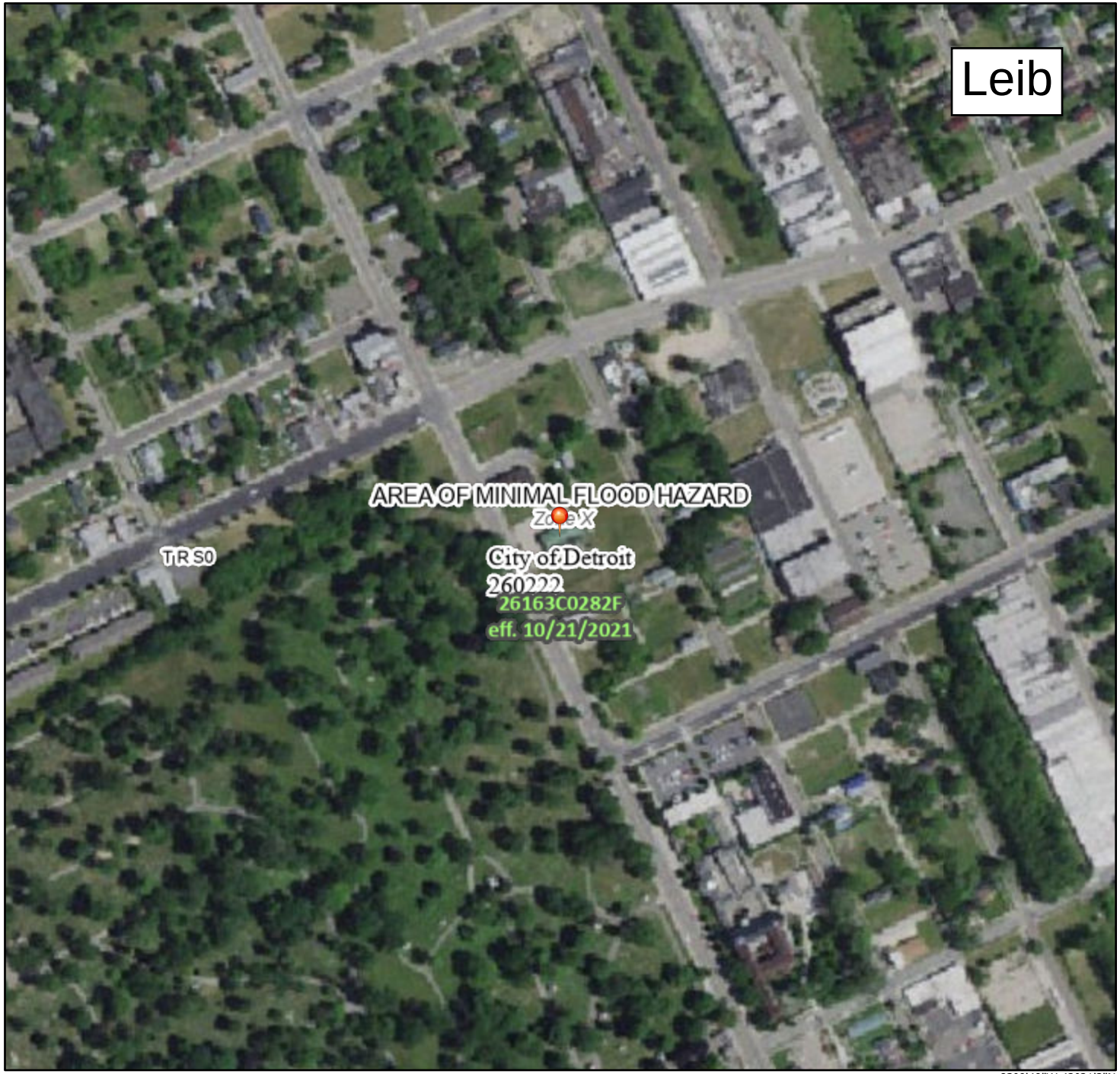
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:44 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°1'17"W 42°21'28"N




0 250 500 1,000 1,500 2,000 Feet

1:6,000

83°0'40"W 42°21'2"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

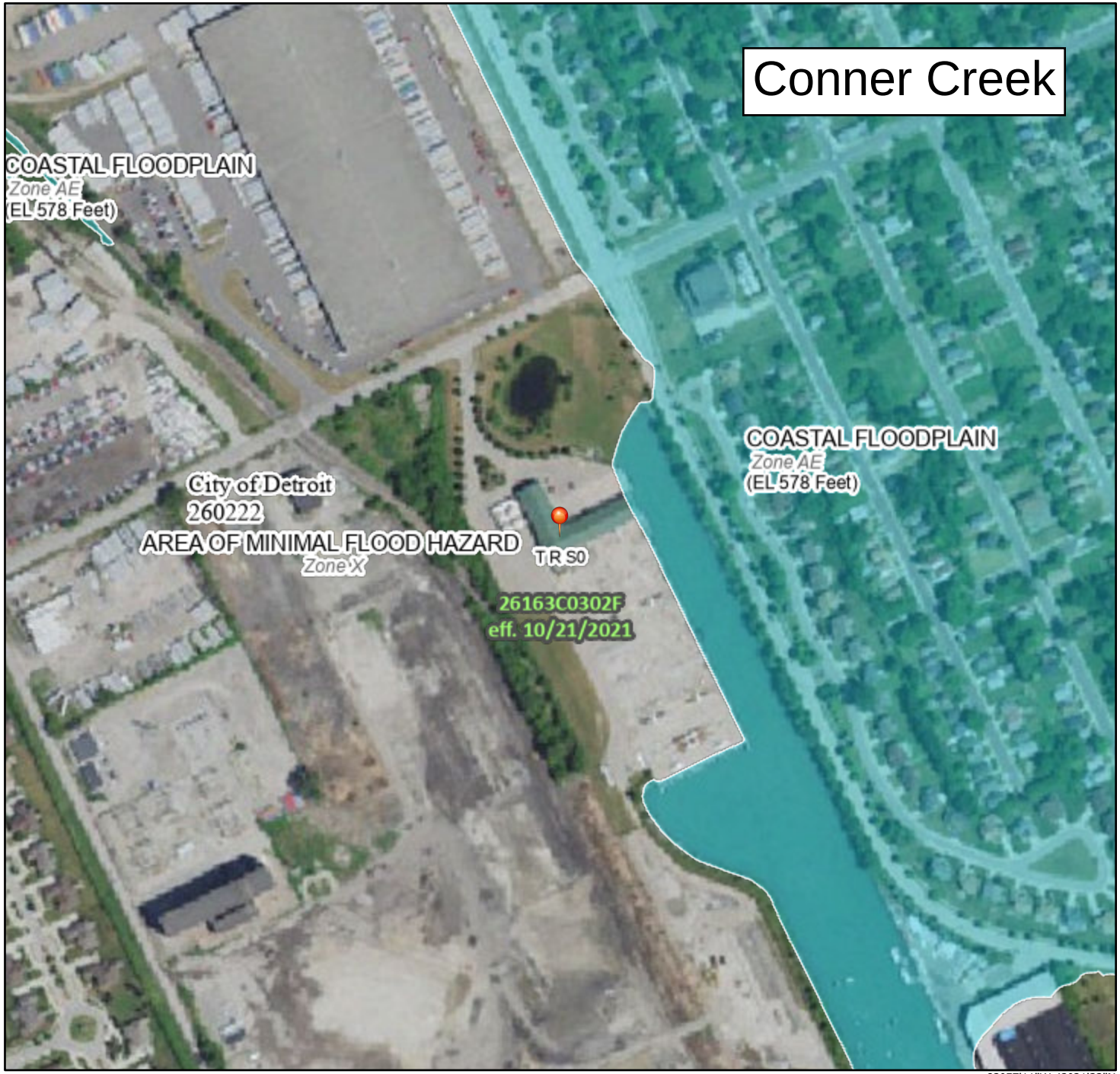
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:55 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

82°57'49"W 42°21'58"N




82°57'11"W 42°21'32"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:59 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°0'10"W 42°20'33"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

82°59'33"W 42°20'7"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:54 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°1'41"W 42°20'15"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

83°1'3"W 42°19'48"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

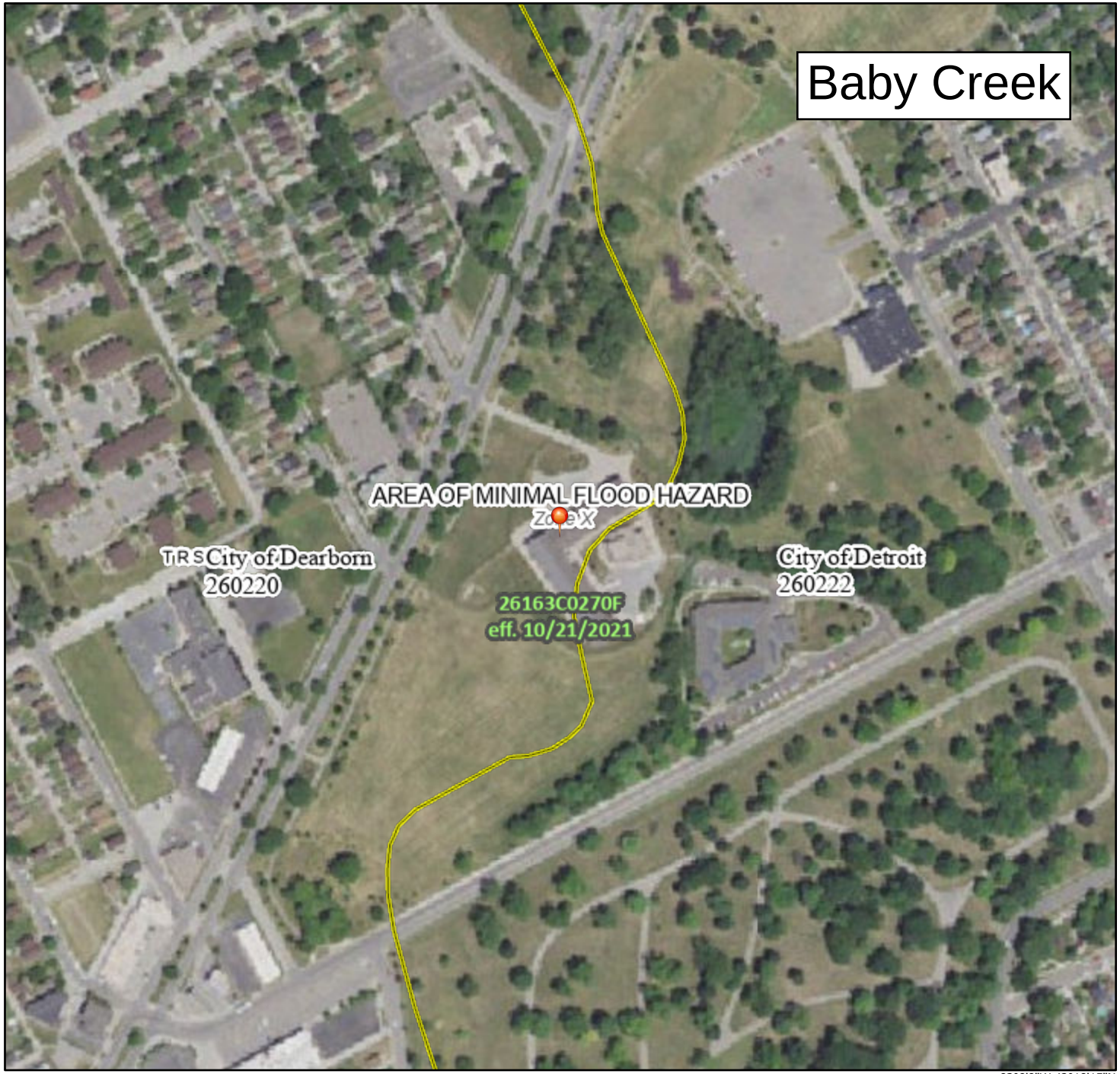
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:53 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°8'46"W 42°18'42"N




83°8'8"W 42°18'15"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:20 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°12'41"W 42°18'40"N

83°12'3"W 42°18'13"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:18 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA

83°8'55"W 42°17'12"N

83°8'18"W 42°16'45"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap Imagery Source: USGS National Map 2023*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/20/2024 at 10:25 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# Appendix B.4
# Natural or Wild Scenic Rivers and Major Surface Waters

National Water Dashboard
Overview
Layers 4
Legend 5
Tools
Find a place
Seven Mile
River Rouge
Scale 3,160 Lat 42.4331 Lon -83.2649
100 m
300 ft
Accessibility
FOIA
Legal
Privacy Policy
USGS Provisional Statement
U.S. Department of the Interior
answers.usgs.gov
1-888-ASK-USGS

Find a place
Puritan-Fenkell
Redford Twp
Detroit
14800
Dale St
Scale 3,160 Lat 42.4007 Lon -83.2652
100 m
300 ft

National Water Dashboard

Overview Layers 4 Legend 5 Tools

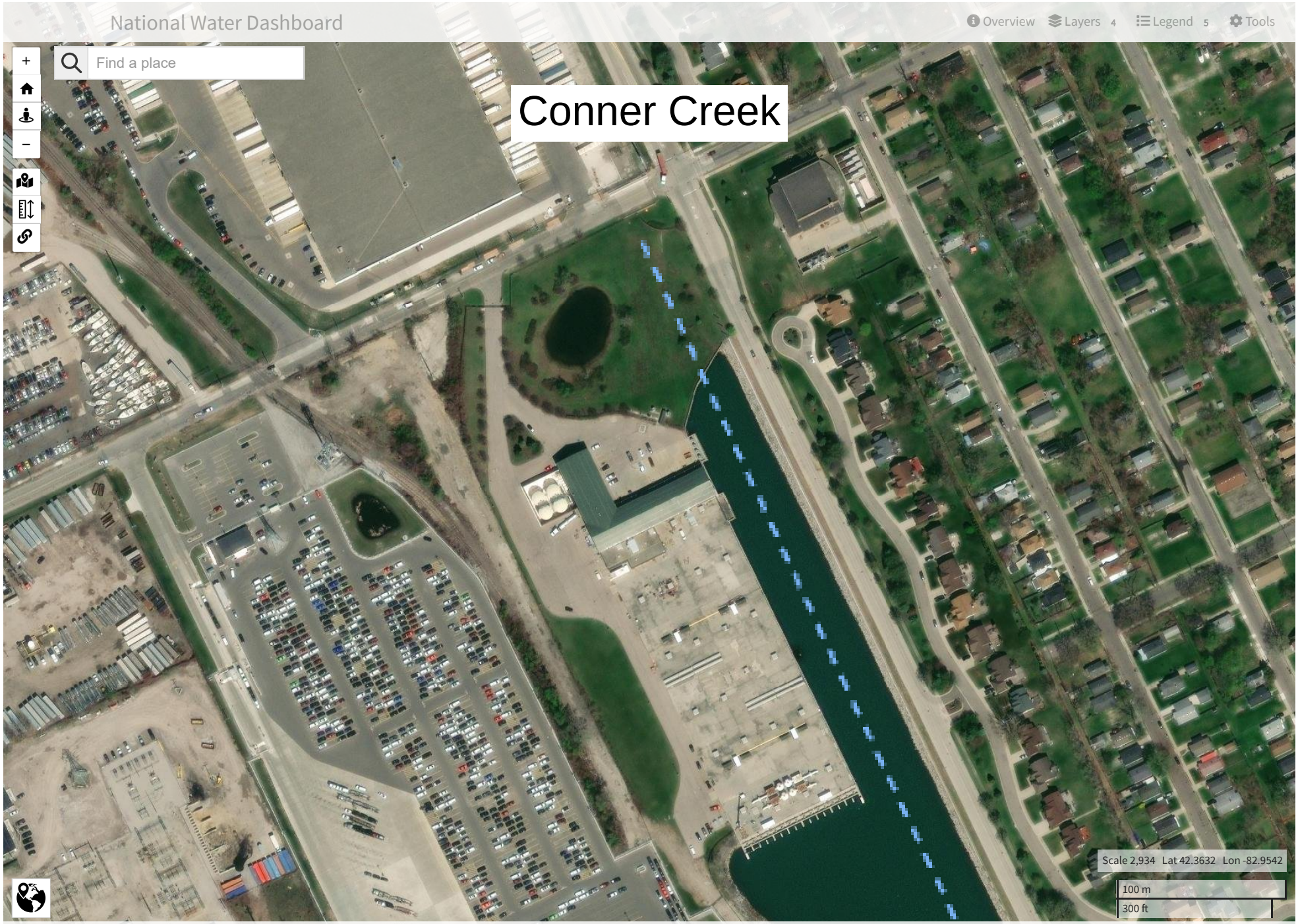
Find a place

Leib

Scale 2,257 Lat 42.3552 Lon -83.0118

50 m

200 ft


Find a place
Conner Creek
Scale 2,934 Lat 42.3632 Lon -82.9542
100 m
300 ft

National Water Dashboard

Overview Layers 4 Legend 5 Tools

Find a place

# Belle Isle

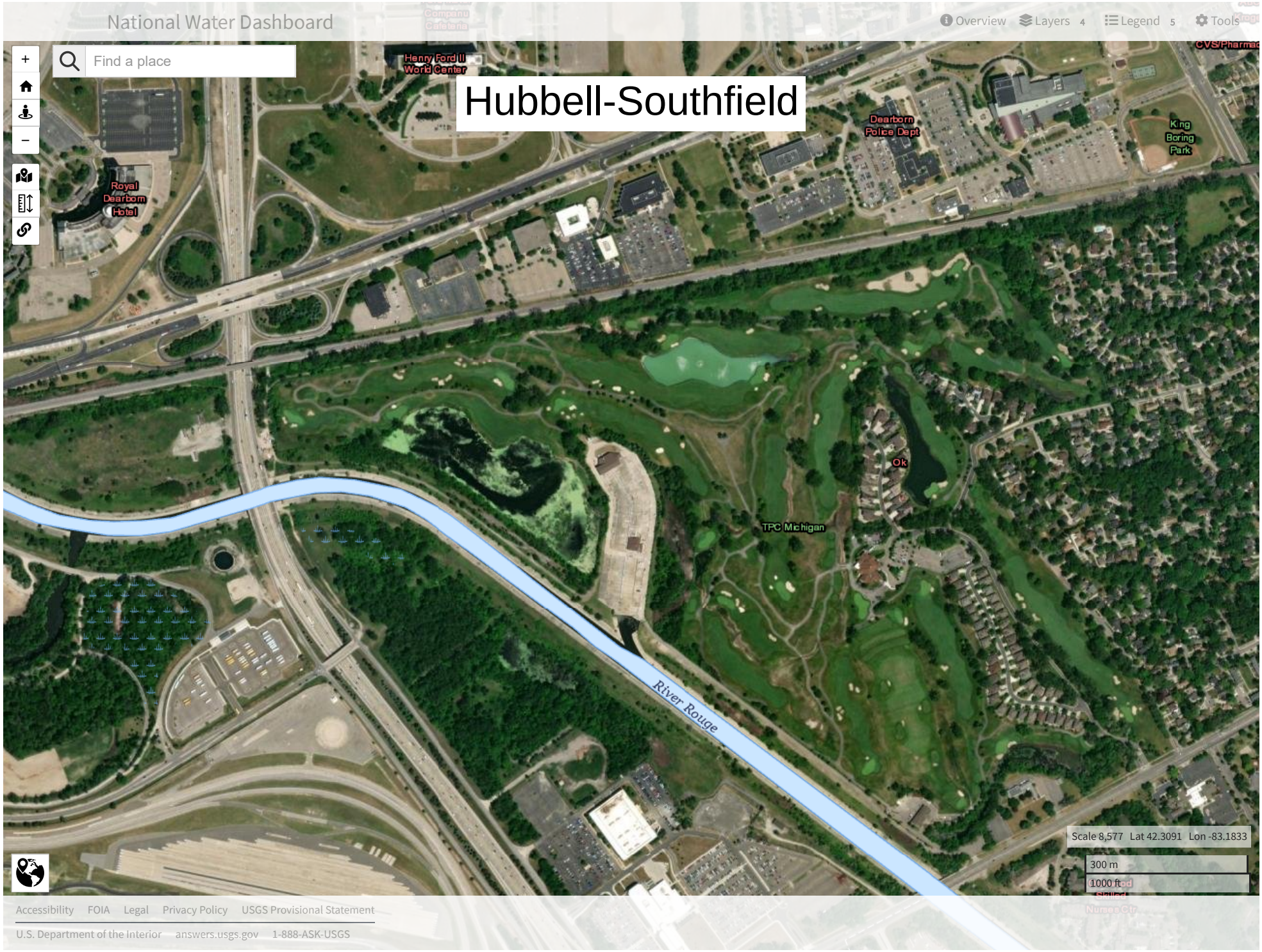
Scale 3,611 Lat 42.3415 Lon -82.9896

100 m

300 ft

National Water Dashboard
Overview
Layers 4
Legend 5
Tools
Find a place
St. Aubin
Chene Park
Chene Park Ampitheater
William C Milliken State Park
Scale 3,837 Lat 42.3322 Lon -83.0150
100 m
300 ft
Accessibility FOIA Legal Privacy Policy USGS Provisional Statement
U.S. Department of the Interior answers.usgs.gov 1-888-ASK-USGS

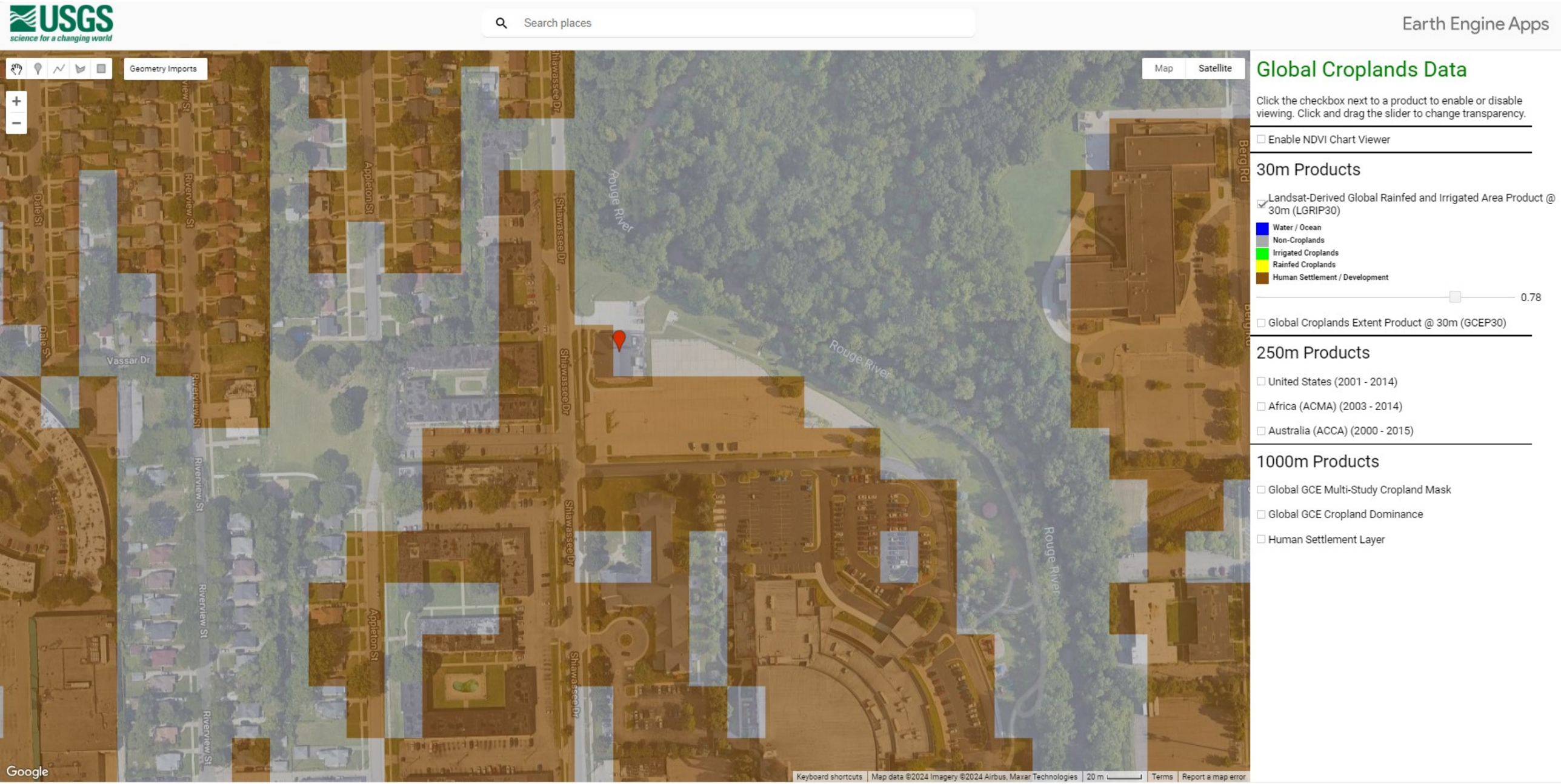
Find a place
Baby Creek
Lapeer Park
Carl W Weiss Playlot
Detroit
Scale 5,417 Lat 42.3111 Lon -83.1286
200 m
500 ft


National Water Dashboard
Overview
Layers 4
Legend 5
Tools
Find a place
Hubbell-Southfield
Henry Ford II World Center
Dearborn Police Dept
King Boring Park
Royal Dearborn Hotel
Ok
TPC Michigan
River Rouge
Scale 8,577 Lat 42.3091 Lon -83.1833
300 m
1000 ft
Accessibility FOIA Legal Privacy Policy USGS Provisional Statement
U.S. Department of the Interior answers.usgs.gov 1-888-ASK-USGS

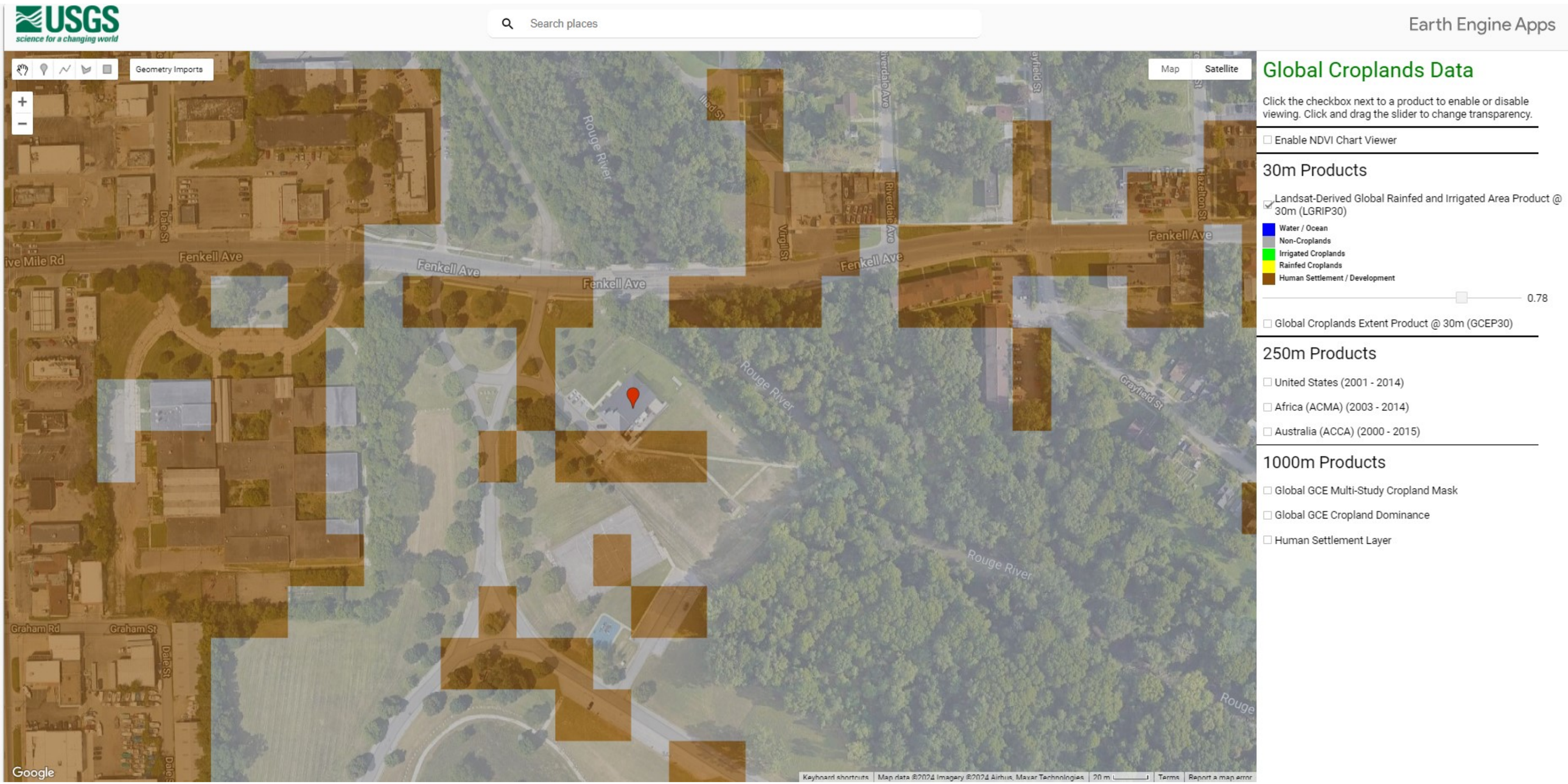
Find a place
Oakwood
Marathon Oil Company
Fleetpride
Owens Corning
Downriver Public Warehouse
Crystal Mines
Forman Playfield
River Rouge
Levy Aggregates
DWSD Oakwood Pump Station
Bridgeview Park
Detroit River Rouge
Melvindale
Detroit
J & K Beauty & Save-A-Lot
Barber Supply
Scale 9,931 Lat 42.2895 Lon -83.1186
300 m
1000 ft

# Appendix B.5
# Agricultural Resources

# Seven Mile


USGS
science for a changing world
Search places
Earth Engine Apps
Geometry Imports
Map
Satellite
Global Croplands Data
Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.
Enable NDVI Chart Viewer
30m Products
Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)
Water / Ocean
Non-Croplands
Irrigated Croplands
Rainfed Croplands
Human Settlement / Development
0.78
Global Croplands Extent Product @ 30m (GCEP30)
250m Products
United States (2001 - 2014)
Africa (ACMA) (2003 - 2014)
Australia (ACCA) (2000 - 2015)
1000m Products
Global GCE Multi-Study Cropland Mask
Global GCE Cropland Dominance
Human Settlement Layer
Shiawassee Dr
Rouge River
Berg Rd
Dale St
Riverview St
Appleton St
Vassar Dr
Google
Keyboard shortcuts
Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies
20 m
Terms
Report a map error

# Puritan-Fenkell



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USGS
science for a changing world
Search places
Earth Engine Apps
Geometry Imports
Map
Satellite
Global Croplands Data
Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.
Enable NDVI Chart Viewer
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Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)
Water / Ocean
Non-Croplands
Irrigated Croplands
Rainfed Croplands
Human Settlement / Development
0.78
Global Croplands Extent Product @ 30m (GCEP30)
250m Products
United States (2001 - 2014)
Africa (ACMA) (2003 - 2014)
Australia (ACCA) (2000 - 2015)
1000m Products
Global GCE Multi-Study Cropland Mask
Global GCE Cropland Dominance
Human Settlement Layer
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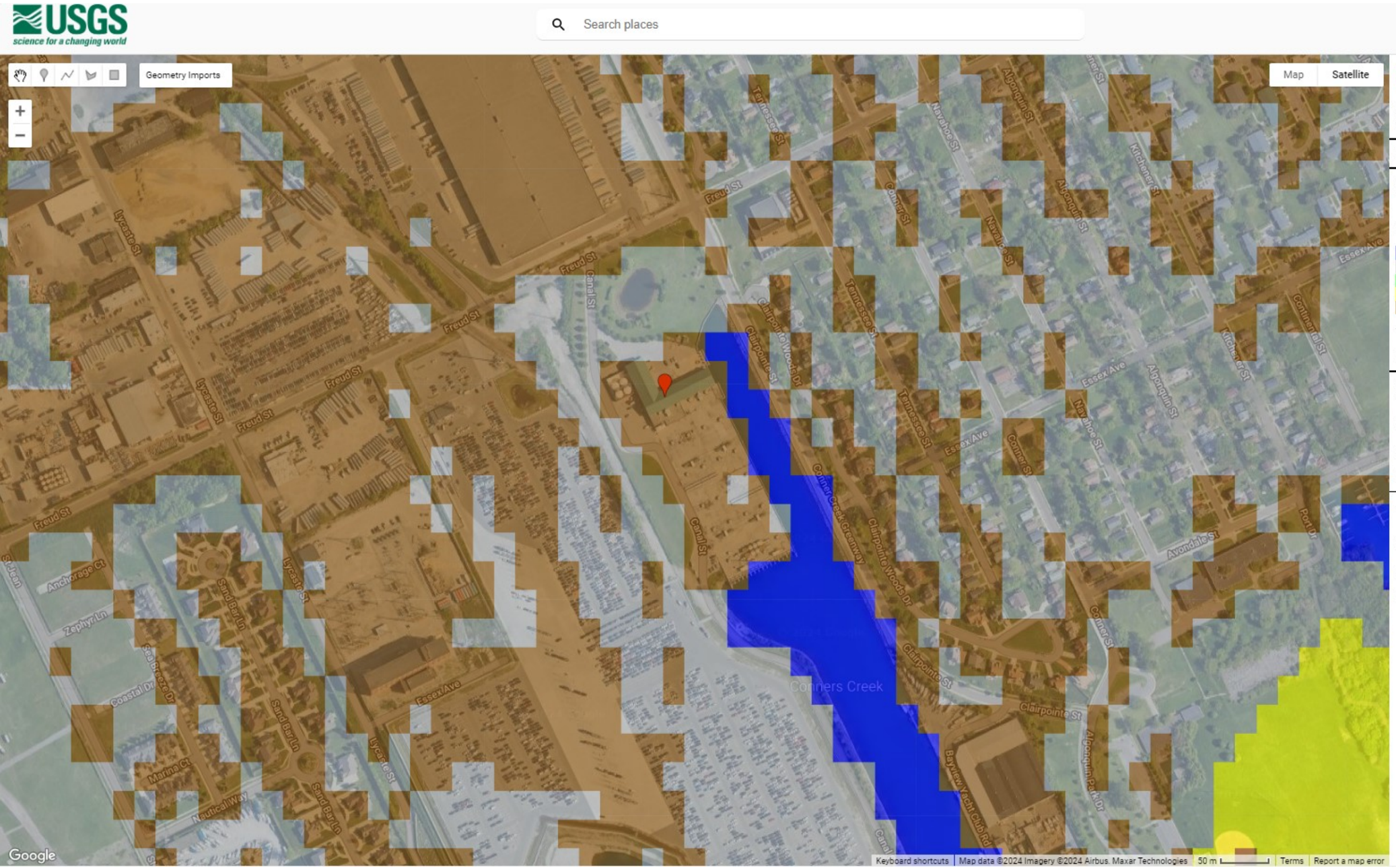
Mt Elliott St
Hendricks St
Hunt St
Elsey St
Burlage Pl
Waterloo St
Meldrum St
Beaufait St
Bellevue St
Kercheval Ave
Google
Keyboard shortcuts
Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies
20 m
Terms
Report a map error

# Conner Creek



# Belle Isle

USGS
science for a changing world
Search places
Earth Engine Apps
Geometry Imports
Map
Satellite
Detroit River
Grand Blvd
Picnic Way
Sunset Dr
Pleasure Dr
Casino Way
Google
Keyboard shortcuts
Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies
20 m
Terms
Report a map error
Global Croplands Data
Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.
Enable NDVI Chart Viewer
30m Products
Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)
Water / Ocean
Non-Croplands
Irrigated Croplands
Rainfed Croplands
Human Settlement / Development
0.78
Global Croplands Extent Product @ 30m (GCEP30)
250m Products
United States (2001 - 2014)
Africa (ACMA) (2003 - 2014)
Australia (ACCA) (2000 - 2015)
1000m Products
Global GCE Multi-Study Cropland Mask
Global GCE Cropland Dominance
Human Settlement Layer

# St. Aubin

USGS
science for a changing world
Search places
Earth Engine Apps
Geometry Imports
Map
Satellite
Global Croplands Data
Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.
Enable NDVI Chart Viewer
30m Products
Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)
Water / Ocean
Non-Croplands
Irrigated Croplands
Rainfed Croplands
Human Settlement / Development
0.78
Global Croplands Extent Product @ 30m (GCEP30)
250m Products
United States (2001 - 2014)
Africa (ACMA) (2003 - 2014)
Australia (ACCA) (2000 - 2015)
1000m Products
Global GCE Multi-Study Cropland Mask
Global GCE Cropland Dominance
Human Settlement Layer
Jefferson Ave
Woodbridge St
Franklin St
Atwater St
Larned St
St Aubin St
Dubois St
Orleans St
Riopelle St
Detroit RiverWalk
Detroit River
Google
Keyboard shortcuts
Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies
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Terms
Report a map error

# Baby Creek

USGS science for a changing world

Search places

Earth Engine Apps

Geometry Imports

Map Satellite

## Global Croplands Data

Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.

Enable NDVI Chart Viewer

### 30m Products

Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)

- Water / Ocean
- Non-Croplands
- Irrigated Croplands
- Rainfed Croplands
- Human Settlement / Development

0.78

Global Croplands Extent Product @ 30m (GCEP30)

### 250m Products

United States (2001 - 2014)

Africa (ACMA) (2003 - 2014)

Australia (ACCA) (2000 - 2015)

### 1000m Products

Global GCE Multi-Study Cropland Mask

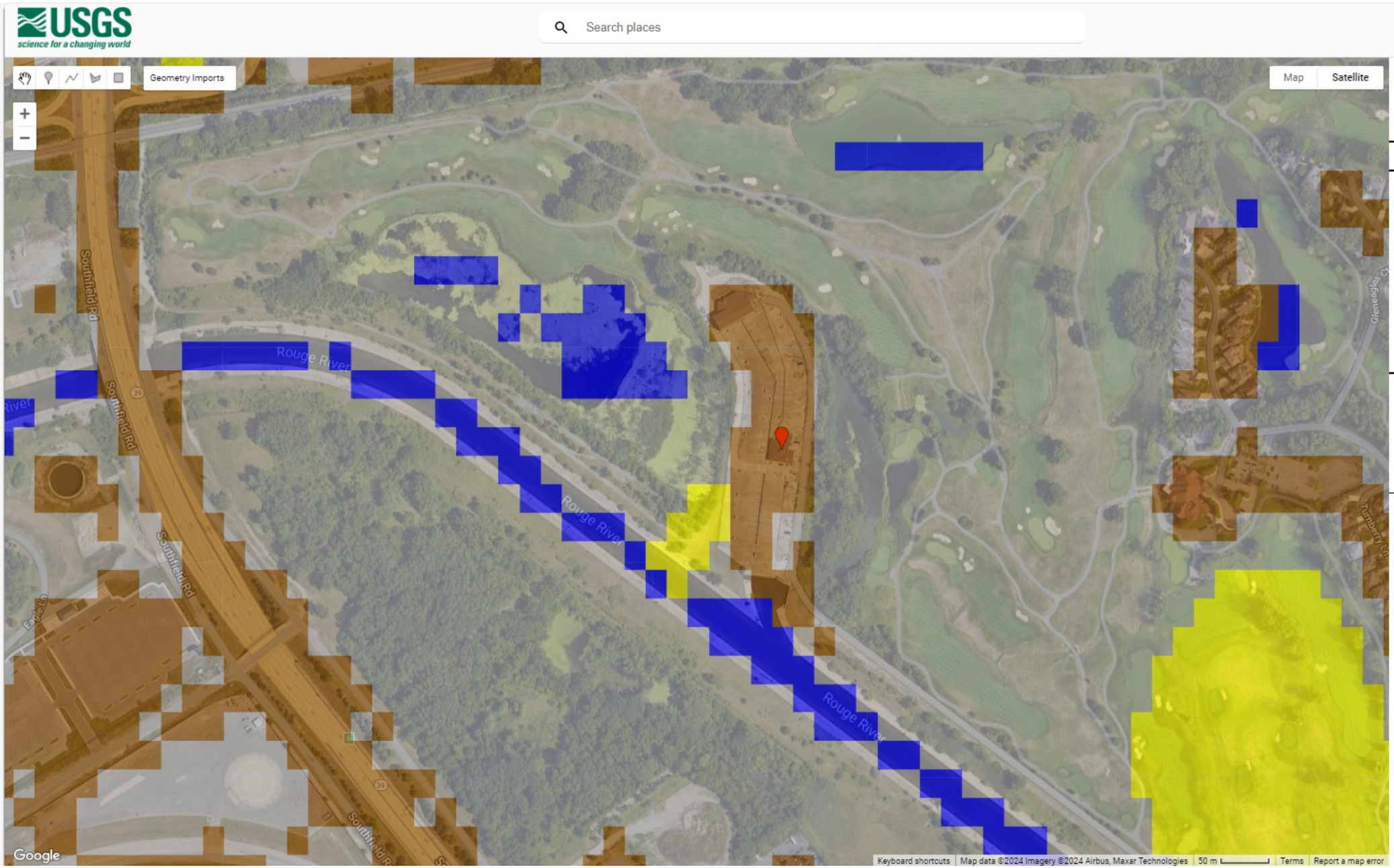
Global GCE Cropland Dominance

Human Settlement Layer

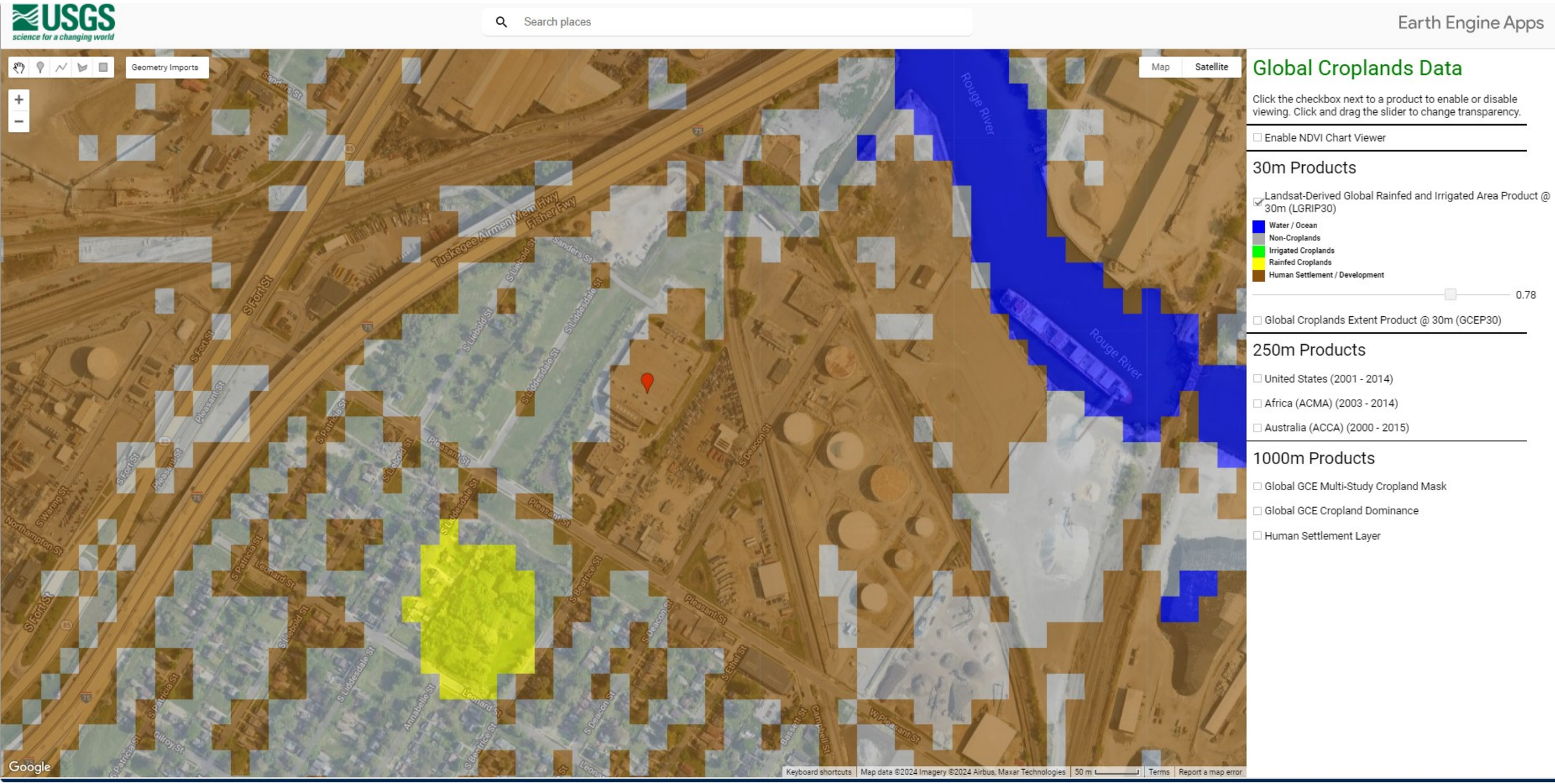
Google

Keyboard shortcuts | Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies | 50 m | Terms | Report a map error

# Hubbell-Southfield



# Oakwood


USGS
science for a changing world
Search places
Earth Engine Apps
Geometry Imports
Map
Satellite
Global Croplands Data
Click the checkbox next to a product to enable or disable viewing. Click and drag the slider to change transparency.
Enable NDVI Chart Viewer
30m Products
Landsat-Derived Global Rainfed and Irrigated Area Product @ 30m (LGRIP30)
Water / Ocean
Non-Croplands
Irrigated Croplands
Rainfed Croplands
Human Settlement / Development
0.78
Global Croplands Extent Product @ 30m (GCEP30)
250m Products
United States (2001 - 2014)
Africa (ACMA) (2003 - 2014)
Australia (ACCA) (2000 - 2015)
1000m Products
Global GCE Multi-Study Cropland Mask
Global GCE Cropland Dominance
Human Settlement Layer
Rouge River
Tuskegee Airmen Mem Hwy
Fisher Fwy
Sanders St
S Fort St
S Liebold St
S Liddesdale St
Pleasant St
S Patricia St
Leonard St
S Deacon St
S Beatrice St
Annabelle St
Dilroy St
S Ethel St
Bassett St
Campbell St
W Pleasant St
Northampton St
S Wyoming St
Google
Keyboard shortcuts
Map data ©2024 Imagery ©2024 Airbus, Maxar Technologies
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Terms
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# Appendix C.
# Zoning Maps

| | | |
|---|---|---|
| XXX | XXX | XXX |
| XXX | **71** | 72 |
| XXX | 73 | 74 |

N

OAKLAND COUNTY

EIGHT MILE ROAD

REDFORD TOWNSHIP

FIVE POINTS

LAHSER AVENUE

Seven Mile

CURTIS AVENUE

**71** 10-2-2018

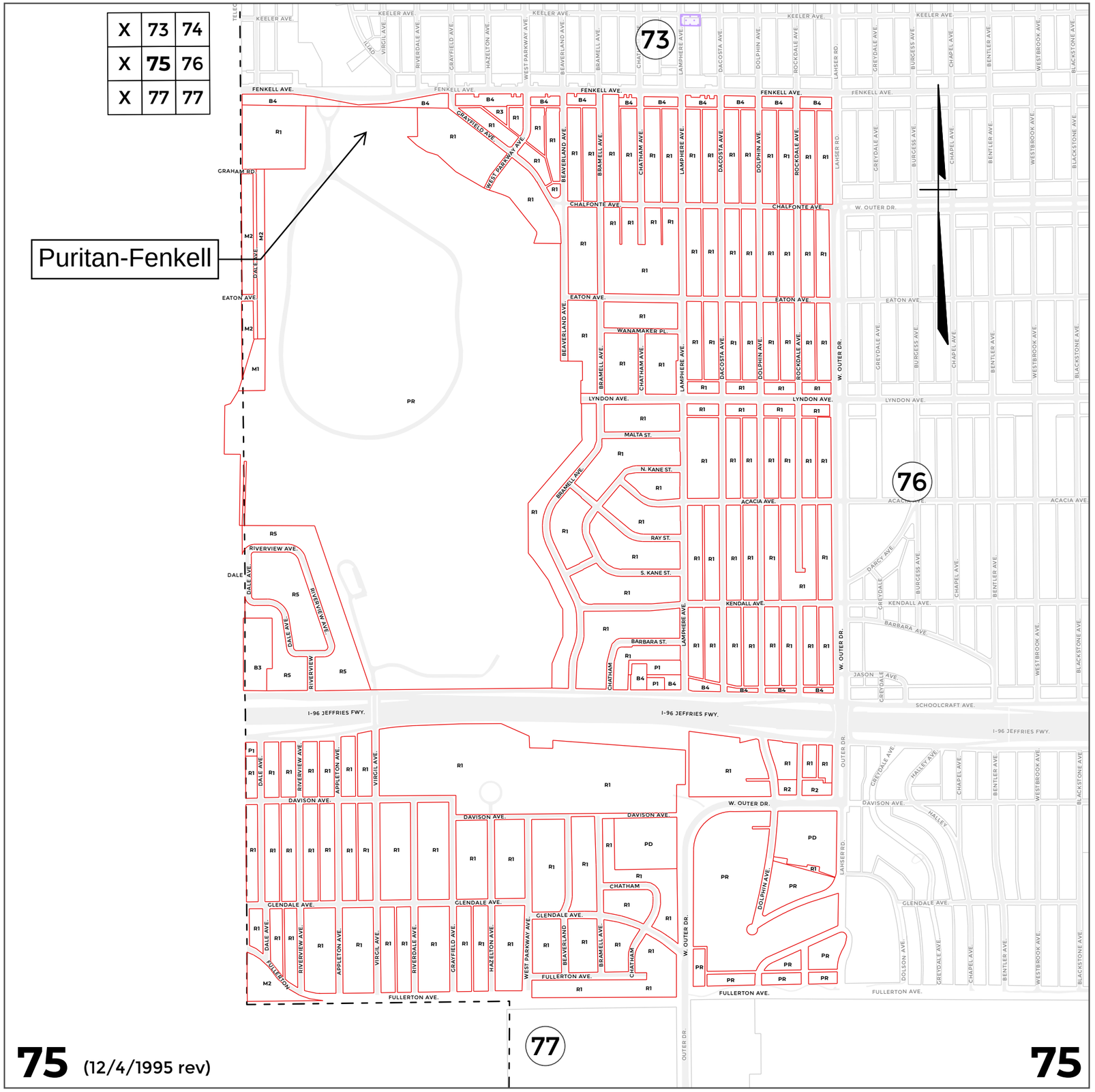
73

72

**71**

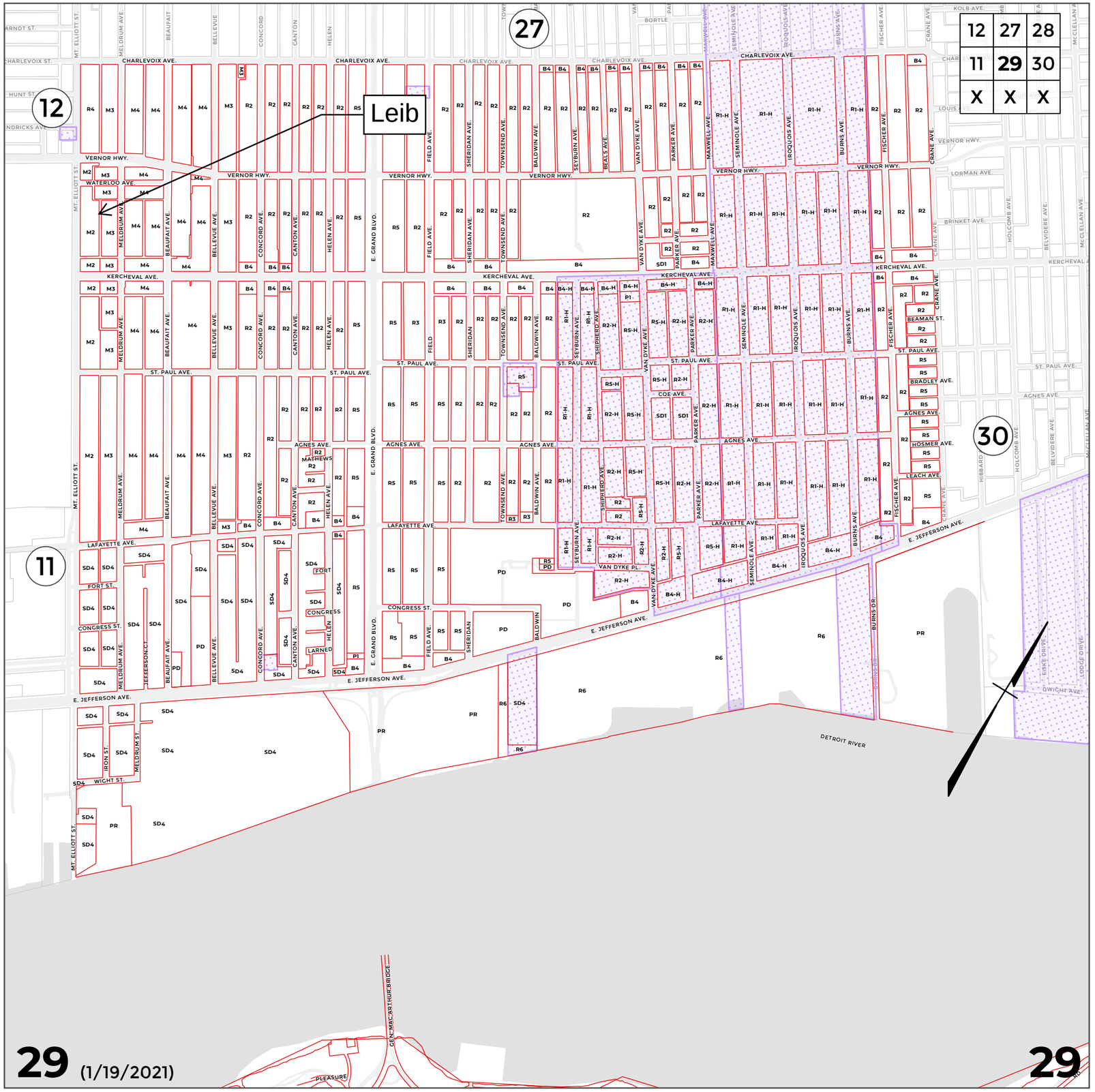
| | | |
|---|---|---|
| X | 73 | 74 |
| X | 75 | 76 |
| X | 77 | 77 |

Puritan-Fenkell




**75** (12/4/1995 rev)

**75**


Leib
27
12
11
30
29
CHARLEVOIX AVE.
VERNOR HWY.
KERCHEVAL AVE.
ST. PAUL AVE.
AGNES AVE.
LAFAYETTE AVE.
CONGRESS ST.
E. JEFFERSON AVE.
WATERLOO AVE.
FORT ST.
WIGHT ST.
VAN DYKE PL.
COE AVE.
BEAMAN ST.
BRADLEY AVE.
HOSMER AVE.
LEACH AVE.
LORMAN AVE.
BRINKET AVE.
HIBBARD AVE.
LARNED
MATHEWS
DETROIT RIVER
GEN. MACARTHUR BRIDGE
PLEASURE
MT. ELLIOTT ST.
MELDRUM AVE.
BEAUFAIT AVE.
BELLEVUE AVE.
CONCORD AVE.
CANTON AVE.
HELEN AVE.
E. GRAND BLVD.
FIELD AVE.
SHERIDAN AVE.
TOWNSEND AVE.
BALDWIN AVE.
SEYBURN AVE.
BEALS AVE.
VAN DYKE AVE.
PARKER AVE.
MAXWELL AVE.
SEMINOLE AVE.
IROQUOIS AVE.
BURNS AVE.
FISCHER AVE.
CRANE AVE.
BELVIDERE AVE.
HOLCOMB AVE.
McCLELLAN AVE.
SHIPHERD AVE.
BURNS DR.
ISLE DRIVE
LODGE DRIVE
GWICHT AVE.
R4
M3
M4
M2
R2
R5
R3
R2-H
R1-H
B4
B4-H
P1
SD1
SD4
PD
PR
R6
12
27
28
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29
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X
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**29** (1/19/2021)

| | | |
|---|---|---|
| 30 | 32 | XXX |
| 30 | **31** | XXX |
| XXX | XXX | XXX |

Conner Creek

JEFFERSON AVENUE

LYCASTLE AVENUE

32

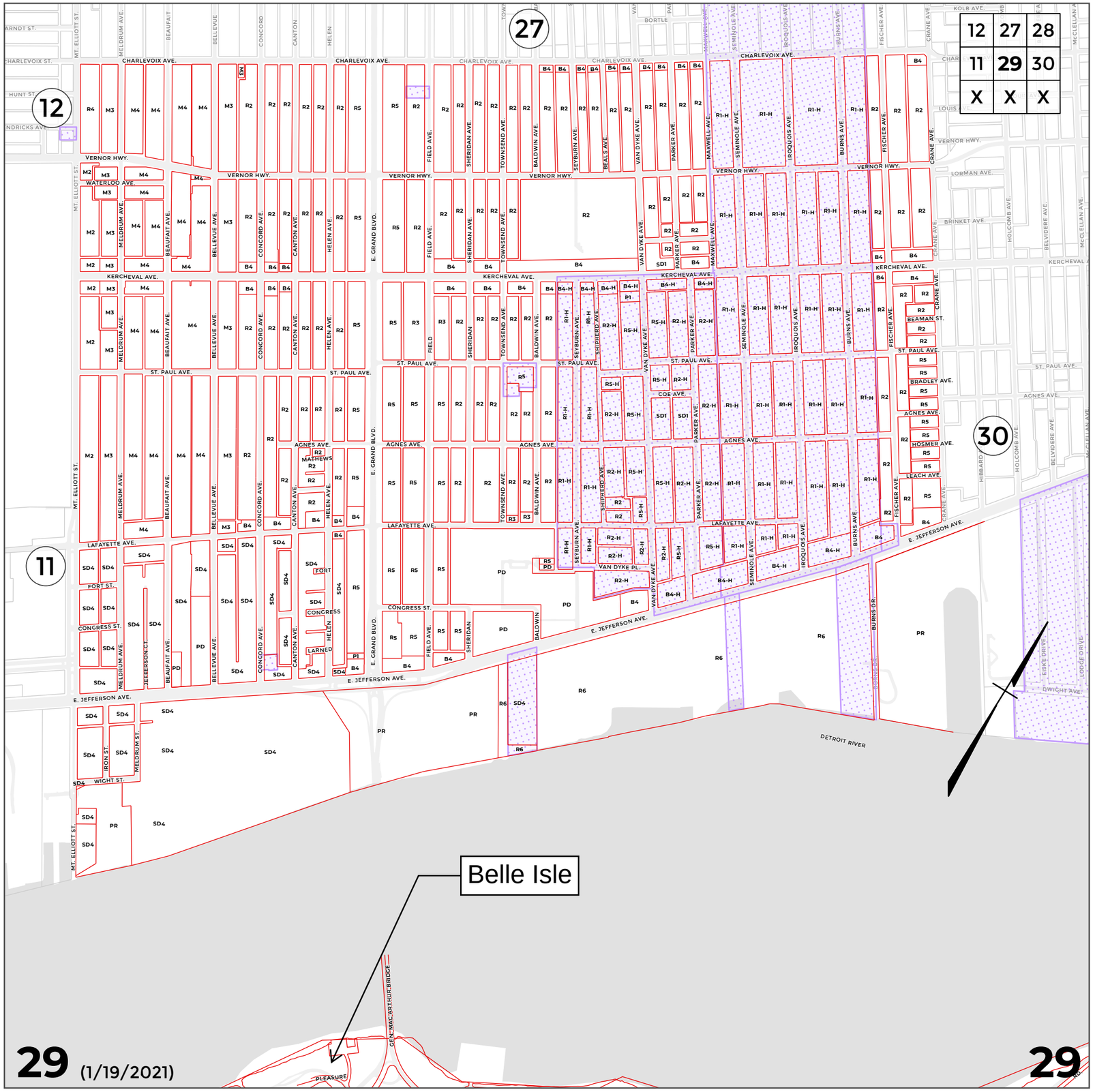
30

DETROIT RIVER

CITY OF GROSSE POINTE PARK

**31** (07-25-2002)

**31**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KERCHEVAL AVE.
ST. PAUL AVE.
AGNES AVE.
LAFAYETTE AVE.
CONGRESS ST.
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WATERLOO AVE.
FORT ST.
WIGHT ST.
VAN DYKE PL.
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BEAMAN ST.
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HOSMER AVE.
LEACH AVE.
MATHEWS
LARNED
LORMAN AVE.
BRINKET AVE.
KOLB AVE.
BORTLE
LOUIS
HIBBARD
MT. ELLIOTT ST.
ARNDT ST.
HUNT ST.
NDRICKS AVE.
MELDRUM AVE.
BEAUFAIT AVE.
BELLEVUE AVE.
CONCORD AVE.
CANTON AVE.
HELEN AVE.
E. GRAND BLVD.
FIELD AVE.
SHERIDAN AVE.
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SEYBURN AVE.
BEALS AVE.
VAN DYKE AVE.
PARKER AVE.
MAXWELL AVE.
SEMINOLE AVE.
IROQUOIS AVE.
BURNS AVE.
FISCHER AVE.
CRANE AVE.
SHIPHERD AVE.
BELVIDERE AVE.
HOLCOMB AVE.
McCLELLAN AVE.
JEFFERSON CT.
IRON ST.
LODGE DRIVE
FISKE DRIVE
GWICHT AVE.
BURNS DR.
GEN. MACARTHUR BRIDGE
PLEASURE
DETROIT RIVER
Belle Isle
PD
PR
SD1
SD4
R1-H
R2-H
R5-H
B4-H
R4
R3
R2
R5
R6
M2
M3
M4
B4
P1
EM
FORT
29 (1/19/2021)

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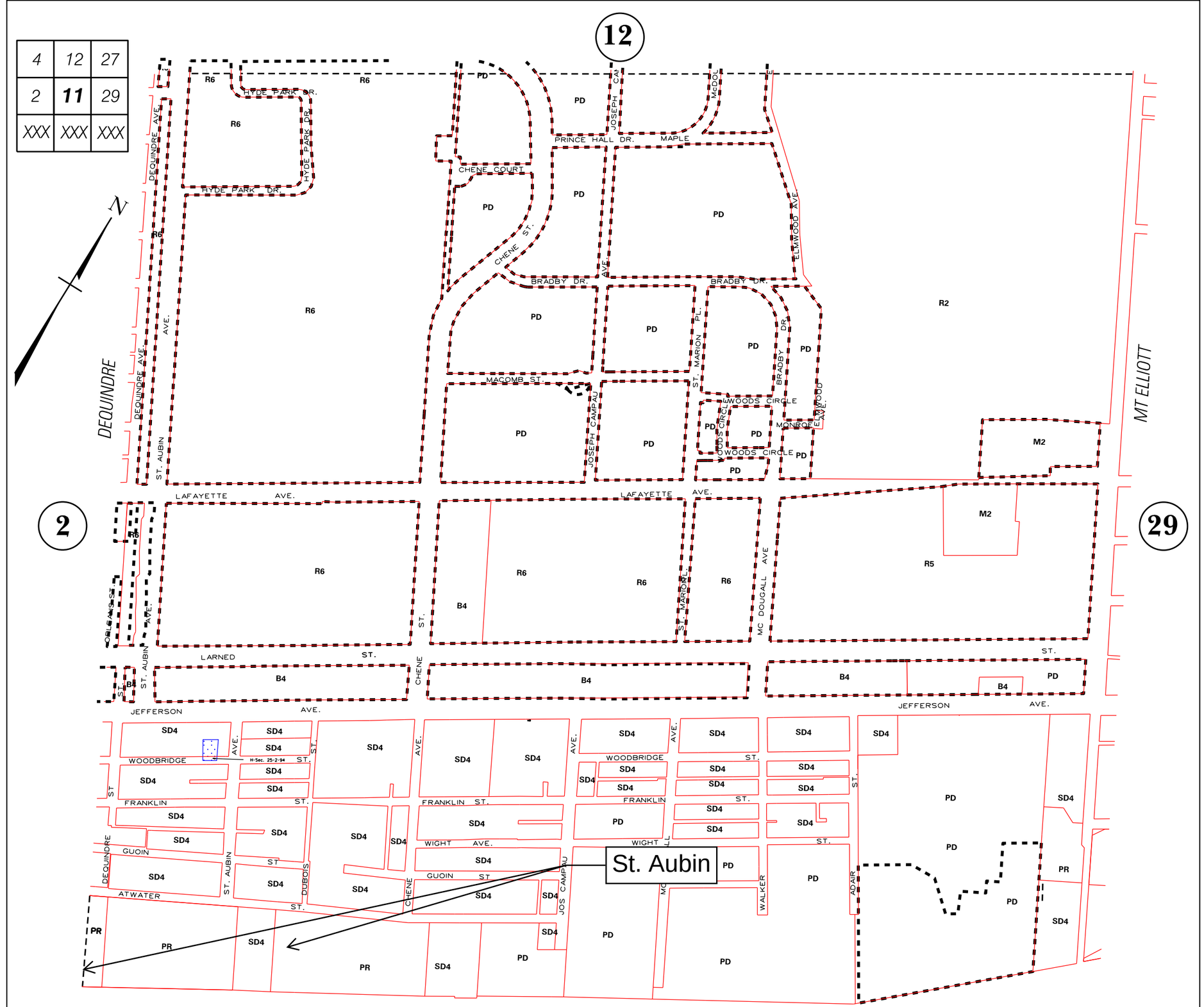
| 2 | **11** | 29 |
| XXX | XXX | XXX |



| | | |
|---|---|---|
| X | 48 | 49 |
| 51 | **52** | 49 |
| 51 | X | 49 |

Oakwood

51

**52** 11/19/2019

**52**

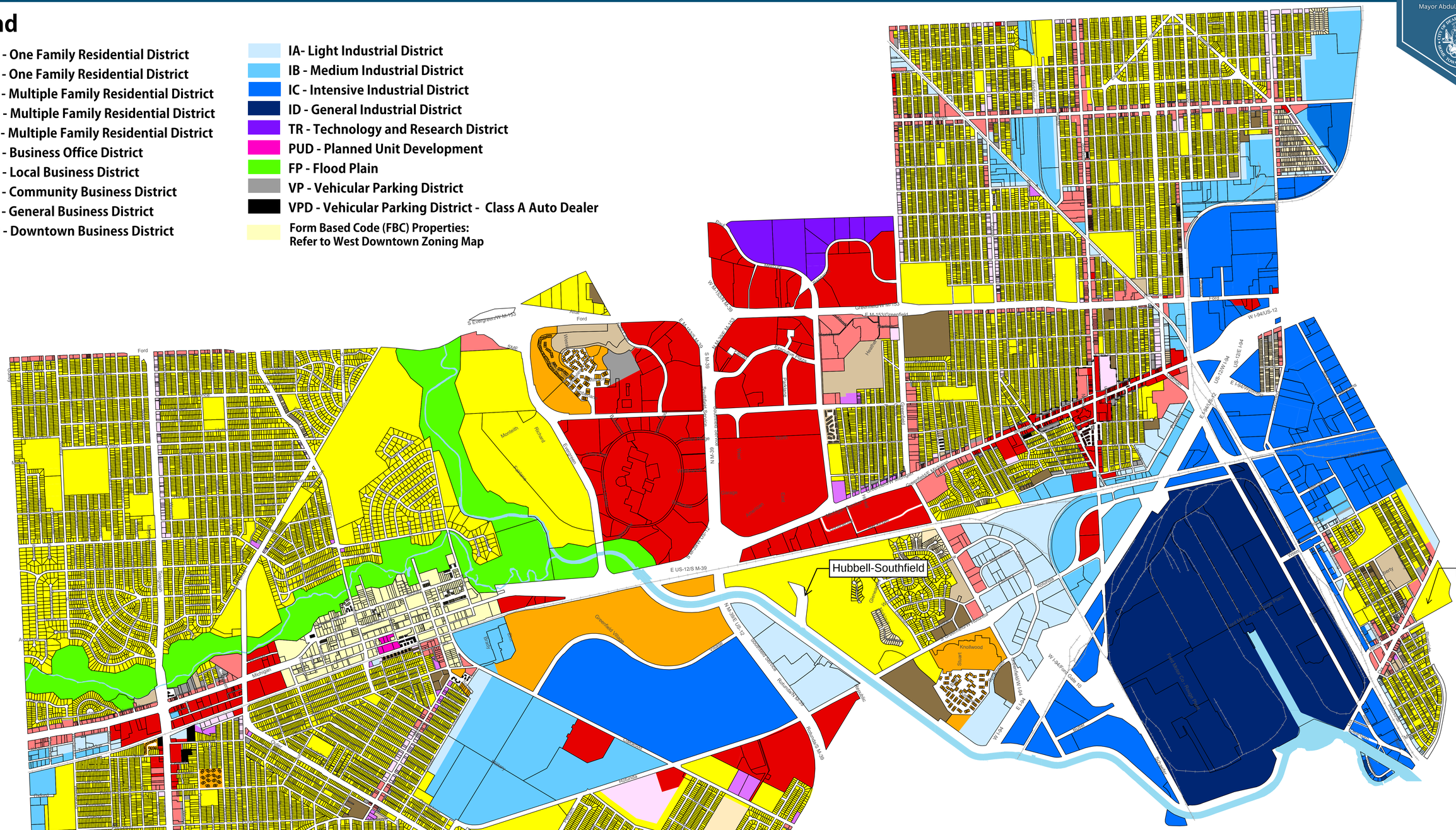
# City of Dearborn Zoning Map

As Amended to December 1st, 2023

ECONOMIC DEVELOPMENT
Mayor Abdullah H. Hammoud

## Legend

- RA - One Family Residential District
- RB - One Family Residential District
- RC - Multiple Family Residential District
- RD - Multiple Family Residential District
- RE - Multiple Family Residential District
- OS - Business Office District
- BA - Local Business District
- BB - Community Business District
- BC - General Business District
- BD - Downtown Business District
- IA- Light Industrial District
- IB - Medium Industrial District
- IC - Intensive Industrial District
- ID - General Industrial District
- TR - Technology and Research District
- PUD - Planned Unit Development
- FP - Flood Plain
- VP - Vehicular Parking District
- VPD - Vehicular Parking District - Class A Auto Dealer
- Form Based Code (FBC) Properties: Refer to West Downtown Zoning Map


Hubbell-Southfield
Baby Creek
E US-12/S M-39
W I-94/US-12
Ford
Michigan
Greenfield Village
Knollwood
Stuart
Rotunda W Dr
Rotunda N Dr
Rotunda S Dr
Evergreen
Monteith
Richard
Southfield Service
Southfield Service Dr
Southfield Service Dr N
Southfield Service Dr S
Greenfield Service Dr
Greenfield Service Dr N
Greenfield Service Dr S
Outer Dr
Inner Dr
Parkland
Parkland Dr
Parkland Ct
Parkland Cir
Knollwood Dr
Knollwood Ct
Stuart Dr
Stuart Ct
Stuart Cir
Rotunda Dr
Rotunda Ct
Rotunda Cir
Rotunda Pl
Rotunda Way
Rotunda Loop
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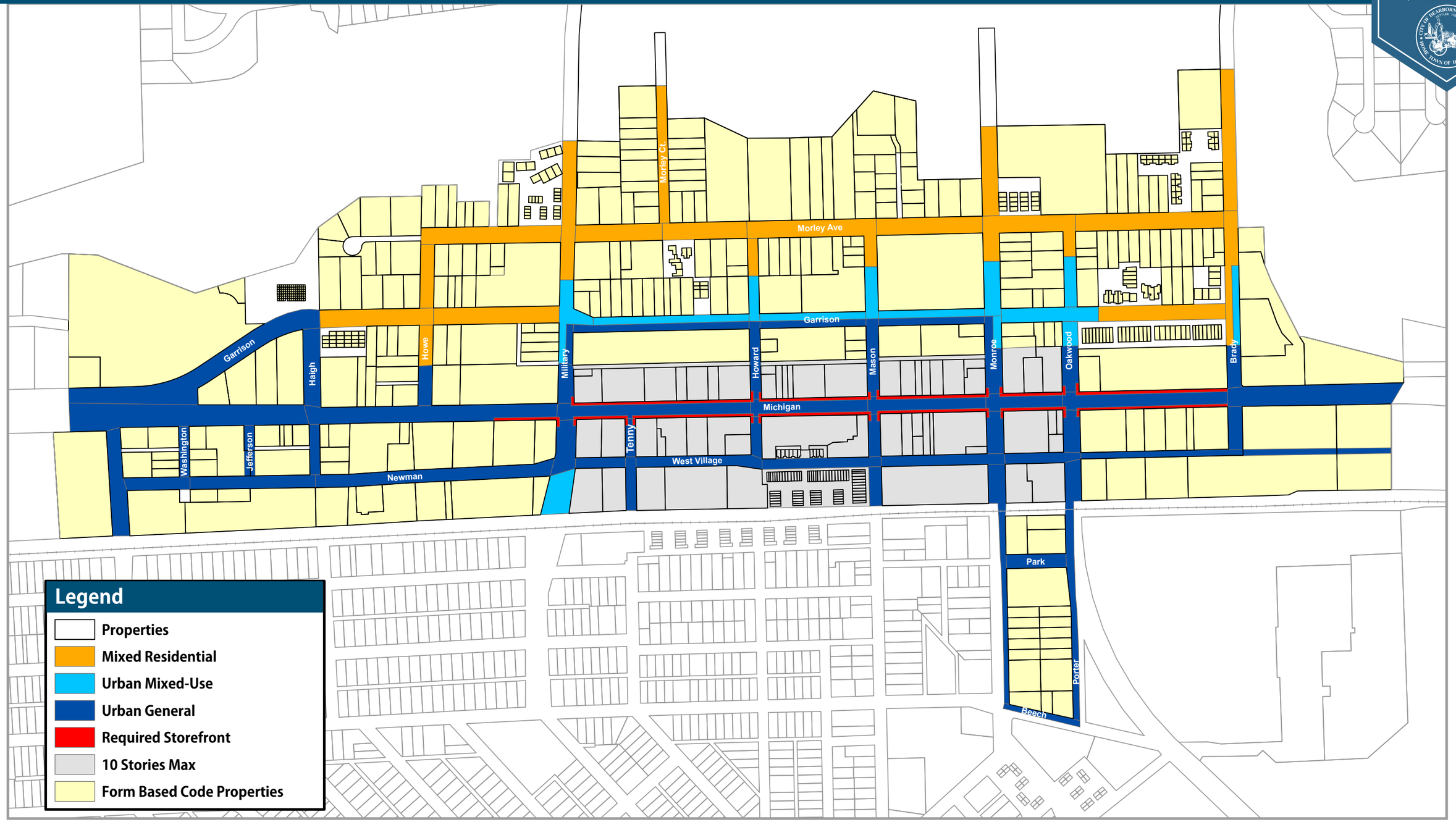
# Zoning Map - West Downtown District

**Form Based Code**
**As Amended to December 1st, 2023**

ECONOMIC DEVELOPMENT
Mayor Abdullah H. Hammoud




ECONOMIC DEVELOPMENT

**City of Dearborn, Michigan**
**Planning and Zoning Division**

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1:2,500

# Appendix D.
# EGLE Forms

# Appendix D.1
# CWSRF Submittal Form

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

# CLEAN WATER STATE REVOLVING FUNDS (CWSRF/SWQIF)
# PROJECT PLANNING DOCUMENT SUBMITTAL FORM

*Part 53, Clean Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.*

Project Name: CIP270006

Project Description: CSO Facilities Improvements II

Legal Name of Applicant: Great Lakes Water Authority
*(Name of the applicant municipality bonding for the project. Ex. A county bonding on behalf of a village or township)*

Applicant Address: Water Board Building; 735 Randolph Street

City: Detroit Zip Code: 48226 County: Wayne

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

Congressional District: 13 State Senate District: 1 State House District: 9

NPDES Permit Number: MI0022802 Associated SAW Grant Number:

Estimated Total Project Cost: $26,835,275 Target Construction Start Date: Q4 2025

Applicant Authorized Representative Name: David Delia, PE

Title: Senior Project Manager Phone: 248.255.5597 Email: ddelia@wadetrim.com

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

Address: 500 Griswold Street, Suite 2500 City: Detroit Zip Code: 48226

Signature of Authorized Representative Date

Completed Project Useful Life and Cost Analysis Certification Form. Blank copy included for use.
☑ Attached

Completed PPL Scoring Data Form. Blank copy included for use.
☑ Attached

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

Did you follow the Qualifications Based Selection (QBS) process for obtaining planning services?
☐ Yes ☐ No

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

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

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

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

# Appendix D.2
# Project Useful Life and Cost Analysis Certification Form

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

# PROJECT USEFUL LIFE AND COST ANALYSIS CERTIFICATION FORM

Per Section 602(b)(13) of the Federal Water Pollution Control Act (FWPCA), all Clean Water State Revolving Fund (CWSRF) assistance recipients must certify that they have conducted the studies and evaluations described in 602(b)(13)(A) and (B), collectively known as a cost and effectiveness analysis.

Applicant Name: Great Lakes Water Authority CWSRF Project Number: CIP270006

Project Description: CSO Facilities Improvements II

1) The applicant has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under the CWSRF; and

2) The applicant has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of:

- constructing the project or activity;
- operating and maintaining the project or activity over the life of the project; and
- replacing the project or activity.

3) The applicant has completed a Project Useful Life analysis for the project or activity and is included in the Project Planning Document or appropriate documentation is attached to this certification.

☑ I certify that requirements (1), (2), and (3) above have been met.

Dave Delia, PE

Name of Professional Engineer (Please Print or Type)

Signature of Professional Engineer Date

Name and Title of Authorized Representative (Please Print or Type)

Signature of Authorized Representative Date

# Appendix D.3
# Project Priority List (PPL) Scoring Data Form

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

# PROJECT PRIORITY LIST SCORING DATA FORM

*Part 53, Clean Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.*

## Instructions

The following information must be completed and submitted alongside a Project Planning Document for the Clean Water State Revolving Fund (CWSRF) or Strategic Water Quality Initiatives Fund (SWQIF). This form should only be completed for items to be included in the upcoming fiscal year project. Include page numbers and appendices of where supporting documentation can be found in the planning document. For traditional wastewater projects, including combined sewer separation, please complete sections 1-4. For projects with only storm water work please complete sections 5-8.

For questions related to wastewater scoring, please contact Charlie Hill at 906-236-3916 or HillC@Michigan.gov. For questions related to storm water scoring, please contact Christe Alwin at 517-420-1501 or AlwinC@Michigan.gov.

UNKNOWN

## Project Information

Applicant: Great Lakes Water Authority (GLWA)

Project Location: Nine CSO Locations; See attached.

CWSRF/SWQIF Project Number: _____

Applicant Population: N/A Population Served by the Project: 3,091,095

Project Type: ☑ Wastewater (including emerging contaminant projects) ☐ Storm Water

## 1. Compliance – Wastewater Projects

Does the project have an enforceable construction schedule established by an order, permit, enforcement action, or other document issued by EGLE?

☐ Yes ☑ No

If yes, copy of enforcement action, order, permit, notice, or another document. Pages: _____

## 2. Public Health – Wastewater Projects

Sanitary Sewer Overflow (SSO)/Bypass. Pages: _____

☐ Wet weather related SSOs demonstrated not meeting SSO policy.

☐ Operational-related SSOs demonstrated dry weather SSOs due to structural concerns (incorrect pumps, difficult to maintain siphons, etc.).

Combined Sewer Overflow (CSO). Pages: 14-15; 34-35

Based on maximum annual volume reported in the last five years, does the project involve the reduction of annual CSO volumes? Check which volume reduction applies.

☐ Greater than 10MG ☐ 5-10MG ☐ Less than 5MG ☑ N/A

Biosolids scoring for PFOS. Pages:

☐ Meets 20 ppb PFOS as expressed in interim biosolids strategy. Must meet EPA public risk level if issued before 3 years. Must meet interim biosolids strategy if revised in next 3 years.

**3. Water Quality – Wastewater Projects**

Pre-project conditions, including wastewater collection/treatment deficiencies and water quality problems occurring. Pages: 17-21

☐ Project includes centralized treatment to address failing septic systems in unsewered areas.

Pages:

If you selected this option, please identify the following documentation included below.

☐ Documentation of fecal coliform in surface water resulting from failing septic tanks.

☐ Documented illicit discharges of sanitary sewage to surface water resulting from failing septic tanks.

☐ Documentation of impact to surface water resulting from failing septic tanks (visual indicators or other metrics).

☐ No documentation of impacts to surface water is included.

Post-project conditions, including proposed facilities and water quality improvements.

Pages: 34-35

A. Information on Existing Discharge Pages: See Page 15

i. Discharge Method:
☑Surface Water ☐Groundwater ☐No existing discharge

ii. Discharge Type:
☐Continuous ☐Seasonal ☑Intermittent ☐ No existing discharge

iii. Flow (identify MGD or MGY): See Page 15
For facilities that discharge to regional treatment plants and do not file surface water discharge monitoring reports, provide the average daily metered flow.

iv. Receiving Water and Type: River

v. Location (township, range, and section): See Attached

vi. Existing Treatment:
☐Untreated ☐Secondary ☐Tertiary ☑Combined Sewer Overflow
☐Primary (includes septic systems with tile fields or direct surface water discharge)

vii. Existing Disinfection Process:
☐None ☑Chlorination ☐Alternative, other: _____

viii. Nitrate contamination of public or private wells caused by the discharge of effluent/waste from the treatment system or systems. Pages: NA

☐ Public well(s) in vicinity contains nitrates > 10 mg/L
☐ Private well(s) in vicinity contains nitrates > 10 mg/L
☐ Monitoring well(s) in vicinity contains nitrates > 10 mg/L
☑ No evidence of nitrate contamination in local wells

Note: If only the total inorganic nitrogen ("TIN" ammonia + nitrite + nitrate) concentration is available, a separate sampling and nitrate analysis should be performed to document the nitrate concentration.

B. Information on Proposed Discharge Pages: _____

i. Discharge Type:
☐Continuous ☐Seasonal ☑Intermittent

ii. Discharge Points and Receiving Waters:
See page 15

iii. Average Design Flow (identify MGD or MGY): See Page 15

iv. Identify Receiving Water: See Page 15

v. Location (township, range, and section): See Attached

vi. Effluent Limits:

Minimum Dissolved Oxygen: NA CBOD$_5$: NA

Ammonia: NA Phosphorus: NA

Total Inorganic Nitrogen (TIN) from groundwater permit: NA

vii. Will the proposed facility address documented total residual chlorine (TRC) violations?
☐Yes, proceed to question viii. ☑No

viii. Will the proposed improvements involve either dechlorination or an alternative disinfection technology (e.g., ultraviolet disinfection, ozonation) that eliminates the use of chlorine? ☑Yes ☐No

C. Existing Pre-Project CSO and SSO Discharges

UNKNOWN

Information must be provided for each outfall directly associated with the proposed project. Note that both tables must be completed for each discharge.

| Outfall Number | Receiving Stream | Location (township, range, section) | Estimated Overflow Volume (MG) for 1-year, 1-hour storm event |
|---|---|---|---|
| 001 | See page 16 | See Attached | |
| 002 | | | |
| 003 | | | |
| 004 | | | |
| 005 | | | |

| Outfall Number | Estimated Overflow Duration, in hours | Estimated Annual Overflow Volume (MG) | Tributary Residential Population |
|---|---|---|---|
| 001 | | | See page 16 |
| 002 | | | |
| 003 | | | |
| 004 | | | |
| 005 | | | |

D. Future Post-Project CSO and SSO Discharges

UNKNOWN

List each outfall from Section C. For outfalls which will cease to function as combined sewer outfalls upon the completion of this project, simply enter “Eliminated” under Receiving Stream. List any new outfalls (e.g., for a retention/treatment basin) created by this project and include its associated discharge data. Note that both tables must be completed for each discharge.

| Outfall Number | Receiving Stream | Location (township, range, section) | Estimated Overflow Volume (MG) for 1-year, 1-hour storm event |
|---|---|---|---|
| 001 | NO CHANGE | NO CHANGE | NO CHANGE |
| 002 | | | |
| 003 | | | |
| 004 | | | |
| 005 | | | |

| Outfall Number | Estimated Overflow Duration, in hours | Estimated Annual Overflow Volume (MG) | Detention Time Before Discharge for 1-year, 1-hour storm event |
|---|---|---|---|
| 001 | NO CHANGE | NO CHANGE | NO CHANGE |
| 002 | | | |
| 003 | | | |
| 004 | | | |
| 005 | | | |

**4. Improving Infrastructure – Wastewater Projects**

Check the following which apply to the proposed project. Pages:_____

☑ Proposed project is part of an approved Asset Management Program.

☐ The purpose of the proposed project is for regionalization of systems.

☑ The proposed project involves resiliency components (e.g., pumping or type of pumps, electrical systems, basement backup protection, etc.)

***The following items only apply to storm water projects.***

**5. Compliance – Storm Water Projects**

Is the applicant a Municipal Separate Storm Sewer System (MS4) permittee?

☐ Yes, permit number:_____ ☐ No

Has the applicant received a violation notice identifying violations related to at least one of the following MS4 permit requirements? ☐ Yes, select all that apply below ☐ No

☐ Illicit Discharge Elimination Program

☐ Post-Construction Stormwater Runoff Program

☐ Pollution Prevention and Good Housekeeping Program

☐ Total Maximum Daily Load (TMDL) Implementation Plan

Copy of violation notice. Page:_____

**6. Public Health – Storm Water Projects**

Does the project result in **all** the following? Pages:_____

☐ Reduced storm water runoff volume for small and large events.

☐ Treatment of the water quality volume.

☐ At least one of the following

- Addresses known flooding issue causing water quality problems or basement backups.
- The design considers projected precipitation for the service life of the project or an increase in precipitation above the current National Oceanic Atmospheric Administration (NOAA) Atlas 14 estimates.

**7. Water Quality – Storm Water Projects**

Is the project located in an applicable TMDL watershed (i.e., E. coli, biota/sediment, phosphorus, dissolved oxygen, or chloride)?

☐ Yes, TMDL(s) title:_____ ☐ No

Does the project result in a direct reduction of the pollutant(s) causing the TMDL impairment?

☐ Yes ☐ No Pages:_____

Does the project result in reduced storm water runoff volume as a primary focus of the project?

☐ Yes ☐ No Pages:_____

Identify all best management practices (BMPs) and estimate size/quantity of each in the project. Definitions of the BMPs below are included at the end of this document.

**Bioretention Basins** Pages:_____

Enter the quantity for each size bioretention basin included in the project.

Less than 0.5 acre:_____ 0.5-1.5 acres:_____ Greater than 1.5 acres:_____

**Rain Gardens** Pages:_____

Enter the quantity for each size rain garden included in the project.

Less than 300ft$^2$:_____ 300-1000ft$^2$:_____ Greater than 1000ft$^2$:_____

**Bioswales** Pages:_____

Enter the quantity for each size bioswale included in the project.

Less than 1 acre:_____ 1 – 3 acres:_____ Greater than 3 acres:_____

**Infiltration Trenches** Pages:_____

Enter the quantity for each size infiltration trench included in the project.

Less than 1 acre:_____ 1 – 5 acres:_____ Greater than 5 acres:_____

**Pervious Pavement** Pages:_____

Select the size of pervious pavement included in the project.

☐ Less than 1 acre ☐ 1 – 5 acres ☐ Greater than 5 acres

**Green Roofs** Pages:_____

Enter the quantity of green roofs included in the project:_____

**Native Revegetation** Pages:_____

Select the size area of native revegetation included in the project.

☐ Less than 1 acre ☐ 1 – 5 acres ☐ Greater than 5 acres

**Water Storage and Reuse** Pages:_____

Select the quantity of water storage and reuse included in the project.

☐ Less than 1,000 gallons ☐ 1,000 – 5,000 gallons ☐ Greater than 5,000 gallons

**Tree Cover** Pages:_____

Enter the quantity of trees planted as part of the project:_____

Does the project result in increased water quality treatment from an existing discharge?

☐ Yes ☐ No Pages:_____

Does the project result in disconnection of existing impervious surfaces with a quantifiable runoff volume reduction or water quality benefit?

☐ Yes, disconnection area:_____ ☐ No Pages:_____

Does the project result in a new or retrofitted regional BMP(s) to address known local site issues preventing full implementation of the NPDES MS4 post-construction requirements?

☐ Yes ☐ No Pages:_____

Does the regional BMP(s) serve more than one site/parcel?

☐ Yes, number of sites/parcels:_____ ☐ No

**8. Improving Infrastructure – Storm Water Projects**

Does the project result in implementation of a Stormwater Asset Management Program.

☐ Yes ☐ No Pages:_____

Does the project result in a water quality benefit from the coordination between two or more municipal agencies on stormwater management?

☐ Yes, list municipal entities benefiting from the project ☐ No Pages:_____

_____

_____

_____

**BMP Definitions:**

Bioretention Basins: Shallow, vegetated basins designed to infiltrate, treat, and temporarily store stormwater. Bioretention basins should be pretreated to optimize water quality performance.

Rain Gardens: Shallow surface depressions planted with native vegetation to capture and treat stormwater runoff. Rain gardens should be pretreated to optimize water quality performance.

Bioswales: Shallow, vegetated stormwater channels designed to slow down runoff and provide infiltration. Check dams may be included to improve performance and maximize infiltration.

Infiltration Trenches: Linear subsurface infiltration structures, typically composed of stone trenches wrapped with geotextile fabric, designed to provide infiltration and conveyance of stormwater.

Green Roof: Rooftops or constructed surfaces that include a thin covering of vegetation or growth media that enables infiltration and evapotranspiration of stormwater.

Native Revegetation: transitioning impervious or previously non-native turfgrass spaces to native plants. Native revegetated spaces may include forest, prairie, meadow, or constructed wetland.

Water Storage and Reuse: structures designed to intercept and store runoff from rooftops and other impervious spaces and allow for its reuse.

Tree Cover: Trees planted specifically for stormwater benefit purposes including stormwater uptake, storage, and evapotranspiration.

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# GLWA Facility Section Map Information

| Facility | Address | Section | | | | | Town | | Range | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WRRF | 9300 W. Jefferson Ave., Detroit, MI 48209 | | 0 | 1 | - | C | 2 | S | 1 | 1 | E |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Baby Creek | 9524 Dix Ave, Dearborn, MI 48120 | | 0 | 3 | - | D | 2 | 1 | 1 | 1 | E |
| Belle Isle | 2 Pleasure Dr, Detroit, MI 48207 | | 4 | 6 | - | H | 2 | 2 | 1 | 2 | E |
| Conner Creek | 11900 Freud St, Detroit, MI 48215 | | 5 | 4 | - | F | 1 | 3 | 1 | 3 | E |
| Hubbell-Southfield | 16540 Rotunda Dr, Dearborn, MI 48120 | | 1 | 2 | - | I | 2 | 0 | 1 | 0 | E |
| Leib | 2188 Mt Elliott St, Detroit, MI 48207 | | 4 | 7 | - | D | 2 | 2 | 1 | 2 | E |
| Oakwood | 12082 Pleasant St, Detroit, MI 48217 | | 7 | 2 | - | E | 2 | 1 | 1 | 1 | E |
| Puritan-Fenkell | 23673 Fenkell Ave, Detroit, MI 48223 | 1 | 2 | 0 | - | B | 1 | 0 | 1 | 0 | E |
| Seven Mile | 19272 Shiawassee Dr, Detroit, MI 48219 | 1 | 2 | 3 | - | E | 1 | 0 | 1 | 0 | E |
| Saint Autin | 2200 Atwater St, Detroit, MI 48207 | | 3 | 8 | - | E | 2 | 2 | 1 | 2 | E |

# Appendix D.4
# Fiscal Sustainability Plan Certification Form and Guidance

# Fiscal Sustainability Plan Certification Form

UNKNOWN

Describe SRF Project to be Funded: OR SRF Project Number _____

CSO Facilities Improvements II Project Plan

Check one box below:

☐ FSP does not apply because:

- ☐ The project is for a new treatment works system.
- ☐ The project involves an upgrade that does not involve repair/replacement or expansion of a treatment works system.
- ☐ The project is for nonpoint source work.
- ☐ Other (explain)

☒ FSP is complete for the SRF-funded project and is available for review by contacting:

_____
(Name) (Phone)

UNKNOWN

I certify that _____ has developed and implemented a plan that meets
(Applicant's Name)
the requirements of Section 603(d)(1)(E)(i) of the Water Resources Reform and Development Act of 2014. The FSP includes an inventory of critical assets, an evaluation of the condition and performance of inventoried assets, a plan for maintaining, repairing, and as necessary, replacing the treatment works, and a plan for funding such activities. The applicant also certifies that the water and energy conservation efforts have been evaluated and will be implemented.

_____
Name and Title of Authorized Representative *(Please Print or Type)*

_____
Signature of Authorized Representative Date

# Fiscal Sustainability Plan
# Guidance and Frequently Asked Questions (FAQ)

## Guidance

On June 10, 2014, President Obama signed into law the Water Resources Reform and Development Act of 2014 (WRRDA). Among its provisions are amendments to the Federal Water Pollution Control Act (FWPCA), which includes the administration of the Clean Water State Revolving Fund (SRF) program. The WRRDA requirement to complete and implement a fiscal sustainability plan (FSP) will be a new condition of the SRF loan agreement. Section 603(d)(1)(E) states that treatment works proposed for repair, replacement, or expansion must develop and implement an FSP that includes at a minimum 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.

All applicants who submit a Project Plan after October 1, 2014, will need to self-certify they are complying with the FSP requirement or that they are exempt. This FSP Certification form will need to be completed and submitted with the Part III Application.

Prior to final loan disbursement, a review of the FSP will be performed by DEQ staff. The DEQ visit will include a review and discussion of the asset inventory, evaluation of efforts to implement water and energy conservation efforts, and a brief overview of the plan to repair/replace/maintain and funding for those activities. See attachment for some examples of conservation activities.

## FAQs

**Q:** Does the FSP need to be system wide?

**A:** No, the FSP can pertain to only those assets that are a part of the SRF-financed project. For example, if the SRF project is on the collection system only, the FSP would only cover the collection system. The FSP does not need to contain treatment plant infrastructure.

**Q:** What is an FSP and when is it completed?

**A:** An FSP is very similar to an Asset Management Plan (AMP) and should be viewed as a 'living document' that is regularly reviewed, revised, and expanded. For this reason, there is no final deadline for FSP completion. However, in order to ensure compliance with this new statutory requirement, applicants must certify that they have created and implemented a FSP (containing the minimum components listed above). Applicants must include Items 1 and 2 above in their final SRF Project Plan submitted by July 1. Item 4 above should be included in the user charge/rate methodology submittal.

**Q**: Is the development of an FSP an eligible loan cost?

**A**: Yes, an applicant can request up to $2 million in loan funds to complete an FSP/AMP or to use towards the development/further development of its AMP. If an applicant is receiving

SAW funds for AMP development, SRF loan funds cannot be used for the same activities already included in its SAW grant. For example, if condition assessment activities for Districts A and B were included in a SAW grant, those same activities cannot be included in an SRF loan. However, condition assessment activities for District C can be included in the SRF loan. This request of AMP funds should be stated in the applicant's Project Plan.

**Q**: Do FSP's need to be submitted for review/approval?

**A**: No, FSPs do not need to be submitted for SRF purposes. DEQ staff may ask to review an applicant's FSP during a site visit or inspection. If loan funds are being used for the development of an FSP/AMP, Revolving Loan Section staff will ask to review the applicant's FSP/AMP during their final site visit.

**Q:** Who must complete an FSP?

**A:** An FSP is required for any applicant that is seeking SRF funding for treatment works proposed for repair, replacement, or expansion. FSP's are not required for new treatment works (there is no existing system) or for nonpoint source projects.

**Q:** I have a SAW grant for AMP development; what do I need to do?

**A:** You must still complete the certification form and submit it with your SRF Part III Application as well as including the FSP minimum Items 1 and 2 (on the previous page) with your final Project Plan, and Item 4 with your rate methodology submittal.

**Q:** Are energy and water conservation tasks considered eligible loan activities?

**A:** Yes, loan eligible activities include energy and water assessments and audits.

**Q:** What type of energy and water conservation activities can be reviewed and implemented by an applicant?

**A:** Applicants can find several conservation resources noted in Appendix I.

**Q:** Can an applicant apply for just a $2 million loan for asset management development?

**A:** No, the applicant must still have an eligible SRF construction project (i.e., address a water quality problem) to receive the $2 million for asset management program development.

# Water and Energy Conservation Examples for a Wastewater Treatment Facility

Applicant's that accept SRF assistance must certify that they evaluated and will be implementing water and energy conservation efforts as part of their fiscal sustainability plan. Below are some examples of water and energy conservation efforts that can be evaluated and used to fulfill this requirement:

**Energy Conservation:**

1. Improve efficiency of aeration equipment: Aeration systems in wastewater plants account for about half of a wastewater treatment plant's energy use. Improved system controls, energy-efficient blowers, and energy-efficient diffuser technologies can reduce costs.
2. Biogas utilization: Biogas recovered from sludge digesters can be burned to produce electricity and heat buildings at the facility. Biogas can also be used to fuel microturbines – an innovative way to generate power using rotational energy.
3. Improve pumping efficiency: Ensure that pumps are sized appropriately and install variable frequency drives that allow speed variations to match flow conditions.
4. Improve efficiency of HVAC and lighting: Replace light fixtures and light bulbs with high efficiency models. Retrofitting HVAC with a more efficient system will have a high initial cost but can reduce energy use by 10-40 percent, generally making it cost-effective over the life of the investment.
5. Improve efficiency of operations: Installing Supervisory Control and Data Acquisition (SCADA) software can increase the efficiency of process monitoring and operational control.

**Water Conservation:**

1. Plant effluent water system: A plant effluent water system can be utilized to recycle effluent water to wastewater treatment plant systems that normally use treated potable water.
2. Reclaimed water for irrigation: During the summer months, reclaimed water can be used to irrigate lawns and landscaping rather than potable water.
3. Reclaimed water for industrial use: Traditionally, pulp and paper facilities, textile facilities, and other facilities using reclaimed water for cooling tower purposes.

Additional information can be found by searching for water and energy conservation methods on the Environmental Protection Agency's website (www.epa.gov/).

Compiled by: Revolving Loan Section, Michigan Department of Environmental Quality
*March 2015*

# APPENDIX I

## Supplemental Information for Implementing Section 603(d)(1)(E)(i)(III)

Under Section 603(d)(1)(E)(i)(III) of the Federal Water Pollution Control Act, as amended, a recipient of a Clean Water State Revolving Fund (CWSRF) loan for "repair, replacement, or expansion" of a treatment works must certify that it has evaluated and will be implementing water and energy conservation efforts as part of its fiscal sustainability plan. As stated in *Interpretive Guidance for Certain Amendments in the Water Resources Reform and Development Act to Titles I, II, V and VI of the Federal Water Pollution Control Act*, the Environmental Protection Agency recommends that the CWSRFs evaluate whether a recipient has selected, to the maximum extent practicable, water and energy efficient approaches in the selected project.

### Energy Conservation

One example of how CWSRFs can evaluate the energy portion of the certification is to use information developed by the recipient through energy assessments and audits. Energy assessments help utilities identify the amount of energy being used in various aspects of its operations. Energy audits, in turn, allow utilities to identify and prioritize projects that will result in operational and capital improvements to their infrastructure and operations, cost savings, and other climate-related benefits like reductions in greenhouse gas emissions and the use of renewable energy. EPA encourages CWSRFs to promote the use of these proven and objective methods by CWSRF borrowers.

Energy Use Assessments

A number of tools are available to help utilities conduct energy assessments, including:

- **EPA's Energy Use Assessment Tool—**this is a free Excel-based tool that can be downloaded and is specifically designed for small and medium sized wastewater and water utilities. It enables utilities to analyze their current energy bills and analyze energy consumption for major pieces of equipment. It also allows the utility to develop a printable summary report outlining current energy consumption and costs, generate graphs depicting energy use over time, and highlight areas of potential improvement in energy efficiency. It is available at http://water.epa.gov/infrastructure/sustain/energy_use.cfm.
- **NYSERDA Energy Benchmarking Tool—**The New York State Energy Research and Development Agency (NYSERDA) has developed a tool to help wastewater utilities assess and benchmark their current energy usage, along with a number of other useful self-audit checklists, available at http://www.nyserda.ny.gov/Energy-Efficiency-and-Renewable-Programs/Commercial-and-Industrial/Sectors/Municipal-Water-and-Wastewater.aspx.

Energy Audits

Energy audits can be broadly characterized according to the following three levels:

- Level 1 (Walk Through Audits)
  - Generally last several hours at the facility
  - Usually result in suggestions for low cost improvements in areas like HVAC or lighting
- Level 2 (Energy Survey and Analysis Audits)
  - One or two days in duration, plus additional time to review energy bills, etc.
  - In addition to HVAC/lighting recommendations, usually result in recommendations for equipment upgrades in existing processes (e.g., variable frequency drives, more efficient motors, etc.)
- Level 3 (Process Energy Audit)
  - One or more days at the facility, time to analyze energy bills and pump curves, and time for additional data gathering
  - Audit covers energy use in both existing and alternative processes, potential design modifications, and optimization of processes and equipment
  - Audit suggestions covered detailed operational and process suggestions for both short-term and long-term payback periods as well as capital intensive projects that may require outside funding
  - Most likely to result in significant savings

EPA hosted a webinar in August 2014 describing a number of energy assessment and audit tools available to states and potential recipients of CWSRF funding. The webinar slides are available at http://water.epa.gov/infrastructure/sustain/upload/NRWA-Energy-Audits-for-Small-Utilities-8-4-14.pdf.

Tool available to help wastewater utilities obtain or conduct energy audits include:

- **EPA's Energy Use Assessment Tool**—described in more detail above. Available at http://water.epa.gov/infrastructure/sustain/energy_use.cfm.

Both energy assessments and audits are eligible for funding under the CWSRF, and a number of organizations can help utilities with these activities, including:

- State Energy Offices (http://www.naseo.org/members-states)
- Electric utilities serving wastewater utilities (http://www.dsireusa.org/)

- Technical assistance providers like the National Rural Water Association, RCAP, and others
- Department of Energy Industrial Assessment Centers (http://energy.gov/eere/amo/industrial-assessment-centers-iacs).

## Water Conservation

Water conservation includes efficiency and reuse efforts to not only conserve our raw water supply, but to also reduce flow to wastewater treatment plants. Therefore, one way CWSRF borrowers can fulfill the water conservation requirement is to consider alternative or complementary projects that result in reduced wastewater flows and therefore reduce a treatment works' capacity needs. There are a number of water conservation projects borrowers can consider, including:

- **Water Reuse—**recycling and water reuse projects that replace potable sources with non-potable sources
  - Gray water, condensate, and wastewater effluent reuse systems
  - Extra treatment costs and distribution pipes associated with water reuse

- **Water Efficient Devices—**installing or retrofitting water efficient devices, such as plumbing fixtures and appliances
  - Shower heads, faucets, toilets, urinals, etc.
  - Education and incentive programs to conserve water such as rebates

- **Water Meters—**installing any type of water meter in a previously unmetered area, or replacing existing broken/malfunctioning water meters or upgrading them if rate structure is based on metered use

- **Water Audits and Conservation Plans—**performing audits of entire utilities or individual users (e.g., large corporations) to assess the amount of water being consumed, the need for retrofits, etc.

Utilities can also fulfill this requirement by considering water conservation projects that are not CWSRF eligible.

Water Efficiency Tools

Tools are readily available to help utilities determine how much water is being conserved, including:

- **EPA's WaterSense Program—**Tools and resources to promote water efficiency are available at http://www.epa.gov/watersense/. States, local governments, and utilities can partner with WaterSense to get access to additional tools and resources to help them design and implement water efficiency and conservation programs. Partnership is free.

- **EPA's Water Conservation Plan Guidelines—**Helpful recommendations to utilities for creating and implementing a Water Conservation Plan, depending on the size of the population served by the utility, available at http://epa.gov/watersense/water-conservation-plan-guidelines.

- **AWWA Water Audit Software—**Free software specifically designed to help utilities perform water audits, to help quantify and track water losses, and determine areas for improved efficiency. Available at http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx.

- **AWE Water Conservation Tracking Tool—**A tool to evaluate water savings, costs, and benefits of conservation programs for a specific water utility, available to AWE members at http://www.allianceforwaterefficiency.org/tracking-tool.aspx.

- Many states have guidelines and example plans to help utilities develop water conservation plans. For example:

    - **TWDB Water Conservation Plan—**Texas Water Development Board has developed a set of guidelines, tutorials, and example plans to help utilities create a water conservation plan that can be adopted and utilized by different entities. Available at http://www.twdb.texas.gov/conservation/municipal/plans/.

# Appendix D.5
# Qualifications-Based Selections (QBS) Form

# QBS Certification Form

## Procurement of Architectural and Engineering Services

Project Name: CSO Facilities Improvements II Project Plan

SRF Project Number: UNKNOWN

Per Section 602(b)(14) of the Federal Water Pollution Control Act (FWPCA), all architectural/ engineering contracts executed after October 1, 2014, must publicly announce all requirements for architectural and engineering services for State Revolving Fund projects and negotiate contracts for those services using the Qualifications-Based Selection process. **Attach the Request for Qualifications advertisement.**

Please list the firms that responded to the Request for Qualifications.

_____

_____

_____

_____

_____

_____

Select one of the following:

☐ I certify to the best of my knowledge that the above referenced project complies with the requirements of Section 602(b)(14) of FWPCA.

If fewer than three firms responded to the Request for Qualifications, describe the efforts taken to publicly advertise and directly solicit participation:

_____

_____

_____

_____

☐ Compliance with Section 602(b)(14) of FWPCA is not required as all architectural and engineering work was performed in-house, or for the reasons listed below:

_____

_____

_____

_____

_____

Name and Title of Authorized Representative *(Please Print or Type)*

_____

Signature of Authorized Representative Date

# Appendix E.
# Regulatory Compliance Documents

# Appendix E.1
# NPDES Discharge Permit

# GLWA NPDES Discharge Permit

# PERMIT NO. MI0022802

# *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 2011-1,

**City of Detroit Water and Sewerage Department**
735 Randolph
Detroit, MI 48226

and

**Great Lakes Water Authority**
735 Randolph
Detroit, MI 48226

are authorized to discharge from the **Great Lakes Water Authority Water Resource Recovery Facility** located at

9300 W. Jefferson
Detroit, MI 48209

designated as **GLWA WRRF**

to the receiving water named the Detroit River and the Rouge River, and from combined sewer overflow facilities to the receiving waters named the Detroit River, the Rouge River, and Conner Creek 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 29, 2017 and amended through May 25, 2017.

**This permit takes effect on July 18, 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. MI0022802 (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 permittees 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:** June 28, 2019. This permit was modified (minor) on July 18, 2019.

Original signed by Christine Alexander
Christine Alexander, Manager
Permits Section
Water Resources Division

## PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the NREPA, the permittees 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 permittees shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

**Annual Permit Fee Classification:** Municipal Major, 500 MGD or greater (IP)

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

## CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Southeast Michigan District Office of the Water Resources Division. The Southeast Michigan District Office is located at 27700 Donald Court, Warren, MI, 48092-2793, Telephone: 586-753-3700, Fax: 586-751-4690.

## 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. Effluent Limitations, Monitoring Point 049F

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittees are authorized to discharge treated municipal wastewater from Monitoring Point 049F through Outfall 049 (DRO). Outfall 049 (DRO) discharges to the Detroit River. Such discharge shall be limited and monitored by the permittees as specified below.

Until the initiation of operation of the Rouge River Outfall (RRO) Disinfection Project, this discharge shall consist of secondary treated municipal wastewater and additional primary treated municipal wastewater up to the hydraulic capacity of Outfall 049 (DRO). After initiation of operation of the RRO Disinfection Project, this discharge shall consist of secondary treated municipal wastewater typically, but primary treated municipal wastewater and additional secondary treated municipal wastewater up to the hydraulic capacity of Outfall 049 (DRO) during wet weather events. During such wet weather events, the permittees are approved to discharge primary treated municipal wastewater from 049A thorough Outfall 049 (DRO).

Whenever Outfall 049 (DRO) is out of service for repairs, the permittees may discharge through Outfall 050 (RRO). All effluent authorized for discharge from Outfall 049F, and the monitoring, limitations and other requirements specified below shall apply to the discharge through Outfall 050 (RRO) unless otherwise specified. At least 10 days in advance of scheduled maintenance and within 24-hours after initiation of diversion due to emergency conditions, the permittees shall notify the Department of the reason for the diversion and the expected duration of the diversion.

| | 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 |
| Fecal Coliform Bacteria | --- | --- | --- | --- | 200 | 400 | (report) | cts/100 ml | Daily | Grab |
| Total Residual Chlorine | --- | --- | --- | --- | --- | --- | 0.11 | mg/l | Daily | Grab |
| Oil & Grease | --- | --- | --- | --- | --- | 15 | (report) | mg/l | Daily | Grab |
| Polychlorinated Biphenyls (PCBs) | | | | | | | | | | |
| PCB Aroclor 1016 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1221 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1232 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1242 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1248 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1254 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1260 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| | | | | | **Maximum PCB Aroclor** | | | | | |
| PCB Aroclor (see I.A.1.g.) | | --- | --- | --- | <0.1 | --- | --- | µg/l | Monthly | See I.A.1.g. |
| Acute Toxicity | --- | --- | --- | --- | --- | --- | (report) | $TU_A$ | Quarterly | 24-Hr Composite |
| Carbonaceous Biochemical Oxygen Demand (CBOD5) | | | | | | | | | | |
| | --- | --- | (report) | lbs/day | --- | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Ammonia Nitrogen (as N) | | --- | (report) | lbs/day | (report) | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Available Cyanide | --- | --- | (report) | lbs/day | --- | --- | (report) | µg/l | Monthly | Grab |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Perfluorooctane sulfonate (PFOS) | (report) | --- | (report) | lbs/day | (report) | --- | (report) | ng/l | Quarterly | Grab |
| Perfluorooctanoic acid (PFOA) | (report) | --- | (report) | lbs/day | (report) | --- | (report) | µg/l | Quarterly | Grab |
| Total Copper | --- | --- | (report) | lbs/day | --- | --- | (report) | µg/l | Quarterly | 24-Hr Composite |
| | | | | | **Minimum Daily** | | **Maximum Daily** | | | |
| pH | --- | --- | --- | --- | 6.0 | --- | 9.0 | S.U. | Daily | Grab |
| Dissolved Oxygen | --- | --- | --- | --- | (report) | --- | --- | mg/l | Daily | Grab |

The following design flow was used in determining the above limitations, but is not to be considered a limitation or actual capacity: a combined 930 MGD of secondary treated effluent.

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
The sampling locations for the pollutants indicated in Part I.A.1. of this permit shall be representative of the effluent and consistent with the locations approved by the Department. The Department may approve alternate sampling locations that are demonstrated by the permittees 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 permittees 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 permittees shall enter "*G" on the Discharge Monitoring Report (DMR).

d. Total Residual Chlorine (TRC)
Compliance with the TRC limit shall be determined on the basis of one or more grab samples. If more than one (1) sample per day is taken, the additional samples shall be collected in near equal intervals over approximately eight (8) hours. The samples shall be analyzed immediately upon collection and the average reported as the daily concentration. Samples shall be analyzed in accordance with Part II.B.2. of this permit.

e. Monitoring Frequency Reduction for Perfluorooctane Sulfonate (PFOS) and/or Perfluorooctanoic Acid (PFOA)
After the submittal of 24 months of data, the permittee may request, in writing, Department approval of a reduction in monitoring frequency for PFOS and/or PFOA. This request shall contain an explanation as to why the reduced monitoring is appropriate. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency indicated in Part I.A.1. of this permit. The monitoring frequency for PFOS and/or PFOA, shall not be reduced to less than annually. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

f. Analytical Methods and Quantification Levels for Available Cyanide and Total Copper
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Available Cyanide shall be in accordance with EPA Method OIA-1677. The quantification level for Available Cyanide and Total Copper shall be 2.0 µg/l and 1.0 µg/l respectively unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval from the

Department, the permittees may use alternate analytical methods (for parameters with methods specified in Title 40 of the Code of Federal Regulations (CFR), Part 136, the alternate methods are restricted to those listed in 40 CFR, Part 136).

g. Limits Below the Quantification Level – Total Polychlorinated Biphenyls (PCBs)
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Total PCBs shall be in accordance with EPA Method 608.3. Upon approval from the Department, the permittees may use alternate analytical methods (for parameters with methods specified in 40 CFR, Part 136, the alternate methods are restricted to those listed in 40 CFR, Part 136). The quantification level shall be 0.1 ug/l unless a higher level is appropriate because of sample matrix interference. Justification for a higher quantification level shall be submitted to the Department within 30 days of such determination.

The water quality-based effluent limitation for Total PCBs is $2.6x10^{-5}$ µg/l ($2.0x10^{-4}$ lbs/day) maximum monthly average. This is less than the quantification level. Control requirements are therefore established consistent with R 323.1213. **The discharge of any individual aroclor at or above the quantification level of 0.1 ug/l is a specific violation of this permit**. If concentrations of all aroclors representing a monitoring period are less than their quantification levels, the permittees will be considered to be in compliance with the permit for the monitoring period that the analyses represent, provided that the permittees are also in full compliance with the Pollutant Minimization Program for Total PCBs set forth in Part I.A.10 of this permit. For the purpose of reporting on the Daily tab of the DMR, individual aroclor results less than the quantification level shall be reported as "<0.1." For the purpose of reporting on the Summary tab of the DMR, the value reported under PCB Aroclor shall be the highest aroclor concentration observed during the monitoring period. This permit condition does not authorize the discharge of PCBs at levels that are injurious to the designated uses of the waters of the state or that constitute a threat to the public health or welfare.

h. Acute Toxicity Requirements
Test species shall include *Ceriodaphnia dubia*. Testing and reporting procedures shall follow procedures contained in EPA-821-R-02-012, “Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms” (Fifth Edition). When the effluent ammonia nitrogen (as N) concentration is greater than 5 mg/l, the pH of the toxicity test shall be maintained at the pH of the effluent at the time of sample collection. The acute toxic unit ($TU_A$) value for **each species tested** shall be reported on the DMR. For **each species not tested**, the permittees shall enter **"*W"** on the DMR. Completed toxicity test reports for each test conducted shall be retained by the permittees in accordance with the requirements of Part II.B.5. of this permit and shall be available for review by the Department upon request. 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 Department will review the toxicity data submitted by the permittees to determine if the acute toxicity requirements of R 323.1219 are being satisfied.

1) If the data indicate persistent exceedance of the acute toxicity requirements of R 323.1219, upon written notification by the Department, the following conditions apply. Within 90 days of the above notification, the permittees shall implement a Toxicity Reduction Evaluation (TRE). The objective of the TRE shall be to reduce the toxicity of the final effluent from Monitoring Point 049F to <3.0 $TU_A$ within three (3) years of notification. The following documents are available as guidance to reduce toxicity to acceptable levels: Phase I, EPA/600/6-91/003; Phase II, EPA/600/R-92/080; Phase III, EPA/600/R-92/081; and Publicly Owned Treatment Works, EPA/833B-99/002. The tests shall be conducted and reported as specified above. Upon approval from the Department, the acute toxicity tests may be performed using the more sensitive species identified in the acute toxicity database. If a more sensitive species cannot be identified, the acute toxicity tests shall be performed with both species. Annual progress reports shall be submitted to the Department within 30 days of the completion of the last test of each annual cycle.

2) This permit may be modified in accordance with applicable laws and rules to include additional whole effluent toxicity control requirements as necessary.

## 2. Effluent Limitations, Monitoring Point 049A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittees are approved to discharge treated municipal wastewater and treated storm water runoff from Monitoring Point 049A through Outfall 049 (DRO). Outfall 049 (DRO) discharges to the Detroit River. Such discharge shall be limited and monitored by the GLWA as specified below.

Monitoring Point 049A is a primary treated effluent conduit. There shall be no discharge from Monitoring Point 049A directly to the Detroit River through Outfall 049 (DRO) unless the discharge from Monitoring Point 049B exceeds a peak hourly flow of 930 MGD (which includes recycle) or in accordance with an approved GLWA Wet Weather Operational Plan (see Part I.A.11.). Discharges from Monitoring Point 049A shall be limited and monitored by the permittees as specified below.

| | Maximum Limits for Quantity or Loading | | | Maximum Limits for Quality or Concentration | | | Monitoring | Sample |
|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Monthly** | **Daily** | **Units** | **Monthly** | **Daily** | **Units** | **Frequency** | **Type** |
| Flow | (report) | (report) | MGD | --- | --- | --- | Daily | Report Total Daily Flow |
| Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | --- | --- | --- | 40 | (report) | mg/l | Daily | 24-Hr Composite |
| Total Suspended Solids | --- | --- | --- | 70 | (report) | mg/l | Daily | 24-Hr Composite |
| Total Phosphorus (as P) | --- | --- | --- | 1.5 | (report) | mg/l | Daily | 24-Hr Composite |
| Ammonia Nitrogen (as N) | --- | --- | --- | (report) | (report) | mg/l | Daily | 24-Hr Composite |
| Total Mercury | | | | | | | | |
| – Corrected | (report) | (report) | lbs/day | (report) | (report) | ng/l | 2x Monthly | Calculation |
| – Uncorrected | --- | --- | --- | --- | (report) | ng/l | 2x Monthly | Grab |
| – Field Duplicate | --- | --- | --- | --- | (report) | ng/l | 2x Monthly | Grab |
| – Field Blank | --- | --- | --- | --- | (report) | ng/l | 2x Monthly | Preparation |
| – Laboratory Method Blank | --- | --- | --- | --- | (report) | ng/l | 2x Monthly | Preparation |

| | 12-Month Rolling Average | | | | 12-Month Rolling Average | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Mercury | 0.19 | --- | --- | lbs/day | 25 | --- | --- | ng/l | Monthly | Calculation |

a. Sampling Locations
The sampling locations for the pollutants in Part 1.A.2. of this permit shall be representative of the effluent and consistent with the locations approved by the Department. Samples for CBOD5, Total Suspended Solids, Ammonia Nitrogen, Total Mercury, and Total Phosphorus shall be taken prior to mixing with other waste streams. The Department may approve alternate sampling locations that are demonstrated by the permittees to be representative of the effluent

b. Sampling of Short-Term Wet Weather Events
If the first calendar day of the discharge event through Monitoring Point 049A includes less than three hours of flow but continues into the next calendar day, the sampling can be included as a part of the subsequent event the following day.

c. 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 month is less than or equal to the LCA, the GLWA will be considered to be in compliance for total mercury for that month, provided the GLWA is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.10. of this permit.

The permittee may choose to demonstrate that an alternate site-specific LCA is appropriate and request a permit modification. Such request and supporting documentation shall be submitted in writing to the Department. Supporting documentation shall include a minimum of 12 samples taken over 12-month period in accordance with EPA Method 1631. Upon approval, this permit may be modified in accordance with applicable laws and rules to incorporate the alternate site-specific LCA as the effluent limitation for Total Mercury.

After a minimum of 12 monthly data points have been collected, the permittees may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittees may reduce the monitoring frequency for total mercury indicated in Part I.A.2. of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittees.

d. 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 permittees 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 permittees 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 permittees 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 permittees 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 permittees 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.

## 3. Effluent Limitations, Monitoring Point 049B

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittees are authorized to discharge treated municipal wastewater from Monitoring Point 049B through Outfall 049 (DRO), or through Outfall 050 (RRO) when there is reduced hydraulic capacity through DRO or during wet weather, once the RRO Disinfection Project is completed. Outfall 049 (DRO) discharges to the Detroit River. Outfall 050 (RRO) discharges to the Rouge River. In addition, the permittees are authorized to discharge treated municipal wastewater from Monitoring Point 049B through Outfall 050 to the Rouge River as provided in Part I.A.4.

Outfall 049B is the combined secondary treated effluent conduit for all dry weather flows and all wet weather flows up to and including a peak hourly flow of 930 MGD (which includes recycle).

Discharges from Monitoring Point 049B shall be limited and monitored by the permittees 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 |
| (This flow measurement is all secondary flow minus recycle and buffer flows) | | | | | | | | | | |
| Recycled Flow (Screened Final Effluent) | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily SFE Flow |
| Buffer Flow | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily Flow |
| Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | 194,000 | 310,000 | (report) | lbs/day | 25 | 40 | (report) | mg/l | Daily | 24-Hr Composite |
| Total Suspended Solids | 233,000 | 349,000 | (report) | lbs/day | 30 | 45 | (report) | mg/l | Daily | 24-Hr Composite |
| Ammonia Nitrogen (as N) | | --- | --- | --- | (report) | --- | (report) | mg/l | Daily | 24-Hr Composite |
| 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 Average** | | | | **12 Month Rolling Average** | | | | | |
| Total Mercury | 0.023 | --- | --- | lbs/day | 3.0 | --- | --- | ng/l | Monthly | Calculation |
| | | | | | **Minimum Daily** | | **Maximum Daily** | | | |
| pH | --- | --- | --- | --- | 6.0 | | 9.0 | S.U. | Daily | Grab |
| Total Phosphorus (as P) | 5400 | --- | (report) | lbs/day | 0.7 | --- | (report) | mg/l | Daily | 24-Hr Composite |
| | **Six Month Average (April - Sept.)** | | | | **Six Month Average (April - Sept.)** | | | | | |
| Total Phosphorus | 4600 | --- | --- | lbs/day | 0.6 | --- | --- | mg/l | (see I.A.3.c) | Calculation |

| | | | | **Minimum** **Monthly** | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $CBOD_5$ Minimum % Removal | --- | --- | --- | 85 | --- | (report) | % | Monthly | Calculation |
| Total Suspended Solids Minimum % Removal | | | --- | 85 | --- | (report) | % | Monthly | Calculation |

a. Sampling Locations
Samples for $CBOD_5$, Total Suspended Solids, Ammonia Nitrogen, Total Phosphorus, Total Mercury and pH shall be taken prior to mixing with other waste streams. Samples for pH shall be collected only during periods of discharge from Monitoring Point 049A through Outfall 049 (DRO).

b. Percent Removal Requirements
These requirements shall be calculated based on the monthly (30-day) effluent CBOD5 and TSS concentrations and the monthly influent concentrations for approximately the same period.

c. Total Phosphorus Six Month Average Limit (April - September)
The six month average shall be determined by adding the six monthly average results from April through September and dividing the sum by six. For the purpose of reporting on the Discharge Monitoring Reports, the permittees shall calculate and report the six month average on the October Discharge Monitoring Report.

d. 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).

e. 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 month is less than or equal to the LCA, the permittees will be considered to be in compliance for total mercury for that month, provided the permittees are also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.10. of this permit.

The permittee may choose to demonstrate that an alternate site-specific LCA is appropriate and request a permit modification. Such request and supporting documentation shall be submitted in writing to the Department. Supporting documentation shall include a minimum of 12 samples taken over 12-month period in accordance with EPA Method 1631. Upon approval, this permit may be modified in accordance with applicable laws and rules to incorporate the alternate site-specific LCA as the effluent limitation for Total Mercury.

After a minimum of 12 monthly data points have been collected, the permittees may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittees may reduce the monitoring frequency for total mercury indicated in Part I.A.3. of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittees.

f. 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 permittees 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 permittees 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 permittees 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 permittees 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 permittees 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.

## 4. Interim Effluent Limitations, Monitoring Point 050A

During the period beginning on the effective date of this permit and lasting until initiation of operation of the RRO Disinfection Project, the permittees are approved to discharge treated municipal wastewater and treated storm water runoff from Monitoring Point 050A through Outfall 050 (RRO). Normally, the discharge may consist of only primary treated effluent when the discharge is necessary due to hydraulic constraints resulting from wet weather events. There shall be no discharge from Monitoring Point 050A unless the discharge from Monitoring Point 049B exceeds a peak hourly flow of 930 MGD (which includes recycle) or in accordance with an approved GLWA WRRF Wet Weather Operational Plan (see Part I.A.11.). Discharge from Outfall 050 (RRO) is not allowed unless hydraulically or structurally necessary. Outfall 050 (RRO) discharges to the Rouge River.

Other options for discharge from Outfall 050 include, 1) when Outfall 049 (DRO) is out-of-service, the discharge may consist of secondary or secondary and primary treated wastewater, 2) when Outfall 049 (DRO) has reduced hydraulic capacity the discharge may consist of secondary or secondary and primary treated wastewater, and 3) when there is department approved limited secondary capacity when Outfall 049 cannot be used due to construction, the discharge may consist of secondary or secondary and primary treated wastewater. Discharges from Monitoring Point 050A shall be limited and monitored by the permittees 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** |
| Limitations and monitoring requirements in effect when Outfall 049 is out-of-service and prior to initiation of operation of the RRO Disinfection Project: | | | | | | | | | | |
| All limitations and monitoring specified in Part I.A.1. apply except for the Available Cyanide monitoring requirement, Total Residual Chlorine requirement, and the Fecal Coliform Bacteria limitations, which are replaced with the limitations and monitoring requirements specified below with the Total Residual Chlorine monitoring and limitation removed: | | | | | | | | | | |
| Available Cyanide | --- | --- | --- | --- | --- | --- | 89 | µg/l | Daily | Grab |
| Fecal Coliform Bacteria | --- | --- | --- | --- | (report) | (report) | --- | cts/100 ml | Daily | Grab |

a. Sampling of Short-Term Wet Weather Events
If the first calendar day of the discharge event through Monitoring Point 050A includes less than three hours of flow but continues into the next calendar day, the sampling can be included as a part of the subsequent event the following day.

## 4. Interim Effluent Limitations, Monitoring Point 050A (continued)

| Parameter | Maximum Limits for Quantity or Loading: Monthly | 7-Day | Daily | Units | Maximum Limits for Quality or Concentration: Monthly | 7-Day | Daily | Units | Monitoring Frequency | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Limitations and monitoring requirements in effect during other periods of discharge from Monitoring Point 050A and prior to Initiation of operation of the RRO Disinfection Project: | | | | | | | | | | |
| Flow | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily Flow |
| Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | --- | --- | --- | --- | 40 | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Total Suspended Solids | --- | --- | --- | --- | 70 | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Total Phosphorus (as P) | --- | --- | --- | --- | 1.5 | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Available Cyanide | --- | --- | --- | --- | --- | --- | 89 | µg/l | Daily | Grab |
| Fecal Coliform Bacteria | --- | --- | --- | --- | (report) | --- | (report) | cts/100 ml | Daily | Grab |
| Ammonia Nitrogen (as N) | | --- | --- | --- | (report) | --- | (report) | mg/l | Daily | 24-Hr Composite |
| Total Copper | --- | --- | --- | --- | --- | --- | (report) | µg/l | Daily | 24-Hr Composite |
| Polychlorinated Biphenyls (PCBs) | | | | | | | | | | |
| PCB Aroclor 1016 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1221 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1232 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1242 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1248 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1254 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1260 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| | | | | | **Maximum PCB Aroclor** | | | | | |
| PCB Aroclor (see I.A.4.e.) | | --- | --- | --- | (report) | --- | --- | µg/l | Monthly | See I.A.4.e. |
| | | | | | **Minimum Daily** | | **Maximum Daily** | | | |
| pH | --- | --- | --- | --- | 6.0 | | 9.0 | S.U. | Daily | Grab |
| Dissolved Oxygen | --- | --- | --- | --- | (report) | | --- | mg/l | Daily | Grab |

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
The sampling locations for the pollutants in Part 1.A.4. of this permit shall be representative of the effluent and consistent with the locations approved by the Department. The Department may approve alternate sampling locations that are demonstrated by the GLWA to be representative of the effluent.

c. Sampling of Short-Term Wet Weather Events
If the first calendar day of the discharge event through Monitoring Point 050A includes less than three hours of flow but continues into the next calendar day, the sampling can be included as a part of the subsequent event the following day.

d. Analytical Methods and Quantification Levels for Available Cyanide and Total Copper
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Available Cyanide shall be in accordance with EPA Method OIA-1677. The quantification levels for Available Cyanide and Total Copper shall be 2.0 µg/l and 1.0 µg/l respectively unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval of the Department, the permittees may use alternate analytical methods (for parameters with methods specified in 40 CFR 136, the alternate methods are restricted to those listed in 40 CFR 136).

e. Limits Below the Quantification Level – Total Polychlorinated Biphenyls (PCBs) The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Total PCBs shall be in accordance with EPA Method 608.3. Upon approval from the Department, the permittees may use alternate analytical methods (for parameters with methods specified in 40 CFR, Part 136, the alternate methods are restricted to those listed in 40 CFR, Part 136). The quantification level shall be 0.1 ug/l unless a higher level is appropriate because of sample matrix interference. Justification for a higher quantification level shall be submitted to the Department within 30 days of such determination.

For the purpose of reporting on the Daily tab of the DMR, individual aroclor results less than the quantification level shall be reported as "<0.1." For the purpose of reporting on the Summary tab of the DMR, the value reported under PCB Aroclor shall be the highest individual aroclor concentration observed during the monitoring period. This permit condition does not authorize the discharge of PCBs at levels that are injurious to the designated uses of the waters of the state or that constitute a threat to the public health or welfare.

# 5. Final Effluent Limitations, Monitoring Point 050A

Upon initiation of operation of the RRO Disinfection Project, the permittees are approved to discharge secondary treated municipal wastewater and primary treated municipal wastewater when hydraulically necessary from Monitoring Point 050A through Outfall 050 (RRO). Outfall 050 (RRO) discharges to the Rouge River. Discharge from Outfall 050 (RRO) is approved when the hydraulic capacity of Outfall 049 (DRO) is not sufficient to meet the approved GLWA wet weather operational plan (see Part I.A.11.). Such discharge shall be limited and monitored by the permittees 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 |
| Available Cyanide | --- | --- | --- | --- | --- | --- | 44 | µg/l | Daily | Grab |
| Total Copper | --- | --- | --- | --- | --- | --- | (report) | µg/l | Monthly | 24-Hr Composite |
| Fecal Coliform Bacteria | --- | --- | --- | --- | 200 | 400 | (report) | cts/100 ml | Daily | Grab |
| Total Residual Chlorine | --- | --- | --- | --- | --- | --- | 38 | µg/l | Daily | Grab |
| Oil & Grease | --- | --- | --- | --- | --- | 15 | (report) | mg/l | Daily | Grab |
| Total Polychlorinated Biphenyls (PCBs) | | | | | | | | | | |
| PCB Aroclor 1016 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1221 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1232 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1242 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1248 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1254 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| PCB Aroclor 1260 | --- | --- | --- | --- | --- | --- | (report) | µg/l | Weekly | 24-Hr Composite |
| | | | | | **Maximum PCB Aroclor** | | | | | |
| PCB Aroclor (See I.A,5.f.) | | --- | --- | --- | <0.1 | --- | --- | µg/l | Monthly | See I.A.5.f. |
| | | | | | **Minimum Daily** | | **Maximum Daily** | | | |
| pH | --- | --- | --- | --- | 6.0 | --- | 9.0 | S.U. | Daily | |
| Dissolved Oxygen | --- | --- | --- | --- | 3.0 | --- | --- | mg/l | Daily | Grab |

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. Sampling Locations
The sampling locations for the pollutants in Part I.A.5. of this permit shall be representative of the effluent and consistent with the locations approved by the Department. The Department may approve alternate sampling locations that are demonstrated by the permittees to be representative of the effluent.

c. Sampling of Short-Term Wet Weather Events
If the first calendar day of the discharge event includes less than three hours of flow but continues into the next calendar day, the sampling can be included as part of the subsequent event the following day.

d. Total Residual Chlorine (TRC)
Compliance with the TRC limit shall be determined on the basis of one or more grab samples. If more than one (1) sample per day is taken, the additional samples shall be collected in near equal intervals over approximately eight (8) hours. The samples shall be analyzed immediately upon collection and the average reported as the daily concentration. Samples shall be analyzed in accordance with Part II.B.2. of this permit.

e. Analytical Methods and Quantification Levels for Available Cyanide and Total Copper
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Available Cyanide shall be in accordance with EPA Method OIA-1677. The quantification levels for Available Cyanide and Total Copper shall be 2.0 µg/l and 1.0 µg/l, respectively, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval of the Department, the permittees may use alternate analytical methods (for parameters with methods specified in 40 CFR 136, the alternate methods are restricted to those listed in 40 CFR 136).

f. Limits Below the Quantification Level – Total Polychlorinated Biphenyls (PCBs)
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Total PCBs shall be in accordance with EPA Method 608.3. Upon approval from the Department, the permittees may use alternate analytical methods (for parameters with methods specified in 40 CFR, Part 136, the alternate methods are restricted to those listed in 40 CFR, Part 136). The quantification level shall be 0.1 ug/l unless a higher level is appropriate because of sample matrix interference. Justification for a higher quantification level shall be submitted to the Department within 30 days of such determination.

The water quality-based effluent limitation for Total PCBs is $2.6 \times 10^{-5}$ µg/l ($2.0 \times 10^{-4}$ lbs/day) maximum monthly average. This is less than the quantification level. Control requirements are therefore established consistent with R 323.1213. **The discharge of any individual aroclor at or above the quantification level of 0.1 ug/l is a specific violation of this permit**. If concentrations of all aroclors representing a monitoring period are less than their quantification levels, the permittees will be considered to be in compliance with the permit for the monitoring period that the analyses represent, provided that the permittees are also in full compliance with the Pollutant Minimization Program for Total PCBs set forth in Part I.A.10 of this permit. For the purpose of reporting on the Daily tab of the DMR, individual aroclor results less than the quantification level shall be reported as "<0.1." For the purpose of reporting on the Summary tab of the DMR, the value reported under PCB Aroclor shall be the highest aroclor concentration observed during the monitoring period. This permit condition does not authorize the discharge of PCBs at levels that are injurious to the designated uses of the waters of the state or that constitute a threat to the public health or welfare.

g. Schedule of Implementation
The permittees shall implement the following for Outfall 050 (RRO) Disinfection Program:

1) On or before February 1, 2010 (submitted), the permittees shall submit for review and approval a basis of design report for the previously proposed Outfall 084 (RRO2).

2) On or before March 1, 2011 (submitted), the permittees shall submit for review and approval complete plans and specifications for Segment 1 of the previously proposed Outfall 084 (RRO2) project. Segment 1 consists of improvements undertaken at the WRRF consistent with the approved Basis of Design report.

3) On or before July 1, 2012 (submitted), the permittees shall commence construction of Segment 1, consistent with the approved plans and specifications.

4) On or before July 1, 2013 (submitted), the permittees shall submit a construction progress report for Segment 1 of the previously proposed Outfall 084 (RRO2).

5) On or before March 1, 2015, (completed) the permittees shall complete construction of Segment 1 of the previously proposed Outfall 084 (RRO2) project.

6) On or before June 1, 2016, (submitted) the permittees shall submit for review and approval a complete basis of design report, and complete plans and specifications, for the Outfall 050 (RRO) Disinfection Project (if design, bid, build). Alternatively, if DWSD chooses to pursue design-build for the Outfall 050 (RRO) Disinfection Project, DWSD shall submit on or before June 1, 2016, (submitted) a detailed engineering report for the overall project, a permitting plan (that includes a description of the construction segments), a timetable for Part 41 permit application submittal, and sufficient project schematics for the overall project.

7) On or before November 1, 2016, (completed) the permittees shall submit complete plans and specifications for at a minimum the first segment to be construction under a design-build contract.

8) On or before April 1, 2017, (commenced) the permittees shall commence construction of the RRO Disinfection Project, consistent with the approved plans and specifications.

9) On or before April 1, 2018, (submitted) the permittees shall submit a construction progress report for RRO Disinfection Project.

10) On or before April 1, 2019, (completed) the permittees shall complete construction of RRO Disinfection Project and place into full operation the facilities to achieve final effluent limits specified in Part I.A.5.

## 6. Combined Sewer Overflow Retention Treatment Basin Discharge Authorization, Monitoring Points 101A, 102A, 103A, 104A, 108A and 109A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittees are authorized to discharge treated combined sewage from the Hubbell/Southfield Combined Sewer Overflow (CSO) Retention Treatment Basin (RTB), Monitoring Point 101A, through Outfall 101; from the Puritan/Fenkell CSO RTB, Monitoring Point 102A, through Outfall 102; from the Seven Mile CSO RTB, Monitoring Point 103A, through Outfall 103; from the Belle Isle RTB, Monitoring Point 108A, through Outfall 108; from the Oakwood RTB, Monitoring Point 109A, through Outfall 109; and from the Conner Creek CSO RTB Monitoring Point 104A, through Outfall 104 when the basins are full and wastewater flows exceed downstream interceptor capacity. Outfall 101, Outfall 102, Outfall 103, and Outfall 109 discharge to the Rouge River. Outfall 108 discharges to the Detroit River. Outfall 104 discharges to Conner Creek. Such discharges shall be limited and monitored by the permittees as specified below:

| Influent Characteristics | Maximum Limits for Quantity or Loading Monthly | 7-Day | Daily | Units | Maximum Limits for Quality or Concentration Monthly | 7-Day | Event | Units | Monitoring Frequency | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily Flow |
| **Effluent Characteristics** | | | | | | | | | | |
| Flow | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily Flow |
| Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Event | Composite |
| Total Suspended Solids | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Event | Composite |
| Ammonia Nitrogen (as N) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Event | Composite |
| Total Phosphorus (as P) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Event | Composite |
| Fecal Coliform Bacteria | | | | | | | | | | |
| May 1 – October 31 | --- | --- | --- | --- | --- | --- | 400 | cts/100 ml | See I.A.6.a. | Grab |
| November 1 – April 30 | --- | --- | --- | --- | --- | --- | 1000 | cts/100 ml | See I.A.6.a. | Grab |
| | | | | | **Event Average** | | **Event Maximum** | | | |
| Total Residual Chlorine | | | | | | | | | | |
| Any Event | --- | --- | --- | --- | (report) | --- | (report) | mg/l | See I.A.6.a. | Grab |

(See additional controls specified in Part I.A.8.)

| Effluent Characteristics | Maximum Limits for Quantity or Loading Monthly | 7-Day | Daily | Units | Maximum Limits for Quality or Concentration Monthly | 7-Day | Event | Units | Monitoring Frequency | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Oil & Grease (Monitoring Point 109A only) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Daily During Discharge | Grab |
| | | | | | **Event Minimum** | | **Event Maximum** | | | |
| pH | --- | --- | --- | --- | (report) | --- | (report) | S.U. | Daily During Discharge | Grab |
| Dissolved Oxygen | --- | --- | --- | --- | (report) | --- | --- | mg/l | Daily During Discharge | Grab |

a. Retention Basin Monitoring and Reporting
The permittee shall conduct retention basin monitoring and report consistent with the requirements of Part II.C.2. of this permit. The permittee shall supply the results of each sample analyzed during each discharge period.

An Event starts when combined sewage is discharged into a facility, and ends when effluent flow (if any) ceases and does not resume within 24 hours.

**Influent flow** shall be reported for all wet weather events where combined sewage is discharged into the facility. Influent flow reporting shall also indicate the component of the total influent flow that is dewatered to the interceptor from the facility during an event and shall be reported in the comment section of the monthly Discharge Monitoring Reports (DMR). Alternate procedures may be approved by the Department.

**Effluent flow** shall be reported for all events that cause discharge from the facility to the receiving waters.

**Effluent sampling for $CBOD_5$, TSS, Ammonia Nitrogen (as N), and Total Phosphorus (as P)** shall be by effluent flow-weighted composite sampling over the entire event. Alternate procedures for determining an event composite may be approved by the Department if existing equipment cannot reliably determine a flow-weighted composite. For purposes of reporting for a discharge event that occurs on multiple calendar days, the composite pollutant concentrations for the event shall be reported on the day the discharge event ended. Individual events shall be determined by a lack of effluent discharge for 24 hours.

For **effluent pH,** report the maximum value of any individual sample taken during the month in the "Maximum" column under "Quality or Concentration" on the monthly DMRs and the minimum value of any individual sample taken during the month in the "Minimum" column under "Quality or Concentration" on the monthly DMRs. The individual values taken during the month shall be reported on the daily DMRs.

For **effluent dissolved oxygen**, report the lowest concentration of any individual sample in the "Minimum" column under the "Quantity or Concentration" on the monthly DMRs. The individual values taken during the month shall be reported on the daily DMRs.

For **effluent Fecal Coliform Bacteria and Total Residual Chlorine,** grab samples shall be collected every two (2) hours for the first six (6) hours of the discharge and every four (4) hours thereafter for the duration of the discharge; the first sample shall be collected as soon as practical after the discharge begins. For fecal coliform, the "event maximum" shall be reported on the daily DMRs as the geometric mean of all samples taken during an event, provided that three (3) or more samples are collected. For TRC, report the average of all samples in an event as the "Event Average" and the maximum individual sample in an event as the "Event Maximum" on the daily DMRs. The goal of the effluent sampling program is to collect at least three samples during each discharge event, and samples shall be collected at shorter intervals at the onset of the event, if the permittee estimates that the event duration may be less than six hours. For purposes of reporting for a discharge event that occurs on multiple calendar days, the pollutant concentrations for the event shall be reported on the day the discharge event ended. The highest event averages for Fecal Coliform and TRC shall also be reported in the "Maximum" columns under "Quality and Concentration" on the monthly DMRs.

b. Retention Treatment Basin Dewatering

The retention treatment basin shall be promptly dewatered as in accordance with the Department Approved Consolidated Annual Report following the need to divert flow to the basin and shall be maintained in readiness for use. The discharge of sludge or residual accumulations from the basin to the surface waters is prohibited. These sludges shall be promptly removed and disposed in accordance with procedures approved by the Department.

For this permit while the Regional Operational Plan is being revised, if up to 930 MGD (including recycle) is being processed with secondary treatment at the WRRF and no primary flow is being discharged, then tributary combined or sanitary storage basins in the GLWA system may be dewatered. Such dewatering will not be considered a violation of this permit, even if contrary to the Wet Weather Event definition (see Part II.A.). Once a revised Regional Operation Plan is developed, it shall be implemented once reviewed and approved by the Department.

c. 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.

d. Operation and Maintenance Plan

The permittee shall assure that discharges only occur in response to rainfall (or snowmelt) events and cease soon thereafter. Any rehabilitation and maintenance needs shall be addressed to ensure adequate sewer capacity and functionality. This may be accomplished through continued implementation of the approved Operation and Maintenance Plan.

## 7. Combined Sewer Overflow Screening and Disinfection Facilities Discharge Authorization, Monitoring Points 105A, 106A and 107A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittees are authorized to discharge treated combined sewage from the Leib Combined Sewer Overflow (CSO) Screening and Disinfection Facility Monitoring Point 105A through Outfall 105, from the St. Aubin CSO Screening and Disinfection Facility Monitoring Point 106A through Outfall 106, and from the Baby Creek CSO Screening and Disinfection Facility Monitoring Point 107A through Outfall 107 when the wastewater flows exceed downstream interceptor capacities. Outfall 105 and Outfall 106 discharge to the Detroit River. Outfall 107 discharges to the Rouge River. Such discharges shall be limited and monitored by the permittees as specified below:

| Effluent Characteristics | Maximum Limits for Quantity or Loading Monthly | 7-Day | Daily | Units | Maximum Limits for Quality or Concentration Monthly | 7-Day | Daily | Units | Monitoring Frequency | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Flow | (report) | --- | (report) | MGD | --- | --- | --- | --- | Daily | Report Total Daily Flow |
| Carbonaceous Biochemical Oxygen Demand (CBOD5) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Quarterly | Grab |
| Total Suspended Solids | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Quarterly | Grab |
| Ammonia Nitrogen (as N) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Quarterly | Grab |
| Total Phosphorus (as P) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Quarterly | Grab |
| Oil & Grease (Baby Creek CSO Screening & Disinfection Facility, only) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | Daily During Discharge | Grab |
| | | | | | | | **Event Maximum** | | | |
| Fecal Coliform Bacteria | | | | | | | | | | |
| May 1 – October 31 | --- | --- | --- | --- | --- | --- | 400 | cts/100 ml | See I.A.7.a. | Grab |
| November 1 – April 30 | --- | --- | --- | --- | --- | --- | 1000 | cts/100 ml | See I.A.7.a. | Grab |
| | | | | | **Event Average** | | **Event Maximum** | | | |
| Total Residual Chlorine Any Event (see additional controls specified in Part 1.A.8.) | --- | --- | --- | --- | (report) | --- | (report) | mg/l | See I.A.7.a. | Grab |
| | | | | | **Event Minimum** | | **Event Maximum** | | | |
| pH | --- | --- | --- | --- | (report) | --- | (report) | S.U. | Daily During Discharge | Grab |
| Dissolved Oxygen | --- | --- | --- | --- | (report) | --- | --- | mg/l | Daily During Discharge | Grab |

a. Screening and Disinfection Facilities Monitoring and Reporting
The permittees shall monitor screening and disinfection facilities performance and report the monitoring consistent with the requirements of Part II.C.2. of this permit. The permittees shall supply the results of each sample taken during each discharge period.

**Effluent flow** shall be reported for all events that cause discharge from the facility to the receiving waters.

For **effluent pH**, report the maximum value of any individual sample taken during the month in the "Maximum" column under "Quality or Concentration" on the monthly DMRs and the minimum value of any individual sample taken during the month in the "Minimum" column under "Quality or Concentration" on the monthly DMRs. The individual values taken during the month shall be reported on the daily DMRs.

For **effluent dissolved oxygen**, report the lowest concentration of any individual sample in the "Minimum" column under the "Quantity or Concentration" on the monthly DMRs. The individual values taken during the month shall be reported on the daily DMRs.

For **effluent Fecal Coliform Bacteria and Total Residual Chlorine**, grab samples shall be collected every two (2) hours for the first six (6) hours of the discharge and every four (4) hours thereafter for the duration of the discharge; the first sample shall be collected as soon as practical after the discharge begins. For fecal coliform, the "event maximum" shall be reported on the daily DMRs as the geometric mean of all samples taken during an event, provided that three (3) or more samples are collected. For TRC, report the average of all samples in an event as the "Event Average" and the maximum individual sample in an event as the "Event Maximum" on the daily DMRs. The goal of the effluent sampling program is to collect at least three samples during each discharge event, and samples shall be collected at shorter intervals at the onset of the event, if the permittees estimate that the event duration may be less than six hours. For purposes of reporting for a discharge event that occurs on multiple calendar days, the pollutant concentrations for the event shall be reported on the day the discharge event ended. The highest event averages for Fecal Coliform and TRC shall also be reported in the "Maximum" columns under "Quality and Concentration" on the monthly DMRs.

b. 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.

c. Sampling Locations
The sampling locations for the pollutants indicated in Part I.A.7 of this permit shall be representative of the effluent and consistent with the locations approved by the Department.

d. Operation and Maintenance Plan
The permittees shall assure that discharges only occur in response to rainfall (or snowmelt) events and cease soon thereafter. Any rehabilitation and maintenance needs shall be addressed to ensure adequate sewer capacity and functionality. This may be accomplished through continued implementation of the approved Operation and Maintenance Plan.

e. Treatment Facility Dewatering
The treatment facility shall be promptly dewatered (if applicable) in accordance with the Department Approved Consolidated Annual Report possible following the need to divert flow to the facility and shall be maintained in readiness for use. The discharge of sludge or residual accumulations from the facility to the surface waters is prohibited.

For this permit while the Regional Operational Plan is being revised, if up to 930 MGD (including recycle) is being processed with secondary treatment at the WRRF and no primary flow is being discharged, then tributary combined or sanitary storage basins in the GLWA system may be dewatered. Such dewatering will not be considered a violation of this permit, even if contrary to the Wet Weather Event definition (see Part II.A). Once a revised Regional Operation Plan is developed, it shall be implemented once reviewed and approved by the Department.

f. 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).

# 8. Total Residual Chlorine Minimization Program

The goal of the Total Residual Chlorine (TRC) Minimization Program is operate the CSO RTBs and the CSO screening and disinfection facilities in a manner that will provide consistent, effective disinfection while minimizing the discharge of TRC, recognizing the overall goal is compliance with the TRC Final Acute Value of 0.038 mg/l at any point in the receiving stream, unless it is determined by the Department by a permit action that a higher level is acceptable.

In addition, the Operational Goals for this facility are 1.5 mg/l TRC as an event average value and 2.0 mg/l (November – April) or 3.0 mg/l (May – October) TRC as an event instantaneous maximum value.

a. TRC Minimization Assessment (Assessment) (submitted)
The permittees shall prepare and conduct a program to assess the capability of each of the 5 CSO RTBs and screening and disinfection facilities as agreed to (a subset of those listed in Part I.A.6. and Part I.A.7.), to minimize the discharge of TRC. Each Assessment shall be conducted according to a schedule acceptable to the Department. Compliance with the Fecal Coliform Bacteria effluent limits set forth in Part I.A.6. and Part I.A.7. of this permit shall be maintained during each Assessment. Each Assessment shall include an evaluation of various operational practices under a variety of wet weather events to identify measures which can be taken to reduce TRC discharge concentrations. Upon notification by the Department, the permittees shall begin conducting each Assessment over an 18-month period and shall submit a report summarizing the results to the Department within 60 days of completion. An extension of an Assessment period beyond 18 months may be requested by the permittees for approval by the Department in the event that a sufficient number of CSO discharge events have not occurred to allow for an adequate assessment of operational procedures.

Each Assessment report shall include the expected achievable TRC discharge concentrations, recommendations as to specific protocols to be used to manage sodium hypochlorite (NaOCl) dosage rates under various conditions to achieve the Operational Goals, and recommended facility modifications to enhance the ability to control TRC levels while maintaining compliance with the Fecal Coliform Bacteria limits. Specific procedures for adjustment of NaOCl feed rates to minimize the discharge of TRC shall be submitted as part of the Operational Plan (and revised as appropriate in annual updates), as required by Part I.A.15.e. of this permit. The TRC minimization procedures, developed as part of each Assessment, shall be implemented upon approval by the Department.

b. Operational Goals
Upon completion of each Assessment, the permittees shall operate the facility with a goal of 1.5 mg/l TRC as an event average value and a goal of 2.0 mg/l (November – April) or 3.0 mg/l (May – October) TRC as an event instantaneous maximum value. If upon completion of an Assessment, the permittees determine the facility can achieve lower TRC goals than those specified above, then the permittees shall operate the facility to achieve the lower TRC levels. If either TRC goal is exceeded for a CSO discharge event, the permittees shall submit a written report to the Department within seven (7) days explaining the cause of the exceedance and describing the corrective measures that will be undertaken to prevent a future recurrence.

c. In-Stream TRC Effluent Plume Evaluation (submitted)
The permittees shall conduct an evaluation of the in-stream TRC effluent plume attributable to each of the agreed-to 5 CSO RTBs screening and disinfection facility discharges. The evaluation shall identify the location and size of the TRC effluent plume during and after CSO discharge events and identify the maximum TRC concentrations in-stream at various downstream locations. Upon notification by the Department to begin conducting each Assessment (Part I.A.8.a.), the permittees shall have 60 days to submit a TRC effluent plume work plan describing the proposed evaluation including sampling locations and a proposed implementation schedule such that the In-Stream TRC Effluent Plume Evaluation shall occur after completion of each Assessment and when the operational goals begin. The permittees shall implement the In-Stream TRC Effluent Plume Evaluation following the schedule upon Department approval of the TRC effluent plume work plan. The permittees shall submit a report documenting the results of the TRC Effluent Plume Evaluation within 90 days after completion of the field work.

d. Permit Re-Opener Clause
Upon completion of each TRC Minimization Assessment and each In-Stream TRC Effluent Plume Evaluation, the Department may reevaluate the need for TRC effluent limitations. This permit may be

modified in accordance with applicable laws and rules to incorporate such revisions as may be necessary to comply with Water Quality Standards at the time of discharge.

e. Best Management Practices/Operator Coordination Work Group (Work Group)
The permittees shall attend and participate in at least quarterly Work Group meetings with representatives from other CSO facilities in Southeast Michigan to exchange information and share experiences relating to the operation and maintenance of CSO control facilities. Such Work Group meetings shall be used to develop Best Management Practices (BMPs) relating to CSO RTB operation, with an initial focus on actions to minimize the TRC discharge levels. At a minimum, the Work Group shall include representatives of the following CSO facilities: Birmingham CSO RTB, Bloomfield Village CSO RTB, Dearborn CSO, GLWA WRRF CSO Facilities, Inkster-Dearborn Heights CSO, Oakland County-Acacia Park (Acacia Park CSO Drainage District, Village of Beverly Hills, City of Birmingham), Redford Township CSO, River Rouge CSO, Wayne County – Dearborn Heights CSO, Wayne County – Inkster CSO, Wayne County – Inkster – Dearborn Heights CSO, and Wayne County – Redford – Livonia CSO. The Work Group shall submit an annual report summarizing the meetings and BMPs developed to the Department by March 1st of each year.

# 9. Additional Monitoring Requirements

As a condition of this permit, the permittees shall monitor the discharge from monitoring points 049F and 050A for the constituents identified below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in October 2019, May 2020, March 2021, and August 2021. Grab samples shall be collected for total phenols, and the Volatile Organic Compounds identified below. For all other parameters, 24-hour composite samples shall be collected.

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** *Ceriodaphnia dubia*. If the permittees have received Department approval to conduct chronic toxicity testing using the more sensitive species identified in the toxicity database, the first three (3) tests required above may be performed using the more sensitive species. The last (4th) test shall be conducted using both 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.

For selected parameters required under this section, the maximum acceptable quantification levels and analytical methods shall be as specified under Quantification Levels and Analytical Methods for Selected Parameters, below, unless a higher quantification 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 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 permittees shall notify the Department within 14 days of completing the monitoring for each month specified above in accordance with Part II.C.5. Additional reporting requirements are specified in Part II.C.11. The permittees shall report to the Department any whole effluent toxicity test results greater than 1.0 $TU_A$ or 1.0 $TU_C$ within five (5) days of becoming aware of the result. If, upon review of the analysis, it is determined that additional requirements are needed to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules.

Whole Effluent Toxicity
chronic toxicity

Hardness
calcium carbonate

Metals (Total Recoverable), Cyanide and Total Phenols

| | | | |
|---|---|---|---|
| antimony | arsenic | 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 | | |

Quantification Levels and Analytical Methods for Selected Parameters

| **Parameter** | **Quantification Level** | | **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 |

| Parameter | Quantification Level | | Analytical Method |
|---|---|---|---|
| Bis (2-Chloroethyl) Ether | 1.0 | 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 | |
| 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 608.3 |
| PCB-1221 | 0.1 | ug/l | EPA Method 608.3 |
| PCB-1232 | 0.1 | ug/l | EPA Method 608.3 |
| PCB-1242 | 0.1 | ug/l | EPA Method 608.3 |
| PCB-1248 | 0.1 | ug/l | EPA Method 608.3 |
| PCB-1254 | 0.1 | ug/l | EPA Method 608.3 |
| PCB-1260 | 0.1 | ug/l | EPA Method 608.3 |
| 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) | 2.0 | ng/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 | |

| Parameter | Quantification Level | Analytical Method |
|---|---|---|
| Silver, Total | 0.5 ug/l | |
| Strontium, Total | 1000 ug/l | |
| Sulfide, 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 | |

## 10. Pollutant Minimization Program for Total Mercury and PCBs

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l and the final effluent limitations for Total Polychlorinated Biphenyls (PCBs). The permittees shall continue to implement the Pollutant Minimization Program approved on November 9, 1995, and updated in October, 1996, 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 and PCBs entering the wastewater collection system, including wet weather sources such as runoff/contributions from contaminated sites in the collection area;

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

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

On or before October 1st of each year, the permittees 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 and/or PCB sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury and/or PCBs.

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

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

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

## 11. Water Resource Recovery Facility Wet Weather Operational Plan

The approved Water Resource Recovery Facility Wet Weather Operational Plan provides the protocol for operations during the interim period before full completion of the Long-term CSO Control Plan. This plan details the necessary requirements to maximize wet weather treatment at the WRRF, while complying with effluent limits and all other conditions of this permit, and minimizing untreated combined sewage discharges in the tributary collection system.

The GLWA WRRF Wet Weather Operational Plan shall be coordinated with the Collection System and CSO Treatment Facilities Operational Plan that is required in accordance with Part I.A.15.d. of this permit. Annually, on or before April 1st, the permittees shall submit an update of the Water Resource Recovery Facility Wet Weather Operational Plan in conjunction with the Collection System and CSO Treatment Facilities Operational Plan update as part of the Consolidated Annual Report to the Department for review and approval.

# 12. Facilities Improvement Program

The permittees shall continue to meet the sludge dewatering, conveyance, and final disposal requirements; submit and implement the solids disposal plans; correct the alum sludge issue; submit the WRRF shutdown schedules; and develop and implement the asset management program as detailed below.

a. WRRF Solids Processing Requirements and Corrections

1) Capacity for sludge dewatering, conveyance, and final disposal; Required maximum solids inventory loads.

The permittees shall ensure that sludge dewatering equipment, sludge conveyance equipment, and final sludge disposal capability is available at the GLWA WRRF as follows:

a) The permittees shall ensure that the WRRF sludge dewatering equipment, sludge conveyance equipment, and final sludge disposal capability are maintained for use; and in good operational working order to meet the following requirements:

(1) Average capacity of 500 dry tons per day (dtpd), calculated as a calendar monthly average;

(2) Peak capacity of 850 dtpd, calculated as a 10-day average;

(3) The peak 10-day average shall be available during any wet weather event when the WRRF is operated in the “Storm Period” of the currently approved WRRF Wet Weather Operational Plan as required by Part I.A.11.

The permittees shall also:

(4) Notify the Department within one business day if solids are recycled from the gravity thickeners to the head of the WRRF for more than 72 hours and provide an explanation for the recycled solids. Recycled solids are defined as a TSS overflow concentration of 1000 mg/l or greater from Complex A thickeners;

(5) Maintain a monthly average solids inventory of less than 750 dtpd, when there are less than 5 days of discharge from Outfall 049A during the month, and maintain a calendar quarterly average solids inventory not to exceed 1000 dtpd. Solids inventory is defined as the total solids in gravity thickener complexes A and B, determined daily in dtpd;

(6) This Section will be reviewed during the next NPDES reissuance based on WRRF performance; and

(7) The permittees are allowed to submit to the Department for review and approval a request to modify the numerical levels specified in Part I.A.12.a. of this permit. This modification request shall include supporting rationale for the revised numerical levels.

2) Long-Term Solids Disposal Plan

a) The permittees submitted to the Department for review and approval a Long-Term Solids Disposal Plan (LTSDP). This Solids Disposal Plan is designed to ensure the availability of sufficient sludge dewatering equipment and sludge disposal capability to meet the capacity requirements specified in Parts I.A.12.a.1).a).(1)&(2) of this permit. The permittees shall implement the LTSDP in accordance with the following schedule:

(1) On or before December 31, 2018, (submitted) the permittees shall submit for approval, a disposal plan for 250 dtpd. This requirement is based on the LTSDP approved on September 24, 2013. Upon notification from the Department, the permittees shall implement the approved disposal plan;

(2) On or before December 31, 2025, the permittees shall complete implementation of the approved plan referenced in item (1) above;

b) The GLWA are advised that implementation of individual elements of the LTSDP may require Part 41 wastewater construction permits or may require other Department approvals.

3) Alum Sludge Correction
The permittees shall continue to implement the approved plan to correct the solids dewatering concerns at the WRRF due to alum sludge discharges from GLWA water treatment plants (WTPs) into the collection system.

Annually, on or before September 1st the permittees shall submit a report to the Department describing if the implemented plan continued to meet the conditions specified above for the preceding fiscal year (July 1 – June 30).

Part 41 construction permits at the WRRF and/or Act 399 construction permits at the specific WTPs may be needed depending on the components of the approved plan.

b. WRRF Quarterly Shutdown Schedules
On or before December 1, March 1, June 1, and September 1, the permittees shall submit quarterly WRRF Shutdown Schedules, until notified in writing by the Department. Consistent with the quarterly dates indicated above, these schedules shall be submitted to the Department in a mutually agreeable format one month prior to the start of each calendar quarter for review and approval. Each quarterly schedule shall detail the primary treatment capacity, secondary treatment capacity, and sludge processing capacity that is planned to be available during the upcoming quarter, considering coordinated shutdowns necessary to complete all rehabilitation and other projects. The shutdown schedules shall be proposed to minimize environmental impact and maximize available treatment during construction of all projects, consistent with the requirements of the rules associated with Act 451, Part 41, being 299.2943 and 299.2955(1) and (3).

c. Operation, Maintenance & Replacement/Asset Management
The permittees shall at all times properly operate and maintain all facilities (i.e., sewer system, treatment works, as defined in Part 41 of Act 451, 1994 as amended, and control systems) that are installed or used by the permittees to operate the treatment works and sewer system and achieve and maintain compliance with the conditions of this permit. The requirements of an asset management program contain goals of effective performance, adequate funding, and adequate operator staffing and training. Asset management is a planning process focused on gaining optimum value for each asset and providing the financial resources to rehabilitate and replace them 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 best-value life-cycle costs, and the best long-term funding strategy.

1) The permittees shall continue to implement the approved Asset Management Program that addresses the following items:

- A comprehensive fixed asset inventory that is maintained, managed, and updated within a computerized maintenance management system (CMMS),

- A comprehensive inventory of the collection system fixed assets and collection system map,
- A Preventive Maintenance Program that may include predictive and reliability centered maintenance,
- A Needs Assessment updated every five years as part of the Project Plan (due on or before October 1, 2021), including condition assessment and evaluation of service level,
- An assessment of asset criticality and risk management,
- A capital planning process,
- A Scheduled Replacement Program (SRP) for assets,
- Monitoring and periodic performance evaluation through Key Performance Indicators (KPIs),
- Management oversight of system performance.

The permittees' Asset Management Program submitted on January 1, 2014, was approved on January 14, 2014, and substantially revised on September 29, 2017.

2) An Annual Report covering implementation of the Asset Management Program during the prior Fiscal Year (July 1 – June 30) shall be prepared by the permittees and submitted to the Department on or before October 1st. The Annual Report shall include:

a) A description and evaluation of the sufficiency of the staffing levels maintained during the year,

b) A description and evaluation of the sufficiency and adequacy of inspections and maintenance activities conducted and corrective actions taken during the previous year,

c) Expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital investment during the previous year, compared with budged/projected expenditures, including an evaluation of the sufficiency of expenditures,

d) A summary of asset/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five (5) core elements and the criticality and risk analysis,

e) A maintenance budget and capital improvement budget for the upcoming year, based on implementation of an effective asset management program that meets the five (5) core elements,

f) An updated estimate of the revenue necessary to complete anticipated OM&R activities, the associated rate schedule impact, and an assessment of the adequacy of the revenue to perform necessary OM&R work, and

g) A description of the progress made towards completion of the outstanding tasks as described in the previous year's Asset Management Annual Report and an updated schedule for completion of any outstanding tasks.

d. Staffing Plan

A Staffing Plan, as required by ACO-00131, has been approved by the Department. The GLWA shall provide an adequate staffing level, in accordance with the approved Staffing Plan, to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. During the term of ACO-00131, a change in the minimum staffing level may be requested by the GLWA by submittal of a revised Staffing Plan, including training requirements, and may be revised only by mutual agreement in writing between the GLWA and the Department. Should ACO-00131 be terminated, then the staffing plan shall be updated as required by the Operations and Maintenance Manual (Part II.C.14 of this permit), and an up to date copy of the manual shall be kept at the WRRF. The Department may review the manual in whole or in part (i.e. staffing) at their discretion and require modifications to it if portions are determined to be inadequate.

e. Key Performance Indicator Monthly Report
The permittee shall update the Key Performance Indicator (KPI) report monthly. If Administrative Consent Order No. ACO-000131, as amended, is terminated, the KPI report shall be submitted by the last day of the month following the termination of the ACO.

f. Public Participation
The permittees will participate in Department initiated public outreach meetings during the term of this permit as resources allow and provided there is adequate notification by the Department.

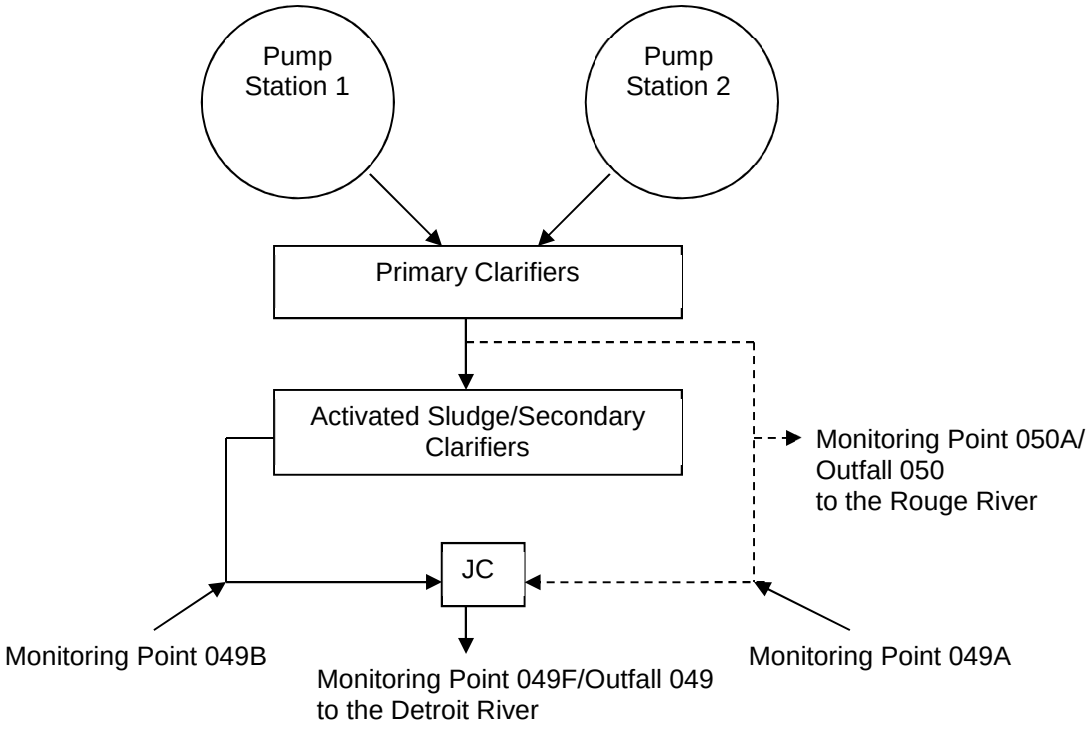
## 13. Reopener for Primary and Secondary Treatment Capacity

The permittees are required to maintain a wet weather primary treatment capacity of 1700 MGD (raw) and wet weather secondary treatment capacity of 930 MGD (which includes recycle). When the elevation of the influent wet well is greater than 85 feet and the facility is not pumping at 1700 MGD (raw), the discharge from untreated combined sewage overflow (CSO) upstream of the facility are not authorized, unless caused by localized storm conditions.

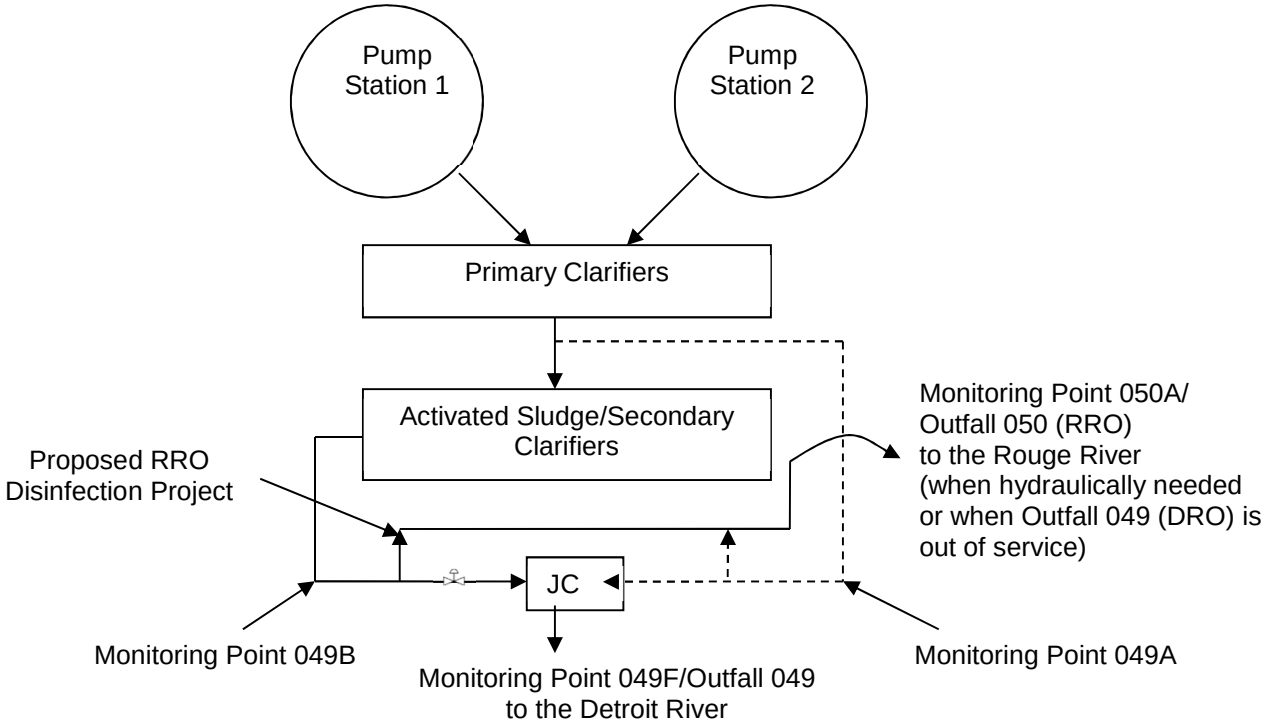
These required wet weather treatment capacities may be revised if new/altered wet weather conditions (such as initiation of operation of upstream CSO facilities, etc.) indicate that either less or more flow can be effectively processed. The criteria used to determine whether the required wet weather primary treatment capacities should be revised must include additional plant evaluation under the updated conditions, using testing procedures approved by the Department.

For reference, outfall/monitoring point designations are shown on the following diagrams:

Prior to Initiation of Operation of RRO Disinfection Project




After Initiation of Operation of RRO Disinfection Project



# 14. Outfalls Prohibited from Discharge to Combined Sewer System

The following Outfalls are prohibited from discharge except as provided for in Part II.C.9.:

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 004 | Fairview (DWF) Pump Station (P28 through P31) Parkview & Detroit River - **Emergency only** | 42°21'20" 082°58'01" | Discharge to Detroit River (Stop-logged) |
| 014 | Dubois (B12) Dubois & Detroit River | 42°20'01" 083°01'19" | Detroit River |
| 051 | Carbon (B46) Carbon & Rouge River | 42°17'07" 083°08'17" | Rouge River |
| 054 | Fort St. (DWSD Northwest) Interceptor) (B50) South Fort St. & Rouge River (West Shore) | 42°17'25" 083°08'35" | Rouge River |
| 056 | Fort St. (Oakwood District) (B49) South Fort St. & Rouge River (West Shore) | 42°17'27" 083°08'33" | Rouge River |
| 080 | Fox Creek Backwater Gates (B01) East Jefferson & Fox Creek. | 42°22'28" 082°56'27" | Fox Creek to Detroit River |

The permittees shall provide for ongoing monitoring (Flow, Duration) for these outfalls should they discharge. This monitoring shall be used to comply with the requirements of Section 324.3112(a) of The Michigan Act (See Part I.A.16.).

# 15. Discharges from Combined Sewer System

a. Limited Discharge Authorization

The permittees are required to utilize, to the maximum extent practicable, available sewerage system transportation capabilities for the delivery of combined sewage to treatment facilities. For an interim period during which the amended Long-Term CSO Control Plan is to be implemented, the permittees are authorized to discharge during wet weather events (see Part II.A.) combined sewage from the outfalls and locations listed below in accordance with the following conditions:

1) a flow rate equivalent to the peak dry weather flow rate has been conveyed to the secondary treatment facilities for treatment without bypass,

2) the total sewerage system storage and transportation capacity for conveyance of wet weather flows to the treatment facilities for treatment has been utilized within the hydraulic design constraints of the system,

3) all primary treatment plant capacity and secondary treatment plant capacity has been utilized in accordance with the approved WRRF Wet Weather Operation Plan (Part 1.A.11.), unless a storm event is localized to the extent that the hydraulic capacity of a portion of the collection system (considering storage) is exceeded prior to reaching plant capacities, and

4) the permittees are in full compliance with all requirements as set forth in Part I.A.16. Combined Sewer Overflow discharges to the Rouge River, the Detroit River, and the Old Channel of the Rouge River are authorized until prohibited, eliminated, or adequately treated to meet water quality standards at times of discharge in accordance with the requirements below, and as specified in Part 1.A.15.f. and g.

5) the outfalls that immediately follow this paragraph are included in the Limited Discharge Authorization. There are some untreated CSO outfalls that appear to discharge only during extreme events. Extreme is defined as; (a) no more than one untreated discharge in ten years from a CSO outfall during the April 1 through October 31 growth period, (b) modeled to not discharge at the 25 year – 24 hour event (during growth period, with normal soil moisture, rainfall distributed to a SCS Type II distribution), or (c) monitored to occur only at rainfalls greater than 4 inches in a 24 hour period. The Department does not intend to require construction of treatment facilities at the following outfalls should they continue to only discharge at the extreme event. This addresses CSO outfalls consistently with SSO outfalls according to the 2002 SSO Policy and 2003 Clarification Statement. The list of untreated CSO outfalls that only discharge at the extreme event is flexible and may be adjusted with the adaptive management CSO correction program.

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 029 | Rosa Parks (B27)<br>Rosa Parks & Detroit River | 42°19'13"<br>083°03'56" | Detroit River |
| 030 | Vermont (B28)<br>Vermont (extended) & Detroit River | 42°19'06"<br>083°04'09" | Detroit River |
| 037 | McKinstry (B35)<br>McKinstry & Detroit River | 42°18'19"<br>083°05'13" | Detroit River |
| 042 | Campbell (B40)<br>Campbell & Detroit River | 42°18'01"<br>083°05'30" | Detroit River |
| 048 | Pulaski (B59A &B)<br>Pulaski & Rouge River | 42°17'21"<br>083°07'11" | Old Channel<br>Rouge River |

6) the outfalls that immediately follow this paragraph are also included in the Limited Discharge Authorization. There are some untreated CSOs that appear to discharge at a minimal frequency and volume. Minimal discharge is defined as actual monitoring of a volume less than 0.3 MG of discharge over a five year period. The Department does not intend to require construction of treatment facilities at the following outfalls should they continue to only discharge at this minimal frequency and volume. The list of untreated CSO outfalls that only discharge at a minimal frequency and volume is flexible and may be adjusted with the adaptive management CSO correction program.

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 024 | Griswold (B22)<br>Griswold & Detroit River | 42°19'35"<br>083°02'28" | Detroit River |
| 032 | Twenty-First St. (B30)<br>Twenty-First St. & Detroit River | 42°18'53"<br>083°04'31" | Detroit River |
| 034 | West Grand Blvd. (B32)<br>West Grand Blvd. & Detroit River | 42°18'41"<br>083°04'50" | Detroit River |
| 035 | Swain (B33)<br>Swain & Detroit River | 42°18'35"<br>083°04'56" | Detroit River |
| 036 | Scotten (B34)<br>Scotten & Detroit River | 42°18'31"<br>083°05'02" | Detroit River |
| 041 | Junction (B39)<br>Junction & Detroit River | 42°18'07"<br>083°05'25" | Detroit River |
| 043 | Dragoon (Livernois Relief)<br>(B41) Dragoon (extended)<br>& Detroit River | 42°17'49"<br>083°05'41" | Detroit River |
| 047 | Dearborn St. (B45)<br>Dearborn St. & Rouge River | 42°17'26"<br>083°06'59" | Old Channel<br>Rouge River |
| 073 | Riverdale (B79)<br>Florence & Rouge River | 42°24'36"<br>083°16'13" | Rouge River |

7) the outfalls that immediately follow this paragraph are also included in the Limited Discharge Authorization. These are untreated CSOs that represent the remaining non-core outfalls that will be required to be addressed under the adaptive management CSO correction program. They include the high-priority non-core CSOs. Note that the list of untreated CSO outfalls is flexible and may be adjusted with the adaptive management CSO correction program.

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 005 | McClellan (B03)<br>McClellan (extended) &<br>Detroit River | 42°21'20"<br>082°58'02" | Detroit River |
| 006 | Fischer (B04)<br>Fischer & Detroit River | 42°21'16"<br>082°59'15" | Detroit River |
| 007 | Iroquois (B05)<br>Iroquois & Detroit River | 42°21'14"<br>082°59'21" | Detroit River |
| 008 | Helen (B06)<br>Helen & Detroit River | 42°20'40"<br>083°00'06" | Detroit River |
| 009 | Mt. Elliott (B07)<br>Mt. Elliott & Detroit River | 42°20'24"<br>083°00'28" | Detroit River |
| 011 | Adair (B09)<br>Adair & Detroit River | 42°20'16"<br>083°00'41" | Detroit River |
| 012 | Joseph Campau (B10)<br>Joseph Campau & Detroit River | 42°10'08"<br>083°01'02" | Detroit River |
| 016 | Orleans Relief (B15)<br>Orleans (Eastside of) &<br>Detroit River | 42°19'54"<br>083°01'36" | Detroit River |
| 017 | Orleans (B14)<br>Orleans (Westside of) &<br>Detroit River | 42°19'53"<br>083°01'37" | Detroit River |
| 018 | Riopelle (B16)<br>Riopelle & Detroit River | 42°19'52"<br>083°01'42" | Detroit River |
| 019 | Rivard (B17)<br>Rivard & Detroit River | 42°19'48"<br>083°01'55" | Detroit River |
| 020 | Hastings (B18)<br>Schweizer Place & Detroit River | 42°19'46"<br>083°02'03" | Detroit River |
| 021 | Randolph (B19)<br>Randolph & Detroit River | 42°19'29"<br>083°02'26" | Detroit River |
| 022 | Bates (B20)<br>Bates & Detroit River | 42°19'38"<br>083°02'32" | Detroit River |
| 023 | Woodward (B21)<br>Woodward & Detroit River | 42°19'37"<br>083°02'35" | Detroit River |
| 025 | First-Hamilton (B23)<br>First (extended) & Detroit River | 42°19'30"<br>083°02'57" | Detroit River |
| 026 | Third St. (B24)<br>Third St. & Detroit River | 42°19'28"<br>083°03'07" | Detroit River |

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 027 | Cabacier (B25)<br>Brooklyn (extended) &<br>Detroit River | 42°19'24"<br>083°03'26" | Detroit River |
| 028 | Eleventh St. (B26)<br>Eleventh St. & Detroit River | 42°19'17"<br>083°03'46" | Detroit River |
| 031 | Eighteenth St. (B29)<br>Eighteenth St. & Detroit River | 42°18'57"<br>083°04'31" | Detroit River |
| 033 | Twenty-Fourth St. (B31)<br>Twenty-Fourth St. & Detroit River | 42°18'47"<br>083°04'42" | Detroit River |
| 038 | Summit-Clark (B36)<br>Summit & Detroit River | 42°18'14"<br>083°05'18" | Detroit River |
| 039 | Ferdinand (B37)<br>Ferdinand & Detroit River | 42°18'13"<br>083°05'19" | Detroit River |
| 040 | Morrell (B38)<br>Morrell & Detroit River | 42°18'10"<br>083°05'22" | Detroit River |
| 044 | Schroeder (B42)<br>Schroeder & West Jefferson | 42°17'32"<br>083°06'00" | Detroit River |
| 046 | Cary (B44)<br>Cary & Rouge River | 42°17'29"<br>083°06'47" | Old Channel<br>Rouge River |
| 059 | Warren (B54)<br>West Warren & Rouge River | 42°20'34"<br>083°14'57" | Rouge River |
| 060 | Tireman (B56, 57 & 58)<br>Tireman & Rouge River | 42°20'59"<br>083°14'51" | Rouge River |
| 061 | West Chicago (B60, 61 & 62)<br>West Chicago & Rouge River<br>(East Shore) | 42°21'46"<br>083°14'56" | Rouge River |
| 062 | West Chicago (B63)<br>West Chicago & Rouge River<br>(West Shore) | 42°21'52"<br>083°15'18" | Rouge River |
| 063 | Plymouth (B64)<br>Plymouth & Rouge River | 42°22'18"<br>083°15'21" | Rouge River |
| 064 | Glendale Relief (B65)<br>Rouge Park Golf Course | 42°22'33"<br>083°14'52" | Rouge River |
| 065 | Lahser (Dolson) (B67 & 68)<br>Lahser & Rouge River | 42°22'52"<br>083°15'23" | Rouge River |
| 066 | Schoolcraft (B70)<br>Jeffries Freeway, I-96 & Rouge River | 42°23'07"<br>083°16'02" | Rouge River |

| OUTFALL | LOCATION | LAT/LONG | RECEIVING STREAM |
|---|---|---|---|
| 067 | West Parkway (B69)<br>Jeffries Freeway, I-96 & Rouge River | 42°23'07"<br>083°16'02" | Rouge River |
| 068 | Brammel (B71)<br>Ray & Rouge River | 42°23'30"<br>083°15'56" | Rouge River |
| 069 | Lyndon (B72)<br>Lyndon & Rouge River | 42°23'35"<br>083°15'57" | Rouge River |
| 072 | Puritan (B77)<br>Puritan & Rouge River (East Shore) | 42°24'28"<br>083°16'14" | Rouge River |
| 074 | McNichols (B80 & 81)<br>West McNichols & Rouge River | 42°24'52"<br>083°15'59" | Rouge River |
| 075 | Glenhurst (B82)<br>Glenhurst & Rouge River | 42°25'32"<br>083°16'19" | Rouge River |
| 077 | Seven Mile (B85)<br>West Seven Mile & Rouge River (East Shore) | 42°25'44"<br>083°16'09" | Rouge River |
| 079 | Pembroke (B87)<br>Frisbee & East Shore Rouge River | 42°26'02"<br>083°16'24" | Rouge River |

Nothing in this section of the permit shall be construed to limit the State of Michigan's ability to pursue remedies under the Michigan Act.

b. Qualified Operations and Maintenance Manager for CSO Discharges
The permittees shall place the wastewater collection system under the supervision of a qualified Operations and Maintenance Manager who shall serve as the contact person for the Department regarding combined sewer discharges. The permittees may replace the manager at any time and shall notify the Department within ten days after the replacement.

c. Disconnection of Eaves Troughs and Roof Downspouts
The permittees shall eliminate direct connections of eaves troughs and roof downspouts to the sewer system throughout the service area tributary to the Upper Rouge CSO outfalls (Outfalls 059-069, 072-075, 077, and 079). This requirement shall be completed for residential property and commercial and industrial properties or as approved by the Department consistent with the permittees' implementation of the Green Storm Water Infrastructure program. In addition, the permittees shall eliminate direct connections of eave troughs and roof downspouts in the service areas tributary to the CSO RTBs, to the CSO Screening & Disinfection Facilities, and to the remaining untreated CSOs based upon the plan detailed in the revised Long-term Control Program. This requirement does not apply if the permittees demonstrates that the disconnection of eaves troughs and roof downspouts is not a cost-effective means of reducing the frequency or duration of combined sewer overflows or of maintaining compliance with this permit. Such a demonstration and supporting documentation shall be submitted to the Department for approval.

d. Collection System and CSO Treatment Facilities Operational Plan
The permittees shall continue implementation of the approved Collection System and CSO Treatment Facilities Operational Plan (Operational Plan). The implementation of the Operational Plan shall be coordinated with the WRRF Wet Weather Operational Plan that is required for development and implementation in accordance with Part I.A.11. of this permit.

On or before April 1 (annually), the permittees shall submit a revised Operational Plan for Department review and approval, which incorporates all changes made to the plan during the last calendar year (items 1-12 below), and supplies the annual discharge documentation (item 13 below). Any changes to the Operational Plan that affect the rate, volume, or characteristics of the discharge, or the system

storage and transportation for conveyance of wet weather flows, shall be submitted to the Department and approved prior to implementation. The operational plan shall define the hydraulic design constraints of the system during both dry and wet weather operation.

The plan shall include:

1) the procedures utilized at the permittees' CSO RTBs and Screening & Disinfection Facilities for adjustment of NaOCl disinfectant feed rates to minimize the discharge of total residual chlorine,

2) the procedures and schedule for sampling/monitoring the stored NaOCl disinfectant at the permittees' CSO RTBs and Screening & Disinfection Facilities to determine the concentration of available chlorine and assure that the stored NaOCl is of sufficient strength to provide effective disinfection,

3) the procedures for sampling/monitoring the available chlorine concentration of each load of NaOCl delivered to the permittees' CSO RTBs and Screening & Disinfection Facilities,

4) if applicable, the procedures utilized at the permittees' CSO RTBs and Screening & Disinfection Facilities for adjustment of dehalogenating reagent feed rates to minimize the discharge of excess reagent,

5) the procedures to ensure that the collection and treatment systems are operated to maximize treatment,

6) the procedures to ensure that all dry weather flows are conveyed to the treatment facilities for treatment without bypass,

7) the hydraulic profile and hydraulic operational elevations for system pump stations, regulators, diversion devices, gates, level sensors, interceptors, etc., to ensure the conveyance of all dry weather flows to the treatment facilities for treatment without bypass,

8) the procedures to ensure that the sewerage system hydraulic and storage capacity is identified and fully utilized during wet weather events with eventual treatment of stored flows,

9) the procedures to ensure that the greatest quantity of wet weather flow is conveyed to the treatment facilities for treatment to minimize untreated wastewater discharges within the region tributary to the GLWA WRRF,

10) the hydraulic profile and hydraulic operational elevations for system pump stations, regulators, diversion devices, gates, level sensors, interceptors, etc., to ensure that the greatest quantity of wet weather flow is conveyed to the treatment facilities for treatment to minimize combined sewage discharges,

11) the procedures for ongoing inspection of the sewer system within the permittees' jurisdiction for excessive inflow and infiltration and, where necessary, reduction of the excessive infiltration and inflow sources, and the elimination of unauthorized sewer system connections, and

12) identification of the location of the rain gauges.

13) The permittees shall submit annual reports that supply the documentation of rainfall and the frequency, duration, and volume of all discharge events during the previous 12-month period (from January 1st through December 31st of the previous year).

The permittees shall continue to pursue the coordination of operational plans (Regional Operational Plan) with tributary communities with the intent of maximizing flow conveyance to the GLWA system and minimizing regional CSOs. Once the Regional Operational Plan is approved by the Department, it shall be implemented.

e. New Wastewater Flows

Increased levels of discharge of sanitary sewage from the combined sewer overflow outfalls listed in Part I.A.15.a. of this permit, the CSO RTBs (see Part I.A.6. of this permit), and the CSO Screening and Disinfection Facilities (see Part I.A.7. of this permit) are prohibited unless:

1) the increased discharges are the result of new sanitary wastewater flows which, on the basis of sound professional judgment, are within design peak dry weather transportation capacity, or

2) the permittees have officially adopted and are timely implementing a definite program, satisfactory to the Department, leading to the construction and operation of necessary collection, transportation, or treatment devices.

f. CSO Control Projects

1) Pertinent CSO Program History

The permittees are continuing to implement CSO Control Programs for the various CSO outfalls that discharge to the Rouge River and the Detroit River. Depending upon the particular CSO Control Program and outfall, the permittees are required to provide for the prohibition, elimination, or adequate treatment of combined sewage discharges containing raw sewage, to comply with the Water Quality Standards at times of discharge.

For the CSO outfalls discharging to the Rouge River, the development and implementation of the CSO Control Programs for the various outfalls was initially established based upon the goals of the Rouge River Remedial Action Plan (RAP), which called for a phased approach to solving the water quality problems of the river. Phase I of the Rouge River RAP extended to 1993 and included 1) monitoring and optimization of the existing combined sewer system, 2) detailed local planning for CSO controls and 3) resolution of financing and institutional problems. Phase II of the Rouge River RAP extended to 2005 (2012 for a few limited outfalls) and called for facility construction based on the goal of protection of public health through the elimination of raw sewage discharges and the control of toxic pollutants. Phase III of the Rouge River RAP follows completion of Phase II facilities and includes further improvements, if necessary, to comply with water quality standards at the time of discharge. Due to the demonstrated financial capability of the permittees for City of Detroit residents in 2009, 2012 and 2017, the CSO Control Program for the CSOs discharging to the Rouge River has been revised as reflected below.

For the CSO outfalls discharging to the Detroit River and the Old Channel of the Rouge River, Department approval of the CSO Control Programs is determined on a case-by-case basis with considerations for environmental impacts, public health impacts, technical feasibility, and economic affordability. As was the case for the Rouge River program, the demonstrated financial capability of the permittees for City of Detroit residents in 2009, 2012 and 2017 also affected the CSO Control Program for the Detroit River and the Old Channel of the Rouge River, and has been revised as reflected below.

In addition, the CSO Control Program now includes significant Green Storm water Infrastructure (GSI) requirements that are an important component of the approved Long-Term CSO Control Program.

Previous Long-Term CSO Control Program Documents include:

- Original Long-Term CSO Control Plan (1996)
- Long-Term CSO Control Plan Update (2002)
- Amendment Rouge (2008)
- Amendment Detroit (2008)
- Evaluation of CSO Control Alternative (for the Upper Rouge Outfalls) (December 15, 2009)

- Supplemental Report on Alternative CSO Controls for the Upper Rouge Outfalls) (April 30, 2010)

The implementation and completion of the CSO Control Program indicated in Part I.A.15.f. and g. are a necessary and essential requirement of this permit.

2) CSO Correction Program Moving Forward

The permittees shall control remaining combined sewer discharges, that are not classified as either extreme or minimal (see Part 1.A.15.a.5) & 6)), to eliminate the discharges or provide adequate treatment of the combined sewage discharges to comply with Water Quality Standards at times of discharge. Upon completion of the RRO disinfection project at the GLWA WRRF and commencing final use of Outfall 050A, the permittees will have completed core elements of their CSO control program and will have achieved a very high level of CSO control. It has been determined that this core level of control has routinely achieved adequate treatment of 95% of the annual combined sewer volume to the collection system. While additional CSO control measures are needed to fully comply with Michigan's Water Quality Standards, as the permittees moves into the final phases of the CSO control program it is appropriate to plan and schedule the remaining control measures, taking into account what has been put in place to date and lessons learned, the unique technical and financial situation of the city of Detroit, and the nature of the remaining CSO challenges.

Based on the foregoing, the permittees shall proceed with remaining CSO corrections using an adaptive management approach. This means that as new information is gained from: (1) evaluation of existing CSO projects and new treatment technologies, (2) evaluation of real-time collection system controls, (3) more accurate and complete data on CSO discharge frequency and volume, (4) benefits of less flow to the collection system from green storm water infrastructure (GSI), (5) benefits of less flow to the collection system due to the City's drainage charge program and new storm water ordinance, (6) benefits of less flow to the collection system as the City continues its sewer rehabilitation program, and (7) any other pertinent information, future CSO controls can be adapted to best provide cost-effective elimination of discharges, adequate treatment of discharges, or classification of discharges as minimal or extreme. Note that for purposes of designing CSO correction projects, minimal discharge is defined as less than 0.3 MG of discharge over a five year period, and extreme is defined as; (a) no more than one untreated discharge in ten years from a CSO outfall during the April 1 through October 31 growth period, (b) modeled to not discharge at the 25 year – 24 hour event (during growth period, with normal soil moisture, rainfall distributed to a SCS Type II distribution), or (c) monitored to occur only at rainfalls greater than 4 inches in a 24 hour period. The performance standard can be based on actual monitoring data normalized for a typical and representative 10-year period of rainfall record or predictively determined based on a calibrated and verified continuous model using a typical and representative 10-year period of rainfall record or other method as determined acceptable by the Department.

The permittees shall propose the non-core CSO correction projects to be designed, constructed, and operated to provide CSO elimination or adequate treatment during the subsequent five-year permit cycle, with each permit reapplication beginning in April 2022. High priority non-core outfalls should generally be addressed first, and outfalls thought of as high priority can change at any time due to implementation of the adaptive management approach. City of Detroit residents within the DWSD service area are "high burden" status based on sewer fees paid as a percentage of median annual household income. Planning of CSO control measures may reflect the permittees' financial capacity for City of Detroit residents determined in the Financial Capability Evaluation that is submitted with each permit reapplication. Based on current and projected CSO capital revenue requirements, and the current average cost per Detroit household for wastewater treatment and CSO control as a percentage of Detroit median household income, the Department does not expect the permittees to propose non-core CSO correction projects with this permit. The permittees shall next propose non-core CSO correction projects for review and approval with the permit reapplication required by April 4, 2022 (and then on April 4, 2027, and April 4, 2032). However, this first tier of non-core projects during 2023 through 2027 is expected to be relatively low cost. Discussion between the permittees and the Department have determined that low cost projects can include connection of CSO discharges to existing CSO treatment facilities, limited storage projects based on the performance standard with no disinfection, outfall gates and in-system storage projects, increased regulator flow capacity, separation projects that use smaller sanitary pipes in existing larger combined sewers to carry sanitary sewage to

GLWA interceptors while the existing combined sewer becomes a storm sewer, and others. At each application submittal in 2022, 2027, and 2032, the project proposal shall include an updated Financial Capability Evaluation that may also include other financial factors as appropriate. Reissued permits will then be drafted and issued with schedules for approved CSO correction projects that provide continuing progress toward meeting water quality standards. The permittees shall prepare an evaluation of Financial Capability, consistent with state and federal guidance, and shall submit the evaluation with the applications for reissuance of this permit (see the cover page of this permit for the next application due date). The Financial Capability Report shall be in the form of previous reports utilizing the EPA Financial Capability Guidance Document (USEPA 832-B-97-004; February, 1997), and updated with information as may be available in order to assess the permittees' ability to undertake future capital improvement projects related to the Long-Term CSO Control Program. This permit may be modified in accordance with applicable law and rules to incorporate revisions to conform to pertinent laws or rules, or as necessary to address prevailing situations.

Based on information currently available, the following are lists by water body that are high priority CSOs that require control. These outfalls can be revised at any time by the permittees or the Department, reflecting adaptive management considerations. While either the permittees or Department can propose changes at any time, an agreement between the two parties is required and shall be made in writing. The goal will be to complete projects fully addressing all high priority outfalls before October 1, 2037.

Rouge River non-core CSOs (these can be changed by mutual agreement between the permittees and the Department)

| High Priority Outfalls |
|---|
| 059, 061, 064, 065, 074 |

Detroit River non-core CSOs (these can be changed by mutual agreement between the permittees and the Department)

| High Priority Outfalls |
|---|
| 005, 007, 009, 012, 022, 025, 031, 038 |

3) Adaptive Management Program for this Permit

The adaptive management approach for this permit, before beginning relatively low cost CSO correction projects from 2023-2027, looks at the (1) evaluation of existing CSO projects and new treatment technologies, (2) evaluation of real-time collection system controls, (3) more accurate and complete data on CSO discharge frequency and volume, (4) benefits of less flow to the collection system from green storm water infrastructure (GSI), (5) benefits of less flow to the collection system due to the City's drainage charge program and new storm water ordinance, (6) benefits of less flow to the collection system as the City continues its sewer rehabilitation program, and (7) any other pertinent information. The permittees shall use the above measures, as appropriate, to further reduce untreated CSO discharges on an ongoing basis from the collection system before starting CSO projects from 2023 - 2037.

On or before April 1st (annually starting in 2020), the permittees shall prepare a joint Progress Report that summarizes; 1) significant real time controls that occurred during the preceding calendar year, 2) GSI implementation work during the preceding year that has been undertaken and completed, including a work plan for GSI implementation projects for the next year, documentation of the annual expenditure for the preceding year, and documentation of a cumulative total-spent-to-date on the GSI program, 3) benefits from the new storm water ordinance and green credit program, and 4) benefits from the City sewer rehabilitation program. The report shall summarize the total benefits from all programs by including; a) an updated estimate of the annual volume of wet weather flow that has been removed from the combined sewer system, b) the resulting frequency, volume and duration of CSO discharges (based on actual monitoring), and c) the predicted change modeled continuously and at design events to frequency, volume and duration of CSO discharges based on the calibrated hydraulic model developed in the Master Plan effort. The report shall reference the CSO discharge report submitted under Part I.A.15.d.(13) of this permit and include the pertinent data as a reference. As part of this reporting process, it shall be documented that an average of $3 million dollars per fiscal year was spent for 2018

and 2019, and $2 million dollars per year for 2020, 2021, and 2022 for the GSI program (these expenditures are an enforceable requirement of this permit).

A more complete description of the adaptive management approach includes:

a) Real-time Control

The GLWA is in the process of determining if real-time control can be used to help further minimize or even eliminate some untreated CSO discharges. One real-time control discussion currently taking place is the Interim Wet Weather Operations Plan (IWOP). The operational changes agreed to between the permittees and the Department in the IWOP will be reported in the Operational Plan Annual Update (Part 1.A.15 d.). The IWOP is evaluating if critical system regulators, gates, pumps, etc., can be adjusted to allow for more treated CSO, and less untreated CSO from the remaining CSO outfalls. Approved adjustments will be at least acceptable until completion of all non-core CSO correction projects and shall be included in Operational Plan Annual Updates. The evaluation shall include all necessary supporting documentation, including hydraulic model runs if appropriate.

b) Green Storm Water Infrastructure (GSI)

For the west side of the City, there is a GSI program in the tributary area to Rouge River Outfalls 059-069, 072-075, 077, and 079. DWSD has developed and is implementing a Department approved GSI Plan for this area consistent with the "Evaluation of CSO Control Alternatives" report dated December 15, 2009. The GSI Plan describes a process for locating, designing, constructing, operating, and evaluating GSI in these sewersheds. GSI implementation shall be planned to capture, reduce, or otherwise control wet weather flows that would otherwise flow into the sewer system and contribute to CSOs, at the permittees' direction. The Plan includes the following elements:

(1) Provisions for disconnection of residential downspouts and disconnection of commercial and industrial downspouts where feasible (see Part I.A.15.c.).

(2) Provisions for demolition and removal of vacant structures and replacement with pervious land cover. Where demolition is planned and implemented at sites that will be re-purposed for GSI, the demolition specifications shall ensure that basements and other impervious surfaces at the sites are removed, that the site is raked to remove large rocks and construction debris, and that engineered soils consisting of an appropriate mix of topsoil, compost, and sand is applied following the demolition to support plant growth and promote infiltration.

(3) Provisions for installation of bioswales along roadways and parking lots to intercept runoff and reduce storm water inputs to the combined sewer system from impervious surfaces.

(4) Provisions for installation of GSI and/or BMPs at commercial and residential properties to capture and retard storm water runoff.

(5) Provisions for tree planting for uptake and evapotranspiration along roadways and open spaces.

(6) Provisions for other GSI implementation projects as determined to be appropriate.

(8) Processes for public outreach and public participation in selecting sites and implementing GSI practices.

(9) Procedures/methods for tracking GSI implementation and measuring effects.

(10) Provisions for ensuring appropriate maintenance of sites where GSI has been implemented, including roles and schedules for maintenance.

(11) Provisions for ensuring storm water management (runoff reduction) benefits associated with GSI implementation continue over time, even as redevelopment may occur in the sewersheds.

The permittees shall continue to implement GSI in these sewersheds. The investment in GSI in these sewersheds shall be an average of 3 million dollars per fiscal year for the ten-year period ending 2019

(for a total of $30 million), and an average of 2 million dollars per year for the following 10 years (for a total of $20 million). GSI implementation will be in accordance with the GSI Plan.

For the near-east side of the City, there has been another GSI program in the tributary area to Detroit River Outfalls 005 - 009, 011, and 012. Because of the potential for some larger-scale green projects due to a relatively large amount of vacant land in the area, it may be possible to eliminate or reduce the size of some previously envisioned CSO treatment facilities for this area using the combination of GSI implementation along with possible sewer separation, and other engineering solutions. With GSI implementation now spreading across the city, it is acceptable for the city to use one-third (1/3) of the total GSI expenditures on projects upstream of untreated CSOs other than Rouge River Outfalls 059-069, 072-075, 077, and 079.

c) Storm Water Control

1) On or before April 1, 2018, (submitted) the permittees shall submit to the Department for review and approval a storm water control requirement for areas of new development and/or redevelopment. This storm water control requirement is primarily a focus within the Rouge Sewer District and Central Sewer District, as it is these two Districts that have untreated CSOs. Therefore, the permittees shall propose a level of storm water control for new development and redevelopment in these two sewer districts, and for the circumstances stated above, that is designed to help further reduce the volume and frequency of untreated CSO discharges, and a procedure and schedule for implementing this control requirement.

2) Storm water runoff from new development and redevelopment that will be conveyed through storm sewers to DWSD's combined sewers will require control to help further reduce volume and frequency of untreated CSO discharges. These are projects that will require construction plan review by the permittees, and a Part 41 construction permit issued by the Department. Please note that in most cases, new combined sewers will no longer be permitted under Part 41 (except for combined sewer relocation projects). Note that this is not a requirement for storm sewers subject to Permit No. MIS040000 issued to the City of Detroit, as the storm sewers under MIS040000 discharge directly to surface waters and are not owned by the DWSD.

d) City Sewer Rehabilitation

DWSD is currently working on a more robust annual program to remove infiltration/inflow (I/I) from its combined collection system. It is the Department's understanding that this program has a budget of about $20 million per year.

g. Combined Sewer Overflow Control Program Schedule

1) West-side Model; Rouge River Outfalls 059-069, Outfalls 072-075, Outfall 077, and Outfall 079. For untreated combined sewer overflows from Outfalls 059-069, Outfalls 072-075, Outfall 077, and Outfall 079, the permittees shall determine the accurate frequency and volume of untreated CSO discharges and amend the "Supplemental Report on Alternative CSO Controls for the Upper Rouge River," dated April 30, 2010 according to the following schedule:

a) The work plan has been approved by the Department that (1) sets forth the monitoring of the 17 CSOs that will be accomplished to accurately determine the frequency and volume of these untreated CSO discharges, (2) uses this monitoring along with the current Ovation monitoring as appropriate in a calibrated and verified model to accurately detail the volume and frequency of the 17 CSOs during a representative and typical 10-year period of rainfall record, and (3) to determine the peak hour flow at the 10 yr – 1 hr event of each of the 17 CSOs. The permittees shall continue to implement the approved work plan.

b) On or before April 15, 2019, (submitted) the permittees shall submit a report to the Department for review and approval that summarizes the determination and provides the volume and frequency of these 17 CSOs over a representative and typical 10-year period of rainfall record and provides the peak hour flow at the 10 yr – 1 hr event for each of these 17 CSOs;

c) On or before November 15, 2022, the permittees shall submit an amendment for Department review and approval to the "Supplemental Report on Alternative CSO Controls for the Upper Rouge River" (dated April 30, 2010) that describes any changes to the recommended long-term CSO control projects for the 17 CSOs. This plan may propose an alternative to the use of 10 minutes of detention at the 10 year – 1 hour event, at the permittees' discretion;

2) Near eastside; Detroit River Outfalls 005-009, 011, and 012. The permittees shall develop a revised CSO Control Plan for this tributary area in accordance with the following schedule:

On or before November 15, 2022, the permittees shall submit to the Department for review and approval an update to their Long-term CSO Control program (Detroit update 2008) for providing elimination or adequate treatment of CSO Outfalls 005-009, Outfall 011, and Outfall 012 to meet water quality standards at times of discharge. This plan shall consider the GI recommendations and potential for storm water reduction from the completed 205(j) report for this area. This plan may propose an alternative control requirement for the Long-term CSO control program.

3) The permittees may choose to offer an entire updated Long-term CSO Control program for all Detroit River CSOs. This updated plan can include a totally revised Detroit update (2008) for all remaining CSOs. Note that CSOs can be prohibited, eliminated, or adequately treated to meet water quality standards at times of discharge. If the permittees decide to pursue this approach, then the revised plan is due on or before November 15, 2022, for Department review and approval.

Following implementation of any phase of any of the approved Control Programs contained in Part I.A.15.f. and g. of this permit, the Control Program(s) may be reevaluated by the permittees or the Department. Future permits may include requirements to conduct water quality evaluations designed to verify that the overall CSO control program is providing adequate treatment to meet water quality standards. This permit may be modified in accordance with applicable laws and rules, to incorporate revisions necessary to conform to pertinent rules or laws, or as necessary to address prevailing situations, such as technical or financial constraints.

h. Notification and Testing Requirements

The federal rule promulgated by the United States Environmental Protection Agency in 40 CFR Part 122 establishing the public notification requirements for CSO discharges to the Great Lakes basin took effect February 7, 2018.

On or before August 7, 2018, (submitted) the permittees shall submit to the Department for approval, a public notification plan in accordance with 40 CFR 122.38(c). Additionally, on or before April 4, 2022, with the application for reissuance, the permittees shall submit to the Department for approval, an updated public notification plan.

Beginning November 7, 2018, all permittees authorized to discharge untreated or treated CSO to the Great Lakes Basin must provide public notification of CSO discharges in accordance with 40 CFR 122.38(a) and the approved public notification plan. The requirements include but are not limited to the following: notification of the local public health department, other potentially affected public entities and the public; and signage, where feasible at discharge points and other potentially impacted public access areas. In addition, in accordance with Section 324.3112a of the NREPA, the permittees shall provide notification to a newspaper of general circulation in the county in which the discharge occurred or is occurring. To the extent that a conflict may arise between Part I.A.15.h. and Part I.A.16., the Department approved Public Notification Plan shall govern.

## 16. Untreated or Partially Treated Sewage Discharge Reporting and Testing Requirements

In accordance with Section 324.3112a of the NREPA, if untreated or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittees are 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 permittees 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 permittees' discharge of untreated or partially treated sewage, and, if those municipalities wish to be notified in the same manner as specified above, the permittees shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

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

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

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.

## 17. Pollutant Minimization and Source Evaluation Program for Perfluorooctane Sulfonate (PFOS) and/or Perfluorooctanoic Acid (PFOA)

The goal of the Pollutant Minimization and Source Evaluation Program is to identify and address sources of perfluorooctane sulfonate (PFOS) and/or perfluorooctanoic acid (PFOA) and to reduce and maintain the effluent concentrations of PFOS and/or PFOA at or below the water quality standards (WQS) and/or the Water Quality-Based Effluent limit (WQBEL). The WQS is 11 **ng/L** for PFOS and the WQBEL for PFOA is 8.04 **ug/l**.

On or before October 1, 2019, the permittee shall submit an approvable Pollutant Minimization and Source Evaluation Program for PFOS and/or PFOA to proceed toward the goal. The Pollutant Minimization and Source Evaluation Program shall continue work under the IPP Interim Initiative and shall include the following at a minimum:

a. Identification of and strategies to identify any additional potential and probable PFOS and/or PFOA sources

b. Monitoring plan for the permitted facility's influent and effluent and effluent from potential sources

c. Implemented measures thus far to eliminate, reduce, and/or control sources, and an assessment of the degree of success and the strategies used to measure success

d. Proposed measures and implementation schedules for elimination, control, and/or reduction of the identified sources (prioritizing highest loadings and concentrations), and the strategies that will be used to measure success

The Pollutant Minimization and Source Evaluation Program shall be implemented upon approval by the Department.

On or before May 1 of each year following Pollutant Minimization and Source Evaluation Program implementation, the permittee shall submit to the Department a status report for the previous calendar year. Upon written notification by the Department, the permittee may be required to submit more frequent status reports. Status reports at a minimum shall include:

a. Complete listing of PFOS and/or PFOA sources

b. Summary of influent and effluent monitoring data

c. Summary of monitoring data from known or potential sources

d. History and compliance status for sources

e. Implemented measures to eliminate, reduce, or control sources, (prioritizing highest loadings and concentrations), and an assessment of the degree of success and the strategies used to measure success

f. Proposed measures and schedules for elimination, control, or reduction of any newly identified PFOS and/or PFOA sources (prioritizing highest loadings and concentrations), and the strategies that will be used to measure success

g. Barriers to implementation and revisions to the implementation schedule

h. Laboratory reports, if not previously supplied

Any information generated as a result of the Pollutant Minimization and Source Evaluation Program set forth in this permit may be used to support a request to modify the Pollutant Minimization and Source Evaluation Program or to demonstrate that the requirement has been completed satisfactorily.
A request for modification of the approved Pollutant Minimization and Source Evaluation Program shall be submitted in writing to the Department along with supporting documentation for review and approval. The Department may approve modifications to the approved Pollutant Minimization and Source Evaluation Program, including a reduction in the frequency of the influent and known or potential source monitoring requirements. Approval of a Pollutant Minimization and Source Evaluation Program modification does not require a permit modification.

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

## 18. Collection System Contingency Plan

An emergency condition at the WRRF might occur that requires reduced (or even no) influent flows to the WRRF. Under Rule 299.2959 of Part 41, the permittee is required to minimize discharge of excessive pollutants. On or before July 1, 2020, the permittee shall submit to the Department for review and approval, a report that documents how the collection system and WRRF would be operated if an emergency condition required reduced influent flow (or no flow) to the WRRF to minimize discharge of excessive pollutants per Rule 299.2959 of Part 41 of PA 451. This could involve in-system storage of flows, use of Retention Treatment Basins for storage and potentially treated discharge, rerouting of flow, use of portions of the WRRF as appropriate, etc. The report shall evaluate operation of the collection system and WRRF, considering at least two hypothetical conditions with no influent flow to the WRRF; a duration of six (6) hours of no influent flow, and a duration of 24 hours of no influent flow.

## 19. Facility Contact

The "Facility Contact" was specified in the application. The permittees 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 obviates the permittees from properly submitting reports and forms as required by law.

## 20. Monthly Operating Reports

Part 41 of Act 451 of 1994 as amended, specifically Section 324.4106 and associated R 299.2953, requires that the permittees 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 thirty (30) days of the effective date of this permit, the permittees 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 permittees 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 permittees may use alternate forms if they are consistent with the approved treatment facility monitoring program. Unless the Department provides written notification to the permittees 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.

## 21. Discharge Monitoring Report – Quality Assurance Study Program

The permittees 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 permittees 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.

## Section B. Storm Water Pollution Prevention

This section is not required.

## PART I

# Section C. Industrial Waste Pretreatment Program

## 1. Federal Industrial Pretreatment Program

a. The permittees shall implement the Federal Industrial Pretreatment Program approved on June 26, 1997, 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 permittees 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 Federal Industrial Pretreatment Program.

c. The permittees shall have the legal authority and necessary interjurisdictional agreements that provide the basis for the implementation and enforcement of the approved Federal Industrial Pretreatment Program 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 permittees shall develop procedures which describe, in sufficient detail, program commitments which enable implementation of the approved Federal Industrial Pretreatment Program, 40 CFR Part 403, and the Part 23 Rules in accordance with R 323.2306(c).

e. The permittees 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 Federal Industrial Pretreatment Program 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 Federal Industrial Pretreatment Program within the tributary governmental jurisdiction's boundaries.

f. The permittees shall prohibit discharges that:

1) cause, in whole or in part, the permittees, 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 permittees 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 permittees shall develop an enforcement response plan which describes, in sufficient detail, program commitments which will enable the enforcement of the approved Federal Industrial Pretreatment Program, 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 Federal Industrial Pretreatment Program which are necessary to ensure compliance with 40 CFR Part 403 and the Part 23 Rules in accordance with R 323.2309.

j. The permittees shall not implement changes or modifications to the approved Federal Industrial Pretreatment Program 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 permittees shall maintain an adequate revenue structure and staffing level for effective implementation of the approved Federal Industrial Pretreatment Program.

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

n. The permittees 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 June 1, 2021. 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 1 of each year, the permittees 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 1 and end on December 31. At a minimum, the Industrial Pretreatment Program Annual Report shall include:

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

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

3) a summary of results of all the sampling and analyses performed of the WRRF'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.

p, The permittee is required under this permit and R 323.2303(4) of the Michigan Administrative Code to review and update their local limits when:

1) New pollutants are introduced.

2) New pollutants that were previously unevaluated are identified

3) New water quality or biosolids standards are established or additional information becomes available about the nature of pollutants, such as removal rates and accumulation in biosolids.

Substantial increases of pollutants are proposed as required in the notification of new or increased uses in accordance with the provisions of 40 CFR 122.42.

## 2. Schedule for Notification to Contributing Jurisdictions

On or before May 1st and November 1st of each year, the permittees shall submit to the Department a report demonstrating the efforts and progress toward achieving the requirement of having all contributing jurisdictions adopt a legal authority that is equivalent to or more restrictive than the permittees', including the revised local limits to be incorporated by the permittees as result of the requirements of Part I.C.2. of this permit. This legal authority includes the provisions of Ordinance 08-05 (Detroit City Code Chapter 56, Article III. Division 3) and subsequent revisions to the local limits. These progress reports shall be submitted every six months until the requirement is achieved. The biannual progress reports shall contain:

a. a listing of all contributing jurisdictions,

b. the status of each contributing jurisdiction's adoption of adequate legal authority, and

c. for contributing jurisdictions who have not yet adopted adequate legal authority, a description of the steps/actions the permittees have taken to assure progress toward the contributing jurisdiction's adoption of adequate legal authority.

The permittees shall, to the best of its ability, work with those contributing jurisdictions who did not adopt adequate legal authority by January 1, 2008, to obtain such legal authority.

**PART I**

# Section D. Residuals Management Program

## 1. Residuals Management Program for Land Application of Biosolids

The permittees are authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the permittees' approved Residuals Management Program (RMP) approved on April 22, 2008, 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 permittees 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 permittees shall submit proposed modifications to the Department for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.

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

d. Contact Information
RMP related submittals to the Department shall be to the Southeast Michigan District Supervisor of the Water Resources Division. The Southeast Michigan District Office is located at 27700 Donald Court, Warren Michigan, 48092-2793, Telephone: 586-753-3750, Fax: 586-753-3751.

## 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.

**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. If the parameter concentration in any sample is less than the quantification limit, regard that value as zero when calculating the daily concentration. 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.

**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.

**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.

**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 permittees' 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.

**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 permittees 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)).

**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.

**Wet Weather Flow** is the wastewater flow (domestic, industrial, commercial and institutional) including infiltration and inflow that occurs as the result of a precipitation or snowmelt event.

**Wet Weather Event**, for the interim period, is defined as those days on which an average 0.10 inches or more of precipitation was recorded by six strategically located rainfall gauges (as defined in Part I.9.c.(10) of the Operational Plan) in the WRRF's service area, plus two days immediately following days of 0.10 inch to 1.00 inch days of precipitation or three days following days of 1.00 inch or more precipitation. Rainfall days are further limited to those days in which the air temperature exceeds 32° F (0° C) for at least an eight hour period. The permittee may demonstrate that certain events such as snowmelt, and other unforeseen events will be considered rainfall days.

The above definition of wet weather event is not adequate on a long term basis, or for the purposes of planning, designing, or implementing the combined sewer overflow improvements required in this permit. For purposes of planning and designing future CSO improvements, the permittee shall consider the effect of dewatering tributary storage basins on overall system recovery, both at the WRRF and CSO overflow points in the collection system.

For this permit while the Regional Operational Plan is being revised, if up to 930 MGD (including recycle) is being processed with secondary treatment at the WRRF and no primary flow is being discharged, then tributary combined or sanitary storage basins in the GLWA system may be dewatered. Such dewatering will not be considered a violation of this permit, even if contrary to the above Wet Weather Event definition. Once a revised Regional Operation Plan is developed, it shall be implemented once reviewed and approved by the Department.

Upon approval of the Department, an alternate "wet weather event" definition may be used.

**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.

**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. In accordance with the Department Approved Wet Weather Operational Plan (See Part I.A.11.), alternate requirements for 24-hour composite sampling may be utilized to satisfy the monitoring requirements of this permit.

**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 Section 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 permittees may use such procedures upon approval.

The permittees 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 permittees' laboratory Quality Control/Quality Assurance program.

## 3. Instrumentation

The permittees 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 permittees 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 permittees will not discharge during the first 60 days following the effective date of this permit, the permittees 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 permittees shall submit self-monitoring data via the Department's MiWaters system.

The permittees 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 permittees 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 permittees 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 permittees 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 permittees 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 permittees by notification in writing from the Department. In such cases, the permittees 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 permittees. Reissuance or modification of this permit or reissuance or modification of an individual permittees' authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittees.

## 4. Additional Monitoring by Permittees

If the permittees monitor 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.

## 5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittees 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 permittees 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 permittees accomplish 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 permittees becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. Other Reporting
The permittees 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 permittees become 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 permittees shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittees have 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 permittees 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.

# 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 permittees) has occurred, the permittees 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 permittees 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 permittees 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 permittees, 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 permittees submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass
If the permittees know 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 permittees 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 permittees becomes aware of the circumstances.

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 permittees 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 permittees 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 permittees are 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 permittees 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.

## 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 permittees shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittees and the new permittees 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 permittees are 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.

## 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 permittees 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 permittees 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 permittees 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 permittees 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 permittees shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittees 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 permittees shall either:

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

## 6. Containment Facilities

The permittees 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 permittees 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 permittees 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 permittees shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittees become 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 permittees 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 permittees from any responsibilities, liabilities, or penalties to which the permittees 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 permittees 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 F.
# GLWA Schedule of Project Needs 2020 through 2060

**Table 7-21. Schedule of Active and Future Planned CIP Projects WRRF Liquid Treatment Train**

| | CIP No. | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRELIMINARY TREATMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab of Ferric Chloride System | 211008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future Rehab of Ferric Chloride System (as necessary) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PS1 Improvements | 211006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future PS1 Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PS 2 Improvements - Phase II | 211005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PS2 Screen and Grit Improvements | 211007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future PS2 Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future PS2 Screen and Grit Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PS1 Screen and Grit Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future PS1 Screen and Grit Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| New Connection - Oakwood Interceptor to PS2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PRIMARY TREATMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab of Rectangular Clarifiers 1-12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab of Circular Clarifier Scum Removal | 211009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| New High Rate Clarification (HRC) System | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab Circular Clarifiers 17 and 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab Circular Clarifiers 13-16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SECONDARY TREATMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab RAS pumps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab of Secondary Clarifiers | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 1 and 2: EBPR w/ Oxygen and Hydraulic Optimization | 212008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 3 and 4: EBPR w/ Oxygen and Hydraulic Optimization | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 1 & 2: Step Feed and ILP Mods | 212008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 3 & 4: Step Feed and ILP Mods | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 1 & 2: Aerator Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aeration Decks 3 & 4: Aerator Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future Aeration Decks 1 & 2 Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future Aeration Decks 3 & 4 Improvements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **DISINFECTION** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Future rehab of Hypochlorite System (as necessary) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Convert to Sodium Hypo for all flow (if feasible) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assess Alternative Disinfectant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ANCILLARY FACILITIES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Underground Duct Bank Repair | 216001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Plant-Wide Fire Alarm | 216002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Potable Water, SFE, Natural Gas, Compressed Air (F) | 216003 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab SFE PS and secondary water system (F) | 216006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rehab Maint Bldg (F) | 216005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# Appendix G.
# Correspondences

# Appendix G.1
# Michigan Natural Features Inventory (MNFI) Correspondences

## Szyperski, Matt

**From:** Sanders, Michael <sander75@msu.edu>
**Sent:** Thursday, September 12, 2024 12:27 PM
**To:** Szyperski, Matt
**Cc:** Adkins, Ashley; Carter, Sarah
**Subject:** RE: RSR_5154_GLWA Rare Species Review Request 1 - West
**Attachments:** RSR Invoice 5154.pdf

**This message originated outside of Wade Trim**

Hello:

**Rare Species Review #5154 - Wayne County, MI**

**NOTE: invoice and information agreement are one attachment**

Thank you for the opportunity to review and comment on this activity for possible impacts to Michigan's rare natural features. Attached are the project invoice plus the Information Use Agreement that explains how our data can be used.

We will begin processing the review once payment is received and the signed Information Agreement is returned.

Please let me know if you have questions or comments.

V/r,

Mike Sanders

**Michael A. Sanders, M.S., M.A.**
*Environmental Review Specialist/Zoologist*
Michigan Natural Features Inventory
Michigan State University Extension
Office 517-284-6215
*mnfi.anr.msu.edu*
Report Rare Species Observations

MSU Extension programs and material are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status.

Michigan State University occupies the ancestral, traditional, and contemporary lands of the Anishinaabeg – Three Fires Confederacy of Ojibwe, Odawa and Potawatomi peoples. The university resides on land ceded in the 1819 Treaty of Saginaw.

Have you found a rare species? Follow the link below!
Learn How to Report Rare Species Observations

**From:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Sent:** Wednesday, August 28, 2024 5:17 PM
**To:** Korroch, Kraig <korroch@msu.edu>; Rogers, Rebecca <rlr@msu.edu>; Sanders, Michael <sander75@msu.edu>
**Subject:** RSR_5154_GLWA Rare Species Review Request 1 - West

---

**From:** Szyperski, Matt <mszyperski@wadetrim.com>
**Sent:** Wednesday, August 28, 2024 5:11:25 PM (UTC-05:00) Eastern Time (US & Canada)
**To:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Cc:** Delia, David <ddelia@wadetrim.com>
**Subject:** GLWA Rare Species Review Request 1 - West

Good Afternoon,

My name is Matt Szyperski with Wade Trim. We are currently working with Great Lakes Water Authority (GLWA) to attain CWSRF funding for a multiple-facility project they have planned, and, as part of the Project Planning Document we are putting together, we need a Rare Species Review completed by the MNFI for each of these nine locations. We reached out to Michael Sanders in June (we experienced a delay on this project), and he told us that the separation distance between the nine sites does not allow us to combine all the sites into one review, rather, the nine sites can be split up into three requests. This is one of three Rare Species Review requests that I will be submitting today. The attached PDF shows the three sites included in this request and the project boundaries for each site.

This project, which is essentially three projects rolled into one, consists of:

- Improvements to the chemical/mixing systems, screening system, HVAC system, power/lighting/building systems, and instrumentation/controls systems, access hatches, and storage space at the St. Aubin Screening and Disinfection Facility (SDF).
- Safety improvements and building rehabilitation at each of the nine CSO facilities.
- Control system upgrades at the Baby Creek and Belle Isle CSO Facilities.

The current conditions of each of the three sites included in this request are as follows:

- The Seven Mile CSO Facility (TR01S,R10E) is off Shiawassee Dr. just North of 7 Mile along the Rouge River. The boundaries of the project work are entirely inside the control building.
- The Puritan-Fenkell CSO Facility (TR01S,R10E) is off Fenkell Ave. just East of Telegraph Rd. along the Rouge River, and lies on the grounds of Eliza Howell Park. The boundaries of the project work are entirely inside the control building.
- The Hubbell-Southfield CSO Facility is along the Rouge River just West of TPC Michigan Golf Course. The boundaries of the project work are entirely within the control building and the headworks building.

Thanks, and let me know if there is anything else I can provide.

Best,

Matt

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Sanders, Michael <sander75@msu.edu>
**Sent:** Thursday, September 26, 2024 3:02 PM
**To:** Szyperski, Matt
**Subject:** RE: RSR#5154_(no subject)
**Attachments:** RSR 5154 Response Letter.pdf; RSR 5154 Section 7 Comments-Wayne County.pdf

**This message originated outside of Wade Trim**

**Rare Species Reviews #5154 – Wayne County, MI**

Hello:

Please find our response letters for Rare Species Review #5154 Also included are Section 7 Comments for those projects with a federal nexus.

Please let me know if you have questions or comments.

Thank you,

Mike Sanders

**Michael A. Sanders, M.S., M.A.**
*Environmental Review Specialist/Zoologist*
Michigan Natural Features Inventory
Michigan State University Extension
Office 517-284-6215
*mnfi.anr.msu.edu*
Report Rare Species Observations

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Have you found a rare species? Follow the link below!
Learn How to Report Rare Species Observations

**From:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Sent:** Wednesday, August 28, 2024 5:17 PM
**To:** Korroch, Kraig <korroch@msu.edu>; Rogers, Rebecca <rlr@msu.edu>; Sanders, Michael <sander75@msu.edu>
**Subject:** RSR#5154_(no subject)

**From:** Szyperski, Matt <mszyperski@wadetrim.com>
**Sent:** Wednesday, August 28, 2024 5:11:25 PM (UTC-05:00) Eastern Time (US & Canada)
**To:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Cc:** Delia, David <ddelia@wadetrim.com>
**Subject:** GLWA Rare Species Review Request 1 - West

Good Afternoon,

My name is Matt Szyperski with Wade Trim. We are currently working with Great Lakes Water Authority (GLWA) to attain CWSRF funding for a multiple-facility project they have planned, and, as part of the Project Planning Document we are putting together, we need a Rare Species Review completed by the MNFI for each of these nine locations. We reached out to Michael Sanders in June (we experienced a delay on this project), and he told us that the separation distance between the nine sites does not allow us to combine all the sites into one review, rather, the nine sites can be split up into three requests. This is one of three Rare Species Review requests that I will be submitting today. The attached PDF shows the three sites included in this request and the project boundaries for each site.

This project, which is essentially three projects rolled into one, consists of:

- Improvements to the chemical/mixing systems, screening system, HVAC system, power/lighting/building systems, and instrumentation/controls systems, access hatches, and storage space at the St. Aubin Screening and Disinfection Facility (SDF).
- Safety improvements and building rehabilitation at each of the nine CSO facilities.
- Control system upgrades at the Baby Creek and Belle Isle CSO Facilities.

The current conditions of each of the three sites included in this request are as follows:

- The Seven Mile CSO Facility (TR01S,R10E) is off Shiawassee Dr. just North of 7 Mile along the Rouge River. The boundaries of the project work are entirely inside the control building.
- The Puritan-Fenkell CSO Facility (TR01S,R10E) is off Fenkell Ave. just East of Telegraph Rd. along the Rouge River, and lies on the grounds of Eliza Howell Park. The boundaries of the project work are entirely inside the control building.
- The Hubbell-Southfield CSO Facility is along the Rouge River just West of TPC Michigan Golf Course. The boundaries of the project work are entirely within the control building and the headworks building.

Thanks, and let me know if there is anything else I can provide.

Best,

Matt

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Sanders, Michael <sander75@msu.edu>
**Sent:** Thursday, September 26, 2024 3:05 PM
**To:** Szyperski, Matt
**Subject:** RE: RSR_5155_GLWA Rare Species Review Request 2 - Central
**Attachments:** RSR 5155 Section 7 Comments-Wayne County.pdf; RSR 5155 Response Letter.pdf

**This message originated outside of Wade Trim**

**Rare Species Reviews #5155 – Wayne County, MI**

Hello:

Please find our response letters for Rare Species Review #5155. Also included are Section 7 Comments for those projects with a federal nexus.

Please let me know if you have questions or comments.

Thank you,

Mike Sanders

**Michael A. Sanders, M.S., M.A.**
*Environmental Review Specialist/Zoologist*
Michigan Natural Features Inventory
Michigan State University Extension
Office 517-284-6215
*mnfi.anr.msu.edu*
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**From:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Sent:** Wednesday, August 28, 2024 5:15 PM
**To:** Korroch, Kraig <korroch@msu.edu>; Rogers, Rebecca <rlr@msu.edu>; Sanders, Michael <sander75@msu.edu>
**Subject:** FW: RSR_5155_GLWA Rare Species Review Request 2 - Central

**From:** Szyperski, Matt <mszyperski@wadetrim.com>
**Sent:** Wednesday, August 28, 2024 5:11:31 PM (UTC-05:00) Eastern Time (US & Canada)
**To:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Cc:** Delia, David <ddelia@wadetrim.com>
**Subject:** GLWA Rare Species Review Request 2 - Central

Good Afternoon,

My name is Matt Szyperski, and I work at Wade Trim. We are working with Great Lakes Water Authority (GLWA) to attain CWSRF funding for a multiple-facility project they have planned, and, as part of the Project Planning Document we are putting together, we need a Rare Species Review completed by the MNFI for each of these nine locations. We reached out to Michael Sanders in June (we experienced a delay on this project), and he told us that the separation distance between the nine sites does not allow us to combine all the sites into one review, rather, the nine sites can be split up into three requests. This is one of three Rare Species Review requests that I will be submitting today.

This project, which is essentially three projects rolled into one, consists of:

- Improvements to the chemical/mixing systems, screening system, HVAC system, power/lighting/building systems, and instrumentation/controls systems, access hatches, and storage space at the St. Aubin Screening and Disinfection Facility (SDF).
- Safety improvements and building rehabilitation at each of the nine CSO facilities.
- Control system upgrades at the Baby Creek and Belle Isle CSO Facilities.

The current conditions of each of the three sites included in this request are as follows:

- The Oakwood CSO Facility is at the corner of Pleasant St. and Liddesdale St. East of the Rouge River. The project work boundaries are entirely within the CSO and pump station buildings.
- The Baby Creek SDF Facility is off Dix Ave. and Vernot Hwy., and lies in/near the grounds of Patton Recreation Center. The project work boundaries are entirely inside the SDF facility and pump station buildings.
- The St. Aubin SDF Facility is off Atwater St. across from Dubois St. and is along the Detroit River. The Project work boundaries are entirely within the SDF facility and backwater gate buildings.

Thanks, and let me know if there is anything else I can provide.

Best,

Matt

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Sanders, Michael <sander75@msu.edu>
**Sent:** Thursday, September 26, 2024 3:09 PM
**To:** Szyperski, Matt
**Subject:** RE: RSR_5156_GLWA Rare Species Review Request 3 - East
**Attachments:** RSR 5156 Response Letter.pdf; RSR 5156 Section 7 Comments-Wayne County.pdf

**This message originated outside of Wade Trim**

**Rare Species Reviews #5156 Wayne County, MI**

Hello:

Please find our response letters for Rare Species Review #5156. Also included are Section 7 Comments for those projects with a federal nexus.

Please let me know if you have questions or comments.

Thank you,

Mike Sanders

**Michael A. Sanders, M.S., M.A.**
*Environmental Review Specialist/Zoologist*
Michigan Natural Features Inventory
Michigan State University Extension
Office 517-284-6215
*mnfi.anr.msu.edu*
Report Rare Species Observations

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Have you found a rare species? Follow the link below!
Learn How to Report Rare Species Observations

**From:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Sent:** Wednesday, August 28, 2024 5:17 PM
**To:** Korroch, Kraig <korroch@msu.edu>; Rogers, Rebecca <rlr@msu.edu>; Sanders, Michael <sander75@msu.edu>
**Subject:** FW: RSR_5156_GLWA Rare Species Review Request 3 - East

**From:** Szyperski, Matt <mszyperski@wadetrim.com>
**Sent:** Wednesday, August 28, 2024 5:11:37 PM (UTC-05:00) Eastern Time (US & Canada)
**To:** Michigan Natural Features Inventory <mnfi@msu.edu>
**Cc:** Delia, David <ddelia@wadetrim.com>
**Subject:** GLWA Rare Species Review Request 3 - East

Good Afternoon,

My name is Matt Szyperski, and I work at Wade Trim. We are working with Great Lakes Water Authority (GLWA) to attain CWSRF funding for a multiple-facility project they have planned, and, as part of the Project Planning Document we are putting together, we need a Rare Species Review completed by the MNFI for each of these nine locations. We reached out to Michael Sanders in June (we experienced a delay on this project), and he told us that the separation distance between the nine sites does not allow us to combine all the sites into one review, rather, the nine sites can be split up into three requests. This is one of three Rare Species Review requests that I will be submitting today.

This project, which is essentially three projects rolled into one, consists of:

- Improvements to the chemical/mixing systems, screening system, HVAC system, power/lighting/building systems, and instrumentation/controls systems, access hatches, and storage space at the St. Aubin Screening and Disinfection Facility (SDF).
- Safety improvements and building rehabilitation at each of the nine CSO facilities.
- Control system upgrades at the Baby Creek and Belle Isle CSO Facilities.

The current conditions of each of the three sites included in this request are as follows:

- The Leib SDF Facility is off Mt. Elliot St. South of Waterloo St. The project work boundaries are entirely within the SDF facility building.
- The Belle Isle CSO Facility is on Belle Isle off Pleasure Dr. along the Detroit River. The project work boundaries are entirely within the CSO and pump station facility building.
- The Conner Creek CSO Facility is off Canal St. along Conners Creek. The project work boundaries are entirely within the control building.

Thanks, and let me know if there is anything else I can provide.

Best,

Matt

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

# Appendix G.2
# Tribal Historic Preservation Office (THPO) Correspondences

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Paula Carrick
12140 W. Lakeshore Drive
Brimley, Michigan 49715

Attention: Paula Carrick
Bay Mills Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Paula Carrick:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

This application is intended to secure low-interest loan funding through the Michigan Department of Environment, Great Lakes, and Energy (MI-EGLE) CWSRF, with distribution starting in fiscal year 2027.

This notice of opportunity to comment is being sent to you to fulfill the consultation requirement of Section 106 of the National Historic Preservation Act review process. Should you have any comments on potential impacts to known areas of religious, historic, and/or cultural significance in the area of the proposed project, please provide them before April 23rd, 2025. Any comments or concerns received will be included in the Final Project Plan.

The following are brief descriptions of the proposed projects:

**St. Aubin SDF – Disinfection, Screening, and Misc. Improvements Project** includes the following:

- Chemical feed system improvements;
- Storage and mixing system improvements;
- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
- Belle Isle CSO
- St. Aubin SDF
- Baby Creek SDF
- Hubble-Southfield CSO
- Oakwood CSO

Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

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If you have any questions on this request or need further information to complete a review of the proposed projects, please contact me at 313.961.3650 or at ddelia@wadetrim.com. Please direct any written communications to my office at 500 Griswold Street, Suite 2500, Detroit, MI 4826, with the subject heading *2026 GLWA Clean Water State Revolving Fund (CWSRF) CSO Facilities Improvements II Project*.

Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

J.M. Parks
12140 W. Lakeshore Drive
Brimley, Michigan 49715

Attention: J.M. Parks
Bay Mills Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear J.M. Parks:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

This application is intended to secure low-interest loan funding through the Michigan Department of Environment, Great Lakes, and Energy (MI-EGLE) CWSRF, with distribution starting in fiscal year 2027.

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- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
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- Baby Creek SDF
- Hubble-Southfield CSO
- Oakwood CSO

Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

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HZN2008

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February 5, 2025

Carolan Sonderegger
2605 N. West Bay Shore Dr.
Peshawbestown, MI 49682

Attention: Carolan Sonderegger
Grand Traverse Band of Ottawa and Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Carolan Sonderegger:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Courtney Hessell
2605 N. West Bay Shore Dr.
Peshawbestown, MI 49682

Attention: Courtney Hessell
Grand Traverse Band of Ottawa and Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Courtney Hessell:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Sammie Dyal
2605 N. West Bay Shore Dr.
Peshawbestown, MI 49682

Attention: Sammie Dyal
Grand Traverse Band of Ottawa and Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Sammie Dyal:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

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313.961.3650 • www.wadetrim.com

February 5, 2025

Molly Meshingaud
N14911 Hannahville B-1 Rd.
Wilson, MI 49896

Attention: Molly Meshingaud
Hannahville Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Molly Meshingaud:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

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313.961.3650 • www.wadetrim.com

February 5, 2025

Cory Sagataw
N14911 Hannahville B-1 Rd.
Wilson, MI 49896

Attention: Cory Sagataw
Hannahville Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Cory Sagataw:

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David J. Delia

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Senior Project Manager

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HZN2008

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February 5, 2025

Michael Schuster
N14911 Hannahville B-1 Rd.
Wilson, MI 49896

Attention: Michael Schuster
Hannahville Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Michael Schuster:

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David J. Delia

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Senior Project Manager

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313.961.3650 • www.wadetrim.com

February 5, 2025

Alden Connor
16429 Beartown Rd.
Baraga, MI 49908

Attention: Alden Connor
Keewenaw Bay Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Alden Connor:

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**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

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If you have any questions on this request or need further information to complete a review of the proposed projects, please contact me at 313.961.3650 or at ddelia@wadetrim.com. Please direct any written communications to my office at 500 Griswold Street, Suite 2500, Detroit, MI 4826, with the subject heading *2026 GLWA Clean Water State Revolving Fund (CWSRF) CSO Facilities Improvements II Project*.

Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Dione Price
16429 Beartown Rd.
Baraga, MI 49908

Attention: Dione Price
Keewenaw Bay Indian Community

Re: CSO Facilities Improvements II Project CWSRF

Dear Dione Price:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

This application is intended to secure low-interest loan funding through the Michigan Department of Environment, Great Lakes, and Energy (MI-EGLE) CWSRF, with distribution starting in fiscal year 2027.

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- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
- Belle Isle CSO
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- Baby Creek SDF
- Hubble-Southfield CSO
- Oakwood CSO

Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

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HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Alina Shively
N4698 US HWY 45
Watersmeet, MI 49969

Attention: Alina Shively
Lac Vieux Desert Band of Lake Superior Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Alina Shively:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Beth Schrader
N4698 US HWY 45
Watersmeet, MI 49969

Attention: Beth Schrader
Lac Vieux Desert Band of Lake Superior Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Beth Schrader:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
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313.961.3650 • www.wadetrim.com

February 5, 2025

Jay Sam
2608 Government Center Drive
Manistee, MI 49660

Attention: Jay Sam
Little River Band of Ottawa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Jay Sam:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Frank Beaver
2608 Government Center Drive
Manistee, MI 49660

Attention: Frank Beaver
Little River Band of Ottawa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Frank Beaver:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Melissa Wiatrolik
7500 Odawa Circle
Harbor Springs, MI 49740

Attention: Melissa Wiatrolik
Little Travese Bay Band of Odawa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Melissa Wiatrolik:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Caroline Moellering
7500 Odawa Circle
Harbor Springs, MI 49740

Attention: Caroline Moellering
Little Travese Bay Band of Odawa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Caroline Moellering:

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David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

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313.961.3650 • www.wadetrim.com

February 5, 2025

Lakota Hobia
2872 Mission Dr.
Shelbyville, MI 49344

Attention: Lakota Hobia
Gun Lake Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear Lakota Hobia:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

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If you have any questions on this request or need further information to complete a review of the proposed projects, please contact me at 313.961.3650 or at ddelia@wadetrim.com. Please direct any written communications to my office at 500 Griswold Street, Suite 2500, Detroit, MI 4826, with the subject heading *2026 GLWA Clean Water State Revolving Fund (CWSRF) CSO Facilities Improvements II Project*.

Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Kaila Akina
2872 Mission Dr.
Shelbyville, MI 49344

Attention: Kaila Akina
Gun Lake Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear Kaila Akina:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
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3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

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- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

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Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Shawn Mckenney
2872 Mission Dr.
Shelbyville, MI 49344

Attention: Shawn Mckenney
Gun Lake Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear Shawn Mckenney:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

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500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Douglas Taylor
311 State Street
Grand Rapids, MI 49503

Attention: Douglas Taylor
Nottawwaseppi Huron Band of the Potawatomi

Re: CSO Facilities Improvements II Project CWSRF

Dear Douglas Taylor:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

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Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Nottawaseppi Environmental
311 State Street
Grand Rapids, MI 49503

Attention: Nottawaseppi Environmental
Nottawwaseppi Huron Band of the Potawatomi

Re: CSO Facilities Improvements II Project CWSRF

Dear Nottawaseppi Environmental:

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

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313.961.3650 • www.wadetrim.com

February 5, 2025

Matthew Bussler
58620 Sink Road, Box 180
Dowagiac, MI 49047

Attention: Matthew Bussler
Pokagon Band of Potawatomi

Re: CSO Facilities Improvements II Project CWSRF

Dear Matthew Bussler:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
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February 5, 2025

Jennifer Kanine
58620 Sink Road, Box 180
Dowagiac, MI 49047

Attention: Jennifer Kanine
Pokagon Band of Potawatomi

Re: CSO Facilities Improvements II Project CWSRF

Dear Jennifer Kanine:

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February 5, 2025

Marcella Hadden
7500 Soaring Eagle Blvd.
Mt. Pleasant, MI 48858

Attention: Marcella Hadden
Saginaw Chippewa Indian Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear Marcella Hadden:

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David J. Delia, PE
Senior Project Manager

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February 5, 2025

William Johnson
7500 Soaring Eagle Blvd.
Mt. Pleasant, MI 48858

Attention: William Johnson
Saginaw Chippewa Indian Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear William Johnson:

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Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

The complete draft project plan will be available to the public on April 8th, 2025, on the **GLWA Website:** https://www.glwater.org/. Of you require a bound printed copy, please contact me and we can arrange for a physical copy to be mailed.

If you have any questions on this request or need further information to complete a review of the proposed projects, please contact me at 313.961.3650 or at ddelia@wadetrim.com. Please direct any written communications to my office at 500 Griswold Street, Suite 2500, Detroit, MI 4826, with the subject heading *2026 GLWA Clean Water State Revolving Fund (CWSRF) CSO Facilities Improvements II Project*.

Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Sally Kniffen
7500 Soaring Eagle Blvd.
Mt. Pleasant, MI 48858

Attention: Sally Kniffen
Saginaw Chippewa Indian Tribe

Re: CSO Facilities Improvements II Project CWSRF

Dear Sally Kniffen:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

1. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements,
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.

This application is intended to secure low-interest loan funding through the Michigan Department of Environment, Great Lakes, and Energy (MI-EGLE) CWSRF, with distribution starting in fiscal year 2027.

This notice of opportunity to comment is being sent to you to fulfill the consultation requirement of Section 106 of the National Historic Preservation Act review process. Should you have any comments on potential impacts to known areas of religious, historic, and/or cultural significance in the area of the proposed project, please provide them before April 23rd, 2025. Any comments or concerns received will be included in the Final Project Plan.

The following are brief descriptions of the proposed projects:

**St. Aubin SDF – Disinfection, Screening, and Misc. Improvements Project** includes the following:

- Chemical feed system improvements;
- Storage and mixing system improvements;
- Screen system improvements;
- Select HVAC improvements;
- Electrical power improvements;
- Lighting, and building system improvements;
- Instrumentation and controls standardization improvements; and
- Access hatch improvements;

These improvements will maintain the long-term reliability of this critical SDF.

**CSO Facility Safety Improvements and Building Rehabilitation Project** addresses the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for the following CSO Facilities.

- Seven Mile CSO
- Puritan-Fenkell CSO
- Leib SDF
- Conner Creek CSO
- Belle Isle CSO
- St. Aubin SDF
- Baby Creek SDF
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- Oakwood CSO

Examples of safety improvements include but are not limited to the following: extending guardrails; reorienting hatches; relocating ladders; removing tripping hazards; and installing swing gates to reduce falling risk. The architectural rehabilitation improves the reliability of the facilities. Examples of architectural improvements include, but are not limited to, the following: repairing masonry; repairing doors; eliminating leaks; sealing joints; painting/coating walls; flashing replacement; coating floors; and replacing ceiling tiles.

**Control System Upgrades at Baby Creek and Belle Isle CSO Facilities Project** implements a series of lighting and instrumentation and control (I+C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF Facility.

Please see the attached maps for the locations of the projects.

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Marie Richards
523 Ashmun St.
Sault Ste. Marie, MI 49783

Attention: Marie Richards
Sault Ste. Marie Tribe of Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Marie Richards:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

Wade Trim Associates, Inc.
500 Griswold Street, Suite 2500 • Detroit, MI 48226
313.961.3650 • www.wadetrim.com

February 5, 2025

Eric Clark
524 Ashmun St.
Sault Ste. Marie, MI 49783

Attention: Eric Clark
Sault Ste. Marie Tribe of Chippewa Indians

Re: CSO Facilities Improvements II Project CWSRF

Dear Eric Clark:

Wade Trim Associates, working on behalf of Great Lakes Water Authority (GLWA), is preparing a Clean Water Revolving Fund (CWRF) Project Plan with the intent to apply for State Revolving Fund (SRF) funding for the CSO Facilities Improvements II Project (CIP270006). The project is located at nine CSO basins in GLWA's system and is divided into the following three parts:

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Very truly yours,

Wade Trim, Inc.

David J. Delia

David J. Delia, PE
Senior Project Manager

MS
HZN2008

# 2026 GLWA CSO Improvements II
# Clean Water State Revolving Fund (CWSRF)

The State Revolving Fund (SRF) funding application is for the following three areas of the CSO Facilities Improvements II project (CIP270006) located at nine CSO basins in GLWA's system:

1. Control System Upgrades at Baby Creek and Belle Isle CSO Facilities.
2. CSO Facility Safety Improvements and Building Rehabilitation, and
3. St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening, and Misc. Improvements.

Figure 1 depicts the location of the nine facilities.

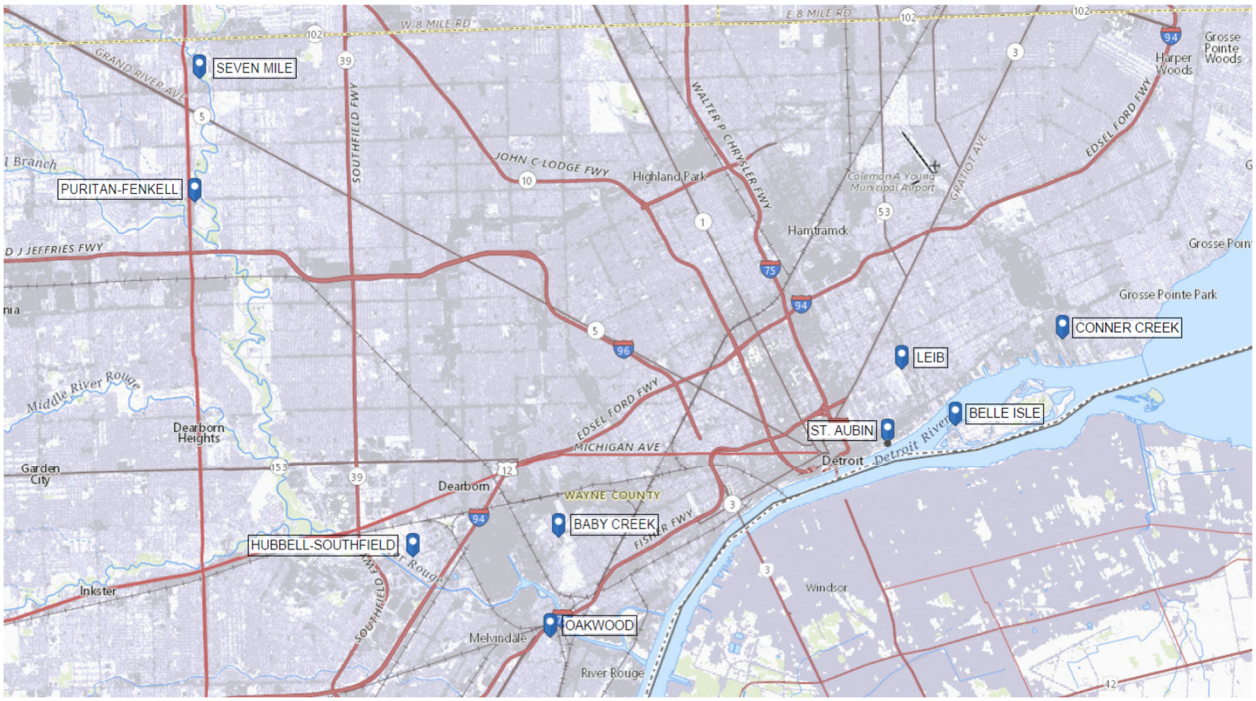


*Figure 1 Map of CSO/SDF Facilities*

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Seven Mile CSO ..... 9
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## Baby Creek SDF

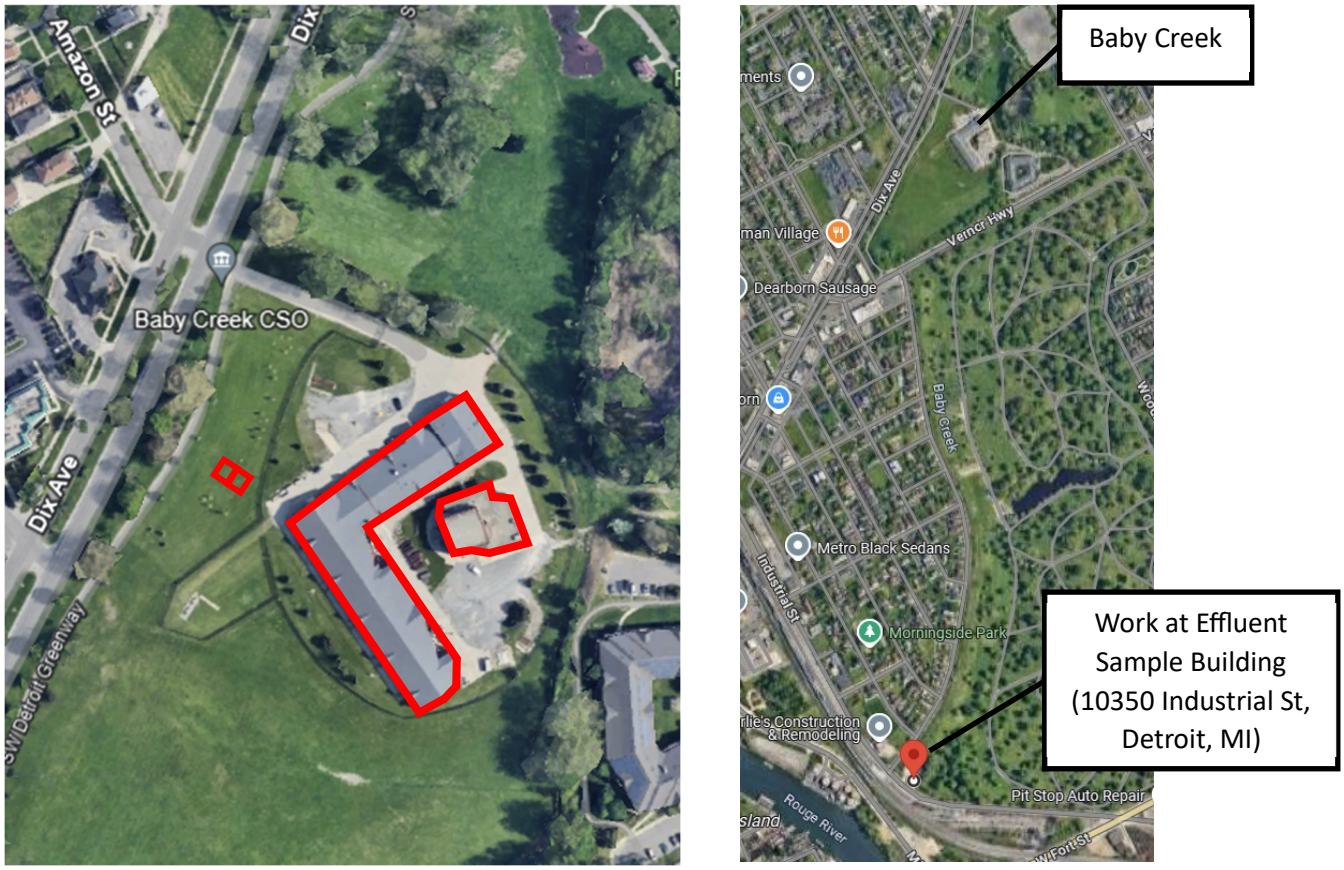


*Figure 2 Baby Creek SDF Limits of Construction*

## Baby Creek SDF Summary of Work

- Safety improvements such as fall protection.
- Architectural building rehabilitation consisting of sealant repairs, masonry repairs, interior/exterior and overhead door and door frame renovations, coating systems reapplications, and guardrail repairs throughout the facility.
- Plumbing work consisting of replacing emergency eyewash stations with combination eyewash shower units, adjusting piping and valves to new eyewash/shower units, and installing a new electric water heater to supply new eyewash/shower units.
- Instrumentation and Control (I+C) improvements focused on additional flow and level monitoring, and local indication for the chemical tank levels.
- Electrical work consisting of power improvements, lighting improvements, and new emergency eyewash station flow switch wiring.

*Figure 3 - Belle Isle CSO Limits of Construction*

## Belle Isle CSO Summary of Work

- Safety improvements such as fall protection gates, removing a concrete slab that is a tripping hazard, and reorienting basin access hatches to reduce chances of falling.
- Architectural building rehabilitation consisting of sealant joint repairs, tucking of pointing of concrete parapet caps, applying a water repellent to coping caps, coatings repair, and window glazing replacement throughout the facility.
- Instrumentation and Control (I+C) improvements focused on the gas detection system (Gas system controller, sensors, remote annunciator panels) and local control stations for the gates.
- Electrical work consisting of installing additional exterior LED lighting, additional exit signs and emergency units, and remote hand stations.

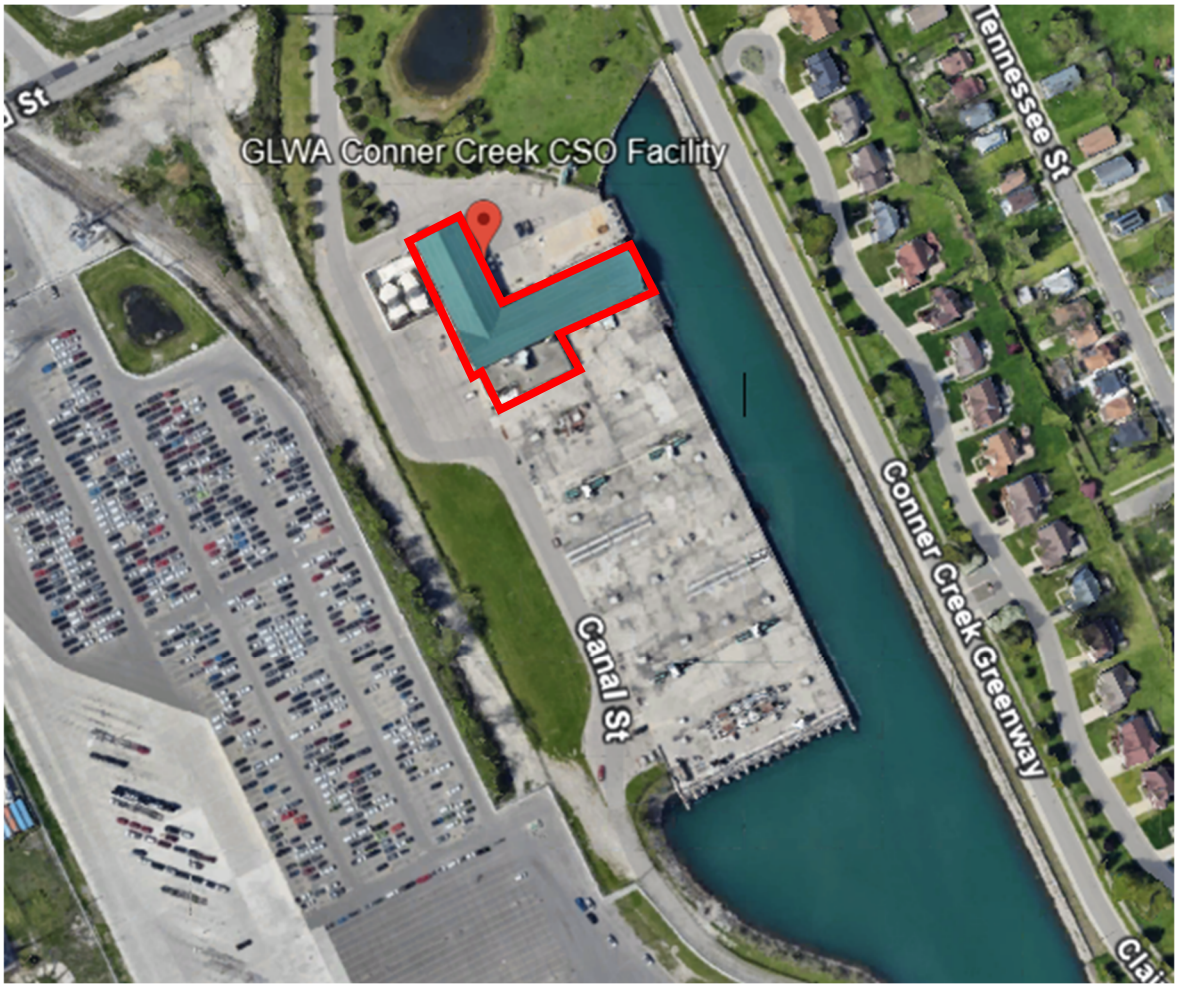


*Figure 4 – Conner Creek CSO Limits of Construction*

### Conner Creek CSO Summary of Work

- Safety improvements such as fall protection (railing extension).
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, Reapplying paints and coatings, ceiling tile replacement, installing exterior columns at the gate operators, and installing ponding.
- Electrical work consisting of installing new LED lighting due to ceiling tile replacement.

*Figure 5 Hubbell-Southfield CSO Limits of Construction*

### Hubbell-Southfield CSO Summary of Work

- Safety improvements consisting of guardrail extensions, toe plate replacements, and installation of swing gates to decrease fall risks. Other repairs will be the replacement of hatches, access covers/grating, and the movement of a ladder/gate.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, coating replacement, and ceiling tile replacement.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing PLC System.
- Electrical work consisting of new emergency eyewash station flow switch wiring, new LED lighting, new wiring/monitoring to power for a new heater, and new flow sensors.

*Figure 6 – Leib SDF Limits of Construction*

## Leib SDF Summary of Work

- Safety improvements consisting of guardrail extensions to reduce fall risk.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, and repairs to interior/exterior and overhead doors.

*Figure 7 – Oakwood CSO Limits of Construction*

## Oakwood CSO Summary of Work

- Safety improvements consisting of rail extensions, fall protection gates, step platforms, and a catwalk to reduce fall risk, and the installation of conduit ramps to eliminate trip hazard.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to interior/exterior and overhead doors, coating replacement, roof and flashing repairs, and masonry wall flashing repairs.
- Plumbing work consisting of replacing emergency eyewash stations with combination eyewash shower units, adjusting piping and valves to new eyewash/shower units, and installing a new electric water heater to supply new eyewash/shower units.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new emergency eyewash station flow switch wiring.

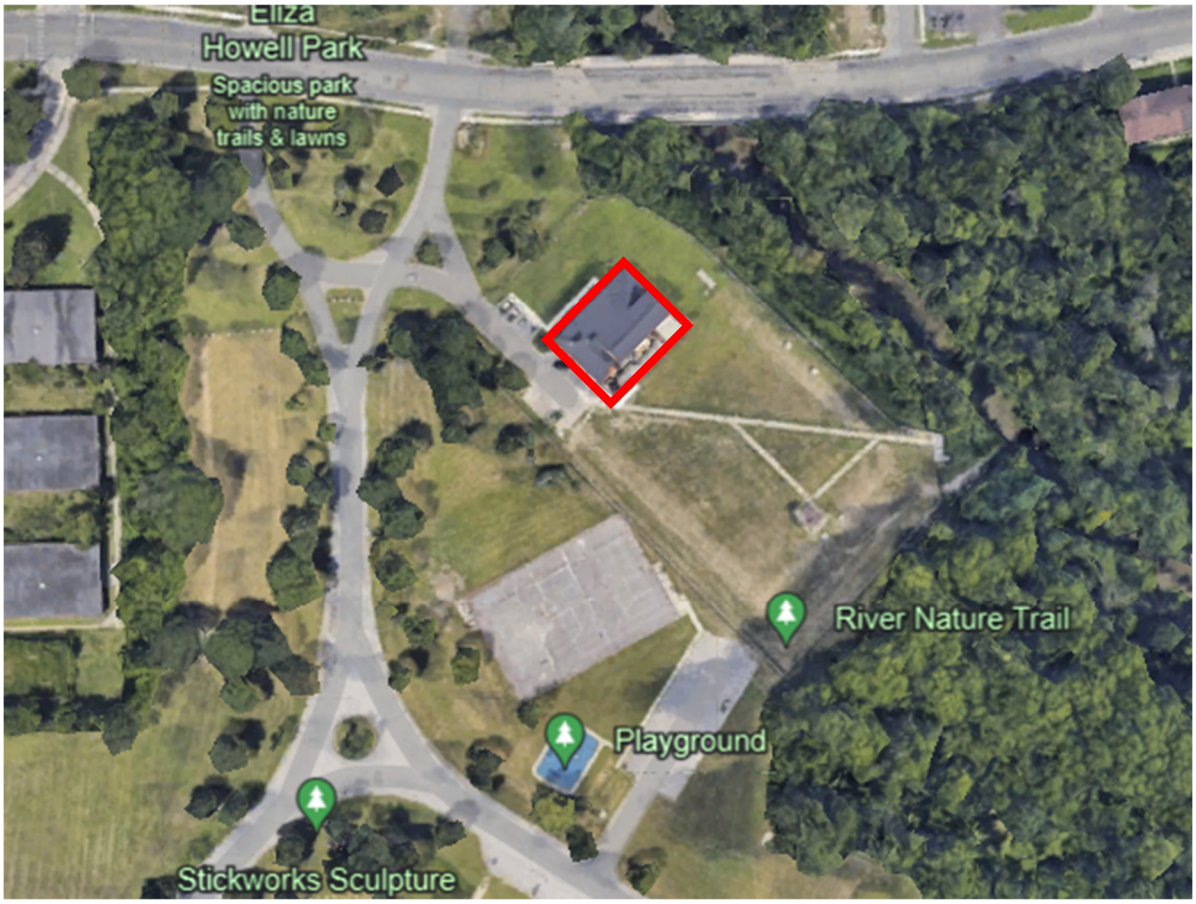


*Figure 8 – Puritan-Fenkell CSO Limits of Construction*

## Puritan-Fenkell CSO Summary of Work

- Safety improvements consisting of temporary stair replacement with permanent stairs to eliminate trip hazard.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, repairs to interior/exterior and overhead doors, coating replacement, and ceiling tile replacement.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new LED lighting and new emergency eyewash station flow switch wiring.

*Figure 9 – Seven Mile CSO Limits of Construction*

## Seven Mile CSO Summary of Work

- Safety improvements consisting of fall protection improvements.
- Architectural building rehabilitation consisting of sealant joint repairs, repairs to exterior masonry, repairs to interior/exterior and overhead doors, and coating replacement throughout the facility.
- Plumbing improvements to the emergency eyewash stations of the same description as those for Baby Creek, plus the addition of alarm stations with flow switches.
- Instrumentation work consisting of adding flow sensors to the existing Ovation System.
- Electrical work consisting of new emergency eyewash station flow switches.

*Figure 10 – St. Aubin SDF Limits of Construction*

## St. Aubin SDF Summary of Work

- Process Mechanical Work:
  - Remove and replace screening systems including new screen components, a washdown station, and screening control system upgrades.
  - Replace existing Hypochlorite storage tanks with two FRP tanks of the same size.
  - Replace 5 existing chemical feed diaphragm pumps with 2 mag-drive centrifugal pumps and install modulating control valves.
  - Adding control valves to the feed pump discharge configurations to incorporate a pressurized recirculation loop.
  - Replace 6 total pre-chlorination 7.5 hp mixers with 6 new 5 hp mixers.
  - Update disinfection control strategy to target higher total residual chlorine (TRC).
  - Installing a colorimetric TRC analyzer.
- Safety Improvement work consists of relocating valves, installing guard rails, and adding netting to open hatches to reduce fall risk.

- Architectural building rehabilitation consisting of sealant joint repairs, painting of interior/exterior and overhead doors/frames/jambs/trim, and coating replacement in the Chemical Storage Room.
- HVAC improvement through the replacement of an exhaust fan for chemical storage.
- Instrumentation work consisting of new chemical system equipment controls, new level sensors, fill panel, and flow meters for the chemical tanks and feed lines in the disinfection system, and four new control valves for the washdown system.
- Electrical improvements consisting of new LED lighting on the interior/exterior of the basin, installing outlets on the exterior of the basin, removal of feed pump control panels, new quick disconnects for existing dewatering pumps and new mixers and sample pumps, installation of starters for chemical feed pumps and sample pumps, replacement of thermal units on existing mixer starters, and refeeding of ventilation/exhaust units to a different motor control center.

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 4:48 PM
**To:** paulacarrick@baymills.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Paula Carrick Correspondence Summary Letter.pdf

Hello Ms. Carrick,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

I have attached a letter to this email. The letter contains brief descriptions of the project as well as a map of the locations of the project. A full Draft Project Plan will be available to the public on April 8th for your review.

We ask that all comments and/or concerns be returned to us on or before April 23rd. This is the date of the public hearing for the Draft Project Plan, and we would like to get all comments and concerns addressed by this date. If there are any major concerns that arise during your review, please contact me as soon as possible so that we can work out a plan for working around any specific requirements that there may be.

If you have any questions or need more information for your review, please feel free to contact me by email or phone.

Thank you,

Matt

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:05 PM
**To:** jmparks@baymills.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** J.M. Parks Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:07 PM
**To:** carolan.sonderegger@gtb-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Carolan Sonderegger Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:08 PM
**To:** courtney.hessell@gtb-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Courtney Hessel Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:09 PM
**To:** sammie.dyal@gtb-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Sammie Dyal Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:10 PM
**To:** molly.meshigaud@hannahville.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Molly Meshingaud Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:10 PM
**To:** csagataw@hicservices.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Cory Sagataw Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:11 PM
**To:** mschuster@hicservices.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Michael Schuster Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:13 PM
**To:** aconnor@kbic-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Alden Connor Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:13 PM
**To:** dprice@kbic-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Dione Price Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:14 PM
**To:** alina.shively@lvd-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Alina Shively Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:14 PM
**To:** beth.schrader@lvd-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Beth Schrader Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:15 PM
**To:** Jonnie Sam
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Jay Sam Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:15 PM
**To:** williambeaver@lrboi-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Frank Beaver Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:16 PM
**To:** mwiatrolik@ltbbodawa-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Melissa Wiatolik Correspondence Summary Letter .pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:17 PM
**To:** cmoellering@ltbbodawa-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Caroline Moellering Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:17 PM
**To:** Lakota.Hobia@glt-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Lakota Hobia Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:18 PM
**To:** Kaila.Akina@glt-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Kaila Akina Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:19 PM
**To:** Shawn.mckenney@glt-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Shawn Mckenney Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:19 PM
**To:** Douglas.Taylor@nhbp-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Douglas Taylor Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:20 PM
**To:** environmental@nhbp-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Nottawaseppi Environmental Correspondence Summary Letter.pdf

Hello,

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:21 PM
**To:** Matthew.Bussler@pokagonband-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Matthew Bussler Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:22 PM
**To:** Jennifer.Kanine@pokagonband-nsn.gov
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Jennifer Kanine Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:23 PM
**To:** mlhadden@sagchip.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Marcella Hadden Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:23 PM
**To:** wjohnson@sagchip.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** William Johnson Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:24 PM
**To:** skniffen@sagchip.org
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Sally Kniffen Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:24 PM
**To:** mrichards@saulttribe.net
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Marie Richards Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

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Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

## Szyperski, Matt

**From:** Szyperski, Matt
**Sent:** Wednesday, February 5, 2025 5:25 PM
**To:** eclark@saulttribe.net
**Cc:** Delia, David
**Subject:** GLWA Project Plan - Request for Review
**Attachments:** Eric Clark Correspondence Summary Letter.pdf

Hello,

I work for an engineering firm called Wade Trim and we are currently putting together a Clean Water Revolving Fund Project Plan on behalf of Great Lakes Water Authority. As part of this Project Plan, all THPOs that may have historic, cultural, and/or religious areas close to the project site are sent a request to review and return any comments and/or concerns.

I have attached a letter to this email. The letter contains brief descriptions of the project as well as a map of the locations of the project. A full Draft Project Plan will be available to the public on April 8th for your review.

We ask that all comments and/or concerns be returned to us on or before April 23rd. This is the date of the public hearing for the Draft Project Plan, and we would like to get all comments and concerns addressed by this date. If you have any concerns, or questions, or if you simply want more information, please contact David J. Delia, PE, Wade Trim Senior Project Manager, ddelia@wadetrim.com, 313-961-3650.

Thank you,

WADE TRIM

**Matthew Szyperski,** Engineer
25251 Northline Road, Taylor, MI 48180
734.403.6051 office
616.443.6279 cell

# Appendix G.3
# SHPO Correspondence

## Szyperski, Matt

**From:** Smartsheet Forms <forms@app.smartsheet.com>
**Sent:** Wednesday, February 5, 2025 3:35 PM
**To:** Szyperski, Matt
**Subject:** Confirmation - Michigan State Historic Preservation Office Section 106/Section 110 Consultation

**This message originated outside of Wade Trim**

Thank you for submitting your request for consultation under Section 106 of the National Historic Preservation Act of 1966, as amended. A copy is included below for your records.

If you have concerns about your submission or were not able to attach all of your documents, please contact Scott Slagor at SlagorS2@Michigan.gov.

# Michigan State Historic Preservation Office Section 106/Section 110 Consultation

| | |
|---|---|
| **Project Name:** | CSO Facilities Improvements II Project |
| **Project Street Address:** | Nine GLWA CSO Facilities - see application |
| **Project Municipal Unit:** | Detroit, Deerborn |
| **Project County:** | Wayne County |
| **Federal Agency:** | US Environmental Protection Agency |
| **Federal Agency Contact Name:** | Andrew Lausted |
| **Federal Agency Mailing Address (street, city, state, zip code):** | 77 West Jackson Blvd. Chicago, IL 60604 |
| **Consultant/Applicant Name** | Dave Delia, PE |
| **Consultant/Applicant Agency/Firm:** | Wade Trim |
| **Consultant/Applicant Mailing Address:** | 500 Griswold, Suite 2500, Detroit, MI 48226 |

| | |
|---|---|
| **Consultant/Applicant Phone Number:** | 313-961-3650 |
| **Consultant/Applicant Email Address:** | ddelia@wadetrim.com |

## File Attachments

**MISHPO-Section-106-Application-Final 2.pdf** (1773k)

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# Appendix G.4
# EGLE Correspondence

## Delia, David

**From:** Richardson, Jeremy (EGLE) <RICHARDSONJ1@michigan.gov>
**Sent:** Friday, November 8, 2024 10:47 AM
**To:** Delia, David
**Cc:** Brooke.Ballard@glwater.org; Eick, Steven (EGLE)
**Subject:** Onsite pre-app Mtg. for 82-2200 Atwater St-Detroit, HQ7-A0GF-5FMYW

**This message originated outside of Wade Trim**

Good morning, thank you again for meeting at the site yesterday to review the proposed outlet work near the DNR Outdoor Center in Detroit, Wayne County. Based on the scope of work we discussed a permit would not be needed from the resources program under Part 301, Inland Lakes and Streams of the NREPA, PA 451, as amended to complete the maintenance activities associated with outlet cover gates. As we discussed, resources program's jurisdiction for the project would be any work/structures proposed at or waterward of the shoreline, or any grade changes within the adjacent floodplain . Hope this helps, please contact if you need anything. Thanks again,

Jeremy Richardson
EGLE-WRD, Warren District Office
27700 Donald Court, Warren, MI 48092
richardsonj1@michigan.gov
Phn: (248) 763-1664

# Appendix H.
# Cost Estimates

# Appendix H.1
# Cost Estimates and Present Worth (Lifecycle Cost) Calculations

Hazen WADE TRIM

# Present Worth (Lifecycle Cost) Calculations
## CSO Improvements II Project Selected Alternative

**Conceptual Cost Estimate:**

Planning Period: 20 years
Approx. No. Households: 1,275,737
Discount Rate (DR): 2.000% from MDEQ Website (https://www.michigan.gov/egle/regulatory-assistance/func
Inflation Rate (i): 2.9% https://www.usinflationcalculator.com/inflation/current-inflation-rates/

| | | Selected Alternative 1A | | | |
|---|---|---|---|---|---|
| | Description | **Cost estimates include project work at the nine CSO facilities for safety, architectural/structural, mixing, I+C, electrical, and other improvements in the scope of the project as well as the selected alternative for the screening system improvements at St. Aubin SDF.** | | **% Total Capital Cost** | **Weighted Useful Life** |
| | Construction Duration (years) | 2.5 years | | | |
| **Capital Costs Expected Useful Life (years)** | | **Capital Costs** | **Escalated Salvage Value** | | |
| | Years | | | | |
| Structures | 50 | $ 622,868 | $ 373,721 | 4% | 1.8 |
| Site Civil/Process equipment | 20 | $ 13,976,650 | $ - | 81% | 16.3 |
| Electrical, Instrumentation, and Controls | 15 | $ 2,583,621 | $ - | 15% | 2.3 |
| | **Subtotal** | **$ 17,183,139** | **$ 373,721** | | **20.3** |
| | | | | | **Project Overall Useful Life** |
| Contingency | 10.00% | $ 1,718,314 | | | |
| Total Probable Construction Cost | **Subtotal** | **$ 18,901,452** | | | |
| Engineering, Legal, and Admin | 27.22% | $ 4,676,820 | | | |
| SRF Loan Request | **Total** | **$ 23,578,273** | | | |
| **Annual Additional OM&R Costs** | **Year:** | **2022** | **Annual Change** | | |
| Salaries and Administrative | 0% | $ - | | | |
| Energy (can be escalated) | | $ - | $ - | | |
| Chemicals | 0% | $ - | | | |
| Repair and Maintenance | | $ - | | | |
| | **Total O&M** | **$ -** | | | |
| | Years | | **Escalated** | | |
| Replacement | 5 | $ - | $ - | | |
| Replacement | 10 | $ - | $ - | | |
| Replacement | 15 | $ 2,583,621 | $ 3,966,975 | | |
| **PRESENT WORTH CALCULATIONS** | | | | | |
| Initial Cost | | $ 23,578,273 | | | |
| OM&R | | $ 2,947,521 | | | |
| Salvage Value (minus) | | $ (251,503) | | | |
| Interest During Construction | | $ 560,985 | | | |
| **Total Present Worth** | | **$ 26,835,275** | | | |
| **Equivalent Annual Cost** | | **$ 1,641,157** | | | |
| **User Impact Cost** | | **$ 1.29** | | | |

Hazen WADE TRIM

# Present Worth (Lifecycle Cost) Calculations
## CSO Improvements II Screening Alternatives

**Conceptual Cost Estimate:**

Planning Period: 20 years
Approx. No. Households: 1,275,737
Discount Rate (DR): 2.000% from MDEQ Website (https://www.michigan.gov/egle/regulatory-assistance/funding/fd/state-revolving-fund)
Inflation Rate (i): 2.9% https://www.usinflationcalculator.com/inflation/current-inflation-rates/

| | | Alternative 0 | | Option 1A | | Option 1B | | ~~Option 2~~ | | Option 3A | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | | "Do Nothing" | | Rehabilitate Screens; Add Flushing System | | Submersible Pump Station and New 30" Force Main | | Perforated Trough With Screenings Screw Conveyor NOT FEASIBLE | | Replace Horizontal Screens with Vertical Plate Screens; Add Screenings Building | |
| Construction Duration (years) | | 2.5 years | | 2.5 years | | 2.5 years | | 2.5 years | | 2.5 years | |
| **Capital Costs Expected Useful Life (years)** | | **Capital Costs** | **Escalated** | **Capital Costs** | **Escalated** | **Capital Costs** | **Escalated** | Capital Costs | Escalated | **Capital Costs** | **Escalated** |
| | Years | | **Salvage Value** | | **Salvage Value** | | **Salvage Value** | | Salvage Value | | **Salvage Value** |
| Structures | 50 | $ - | $ - | $ 2,723 | $ 1,634 | $ 1,586,612 | $ 951,967 | $ - | $ - | $ 1,310,059 | $ 786,035 |
| Site Civil/Process equipment | 20 | $ - | $ - | $ 588,416 | $ - | $ 6,051,137 | $ - | $ - | $ - | $ 5,386,589 | $ - |
| Electrical, Instrumentation, and Controls | 15 | $ - | $ - | $ 75,716 | $ - | $ 2,505,183 | $ - | $ - | $ - | $ 166,735 | $ - |
| | **Subtotal** | **$ -** | **$ -** | **$ 666,855** | **$ 1,634** | **$ 10,142,932** | **$ 951,967** | $ - | $ - | **$ 6,863,383** | **$ 786,035** |
| Contingency | 10.00% | $ - | | $ 66,685 | | $ 1,014,293 | | $ - | | $ 686,338 | |
| Total Probable Construction Cost | **Subtotal** | **$ -** | | **$ 733,540** | | **$ 11,157,225** | | $ - | | **$ 7,549,721** | |
| Engineering, Legal, and Admin | 27.22% | $ - | | $ 181,501 | | $ 2,760,652 | | $ - | | $ 1,868,041 | |
| SRF Loan Request | **Total** | **$ -** | | **$ 915,042** | | **$ 13,917,877** | | $ - | | **$ 9,417,762** | |
| **Annual Additional OM&R Costs** | **Year:** | **2022** | **Annual Change** | **2022** | **Annual Change** | **2022** | **Annual Change** | 2022 | Annual Change | **2022** | **Annual Change** |
| Salaries and Administrative | 0% | $ - | | $ - | | $ - | | $ - | | $ - | |
| Energy (can be escalated) | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Chemicals | 0% | $ - | | $ - | | $ - | | $ - | | $ - | |
| Repair and Maintenance | | $ - | | $ - | | $ - | | $ - | | $ - | |
| | **Total O&M** | **$ -** | | **$ -** | | **$ -** | | $ - | | **$ -** | |
| | Years | | **Escalated** | | **Escalated** | | **Escalated** | | Escalated | | **Escalated** |
| Replacement | 5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Replacement | 10 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Replacement | 15 | $ - | $ - | $ 75,716 | $ 116,257 | $ 2,505,183 | $ 3,846,538 | $ - | $ - | $ 166,735 | $ 256,011 |
| **PRESENT WORTH CALCULATIONS** | | | | | | | | | | | |
| Initial Cost | | $ - | | $ 915,042 | | $ 13,917,877 | | $ - | | $ 9,417,762 | |
| OM&R | | $ - | | $ 86,380 | | $ 2,858,035 | | $ - | | $ 190,220 | |
| Salvage Value (minus) | | $ - | | $ (1,099) | | $ (640,647) | | $ - | | $ (528,979) | |
| Interest During Construction | | $ - | | $ 21,771 | | $ 331,141 | | $ - | | $ 224,072 | |
| **Total Present Worth** | | **$ -** | | **$ 1,022,094** | | **$ 16,466,406** | | $ - | | **$ 9,303,075** | |
| **Equivalent Annual Cost** | | **$ -** | | **$ 62,508** | | **$ 1,007,031** | | $ - | | **$ 568,946** | |
| **User Impact Cost** | | **$ -** | | **$ 0.05** | | **$ 0.79** | | **$ -** | | **$ 0.45** | |

***Present Worth Factors***

| *Case* | *Years* | *Factor* |
|---|---|---|
| *Single Payment* | *10* | *0.8203* |
| *Single Payment* | *15* | *0.7430* |
| *Salvage Value* | *20* | *0.6730* |
| *OM&R* | *20* | *16.3514* |
| *Energy* | *20* | *144.6003* |
| *Capital Recovery Factor* | *20* | *0.0612* |

***Assumptions:***

The project is anticipated to reduce annual operations, maintenance and repair (OM&R) costs; $0 is assumed for Salaries and Administrative, Energy, and Repair and Maintenance because the project is anticipated to reduce costs from current expenditures; $0 is assumed for Chemicals because no change in chemical usage will result from this project; this project's OM&R costs should not negatively affect User Impact Cost.

# Appendix H.2
# Opinion of Probable Construction Costs (OPCC)

# Great Lakes Water Authority

## CSO Facility Improvements II

***REGENCY CONSTRUCTION SERVICES, INC.***

**EXECUTIVE SUMMARY**

**100% Estimate**

**December 30, 2024**

This probable cost document was generated from 100% Design Documents developed by Hazen. The documents were dated December 2024, titled "Great Lakes Water Authority Contract No. 2200061 CIP No. 270006 CSO Facility Improvements II" and received by Regency on November 15, 2024.

The project consists of CSO repairs at 9 sites.

This probable cost document estimates the construction costs to be **$ 18,902,000**

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
### 100% Estimate

| | | |
|---|---|---|
| Great Lakes Water Authority | ***DESIGNER:*** **Hazen** | ***DATE:*** **December 30, 2024** |
| | | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

## PROBABLE COST SUMMARY

| *DIVISION* | ***BUILDING COMPONENT*** | PURITAN FENKELL | SEVEN MILE | HUBBELL SOUTHFIELD | LEIB | ST. AUBIN | CONNER CREEK | BABY CREEK | BABY CREEK Sample Building and Miller Rd. Improvements | OAKWOOD | BELLE ISLE | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | GENERAL REQUIREMENTS | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** | **See Below** |
| 2 | EXISTING CONDITIONS | $40,935 | $40,000 | $40,100 | $40,000 | $185,727 | $56,475 | $40,000 | $133,678 | $40,000 | $40,000 | $656,915 |
| 3 | CONCRETE | $105,300 | $100,200 | $341,475 | $88,650 | $400,250 | $307,825 | $260,650 | $0 | $290,228 | $54,850 | $1,949,428 |
| 4 | MASONRY | $38,175 | $6,220 | $0 | $41,085 | $25,450 | $54,920 | $1,995 | $0 | $2,500 | $1,710 | $172,055 |
| 5 | METALS | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 | WOOD, PLASTIC & COMPOSITE | $0 | $0 | $5,610 | $0 | $63,350 | $4,000 | $0 | $0 | $1,000 | $0 | $73,960 |
| 7 | THERMAL AND MOISTURE PROTECTION | $24,775 | $14,775 | $68,505 | $11,930 | $12,430 | $221,980 | $56,120 | $0 | $85,050 | $16,995 | $512,560 |
| 8 | OPENINGS | $56,500 | $78,700 | $83,450 | $24,500 | $7,500 | $141,800 | $120,450 | $0 | $218,300 | $2,500 | $733,700 |
| 9 | FINISHES | $10,115 | $33,140 | $79,115 | $3,000 | $65,960 | $125,725 | $118,731 | $0 | $268,055 | $3,250 | $707,091 |
| 10 | SPECIALTIES | $2,000 | $2,000 | $5,800 | $2,000 | $2,150 | $2,000 | $5,000 | $0 | $2,000 | $4,200 | $27,150 |
| 11 | EQUIPMENT | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 12 | FURNISHINGS | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 13 | SPECIAL CONSTRUCTION | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 14 | CONVEYING SYSTEMS | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 21 | FIRE SUPPRESSION | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 22 | PLUMBING | $105,922 | $185,711 | $151,769 | $0 | $32,431 | $0 | $93,094 | $0 | $92,630 | $0 | $661,556 |
| 23 | HVAC | $0 | $0 | $9,000 | $0 | $8,800 | $0 | $0 | $0 | $0 | $0 | $17,800 |
| 26 | ELECTRICAL / INSTRUMENTATION | $89,117 | $72,576 | $45,161 | $0 | $1,681,330 | $117,867 | $423,262 | $0 | $116,247 | $268,161 | $2,813,719 |
| 27 | COMMUNICATIONS | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 28 | ELECTRONIC SAFETY & SECURITY | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 31 | EARTHWORK / CIVIL | $0 | $0 | $0 | $0 | $9,720 | $0 | $0 | $0 | $0 | $0 | $9,720 |
| 32 | EXTERIOR IMPROVEMENTS | $0 | $0 | $0 | $0 | $75,595 | $0 | $7,500 | $0 | $0 | $0 | $83,095 |
| 33 | UTILITIES | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 40 | PROCESS INTERCONNECTIONS | $0 | $0 | $0 | $0 | $563,525 | $0 | $0 | $0 | $0 | $0 | $563,525 |
| 43 | PROCESS GAS & LIQUID HANDLING | $0 | $0 | $0 | $0 | $2,096,200 | $0 | $0 | $0 | $0 | $0 | $2,096,200 |
| **SUBTOTAL; ALL TRADES WORK, NET** | | **$472,839** | **$533,321** | **$829,985** | **$211,165** | **$5,230,417** | **$1,032,592** | **$1,126,802** | **$133,678** | **$1,116,009** | **$391,666** | **$11,078,474** |
| | SALES TAX: 6% on materials above | $14,185 | $16,000 | $24,900 | $6,335 | $156,913 | $30,978 | $33,804 | $4,010 | $33,480 | $11,750 | $332,354 |
| | GENERAL CONDITIONS; 15% (multiple sites) | $73,054 | $82,398 | $128,233 | $32,625 | $808,099 | $159,535 | $174,091 | $20,653 | $172,423 | $60,512 | $1,711,624 |
| | MOBILIZATION / DEMOB; 5% | $28,004 | $31,586 | $49,156 | $12,506 | $309,771 | $61,155 | $66,735 | $7,917 | $66,096 | $23,196 | $656,123 |
| | ESTIMATING CONTINGENCY; 10% | $58,808 | $66,331 | $103,227 | $26,263 | $650,520 | $128,426 | $140,143 | $16,626 | $138,801 | $48,713 | $1,377,857 |
| | INSURANCE & BONDING; 3% | $19,407 | $21,889 | $34,065 | $8,667 | $214,672 | $42,381 | $46,247 | $5,487 | $45,804 | $16,075 | $454,693 |
| | BONDS; 1% | $6,663 | $7,515 | $11,696 | $2,976 | $73,704 | $14,551 | $15,878 | $1,884 | $15,726 | $5,519 | $156,111 |
| | ESCALATION: 8.98%, based on Midpoint of construct. May '27 | $60,432 | $68,162 | $106,077 | $26,988 | $668,480 | $131,972 | $144,012 | $17,085 | $142,633 | $50,057 | $1,415,898 |
| **BID PACKAGE SUBTOTAL** | | **$733,391** | **$827,202** | **$1,287,338** | **$327,525** | **$8,112,576** | **$1,601,589** | **$1,747,712** | **$207,340** | **$1,730,973** | **$607,489** | **$17,183,134** |
| | PROVISIONAL ALLOWANCE: 10% | $73,339 | $82,720 | $128,734 | $32,752 | $811,258 | $160,159 | $174,771 | $20,734 | $173,097 | $60,749 | $1,718,313 |
| ***TOTAL PROBABLE CONSTRUCTION COSTS:*** | | **$806,730** | **$909,922** | **$1,416,071** | **$360,277** | **$8,923,834** | **$1,761,748** | **$1,922,483** | **$228,074** | **$1,904,070** | **$668,238** | **$18,901,448** |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

*Designed By:* Hazen

*Great Lakes Water Authority*

*Date:* December 30, 2024

*REGENCY CONSTRUCTION SERVICES, INC.*

## 2 EXISTING CONDITIONS

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **Temporary Field Office** | | | | **$270,000** | | | |
| 2A1 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | PURITAN | Puritan-Fenkell |
| 2A2 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | SEVEN | Seven Mile |
| 2A3 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | HUBBEL | Hubbell-Southfield |
| 2A4 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | LEIB | LIEB |
| 2A5 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | AUBIN | St. Aubin |
| 2A6 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | CONNER | Conner Creek |
| 2A7 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | CREEK | Baby Creek |
| 2A8 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | OAK | Oakwood |
| 2A9 | Temporary Field Office | 1 | LS | $30,000.00 | $30,000 | | BELLE | Belle Isle |
| **B** | **SELECTIVE DEMOLITION** | | | | **$50,060** | | | |
| 2B1 | 5. Clean HVAC Supply Diffuser | 35 | EA | $50.00 | $1,750 | | CONNER | ARCH:A76-109 |
| 2B2 | 6. Clean HVAC Return Diffuser | 17 | EA | $50.00 | $850 | | CONNER | ARCH:A76-109 |
| 2B3 | 5. Clean HVAC Supply Diffuser | 11 | EA | $50.00 | $550 | | CONNER | ARCH:A76-108 |
| 2B4 | 6. Clean HVAC Return Diffuser | 5 | EA | $50.00 | $250 | | CONNER | ARCH:A76-108 |
| 2B5 | 7. Clean HVAC Lear Diffusers | 4 | EA | $50.00 | $200 | | CONNER | ARCH:A76-108 |
| 2B6 | 3. Provide Temp Chemical Feed | | | | **in Div. 43** | | AUBIN | DEMO:X75-041 |
| 2B7 | Removable Conc. Hatch Slabs (assume existing to remain) | | | | **N.I.C.** | | LEIB | GENERAL:G74-100 |
| 2B8 | 1. Demo CMU & Salvage Veneer, incl. Pinning and Shorring | 191 | SF | $50.00 | $9,550 | | AUBIN | DEMO:X75-131 |
| 2B9 | 2. Demo Platform | 44 | SF | $60.00 | $2,640 | | AUBIN | DEMO:X75-131 |
| 2B10 | 6. Demo Utility Sink | 1 | EA | $200.00 | $200 | | AUBIN | DEMO:X75-131 |
| 2B11 | 7. Demo Door Frame | 1 | EA | $250.00 | $250 | | AUBIN | DEMO:X75-131 |
| 2B12 | 8. Demo Door & Frame | 1 | EA | $300.00 | $300 | | AUBIN | DEMO:X75-131 |
| 2B13 | 9. Demo concrete sidewalk 6" SOG | 425 | SF | $15.00 | $6,375 | | AUBIN | DEMO:X75-131 |
| 2B14 | 10. Saw Cut Concrete | 21 | LF | $25.00 | $525 | | AUBIN | DEMO:X75-131 |
| 2B15 | 11. Trench through existing slab. | 37 | SF | $50.00 | $1,850 | | AUBIN | DEMO:X75-131 |
| 2B16 | 12. Grind down conc. slab a achieve slope | 160 | SF | $50.00 | $8,000 | | AUBIN | DEMO:X75-131 |
| 2B17 | Demo Hatch & Associated Concrete | 1 | EA | | **in Div. 3** | | AUBIN | DEMO:X75-122 |
| 2B18 | Demo Hatch & Associated Concrete | 1 | EA | | **in Div. 3** | | AUBIN | DEMO:X75-121 |
| 2B19 | Demo manhole ladder rungs | 5 | EA | | **in Div. 3** | | AUBIN | DEMO:X75-121 |
| 2B20 | Demo Steel Cover and steel support members | 440 | SF | | **in Div. 3** | | AUBIN | DEMO:X75-121 |
| 2B21 | Demo Top 18'' of Conc. Walls | 108 | SF | | **in Div. 3** | | AUBIN | DEMO:X75-121 |
| 2B22 | Demo Concrete Pads | 199 | SF | | **in Div. 3** | | AUBIN | DEMO:X75-120 |
| 2B23 | Demo Concrete Pump Pads | 25 | SF | | **in Div. 3** | | AUBIN | DEMO:X75-120 |
| 2B24 | Demo Grating at Stair Landing | 14 | SF | | **in Div. 3** | | AUBIN | DEMO:X75-120 |
| 2B25 | Demo Door 3070 | 2 | EA | $200.00 | $400 | | AUBIN | DEMO:X75-120 |
| 2B26 | Demo Wall, not noted, assume required | 16 | LF | $50.00 | $800 | | AUBIN | DEMO:X75-120 |
| 2B29 | Remove Storage Tank #1 | 1 | EA | $1,000.00 | $1,000 | | AUBIN | DEMO:X75-041 |
| 2B30 | 1. Demo Cold Water Piping | | | | **in Div. 22** | | HUBBEL | DEMO:X73-201 |
| 2B31 | 2. Demo Emergency Eyewash shower | | | | **in Div. 22** | | HUBBEL | DEMO:X73-201 |
| 2B32 | Demo Hatch | 12 | EA | | **in Div. 3** | | HUBBEL | DEMO:X73-102 |
| 2B33 | Demo Hatch | 5 | EA | | **in Div. 3** | | HUBBEL | DEMO:X73-101 |
| 2B34 | 1. Demo Cold Water Piping | | | | **in Div. 22** | | SEVEN | DEMO:X72-161 |
| 2B35 | Demo Wood Crossover Platform | 1 | EA | | **in Div. 3** | | PURITAN | DEMO:X71-170 |
| 2B36 | 1. Demo Pipe associated with EMS | | | | **in Div. 22** | | PURITAN | DEMO:X71-161 |
| 2B37 | 2. Demo Cold Water Piping | | | | **in Div. 22** | | PURITAN | DEMO:X71-161 |
| 2B38 | 3. Demo Emergency Eyewash shower | | | | **in Div. 22** | | PURITAN | DEMO:X71-161 |
| 2B39 | 1. Demo ACT Tile, Grid to Remain | 6,953 | SF | $1.25 | $8,691 | | CONNER | ARCH:A76-109 |
| 2B41 | 1. Demo ACT Tile, Grid to Remain | 3,347 | SF | $1.25 | $4,184 | | CONNER | ARCH:A76-108 |
| 2B43 | 9. Remove Unistrut, cut bolts flush with wall & floor | 14 | EA | $40.00 | $560 | | AUBIN | ARCH:A75-102 |
| 2B44 | 11. Demo Wood Blocking | 1 | EA | $100.00 | $100 | | AUBIN | ARCH:A75-102 |
| 2B45 | Remove Existing insulation | 20 | LF | $5.00 | $100 | | HUBBEL | ARCH:A73-104 |
| 2B46 | 4. Demo Flue & associated brackets | 1 | EA | $500.00 | $500 | | PURITAN | ARCH:A71-203 |
| 2B47 | 8. Remove ACT tile grid to remaining | 348 | SF | $1.25 | $435 | | PURITAN | ARCH:A71-101 |
| **C** | **SITE DEMOLITION** | | | | **$5,000** | | | |
| 2C1 | Demo sidewalk at new access driveway | 1 | LS | $3,500.00 | $3,500 | | AUBIN | G75-100 |
| 2C2 | Demo fencing at new access driveway | 1 | LS | $1,500.00 | $1,500 | | AUBIN | G75-100 |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

## *2 EXISTING CONDITIONS*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **D** | **MISCELLANEOUS** | | | | **$331,855** | | | |
| 2D1 | Sample Building and Miller Road Improvements | 1 | LS | $133,678.00 | $133,678 | | BCSample | Per Hazen and Sawyer 11/11/24 |
| 2D2 | Remove settled material from Outfall Conduit: 1,878' L x 10' w x 1' deep | 696 | CY | $145.31 | $101,073 | | AUBIN | St. Aubin |
| 2D3 | Remove settled material from Effluent Structure 1' deep | 49 | CY | $145.31 | $7,104 | | AUBIN | St. Aubin |
| | **Facility Road Cleaning & Snow Removal:** | | | | | | | |
| 2D4 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | PURITAN | per Summary of Work |
| 2D5 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | SEVEN | per Summary of Work |
| 2D6 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | HUBBEL | per Summary of Work |
| 2D7 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | LEIB | per Summary of Work |
| 2D8 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | AUBIN | per Summary of Work |
| 2D9 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | CONNER | per Summary of Work |
| 2D10 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | CREEK | per Summary of Work |
| 2D11 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | OAK | per Summary of Work |
| 2D12 | Facility Road Cleaning & Snow removal allowance | 1 | ALLOW | $10,000.00 | $10,000 | | BELLE | per Summary of Work |
| 2D13 | Temp. Enclosure / Shelter at CSO Entrances / Hatches | | | | **N.I.C.** | | | Assume not required |
| 2D14 | Initial CSO Dewatering and Maintenance Pumping | | | | **N.I.C.** | | | Assume not required |
| 2D15 | Clean CSO Interior in Prep. of Disinfection | | | | **N.I.C.** | | | Assume not required |
| 2D16 | Engineer's Inspection Support | | | | **N.I.C.** | | | Assume not required |
| 2D17 | Groundwater Monitoring Wells | | | | **N.I.C.** | | | Assume not required |
| **TOTAL** | **EXISTING CONDITIONS** | | | | **$656,915** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:*** **Hazen**

***Great Lakes Water Authority***

***Date:*** **December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

## *3 CONCRETE*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **SELECTIVE STRUCTURAL WORK** | | | | **$1,949,428** | | | |
| | **Puritan Fenkell:** | | | | | | | |
| 3A1 | Remove Exist. Wood Crossover Platform | 1 | LS | $800.00 | $800 | | PURITAN | X71-170 |
| 3A2 | Permanent Railings | 3 | EA | $4,000.00 | $12,000 | | PURITAN | S71-000, -101, -102 |
| 3A3 | Removable Railings | 4 | EA | $4,500.00 | $18,000 | | PURITAN | S71-000, -101, -102 |
| 3A4 | Net or Grating, (Net at large equip. hatch) | 1 | EA | $2,000.00 | $2,000 | | PURITAN | S71-000, -101, -102 |
| 3A5 | Net or Grating, (Grating at small hatch) | 10 | EA | $2,500.00 | $25,000 | | PURITAN | S71-000, -101, -102 |
| 3A6 | Fall Protect. Davit Arm (Fixed Base only) | 4 | EA | $750.00 | $3,000 | | PURITAN | S71-000, -101, -102 |
| 3A7 | Fall Protect. Ring | 3 | EA | $500.00 | $1,500 | | PURITAN | S71-000, -101, -102 |
| 3A8 | Fall Arrest System | 1 | EA | $1,500.00 | $1,500 | | PURITAN | S71-000, -101, -102 |
| 3A9 | Grab Bar | 6 | EA | $500.00 | $3,000 | | PURITAN | S71-000, -101, -102 |
| 3A10 | Replace Hatch Lift Assist Cylinders, large hatch | 1 | EA | $1,000.00 | $1,000 | | PURITAN | S71-000, -101, -102 |
| 3A11 | Replace Hatch Lift Assist Cylinders | 17 | EA | $500.00 | $8,500 | | PURITAN | S71-000, -101, -102 |
| 3A12 | Add Channel Frame Weepholes | 10 | EA | $500.00 | $5,000 | | PURITAN | S71-000, -101, -102 |
| 3A13 | Remove Cage, Add Gate & Fall Arrest system w/ Grab Bar | 1 | EA | $4,000.00 | $4,000 | | PURITAN | S71-000, -101, -102 |
| 3A14 | Add Gate & Fall Arrest system w/ Grab Bar | 2 | EA | $2,500.00 | $5,000 | | PURITAN | S71-000, -101, -102 |
| 3A15 | Crossover Platform: FRP Framing, Grating, Guardrail, Ladders | 1 | EA | $15,000.00 | $15,000 | | PURITAN | S71-000, -101, -102 |
| | **Seven Mile:** | | | | | | | |
| 3A16 | Permanent Railings | 1 | EA | $4,000.00 | $4,000 | | SEVEN | S72-000, -101, -102 |
| 3A17 | Removable Railings | 5 | EA | $4,500.00 | $22,500 | | SEVEN | S72-000, -101, -102 |
| 3A18 | Net or Grating, (Grating at small hatch) | 10 | EA | $2,500.00 | $25,000 | | SEVEN | S72-000, -101, -102 |
| 3A19 | Fall Protect. Davit Arm (Fixed Base only) | 4 | EA | $750.00 | $3,000 | | SEVEN | S72-000, -101, -102 |
| 3A20 | Fall Protect. Ring | 2 | EA | $500.00 | $1,000 | | SEVEN | S72-000, -101, -102 |
| 3A21 | Grab Bar | 4 | EA | $500.00 | $2,000 | | SEVEN | S72-000, -101, -102 |
| 3A22 | Replace Hatch Lift Assist Cylinders | 20 | EA | $600.00 | $12,000 | | SEVEN | S72-000, -101, -102 |
| 3A23 | Add Channel Frame Weepholes | 13 | EA | $500.00 | $6,500 | | SEVEN | S72-000, -101, -102 |
| 3A24 | Portable Railings | 1 | EA | $3,500.00 | $3,500 | | SEVEN | S72-000, -101, -102 |
| 3A25 | Remove Gate, Add Fall Arrest system w/ Grab Bar | 1 | EA | $4,000.00 | $4,000 | | SEVEN | S72-000, -101, -102 |
| 3A26 | Add Chains top and mid-rail, large hatch | 1 | EA | $700.00 | $700 | | SEVEN | S72-000, -101, -102 |
| 3A27 | Re-Orient Hatch Opening Direction | 1 | EA | $1,500.00 | $1,500 | | SEVEN | S72-000, -101, -102 |
| 3A28 | Add Gate & Fall Arrest system w/ Grab Bar | 2 | EA | $2,500.00 | $5,000 | | SEVEN | S72-000, -101, -102 |
| 3A29 | Duct Elbow Support Framing | 1 | EA | $9,500.00 | $9,500 | | SEVEN | S72-000, -101, -102 |
| | **Hubbell Southfield:** | | | | | | | |
| 3A30 | Demo Hatches (14 only per S-73-000) | 14 | EA | $1,000.00 | $14,000 | | HUBBEL | X73-101,-102 |
| 3A31 | New Recessed Hatches incl. Concrete Perimeter work | 14 | EA | $9,500.00 | $133,000 | | HUBBEL | S73-000, -101, -102 |
| 3A32 | Removable Railings | 7 | EA | $4,500.00 | $31,500 | | HUBBEL | S73-000, -101, -102 |
| 3A33 | Net or Grating, (Grating at small hatch) | 23 | EA | $2,500.00 | $57,500 | | HUBBEL | S73-000, -101, -102 |
| 3A34 | Fall Protect. Davit Arm (Fixed Base only) | 5 | EA | $750.00 | $3,750 | | HUBBEL | S73-000, -101, -102 |
| 3A35 | Grab Bar | 10 | EA | $500.00 | $5,000 | | HUBBEL | S73-000, -101, -102 |
| 3A36 | Replace Hatch Lift Assist Cylinders | 32 | EA | $600.00 | $19,200 | | HUBBEL | S73-000, -101, -102 |
| 3A37 | Add Channel Frame Weepholes | 24 | EA | $500.00 | $12,000 | | HUBBEL | S73-000, -101, -102 |
| 3A38 | Portable Railings | 2 | EA | $3,500.00 | $7,000 | | HUBBEL | S73-000, -101, -102 |
| 3A39 | Replace Guardrail and Add Gate | 1 | EA | $3,500.00 | $3,500 | | HUBBEL | S73-000, -101, -102 |
| 3A40 | Add Gate & Fall Arrest system w/ Grab Bar | 11 | EA | $2,500.00 | $27,500 | | HUBBEL | S73-000, -101, -102 |
| 3A41 | New Concrete Topping Slab, sloped. Incl. scarify ex. surface, chip out conc. to achieve min. 2" depgh, epoxy dowels into ex. slab @16" oc | 367 | SF | $75.00 | $27,525 | | HUBBEL | ARCH:A73-101, Note 2 |
| | **Leib:** | | | | | | | |
| 3A42 | Permanent Railings | 4 | EA | $4,000.00 | $16,000 | | LEIB | S74-000, -101, -102 |
| 3A43 | Net or Grating, (Net at large equip. hatch) | 3 | EA | $2,000.00 | $6,000 | | LEIB | S74-000, -101, -102 |
| 3A44 | Net or Grating, (Grating at small hatch) | 16 | EA | $2,500.00 | $40,000 | | LEIB | S74-000, -101, -102 |
| 3A45 | Fall Protect. Davit Arm (Fixed Base only) | 3 | EA | $750.00 | $2,250 | | LEIB | S74-000, -101, -102 |
| 3A46 | Fall Arrest System | 1 | EA | $1,500.00 | $1,500 | | LEIB | S74-000, -101, -102 |
| 3A47 | Grab Bar | 3 | EA | $500.00 | $1,500 | | LEIB | S74-000, -101, -102 |
| 3A48 | Replace Hatch Lift Assist Cylinders, large hatch | 3 | EA | $1,000.00 | $3,000 | | LEIB | S74-000, -101, -102 |
| 3A49 | Replace Hatch Lift Assist Cylinders | 4 | EA | $600.00 | $2,400 | | LEIB | S74-000, -101, -102 |
| 3A50 | Add Channel Frame Weepholes | 2 | EA | $500.00 | $1,000 | | LEIB | S74-000, -101, -102 |
| 3A51 | Add Gate & Fall Arrest system w/ Grab Bar | 2 | EA | $2,500.00 | $5,000 | | LEIB | S74-000, -101, -102 |
| 3A52 | Road Closures / Traffic Control for work on Mt. Elliott St. | 1 | ALLOW | $10,000.00 | $10,000 | | LEIB | S74-000, -101, -102 |
| | **St. Aubin:** | | | | | | | |
| 3A53 | Removable Railings | 4 | EA | $4,500.00 | $18,000 | | AUBIN | S75-000, -101 |
| 3A54 | Net or Grating, (Grating at small hatch) | 12 | EA | $2,500.00 | $30,000 | | AUBIN | S75-000, -101 |
| 3A55 | Fall Protect. Davit Arm (Fixed Base only) | 2 | EA | $750.00 | $1,500 | | AUBIN | S75-000, -101 |
| 3A56 | Grab Bar | 2 | EA | $500.00 | $1,000 | | AUBIN | S75-000, -101 |
| 3A57 | Replace Hatch Lift Assist Cylinders, extra large hatch | 1 | EA | $2,000.00 | $2,000 | | AUBIN | S75-000, -101 |
| 3A58 | Replace Hatch Lift Assist Cylinders | 15 | EA | $600.00 | $9,000 | | AUBIN | S75-000, -101 |
| 3A59 | Add Channel Frame Weepholes | 16 | EA | $500.00 | $8,000 | | AUBIN | S75-000, -101 |
| 3A60 | Portable Railings | 1 | EA | $3,500.00 | $3,500 | | AUBIN | S75-000, -101 |
| 3A61 | Re-Orient Hatch Opening Direction | 1 | EA | $1,500.00 | $1,500 | | AUBIN | S75-000, -101 |
| 3A62 | New Hatch incl. Concrete Perimeter work | 1 | EA | $9,500.00 | $9,500 | | AUBIN | S75-101 |
| 3A63 | New Concrete Pedestal: 18" x 24" x 54" high | 1 | EA | $6,000.00 | $6,000 | | AUBIN | S75-101 pump pedestal |
| 3A64 | Remove ex. FRP Grating at Stair Landing and Platform | 1 | LS | $2,500.00 | $2,500 | | AUBIN | X75-120 |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

## *3 CONCRETE*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 3A65 | Demo Conc. Pads including 1-1/2" deep into slab, patch slabs. | 1 | LS | $20,000.00 | $20,000 | | AUBIN | X75-120 |
| 3A66 | Demo Conc. Floor for new Drain Pipe, including patching slab | 1 | LS | $10,000.00 | $10,000 | | AUBIN | X75-120 |
| 3A67 | New FRP Grating & Guardrail at Stair Landing | 1 | LS | $3,000.00 | $3,000 | | AUBIN | S75-110 |
| 3A68 | Concrete Floor sloped to floor drains | 1 | LS | $4,500.00 | $4,500 | | AUBIN | S75-110 |
| 3A69 | Concrete Equip. Pads: 6" high | 1 | LS | $5,500.00 | $5,500 | | AUBIN | S75-110 |
| 3A70 | SS Monorail w/ 1/4 Ton manual chain hoist | 1 | LS | $12,500.00 | $12,500 | | AUBIN | S75-110 |
| 3A71 | Remove Steel Cover and supports, including top 18" of conc. walls. Demo (2) Hatches including concrete structure for larger openings. Includes shoring from 20' below. | 1 | LS | $41,500.00 | $41,500 | | AUBIN | X75-121, -122 |
| 3A72 | New Concrete Elevated Top Beams and 18" Top of Walls, heavy reinforcing, epoxy dowels @12" along perimeter, including shoring from 20' below. | 1 | LS | $68,000.00 | $68,000 | | AUBIN | S75-121 |
| 3A73 | New Hatch incl. Concrete Perimeter work | 1 | EA | $9,500.00 | $9,500 | | AUBIN | S75-120 Outfall |
| 3A74 | New Hatches at New Conc. Top, large w/ nets | 4 | EA | $13,250.00 | $53,000 | | AUBIN | S75-120 Outfall |
| 3A75 | New Hatches at New Conc. Top, small w/ grating | 2 | EA | $8,750.00 | $17,500 | | AUBIN | S75-120 Outfall |
| 3A76 | New Hatches at New Conc. Top, small w/ grab bar, davit base | 2 | EA | $7,500.00 | $15,000 | | AUBIN | S75-120 Outfall |
| 3A77 | Add Grating, Davit Arm base, lift cylinders, weepholes, ladder | 1 | LS | $10,000.00 | $10,000 | | AUBIN | S75-120 Outfall H-50 |
| 3A78 | Concrete SOG, at New Apron | 227 | SF | $50.00 | $11,350 | | AUBIN | GENERAL:G75-100 |
| 3A79 | Concrete Curb 8"x8" | 1 | LS | $5,000.00 | $5,000 | | AUBIN | ARCH:A75-301 |
| 3A80 | Provide 6" SOG w/ #5 bar 12" OC EW, Rigid Insul. under enclosu | 428 | SF | $50.00 | $21,400 | | AUBIN | ARCH:A75-101, Note 3 |
| | **Conner Creek:** | | | | | | | |
| 3A81 | Permanent Railings | 11 | EA | $4,000.00 | $44,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A82 | Removable Railings | 2 | EA | $4,500.00 | $9,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A83 | Net or Grating, (Net at large hatch) | 18 | EA | $2,000.00 | $36,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A84 | Net or Grating, (Grating at small hatch) | 26 | EA | $2,500.00 | $65,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A85 | Fall Protect. Davit Arm (Fixed Base only) | 6 | EA | $750.00 | $4,500 | | CONNER | S76-000, -101, -102, -103 |
| 3A86 | Fall Protect. Ring | 37 | EA | $500.00 | $18,500 | | CONNER | S76-000, -101, -102, -103 |
| 3A87 | Fall Arrest System | 1 | EA | $1,500.00 | $1,500 | | CONNER | S76-000, -101, -102, -103 |
| 3A88 | Grab Bar | 2 | EA | $500.00 | $1,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A89 | Replace Hatch Lift Assist Cylinders, extra large hatch | 18 | EA | $2,000.00 | $36,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A90 | Replace Hatch Lift Assist Cylinders | 61 | EA | $600.00 | $36,600 | | CONNER | S76-000, -101, -102, -103 |
| 3A91 | Add Channel Frame Weepholes | 20 | EA | $500.00 | $10,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A92 | Portable Railings | 4 | EA | $3,500.00 | $14,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A93 | Leading Edge Coating | 24 | EA | $250.00 | $6,000 | | CONNER | S76-000, -101, -102, -103 |
| 3A94 | Provide new concrete topping slab, sloped. Incl. scarify ex. surface, chip out conc. to achieve min. 2" depgh, epoxy dowels into ex. slab @16" oc | 343 | SF | $75.00 | $25,725 | | CONNER | ARCH:A76-103, -301 Detail 3 |
| | **Baby Creek:** | | | | | | | |
| 3A95 | Permanent Railings | 2 | EA | $4,000.00 | $8,000 | | CREEK | S77-000, -101, -102 |
| 3A96 | Removable Railings | 2 | EA | $4,500.00 | $9,000 | | CREEK | S77-000, -101, -102 |
| 3A97 | Net or Grating, (Net at large hatch) | 12 | EA | $2,000.00 | $24,000 | | CREEK | S77-000, -101, -102 |
| 3A98 | Net or Grating, (Grating at small hatch) | 7 | EA | $2,500.00 | $17,500 | | CREEK | S77-000, -101, -102 |
| 3A99 | Fall Protect. Davit Arm (Fixed Base only) | 1 | EA | $750.00 | $750 | | CREEK | S77-000, -101, -102 |
| 3A100 | Fall Protect. Ring | 5 | EA | $500.00 | $2,500 | | CREEK | S77-000, -101, -102 |
| 3A101 | Replace Hatch Lift Assist Cylinders, extra large hatch | 12 | EA | $2,000.00 | $24,000 | | CREEK | S77-000, -101, -102 |
| 3A102 | Replace Hatch Lift Assist Cylinders | 14 | EA | $600.00 | $8,400 | | CREEK | S77-000, -101, -102 |
| 3A103 | Add Channel Frame Weepholes | 2 | EA | $500.00 | $1,000 | | CREEK | S77-000, -101, -102 |
| 3A104 | Portable Railings | 1 | EA | $3,500.00 | $3,500 | | CREEK | S77-000, -101, -102 |
| 3A105 | Add Chains top and mid-rail, large hatch | 4 | EA | $700.00 | $2,800 | | CREEK | S77-000, -101, -102 |
| 3A106 | Add Chains mid-rail, large hatch | 8 | EA | $400.00 | $3,200 | | CREEK | S77-000, -101, -102 |
| 3A107 | Add Gate & Fall Arrest system w/ Grab Bar | 4 | EA | $2,500.00 | $10,000 | | CREEK | S77-000, -101, -102 |
| 3A108 | Cut Out (2) 4' Dia. holes into Channel Top, 7'-6" below grade | 1 | LS | $35,000.00 | $35,000 | | CREEK | X77-170 |
| 3A109 | CIP Channel Top Slab with (2) 4' Dia. Precast Conc. MH's | 1 | LS | $65,000.00 | $65,000 | | CREEK | S77-104 |
| | Repair Concrete at guard rail posts per A77-104 | 23 | EA | $2,000.00 | $46,000 | | CREEK | ARCH:A77-103, Note 5 |
| | **Oakwood:** | | | | | | | |
| 3A105 | Permanent Railings | 15 | EA | $4,000.00 | $60,000 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A106 | Removable Railings | 13 | EA | $4,500.00 | $58,500 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A107 | Net or Grating, (Net at large hatch) | 10 | EA | $2,000.00 | $20,000 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A108 | Net or Grating, (Grating at small hatch) | 7 | EA | $2,500.00 | $17,500 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A109 | Fall Protect. Davit Arm (Fixed Base only) | 15 | EA | $750.00 | $11,250 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A110 | Fall Protect. Ring, includes 1 additional Ring per detail | 34 | EA | $1,000.00 | $34,000 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A111 | Fall Arrest System | 5 | EA | $1,500.00 | $7,500 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A112 | Grab Bar | 25 | EA | $500.00 | $12,500 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A113 | Replace Hatch Lift Assist Cylinders | 81 | EA | $600.00 | $48,600 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A114 | Add Channel Frame Weepholes | 12 | EA | $500.00 | $6,000 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A115 | Leading Edge Coating | 32 | EA | $250.00 | $8,000 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A116 | Remove existing Ladder Cage | 1 | EA | $500.00 | $500 | | OAK | S78-000,-100, -101, -102, -103 |
| 3A117 | Conduit Safety Coating, incl. supports and 3" wide deck strip | 2,351 | LF | $2.50 | $5,878 | | OAK | S78-000,-100, -101, -102, -103 |
| | **Belle Isle:** | | | | | | | |
| 3A118 | Permanent Railings | 3 | EA | $4,000.00 | $12,000 | | BELLE | S79-000, -101, -102 |
| 3A119 | Removable Railings | 1 | EA | $4,500.00 | $4,500 | | BELLE | S79-000, -101, -102 |
| 3A120 | Net or Grating, (Grating at small hatch) | 3 | EA | $2,500.00 | $7,500 | | BELLE | S79-000, -101, -102 |
| 3A121 | Fall Protect. Davit Arm (Fixed Base only) | 5 | EA | $750.00 | $3,750 | | BELLE | S79-000, -101, -102 |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | | | | | |
|---|---|---|---|---|---|---|
| | ***Designed By:*** **Hazen** | | | | | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | | | | | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***3 CONCRETE***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 3A122 | Fall Protect. Ring | 8 | EA | $500.00 | $4,000 | | BELLE | S79-000, -101, -102 |
| 3A123 | Grab Bar | 2 | EA | $500.00 | $1,000 | | BELLE | S79-000, -101, -102 |
| 3A124 | Replace Hatch Lift Assist Cylinders | 16 | EA | $600.00 | $9,600 | | BELLE | S79-000, -101, -102 |
| 3A125 | Leading Edge Coating | 8 | EA | $250.00 | $2,000 | | BELLE | S79-000, -101, -102 |
| 3A126 | Re-Orient Hatch Opening Direction | 2 | EA | $1,500.00 | $3,000 | | BELLE | S79-000, -101, -102 |
| 3A127 | Add Gate & Fall Arrest system w/ Grab Bar | 1 | EA | $2,500.00 | $2,500 | | BELLE | S79-000, -101, -102 |
| 3A128 | Demo Conc. Pads including 1-1/2" deep into slab, patch slabs. | 1 | LS | $5,000.00 | $5,000 | | BELLE | S79-000, -101, -102 |
| **TOTAL** | **CONCRETE** | | | | **$1,949,428** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***4 MASONRY***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **A** | **MISCELLANEOUS** | | | | **$172,055** | | | |
| 4A1 | 2. Tuck Point Precast Joints | 114 | LF | $15.00 | $1,710 | | BELLE | ARCH:A79-201 |
| 4A2 | R&R Masonry Veneer & add flashing | 1 | LS | $2,500.00 | $2,500 | | OAK | ARCH:A78-211 |
| 4A3 | 1. Tuck Point Masonry Veneer | 35 | SF | $15.00 | $525 | | CREEK | ARCH:A77-202 |
| 4A4 | 1. Tuck Point Masonry Veneer | 38 | SF | $15.00 | $570 | | CREEK | ARCH:A77-201 |
| 4A5 | 2&3. R&R Brick Veneer | 18 | SF | $50.00 | $900 | | CREEK | ARCH:A77-201 |
| 4A6 | 2&4. Create masonry opening & provide sidewall grate per 2/A76 | 17 | EA | $2,000.00 | $34,000 | | CONNER | ARCH:A76-103 |
| 4A7 | 3. R&R Grout at steel base plates | 12 | EA | $500.00 | $6,000 | | CONNER | ARCH:A76-103 |
| 4A8 | 2. Create masonry opening & provide sidewall grate per 2/A76-3 | 4 | EA | $2,000.00 | $8,000 | | CONNER | ARCH:A76-102 |
| 4A9 | 3. R&R Grout at steel base plates | 6 | EA | $500.00 | $3,000 | | CONNER | ARCH:A76-102 |
| 4A10 | Steel angle Per 3/A76-103 | 49 | LF | $80.00 | $3,920 | | CONNER | ARCH:A76-103 |
| 4A11 | Lintel at new masonry wall opening | 13 | LF | $125.00 | $1,625 | | AUBIN | ARCH:A75-301 |
| 4A12 | R&R Split Face Masonry, tooth in along perimeter of opening | 35 | SF | $75.00 | $2,625 | | AUBIN | ARCH:A75-301 |
| 4A13 | 1. Demo & Replace Exterior Masonry wall system | 189 | SF | $100.00 | $18,900 | | AUBIN | ARCH:A75-201 |
| 4A14 | 2. Reuse salvaged split face CMU at knock out panel | 23 | SF | $100.00 | $2,300 | | AUBIN | ARCH:A75-201 |
| 4A15 | 1. R&R Cast Stone Window Sill | 76 | LF | $150.00 | $11,400 | | LEIB | ARCH:A74-201 |
| 4A16 | 2. R&R Glass Block Windows | 209 | SF | $125.00 | $26,125 | | LEIB | ARCH:A74-201 |
| 4A17 | 3. Tuck Point Brick | 4 | SF | $15.00 | $60 | | LEIB | ARCH:A74-201 |
| 4A18 | 4. Replace Spalled Brick | 3 | SF | $250.00 | $750 | | LEIB | ARCH:A74-201 |
| 4A19 | 5. Replace Spider Cracked Bricks | 11 | SF | $250.00 | $2,750 | | LEIB | ARCH:A74-201 |
| 4A20 | 1. Tuck Point Mortar Joints | 108 | SF | $15.00 | $1,620 | | SEVEN | ARCH:A72-202 |
| 4A21 | 1. Tuck Point Mortar Joints | 140 | SF | $15.00 | $2,100 | | SEVEN | ARCH:A72-201 |
| 4A22 | 7. Remove Existing Angle Door Sill & replace with SS angles | 1 | EA | $2,500.00 | $2,500 | | SEVEN | ARCH:A72-101 |
| 4A23 | 1. R&R Cast Stone Band | 43 | SF | $200.00 | $8,600 | | PURITAN | ARCH:A71-203 |
| 4A24 | 1B R&R Cast Stone Band | 8 | SF | $200.00 | $1,600 | | PURITAN | ARCH:A71-203 |
| 4A25 | 2. Tuck Point Mortar Joints | 98 | SF | $15.00 | $1,470 | | PURITAN | ARCH:A71-203 |
| 4A26 | 1. R&R Cast Stone Band | 63 | SF | $200.00 | $12,600 | | PURITAN | ARCH:A71-202 |
| 4A27 | 1B R&R Cast Stone Band | 6 | SF | $200.00 | $1,200 | | PURITAN | ARCH:A71-202 |
| 4A28 | 2. Tuck Point Mortar Joints | 146 | SF | $15.00 | $2,190 | | PURITAN | ARCH:A71-202 |
| 4A29 | 1C R&R Cast Stone Band | 3 | SF | $200.00 | $600 | | PURITAN | ARCH:A71-202 |
| 4A30 | 1. R&R Cast Stone Band | 24 | SF | $200.00 | $4,800 | | PURITAN | ARCH:A71-201 |
| 4A31 | 1B R&R Cast Stone Band | 4 | SF | $200.00 | $800 | | PURITAN | ARCH:A71-201 |
| 4A32 | 2. Tuck Point Mortar Joints | 121 | SF | $15.00 | $1,815 | | PURITAN | ARCH:A71-201 |
| 4A33 | 6. Remove Door angle Sill & replace with galv. | 1 | EA | $2,500.00 | $2,500 | | PURITAN | ARCH:A71-101 |
| **TOTAL** | **MASONRY** | | | | **$172,055** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | | | | | |
|---|---|---|---|---|---|---|
| | ***Designed By:*** **Hazen** | | | | | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | | | | | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

## *6 WOOD, PLASTIC & COMPOSITE*

| A | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **A** | **MISCELLANEOUS** | | | | **$73,960** | | | |
| 6A1 | Provide new FRP handrail Per 2/A78-11 | 1 | EA | $1,000.00 | $1,000 | | OAK | ARCH:A78-111 |
| 6A2 | FRP Guard Rail fill 3/A76-102 | 2 | EA | $1,000.00 | $2,000 | | CONNER | ARCH:A76-103 |
| 6A3 | FRP Guard Rail fill 3/A76-102 | 2 | EA | $1,000.00 | $2,000 | | CONNER | ARCH:A76-102 |
| 6A4 | 4. Existing FRP Stairs Temp Supports during floor coating work | 2 | EA | $200.00 | $400 | | AUBIN | ARCH:A75-102 |
| 6A5 | 5. Provide removable FRP Guardrail | 7 | LF | $500.00 | $3,500 | | AUBIN | ARCH:A75-102 |
| 6A6 | 8. Temp R&R Stairs & Landing during painting | 123 | SF | $200.00 | $24,600 | | AUBIN | ARCH:A75-102 |
| 6A7 | Provide Epoxy Res Counter Top & integral back splash | 23 | SF | $150.00 | $3,450 | | AUBIN | ARCH:A75-101 |
| 6A8 | Stl. Base Cabinet Lab Casework, Open front | 6 | LF | $300.00 | $1,800 | | AUBIN | ARCH:A75-101 |
| 6A9 | Epoxy Resin Shelf | 6 | LF | $150.00 | $900 | | AUBIN | ARCH:A75-101 |
| 6A10 | FRP prefabricated Pipe Enclosure with doors | 41 | SF | $700.00 | $28,700 | | AUBIN | ARCH:A75-301 |
| 6A11 | 5. Provide new 4" High FRP Toe Board | 21 | LF | $100.00 | $2,100 | | HUBBEL | ARCH:A73-111 |
| 6A12 | R&R 3/4" Exterior Grade Plywood | 22 | LF | $80.00 | $1,760 | | HUBBEL | ARCH:A73-104 |
| 6A13 | Provide roof cricket framing 2x & Plywood | 10 | SF | $175.00 | $1,750 | | HUBBEL | ARCH:A73-104 |
| **TOTAL** | **WOOD, PLASTIC & COMPOSITE** | | | | **$73,960** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| GLWA Great Lakes Water Authority | ***Designed By:*** **Hazen** | REGENCY CONSTRUCTION SERVICES |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

## *7 THERMAL AND MOISTURE PROTECTION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **MISCELLANEOUS** | | | | **$512,560** | | | |
| 7A1 | 1. Prep Conc. Coping Cap. Provide silicone water repellant | 91 | LF | $100.00 | $9,100 | | BELLE | ARCH:A79-201 |
| 7A2 | R&R Cove joint Backer Rod & Sealant | 179 | LF | $25.00 | $4,475 | | BELLE | ARCH:A79-201 |
| 7A3 | R&R Masonry Control joint | 73 | LF | $10.00 | $730 | | BELLE | ARCH:A79-201 |
| 7A4 | R&R joint at Wall Openings | 269 | LF | $10.00 | $2,690 | | BELLE | ARCH:A79-201 |
| 7A5 | R&R Cove joint Backer Rod & Sealant | 201 | LF | $25.00 | $5,025 | | OAK | ARCH:A78-212 |
| 7A6 | R&R Masonry Control joint | 101 | LF | $10.00 | $1,010 | | OAK | ARCH:A78-212 |
| 7A7 | R&R joint at Wall Openings | 312 | LF | $10.00 | $3,120 | | OAK | ARCH:A78-212 |
| 7A8 | R&R Cove joint Backer Rod & Sealant | 566 | LF | $25.00 | $14,150 | | OAK | ARCH:A78-211 |
| 7A9 | R&R Masonry Control joint | 1,062 | LF | $10.00 | $10,620 | | OAK | ARCH:A78-211 |
| 7A10 | R&R joint at Wall Openings | 965 | LF | $10.00 | $9,650 | | OAK | ARCH:A78-211 |
| 7A11 | R&R Masonry Control joint | 200 | LF | $10.00 | $2,000 | | OAK | ARCH:A78-203 |
| 7A12 | R&R joint at Wall Openings | 74 | LF | $10.00 | $740 | | OAK | ARCH:A78-203 |
| 7A13 | R&R Cove joint Backer Rod & Sealant | 336 | LF | $25.00 | $8,400 | | OAK | ARCH:A78-202 |
| 7A14 | R&R Masonry Control joint | 668 | LF | $10.00 | $6,680 | | OAK | ARCH:A78-202 |
| 7A15 | R&R joint at Wall Openings | 127 | LF | $10.00 | $1,270 | | OAK | ARCH:A78-202 |
| 7A16 | R&R Cove joint Backer Rod & Sealant | 293 | LF | $25.00 | $7,325 | | OAK | ARCH:A78-201 |
| 7A17 | R&R Masonry Control joint | 368 | LF | $10.00 | $3,680 | | OAK | ARCH:A78-201 |
| 7A18 | R&R joint at Wall Openings | 258 | LF | $10.00 | $2,580 | | OAK | ARCH:A78-201 |
| 7A19 | 20. R&R EPDM Roofing, incl. Flashings | 44 | SF | $200.00 | $8,800 | | OAK | ARCH:A78-104 |
| 7A20 | R&R Cove joint Backer Rod & Sealant | 84 | LF | $25.00 | $2,100 | | CREEK | ARCH:A77-203 |
| 7A21 | R&R Masonry Control joint | 87 | LF | $10.00 | $870 | | CREEK | ARCH:A77-203 |
| 7A22 | R&R joint at Wall Openings | 101 | LF | $10.00 | $1,010 | | CREEK | ARCH:A77-203 |
| 7A23 | R&R Cove joint Backer Rod & Sealant | 557 | LF | $25.00 | $13,925 | | CREEK | ARCH:A77-202 |
| 7A24 | R&R Masonry Control joint | 413 | LF | $10.00 | $4,130 | | CREEK | ARCH:A77-202 |
| 7A25 | R&R joint at Wall Openings | 1,138 | LF | $10.00 | $11,380 | | CREEK | ARCH:A77-202 |
| 7A26 | R&R Cove joint Backer Rod & Sealant | 523 | LF | $25.00 | $13,075 | | CREEK | ARCH:A77-201 |
| 7A27 | R&R Masonry Control joint | 364 | LF | $10.00 | $3,640 | | CREEK | ARCH:A77-201 |
| 7A28 | R&R joint at Wall Openings | 589 | LF | $10.00 | $5,890 | | CREEK | ARCH:A77-201 |
| 7A29 | 4. R&R Cove joint Sealant | 10 | LF | $10.00 | $100 | | CREEK | ARCH:A77-102 |
| 7A30 | R&R Cove joint Backer Rod & Sealant | 223 | LF | $25.00 | $5,575 | | CONNER | ARCH:A76-204 |
| 7A31 | R&R Masonry Control joint | 118 | LF | $10.00 | $1,180 | | CONNER | ARCH:A76-204 |
| 7A32 | R&R joint at Wall Openings | 626 | LF | $10.00 | $6,260 | | CONNER | ARCH:A76-204 |
| 7A33 | R&R Cove joint Backer Rod & Sealant | 187 | LF | $25.00 | $4,675 | | CONNER | ARCH:A76-203 |
| 7A34 | R&R Masonry Control joint | 139 | LF | $10.00 | $1,390 | | CONNER | ARCH:A76-203 |
| 7A35 | R&R joint at Wall Openings | 383 | LF | $10.00 | $3,830 | | CONNER | ARCH:A76-203 |
| 7A36 | R&R Cove joint Backer Rod & Sealant | 191 | LF | $25.00 | $4,775 | | CONNER | ARCH:A76-202 |
| 7A37 | R&R Masonry Control joint | 114 | LF | $10.00 | $1,140 | | CONNER | ARCH:A76-202 |
| 7A38 | R&R joint at Wall Openings | 414 | LF | $10.00 | $4,140 | | CONNER | ARCH:A76-202 |
| 7A39 | R&R Cove joint Backer Rod & Sealant | 303 | LF | $25.00 | $7,575 | | CONNER | ARCH:A76-201 |
| 7A40 | R&R Masonry Control joint | 273 | LF | $10.00 | $2,730 | | CONNER | ARCH:A76-201 |
| 7A41 | R&R joint at Wall Openings | 666 | LF | $10.00 | $6,660 | | CONNER | ARCH:A76-201 |
| 7A42 | R&R joint Backer Rod & Sealant Horizontal Slab | 4,109 | LF | $10.00 | $41,090 | | CONNER | ARCH:A76-107 |
| 7A43 | R&R joint Backer Rod & Sealant Horizontal Slab | 4,325 | LF | $10.00 | $43,250 | | CONNER | ARCH:A76-106 |
| 7A44 | R&R joint Backer Rod & Sealant Horizontal Slab | 4,153 | LF | $10.00 | $41,530 | | CONNER | ARCH:A76-105 |
| 7A45 | R&R joint Backer Rod & Sealant Horizontal Slab | 4,618 | LF | $10.00 | $46,180 | | CONNER | ARCH:A76-104 |
| 7A46 | R&R Cove joint Backer Rod & Sealant | 79 | LF | $25.00 | $1,975 | | AUBIN | ARCH:A75-202 |
| 7A47 | R&R Masonry Control joint | 64 | LF | $10.00 | $640 | | AUBIN | ARCH:A75-202 |
| 7A48 | R&R joint at Wall Openings | 255 | LF | $10.00 | $2,550 | | AUBIN | ARCH:A75-202 |
| 7A49 | R&R Cove joint Backer Rod & Sealant | 143 | LF | $25.00 | $3,575 | | AUBIN | ARCH:A75-201 |
| 7A50 | R&R Masonry Control joint | 153 | LF | $10.00 | $1,530 | | AUBIN | ARCH:A75-201 |
| 7A51 | R&R joint at Wall Openings | 216 | LF | $10.00 | $2,160 | | AUBIN | ARCH:A75-201 |
| 7A52 | R&R Cove joint Backer Rod & Sealant | 294 | LF | $25.00 | $7,350 | | LEIB | ARCH:A74-201 |
| 7A53 | R&R Masonry Control joint | 212 | LF | $10.00 | $2,120 | | LEIB | ARCH:A74-201 |
| 7A54 | R&R joint at Wall Openings | 246 | LF | $10.00 | $2,460 | | LEIB | ARCH:A74-201 |
| 7A55 | R&R Cove joint Backer Rod & Sealant | 458 | LF | $25.00 | $11,450 | | HUBBEL | ARCH:A73-211 |
| 7A56 | R&R Masonry Control joint | 131 | LF | $10.00 | $1,310 | | HUBBEL | ARCH:A73-211 |
| 7A57 | R&R joint at Wall Openings | 951 | LF | $10.00 | $9,510 | | HUBBEL | ARCH:A73-211 |
| 7A58 | R&R Cove joint Backer Rod & Sealant | 152 | LF | $25.00 | $3,800 | | HUBBEL | ARCH:A73-202 |
| 7A59 | R&R Masonry Control joint | 10 | LF | $10.00 | $100 | | HUBBEL | ARCH:A73-202 |
| 7A60 | R&R joint at Wall Openings | 145 | LF | $10.00 | $1,450 | | HUBBEL | ARCH:A73-202 |
| 7A61 | 1. R&R Freeze Board | 175 | LF | $75.00 | $13,125 | | HUBBEL | ARCH:A73-202 |
| 7A62 | R&R Cove joint Backer Rod & Sealant | 138 | LF | $25.00 | $3,450 | | HUBBEL | ARCH:A73-201 |
| 7A63 | R&R Masonry Control joint | 30 | LF | $10.00 | $300 | | HUBBEL | ARCH:A73-201 |
| 7A64 | R&R joint at Wall Openings | 165 | LF | $10.00 | $1,650 | | HUBBEL | ARCH:A73-201 |
| 7A65 | 1. R&R Freeze Board | 174 | LF | $75.00 | $13,050 | | HUBBEL | ARCH:A73-201 |
| 7A66 | Provide Spray Foam insulation R-20 | 19 | LF | $25.00 | $475 | | HUBBEL | ARCH:A73-104 |
| 7A67 | Provide Tyvek air barrier | 23 | LF | $45.00 | $1,035 | | HUBBEL | ARCH:A73-104 |
| 7A68 | R&R Vinyl Siding | 23 | LF | $60.00 | $1,380 | | HUBBEL | ARCH:A73-104 |
| 7A69 | Provide ice guard & Patch roof shingles | 74 | SF | $80.00 | $5,920 | | HUBBEL | ARCH:A73-104 |
| 7A70 | Extend Down Spout | 2 | LF | $250.00 | $500 | | HUBBEL | ARCH:A73-101 |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

### *7 THERMAL AND MOISTURE PROTECTION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 7A71 | R&R Cove joint Backer Rod & Sealant | 149 | LF | $25.00 | $3,725 | | SEVEN | ARCH:A72-203 |
| 7A72 | R&R Masonry Control joint | 41 | LF | $10.00 | $410 | | SEVEN | ARCH:A72-203 |
| 7A73 | R&R joint at Wall Openings | 209 | LF | $10.00 | $2,090 | | SEVEN | ARCH:A72-203 |
| 7A74 | R&R Cove joint Backer Rod & Sealant | 79 | LF | $25.00 | $1,975 | | SEVEN | ARCH:A72-202 |
| 7A75 | R&R Masonry Control joint | 114 | LF | $10.00 | $1,140 | | SEVEN | ARCH:A72-202 |
| 7A76 | R&R joint at Wall Openings | 289 | LF | $10.00 | $2,890 | | SEVEN | ARCH:A72-202 |
| 7A77 | R&R Cove joint Backer Rod & Sealant | 55 | LF | $25.00 | $1,375 | | SEVEN | ARCH:A72-201 |
| 7A78 | R&R Masonry Control joint | 40 | LF | $10.00 | $400 | | SEVEN | ARCH:A72-201 |
| 7A79 | R&R joint at Wall Openings | 77 | LF | $10.00 | $770 | | SEVEN | ARCH:A72-201 |
| 7A80 | R&R Cove joint Backer Rod & Sealant | 170 | LF | $25.00 | $4,250 | | PURITAN | ARCH:A71-203 |
| 7A81 | R&R Masonry Control joint | 163 | LF | $10.00 | $1,630 | | PURITAN | ARCH:A71-203 |
| 7A82 | R&R joint at Wall Openings | 160 | LF | $10.00 | $9,510 | | PURITAN | ARCH:A71-203 |
| 7A83 | R&R Cove joint Backer Rod & Sealant | 158 | LF | $25.00 | $3,950 | | PURITAN | ARCH:A71-202 |
| 7A84 | R&R Masonry Control joint | 30 | LF | $10.00 | $300 | | PURITAN | ARCH:A71-202 |
| 7A85 | R&R joint at Wall Openings | 128 | LF | $10.00 | $1,280 | | PURITAN | ARCH:A71-202 |
| 7A86 | R&R Cove joint Backer Rod & Sealant | 23 | LF | $25.00 | $575 | | PURITAN | ARCH:A71-201 |
| 7A87 | R&R Masonry Control joint | 53 | LF | $10.00 | $530 | | PURITAN | ARCH:A71-201 |
| 7A88 | R&R joint at Wall Openings | 275 | LF | $10.00 | $2,750 | | PURITAN | ARCH:A71-201 |
| **TOTAL** | **THERMAL AND MOISTURE PROTECTION** | | | | **$512,560** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***8 OPENINGS***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **DOOR SYSTEMS** | | | | **$731,200** | | | |
| 8A1 | Modify OHD Track for raised sill elevation | 1 | EA | $750.00 | $750 | | HUBBEL | ARCH:A73-101 |
| 8A2 | 4. Replace door track & brackets | 1 | EA | $2,000.00 | $2,000 | | PURITAN | ARCH:A71-101 |
| 8A3 | 7. Replace OHD safety sensor | 1 | EA | $600.00 | $600 | | PURITAN | ARCH:A71-101 |
| 8A4 | OHD 12x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 5 | EA | $11,500.00 | $57,500 | | OAK | ARCH:A00-006:Oakwood |
| 8A5 | OHD 14x20 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $22,500.00 | $22,500 | | OAK | ARCH:A00-006:Oakwood |
| 8A6 | OHD 12x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 2 | EA | $11,500.00 | $23,000 | | CONNER | ARCH:A00-005:Conner Creek |
| 8A7 | OHD 24x17 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $32,500.00 | $32,500 | | CONNER | ARCH:A00-005:Conner Creek |
| 8A8 | OHD 16x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $15,500.00 | $15,500 | | CONNER | ARCH:A00-005:Conner Creek |
| 8A9 | OHD 14x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 3 | EA | $13,500.00 | $40,500 | | CREEK | ARCH:A00-005:Baby Creek |
| 8A10 | OHD 12x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $11,500.00 | $11,500 | | SEVEN | ARCH:A00-004:Seven Mile |
| 8A11 | OHD 10x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 2 | EA | $10,500.00 | $21,000 | | SEVEN | ARCH:A00-004:Seven Mile |
| 8A12 | OHD 10x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $10,500.00 | $10,500 | | PURITAN | ARCH:A00-004:Puritan Fenkell |
| 8A13 | OHD 12x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 2 | EA | $11,500.00 | $23,000 | | PURITAN | ARCH:A00-004:Puritan Fenkell |
| 8A14 | OHD 10x10 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $9,500.00 | $9,500 | | LEIB | ARCH:A00-004:Leib |
| 8A15 | OHD 10x12 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $10,500.00 | $10,500 | | HUBBEL | ARCH:A00-004:Hubbell Southfield |
| 8A16 | OHD 10x10 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $9,500.00 | $9,500 | | HUBBEL | ARCH:A00-004:Hubbell Southfield |
| 8A17 | OHD 8x8 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $8,500.00 | $8,500 | | HUBBEL | ARCH:A00-004:Hubbell |
| 8A18 | OHD 14x14 - Steel Sectional, Insl., Motorized, incl. Demo Ex. | 1 | EA | $15,500.00 | $15,500 | | HUBBEL | ARCH:A00-004:Hubbell Southfield |
| 8A19 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 34 | EA | $3,750.00 | $127,500 | | OAK | ARCH:A00-006:Oakwood |
| 8A20 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 2 | EA | $5,400.00 | $10,800 | | OAK | ARCH:A00-006:Oakwood |
| 8A21 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 16 | EA | $3,750.00 | $60,000 | | CONNER | ARCH:A00-005:Conner Creek |
| 8A22 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 2 | EA | $5,400.00 | $10,800 | | CONNER | ARCH:A00-005:Conner Creek |
| 8A23 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 2 | EA | $3,750.00 | $7,500 | | CREEK | ARCH:A00-005:Baby Creek |
| 8A24 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 3 | EA | $5,400.00 | $16,200 | | CREEK | ARCH:A00-005:Baby Creek |
| 8A25 | Door Type NG - 3070 HM D.F.H. Insul., Incl. Demo Existing | 15 | EA | $3,750.00 | $56,250 | | CREEK | ARCH:A00-005:Baby Creek |
| 8A26 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 2 | EA | $3,750.00 | $7,500 | | AUBIN | ARCH:A00-004:St. Aubin |
| 8A27 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 8 | EA | $3,750.00 | $30,000 | | SEVEN | ARCH:A00-004:Seven Mile |
| 8A28 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 3 | EA | $5,400.00 | $16,200 | | SEVEN | ARCH:A00-004:Seven Mile |
| 8A29 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 4 | EA | $3,750.00 | $15,000 | | PURITAN | ARCH:A00-004:Puritan Fenkell |
| 8A30 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 1 | EA | $5,400.00 | $5,400 | | PURITAN | ARCH:A00-004:Puritan Fenkell |
| 8A31 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 4 | EA | $3,750.00 | $15,000 | | LEIB | ARCH:A00-004:Leib |
| 8A32 | Door Type F - 3070 HM D.F.H. Insul., Incl. Demo Existing | 6 | EA | $3,750.00 | $22,500 | | HUBBEL | ARCH:A00-004:Hubbell |
| 8A33 | Door Type F&F- 6070 HM D.F.H. Insul., Incl. Demo Existing | 3 | EA | $5,400.00 | $16,200 | | HUBBEL | ARCH:A00-004:Hubbell Southfield |
| **B** | **ENTRANCES, STOREFRONTS AND CURTAIN WALLS** | | | | | | | |
| 8B1 | No Work Included | | | | | | | |
| **C** | **WINDOWS / SKYLIGHTS** | | | | **$2,500** | | | |
| 8C1 | 4. R&R Glazing 1" Low E with tint to match existing: (3 sf) | 1 | LS | $2,500.00 | $2,500 | | BELLE | ARCH:A79-201 |
| **D** | **INTERIOR GLAZING** | | | | | | | |
| 8D1 | No Work Included | | | | | | | |
| **E** | **LOUVERS AND VENTS** | | | | | | | |
| 8E1 | No Work Included | | | | | | | |
| **F** | **MISCELLANEOUS** | | | | | | | |
| 8F1 | No Work Included | | | | | | | |
| **TOTAL** | **OPENINGS** | | | | **$733,700** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

GLWA Great Lakes Water Authority

REGENCY CONSTRUCTION SERVICES

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

***9 FINISHES***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **Ceilings** | | | | **$59,505** | | | |
| 9A1 | 3. Provide new 2x4 ACT tile, exist. grid to remain and cleaned | 7,031 | SF | $5.50 | $38,671 | | CONNER | ARCH:A76-109 |
| 9A2 | 3. Provide new 2x4 ACT tile, exist. grid to remain and cleaned | 3,349 | SF | $5.50 | $18,420 | | CONNER | ARCH:A76-108 |
| 9A3 | 10. Provide new 2x2 ACT tile, exist. grid to remain and cleaned | 345 | SF | $7.00 | $2,415 | | PURITAN | ARCH:A71-101 |
| **B** | **Flooring** | | | | **$307,645** | | | |
| 9B1 | 1. Provide Epoxy Flooring System 2 Per 2/A00-009 | 3,375 | SF | $20.00 | $67,500 | | OAK | ARCH:A78-104 |
| 9B2 | 2. Epoxy Coat Base Plate Per L/A00-009 | 9 | EA | $100.00 | $900 | | OAK | ARCH:A78-104 |
| 9B3 | 3. Temp R&R Rail along floor during flooring work Per H/A00-009 | 21 | LF | $15.00 | $315 | | OAK | ARCH:A78-104 |
| 9B4 | 4. Coating at Pipe Penetration Per F/A00-009 | 91 | EA | $100.00 | $9,100 | | OAK | ARCH:A78-104 |
| 9B5 | 5. Pipe Support Base Plate Per D/A00-009 | 26 | EA | $100.00 | $2,600 | | OAK | ARCH:A78-104 |
| 9B6 | 8. Temp R&R Toe Board during flooring work | 114 | LF | $15.00 | $1,710 | | OAK | ARCH:A78-104 |
| 9B7 | 9. Floor opening finish Edge Per D/A00-009 | 234 | LF | $100.00 | $23,400 | | OAK | ARCH:A78-104 |
| 9B8 | 12. Epoxy Coat Trench Drain | 12 | LF | $100.00 | $1,200 | | OAK | ARCH:A78-104 |
| 9B9 | 13. Temp R&R Hose reel during flooring work | 1 | EA | $100.00 | $100 | | OAK | ARCH:A78-104 |
| 9B10 | 1. Provide Epoxy Floor System 2 Per 2/A00-009 | 2,125 | SF | $20.00 | $42,500 | | OAK | ARCH:A78-103 |
| 9B11 | 2. Temp R&R Grating during flooring work | 633 | SF | $20.00 | $12,660 | | OAK | ARCH:A78-103 |
| 9B12 | 3. R&R bolt down bollards during flooring work. Per H/A00-009 | 2 | EA | $100.00 | $200 | | OAK | ARCH:A78-103 |
| 9B13 | 4. Pipe Penetration Per F/A00-009 | 25 | EA | $100.00 | $2,500 | | OAK | ARCH:A78-103 |
| 9B14 | 5. Pipe Support Base Per H/A00-009 | 7 | EA | $100.00 | $700 | | OAK | ARCH:A78-103 |
| 9B15 | 6. Unistrut Pipe Support Per D/A00-009 | 7 | EA | $100.00 | $700 | | OAK | ARCH:A78-103 |
| 9B16 | 9. Pipe Support Base Plate coating Per D/A00-009 | 2 | EA | $100.00 | $200 | | OAK | ARCH:A78-103 |
| 9B17 | 1. Provide Epoxy Floor Coating System Per 1/A00-990 | 951 | SF | $20.00 | $19,020 | | OAK | ARCH:A78-102 |
| 9B18 | 2. Provide Epoxy Floor Coating System Per 2/A00-009 | 1,532 | SF | $20.00 | $30,640 | | OAK | ARCH:A78-102 |
| 9B19 | 3. Epoxy Floor Base Plate Per L/A00-009 | 8 | EA | $100.00 | $800 | | OAK | ARCH:A78-102 |
| 9B20 | 5. Pipe Penetration Per F/A00-009 | 64 | EA | $100.00 | $6,400 | | OAK | ARCH:A78-102 |
| 9B21 | 6. Provide base plate floor coating per D/A00-009 | 2 | EA | $100.00 | $200 | | OAK | ARCH:A78-102 |
| 9B22 | 9. Epoxy Floor Coating at Trench Dra Per K/A00-009 | 40 | LF | $100.00 | $4,000 | | OAK | ARCH:A78-102 |
| 9B23 | 1. Provide Epoxy Floor System | 804 | SF | $20.00 | $16,080 | | CONNER | ARCH:A76-101 |
| 9B24 | 2. Pipe Penetration Per G/A00-009 | 4 | EA | $100.00 | $400 | | CONNER | ARCH:A76-101 |
| 9B25 | 3&4 Pipe Support Grout Pack per D/A00-009 | 13 | EA | $100.00 | $1,300 | | CONNER | ARCH:A76-101 |
| 9B26 | 9. Temp R&R Door Threshold during flooring work | 1 | EA | $100.00 | $100 | | CONNER | ARCH:A76-101 |
| 9B27 | 10. Pipe Penetration per 3H/A00-009 | 27 | EA | $100.00 | $2,700 | | AUBIN | ARCH:A75-102 |
| 9B28 | R&R Epoxy coating at floor and containment walls. | 2,986 | SF | $20.00 | $59,720 | | AUBIN | ARCH:A75-102 |
| **C** | **Painting** | | | | **$339,941** | | | |
| 9C1 | 1. Prep & Paint Bollards | 11 | EA | $150.00 | $1,650 | | BELLE | ARCH:A79-101 |
| 9C2 | 3&4. Prep & Paint OHD Jamb & Lintels | 16 | LF | $100.00 | $1,600 | | BELLE | ARCH:A79-101 |
| 9C3 | Prep & Paint concrete walls | 316 | SF | $10.00 | $3,160 | | OAK | ARCH:A78-212 |
| 9C4 | 1. Prep & Paint Existing Columns | 14 | EA | $300.00 | $4,200 | | OAK | ARCH:A78-111 |
| 9C5 | 2. Prep & Paint Roof Beams | 471 | LF | $50.00 | $23,550 | | OAK | ARCH:A78-111 |
| 9C6 | 21. Prep & Paint Steel Roof Beam | 124 | LF | $50.00 | $6,200 | | OAK | ARCH:A78-104 |
| 9C7 | 4. Paint Existing Bollard per F/A00-009 | 24 | EA | $150.00 | $3,600 | | OAK | ARCH:A78-102 |
| 9C8 | 2. Prep & Paint Louver | 394 | SF | $150.00 | $59,100 | | CREEK | ARCH:A77-202 |
| 9C9 | 4. Prep & Paint Bollards | 6 | EA | $150.00 | $900 | | CREEK | ARCH:A77-201 |
| 9C10 | 5. Prep & Paint Steel Columns | 2 | EA | $300.00 | $600 | | CREEK | ARCH:A77-201 |
| 9C11 | 3. Prep & Paint Steel Column | 2 | EA | $300.00 | $600 | | CREEK | ARCH:A77-104 |
| 9C12 | 4. Prep & Paint Crane Rails | 98 | LF | $75.00 | $7,350 | | CREEK | ARCH:A77-104 |
| 9C13 | 2. Prep & Paint Bollards | 5 | EA | $150.00 | $750 | | CREEK | ARCH:A77-103 |
| 9C14 | 3. Prep & Paint Steel Column | 9 | EA | $300.00 | $2,700 | | CREEK | ARCH:A77-103 |
| 9C15 | 4. Prep & Paint Crane Rails | 523 | LF | $75.00 | $39,225 | | CREEK | ARCH:A77-103 |
| 9C16 | 1. Prep & Paint Steel Column | 2 | EA | $300.00 | $600 | | CREEK | ARCH:A77-102 |
| 9C17 | 2. Prep & Paint Plaster Soffit | 458 | SF | $7.00 | $3,206 | | CREEK | ARCH:A77-102 |
| 9C18 | 3. Prep & Paint Bollards | 4 | EA | $150.00 | $600 | | CREEK | ARCH:A77-102 |
| 9C19 | 1. Prep & Paint Crain Rails | 244 | LF | $75.00 | $18,300 | | CONNER | ARCH:A76-103 |
| 9C20 | 3. Prep & Paint Steel Columns | 12 | EA | $300.00 | $3,600 | | CONNER | ARCH:A76-103 |
| 9C21 | Prep & Paint CMU Wall | 337 | SF | $10.00 | $3,370 | | CONNER | ARCH:A76-103 |
| 9C22 | 1. Prep & Paint Crain Rails | 251 | LF | $75.00 | $18,825 | | CONNER | ARCH:A76-102 |
| 9C23 | 3. Prep & Paint Steel Columns | 6 | EA | $300.00 | $1,800 | | CONNER | ARCH:A76-102 |
| 9C24 | Prep & Paint CMU Wall | 336 | SF | $10.00 | $3,360 | | CONNER | ARCH:A76-102 |
| 9C25 | 3. Prep & Paint CMU Walls | 223 | LF | $10.00 | $2,230 | | AUBIN | ARCH:A75-102 |
| 9C26 | 1. Paint Floor Stripes 2" Wide | 54 | LF | $15.00 | $810 | | AUBIN | ARCH:A75-101 |
| 9C27 | 2. Prep & Paint Emergency Eye Wash Station | 1 | EA | $500.00 | $500 | | AUBIN | ARCH:A75-101 |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***9 FINISHES***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 9C28 | 1. Prep & Paint Bollards | 16 | EA | $150.00 | $2,400 | | HUBBEL | ARCH:A73-211 |
| 9C29 | 2. Prep & Paint Bollards | 1 | EA | $150.00 | $150 | | HUBBEL | ARCH:A73-202 |
| 9C30 | 2. Prep & Paint Bollards | 2 | EA | $150.00 | $300 | | HUBBEL | ARCH:A73-201 |
| 9C31 | 3. Prep & Paint Wood Trusses | 1,089 | LF | $5.00 | $5,445 | | HUBBEL | ARCH:A73-112 |
| 9C32 | 4. Prep & Paint Plywood Sheathing | 1,049 | SF | $5.00 | $5,245 | | HUBBEL | ARCH:A73-112 |
| 9C33 | 1. Prep & Paint Steel Roof Truss | 526 | LF | $50.00 | $26,300 | | HUBBEL | ARCH:A73-112 |
| 9C34 | 2. Prep & Paint Steel Truss Cross Bracing | 68 | LF | $50.00 | $3,400 | | HUBBEL | ARCH:A73-112 |
| 9C35 | 4. Paint Existing Bollards & Provide Plastic Cover | 11 | EA | $150.00 | $1,650 | | HUBBEL | ARCH:A73-111 |
| 9C36 | 2. Prep & Paint Wood Trusses | 2,103 | LF | $5.00 | $10,515 | | HUBBEL | ARCH:A73-102 |
| 9C37 | 3. Prep & Paint Plywood Sheathing | 4,162 | SF | $5.00 | $20,810 | | HUBBEL | ARCH:A73-102 |
| 9C38 | 1. Paint Bollards | 2 | EA | $150.00 | $300 | | HUBBEL | ARCH:A73-101 |
| 9C39 | 1. Paint CMU Wall | 1,420 | SF | $10.00 | $14,200 | | SEVEN | ARCH:A72-203 |
| 9C40 | 4. Prep & Paint CMU | 319 | LF | $10.00 | $3,190 | | SEVEN | ARCH:A72-101 |
| 9C41 | 5. Prep & Paint OHD Steel Jamb Channel | 3 | EA | $500.00 | $1,500 | | SEVEN | ARCH:A72-101 |
| 9C42 | 6. Prep & Paint OHD Track & Brackets | 3 | EA | $500.00 | $1,500 | | SEVEN | ARCH:A72-101 |
| 9C43 | 8. Prep & Paint Steel Roof Truss | 348 | LF | $25.00 | $8,700 | | SEVEN | ARCH:A72-101 |
| 9C44 | 9. Prep & Paint Steel Truss Cross Bracing | 51 | LF | $50.00 | $2,550 | | SEVEN | ARCH:A72-101 |
| 9C45 | 2. Prep & Paint CMU Wall | 250 | LF | $10.00 | $2,500 | | PURITAN | ARCH:A71-101 |
| 9C46 | 3. Prep & Paint Existing Steel Jamb | 2 | EA | $500.00 | $1,000 | | PURITAN | ARCH:A71-101 |
| 9C47 | 5. Prep & Paint OHD track & Brackets | 1 | EA | $500.00 | $500 | | PURITAN | ARCH:A71-101 |
| 9C48 | Prep & Paint 3070 HM Door & Frame | 3 | EA | $500.00 | $1,500 | | CONNER | ARCH:A00-005 |
| 9C49 | Prep & Paint 3070 HM Door & Frame | 5 | EA | $500.00 | $2,500 | | CREEK | ARCH:A00-005 |
| 9C50 | Prep & Paint 6070 HM Door & Frame | 1 | EA | $600.00 | $600 | | CREEK | ARCH:A00-005 |
| 9C51 | Prep & Paint 3070 HM Door & Frame | 5 | EA | $500.00 | $2,500 | | PURITAN | ARCH:A00-004 |
| 9C52 | Prep & Paint 3070 HM Door & Frame | 3 | EA | $500.00 | $1,500 | | SEVEN | ARCH:A00-004 |
| 9C53 | Prep & Paint 3070 HM Door & Frame | 4 | EA | $500.00 | $2,000 | | HUBBEL | ARCH:A00-004 |
| 9C54 | Prep & Paint 3070 HM Door & Frame | 6 | EA | $500.00 | $3,000 | | LEIB | ARCH:A00-004 |
| 9C55 | Prep & Paint 6070 HM Door & Frame | 2 | EA | $600.00 | $1,200 | | PURITAN | ARCH:A00-004 |
| 9C56 | Prep & Paint 6070 HM Door & Frame | 1 | EA | $600.00 | $600 | | HUBBEL | ARCH:A00-004 |
| **TOTAL** | **FINISHES** | | | | **$707,091** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

***10 SPECIALTIES***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **MISCELLANEOUS** | | | | **$27,150** | | | |
| | **Temporary Project Signage:** | | | | | | | |
| 10A1 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | PURITAN | G00-003 |
| 10A2 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | SEVEN | G00-003 |
| 10A3 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | HUBBEL | G00-003 |
| 10A4 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | LEIB | G00-003 |
| 10A5 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | AUBIN | G00-003 |
| 10A6 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | CONNER | G00-003 |
| 10A7 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | CREEK | G00-003 |
| 10A8 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | OAK | G00-003 |
| 10A9 | Tempoary Project Signage | 1 | LS | $2,000.00 | $2,000 | | BELLE | G00-003 |
| 10A10 | Provide new plastic bollard cover | 11 | EA | $200.00 | $2,200 | | BELLE | ARCH:A79-101 |
| 10A11 | 4. Provide Plastic Bollard Covers | 6 | EA | $200.00 | $1,200 | | CREEK | ARCH:A77-201 |
| 10A12 | 2. Provide Plastic Bollard Covers | 5 | EA | $200.00 | $1,000 | | CREEK | ARCH:A77-103 |
| 10A13 | 3. Provide Plastic Bollard Covers | 4 | EA | $200.00 | $800 | | CREEK | ARCH:A77-102 |
| 10A14 | Provide Signage at Outfall Building Hatch | 1 | EA | $150.00 | $150 | | AUBIN | ARCH:A75-202 |
| 10A15 | 1. Provide Plastic Bollard Covers | 16 | EA | $200.00 | $3,200 | | HUBBEL | ARCH:A73-211 |
| 10A16 | 2. Provide Plastic Bollard Covers | 1 | EA | $200.00 | $200 | | HUBBEL | ARCH:A73-202 |
| 10A17 | 2. Provide Plastic Bollard Covers | 2 | EA | $200.00 | $400 | | HUBBEL | ARCH:A73-201 |
| **TOTAL** | **SPECIALTIES** | | | | **$27,150** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:*** Hazen

***Great Lakes Water Authority***

***Date:*** December 30, 2024

***REGENCY CONSTRUCTION SERVICES, INC.***

## 22 PLUMBING SYSTEMS

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **PLUMBING FIXTURES AND EQUIPMENT** | | | | **$563,600** | | | |
| 22A1 | **PURITAN-FENKELL** | | | | | | | |
| 22A2 | DWH-1: Electric Water Heater, 144kw, Explosion Proof, (Bradley SNA-144) | 1 | EA | $76,000.00 | $76,000 | | PURITAN | Service Entr. Rm. 101, Budget per New Century Sales 12/10/24 |
| 22A3 | EMS-1: Emergency Shower/Eye Wash Station (Stingray S5515) | 1 | EA | $1,900.00 | $1,900 | | PURITAN | Budget per Burke Agency 11/21/24 |
| 22A4 | EMS-2: Emergency Shower/Eye Wash Station w/ Heat Trace (Bradley S19-304-1014) | 1 | EA | $10,500.00 | $10,500 | | PURITAN | Courtyard Rm. 113, Budget per New Century Sales 12/10/24 |
| 22A5 | **SEVEN MILE** | | | | | | | |
| 22A6 | DWH-1: Electric Water Heater Skid, 144kw, Explosion Proof, (Bradley SNA-SKID1) | 1 | EA | $178,000.00 | $178,000 | | SEVEN | Headworks Rm. 112, Budget per New Century Sales 12/10/24 |
| 22A7 | EMS-1: Emergency Shower/Eye Wash Station (Stingray S5515) | 1 | EA | $1,900.00 | $1,900 | | SEVEN | NaOCl Rm. 114, Budget per Burke Agency 11/21/24 |
| 22A8 | **HUBBEL SOUTHFIELD** | | | | | | | |
| 22A9 | DWH-1: Electric Water Heater Skid, 5kw, 318 gallon storage (Bradley NTS2 Navigator) | 1 | EA | $114,000.00 | $114,000 | | HUBBEL | Odor Control Rm. 122, Budget per New Century Sales 12/10/24 |
| 22A10 | EMS-1: Emergency Shower/Eye Wash Station (Stingray S5515) | 3 | EA | $1,900.00 | $5,700 | | HUBBEL | (2) Odor Control Rm. 122 & (1) HOCl Storage Rm. 123, Budget per Burke Agency 11/21/24 |
| 22A11 | TMV-1: Thermostatic Mixing Valve (Lawler) | 1 | EA | $1,500.00 | $1,500 | | HUBBEL | MP73-161 Keynote 3 |
| 22A12 | PVC Trough Drain 12"x72" | 1 | EA | $3,200.00 | $3,200 | | HUBBEL | MP73-161 Keynote 6 |
| 22A13 | **BABY CREEK** | | | | | | | |
| 22A14 | DWH-1: Electric Water Heater, 144kw, Explosion Proof, (Bradley SNA-144) | 1 | EA | $76,000.00 | $76,000 | | CREEK | Screen Bldg Rm. 100, Budget per New Century Sales 12/10/24 |
| 22A15 | EMS-1: Emergency Shower/Eye Wash Station (Stingray S5515) | 2 | EA | $1,900.00 | $3,800 | | CREEK | Screen Bldg Rm. 100, Budget per Burke Agency 11/21/24 |
| 22A16 | **OAKWOOD** | | | | | | | |
| 22A17 | DWH-1: Electric Water Heater, 144kw, Explosion Proof, (Bradley SNA-144) | 1 | EA | $76,000.00 | $76,000 | | OAK | Budget per New Century Sales 12/10/24 |
| 22A18 | EMS-1: Emergency Shower/Eye Wash Station (Stingray S5515) | 2 | EA | $1,900.00 | $3,800 | | OAK | Budget per Burke Agency 11/21/24 |
| 22A19 | **ST. AUBIN** | | | | | | | |
| 22A20 | DWH-1: Electric Water Heater, 4.5 kw, 40 gallon storage (Lochinvar LDT-40-X-K) | 1 | EA | $5,000.00 | $5,000 | | AUBIN | Toilet Rm. 10, Budget per ETNA Supply 11-21-24 |
| 22A21 | Expansion Tank, 2 gallon | 1 | EA | $250.00 | $250 | | AUBIN | |
| 22A22 | SK-1: Countertop stainless steel single bowl sink with std | 1 | EA | $2,300.00 | $2,300 | | AUBIN | Mech. Equip. Rm. 08 |
| 22A23 | FFD-1: Floor Drain | 5 | EA | $750.00 | $3,750 | | AUBIN | MP75-152 Keynote 6 |
| **B** | **DOMESTIC WATER PIPING & INSULATION** | | | | **$79,430** | | | |
| 22B1 | **PURITAN-FENKELL** | | | | | | | |
| 22B2 | Domestic Piping 3/4" Type L Copper HWR | 100 | LF | $18.89 | $1,889 | | PURITAN | |
| 22B3 | Domestic Piping 1-1/4" Type L Copper TW | 170 | LF | $28.47 | $4,839 | | PURITAN | |
| 22B4 | Domestic Piping 2" Type L Copper CW | 40 | LF | $48.96 | $1,958 | | PURITAN | |
| 22B5 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $3,040.39 | $3,040 | | PURITAN | |
| 22B6 | Piping Insulation 3/4" (1" thick rubber) HWR | 100 | LF | $13.50 | $1,350.00 | | PURITAN | |
| 22B7 | Piping Insulation 1-1/4" (1" thick rubber) TW | 170 | LF | $14.90 | $2,533.00 | | PURITAN | |
| 22B8 | Piping Insulation 2" (1" thick rubber) CW | 40 | LF | $17.80 | $712.00 | | PURITAN | |
| 22B9 | **SEVEN MILE** | | | | | | | |
| 22B10 | Domestic Piping 1-1/4" Type L Copper TW | 70 | LF | $28.47 | $1,993 | | SEVEN | |
| 22B11 | Domestic Piping 2" Type L Copper CW | 20 | LF | $48.96 | $979 | | SEVEN | |
| 22B12 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $1,040.11 | $1,040 | | SEVEN | |
| 22B13 | Piping Insulation 1-1/4" (1" thick rubber) TW | 70 | LF | $14.90 | $1,043.00 | | SEVEN | |
| 22B14 | Piping Insulation 2" (1" thick rubber) CW | 20 | LF | $17.80 | $356.00 | | SEVEN | |
| 22B15 | **HUBBEL SOUTHFIELD** | | | | | | | |
| 22B16 | Domestic Piping 3/4" Type L Copper HWR | 110 | LF | $18.89 | $2,078 | | HUBBEL | |
| 22B17 | Domestic Piping 1-1/4" Type L Copper TW | 140 | LF | $28.47 | $3,985 | | HUBBEL | |
| 22B18 | Domestic Piping 2" Type L Copper CW | 30 | LF | $48.96 | $1,469 | | HUBBEL | |
| 22B19 | Domestic Piping 2" Type L Copper TW | 80 | LF | $48.96 | $3,917 | | HUBBEL | |
| 22B20 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $4,007.14 | $4,007 | | HUBBEL | |
| 22B21 | Piping Insulation 3/4" (1" thick rubber) HWR | 110 | LF | $13.50 | $1,485.00 | | HUBBEL | |
| 22B22 | Piping Insulation 1-1/4" (1" thick rubber) TW | 140 | LF | $14.90 | $2,086.00 | | HUBBEL | |
| 22B23 | Piping Insulation 2" (1" thick rubber) CW | 30 | LF | $17.80 | $534.00 | | HUBBEL | |
| 22B24 | Piping Insulation 2" (1-1/2" thick wool) TW | 80 | LF | $26.50 | $2,120.00 | | HUBBEL | |
| 22B25 | | | | | | | | |
| 22B26 | Domestic Piping 1-1/4" Type L Copper CW | 10 | LF | $28.47 | $285 | | HUBBEL | MP73-161 Keynote 1 |
| 22B27 | Domestic Piping 1-1/4" Type L Copper HW | 30 | LF | $28.47 | $854 | | HUBBEL | MP73-161 Keynote 1 |
| 22B28 | Domestic Piping 1-1/4" Type L Copper TW | 10 | LF | $28.47 | $285 | | HUBBEL | MP73-161 Keynote 1 |
| 22B29 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $498.14 | $498 | | HUBBEL | |
| 22B30 | Piping Insulation 1-1/4" (1/2" thick rubber) CW | 10 | LF | $11.15 | $111.50 | | HUBBEL | |
| 22B31 | Piping Insulation 1-1/4" (1" thick rubber) HW | 30 | LF | $14.90 | $447.00 | | HUBBEL | |
| 22B32 | Piping Insulation 1-1/4" (1" thick rubber) TW | 10 | LF | $14.90 | $149.00 | | HUBBEL | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

*Designed By:* Hazen

*Great Lakes Water Authority*

*Date:* December 30, 2024

REGENCY CONSTRUCTION SERVICES

*REGENCY CONSTRUCTION SERVICES, INC.*

## 22 PLUMBING SYSTEMS

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 22B33 | **BABY CREEK** | | | | | | | |
| 22B34 | Domestic Piping 1-1/4" Type L Copper TW | 150 | LF | $28.47 | $4,270 | | CREEK | |
| 22B35 | Domestic Piping 2" Type L Copper CW | 30 | LF | $48.96 | $1,469 | | CREEK | |
| 22B36 | Domestic Piping 2" Type L Copper TW | 30 | LF | $48.96 | $1,469 | | CREEK | |
| 22B37 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $2,522.57 | $2,523 | | CREEK | |
| 22B38 | Piping Insulation 1-1/4" (1" thick rubber) TW | 150 | LF | $14.90 | $2,235.00 | | CREEK | |
| 22B39 | Piping Insulation 2" (1" thick rubber) CW | 30 | LF | $17.80 | $534.00 | | CREEK | |
| 22B40 | Piping Insulation 2" (1-1/2" thick wool) TW | 30 | LF | $26.50 | $795.00 | | CREEK | |
| 22B41 | **OAKWOOD** | | | | | | | |
| 22B42 | Domestic Piping 1-1/4" Type L Copper TW | 80 | LF | $28.47 | $2,277 | | OAK | |
| 22B43 | Domestic Piping 2" Type L Copper CW | 80 | LF | $48.96 | $3,917 | | OAK | |
| 22B44 | Domestic Piping 2" Type L Copper TW | 20 | LF | $48.96 | $979 | | OAK | |
| 22B45 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $2,510.61 | $2,511 | | OAK | |
| 22B46 | Piping Insulation 1-1/4" (1" thick rubber) TW | 80 | LF | $14.90 | $1,192.00 | | OAK | |
| 22B47 | Piping Insulation 2" (1" thick rubber) CW | 80 | LF | $17.80 | $1,424.00 | | OAK | |
| 22B48 | Piping Insulation 2" (1-1/2" thick wool) TW | 20 | LF | $26.50 | $530.00 | | OAK | |
| 22B49 | **ST. AUBIN** | | | | | | | |
| 22B50 | Domestic Piping 1/2" Type L Copper CW | 30 | LF | $15.74 | $472 | | AUBIN | |
| 22B51 | Domestic Piping 1/2" Type L Copper HW | 30 | LF | $15.74 | $472 | | AUBIN | |
| 22B52 | Domestic Piping 2" Type L Copper CW | 30 | LF | $48.96 | $1,469 | | AUBIN | |
| 22B53 | Domestic Piping 2" Type L Copper HW | 30 | LF | $48.96 | $1,469 | | AUBIN | |
| 22B54 | Valves, Fitting, Connections (35% of Above) | 1 | ALLOW | $1,358.72 | $1,359 | | AUBIN | |
| 22B55 | Piping Insulation 1/2" (1/2" thick rubber) | 30 | LF | $10.40 | $312.00 | | AUBIN | |
| 22B56 | Piping Insulation 1/2" (1" thick rubber) | 30 | LF | $12.70 | $381.00 | | AUBIN | |
| 22B57 | Piping Insulation 2" (1" thick rubber) CW | 30 | LF | $17.80 | $534.00 | | AUBIN | |
| 22B58 | Piping Insulation 2" (1-1/2" thick wool) TW | 30 | LF | $26.50 | $795.00 | | AUBIN | |
| **C** | **SANITARY PIPING** | | | | **$13,627** | | | |
| 23C1 | **HUBBEL SOUTHFIELD** | | | | | | | |
| 23C2 | 2" Odor Control Drain (Sch 40 PVC) | 20 | LF | $29.19 | $584 | | HUBBEL | MP73-161 Keynote 6 |
| 23C3 | Fittings, Connections (30% of Above) | 1 | ALLOW | $175.14 | $175 | | HUBBEL | |
| 23C4 | **ST. AUBIN** | | | | | | | |
| 23C5 | 4" Sanitary (CI) Single Hub Below Grade | 60 | LF | $62.41 | $3,744 | | AUBIN | |
| 23C6 | Fittings, Connections (30% of Above) | 1 | ALLOW | $1,123.33 | $1,123 | | AUBIN | |
| 23C7 | Sawcut and Patch Floor for New Sanitary | 40 | LF | $200.00 | $8,000 | | AUBIN | |
| **D** | **STORM PIPING** | | | | | | | |
| 22D1 | No Work Included | | | | **N.I.C.** | | | |
| **E** | **NATURAL GAS SYSTEMS** | | | | | | | |
| 22E1 | No Work Included | | | | **N.I.C.** | | | |
| **F** | **MEDICAL GAS, CA, VAC & PROCESSED WATER** | | | | | | | |
| 22F1 | No Work Included | | | | **N.I.C.** | | | |
| **G** | **PLUMBING DEMOLITION** | | | | **$4,900** | | | |
| 22G1 | **PURITAN-FENKELL** | | | | | | | |
| 22G2 | Demo CW at Existing Emergency Eyewash/Shower Combo | 1 | EA | $100.00 | $100 | | PURITAN | X71-161 Keynote 1 |
| 22G3 | Demo CW Piping | 90 | LF | $10.00 | $900 | | PURITAN | X71-161 Keynote 2 |
| 22G4 | Demo Emergency Eyewash/Shower Combo | 1 | EA | $200.00 | $200 | | PURITAN | X71-161 Keynote 3 |
| 22G5 | **SEVEN MILE** | | | | | | | |
| 22G6 | Demo CW Piping | 40 | LF | $10.00 | $400 | | SEVEN | X72-161 Keynote 1 |
| 22G7 | **HUBBEL SOUTHFIELD** | | | | | | | |
| 22G8 | Demo Domestic Piping to Safety Station | 1 | LS | $200.00 | $200 | | HUBBEL | MP73-161 Keynote 1 |
| 22G9 | Demo CW Piping | 150 | LF | $10.00 | $1,500 | | HUBBEL | X71-161 Keynote 1 |
| 22G10 | Demo Emergency Eyewash/Shower Combo | 3 | EA | $200.00 | $600 | | HUBBEL | X73-201 Keynote 2 |
| 22G11 | **ST. AUBIN** | | | | | | | |
| 22G12 | Demo Water Heater | 1 | EA | $600.00 | $600 | | AUBIN | X75-152 Keynote 1 |
| 22G13 | Demo Utility Sink and Cap Piping | 1 | EA | $400.00 | $400 | | AUBIN | X75-152 Keynote 1 |
| **H** | **MISCELLANEOUS** | | | | | | | |
| 22H1 | No Work Included | | | | **N.I.C.** | | | |
| **TOTAL** | **PLUMBING SYSTEMS** | | | | **$661,556** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***23 HVAC SYSTEMS***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **A** | **HVAC EQUIPMENT** | | | | **$16,700** | | | |
| 22A1 | **ST. AUBIN** | | | | | | | |
| 22A2 | EF-1: Wall Mounted Exhaust Fan, 3,000 CFM, 2HP (Greenheck CUE-180-VG) | 1 | EA | $7,000.00 | $7,000 | | AUBIN | Chemical Storage Rm. 102 |
| 22A3 | EUH-1: Electric Unit Heater, 1kw (QMARK CWH1101DSF) | 1 | EA | $700.00 | $700 | | AUBIN | Serving Exterior Pipe Enclosure |
| 22A4 | **HUBBEL SOUTHFIELD** | | | | | | | |
| 22A5 | Demo/Replace 54" Gasket/Bolt Set at Odor Control Unit | 1 | ALLOW | $9,000.00 | $9,000 | | HUBBEL | MP73-161 Keynote 5 |
| **B** | **HVAC DUCTWORK, INSULATION & ACCESSORIES** | | | | | | | |
| 23B1 | No Work Included | | | | **N.I.C.** | | | |
| **C** | **HVAC PIPING & INSULATION** | | | | | | | |
| 23C1 | No Work Included | | | | **N.I.C.** | | | |
| **D** | **HVAC CONTROLS** | | | | | | | |
| 23D1 | No Work Included | | | | **N.I.C.** | | | |
| **E** | **HVAC DEMOLITION** | | | | **$1,100** | | | |
| 23E1 | **ST. AUBIN** | | | | | | | |
| 23E2 | Demo Wall Mounted Exhaust Fan and Louver | 1 | LS | $1,100.00 | $1,100 | | AUBIN | X75-152 Keynote 2 |
| **F** | **MISCELLANEOUS** | | | | | | | |
| 23F1 | No Work Included | | | | **N.I.C.** | | | |
| **TOTAL** | **HVAC SYSTEMS** | | | | **$17,800** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | |
|---|---|
| ***Designed By:*** | **Hazen** |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** |
| ***REGENCY CONSTRUCTION SERVICES, INC.*** | |

## *26 ELECTRICAL / INSTRUMENTATION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **ELECTRICAL WORK** | | | | **$1,533,864** | | | |
| 26A1 | **PURITAN-FENKELL** | | | | | | | |
| 26A2 | 225A/3P/480V Breaker With Bucket in Exist. MCC-1 | 1 | EA | $3,500.00 | $3,500 | | PURITAN | |
| 26A3 | 400A, 3P, 480V Disconnect Switch, N.F. Explosion Proof | 1 | EA | $16,440.00 | $16,440 | | PURITAN | DWH-1 |
| 26A4 | 60A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 2 | EA | $1,825.00 | $3,650 | | PURITAN | Chemical Feed Pumps |
| 26A5 | $ms 120V Manual Starter, Explosion Proof | 1 | EA | $750.00 | $750 | | PURITAN | Recirc. Pump |
| 26A6 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | PURITAN | |
| 26A7 | **FEEDERS** | | | | | | PURITAN | |
| 26A8 | 225A Feeder to Instant Hot Water Heater | 90 | LF | $120.00 | $10,800 | | PURITAN | DWH-1 |
| 26A9 | Chemical Feed Pumps - Reuse Existing Feeder | | | | **N.I.C.** | | PURITAN | Chemical Feed Pumps |
| 26A10 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | PURITAN | |
| 26A11 | 30A Feeder to Eye Wash Station - Heat Trace Power | 100 | LF | $37.00 | $3,700 | | PURITAN | |
| 26A12 | 20A Feeder to Crane Wireless Control System | 90 | LF | $35.00 | $3,150 | | PURITAN | |
| 26A13 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | PURITAN | |
| 26A14 | Sensor Wiring for OH Door to OH Door Control Panel | 1 | EA | $1,403.00 | $1,403 | | PURITAN | |
| 26A15 | **LIGHTS** | | | | | | PURITAN | |
| 26A16 | A 2 x 4 Lay-In | 8 | EA | $381.80 | $3,054 | | PURITAN | Budget Quote |
| 26A17 | B 2 x 2 Lay-In | 1 | EA | $361.10 | $361 | | PURITAN | Budget Quote |
| 26A18 | Lighting Wiring | 9 | EA | $172.50 | $1,553 | | PURITAN | |
| 26A19 | **DEMO** | | | | | | PURITAN | |
| 26A20 | Demo 2 x 4 Lay-In | 8 | EA | $45.00 | $360 | | PURITAN | |
| 26A21 | Demo 2 x 2 Lay-In | 1 | EA | $45.00 | $45 | | PURITAN | |
| 26A22 | Demo Chemical Feed Pump Disconnect | 2 | EA | $360.00 | $720 | | PURITAN | |
| 26A23 | **MISCELLANEOUS** | | | | | | PURITAN | |
| 26A24 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | PURITAN | |
| 26A25 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | PURITAN | |
| 26A26 | **Seven Mile** | | | | | | | |
| 26A27 | 225A/3P/480V Breaker With Bucket in Exist. MCC-1 | 1 | EA | $3,500.00 | $3,500 | | SEVEN | |
| 26A28 | 400A, 3P, 480V Disconnect Switch, N.F. Explosion Proof | 1 | EA | $16,440.00 | $16,440 | | SEVEN | DWH-1 |
| 26A29 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | SEVEN | |
| 26A30 | **FEEDERS** | | | | | | SEVEN | |
| 26A31 | 225A Feeder to Instant Hot Water Heater | 130 | LF | $120.00 | $15,600 | | SEVEN | DWH-1 |
| 26A32 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | SEVEN | DWH-1 |
| 26A33 | 20A Feeder to Crane Wireless Control System | 75 | LF | $35.00 | $2,625 | | SEVEN | |
| 26A34 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | SEVEN | |
| 26A35 | **MISCELLANEOUS** | | | | | | SEVEN | |
| 26A36 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | SEVEN | |
| 26A37 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | SEVEN | |
| 26A38 | **Hubbell** | | | | | | | |
| 26A39 | 100A/3P/480V Breaker With Bucket in Exist. MCC-H2 | 1 | EA | $2,500.00 | $2,500 | | HUBBEL | |
| 26A40 | 30A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 1 | EA | $1,600.00 | $1,600 | | HUBBEL | DWH-1 |
| 26A41 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | HUBBEL | |
| 26A42 | **FEEDERS** | | | | | | HUBBEL | |
| 26A43 | 20A Feeder to Instant Hot Water Heater | 90 | LF | $35.00 | $3,150 | | HUBBEL | DWH-1 |
| 26A44 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | HUBBEL | DWH-1 |
| 26A45 | 20A Feeder to Crane Wireless Control System | 100 | LF | $35.00 | $3,500 | | HUBBEL | |
| 26A46 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | HUBBEL | |
| 26A47 | **MISCELLANEOUS** | | | | | | HUBBEL | |
| 26A48 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | HUBBEL | |
| 26A49 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | HUBBEL | |
| 26A50 | **ST AUBIN** | | | | | | | |
| 26A51 | Size 1 Motor Starter, With Bucket in Exist. MCC-A | 6 | EA | $4,000.00 | $24,000 | | AUBIN | |
| 26A52 | 100A/3P/480V Breaker With Bucket in Exist. MCC-A | 2 | EA | $2,500.00 | $5,000 | | AUBIN | |
| 26A53 | Size 1 Duplex Motor Starter, With Bucket in Exist. MCC-A | 1 | EA | $4,530.00 | $4,530 | | AUBIN | |
| 26A54 | Size 3 Motor Starter, With Bucket in Exist. MCC-A | 1 | EA | $5,478.75 | $5,479 | | AUBIN | |
| 26A55 | Size 1 Motor Starter, With Bucket in Exist. MCC-B | 5 | EA | $4,000.00 | $20,000 | | AUBIN | |
| 26A56 | 100A/3P/480V Breaker With Bucket in Exist. MCC-B | 4 | EA | $2,500.00 | $10,000 | | AUBIN | |
| 26A57 | 30A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 1 | EA | $1,600.00 | $1,600 | | AUBIN | DWH-1 |
| 26A58 | 225A/3P/480V Breaker With Bucket in Exist. MCC-C | 1 | EA | $3,500.00 | $3,500 | | AUBIN | |
| 26A59 | Size 5 Motor Starter, With Bucket in Exist. MCC-C | 2 | EA | $13,400.00 | $26,800 | | AUBIN | |
| 26A60 | Size 1 Motor Starter, With Bucket in Exist. MCC-C | 5 | EA | $4,000.00 | $20,000 | | AUBIN | |
| 26A61 | 100A/3P/480V Breaker With Bucket in Exist. MCC-C | 5 | EA | $2,500.00 | $12,500 | | AUBIN | |
| 26A62 | Size 1 Soft Motor Starter, With Bucket in Exist. MCC-C | 1 | EA | $4,000.00 | $4,000 | | AUBIN | |
| 26A63 | 30A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 2 | EA | $1,600.00 | $3,200 | | AUBIN | Flushing Valves |
| 26A64 | 30A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 3 | EA | $1,600.00 | $4,800 | | AUBIN | CFP-1,2,3 |
| 26A65 | $ms 120V Manual Starter, Nema 4X | 1 | EA | $750.00 | $750 | | AUBIN | 1KW Unit Heater - EUH-1 |
| 26A66 | 30A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 2 | EA | $1,600.00 | $3,200 | | AUBIN | Sample Pumps |
| 26A67 | 30A, 3P, 208V Disconnect Switch, N.F. Nema 4X | 15 | EA | $1,600.00 | $24,000 | | AUBIN | Misc. 208V Valves |
| 26A68 | $ms 120V Manual Starter, Nema 4X | 6 | EA | $750.00 | $4,500 | | AUBIN | Misc. 120V Instruments |
| 26A69 | $ms 120V Manual Starter, Nema 4X | 3 | EA | $750.00 | $2,250 | | AUBIN | Misc. 120V Valves |
| 26A70 | 60A, 3P Breaker in Existing Panel PDP-1 | 1 | EA | $1,970.00 | $1,970 | | AUBIN | |
| 26A71 | 60A, 3P, 480V Disconnect Switch, N.F. Nema 4X | 1 | EA | $1,825.00 | $1,825 | | AUBIN | Effluent Sample Pump |
| 26A72 | 20A, 1P Breaker in Existing Mini Power Zone | 1 | EA | $417.50 | $418 | | AUBIN | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| GLWA Great Lakes Water Authority | *Designed By:* Hazen | REGENCY CONSTRUCTION SERVICES |
| *Great Lakes Water Authority* | *Date:* December 30, 2024 | *REGENCY CONSTRUCTION SERVICES, INC.* |

## *26 ELECTRICAL / INSTRUMENTATION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 26A73 | **FEEDERS** | | | | | | AUBIN | |
| 26A74 | 30A Feeder to Counter Current Mixers From MCC-A (4) | 510 | LF | $37.00 | $18,870 | | AUBIN | |
| 26A75 | 20A Feeder to Screen 1 and 2 From MCC-A (2) | 40 | LF | $35.00 | $1,400 | | AUBIN | |
| 26A76 | 20A Feeder to DWH-1 From MCC-B | 80 | LF | $35.00 | $2,800 | | AUBIN | |
| 26A77 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | AUBIN | DWH-1 |
| 26A78 | 30A Feeder to Counter Current Mixers From MCC-C (3) | 430 | LF | $37.00 | $15,910 | | AUBIN | |
| 26A79 | 20A Feeder to Flushing Valves From MCC-C (2) | 110 | LF | $35.00 | $3,850 | | AUBIN | |
| 26A80 | New Exhaust Fan EF-1 connection to Existing Feeder | 1 | EA | $344.00 | $344 | | AUBIN | |
| 26A81 | 20A Feeder to Sampler Analyzer Panel From LP-A | 40 | LF | $35.00 | $1,400 | | AUBIN | |
| 26A82 | 20A Feeder to FE/FIT and LIT Instruments From LP-A (5) | 115 | LF | $35.00 | $4,025 | | AUBIN | |
| 26A83 | 20A Feeder to Flushing Valve Actuators From LP-A (2) | 120 | LF | $35.00 | $4,200 | | AUBIN | |
| 26A84 | 20A Feeder to 1KW Unit Heater From LP-A | 75 | LF | $35.00 | $2,625 | | AUBIN | |
| 26A85 | 20A Feeder to Misc. Instruments (28) | 2,065 | LF | $35.00 | $72,275 | | AUBIN | |
| 26A86 | 60A Feeder to Effluent Sample Pump From Panel PDP-1 | 75 | LF | $49.00 | $3,675 | | AUBIN | |
| 26A87 | 20A Feeder to 700W Hydraulic Power Pack Tank Heaters (2) | 150 | LF | $35.00 | $5,250 | | AUBIN | |
| 26A88 | Vendor Furnished Cabling to Instruments (5) | 240 | LF | $28.00 | $6,720 | | AUBIN | |
| 26A89 | Analog Wiring to Instruments (6) | 430 | LF | $29.00 | $12,470 | | AUBIN | |
| 26A90 | Instrumentation Wiring to STA-DCS From Analyzer Panel | 50 | LF | $40.00 | $2,000 | | AUBIN | |
| 26A91 | Instrumentation and Control Wiring - Small (27) | 2,085 | LF | $41.00 | $85,485 | | AUBIN | |
| 26A92 | Instrumentation and Control Wiring - Medium (30) | 2,310 | LF | $49.00 | $113,190 | | AUBIN | |
| 26A93 | Instrumentation and Control Wiring - Large (8) | 515 | LF | $55.00 | $28,325 | | AUBIN | |
| 26A94 | **LIGHTS** | | | | | | AUBIN | |
| 26A95 | FL Wall Pack | 2 | EA | $1,357.00 | $2,714 | | AUBIN | |
| 26A96 | SLP Single Head Light Pole With Concrete Base | 6 | EA | $9,540.40 | $57,242 | | AUBIN | |
| 26A97 | Underground Lighting and GFCI Feeder | 260 | LF | $36.00 | $9,360 | | AUBIN | |
| 26A98 | 20A, 120V GFI Receptacle | 2 | EA | $336.95 | $674 | | AUBIN | |
| 26A99 | 20A, 120V GFI WP Receptacle | 2 | EA | $336.95 | $674 | | AUBIN | |
| 26A100 | 20A, 120V GFI WP Receptacle on Light Pole | 8 | EA | $336.95 | $2,696 | | AUBIN | |
| 26A101 | Receptacle Wiring | 4 | EA | $575.00 | $2,300 | | AUBIN | |
| 26A102 | 30A, 480V, 3ph, 4 Wire Quick Connect Plug, Nema 4X | 12 | EA | $575.00 | $6,900 | | AUBIN | Pumps and Mixers |
| 26A103 | 30A, 480V, 3ph, 4 Wire Quick Connect Receptacle, Nema 4X | 12 | EA | $575.00 | $6,900 | | AUBIN | Pumps and Mixers |
| 26A104 | 30A Quick Connect Wiring | 12 | EA | $862.50 | $10,350 | | AUBIN | Pumps and Mixers |
| 26A105 | **DEMO** | | | | | | AUBIN | |
| 26A106 | Demo 7-1/2HP Mixer Power | 8 | EA | $720.00 | $5,760 | | AUBIN | |
| 26A107 | Demo Starter - Effluent Sample Pump - CP-2 | 1 | EA | $720.00 | $720 | | AUBIN | |
| 26A108 | Demo Chemical Feed Pump Control Panels, Staters and Drives | 5 | EA | $720.00 | $3,600 | | AUBIN | |
| 26A109 | Demo Chemical Feed Pump Wiring | 5 | EA | $720.00 | $3,600 | | AUBIN | |
| 26A110 | Demo Devices associated With Storage Tank | 1 | EA | $720.00 | $720 | | AUBIN | |
| 26A111 | Demo Electrical Equipment at Platform to Be Removed | 1 | EA | $720.00 | $720 | | AUBIN | |
| 26A112 | Demo Mixer / Pump Wiring | 11 | EA | $720.00 | $7,920 | | AUBIN | |
| 26A113 | Demo Hydraulic Power Unit Control Panel and Wiring | 2 | EA | $720.00 | $1,440 | | AUBIN | |
| 26A114 | Demo Water Heater Wiring | 1 | EA | $720.00 | $720 | | AUBIN | |
| 26A115 | Demo Exhaust Fan Wiring | 2 | EA | $720.00 | $1,440 | | AUBIN | |
| 26A116 | Demo Flood Light - Fixture Only, Wiring to Remain | 2 | EA | $90.00 | $180 | | AUBIN | |
| 26A117 | Demo 460V Isolation Transformer and Wiring | 1 | EA | $720.00 | $720 | | AUBIN | |
| 26A118 | Demo Sampler / Analyzer System Instruments and Wiring | 1 | EA | $1,440.00 | $1,440 | | AUBIN | |
| 26A119 | Demo Flow Meter Wiring at Chemical Feed Pumps | 5 | EA | $720.00 | $3,600 | | AUBIN | |
| 26A120 | Demo 20A Outlet | 2 | EA | $180.00 | $360 | | AUBIN | |
| 26A121 | Demo Breaker and Bucket in MCC-A | 10 | EA | $720.00 | $7,200 | | AUBIN | |
| 26A122 | Demo Breaker and Bucket in MCC-B | 12 | EA | $720.00 | $8,640 | | AUBIN | |
| 26A123 | Demo Breaker and Bucket in MCC-C | 16 | EA | $720.00 | $11,520 | | AUBIN | |
| 26A124 | Demo Damper Wiring | 1 | EA | $360.00 | $360 | | AUBIN | |
| 26A125 | **MISCELLANEOUS** | | | | | | AUBIN | |
| 26A126 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | AUBIN | |
| 26A127 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | AUBIN | |
| 26A128 | **CONNER CREEK** | | | | | | | |
| 26A129 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | CONNER | |
| 26A130 | **FEEDERS** | | | | | | CONNER | |
| 26A131 | 20A Feeder to Crane Wireless Control System | 100 | LF | $35.00 | $3,500 | | CONNER | |
| 26A132 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | CONNER | |
| 26A133 | **LIGHTS** | | | | | | CONNER | |
| 26A134 | A 2 x 4 Lay-In | 134 | EA | $381.80 | $51,161 | | CONNER | Budget Quote |
| 26A135 | Lighting Wiring | 134 | EA | $172.50 | $23,115 | | CONNER | |
| 26A136 | **DEMO** | | | | | | CONNER | |
| 26A137 | Demo 2 x 4 Lay-In | 134 | EA | $45.00 | $6,030 | | CONNER | |
| 26A138 | **MISCELLANEOUS** | | | | | | CONNER | |
| 26A139 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | CONNER | |
| 26A140 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | CONNER | |
| 26A141 | **BABY CREEK** | | | | | | | |
| 26A142 | 225A/3P/480V Breaker With Bucket in Exist. MCC-3 | 1 | EA | $3,500.00 | $3,500 | | CREEK | |
| 26A143 | 400A, 3P, 480V Disconnect Switch, N.F. Explosion Proof | 1 | EA | $16,440.00 | $16,440 | | CREEK | DWH-1 |
| 26A144 | $ms 120V Manual Starter, Explosion Proof | 1 | EA | $750.00 | $750 | | CREEK | Recirc. Pump |
| 26A145 | 30A, 3P, 480V Disconnect Switch, N.F. Explosion Proof | 1 | EA | $2,830.00 | $2,830 | | CREEK | OH Door |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

## *26 ELECTRICAL / INSTRUMENTATION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 26A146 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | CREEK | |
| 26A147 | **FEEDERS** | | | | | | CREEK | |
| 26A148 | 225A Feeder to Instant Hot Water Heater | 95 | LF | $120.00 | $11,400 | | CREEK | DWH-1 |
| 26A149 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | CREEK | |
| 26A150 | 20A Feeder to Crane Wireless Control System | 140 | LF | $35.00 | $4,900 | | CREEK | |
| 26A151 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | CREEK | |
| 26A152 | 20A Feeder to Duct Bank for LE/LIT Control Panel From RP-A | 65 | LF | $35.00 | $2,275 | | CREEK | |
| 26A153 | Control Wiring to Duct Bank for LE/LIT Control Panel From DCS | 40 | LF | $39.00 | $1,560 | | CREEK | |
| 26A154 | Underground Cond. to Flow Meter Control Panel From Control Room - Including (3) 1" PVC Schedule 40 For Pow. and Control | 290 | LF | $64.00 | $18,560 | | CREEK | |
| 26A155 | Underground Conduit to Instruments From Control Panel - Including (1) 1" PVC Schedule 40 for Vendor Furnished Cable | 120 | LF | $32.00 | $3,840 | | CREEK | |
| 26A156 | 20A Feeder to Chemical Fill Station From RP-A | 160 | LF | $35.00 | $5,600 | | CREEK | |
| 26A157 | 20A Feeder to RTU Enclosure From RP-A | 100 | LF | $35.00 | $3,500 | | CREEK | |
| 26A158 | Vendor Furnished Cabling to Chemical Fill Station | 280 | LF | $28.00 | $7,840 | | CREEK | |
| 26A159 | Control Wiring to Chemical Fill Station | 350 | LF | $41.00 | $14,350 | | CREEK | |
| 26A160 | Instrumentation Wiring to BBK-DCS | 110 | LF | $29.00 | $3,190 | | CREEK | |
| 26A161 | **LIGHTS** | | | | | | CREEK | |
| 26A162 | SLP1 Single Head Light Pole With Concrete Base | 1 | EA | $9,540.40 | $9,540 | | CREEK | |
| 26A163 | Underground Lighting Feeder | 350 | LF | $35.00 | $12,250 | | CREEK | |
| 26A164 | Underground Lighting Feeder Connection to Existing Pole | 1 | LF | $1,110.00 | $1,110 | | CREEK | |
| 26A165 | 20A, 120V GFI WP Receptacle | 8 | EA | $336.95 | $2,696 | | CREEK | |
| 26A166 | Receptacle Wiring | 8 | EA | $575.00 | $4,600 | | CREEK | |
| 26A167 | **DEMO** | | | | | | CREEK | |
| 26A168 | Demo OH Door Disconnect | 1 | EA | $360.00 | $360 | | CREEK | |
| 26A169 | **MISCELLANEOUS** | | | | | | CREEK | |
| 26A170 | Equipment Rack Grounding | 1 | EA | $1,000.00 | $1,000 | | CREEK | |
| 26A171 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | CREEK | |
| 26A172 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | CREEK | |
| 26A173 | **OAKWOOD** | | | | | | | |
| 26A174 | 225A/3P/480V Breaker With Bucket in Exist. MCC-1 | 1 | EA | $3,500.00 | $3,500 | | OAK | |
| 26A175 | 400A, 3P, 480V Disconnect Switch, N.F. Explosion Proof | 1 | EA | $16,440.00 | $16,440 | | OAK | DWH-1 |
| 26A176 | $ms 120V Manual Starter, Explosion Proof | 1 | EA | $750.00 | $750 | | OAK | Recirc Pump |
| 26A177 | Wireless Radio Crane Control System With (2) Transmitters | 3 | EA | $15,460.60 | $46,382 | | OAK | |
| 26A178 | **FEEDERS** | | | | | | OAK | |
| 26A179 | 225A Feeder to Instant Hot Water Heater | 130 | LF | $120.00 | $15,600 | | OAK | DWH-1 |
| 26A180 | Connection to DWH-1 | 1 | EA | $350.00 | $350 | | OAK | DWH-1 |
| 26A181 | 20A Feeder to Crane Wireless Control System (3) | 355 | LF | $35.00 | $12,425 | | OAK | |
| 26A182 | Control Wiring for Crane Wireless Control System (3) | 60 | LF | $55.00 | $3,300 | | OAK | |
| 26A183 | **MISCELLANEOUS** | | | | | | OAK | |
| 26A184 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | OAK | |
| 26A185 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | OAK | |
| 26A186 | **BELLE ISLE** | | | | | | | |
| 26A187 | Wireless Radio Crane Control System With (2) Transmitters | 1 | EA | $15,460.60 | $15,461 | | BELLE | |
| 26A188 | **FEEDERS** | | | | | | BELLE | |
| 26A189 | 20A Feeder to Crane Wireless Control System | 130 | LF | $35.00 | $4,550 | | BELLE | |
| 26A190 | Control Wiring for Crane Wireless Control System | 20 | LF | $55.00 | $1,100 | | BELLE | |
| 26A191 | 20A Feeder to AE/AIT Instruments (5) | 450 | LF | $35.00 | $15,750 | | BELLE | |
| 26A192 | Communications Wiring From Gas Detection Control Panel to BLI-DCS | 35 | LF | $29.00 | $1,015 | | BELLE | |
| 26A193 | Instrument Wiring From Gas Detection Control Panel to Pull Box | 60 | LF | $42.00 | $2,520 | | BELLE | |
| 26A194 | Instrument Wiring From Pull Box to AE/AIT (5) | 260 | LF | $29.00 | $7,540 | | BELLE | |
| 26A195 | Instrument Wiring From BLI-DCS to AE/AIT (5) | 600 | LF | $40.00 | $24,000 | | BELLE | |
| 26A196 | **LIGHTS** | | | | | | BELLE | |
| 26A197 | SLP Single Head Light Pole With Epoxy Anchors to Basin Roof | 8 | EA | $9,540.40 | $76,323 | | BELLE | |
| 26A198 | Exposed Lighting Feeder to Light Poles | 395 | LF | $35.00 | $13,825 | | BELLE | |
| 26A199 | 20A Toggle Switch, WP | 2 | EA | $273.70 | $547 | | BELLE | |
| 26A200 | Lighting and Receptacle Wiring | 2 | EA | $575.00 | $1,150 | | BELLE | |
| 26A201 | **DEMO** | | | | | | BELLE | |
| 26A202 | Demo Gas Detection Control Panel | 1 | EA | $2,880.00 | $2,880 | | BELLE | |
| 26A203 | **MISCELLANEOUS** | | | | | | BELLE | |
| 26A204 | Testing and Permits | 1 | EA | $7,500.00 | $7,500 | | BELLE | |
| 26A205 | Temporary Power and Lighting for All Trades | 1 | EA | $10,000.00 | $10,000 | | BELLE | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

## *26 ELECTRICAL / INSTRUMENTATION*

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **B** | **INSTRUMENTATION** | | | | **$1,279,855** | | | |
| 26B1 | **PURITAN-FENKELL** | | | | | | | |
| 26B2 | Eye Wash Alarm Panel | 1 | EA | $4,360.00 | $4,360 | | PURITAN | |
| 26B3 | Relocate Existing Phone | 1 | EA | $860.00 | $860 | | PURITAN | |
| 26B4 | **SEVEN MILE** | | | | | | | |
| 26B5 | No Work Included | | | | | | SEVEN | |
| 26B6 | **HUBBEL-SOUTHFIELD** | | | | | | | |
| 26B7 | No Work Included | | | | | | HUBBEL | |
| 26B8 | **ST AUBIN** | | | | | | | |
| 26B9 | Screen Control Panel A | 1 | EA | $63,600.00 | $63,600 | | AUBIN | P&ID shows separate pwr pack |
| 26B10 | Screen LCS Local Control Station | 2 | EA | $1,290.00 | $2,580 | | AUBIN | |
| 26B11 | Chemical Fill Station High Level Alarm - Mount in Hallway | 1 | EA | $1,000.00 | $1,000 | | AUBIN | |
| 26B12 | Local Control Panel - Chemical Fill Station | 1 | EA | $64,520.00 | $64,520 | | AUBIN | |
| 26B13 | Local Control Panel - Chemical Feed Pump | 3 | EA | $28,800.00 | $86,400 | | AUBIN | |
| 26B14 | Local Control Panel - Mixer | 7 | EA | $23,380.00 | $163,660 | | AUBIN | |
| 26B15 | Local Control Panel - Disinfection Sample Pump - w/ Starter | 1 | EA | $43,800.00 | $43,800 | | AUBIN | |
| 26B16 | Local Control Panel - Pre-Treatment Automatic Strainer | 2 | EA | $43,800.00 | $87,600 | | AUBIN | |
| 26B17 | Local Control Panel - Disinfection Automatic Strainer | 2 | EA | $43,800.00 | $87,600 | | AUBIN | |
| 26B18 | Local Control Panel - Effluent Sample Pump - w/ Starter | 1 | EA | $43,800.00 | $43,800 | | AUBIN | |
| 26B19 | Local Control Panel - Automatic Sampler | 1 | EA | $33,800.00 | $33,800 | | AUBIN | |
| 26B20 | Local Control Panel - Pre-Treatment Automatic Strainer | 1 | EA | $43,800.00 | $43,800 | | AUBIN | |
| 26B21 | Analyzer Control Panel | 1 | EA | $53,800.00 | $53,800 | | AUBIN | |
| 26B22 | Relocate Eye Wash Control Panel and Alarm Lights | 1 | EA | $4,360.00 | $4,360 | | AUBIN | |
| 26B23 | LE / LIT Sonic Level Transmitter | 2 | EA | $9,800.00 | $19,600 | | AUBIN | |
| 26B24 | Level Switch | 2 | EA | $8,517.50 | $17,035 | | AUBIN | |
| 26B24 | Install Level Switch Furnished By Others, With Tank | 6 | EA | $450.00 | $2,700 | | AUBIN | |
| 26B25 | Tank Level Gauge | 2 | EA | $4,440.00 | $8,880 | | AUBIN | |
| 26B26 | Pressure Switch | 3 | EA | $1,200.00 | $3,600 | | AUBIN | |
| 26B27 | Pressure Gauge | 10 | EA | $1,000.00 | $10,000 | | AUBIN | |
| 26B28 | FE/ / FIT | 3 | EA | $9,800.00 | $29,400 | | AUBIN | |
| 26B29 | AIT / AE | 1 | EA | $9,800.00 | $9,800 | | AUBIN | |
| 26B30 | Flow Switch, FSL 2" | 2 | EA | $770.00 | $1,540 | | AUBIN | |
| 26B31 | Temperature Alarm (Heater) | 1 | EA | $1,000.00 | $1,000 | | AUBIN | |
| 26B32 | Programming / Loop Checks / Testing at Existing DCS Cabinet | 1 | ALLOW | $50,000.00 | $50,000 | | AUBIN | |
| 26B33 | **CONNER CREEK** | | | | | | | |
| 26B34 | No Work Included | | | | | | CONNER | |
| 26B35 | **BABY CREEK** | | | | | | | |
| 26B36 | Local Control Panel - Chemical Fill Station | 1 | EA | $64,520.00 | $64,520 | | CREEK | |
| 26B37 | Rack for Flow Meter Control Panel | 1 | EA | $10,000.00 | $10,000 | | CREEK | |
| 26B38 | Flow Meter Control Panel on Rack | 1 | EA | $60,000.00 | $60,000 | | CREEK | |
| 26B39 | FE/FIT Doppler Flow Element/Transmitter | 2 | EA | $16,420.00 | $32,840 | | CREEK | In Manhole Structure at Bypass |
| 26B40 | LE Radar Level Element | 2 | EA | $10,020.00 | $20,040 | | CREEK | In Manhole Structure at Bypass |
| 26B41 | Level Switch | 8 | EA | $800.00 | $6,400 | | CREEK | |
| 26B42 | Level Element at Sodium Hypochlorite Storage Tank | 4 | EA | $6,740.00 | $26,960 | | CREEK | |
| 26B43 | Testing / Calibration / Commissioning | 1 | LS | $36,000.00 | $36,000 | | CREEK | |
| 26B44 | **OAKWOOD** | | | | | | | |
| 26B45 | No Work Included | | | | | | OAK | |
| 26B46 | **BELLE ISLE** | | | | | | | |
| 26B47 | DCS Modules - Allowance | 1 | ALLOW | $5,000.00 | $5,000 | | BELLE | |
| 26B48 | New Gas Detection System Control Panel | 1 | EA | $30,000.00 | $30,000 | | BELLE | |
| 26B49 | AIT / AE | 5 | EA | $9,800.00 | $49,000 | | BELLE | |
| **TOTAL** | **ELECTRICAL / INSTRUMENTATION** | | | | **$2,813,719** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

***Designed By:***
**Hazen**

***Great Lakes Water Authority***

***Date:***
**December 30, 2024**

***REGENCY CONSTRUCTION SERVICES, INC.***

***31 EARTHWORK / CIVIL***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **SWP3** | | | | **$9,720** | | | |
| 31A1 | Stabilized Construction Access | 1 | LS | $7,500.00 | $7,500 | | AUBIN | G75-101 |
| 31A2 | Silt Fence, incl. maintenance and removal | 370 | LF | $6.00 | $2,220 | | AUBIN | G75-101 |
| **TOTAL** | **EARTHWORK / CIVIL** | | | | **$9,720** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***32 EXTERIOR IMPROVEMENTS***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PACKAGE | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **A** | **Fencing** | | | | **$65,000** | | | |
| 32A1 | Chain Link Fence with posts every 4', Vinyl coated | 420 | LF | $125.00 | $52,500 | | AUBIN | G75-100 |
| 32A2 | Chain Link Gates | 2 | EA | $2,500.00 | $5,000 | | AUBIN | G75-100 |
| 32A3 | Replace one section of 8' high Ornamental Fence with a 48" wide swing gate Detail C-32-0512 / D00-502 | 1 | LS | $7,500.00 | $7,500 | | CREEK | G77-100 |
| **B** | **Site Concrete** | | | | **$4,540** | | | |
| 32B1 | New Access Driveway Apron | 227 | SF | $20.00 | $4,540 | | AUBIN | G75-100 |
| **C** | **Landscaping** | | | | **$13,555** | | | |
| 32C1 | Lawn Restoration: Topsoil and seeding | 18,073 | SF | $0.75 | $13,555 | | AUBIN | G75-100 Note #2 |
| **TOTAL** | **EXTERIOR IMPROVEMENTS** | | | | **$83,095** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

*Designed By:* Hazen

*Great Lakes Water Authority*

*Date:* December 30, 2024

*REGENCY CONSTRUCTION SERVICES, INC.*

## 40 PROCESS INTERCONNECTIONS

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| **A** | **PROCESS VALVES/EQUIPMENT** | | | | **$106,975** | | | |
| 40A1 | **ST. AUBIN** | | | | | | | |
| 40A2 | **Chemical Storage Room** | | | | | | | |
| 40A3 | 0.50" Ball Valve, PVC | 9 | EA | $155.00 | $1,395 | | AUBIN | D75-600 |
| 40A4 | 1.50" Ball Valve, PVC, Electrically Actuated | 3 | EA | $1,360.00 | $4,080 | | AUBIN | D75-600 |
| 40A5 | 1.50" Ball Valve, PVC | 14 | EA | $325.00 | $4,550 | | AUBIN | D75-600 |
| 40A6 | 1.50" Check Valve, PVC | 3 | EA | $530.00 | $1,590 | | AUBIN | D75-600 |
| 40A7 | 1.50" Diaphragm Valve, PVC, Electrically Actuated | 3 | EA | $2,100.00 | $6,300 | | AUBIN | D75-600 |
| 40A8 | 1.50" Expansion Joint | 6 | EA | $900.00 | $5,400 | | AUBIN | D75-301 Section 3 |
| 40A9 | 1.50" Magnetic Flow Meter | 3 | EA | $3,500.00 | $10,500 | | AUBIN | D75-600 |
| 40A10 | 1.50" Basket Strainer | 3 | EA | $1,500.00 | $4,500 | | AUBIN | D75-600 |
| 40A11 | 2.00" Ball Valve, PVC | 7 | EA | $430.00 | $3,010 | | AUBIN | D75-600 |
| 40A12 | 2.00" Ball Valve, PVC, Electrically Actuated | 2 | EA | $1,490.00 | $2,980 | | AUBIN | D75-600 |
| 40A13 | 2.00" Diaphragm Valve, PVC, Electrically Actuated | 1 | EA | $2,300.00 | $2,300 | | AUBIN | D75-600 |
| 40A14 | 2.00" Backpressure Valve | 1 | EA | $1,800.00 | $1,800 | | AUBIN | D75-600 |
| 40A15 | 4.00" Ball Valve, PVC, Electrically Actuated | 2 | EA | $3,100.00 | $6,200 | | AUBIN | Valve Schedule |
| 40A16 | Hose Bibb, Stainless Steel | 4 | EA | $450.00 | $1,800 | | AUBIN | D00-502, M-40-0704R |
| 40A17 | Hose Reel w/ Wash Gun | 1 | EA | $2,100.00 | $2,100 | | AUBIN | D00-502, M-40-0708 |
| 40A18 | | | | | | | | |
| 40A19 | **Disinfection Control Sampler System** | | | | | | | |
| 40A20 | 2.00" Ball Valve, PVC | 7 | EA | $430.00 | $3,010 | | AUBIN | D75-601 |
| 40A21 | 2.00" Ball Valve, PVC, Electrically Actuated | 2 | EA | $1,490.00 | $2,980 | | AUBIN | D75-600 |
| 40A22 | 3.00" Ball Valve, PVC | 1 | EA | $1,050.00 | $1,050 | | AUBIN | D75-600 |
| 40A23 | | | | | | | | |
| 40A24 | **North Wall of Odor Control Room** | | | | | | | |
| 40A25 | 4" Butterfly Valve, NPW, Electrically Actuated | 2 | EA | $8,000.00 | $16,000 | | AUBIN | D75-610 |
| 40A26 | 1.50" Ball Valve, PVC | 14 | EA | $325.00 | $4,550 | | AUBIN | D75-600 |
| 40A27 | 1.50" Backpressure Valve | 7 | EA | $1,200.00 | $8,400 | | AUBIN | D75-600 |
| 40A28 | | | | | | | | |
| 40A29 | **Screen Trough Flushing System** | | | | | | | |
| 40A30 | Flushing System Spray Nozzles | 24 | EA | $520.00 | $12,480 | | AUBIN | Budget per BETE 2/18/24 |
| **B** | **PROCESS PIPING** | | | | **$456,550** | | | |
| 40B1 | **ST. AUBIN** | | | | | | | |
| 40B2 | **Demo** | | | | | | | |
| 40B3 | Demo Sodium Hypochlorite Piping & Supports | 440 | LF | $20.00 | $8,800 | | AUBIN | X75-140 |
| 40B4 | Demo Chemical Feed Piping & Supports | 1 | LS | $6,000.00 | $6,000 | | AUBIN | X75-141 Note 1, 2, & 4, X75-841 Photo 1, 2, & 4 |
| 40B5 | Demo Chemical Feed Fill Lines and Fill Connections (Approx. 50LF) | 1 | LS | $1,600.00 | $1,600 | | AUBIN | X75-141 |
| 40B6 | Demo Stroage Tank No.1 & No.2 Vent Piping (Approx. 50LF) | 1 | LS | $1,200.00 | $1,200 | | AUBIN | X75-141, X75-842 Photo 6 |
| 40B7 | Salvage and Reinstall Sump Pump Piping, Valves, and Instrumentation (SCH80 PVC, Approx. 30LF Rework) | 1 | LS | $6,200.00 | $6,200 | | AUBIN | X75-141 Note 5, X75-842 Photos 7 & 8 |
| 40B8 | Remove Water Line and Sump Pump Discharge Connection | 1 | LS | $400.00 | $400 | | AUBIN | X75-141 Note 7, X75-842 Photo 9 |
| 40B9 | **New** | | | | | | | |
| 40B10 | Screen Trough Flushing Header Pipe and Fittings, SCH40 316 SS w/ grooved couplings (approx. 22' in length, mainly fittings) | 2 | EA | $20,000.00 | $40,000 | | AUBIN | D75-110 Note 5 |
| 40B11 | 2.00" S, SCH80 PVC, incl. fittings/supports | 360 | LF | $51.00 | $18,360 | | AUBIN | D75-100, D75-110, & D75-120 |
| 40B12 | 4.00" S, SCH40 304 SS, grooved joint, incl. fittings/supports | 1,520 | LF | $146.00 | $221,920 | | AUBIN | D75-110, D75-120, & D75-121 |
| 40B13 | 1.50" SHS, PE SDR 11, incl. fittings/supports | 950 | LF | $46.00 | $43,700 | | AUBIN | D75-100, D75-101, & D75-110 |
| 40B14 | 2.00" SHS, PE SDR 11, incl. fittings/supports | 180 | LF | $64.00 | $11,520 | | AUBIN | D75-100, D75-101, & D75-110 |
| 40B15 | 4.00" SHS, PE SDR 11, incl. fittings/supports | 70 | LF | $134.00 | $9,380 | | AUBIN | D75-101 |
| 40B16 | 2.00" NPW, SCH80 PVC, incl. fittings/supports | 250 | LF | $51.00 | $12,750 | | AUBIN | D75-100 & D75-101 |
| 40B17 | 3.00" NPW, SCH80 PVC, incl. fittings/supports | 40 | LF | $73.00 | $2,920 | | AUBIN | D75-100 |
| 40B18 | 4" NPW, DIP, flanged Class 53, incl. fittings | 200 | LF | $260.00 | $52,000 | | AUBIN | D75-100 & D75-110 |
| 40B19 | 4" NPW Pipe Supports | 1 | LS | $6,000.00 | $6,000 | | AUBIN | D75-100 & D75-110 |
| 40B20 | 6" Vent Piping for Storage Tanks No.1 & No.2, SCH80 CPVC | 1 | LS | $7,500.00 | $7,500 | | AUBIN | D75-101 and D75-300 |
| 40B21 | FRP Insect Screen for 6" Tank Vent | 2 | EA | $150.00 | $300 | | AUBIN | D75-101 Note 2 |
| 40B22 | 4" Core Drill at Exterior Wall | 2 | EA | $2,000.00 | $4,000 | | AUBIN | D75-110 Note 2 |
| 40B23 | Double Link Seal for 4" NPW | 2 | EA | $1,000.00 | $2,000 | | AUBIN | D75-110 Note 2 |
| **TOTAL** | **PROCESS INTERCONNECTIONS** | | | | **$563,525** | | | |

# GREAT LAKES WATER AUTHORITY
## CSO FACILITY IMPROVEMENTS II
**100% Estimate**

| | | |
|---|---|---|
| | ***Designed By:*** **Hazen** | |
| ***Great Lakes Water Authority*** | ***Date:*** **December 30, 2024** | ***REGENCY CONSTRUCTION SERVICES, INC.*** |

***43 PROCESS GAS & LIQUID HANDLING***

| | ITEM DESCRIPTION | QUANTITY | UNIT | UNIT COST* | TOTAL | BID PCKG | CODE | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **A** | **PROCESS EQUIPMENT** | | | | **$2,096,200** | | | |
| 43A1 | **ST. AUBIN** | | | | | | | |
| 43A2 | **Demo** | | | | | | | |
| 43A3 | Demo Chemical Feed Pump No.1 & No.2 | 2 | EA | $2,000.00 | $4,000 | | AUBIN | X75-041, Phase 1A |
| 43A4 | Demo Storage Tank No.1 | 1 | EA | $13,000.00 | $13,000 | | AUBIN | X75-041, Phase 1A |
| 43A5 | Provide Temporary Chemical Feed System - Allowance | 1 | ALLOW | $50,000.00 | $50,000 | | AUBIN | X75-041 Keynote 3 |
| 43A6 | Demo Chemical Feed Pump No.3, No.4, & No.5 | 3 | EA | $2,000.00 | $6,000 | | AUBIN | X75-042, Phase 2A |
| 43A7 | Demo Storage Tank No.2 | 1 | EA | $13,000.00 | $13,000 | | AUBIN | X75-041, Phase 1A |
| 43A8 | Demo Sodium Hypochlorite Mixer and Supports | 7 | EA | $1,200.00 | $8,400 | | AUBIN | X75-140 Note 1 |
| 43A9 | Remove and Reinstall Sump Pump at Chemical Storage | 1 | LS | $600.00 | $600 | | AUBIN | X75-141 Note 5 |
| 43A10 | Demo Hydraulic Power Unit | 2 | EA | $1,100.00 | $2,200 | | AUBIN | X75-141 Note 6 |
| 43A11 | | | | | | | | |
| 43A12 | **New** | | | | | | | |
| 43A13 | Deflection Screen No.1 and No.2 Rehabilitation | 1 | LS | $650,000.00 | $650,000 | | AUBIN | Budget Equipment per Saveco 12/21/23 |
| 43A14 | Hydraulic Power Pack, 10 gallon vertical reservoir, 5 HP, 2.1 GPM gear pump | 2 | EA | $55,000.00 | $110,000 | | AUBIN | Budget Equipment per Saveco 12/21/23 |
| 43A15 | Chemical Storage Tank No.1 & No.2 | 2 | EA | $150,000.00 | $300,000 | | AUBIN | Budget per NOV 11/13/24 |
| 43A16 | Chemical Feed Pump No.1, No.2 & No.3 | 3 | EA | $25,000.00 | $75,000 | | AUBIN | Budget per FCX Performance |
| 43A17 | Submersible Mixer for Sodium Hypochlorite | 7 | ALLOW | $90,000.00 | $630,000 | | AUBIN | |
| 43A18 | Disinfection Sample Pump, Submersible Centrifugal Chopper Pump, 20 HP | 1 | ALLOW | $55,000.00 | $55,000 | | AUBIN | |
| 43A19 | Outfall Sample Pump, Submersible Centrifugal Chopper Pump, 10 HP | 1 | ALLOW | $50,000.00 | $50,000 | | AUBIN | |
| 43A20 | Automatic In-Line Sampler | 1 | ALLOW | $15,000.00 | $15,000 | | AUBIN | |
| 43A21 | 2" Automatic In-Line Self Cleaning Strainer (SP Kinney Model AP) | 3 | EA | $38,000.00 | $114,000 | | AUBIN | Budget per SP Kinney 5/24/24 |
| **TOTAL** | **PROCESS GAS & LIQUID HANDLING** | | | | **$2,096,200** | | | |

# Appendix I.
# Public Participation

# Appendix I.1
# Public Hearing Notice

# Appendix I.2
# Project Plan Direct Mailing List

City of Eastpointe, City Clerk
23200 Gratiot Ave.
Eastpointe, MI 48021-1683

Ray Township, City Clerk
64255 Wolcott Rd.
Ray, MI 48096-2433

Charter Twp. of Chesterfield
City Clerk
47275 Sugarbush Rd.
Chesterfield, MI 48047-5136

City of Sterling Heights, City Clerk
40555 Utica Rd.
Sterling Heights, MI 48311-8009

City of Mt. Clemens, City Clerk
1 Crocker Blvd.
Mt. Clemens, MI 48043-2525

Charter Twp. of Washington
City Clerk
57900 Van Dyke Rd
Washington, MI 48094-2883

Bruce Township, City Clerk
223 E. Gates St.
Romeo, MI 48065-4405

Shelby Charter Township, City Clerk
52700 Van Dyke Ave.
Shelby Township, MI 48316-3556

Charter Township of Clinton
City Clerk
40700 Romeo Plank Rd.
Clinton Township, MI 48038-2900

City of Memphis, City Clerk
35095 Potter St.
Memphis, MI 48041-4654

City of Fraser, City Clerk
34935 Hidden Pine Dr.
Fraser, MI 48026-2091

Lenox Township, City Clerk
63775 Gratiot Ave.
Lenox, MI 48050-2517

Macomb Township, City Clerk
54111 Broughton Rd.
Macomb, MI 48042-1831

City of St. Clair Shores, City Clerk
27600 Jefferson Circle Dr.
Saint Clair Shores, MI 48094-2883

Richmond Township, City Clerk
34900 School Section Rd.
Richmond, MI 48062-3624

Village of Romeo, City Clerk
121 W. Saint Clair St.
Romeo, MI 48065-4691

Village of New Haven, City Clerk
57775 Main St.
New Haven, MI 48048-2627

SEMCOG
1001 Woodward, Ste. 1400
Detroit, MI 48226

Village of Armada, City Clerk
74274 Burk St.
Armada, MI 48005-7704

City of Utica, City Clerk
7550 Auburn Rd. Ste. 1
Utica, MI 48317-5279

City of New Baltimore, City Clerk
36535 Green St.
New Baltimore, MI 48047-2598

City of Richmond, City Clerk
68225 S. Main St.
Richmond, MI 48062-1383

City of Roseville, City Clerk
29777 Civic Center Blvd.
Roseville, MI 48066-2179

Armada Township, City Clerk
23121 E. Main St.
Armada, MI 48005-4706

Charter Township of Harrison
City Clerk
38151 Lanse Creuse St.
Harrison, Township, MI 48045-3479

City of Warren, City Clerk
1 City Sq., Ste. 205
Warren, MI 48093-5290

Charter Township of Brandon
City Clerk
P.O. Box 929
Ortonville, MI 48462-0929

City of Southfield, City Clerk
26000 Evergreen Rd.
Southfield, MI 48076-4453

Village of Holly, City Clerk
Karl Richter Center
Holly, MI 48442-1694

Addison Township, City Clerk
1440 Rochester Rd., Ste. 2
Leonard, MI 48367-3560

City of Troy, City Clerk
500 W. Big Beaver Rd.
Troy, MI 48084-5285

City of Berkley, City Clerk
3338 Coolidge Hwy.
Berkley, MI 48072-1690

Charter Township of Milford
City Clerk
1100 Atlantic St., Ste. 1
Milford, MI 48381-2000

Charter Township of Royal Oak
City Clerk
21131 Garden Ln.
Ferndale, MI 48220-4200

City of Wixom, City Clerk
49045 Pontiac Trail
Wixom, MI 48393-2567

City of Bloomfield Hills
City Clerk
45 E. Long Lake Rd.
Bloomfield Hills, MI 48304-2369

Charter Township of Waterford
City Clerk
5200 Civic Center Dr.
Waterford, MI 48329-3715

Charter Township of Lyon
City Clerk
58000 Grand River Ave.
New Hudson, MI 48165-9816

City of Novi, City Clerk
45175 W. 10 Mile Rd.
Novi, MI 48375-3024

City of South Lyon, City Clerk
335 S. Warren St.
South Lyon, MI 48178-1317

City of Pleasant Ridge City Clerk
23925 Woodward Ave.
Pleasant Ridge, MI 48069-1199

City of Sylvan lake
City Clerk
1820 Inverness St.
Sylvan Lake, MI 48320-1679

City of Huntington Woods
City Clerk
26815 Scotia Rd.
Huntington Woods, MI 48070-1101

Village of Milford, City Clerk
1100 Atlantic St., Ste. 2
Milford, MI 48381-2001

Village of Lake Orion
City Clerk
21 E. Church St.
Lake Orion, MI 48362-3212

City of Hazel Park, City Clerk
111 E. 9 Mile Rd., Fl. 2
Hazel Park, MI 48030-1892

Village of Bingham Farms
City Clerk
24255 W. 13 Mile Rd., Ste. 190
Bingham Farms, MI 48025-4345

Novi Township, City Clerk
44020 Cottisford St.
Northville, MI 48167-8911

City of Royal Oak, City Clerk
211 S. Williams St.
Royal Oak, MI 48067-2634

City of Farmington, City Clerk
23600 Liberty St.
Farmington, MI 48335-3572

City of Pontiac, City Clerk
47450 Woodward Ave.
Pontiac, MI 48342-5021

City of Auburn Hills, City Clerk
1827 N. Squirrel Rd.
Auburn Hills, MI 48326-2753

City of Clawson, City Clerk
425 N. Main St., Ste. 1
Clawson, MI 48017-1596

City of Lake Angelus
City Clerk
45 Gallogly Rd.
Lake Angelus, MI 48326-1262

City of Rochester Hills, City Clerk
1000 Rochester Hills Dr.
Rochester Hills, MI 48309-3033

Charter Township of White Lake
City Clerk
7525 Highland Rd.
White Lake, MI 48383-2938

Groveland Township
City Clerk
4695 Grange Hall Rd.
Holly, MI 48442-8707

City of Orchard Lake Village
City Clerk
3955 Orchard Lake Rd.
Orchard Lake, MI 48323-1605

Charter Township of Highland
City Clerk
205 N. John St.
Highland, MI 48357-4531

City of Ferndale, City Clerk
300 E. 9 Mile Rd.
Ferndale, MI 48220-1731

Rose Township, City Clerk
9080 Mason St.
Holly, MI 48442-8650

City of the Village of Clarkston
375 Depot Rd.
Clarkston, MI 48346-1418

Village of Wolverine Lake
City Clerk
425 Glengary Rd.
Wolverine Lake, MI 48390-1404

Springfield Charter Township
City Clerk
12000 Davisburg Rd.
Davisburg, MI 48350-2643

Village of Oxford, City Clerk
22 W. Burdick St.
Oxford, MI 48371-4683

City of Oak Park, City Clerk
14000 Oak Park Blvd.
Oak Park, MI 48237-2090

City of Rochester, City Clerk
400 6th St.
Rochester, MI 48307-1483

Village of Leonard, City Clerk
23 E. Elmwood
Leonard, MI 48367-1803

Charter Township of Independence
City Clerk
6483 Waldon Center Dr.
Clarkston, MI 48347-0069

City of Birmingham, City Clerk
151 Martin St.
Birmingham, MI 48009-3368

City of Madison Heights, City Clerk
300 W. 13 Mile Rd.
Madison Heights, MI 48071-1899

Village of Franklin, City Clerk
32325 Franklin Rd.
Franklin, MI 48025-1199

Charter Township of Oakland
City Clerk
4393 Collins Rd.
Rochester, MI 48306-1619

Charter Township of Bloomfield
City Clerk
4200 Telegraph Rd.
Bloomfield, MI 48302-2038

Charter Twp. of W. Bloomfield
City Clerk
4550 Walnut Lake Rd.
West Bloomfield, MI 48323-2556

Charter Township of Orion
City Clerk
2525 Joslyn Rd.
Lake Orion, MI 48360-1951

City of Farmington Hills, City Clerk
31555 W. 11 Mile Rd.
Farmington Hills, MI 48336-1165

City of Lathrup Village, City Clerk
27400 Southfield Rd.
Lathrup Village, MI 48076-3489

Charter Township of Royal Oak
City Clerk
21131 Garden Ln.
Ferndale, MI 48220-4200

Southfield Township, City Clerk
18550 W. 13 Mile Rd.
Southfield Township, MI 48025

City of Keego Harbor, City Clerk
2025 Beechmont St.
Keego Harbor, MI 48320-1168

Holly Township, City Clerk
102 Civic Dr.
Holly, MI 48442-1500

Charter Township of Oxford
City Clerk
300 Dunlap Rd.
Oxford, MI 48371-6900

City of Grosse Pointe, City Clerk
17147 Maumee Ave.
Grosse Pointe, MI 48230-1589

City of Flat Rock, City Clerk
25500 Gibraltar Rd.
Flat Rock, MI 48134-1335

Charter Township of Canton
City Clerk
1150 S. Canton Center Rd.
Canton, MI 48188-1608

Brownstown Charter Township
City Clerk
21313 Telegraph Rd.
Brownstown, MI 48183-1314

City of Garden City, City Clerk
6000 Middlebelt Rd.
Garden City, MI 48135-2480

City of Grosse Pointe Park
City Clerk
15115 E. Jefferson Ave., Ste.1
Grosse Pointe Park, MI 48230-1312

City of Taylor, City Clerk
23555 Goddard Rd.
Taylor, MI 48180-4116

City of Lincoln Park, City Clerk
1355 Southfield Rd.
Lincoln Park, MI 48146-2380

City of Dearborn, City Clerk
16901 Michigan Ave.
Dearborn, MI 48126

Charter Township of Redford
City Clerk
15145 Beech Daly Rd.
Redford, MI 48239-3201

Charter Township of Plymouth
City Clerk
9955 N. Haggerty Rd.
Plymouth, MI 48170-4673

City of Romulus, City Clerk
11111 Wayne Rd.
Romulus, MI 48174-1485

City of Westland, City Clerk
36300 Warren Rd.
Westland, MI 48185

City of Southgate, City Clerk
14440 Dix Toledo Rd.
Southgate, MI 48195-2598

City of Harper Woods, City Clerk
19617 Harper Ave.
Harper Woods, MI 48225-2095

City of Trenton, City Clerk
2800 3rd St.
Trenton, MI 48183-2918

City of Hamtramck, City Clerk
3401 Evaline St.
Hamtramck, MI 48212-3315

City of Highland Park, City Clerk
12050 Woodward Ave.
Highland Park, MI 48203-3578

City of Wyandotte, City Clerk
3200 Biddle Ave.
Wyandotte, MI 48192-5915

City of Grosse Pointe Woods
City Clerk
20225 Mack Plaza Dr.
Grosse Pointe Woods, MI 48236-2343

Northville Charter Township
City Clerk
44405 6 Mile Rd.
Northville, MI 48168-9547

City of Livonia, City Clerk
33000 Civic Center Dr.
Livonia, MI 48154-3087

Sumpter Township, City Clerk
23480 Sumpter Rd.
Belleville, MI 48111-9679

City of Ecorse, City Clerk
3869 W. Jefferson Ave.
Ecorse, MI 48229-1701

City of Riverview, City Clerk
14100 Civic Park Dr.
Riverview, MI 48193-7600

City of River Rouge, City Clerk
10600 W. Jefferson Ave., Ste. 1
River Rouge, MI 48218-1298

City of Woodhaven, City Clerk
21869 West Rd.
Woodhaven, MI 48183-3297

City of Plymouth, City Clerk
201 S. Main St.
Plymouth, MI 48170-1637

City of Belleville, City Clerk
6 Main St.
Belleville, MI 48111-2736

City of Northville, City Clerk
215 W. Main St.
Northville, MI 48167-1599

City of Wayne, City Clerk
3355 S. Wayne Rd.
Wayne, MI 48184-1232

City of Allen Park, City Clerk
16850 Southfield Rd.
Allen Park, MI 48101-2557

City of the Village of Grosse Pte. Shores
City Clerk
795 Lake Shore Rd.
Grosse Pointe Shores, MI 48236-1455

City of Rockwood, City Clerk
32409 Fort Rd.
Rockwood, MI 48173-1111

City of Dearborn Heights
City Clerk
6045 Fenton, St.
Dearborn Heights, MI 48127-3287

Grosse Ile Township, City Clerk
9601 Groh Rd.
Grosse Ile, MI 48138-2171

City of Grosse Pointe Farms
City Clerk
90 Kerby Rd.
Grosse Pointe Farms, MI 48236-3161

City of Inkster, City Clerk
26215 Trowbridge St.
Inkster, MI 48141-1800

Huron Charter Township, City Clerk
22950 Huron River Dr.
New Boston, MI 48164-9791

City of Detroit, City Clerk
2 Woodward Ave., Rm. 200
Detroit, MI 48226-3441

Charter Township of Van Buren
City Clerk
46425 Tyler Rd.
Belleville, MI 4811-5217

City of Melvindale, City Clerk
3100 Oakwood Blvd.
Melvindale, MI 48122-1298

Dept. of Public Safety
16850 Southfield Rd.
Allen Park, MI 48101-2599

Dept. of Public Works
7070 E. Ten Mile Rd.
Center Line, MI 48015-0000

Water and Sewer Manager
2951 Greenfield Rd.
Dearborn, MI 48120

Dept. of Public Works
23600 Liberty St., P.O. Box 9002
Farmington, MI 48335-3572

Sewer Supervisor
17147 Maumee
Grosse Pointe, MI 48230-1589

Sewer Superintendent
90 Kerby Rd.
Grosse Pointe, MI 48236-3100

Dept. of Public Safety
15115 E. Jefferson
Grosse Pointe Park, MI 48230-1399

Water/Sewer Superintendent
3401 Evaline
Hamtramck, MI 48212-3399

Dept. of Public Works
19600 E. Eight Mile Rd.
Harper Woods, MI 48225-1139

Water/Sewer Director
12050 Woodward Ave.
Highland Park, MI 48203-3596

DPW Water Superintendent
3100 Oakwood Blvd.
Melvindale, MI 48122-1220

Deputy Director of Public Works
15145 Beech Daly
Redford, MI 48239-3299

# Appendix I.3
# Project Plan Summary

# Appendix I.4
# Public Hearing Meeting Presentation

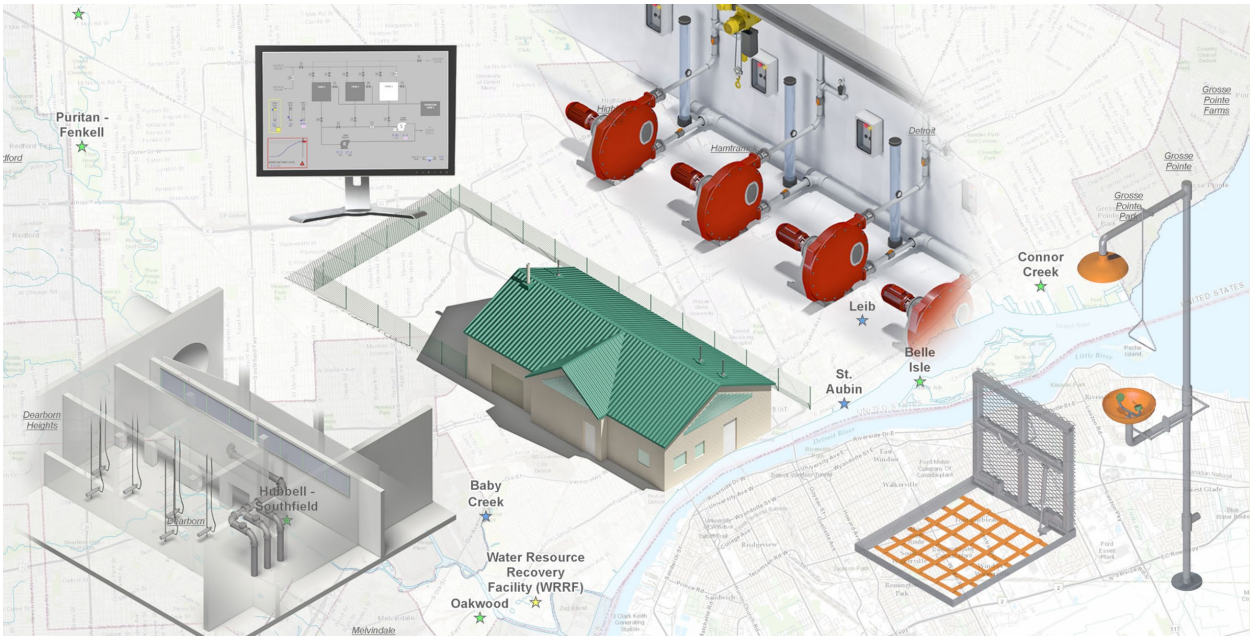
# Appendix I.5
# Public Hearing Transcript

# Appendix J.
# Board Resolution

# Appendix K.
# Basis of Design Documents

# Appendix K.1
# Hazen's Basis of Design Report

Hazen and Sawyer
26777 Central Park Blvd, Suite 180
Southfield, MI 48076 • 313.309.9834




GLWA
Great Lakes Water Authority

# Basis of Design Report

# Design Services of CSO Facilities Improvements

DRAFT

GLWA Contract No. 2200061

October 2024

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| Abbreviation | Definition |
|---|---|
| A | Amp |
| AA | Average Annual |
| AACE | Association for the Advancement of Cost Engineering |
| AASHTO | American Association of State Highway and Transportation Officials |
| ACI | American Concrete Institute |
| ADM | Aluminum Design Manual |
| AEIC | Association of Edison Illuminating Companies |
| AISC | American Institute of Steel Construction |
| AISC-LRFD | American Institute of Steel Construction-Load and Resistance Factor Design |
| ANSI | American National Standards Institute |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigerating and Air-Conditioning Engineers |
| ASTM | American Society for Testing and Materials |
| AWG | American Wire Gauge |
| AWS | American Welding Society |
| AWWA | American Water Works Association |
| BC | Baby Creek SDF |
| BICSI | Building Industry Consulting Service International |
| BLI | Belle Isle CSO & RTB |
| BODR | Basis of Design Report |
| BSEED | Building, Safety Engineering and Environmental Department, City of Detroit |
| CF | Cubic Feet |
| CFM | Cubic Feet per Minute |
| CPM | Critical Path Method |
| CMU | Concrete Masonry Unit |
| CSF | Condensed Silica Fume |
| CSO | Combined Sewer Overflow |
| CY | Cubic Yards |
| DP | Distribution Panel |
| EB | Electrical Building |
| EGLE | Michigan Department of Environment, Great Lakes, and Energy |
| EPR | Ethylene-Propylene Rubber |
| $f_c$ | Compression strength |
| FM | Factory Mutual |
| FPS | Feet Per Second |
| FRP | Fiberglass Reinforced Plastic |
| GGBFS | Ground Granulated Blast Furnace Slag |
| GLWA | Great Lakes Water Authority |
| GPM | Gallons Per Minute |
| HGL | Hydraulic Grade Line |
| HL | Highway Loading |
| HP | Horsepower |
| HS | Hubbell Southfield CSO & RTB |
| H&S | Health and Safety |

| | |
|---|---|
| HVAC | Heating, Ventilation and Air-Conditioning |
| IBC | International Building Code |
| I&C | Instrumentation and Controls |
| ICEA | Insulated Cable Engineers Association |
| IEBC | Independence Electoral and Boundaries Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| IES | Illuminating Engineering Society |
| I/O | Input/Output |
| ISA | Instrument Society of America |
| ISO | International Organization for Standardization |
| kV | Kilovolt |
| kWh | Kilowatt-Hour |
| LCCA | Life Cycle Cost Analysis |
| LED | Light Emitting Diode |
| LEIB | Leib SDF |
| LEL | Lower Explosive Limit |
| LF | Linear Feet |
| MCC | Motor Control Center |
| MDOT | Michigan Department of Transportation |
| MG | Million Gallons |
| MGD | Million Gallons Per Day |
| MH | Manhole |
| MOPO | Maintenance of Plant Operations |
| MSP | Manual of Standard Practice |
| MV | Medium Voltage |
| NCC | Non-Cost Criteria |
| NEC | National Electrical Code |
| NECA | National Electrical Contractors Association |
| NEMA | National Electrical Manufacturers Association |
| NETA | National Electrical Testing Association |
| NESC | National Electrical Safety Code |
| NFPA | National Fire Protection Association |
| NI-EA | North Interceptor-East Arm |
| NPDES | National Pollutant Discharge Elimination System |
| NTP | Notice to Proceed |
| OEM | Original Equipment Manufacturer |
| OWK | Oakwood CSO & RTB |
| O&M | Operation and Maintenance |
| OPCC | Opinion of Probable Construction Cost |
| OSHA | Occupational Safety and Health Administration |
| PCF | Pounds Per Cubic Foot |
| PCI | Precast/Prestressed Concrete Institute |
| PF | Puritan Fenkell CSO & RTB |
| PFD | Process Flow Diagram |
| PPE | Personal Protective Equipment |
| PSF | Pounds Per Square Foot |

| | |
|---|---|
| PVC | Polyvinyl Chloride |
| RGS | Rigid Hot-Dipped Galvanized Steel |
| RIO | Remote Input/Output |
| ROS | Remote Operator Station |
| RP | Recommended Practices |
| RTB | Retention and Treatment Basin |
| RWCS | Regional Wastewater Collection System |
| SCFM | Standard Cubic Feet per Minute |
| SCR | Screenings Capture Ratio |
| SDF | Screening and Disinfection Facility |
| SESC | Soil Erosion and Sedimentation Control |
| SHCFV | Sodium Hypochlorite Feed Valve |
| SHCRV | Sodium Hypochlorite Recirculation Valve |
| SLG | Slide Gate |
| SM | Seven Mile CSO & RTB |
| SRF | State Revolving Fund |
| STA | St Aubin SDF |
| TC | Tray Cable |
| THHN | Thermoplastic High Heat-Resistant Nylon-Coated |
| THWN | Thermoplastic High-Heat and Water-Resistant Nylon-Coated |
| TIA | Telecommunication Industry Association |
| TM | Technical Memorandum |
| TMS | The Masonry Society |
| UL | Underwriters Laboratories |
| VFD | Variable Frequency Drive |
| W.C. | Inches Water Column |
| XHHW | Cross-Linked High Water-Resistant Insulated Wire |

# 1. Introduction

## 1.1 Background

The Great Lakes Water Authority (GLWA) operates and maintains nine combined sewer overflow (CSO) facilities that treat combined sewer flows to water quality levels that ensure protection of public health and environment, in accordance with their Michigan Department of Environmental Quality (MDEQ) National Pollution Discharge Elimination System (NPDES) permit. The majority of these CSO facilities began operation in the late 1990's to early 2000's and are currently in need of system upgrades and rehabilitation. This project combines three separate CSO facility capital improvement projects (CIP) into a single contract for the benefit of efficiencies and expedience to GLWA. A summary of the three sub-projects, along with a brief outline of major improvements for each, are as follows:

- **St. Aubin Screening and Disinfection Facility (SDF) – Disinfection, Screening and Misc. Improvements (CIP 260617)**
    - Chemical feed, storage and mixing system improvements;
    - Screen system improvements;
    - Select HVAC system improvements;
    - Electrical power, lighting and building systems;
    - Instrumentation and controls;
    - Access hatches; and
    - Incorporation of storage space within the Control Building.
- **CSO Facility Safety Improvements and Building Rehabilitation (CIP 270005)**
    - Address the safety and architectural deficiencies identified as part of the CS-299 Multidisciplinary Needs Assessment for all nine CSO Facilities.
- **Control System Upgrades at Baby Creek and Belle Isle CSO Facilities (CIP 270006)**
    - Implementation of a series of lighting and instrumentation and control (I&C) system improvements needed at GLWA's Belle Isle CSO and Baby Creek SDF facility.

## 1.2 Project Goals and Objectives

The overarching goals for the Design Services of CSO Facilities Improvements project were established by GLWA and agreed upon by the project team:

- Standardize CSO systems and equipment, coordinated with other ongoing GLWA CSO projects.
- Incorporate RCM/RCD (Reliability Centered Maintenance/Reliability Centered Design) into the design to reduce life-cycle costs and mitigate O&M difficulties.

- Provide safer facilities through fall protection and emergency eyewash improvements.
- Rehabilitate buildings to address current architectural, electrical and HVAC / plumbing deficiencies.

Specific to the St. Aubin SDF Disinfection, Screening and Misc. Improvements project (CIP 260617), the following goals were established by GLWA and agreed upon by the project team:

- Long-term system reliability;
- Simplified operations & maintenance (O&M);
- Standardize parts and systems across all GLWA CSO facilities, where practical;
- Achieve both automated and manual chemical delivery.

Effective screenings removal will protect the water quality of the Detroit River by increasing screening operational efficiency and preventing debris from being discharged into the river. Optimized disinfection chemical injection and disinfection control strategies will ensure adequate disinfection while keeping TRC levels within the permit goal range.

Specific to the CSO Facility Safety Improvements and Building Rehabilitation (CIP 270005), the following goals were established by GLWA and agreed upon by the project team:

- Remedy safety deficiencies (fall protection, eyewash and emergency showers).
- Remedy architectural rehabilitation deficiencies (caulking, sealing, painting and other building maintenance tasks intended to prevent continued deterioration of the building structure).

Specific to the Control System Upgrades at Baby Creek and Belle Isle CSO Facilities (CIP 270006), the following goals were established by GLWA and agreed upon by the project team:

- Provide sufficient light levels per OSHA standards in all work areas and incorporate exterior power receptacles to assist maintenance and operation of the facility.
- Provide flow meters and level sensors which reliably relate desired information to GLWA staff.
- At Belle Isle CSO, add local control of the valves in the two basin dewatering vaults that require confined space entry into the vaults.

## 1.3 Purpose

The objective of this report is to summarize the design of the screening and disinfection system improvements at St Aubin SDF, safety and building rehabilitation at all nine CSO facilities, and control system upgrades at Baby Creek and Belle Isle CSO facilities. This BODR includes a summary of the design objectives, criteria for meeting the objectives, evaluations of alternatives and equipment, along with O&M concerns to be addressed by the improvements. This report also includes major equipment data sheets, design calculations, project construction schedule, and opinion of probable construction cost.

### 1.3.1 Project Approach

At the outset of the project, the Hazen team conducted a condition assessment at all nine (9) CSO facilities to verify observations documented within prior projects executed by GLWA, specifically the CS-299 Multidisciplinary Needs Assessment Project and St. Aubin 20% Design. As part of the field assessment work, the Hazen Team documented existing conditions at all nine CSO facilities with an emphasis on safety compliance and building rehabilitation.

Multiple workshops were held with GLWA staff throughout the project's Study Phase, between the months of January and August 2023, to present alternative evaluations conducted along with recommended improvements.

The recommendations documented within this report were developed through additional detailed analysis of alternatives, including in-depth dialog with GLWA staff to gain consensus on the appropriate solutions for these improvements. A summary of key decisions that resulted from this effort is provided in **Table 1-1**.

**Table 1-1: Study Phase Key Decision Summary**

| Date | Key Decision |
|---|---|
| **March 24, 2023** | Seven Mile – GLWA requested an additional eyewash in the chemical tank area. |
| **April 14, 2023** | Belle Isle – Remote control stations will be installed on the walls near each drain valve vault (4 stations total) for local control. Stations do not need to be grouped together. |
| **April 28, 2023** | St. Aubin – Existing sodium hypochlorite storage tanks will be replaced. Change from relining the existing tanks as indicated in scope of work. |
| **April 28, 2023** | St. Aubin – Mixing of the sodium hypochlorite in the chemical storage tanks will be performed with the use of feed pumps and piping (i.e., a dedicated mixing device internal to each storage tank is not required). |
| **April 28, 2023** | St. Aubin – Use of additional sensors such as temperature sensors to optimize disinfection control strategy are no longer being considered. However, GLWA would like to include a pH probe to monitor water quality. |
| **June 9, 2023** | St. Aubin – Screening alternative 1A, Rehabilitate Existing Screens and Improve Operation, selected by GLWA for design. |
| **June 23, 2023** | St. Aubin – One (1) spare mixer to be provided at St. Aubin SDF as part of this project. |
| **July 8, 2023 (Email)** | St. Aubin – Install mag-drive centrifugal pumps at St. Aubin with a pressurized manifold feed loop configuration with multiple feed control valves instead of hose pumps. |
| **July 17, 2023** | St. Aubin – Install three (3), 5 HP mixers per mixing chamber at St Aubin SDF. Install the pre-chlorination mixer co-current to flow, like the current arrangement. |
| **July 17, 2023** | St. Aubin – The primary disinfection control strategy operating mode will be TRC mode. |
| **July 28, 2023** | St. Aubin – GLWA preference is vented ball valves on the sodium hypochlorite piping for isolation. Provide diaphragm or globe valves for throttling applications. |
| **July 28, 2023** | St. Aubin – For the chemical feed system at STA, GLWA prefers Alternative A, the pressurized manifold feed loop configuration with multiple feed control valves (one flow control valve per mixing zone). |
| **July 28, 2023** | St. Aubin – GLWA prefers multiple feed control valves without bypasses on each line. A spare valve on the shelf will be specified as a back-up. |

| Date | Key Decision |
|---|---|
| **July 28, 2023** | Belle Isle – Keep the gas monitoring at Belle Isle and tie directly into Ovation. |
| **July 28, 2023** | St. Aubin – GLWA is not comfortable operating the Dewatering Pumps at STA to assist with managing screenings during wet weather events, due to concerns related to the potential of unintended isolated flooding as a result. |
| **July 28, 2023** | Baby Creek – GLWA would like to keep the influent level sensors at BC as is. |
| **August 16, 2023** | Conner Creek – To manage ponding water at Conner Creek in areas B and C, incorporate scuppers and grind top slab to aid in drainage. GLWA is not interested in coring the concrete slabs due to concerns related to structural longevity. |
| **August 16, 2023** | St. Aubin – Automate screen washdown controls. |

The Hazen Team developed technical memorandums to document the alternative evaluations conducted throughout the Study Phase and memorialize key decisions made prior to the 30% Design. A summary of those memos developed is provided in **Table 1-2**.

**Table 1-2: Study Phase Deliverable Summary**

| Date | Title |
|---|---|
| **August 18, 2023** | TM 1A: St. Aubin Screen Alternative Evaluation (CIP 260617) – Draft |
| **September 11, 2023** | TM 1B: St. Aubin SDF Disinfection Chemical Mixing Improvements – Draft |
| **June 26, 2023** | TM 2A: CSO Facility Safety Improvements (CIP 270005) – Final |
| **May 19, 2023** | TM 2B: CSO Facility Building Rehabilitation (CIP 270005) – Final |
| **June 2, 2023** | TM 3: Control System Upgrades at Baby Creek and Belle Isle CSO Facilities (CIP 270006) – Final |

## 1.4 Document Organization

This report is arranged to provide general design standards and methodologies for the overarching project improvements up-front in Sections 2 through 7. Sections 8 through 16 provide specific design criteria for each of the nine CSO facilities. These nine sections are listed alphabetically. Each facility's section has a subsection for safety, architectural building rehabilitation, electrical, and instrumentation improvements. St. Aubin SDF has addition subsections for process-mechanical and HVAC. Following the individual facilities, the proposed construction schedule, permitting, and the Opinion of Probable Construction Costs are provided for the overall project and include in Sections 17 through 19, respectively.

# 2. Process Requirements

## 2.1 Codes, Standards, References

The process mechanical design of the CSO Facilities Improvements Project will make use of many applicable industry standards and design guidance for piping, valves, and process equipment. The following is a list of the more significant resources that the process design will follow and reference within the design documents, when appropriate.

- American Water Works Association (AWWA)
- American Society of Mechanical Engineers (ASME)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Hydraulic Institute (HI)

## 2.2 Material Selection and Corrosion Control

Factors that influence materials selection are corrosion resistance in the environment, mechanical properties, cost, availability, maintainability, compatibility with other system components, life expectancy, and reliability. The following section summarizes the design criteria for corrosive applications.

### 2.2.1 Chemicals

Sodium hypochlorite chemical service piping shall be PVC (polyvinyl chloride) piping, schedule 80. Piping will be socket welded or flanged. For socket welded joints, a silica-free grade of cement will be specified. Gaskets will be compatible with material. Several acceptable gasket materials compatible with sodium hypochlorite include Hypalon, PTFE and Viton (FKM or FPM). Pipe supports shall be constructed of fiber-reinforced polymer (FRP) material.

All equipment wetted parts shall be compatible with process fluid. Chemical storage tanks shall be FRP material constructed with resins compatible with sodium hypochlorite. Hastelloy-C hardware will be used for equipment anchoring within the Chemical Storage Room (e.g., storage tanks, feed pumps, etc.).

# 3. Architectural Requirements

The following buildings are included within the project scope and consist of rehabilitation or modification to existing construction:

- Puritan Fenkell CSO
- Seven Mile CSO
- Hubbell-Southfield CSO
- Lieb SDF
- St. Aubin SDF
- Conner Creek CSO
- Baby Creek SDF
- Oakwood CSO
- Belle Isle CSO

## 3.1 Codes, Standards, References

The following codes and standards will be used within the project scope of work:

- 2015 Michigan Building Code
- 2015 Michigan Rehabilitation Code for Existing Building
- Building Code Requirements for Structural Concrete, American Concrete Institute; ACI 318
- Code Requirements for Environmental Engineering Concrete Structures, American Concrete Institute; ACI 350
- Building Code Requirements for Masonry Structures, American Concrete Institute; ACI 530
- Specifications for Masonry Structures, American Concrete Institute; ACI 530.1
- International Building Code 2012 (IBC)
- PCI Design Handbook, PCI Pre-cast/Pre-stress Concrete Institute
- Manual of Steel Construction – Load and Resistance Factor Design, American Institute of Steel Construction; AISC-LRFD
- Structural Steel Detailing Manual, American Institute of Steel Construction (AISC)
- Structural Welding Code, American Welding Society (AWS)
- Detailing Manual, American Concrete Institute; SP-66
- Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers (ASCE 7-10)
- NFPA 101 Life Safety Code (2018)

### 3.1.1 NFPA 820: Standard for Fire Protection Wastewater Treatment and Collection Facilities Governing Code

Codes, standards, and references will provide the minimum standard for fire resistance, strength, serviceability, and quality standards shall not be less than stipulations required by the governing code. The governing codes used for the design are the current 2015 Michigan Building Code (2015 IBC with Michigan Amendments as adopted in April 2017) and 2015 Michigan Rehabilitation Code for Existing Buildings (2015 IEBC with Michigan Amendments as adopted in December 2016), 2015 Michigan

Mechanical Code (adopted in April 2017), 2015 Michigan Plumbing Code (adopted in April 2017), 2015 Michigan Energy Code (adopted in September of 2017), 2012 International Fire Code, and 2017 National Electrical Code (NEC) (adopted in January of 2019).

### 3.1.2 Supplemental Design Codes

Selected provisions from the following codes may also be used for the project:

- Standard Specifications for Highway Bridges, American Association of the State Highway and Transportation Officials, Latest Edition
- American Society of Civil Engineers – ASCE 24-14 Flood Resistant Design and Construction
- Americans with Disabilities Act
- NFPA 10 – Portable Fire Extinguishers
- NFPA 13 – Installation of Sprinkler Systems
- NFPA 30 – Flammable and Combustible Liquids Code
- NFPA 45 – Fire Protection for Laboratories Using Chemicals
- NFPA 80 – Fire Doors and Fire Windows
- NFPA 704 – Identification of Fire Hazards of Materials
- UL Fire Resistance Directory
- AISC Design Guide 7 – Industrial Building Design
- ASME-B30.11-2010 – Monorails and Underhung Cranes
- MIOSHA-General Industry Safety Standard
    - Part 2 – Walking-Working Surfaces
    - Part 92&430 – Hazard Communication Part 472 – Medical Services and First Aid
    - STD-07-1R5 – Eyewash/Shower Equipment

In addition to the state and federal codes, local regulations additionally impact the design of the buildings and include the City of Detroit Zoning Ordinance. The impact of these regulations includes developed area, parking, landscaping, signage, and noise.

### 3.1.3 Codes and Standards for Specific Materials

Design of specific materials will be performed in accordance with the standards, codes, and specifications adopted by the governing code as listed below.

#### *3.1.3.1 Concrete*

- Building Code Requirements for Structural Concrete, Publication No. 318, Latest Edition, American Concrete Institute.
- Specifications for Structural Concrete, Publication No. 301, Latest Edition, American Concrete Institute.
- Code Requirements for Environmental Engineering Structures, Publication No. 350 and Commentary, Publication No. 350R, Latest Editions, American Concrete Institute.

- Code Requirements for Assessment, Repair and Rehabilitation of Existing Concrete Structures, Publication No. 562, Latest Edition, American Concrete Institute.

#### *3.1.3.2 Stainless Steel*

- ASCE 8, Standard Specification for the Design of Cold-formed Stainless Steel Structural Members, American Society of Civil Engineers.
- AISC Design Guide 27, Structural Stainless Steel, American Institute of Steel Construction.

#### *3.1.3.3 Aluminum*

- Aluminum Design Manual (ADM) Specifications & Guidelines for Aluminum Structures, Aluminum Association.
- AWS D1.2, Structural Welding Code – Aluminum, American Welding Society.

### 3.1.4 References

Engineering manuals, handbooks, textbooks, articles, and technical publications that may be used in design on this project are as follows:

- Reinforced Concrete Design Handbook, Working Stress Method, Publication SP-3, American Concrete Institute.
- Design Handbook in accordance with the Strength Design Method, Publications SP-17 and SP-17A, American Concrete Institute.
- Detailing Manual, Publication SP-66, American Concrete Institute.
- ACI 350.3, Seismic Design of Liquid-Containing Concrete Structures, American Concrete Institute
- MSP-1-86 Manual of Standard Practice, Concrete Reinforcing Steel Institute.
- Design Manual for Structural Stainless Steel, Nickel Development Institute.
- Guidelines for the Use of Stainless Steel in Municipal Wastewater Treatment Plants, Arthur H. Tuthill, Nickel Development Institute.
- Extren Fiberglass Structural Shapes – Design Manual, Strongwell Corporation.
- Dynaform FRP Structural Shapes Design Guide, Fibergrate Composite Structures.

## 3.2 Architectural Building Rehabilitation Considerations

As part of the CS-299 Multidisciplinary Needs Assessment for CSO Facilities, consultants were tasked with assessing and cataloging deficiencies in safety and building rehabilitation across all nine (9) CSO facilities.

The major building components of the existing CSO facilities have been reviewed and evaluated to determine their current condition and to provide recommendations for rehabilitation to maintain and extend the useful life of the entire facility. The work of this section addresses building rehabilitation defects which include doors, windows, room finishes, floors and ceilings, and corrosion of visible steel members. Building rehabilitation does not include structural defects or roofing Work, as those upgrades are part of other contracts for building improvements.

Specific recommended solutions to resolve the various building deficiencies are provided for each of the CSO Facilities within the dedicated section herein.

### 3.2.1 Building Sealants

The condition of the existing joint sealants at the key areas of the building including around windows, doors, and louvers, control joints in the masonry walls, and the joint where the building meets the surrounding pavement were reviewed. Joint sealants have a typical life expectancy of 7 -years, and then you will start to see deterioration of the joint which includes hardening, cracking and debonding from the adjacent surfaces. The current conditions, along with factoring in the start of joint replacement being 2-3 years away, most of the joints will need to be replaced.

The sealant joints around the perimeter of the windows, doors, and louvers will have the sealant joints replaced as part of this project. At the exterior side of the joint a urethane-based multicomponent sealant for joints between metal and masonry, capable of 50-percent joint movement will be specified to replace the existing joint. On the interior side of the joint an acrylic latex or siliconized acrylic latex sealant will be specified. At both the interior and exterior side of the joint the existing joint sealant and backer will be removed. The existing joint will then be prepared by thorough cleaning, applying a primer, installing new backer rod and new joint sealant.

The masonry control joints on both the interior and exterior of the building were observed and where they have hardened and starting to crack and nearing the end of their useful life will be replaced. A urethane-based multicomponent sealant for masonry to masonry joints, capable of 50-percent joint movement will be specified to replace the existing joint at both the interior and exterior side of the joint the existing joint sealant and backer will be removed. The existing joint will then be prepared by thorough cleaning, applying a primer, installing a new backer rod and new joint sealant.

The cove joints around the exterior perimeter of the building between the pavement and wall will need to be replaced. A polyurethane-based multicomponent sealant capable of 50-percent joint movement will be specified to replace the existing joint. The existing joint sealant and backer will be removed. The existing joint will then be prepared by thorough cleaning, applying a primer, installing a new backer and then finally the cove joint sealant.

### 3.2.2 Exterior Walls

The existing exterior walls are predominately masonry cavity wall construction consisting of a 4-inch face brick, air space, rigid insulation, and a CMU back-up wall. The exterior masonry were generally found to be in good condition requiring only minor repair including tuck-point and brick replacement were weathered. There were some areas where step cracking or shear cracking through brick was observed and, in these areas, tuck-pointing as well as replacement are recommended.

### 3.2.3 Doors

The existing interior and exterior doors were observed for corrosion issues, door hardware, and proper operation. The considerations evaluated for each of the components of the door opening are identified below.

*Frame:* The existing door frames were reviewed for corrosion and structural integrity. The main deficiency found was corrosion occurring typically within the bottom 12-inches of the frame. Where the corrosion appears to have reduced the original metal thickness to less than half, the entire frame is recommended to be replaced. Where the corrosion has not reduced the original thickness to less than half, those frames are able to be repaired by removing the rust to bare metal and priming and repainting the entire frame.

Where the existing frame is replaced, the door and door hardware, regardless of condition would also be replaced. The new frame and door will be FRP for both the frame and door.

*Door:* The existing doors were reviewed for corrosion related problems and overall integrity. Where issues with the doors were observed they primarily entailed corrosion at the bottom of the door and around the permitter. Where the corrosion appears to have reduced the structural integrity of the door, the door will be replaced. When replacing the door, the frame and all hardware will also be replaced.

Where corrosion is minimal, or where areas of the original paint has failed by peeling or other damaged, the doors will be repaired which entails removal of corrosion back to sound metal, prepping and priming and repainting of the existing doors on all faces and edges.

Where existing doors and frames are replaced with new doors and frames. FRP will be used for both the frame and the door.

*Lockset:* The doors locksets and handles were reviewed for proper function, latching, and conformance with ADA. Where lockset showed signs of corrosion, lever and/or strike sticking in the unlock position a new lockset will be provided. Where existing locksets were provided with a knob handle not in compliance with ADA, the locksets will also be replaced.

New mortise locksets will comply with BHMA A156.13, for Security Grade 1; stamped steel case with steel or brass parts; Series 1000.

*Hinges:* Existing door hinges were reviewed for being seated tight in the hinge mortise and all screws present. Where hinges have pulled away from the frame causing the doors to rub against the frame when

closing, and even in some instances cause the door to not close completely. Hinges that also exhibited signs of corrosion and rusting will be replaced.

New hinges will be continuous geared hinges complying with BHMA A156.26. Hinges will be extruded aluminum, pinless, geared hinge leaves joined by a continuous extruded aluminum cap.

*Closer: The* existing door closers were observed for proper function including full opening, opening and closing forces, latching force, and overall condition. Where closers were found to have corrosion and damage which impacted the proper operation, the closer will be replaced.

New closers will comply with BHMA A156.4. Closers will be rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm.

*Weatherstripping:* Weatherstripping and gasketing on the jambs and head of the door, and the door sweep were reviewed. Door gasketing relies on compression or other deformation to create a seal with the door to the frame. Based on frequency of use will typically need to be replaced every 5-10 -years. Considering the anticipated time until the work of this project is started it is assumed that the existing weather stripping will have reached its useful life and where other work is being performed on an exterior door the weatherstripping will also be replaced.

*Threshold:* Thresholds were reviewed as part of the door hardware. Thresholds generally were in good condition and do not require any work. Where thresholds were either missing or damaged, they are indicated to be replaced with new.

New threshold will be aluminum and complying with BHMA A156.21, with a maximum height of ½-inch to comply with ADA requirements. For out-swinging doors the threshold will be provided with a raised bumper with silicone bumper seal. Where door is in-swinging a saddle type threshold will be used.

*Silencers:* Silencers are rubber bumpers that are installed at interior door frames where other gasketing is not installed to cushion the door when closing. Where silencers were observed to not be installed, new silencers will be installed.

*Overhead Stops:* Overhead stops were reviewed for proper function and corrosion. Where the existing overhead stop was either corroded or broken, they will be provided with a new stop.

Where overhead stops are being replaced, they will comply with BHMA A156.8. At doors where both the closer and overhead stop are indicated to be replaced, the overhead stop will be omitted, and the overhead stop function will be provided in the closer.

### 3.2.4 Overhead Doors

The existing overhead doors were observed for proper operation and condition. Generally, the overhead coiling doors were found to be in good operating condition with some corrosion of the components observed. Additionally, the bottom bar sensor that acts as a safety device that stops and reverses the door from closing if an object is detected below was reviewed and where not operating correctly will be replaced. The main components listed below were observed in further detail.

*Wall Opening:* The wall opening consists of the jamb framing and the head framing. This typically consists of steel angles or channels at the jambs and at the head of the opening. Review of the existing conditions found generally two types of required repairs. The first condition observed was where the bottom jambs have corroded and reduced the original metal thickness to less the half of the original thickness. For this condition the bottom portion of the jamb steel will be removed, and a new steel section installed and continuously welded to the existing and ground smooth. Where only minor corrosion or peeling paint is occurring, the steel opening members will be repaired by repainting. This will require removing all corrosion back to bare metal and removal of any paint that is not bonded to the substrate, priming and repainting.

*Door Track:* The door track where the door slats ride was reviewed for condition. Where the existing track was found to have significant corrosion throughout the entire length of the track and having areas where the base metal has deteriorated significantly, the entire track will be replaced with a new track. Where corrosion of the door track is significant, but limited the area/length of track impacted, the track will be repaired by removing the corroded section and replacing only the area damaged. Under this repair the entire track would be repainted once the repair is completed. The third condition observed is where there is minor corrosion on the track and the recommendation is to remove the corrosion back to bare metal and repaint the entire track.

*Door Slats:* The slats on a coiling door are interlocked with one another and create a rubbing condition between the adjacent slats that create a wear condition. This wear condition can lead to the factory applied coatings to wear away causing corrosion to begin at these locations. Where minimal wear or corrosion has occurred on the slates, the existing slates will have the corrosion removed back to bare metal, prepped, primed and repainted. Where a significant number of the slats are impacted by corrosion, a new overhead door including track and motor operator will be provided.

*Door Sill:* The door sills are typically constructed of back-to-back angles. The bottom bar sensor and door seal are then attached to the bottom. The observations of the door sill focused on the condition of the angle sill, and the bottom bar sensor. Where significant corrosion and/or deterioration was observed the sill angles will be replaced with new back-to-back stainless-steel angles. Where minor corrosion occurs on the sill, the existing sill angles will be repaired consisting of mechanically removing the corrosion back to bare metal, priming and painting.

*Weather Stripping:* Similar to weatherstripping on the doors, the weatherstripping on the overhead coiling doors have a life expectancy between 5-10 -years depending on frequency of use. For overhead coiling doors the weatherstripping is found at the jambs and at the head of the door. Considering the anticipated time until the work of this project is started it is assumed that the existing weather stripping will have reached its useful life, and the existing weatherstripping will be replaced if completing other work on the doors.

### 3.2.5 Floors and Ceilings

The flooring at the CSO sites was reviewed for condition as well as specific areas were also noted to receive new flooring. The primary floor surface is exposed concrete with sealer and were reviewed to

identify any large cracking and spalled areas that could be considered a hazard. These floors were found to be in good condition and do not require any repair work.

The other type of flooring that was observed was ceramic/porcelain tile floors. These were also observed to identify cracked tile or open joints. While there were some locations of cracked tiles, these cracks were hairline in nature and the tile remained well bonded to the substrate, and due to the difficulty of finding matching tiles, replacement is not recommended. There are a couple of locations where joints either between tiles or at the floor to wall joint where the grout joints have failed or have opened up. For these locations existing grout will be removed, the joint cleaned and new grout installed matching the existing.

The final flooring type that was observed were process and mechanical areas that had a fluid applied flooring. Where these floors were found to be heavily worn, or have flaking and peeling coatings, they will be replaced. The existing coatings will be removed by mechanical or abrasive blasting to achieve the manufacturers required surface profile. A new novalac vinyl ester lining system will then be installed over the floor and turned up the wall to form a wall base. The floor coating will consist of the following components:

- Basecoat: Catalyzed, vinyl ester or epoxy resin with silica fillers.
- Concrete Surfacer: Two-component, vinyl ester or epoxy material with inert mineral fillers.
- Moisture Barrier Coating: Two-component water dispensed polyurethane.
- Primer: Two-component, 100 percent solids, moisture-tolerant, conductive, catalyzed vinyl ester or epoxy.
- Reinforcement: One-ounce chopped strand fiberglass mat.
- Topcoat: Catalyzed, Novolac vinyl ester resin with silica fillers.

Ceilings were also reviewed to determine current condition. Ceilings at the CSO sites are primarily exposed structure of either painted wood trusses and sheathing or painted steel beams, trusses and roof deck. Where coatings on the exposed structure are showing signs of corrosion, or peeling and flaking paint, they will be repainted. This will include removing all corrosion to bare metal, removing all flaking or loose paint, preparing the surface, priming and painting. Coating systems are discussed in further detail under the “Coatings” Section below.

The other ceiling type is lay-in acoustical ceiling tiles located primarily in office and support spaces of the CSO. Where the existing tiles were observed to be damaged, including chips and stains, the ceilings will be replaced. The existing ceiling grid was in good condition and will be cleaned and retained for reuse in the new ceiling. The existing ceiling tiles will be replaced by new ceiling tiles installed in the existing grid.

### 3.2.6 Coatings

The existing painted CMU and concrete walls at the CSO sites were reviewed. Where the existing masonry and concrete paint coatings were found to have peeling and flaking paint, those areas will have

the existing coating removed to sound surface and prepared, primed and painted. At a minimum if the entire space is not painted, the wall will be painted from corner to corner to reduce to provide a uniform appearance. See **Table 3-1** below for basis-of-design paint system.

The existing steel structural systems exposed to view were reviewed and where corrosion and peeling and flaking paint were found, the structural element will be repainted. This will include all bolts, baseplates and brackets. Corrosion will be removed to bare metal, the surface prepared, primed and painted. See table below for basis-of-design paint system.

Wood Trusses and Roof Sheathing exposed to view were also observed and where paint was observed to be peeling and flaking, it will be repainted. All loose paint will be removed, the surface cleaned and prepared, primed and painted. See table below for basis-of-design paint system.

Louvers with a painted finish were reviewed and the majority were found to be in good condition. When the painted finish has failed with peeling and flaking paint, the louver will be repainted. All existing paint will be removed back to bare metal and where coatings are well adhered. The louver will then be clean and prepared, primed and painted.

Bollards on the exterior of the building were observed. Where corrosion is occurring, it will be removed back to bare metal, prepared, primed and painted. In locations with plastic bollard caps, they will be removed and replaced with new plastic caps.

**Table 3-1: Coating Systems Basis-of-Design (Sherwin Williams)**

| Painted Surface | Primer | Intermediate Coat | Finish Coat |
|---|---|---|---|
| **Exterior: CMU & Concrete** | Macropoxy 646 Fast Cure Epoxy | Macropoxy 646 Fast Cure Epoxy | Macropoxy 646 Fast Cure Epoxy |
| **Exterior: Non-Ferrous & Galv Metal** | Centurion WB Urethane | Acrolon 218HS | Acrolon 218HS |
| **Interior: CMU & Concrete** | Macropoxy 646 Fast Cure Epoxy | Macropoxy 646 Fast Cure Epoxy | Macropoxy 646 Fast Cure Epoxy |
| **Interior: Ferrous Metals, Structural Steel** | Macropoxy 646 Fast Cure Epoxy | N/A | Hi Solids Polyurethane |
| **Interior: Wood Framing & Sheathing** | S-W Premium Wall & Wood Latex Primer | S-W ProClassic Waterbased Acrylic-Alkyd | S-W ProClassic Waterbased Acrylic-Alkyd |

# 4. Structural Requirements

## 4.1 Codes, Standards, References

The existing structures will be evaluated for improvements/modifications in accordance with the Michigan Rehabilitation Code (2015). Any new structural elements will be designed in accordance with the Michigan Building Code. Applicable structural codes, standards and references for design are included in **Section 3.1** above. Loads and load combinations used in the evaluation of existing structural elements and design of new structural elements will be as described in **Section 4.2**

## 4.2 Design Loads

The loads presented in the following tables will be used as the basis of design for all new and modified structures.

### 4.2.1 Dead Loads

Dead loads are those resulting from the weight of all permanent non-removable stationary construction, such as walls, floors, roofs, permanent partitions, framing, ceilings, cladding, and equipment bases. Loads from process liquids within the structure and from soil and groundwater outside the structure will not be considered as dead loads. Unless deemed otherwise by the Governing Building Code, Dead Loads will be as detailed in **Table 4-1**.

**Table 4-1: Dead Loads**

| Area | Dead Load |
|---|---|
| **Concrete** | 150 pcf |
| **Steel and Stainless Steel** | 490 pcf |
| **Aluminum** | 169 pcf |
| **Fiberglass Reinforced Plastic (FRP)** | 120 pcf |
| **Concrete Masonry, CMU, 8” Lightweight** | 77 psf (grouted solid)<br>50 psf (grouted at 32” oc)<br>38 psf (hollow) |
| **Concrete Masonry, CMU, 12” Lightweight** | 118 psf (grouted solid)<br>73 psf (grouted @32” oc)<br>55 psf (hollow) |
| **Wood** | 30 to 40 pcf |
| **Select Fill** | 130 pcf |
| **Aggregate Base** | 135 pcf |
| **Pipe Loads** | Design for actual dead loads for pipes > 16” diameter<br>Where beams may support pipes ≤16” diameter, add 1000 pounds at midspan |

### 4.2.2 Live Loads

Live loads technically include all nonpermanent loadings that can occur, in addition to the dead loads. Live loads are those resulting from occupancy, furnishings, and equipment. Except in administrative areas, live load reductions stated in the Governing Code will not be used due to the relatively high probability of simultaneous live loads in all areas. Unless deemed otherwise by the Governing Building Code, Live Loads will be as detailed in **Table 4-2**.

**Table 4-2: Live Loads**

| Area | Live Load |
|---|---|
| **Working Roofs** | 100 psf |
| **Non-working Roof Loads** | As per Governing Code, including wind |
| **Office Floors** | 80 psf |
| **Corridors and Stairways (Process Areas)** | 150 psf |
| **Pipe Supports** | 25 to 100 psf |
| **Electrical Control Rooms** | 250 psf |
| **Light Storage** | 150 psf |
| **Process Areas/Heavy Storage** | 300 psf |
| **Grated Access Platforms and Walkways** | 150 psf |
| **Catwalks** | 100 psf |
| **Pipe Loads** | Design for actual live loads for pipes > 16” diameter<br>Where beams may support pipes ≤16” diameter, add 1000 pounds at midspan |
| **Truck Accessible Areas** | HL-93 loading per AASHTO |
| **Liquid Chemicals** | Per specified specific gravity |
| **Liquid Loads (All Unless Specified Otherwise)** | 65 pcf (Raw Influent) |
| **Monorail** | 1/4 Ton Capacity |

### 4.2.3 Equipment Loads

Process area operating floors are designed for the load case resulting in the maximum stresses from the following live load conditions:

- 300 psf on the entire floor area, with no additional load from equipment included.
- 150 psf on the areas not directly under equipment, plus actual equipment loads.

Equipment loads obtained from manufacturers will be used when available, and other equipment loads will be assumed for the design. These loads will be confirmed prior to completion of design. In addition to the equipment’s operating weight (including any fluids contained), other loads due to moving parts, malfunction, and maintenance will be considered. Examples of these other loads include but are not limited to the following:

- Loads from rotating equipment will include moment, torque, and lateral thrust.
- Loads from all equipment will include those loads induced for required maintenance, such as the removal of large components that may be temporarily placed on the adjacent floor.
- Loads from hoisting equipment such as monorails will be as shown in **Table 4-2**.

The load option that creates the highest stress conditions will control the design. The weight of equipment components, which could be placed on or transported across the floor, shall be located to create maximum stress conditions.

#### 4.2.4 Piping Loads

For purposes of this design, the live loads listed above will be considered to include the loads from process piping that are supported by the floor below the piping. On floors and roofs that will support process piping suspended below, an additional live load allowance will be included for the detailed design. Since the piping associated with this work is small diameter, the allowance will be 10 psf, anticipated to be suspended below the floor or roof.

#### 4.2.5 HVAC, Ducts, Plumbing, and Electrical Raceway Loads

Loads from HVAC ducts, plumbing, and electrical raceways associated with the improvements that are suspended from floors and roofs above are typically relatively light and included within the live loads listed above. However, if they do get significant at selected locations, they will be specifically considered in the evaluation of the existing structural elements.

#### 4.2.6 Wind Loads

Wind loads on any above grade structures will be in accordance with the governing code and ASCE 7. The ultimate wind speed determined for this project is 120 mph.

#### 4.2.7 Snow Loads

Snow loads will be in accordance with the governing code and ASCE 7. The ground snow load determined for this project is 20 psf.

#### 4.2.8 Seismic Loads

Seismic loads resulting from seismic acceleration of the structure dead and live loads, including equipment and piping, will be determined in accordance with the governing code and ASCE 7 as applicable codes for seismic design. The governing code allows the use of the design procedure for rigid structures given therein, or any alternate design basis prescribed for tanks by a national standard.

| | |
|---|---|
| **Risk Category** | III |
| **Anticipated Seismic Site Class** | E |
| **Seismic Design Category** | B |

Seismic loads resulting from seismic acceleration of soil and groundwater will be in accordance with recommendations established in the geotechnical investigation. It has not been determined if the groundwater is drained with a permanent free draining or pumped underdrain system, so groundwater loads will be included in the evaluation of existing buried structures.

The substructure walls shall be analyzed and designed to resist the exterior groundwater and soil loads. The procedures used for the analysis of these conditions are summarized below.

### 4.2.9 External Soil Loads

Existing walls subject to external soil loads shall be evaluated to resist four static loads and two seismic loads in accordance with ACI 350/350R Code and Commentary, Chapter 21, "Seismic Design of Liquid-Containing Structures" and data to be furnished by the Geotechnical Engineer. The design loads include:

- Soil Pressure "At-Rest" is the static distribution of the soil based on the soil parameters and ground water levels.
- Surcharge Pressure Live Load is based upon 300 psf live load.
- Surcharge Pressure of Soil/Foundations is based upon soil cover over tanks and spread footings of adjacent structures, where applicable.
- Hydrostatic Pressure on external walls is the static pressure distribution that the ground water level produces.
- Seismic Soil Pressure is based on severeal equations that take into consideration the soil parameters, soil surcharge and groundwater level. The Geotechnical Engineer should provide these equations.
- Wall Inertia is the lateral inertia force due to the weight of the tank wall per unit height of the tank wall, acting at any given height, y, above the base of the wall.

Vertical accelerations shall be set at 50 percent of the accelerations as determined in the horizontal direction according to code requirements.

### 4.2.10 Process Liquid Loads

Process liquid loads are based on a density of 63 and 79 pcf for water and 15% sodium hypochlorite, respectively. Loads from process liquids and from chemicals are determined for the worst case of the following two conditions:

- Liquid surface at normal maximum operating level. For this condition, normal allowable stresses are used when design is done by the working stress method, or the load factor for live loads (including the environmental durability factor of ACI 350 for concrete structures) is used if design is done by the ultimate strength method.
- Liquid surface at the maximum level possible (overflow conditions). For this condition, a 33 percent increase in allowable stresses is used, or the load factor for live loads (excluding the environmental durability factor of ACI 350 for concrete structures) is used if design is done by the ultimate strength method.

Seismic loads from process liquids are determined as stated above, using a liquid surface at normal operating level. Seismic loads for liquid surface at maximum levels possible (overflow) are not considered.

### 4.2.11 Loading Combinations

The load combinations in **Table 4-3** shall be used in the design of structures. Additional load combinations, which may produce a maximum stress condition, are also to be considered, as appropriate. Note that combinations, which clearly do not govern, will not need to be fully analyzed.

**Table 4-3: Load Combinations**

| |
|---|
| Dead Load + Construction (if unusual construction loads occur) |
| Dead Load + Live Load + Permanent Equipment Load |
| Dead Load + Normal Operating Equipment Load + Seismic |
| Dead Load + Normal Operating Equipment Load + Flood |
| Dead Load + Normal Operating Equipment Load + Wind |

### 4.2.12 Safety Factors

Structures shall be evaluated on the basis of determining the service loads and obtaining a suitable ratio of material or soil strength to these loads termed a safety factor. Either the service loads are multiplied by a suitable set of load factors and compared with the ultimate strength, or the structural material or yield strength is divided by a suitable safety factor detailed in **Table 4-4** below.

**Table 4-4: Safety Factors**

| Type | Safety Factor |
|---|---|
| Overturning | 1.50 |
| Sliding | 1.50 |
| Buoyancy for Groundwater, Design Elevation | 1.25 |
| Buoyancy for Groundwater, 100-yr Flood Elev. | 1.10 |
| Buoyancy for Flood for structures in Flood Hazard Areas | 1.50 |

Forces resisting buoyancy shall be a combination of structure dead load (not including partitions and equipment), weight of soil directly over footings (considering buoyant soil weight), and the tensile resistance of anchors.

#### 4.2.13 Materials of Construction

- Reinforced concrete will have a minimum 28-day compressive strength ($f_c$) of 4,500 psi and ASTM grade 60 deformed reinforcement having a minimum yield strength of 60,000 psi
- Use pozzolan fly ash (PFA) and compact concrete with adequate cover to limit chloride or sulfate contamination
- Added durability measures such as the use of condensed silica fume (CSF) or ground granulated blast furnace slag (GGBFS).
- Other rolled sections will be ASTM A36.
- Bolted connections shall be with ASTM A325, Type I bolts with A563, Grade DH heavy hex nuts and ASTM F436, Grade 1 washers.
- Anchor rods will be ASTM A316/316L at all submerged, buried, and corrosive areas and ASTM F1554 galvanized at all other areas
- Post-installed concrete anchors will be epoxy adhesive anchors as all submerged or buried locations and locations subjected to vibrations. Wedge-type expansion anchors will be used as all other locations. All post-installed anchors will be of ASTM A316 stainless steel.
- Stainless steel shall be ASTM A316/316L
- Aluminum will be 6061-T6 or 6063-T5 or T6 meeting the requirements of ASTM B308
- Handrails and guardrails will be of 6063-T5 or T6
- Connection and hardware will be of A316/316 and guardrails will be of 6063-T5 or T6
- All FRP products shall be manufactured by a pultrusion process utilizing polyester or vinyl ester resin
- Connections for FRP construction, including angles, plate, bolts, nuts, washers, hold downs, and saddle clips shall be type A316 stainless steel unless otherwise noted
- Water stops will be of PVC meeting Army Corps of Engineers, CRD-C-572 with a center bulb at expansion joints, unless noted otherwise
- PVC dumbbell water stops to be used at all construction and control joints
- Joint filler material will be of ASTM D1752, Type I (sponge rubber) or Type II (cork)

## 4.3 Structural Considerations

#### 4.3.1 Safety Improvements

This section identifies various solutions to mitigate the risk of staff falling and establishes general recommended guidelines for addressing these common fall risk conditions. However, each fall protection situation was reviewed on a case-by-case basis, considering observed field conditions along with input received from GLWA staff related to how operation and maintenance tasks are performed at the CSO facilities. Specific recommended solutions to resolve the various safety deficiencies are provided for each of the CSO Facilities within the dedicated section herein.

#### *4.3.1.1 Fall Protection*

Permanent railings are preferred since they provide the most reliable protection. This includes most access hatch locations used to enter confined space from the top slab, refer to **Figures 4-2 and 4-3** for examples. It also includes other locations where there are no traffic or access issues. However, permanent railings are not practical at all locations due to the need to maintain traffic or access. These locations require other forms of fall protection.

For hatch openings used for equipment removal, where permanent railings are not practical, GLWA requested that nets be provided. For equipment openings with double leaves where each side is at least 3.5 ft. high (42-inches) when opened, swing gates should be added to provide fall protection for these hatch openings. For equipment openings where the hatch leaves are not 3.5 ft. high, temporary/portable railings are recommended to protect staff at locations where the hatch could be left open, and the net pulled back for equipment removal for an extended period. The temporary railings could be either custom-made railings from a local fabricator that slide into cored holes in the floor (for inside locations only), or they could be standard portable railings purchased from a handrail manufacturer. If temporary railings are not acceptable for these equipment openings, permanent fall protection anchor points as shown in **Figure 4-1** are recommended in conjunction with staff in a safety harness to provide fall protection for the worker while removing/installing equipment.

**Figure 4-1 Permanent Fall Protection Anchor Points**

**Figure 4-2 Swing Gate with Temporary Railing**

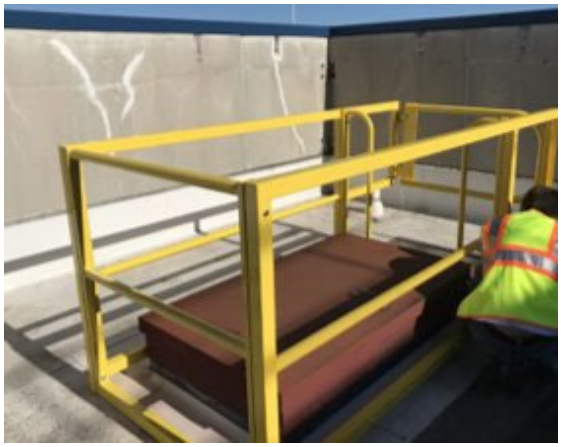


**Figure 4-3 Permanent Railing and Swing Gate Around Hatch**

For hatch locations with ladder access into confined spaces (i.e., basins or vaults), a portable fall protection davit arm (**Figure 4-4**) in conjunction with a worker safety harness is typically preferred. The davit arm provides both fall protection and aids in personnel rescue, if needed. A ladder retractable ladder grab bar system (**Figure 4-5**) could also be used for fall protection; however, most are not designed for retrieval. When required, a temporary retrieval system must be used, such as a tripod with winch or davit arm system.

**Figure 4-4 Removable, Fixed Position Davit Arm System**

**Figure 4-5 Retractable Ladder Grab Bar**

All ladders should have retractable safety posts at the top of the ladder for improved safety when entering or exiting the opening.

Netting, as shown in **Figure 4-6**, is recommended as the permanent safety measure at locations where equipment maintenance is often required. Permanent fall protection anchor points will be installed to provide fall protection during maintenance. An example at the Conner Creek basin is when staff are maintaining the lighting for the basin. Many small (2 ft. by 2 ft.) hatches are left open during maintenance while the staff replaces light bulbs.

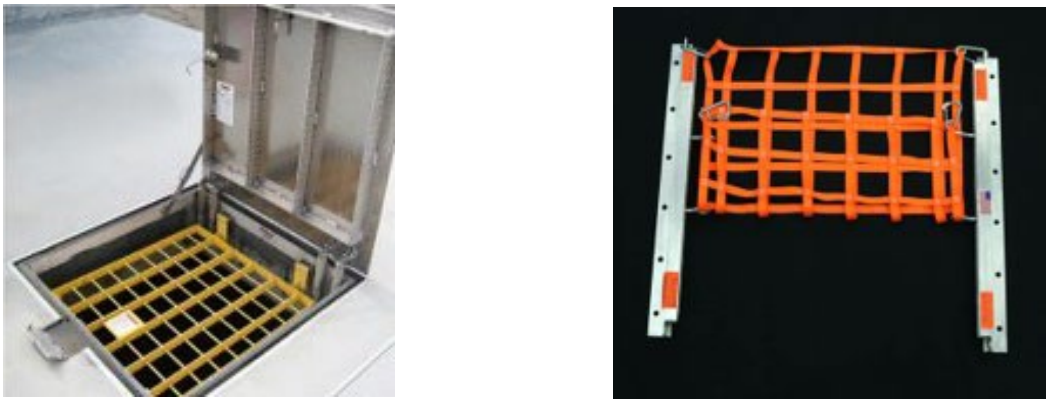


**Figure 4-6 Removable Grating and Slide-Away Netting**

Re-orienting the basin access hatches, as necessary, to make closing the hatch safer (**Figure 4-7**). An example is at the Belle Isle basin where staff must reach across the opening to actuate the red handle to close the hatch.

**Figure 4-7 Basin Roof Unsafe Hatch Orientation**

In general, the lift assist cylinders in the hatches need to be replaced to assist in opening and closing the hatches. Most hatches at the CSO facilities have been in operation for over 20 years and the degradation and failure rates of the lift assist cylinders are highly variable. Since the construction of these improvements is still several years away, we recommend including replacement of all the hatch lift assist cylinders in the scope of the construction project, to ensure a longer equipment life of the hatches at the completion of construction. New assist cylinders will reduce the amount of force required by personnel to open the hatches, therefore making it safer.

Current OSHA regulations requires the installation of a ladder safety system or personal fall arrest system for existing fixed ladders over 24 ft. in height by November 18, 2036, for any section of the fixed ladder/cage/well that is replaced, or for any new fixed ladder exceeding twenty-four feet in height (Revised OSHA standard 1910.28(b)(9)). Existing cages on ladders over twenty-four feet tall will require replacement with an alternate fall arrest system or ladder safety system to meet the revised standards (**Figure 4-8**). Existing ladders with cages that are less than 24 feet in height do not need to be removed per statute, and were evaluated with Owner staff on an individual basis. Recommended improvements are included in the detail for each facility.

**Figure 4-8 Ladder and Personal Fall Arrest Systems Cable based (left) and Rail based (right)**

#### *4.3.1.2 Trip and Fall Hazards*

There are many other unique fall protection and trip hazards that were identified at the CSO facilities. Some of the more common occurrences observed were:

- Locations where access to the top of ladders from the main floor, or from an equipment platform had hanging chains or nothing to prevent access to the opening in the guardrail to access the ladder.
- Missing portions of or gaps in the existing guard rails
- Access to and from ladders had large gaps or objects and tripping hazards near where foot support is necessary.
- Additions of chains between flush mount or recessed double leaf hatches, where the open lockable hatch itself can serve as a form of fall protection.

Many of these hazards can be addressed with the addition of fall protection features such as temporary railings, or the addition of retrofitting swing gates (**Figure 4-9**) to existing guard rail systems. GLWA staff expressed a preference to use swing gates in lieu of chains for fall protection, to resolve these discrepancies. Chains can be used between double leaf hatches in addition to removable safety grating or netting, but are typically not suitable for fall protection. If secondary safety grating installed the chains are more of a visual warning and don't function as necessary fall protection mitigation. If the double leaf hatches came installed with chains or if the manufacturer recommends that they are part of the installation then the chains between the double leaf hatches should be in use (**Figure 4-10**).

**Figure 4-9 Retrofit Swing Gate**

**Figure 4-10 Double Leaf Hatch with Grating and Top Chain**

### 4.3.2 Site Specific Improvements

See Sections 8 through 16 of this report for details related to all nine CSO facilities' structural improvements.

# 5. HVAC and Plumbing Requirements

## 5.1 Codes, Standards, References

The HVAC and Plumbing systems for the Design Services for CSO Facilities Improvements would be governed by the following codes and standards.

- 2015 Michigan Building Code
- 2015 Michigan Mechanical Code
- 2015 Michigan Energy Code
- 2018 Plumbing Code
- Recommended Standards for Wastewater Facilities (The Ten State Standards)
- NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities
- ANSI Z358.1 Emergency Eyewash & Shower Standard

All equipment will have appropriate construction and electrical classification for the associated hazard classification per NFPA 820.

## 5.2 Plumbing Equipment Requirements

### 5.2.1 Eyewash and Emergency Shower Overview

Multiple eye wash stations and emergency showers throughout the CSO facilities were identified as having issues with them such as corrosion (rust), improper height of eyewash and/or showerheads, no shower head installed, station location was difficult to access, and in some areas additional stations are recommended to reduce travel distance. Eyewash and emergency shower improvements are detailed in the Baby Creek, Hubbell-Southfield, Puritan-Fenkell, and Seven Mile facility sections.

At the sites noted above the eyewashes and showers the presence of tepid water at the emergency fixtures was reviewed. Where the existing shower and eyewash only have domestic cold water supply and not tepid water, a new hot water supply will be provided to each of these locations with a thermostatic mixing valve. In addition, a return/recirculation line will be added to ensure tepid water is able to be provided within the required timeframe. Outdoor showers will be provided with heat trace for freeze protection.

New and existing emergency fixtures will be connected to Ovation/SCADA for monitoring and alarm purposes. The controls will include water flow switch, local alarm, and contacts for remote monitoring.

### 5.2.2 Water Heaters

New water heaters will be installed at locations with new emergency fixtures. The emergency showers require 20 gpm minimum flow tepid water supply (60F to 100F) for at least 15 minutes. Existing domestic hot water heaters are not able to satisfy this requirement. New water heaters will be electric, instantaneous or tank type depending on the existing space and electrical service constraints, other plumbing fixtures served by the system. Dedicated tankless water heaters will be provided where feasible.

Basis of design is Bradley Keltech for instantaneous water heaters, Bradley Navigator for tank type. Water heater enclosure will be Class 1 Division 2 compliant if located in classified process areas, NEMA 4X in non-classified areas. Heat trace and/or recirculation loop will be provided where fixtures are more than 50 ft apart or freezing conditions may exist.

#### 5.2.3 Site Specific Improvements

See Sections 8 through 16 of this report for details related to all nine CSO facilities' plumbing improvements.

## 5.3 HVAC Equipment Requirements

In general, existing HVAC systems are expected to remain. Scope of work at St. Aubin includes fan replacement and associated duct modifications.

The new equipment will have appropriate construction and electrical classification for the associated hazard classification per NFPA 820. The new equipment, sheet metal, accessories will be stainless steel, aluminum, and FRP construction to withstand the corrosive environment.

#### 5.3.1 Site Specific Improvements

HVAC improvements under this project are limited to work at St. Aubin. See Section 16 of this report for detailed scope of work.

# 6. Electrical Requirements

## 6.1 Codes, Standards, References

Design and construction of the electrical distribution and lighting systems will be governed by the following codes and standards:

- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Factory Mutual (FM)
- Instrument Society of America (ISA)
- Institute of Electrical and Electronics Engineers (IEEE)
- 2017 National Electrical Code (NEC)
- NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities
- National Electrical Manufacturer's Association (NEMA)
- National Electrical Safety Code (NESC)
- International Electrical Testing Association (NETA)
- National Fire Protection Association (NFPA)
- International Organization for Standardization (ISO)
- Regulations and Standards of the Occupational Safety and Health Act (OSHA)
- Underwriters Laboratories Inc. (UL)
- The Insulated Cable Engineers Association (ICEA)
- The National Electrical Contractors Association (NECA) Standard of Installation
- National and Local Fire Codes
- Michigan Electrical Code
- Ten State Standards for Water Works
- GLWA Electrical Standard Specifications

## 6.2 Electrical Construction Materials – General

Electrical construction materials that are expected to be used for this project are listed below. Materials shall comply with GLWA standards and NEC area classification established for this project.

Fittings will be copper-free cast aluminum with aluminum conduit, PVC-coated RGS with PVC-coated RGS conduit, and PVC with PVC conduit. Covers for fittings will have neoprene gaskets and stainless steel screws.

Stainless steel 316 bolts and screws will be specified for all boxes and fittings, as well as all general hardware used for the electrical installation.

Conduits will be mounted a minimum of ¼ inch off of all walls using clamp backs or strut. Appropriate spacers will be used to prevent corrosion where in contact with concrete or dissimilar metals. Conduits will be ¾ inch minimum exposed, 1 inch minimum encased. Where flexibility is required, liquid-tight

flexible metal conduit with integral ground will be used. in chemical areas, liquid tight flexible non-metallic will be used.

Exposed conduits in non-chemical areas will be rigid aluminum. All encased conduit and exposed conduits in chemical areas will be PVC Schedule 80. Conduits emerging from concrete encasement will be PVC-coated rigid galvanized steel (RGS). Ductbank encasement will be constructed of red-dyed, reinforced concrete.

Wire will be stranded copper, type XHHW-2. Wire sizes will be #14 American Wire Guage (AWG) minimum for control, #12 AWG minimum for power. Shielded instrumentation wire will be two (2) or three (3) conductor #16 AWG twisted shielded type for use with all analog signals. Wiring shall be tin coated per GLWA standards. Ethernet cable will be installed in aluminum condui

The following wiring combinations will be avoided:

- Combined power and control wiring
- Combined AC and DC wiring
- Combined power wiring (except where necessary and with proper de-rating)

The following systems will not be combined with any other systems:

- Telephone systems
- Data (communications) Systems
- Special systems (i.e. Fire Alarm etc.)

Conduit wire fills will be designed for 90% of the allowable per the NEC (36% total fill) per the GLWA standards. In general, conduit fill calculations will use the cross-sectional area for Schedule 80 PVC (2023 NEC, Chapter 9) as the basis for calculating the cross-sectional area for wire fills in conduits.

Receptacles in wet, damp, corrosive or outdoor areas will be GFCI type and furnished with a wet location listed while in use cover WPCR.

Available voltages are anticipated to be 120/208 volts 3 phase, 4 wire or 277/480 volts, single phase for small loads (less than ½ horse power), and 480 volts three phase, 3 wire otherwise. If required by special equipment, 120/240 volt, single phase transformers and panelboards will be provided.

Motors less than ½ HP will be 115 volts single phase. In general, motors ½ HP and above will be 460Volts three phase. Motor enclosures will be TEFC (totally enclosed, fan cooled) or ODP (open drip-proof) as applicable for the service location, with a 1.15 service factor. Motor enclosures will be class 1 Div 1 inside the basin as defined by NFPA 820. All equipment in this project is expected to be low voltage (under 600 volts).

Enclosures (other than conduit fittings or switch/receptacle boxes) will be as follows:

- NEMA 4X stainless steel 316 in all areas, except;
    - NEMA 1 or NEMA 12 painted steel in electrical rooms, control rooms, and other clean, dry, finished areas
    - NEMA 7 for indoor/outdoor use in Class I, Division 1 and Division 2 hazardous areas
    - NEMA 4X FRP only in area's where compatible with chemicals present.

pilot devices will be heavy duty, NEMA rated. Pilot lights will be push-to-test LED transformer type. Momentary pushbuttons with electrically held circuits will be utilized. Lights and pushbuttons shall meet GLWA standards.

All lighting shall be designed in accordance to the latest edition of the IES. LED luminaires shall be used to light the interior spaces. Industrial wet location listed LED encased and gasketed fixtures will be utilized in all process, mechanical and electrical room areas. All luminaires shall have LED drivers, proper thermal management, and LEDs with minimum 3500K Color Corrective Temperature (CCT). Color temperature for indoor and outdoor requirement will be coordinated with GLWA.

**Table 6-1** shows the IES standard recommended foot-candle levels for areas listed:

**Table 6-1: IES Recommended Foot-Candle Levels**

| Lighting Levels | Location |
|---|---|
| 10 FC | Stairways |
| 30 FC | Process Areas |
| 10-20 FC | Piping Galleries/Tunnels |
| 50-100 FC | Offices |
| 50-100 FC | Mechanical / Electrical Rooms |
| 20 FC | Storage Rooms |
| 30 FC | Restrooms |

Exit and emergency egress lights will be provided per NEC, NFPA 101 and where required by other codes. Exit lights and emergency units will be LED style. Emergency lights will utilize integral battery packs and two lamp heads. Fixtures will have NEMA 4X housings in wet, damp or corrosive areas and class 1 division 1 in classified area defined by NFPA 820. Battery pack lighting will include test stations accessible from the floor (approximately 5 feet above the finished floor).

Exit fixtures shall have an LED light source with single, red letters. Directional arrows and double face exit fixtures shall be used as required. Emergency battery wall packs will be provided and will be capable of providing a minimum of 1-foot candle of light at the floor for a minimum of 90 minutes.

## 6.3 Electrical Design Conditions

There are several motor control centers 480 volts, 3 phase and several electrical branch panels 208/120 volts that are located in the electrical rooms with adequate spares and spaces capacity to support any process mechanical and HVAC new loads. The electrical branch panels will be utilized to provide power to new receptacles, lighting, instruments, gas detection, security system and other small miscellaneous loads.

# 7. Instrumentation and Control Requirements

## 7.1 Codes, Standards, References

Design and construction of the instrumentation and control system will be governed by the following codes and standards:

- American National Standards Institute (ANSI)
- Building Industry Consulting Service International (BICSI)
- Factory Mutual (FM)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Society of Automation (ISA)
- National Electrical Code (NEC)
- National Electrical Manufacturer's Association (NEMA)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories Inc. (UL)
- Telecommunications Industry Association (TIA)

## 7.2 Recommended Improvements

### 7.2.1 Level Sensors

Level sensor technology is evenly split between contact and non-contact solutions. Non-contact solutions are preferred in wastewater and chemical applications for the longevity of the instrument and ease of maintenance, while contact (submersible) types are preferred for enclosed spaces there the full measurement range is required. Chemical storage tank level sensors and local displays are the first step in real-time monitoring and alarming of issues with chemical systems before they become major safety or operational hazards.

### 7.2.2 Flow Meters

Flow metering is accomplished in many ways, the selection being dependent on the application. For large channels normally found in sewer systems, flow meters with no moving parts and that can handle submersion are preferred. There are multiple options for meters that utilize sonic, laser, radar or doppler technology to measure flow in large channels. Meter selection will be based on suitability for the application, accuracy, and maintenance requirements with units that can be maintained in-house by GLWA preferred.

### 7.2.3 Gas Monitoring

Knowing that there are hazardous gasses present prior to entry into a wastewater area is critical to personnel safety. Although personal/portable gas detectors are used, having a permanent system that is always checking the atmosphere is a better solution, especially for facilities that are normally unmanned.

As gas detection technology has changed over time, the latest sensor types will be used to replace the existing sensors. Gas system panels that meet life-safety requirements will be reviewed, including annunciators (lights & horns) at entryways to hazardous locations, and centralized annunciation in the control room. Warning system will be added near the control room to alert staff of any unsafe conditions within the facility. Pilot lights will be added to the local gas detection panel. Color codes will be determined based on GLWA standards to assure CSO facility staff are not confused with different color codes that are used in the different facilities.

#### 7.2.4 Site Specific Improvements

See Sections 8 through 16 of this report for details related to all nine CSO facilities' instrumentation improvements.

# 8. Baby Creek

## 8.1 Safety Improvements

All safety improvements at Baby Creek CSO Facility are consistent with recommendations provided in section 4.3.

## 8.2 Architectural Building Rehabilitation

The rehabilitation work at Baby Creek will include repairs to the sealant joints, exterior masonry, interior and exterior doors, overhead doors, various coatings throughout the facility and guardrail repairs.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.
- The interior floor expansion joint in the hallway.

The exterior of the building will also have masonry repairs in areas identified on the drawings. This includes the following type of repairs:

- Tuckpointing of weathered mortar joints.
- Replacement of cracked and weathered brick units.
- Repair of step cracking in mortar joints.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Existing door frames that have corrosion where it meets the floor/ground surface and have been previously patched, will have the frames removed and replaced. Where the frame is replaced, the door and all hardware will also be replaced.
- Doors with severe corrosion will have the door, frame, and hardware replaced.
- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, closers, and weatherstripping on exterior doors.

The coiling overhead doors were reviewed and door 100.2 has damaged door slats and will be replaced with a new door, track and motor operator. The remaining overhead coiling doors will be repaired by removing the corrosion from the existing door tracks and then be repainted. The weatherstripping on the doors at both the jamb and head will be replaced.

The coating systems were reviewed throughout the existing facility. In several areas corrosion and failing coatings were observed and will have the surfaces prepared, primed and repainted. The following areas are addressed under this project:

- The steel columns, baseplates, and anchor bolts in the Screening Building will be prepped, primed and repainted.
- The overhead crane beam supporting the crane rail in the Screening Building will be prepped, primed and repainted.
- The exterior louvers at the Fan rooms will have the peeling paint removed, prepped, primed and repainted.
- The steel bollards around the site will be prepped, primed, and repainted.
- The steel entry columns at the main entry canopy will have the corrosion removed from the tube column, baseplate and anchor bolts, be prepped, primed, and repainted.
- The damaged areas on the underside of the main entry canopy have had previous patches to the soffit material, and the entire soffit will now be prepped, primed and repainted.

The FRP guardrails around the screens in the Screening Building were observed to have cracking occurring around the core drilled holes in the concrete where the posts are set. Where this is occurring the existing FRP railing section will be removed, the existing post holes will have the concrete repaired. The existing guardrail will be reinstalled once the floor is patched in new post holes setback a minimum of 6-inches from the slab opening and set in non-shrink grout.

## 8.3 Plumbing

The plumbing work at Baby Creek includes replacement of the existing emergency eyewashes with new combination emergency eyewash and shower units located in the Screening area. The following is an overview of the scope of work:

- The two existing emergency eyewashes in the Screen Building will be replaced with new combination emergency eyewash and shower units. Alarm stations with flow switches will be included.
- The existing emergency eyewashes are piped to cold water line only, which is not in compliance with the tepid water requirement. Hot water supply and return piping will be extended from the corridor ceiling space of the Control Building to the new fixtures. Thermostatic mixing valves will be provided for precise temperature control at each new fixture.
- The existing water heater does not have the capacity to add the emergency eyewashes and showers to the existing hot water system. A new electric water heater as sized and shown on the drawings will be provided to serve the emergency eyewash fixtures.

## 8.4 Instrumentation

I&C improvements at Baby Creek are focused on additional flow and level monitoring, and local indication for the chemical tank levels.

Additional instrumentation is needed outside of the Influent and Screening areas. An additional flow meter is needed to improve monitoring of flow through the CSO Facility during wet weather events. There are two bypass conduits at the facility that are not currently monitored – the Emergency Wet Weather Bypass, and the Elmer Ternes Bypass. The Elmer Ternes Bypass is slated to be put back into service under a separate active project (1902908). The Emergency Wet Weather Bypass conduit will be designed to add a flow meter that can measure flow in all conditions and can be removed for maintenance without requiring entry into the bypass channel.

A non-contact style flow meter will be added to the Emergency Wet Weather Bypass conduit for measuring flow during normal and wet weather events. The recommended location for the new flow meter is shown in **Figure 8-1**. Due to the potential for surcharge during wet weather events, a Range-Gated Doppler technology, shown in **Figure 8-2**, is recommended over the LaserFlow. A NivuFlow combination ultrasonic and radar system offers the best measurement capability for an enclosed channel that would be subject to surcharge conditions. The LaserFlow meter requires a separate sensor for submerged conditions which impacts the accuracy. Based on GLWA's use of this conduit during wet weather events, submersion will be a typical occurance. The meter installation will employ a removable instrument rack that holds the instruments and can be raised out of the channel for periodic maintenance. This minimizes entry into the channel, and keeps the instruments away from the channel floor where they could be impacted by debris.

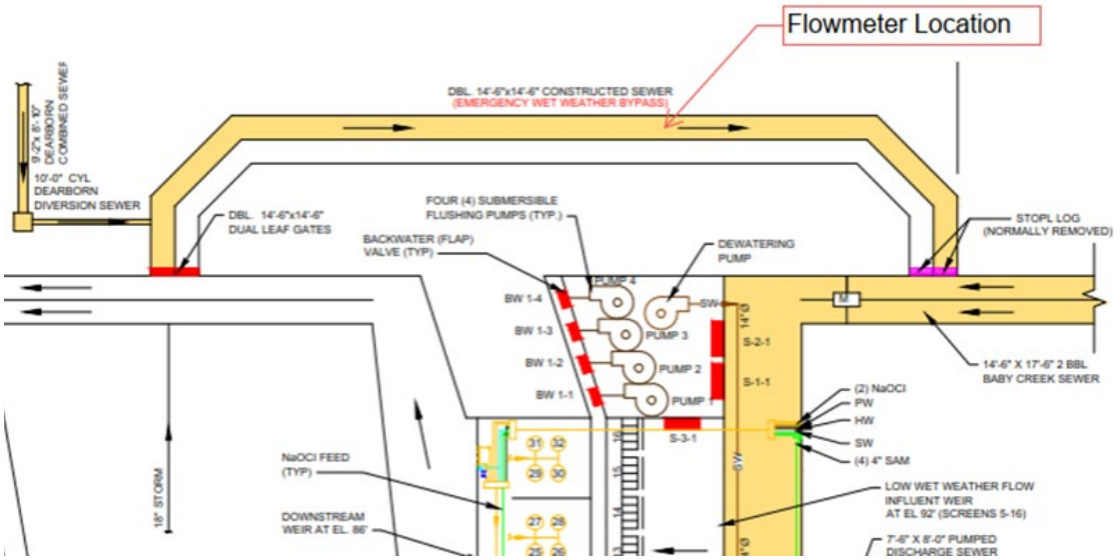



**Figure 8-1 Recommended Baby Creek Wet Weather Bypass Flow Meter Location**

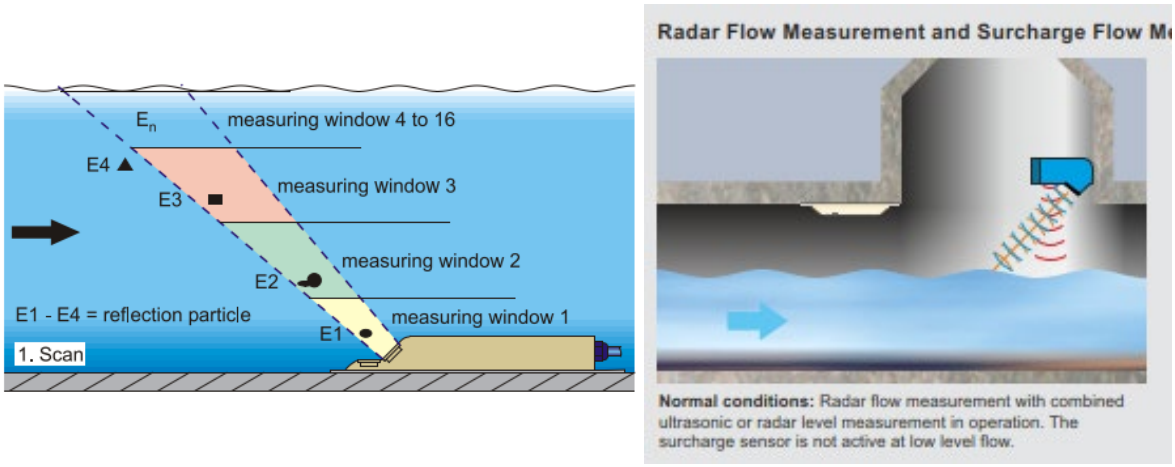



**Figure 8-2 Range Gated Doppler Measurement Principles**

Additional instrument related work at Baby Creek is the addition of a level sensor at the outfall chamber. Due to the location and HGL in the area, a submersible type sensor will be used to measure this level (Ametek 575 is the GLWA standard). The signal would be tied to the Sample Building's control system and relayed to the main facility.

The four chemical storage tanks will receive new level sensors, and local display panels. Radar level sensors will be used for these applications given their ability to output a milliamp signal, versus sonic sensors that require a separate transmitter. Local alarm annunciators will be used to alert a delivery driver or operator to high level conditions through both visual and audible alarms and displays. The real-time levels will be displayed at the local panel and in the control system, keeping each signal separate so that maintenance on one system will not impact the other.

## 8.5 Electrical

Power and lighting improvement in this section will conform to **Subsection 6.2**.

Baby Creek has recently replaced and added LED lighting downstream of the mixers. There is sufficient lighting and adequate light levels downstream of the mixers that meet maintenance and operational activities. There is no lighting near the Bypass Gates. It is unsafe operating bypass gates at night. There are few exterior receptacles at the front and back of the facility. The existing receptacles are approximately spaced every 150 feet away.

It is recommended to add a light pole near the Bypass Gates to provide sufficient lighting for O&M activities to be performed in the dark. It is recommended to add exterior receptacles so that receptacles are spaced every 75 feet to assist in the maintenance and operational of the facility. New receptacles will be provided new branch circuits.

New emergency Eyewash flow sensor and level sensors will be wired to existing Ovation cabinet.

# 9. Belle Isle

## 9.1 Safety Improvements

Fall protection is required for the tank roof platforms at ladder openings (**Figure 9-1**). Locking fall protection gates will be added to the ladder entrances on top of the chemical storage tanks.

**Figure 9-1 Chemical Tank Ladder Openings**

Tight corridors exist in the odor control room, and partially elevated concrete slabs can make traversing the area difficult. In particular, the section of concrete slab between the emergency exit and the stairway to the second floor will be removed (**Figure 9-2**). The removal of this slab will improve emergency access by eliminating any potential trip hazards when moving quickly in an emergency.

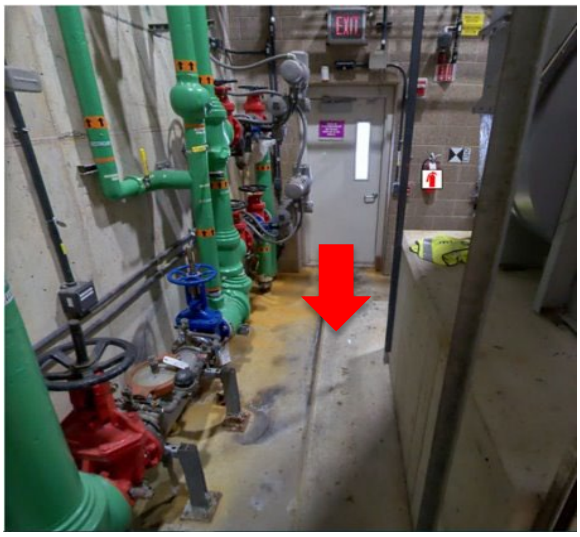



**Figure 9-2 Odor Control Room Elevated Slab**

To further protect personnel and make closing the hatches safer, some of the hatches to the basin need to be re-oriented. The current orientation requires personnel to be in unsafe positions or reach beyond safe limits to close the hatch. An example of one of the existing basin hatches which requires reorientation is provided in **Figure 9-3**, for reference.

**Figure 9-3 Basin Roof Unsafe Hatch Orientation**

## 9.2 Architectural Building Rehabilitation

The rehabilitation work at Belle Isle will include repairs to the sealant joints, tuck pointing of concrete parapet caps, applying a water repellant to coping caps, coatings repair of several areas of the facility and window glazing replacement.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The exterior masonry walls of the building are in good condition. The only repair work besides the sealants noted above is tuckpointing of the horizontal and vertical butt joints between the concrete coping sections over the basin. In addition to tuckpointing of the coping sections a siloxane water repellant will be applied. This will allow the concrete to breathe and not trap moisture while stopping water from wicking into the concrete material.

The coating systems were reviewed throughout the existing facility. Where corrosion and failing coatings were observed they will have the surfaces prepared, primed and repainted. The following areas are addressed under this project:

- The steel bollards around the site will be prepped, primed, and repainted. In addition to repainting these bollards, the existing grout pack under the baseplates will be removed and new non-shrink grout installed.
- At the overhead door the existing jamb and head channel trim will be prepped, primed, and repainted. Additionally, the sill angles for the overhead door is beginning to show some corrosion and will be removed, prepped, primed and repainted.

The existing insulated glass unit in the window to the Office/Control Room has failed and the glass seal has failed. The glazing in this window will be removed and replaced with 1-inch insulated glass with a low-e coating and argon filled unit.

## 9.3 Instrumentation

I&C improvements at Belle Isle are focused on the gas detection system and local control stations for the gates.

The existing gas detection system is based on an obsolete PLC that monitors all of the sensors, generates alarms for the local panels, and outputs the gas readings to the main control system. The age of the PLC platform, and the lack of alarms when the system is offline, make the replacement of this system a high priority. While the replacement of the gas detection system is outside of the scope of this project, it is recommended that GLWA perform the following when it is time to upgrade:

- Replace the PLC panel with a standalone gas system controller made by an OEM
- Place the controller in the main control room and provide local annunciation capability
- Replace the sensors with new units and provide remote sample draw assemblies

- Replace the remote annunciator panels with new units
- Integrate the gas system controller into the Ovation system as a 3rd Party device

The two basin dewatering valves are located in below-grade vaults, and access to their local operators requires confined space entry, a time-consuming process that is difficult during wet weather events. New Remote Hand Stations, shown in **Figure 9-4**, that provide full monitoring and control of the gate actuators will be added above grade. These hand stations will not impact the existing remote controls of the gates, but act as a local control panel mounted remotely from the actuator unit.

**Figure 9-4 Rotork Remote Hand Station**

## 9.4 Electrical

Power and lighting improvement in this section will conform to **Subsection 6.2**.

Belle Isle has recently updated lighting with LED lighting. Interior building lighting is in good condition and provides adequate footcandle levels. However, the exterior lighting is only on the exterior wall near the basin, and the lighting levels are inadequate and in poor condition. The odor control room and pump station basement do not have adequate emergency and egress lighting.

Additional exterior LED lighting on top of the basin and river side of the basin are required to meet operation needs. Additional exit signs and emergency units are required in the odor control room and pump station basement to meet life safety code requirements.

Four remote hand stations for existing vault actuators will be installed at ground level.

# 10. Conner Creek

## 10.1 Safety Improvements

The railing between bar screen Nos. 8 and 9 is missing and creates a fall hazard (**Figure 10-1**). The railing will be extended to eliminate the fall hazard.

**Figure 10-1 Screen Building Bar Screen Railing Missing**

## 10.2 Architectural Building Rehabilitation

The rehabilitation work at Conner Creek will include repairs to the sealant joints, interior and exterior doors, overhead doors, paints and coatings, ceiling tile replacement, exterior columns at the gate operators, and ponding around the Screen Building.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.
- The control joints located in the concrete slab over the basin.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Existing door frames that have corrosion where it meets the floor/ground surface and have been previously patched, will have the frames removed and replaced. Where the frame is replaced, the door and all hardware will also be replaced.
- Doors with severe corrosion will have the door, frame, and hardware replaced.
- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, exit devices, closers, weatherstripping and thresholds on exterior doors.

The coiling overhead doors were reviewed for current condition and to ensure operation. The following repairs will be completed on the overhead doors and noted in the door schedule on the drawings.

- Door jamb and head channel trim is showing signs of corrosion that will be removed back to bare metal, prepped, primed, and repainted.
- Door track sections have corrosion that will be removed back to bare metal, prepped, primed and repainted.
- Door sills will be repaired where minor corrosion is occurring by removing the corrosion back to bare metal, prepping, priming and repainting. Where corrosion is severe, the sills will be removed and new stainless steel sills will be provided.
- The existing overhead doors weatherstripping on the jambs and heads will be replaced with new weatherstripping.
- A couple of the doors the bottom sensor bar was observed to not be operational. Where this occurs, the existing sensors will be removed, and a new bottom bar sensor will be installed.
- Overhead door 101.1 to the Maintenance Room has some minor paint failure, which will be removed back to sound coating, the area prepped, primed and painted.

The coating systems were reviewed throughout the existing facility and generally found to be in good condition, with the exception of the few areas noted below.

- The two end walls in the Screen Building from the bottom of the roof truss to the roof deck have areas that are not painted generally aligning with the structural member. The top portion of the walls will be cleaned, prepped, primed, and repainted.
- The two crane rail support beams were noticed to have minor corrosion occurring. The corrosion should be removed to bare metal, prepped, primed, and repainted.
- The floor in the Mechanical Room in the Control Building was previously coated with a fluid applied floor coating. This coating has completely failed and should be removed and the floor surface prepped, primed, and recoated with a new high performance floor coating.

The lay-in acoustical ceilings in both the first and second floors of the office portion of the building are in poor condition with many stains and damaged tiles. Due to the texture and age of these tiles they have also discolored, making selective replacement of damaged tiles with matching tiles not possible. Therefore, all of the existing ceiling tiles will be removed and replaced with new tiles. The existing

ceiling grid is in good condition and will be retained and cleaned. Similarly, the existing HVAC supply and return diffusers are in good condition and will cleaned and retained. The light fixtures are not LED fixtures and therefore will be replaced with new LED fixtures in the same location as previously installed.

At the gate platform structures on the north side of the Screen Building the exposed columns are showing signs of corrosion at the base of the columns including the baseplate and anchor bolts. These columns will have the corrosion removed to bare metal, prepped, primed and painted.

There were also observed issues with ponding water occurring between the north side of the screen building and the gate operator platform. This condition also occurs between the Screen Building and the parapet wall adjacent to the creek on the east side of the building. The concrete slab in this area was originally constructed as a flat slab, which is now causing water to not drain quickly from this area. Options for introducing a topping slab in the area to achieve some slope was reviewed, however not practical due to the weep hole for the Screen Building exterior wall being directly on top of the slab. Adding any additional elevation to this area would block these weeps and cause more harm. For both of these areas new scupper openings are proposed. On the north side scuppers will be cut into the base of the gate operator walls to allow water to drain to the basin below. On the east side the scuppers will be cut into the parapet wall allowing water to drain to the creek. At the scupper location a side wall strainer will be provided to prevent large debris from entering the scupper. Because the slab cannot be sloped, there may still be some minor water ponding, but should drain the bulk of the water and allow it to dry out faster than the current condition.

Ponding also is occurring on top of the basin in the southeast corner of the Screen Building. The original design slopes the entire basin slab to the east to drain to the creek through scuppers in the parapet wall. In this area water is ponding against the parapet wall between the existing scuppers and appears to be a low point. For this area a new concrete topping slab will be poured to form a cricket diverting water to the two existing scupper locations.

## 10.3 Instrumentation

No instrumentation improvements at Conner Creek are included in this project.

## 10.4 Electrical

New LED lighting will be installed due to ceiling tiles replacement. Lighting improvement in this section will conform to **Subsection 6.2**.

# 11. Hubbell-Southfield

## 11.1 Safety Improvements

The railing between Bar Screen Nos. 2 and 3 platforms is missing and presents a space for personnel to fall into the screening area. The railing will be extended to eliminate the fall hazard. Toe plates (kick plates) were missing in several places along the walkway (**Figure 11-1**). Approximately 20-LF of missing toe plates will be replaced.

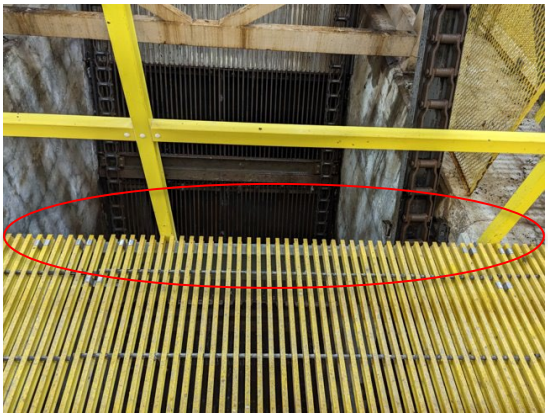


**Figure 11-1 Screening Building Bar Screen Platform Components Missing**

Swing gates are to be installed at the top of the ladders in the Basin Odor Control Room to prevent any personnel moving along the walkway from falling over the ladder (**Figure 11-2** and **Figure 11-3**).

**Figure 11-2 Control Building Odor Control Room Walkway Ladder Opening Requires Gate**

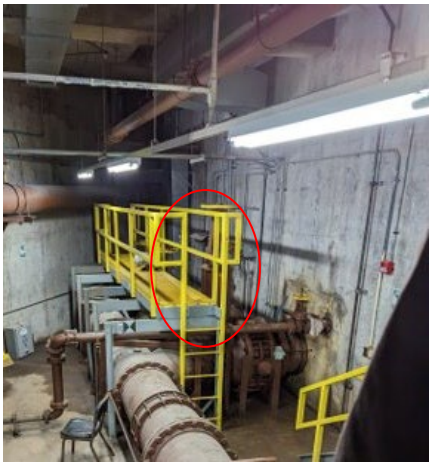


**Figure 11-3 Piping Gallery Access Platform Ladder Opening Requires Gate**

Some of the existing deck access hatches are not sufficiently recessed or protected to avoid snowplow damage (**Figure 11-4a**). These hatches need to be replaced and recessed into the concrete to protect the hatches from being further damaged. There is limited drive access in the area near the main operator building, and it is not feasible to physically separate the hatches from heavy truck traffic. The access covers and grating over the stop logs will be replaced due to excessive oxidation (**Figure 11-4b**).

**Figure 11-4a, 11-4b, and 11-4c Access Hatches Around Site Exterior**

New guardrails and gates with grab bars are required at all the basin stair/ladder access hatches. Any ladders that have existing chains across the entrance need to be modified or replaced. The chains do not provide adequate fall protection at the entrance of a ladder. For any cages that are integral with the ladder, the entire ladder structure may need replacement. A gate and grab bar will replace the existing chain at the entrance of the ladders. The hatch in the Chemical Room is inadequate and presents a fall hazard (**Figure 11-5c**). Guardrails with a gate will be installed around the entire hatch with the gate placed on the

left side of the opening. The existing ladder will be moved to the left to be no more than 12 inches from the step off point where the new gate will be on the left.

**Figure 11-5a, 11-5b, and 11-5c Basin and Chemical Room Ladder Access Points**

## 11.2 Architectural Building Rehabilitation

The rehabilitation work at Hubbell-Southfield will include repairs to the sealant joints, interior and exterior doors, overhead doors, various coatings throughout the facility, and replacement of damaged ceiling tiles.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Doors with severe corrosion will have the door, frame, and hardware replaced.
- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, hinges, closers, and weatherstripping on exterior doors.

The coiling overhead doors were reviewed for current condition and to ensure operation. The following repairs will be completed on the overhead doors and noted in the door schedule on the drawings.

- Door jamb and head channel trim is showing signs of corrosion that will be removed back to bare metal, prepped, primed, and repainted.
- Door track sections have corrosion that will be removed back to bare metal, prepped, primed and repainted.
- The door track at door 120B will have the bottom 3-feet of the track replaced. The remainder of the track will have all corrosion removed back to bare metal, prepped, primed, and repainted.
- Door sills will be repaired where minor corrosion is occurring by removing the corrosion back to bare metal, prepping, priming and repainting.
- The existing overhead doors weatherstripping on the jambs and heads will be replaced with new weatherstripping.

The coating systems were reviewed throughout the existing facility. In several areas corrosion and failing coatings were observed and will have the surfaces prepared, primed and repainted. The following areas are addressed under this project:

- The steel trusses in the Headworks area will be prepped, primed and repainted.
- The roof areas outside of the Headworks room have exposed painted wood trusses and plywood sheathing. The paint on these surfaces is starting to fail and will have all loose paint removed, prepped, primed, and repainted.
- The steel bollards around the site will be prepped, primed, and repainted.

The lay-in acoustical ceilings in the Office, Corridor, Toilet Room, and Men's and Women's Locker is in poor condition with several damaged tiles. Due to the texture and age of these tiles they have also discolored, making selective replacement of damaged tiles with matching tiles not possible. Therefore, all of the existing ceiling tiles will be removed and replaced with new tiles. The existing ceiling grid is in good condition and will be retained and cleaned. Similarly, the existing HVAC supply and return diffusers are in good condition and will be cleaned and retained. The light fixtures are not LED fixtures and therefore will be replaced with new LED fixtures in the same location as previously installed.

At the Control Building there has been an ongoing issue with water infiltration/leak occurring around the odor control stack and the sheet metal cap. The leak has been addressed numerous times in the past by providing additional sealant at the joint between the cap and the stack. However, due to the thin nature of both the stack and the sheet metal cap a proper bond cannot be achieved with the sealant and will continue to fail and allow water to infiltrate. As part of the project a new chimney cap will be provided that includes a lap joint of the odor control stack providing a physical barrier to this joint not relying on sealant.

## 11.3 Plumbing

The plumbing work at Hubbell-Southfield is limited to improvements and repairs to the combination emergency eyewash and shower units in the Headworks Building and includes the following scope:

- The existing combination emergency eyewash and showers in the Odor Control Room (2 Locations) will remain.
- The existing combination emergency eyewash and shower underneath the stair run at the lowest level of the Hypochlorite Storage room will be removed and a new fixture provided shifting slightly to provide enough height underneath the stairs.
- The existing emergency fixtures are piped to cold water line only, which is not in compliance with the tepid water requirement. Hot water supply and return piping will be extended from the new water heater to each fixture. Thermostatic mixing valves will be provided for precise temperature control at each new fixture.
- Alarm stations with flow switches will be installed at every eyewash/shower.
- A new electric water heater and recirculation pump shown and sized on the drawings will serve the new and existing emergency fixtures.

## 11.4 Instrumentation

Instrumentation work is limited to integrating the new Eye wash flow sensors into the existing PLC system. Spare input channels are available in the existing I/O cabinets at the main control room and the headworks building.

## 11.5 Electrical

Power and Lighting improvement in this section will conform to **Subsection 6.2**. The following items are included in the electrical work at Hubbell-Southfield:

- New LED lighting will be installed due to ceiling tiles replacement.
- The new tankless water heater will be powered from existing motor control center MCC-H2.
- Eye wash new flow sensors will be monitored and wired to existing PLC cabinet.

# 12. Leib

## 12.1 Safety Improvements

The guardrails in the chemical room on top of the tanks must be extended around the circumference of the tanks to eliminate the fall hazard. The lack of guardrails around the circumference of the tanks prevents plant operators from safely accessing the pipes above (**Figure 12-1**).

**Figure 12-1 Chemical Room Missing Guardrail**

## 12.2 Architectural Building Rehabilitation

The rehabilitation work at Leib will include repairs to the sealant joints, exterior masonry, interior and exterior doors, and overhead doors.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.

- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The exterior of the building will also have masonry repairs in areas identified on the drawings. This includes the following type of repairs:

- The existing cast stone windowsills have cracks and will be removed and replaced. As part of the sill replacement the glass block windows associated with the sills will also be removed and replaced.
- Tuckpointing of weathered mortar joints.
- Replacement of cracked, spalled, and bricks with spider cracks on the face shell will be removed and replaced with new brick to match color, blend, and texture.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, closers, and weatherstripping on exterior doors.

The existing coiling overhead door will be repaired by having the corrosion removed from the jamb and head channel, prepped, primed and painted. The door sill also has minor corrosion that will be removed, prepped, primed and painted. The weatherstripping on the doors at both the jamb and head will be replaced.

## 12.3 Instrumentation

No instrumentation improvements at Leib are included in this project.

## 12.4 Electrical

No electrical improvements at Leib are included in this project.

# 13. Oakwood

## 13.1 Safety Improvements

An extension of the existing railing on the stairway in the Storm Pump Station will be installed. In its current configuration, the railing presents a fall hazard with a gap in the railing large enough for a person to fall between (**Figure 13-1**).

**Figure 13-1 Pump Station Railing Fall Hazard**

Conduit is routed along the top of the basins in various locations to run electrical power to light fixtures and ventilation equipment. These conduits produce trip hazards for any personnel working or traversing the roof. To eliminate the trip hazards, conduit ramps are to be installed over the conduits (**Figure 13-2** and **Figure 13-3**).

**Figure 13-2 Basin Roof Conduit Ramps**

**Figure 13-3 Conduit Ramps**

For each of the chemical storage tanks, locking fall protection gates will be installed at the top of the tank at the ladder entrances (**Figure 13-4**). Step platforms will also be installed at the top of the ladders due to a large gap between the ladder and chemical tank's top platform creating a fall hazard. To allow for ease of traversing the tanks, a catwalk installed between the top of the tank platforms will be evaluated to minimize the amount of times personnel must ascend and descend the ladders.

**Figure 13-4 Chemical Tank Ladder Opening**

## 13.2 Architectural Building Rehabilitation

The rehabilitation work at Oakwood will include repairs to the sealant joints, interior and exterior doors, overhead doors, various coatings throughout the facility, roof and flashing repairs, and masonry through wall flashing repair.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.

- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.
- The interior floor expansion joint in the hallway.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Existing door frames that have corrosion where it meets the floor/ground surface and have been previously patched, will have the frames removed and replaced. Where the frame is replaced, the door and all hardware will also be replaced.
- Doors with severe corrosion will have the door, frame, and hardware replaced.
- Door hardware that does not operate or is damaged will be replaced including locksets, exit devices, closers, hinges, overhead stops, and weatherstripping on exterior doors.

The coiling overhead doors were reviewed for current condition and to ensure operation. The following repairs will be completed on the overhead doors and noted in the door schedule on the drawings.

- Door jamb and head channel trim is showing signs of corrosion that will be removed back to bare metal, prepped, primed, and repainted.
- Door track sections that have corrosion will be removed back to bare metal, prepped, primed and repainted.
- Door sills were typically in poor condition and will be removed and replaced with new stainless steel sill angles. Where only minor corrosion is occurring, that door sill will have all corrosion removed to bare metal, prepped, primed and painted.
- A couple of the doors the bottom sensor bar was observed to not be operational. Where this occurs, the existing sensors will be removed, and a new bottom bar sensor will be installed.
- The existing overhead doors weatherstripping on the jambs and heads will be replaced with new weatherstripping.

The coating systems were reviewed throughout the existing facility. In several areas corrosion and failing coatings were observed and will have the surfaces prepared, primed and repainted. The following areas are addressed under this project:

- The lowest level of Stair 4 has coating failing on the concrete wall. The wall will have the coating removed and the concrete surface prepped, primed and painted. The cause of the paint failure is caused by moisture migration through the concrete wall. To stop the moisture migration a cementitious crystalline concrete waterproofer will be applied to the wall.
- Corrosion was also observed on the steel column, base plates, and steel roof beams at the Sanitary Pump Station room. The corrosion should be removed from the steel, and the steel prepared, primed and painted.
- The roof steel framing in the Screen Room is showing signs of corrosion and should be removed back to bare metal and then primed and painted.
- The steel bollards around the site will be prepped, primed, and repainted.

Several areas have been identified to have the existing floor coating replaced. In these areas the existing floor coating should be shot blasted to remove the existing coating. A new 4-coat Novalac Vinyl Ester high performance coating system should be installed. The floor installation would also include forming a new cove base and extending the coating a minimum of 6-inches up the wall. The following areas will have a new high performance floor coating:

- Screening Collection Room in the Screen Facility
- MAU Room in the Screen Facility
- The Screen Room in the Screen Facility
- The Screen Facility Control Room in the Screen Facility
- Odor Control Room in the Basin.

There was also identified an area of the Screen Facility roof between the skylights where there is a roof leak. The flashing of the roof to the two skylights will be redone and given the close proximity of the two skylights to each other the small roof area between the skylights will also be replaced.

There is also a small section of flashing on the Pump Station Building where the masonry through wall flashing has failed and the stainless steel drip edge has become detached from the flexible through wall flashing. In this area the portion of masonry will be removed, the flashing reinstalled, then the masonry reinstalled.

## 13.3 Instrumentation

Instrumentation work is limited to integrating the new Eye wash flow sensors into the existing Ovation system. Spare input channels are available in the existing I/O cabinets at the main building and CSO building.

## 13.4 Electrical

Wiring for emergency eyewash in this section will conform to **Subsection 6.2**.

New emergency eyewash station flow switches monitoring will be wired to existing Ovation cabinets.

# 14. Puritan Fenkell

## 14.1 Safety Improvements

The temporary stairs (**Figure 14-1**) in the Chemical Room will be replaced with permanent FRP stairs to eliminate the trip hazard created by the plastic chemical pipe passing through that location. Due to the space constraints the new stairs will have a similar ladder configuration (i.e. ships ladder style) and the design will be coordinated to protect the sodium hypochlorite pipe from being stepped on at that location.

**Figure 14-1 Makeshift Stairs to Access Containment Area**

## 14.2 Architectural Building Rehabilitation

The rehabilitation work at Puritan-Fenkell will include repairs to the sealant joints, exterior masonry, interior and exterior doors, overhead doors, wall coatings in the Headwork Room, and lay-in acoustical ceiling tile replacement.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The exterior of the building will also have masonry repairs in areas identified on the drawings. This includes the following type of repairs:

- Removing and replacing sections of the stone banding that is either cracked or missing. The band will be replaced with new Cast Stone units that match the color and texture of the existing stone banding.
- Tuckpointing of weathered mortar joints.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, closers, silencers and weatherstripping on exterior doors.

The coiling overhead doors were reviewed for current condition and to ensure operation. The following repairs will be completed on the overhead doors and noted in the door schedule on the drawings.

- Door jamb and head channel trim is showing signs of corrosion that will be removed back to bare metal, prepped, primed, and repainted.
- Door tracks with severe corrosion will have the track removed and a new track installed.
- Door track sections have corrosion that will be removed back to bare metal, prepped, primed and repainted.
- Door sills will be repaired where minor corrosion is occurring by removing the corrosion back to bare metal, prepping, priming and repainting.
- The existing overhead doors weatherstripping on the jambs and heads will be replaced with new weatherstripping.
- Where the door's bottom sensor bar was observed to not be operational, the existing sensors will be removed, and a new bottom bar sensor will be installed.

The coating systems were reviewed throughout the existing facility. Generally, they were found to be in good condition. The one area that will be repaired as part of this project are the walls within the Headworks room where the paint has failed in several locations. The walls will be cleaned, and all loose and peeling paint removed, then prepped, primed and repainted.

The lay-in acoustical ceilings in the Office, Toilet Room, and Men’s and Women’s Locker are in poor condition with several damaged tiles. Due to the texture and age of these tiles they have also discolored, making selective replacement of damaged tiles with matching tiles not possible. Therefore, all of the existing ceiling tiles will be removed and replaced with new tiles. The existing ceiling grid is in good condition and will be retained and cleaned. Similarly, the existing HVAC supply and return diffusers are in good condition and will be cleaned and retained. The light fixtures are not LED fixtures and therefore will be replaced with new LED fixtures in the same location as previously installed.

## 14.3 Plumbing

The plumbing work at Puritan-Fenkell includes improvements to the emergency eyewash/shower units and includes the following scope:

- The existing combination emergency eyewash and shower in the Sodium Hypochlorite Area will remain.
- A new exterior emergency eyewash and shower will be added to the Courtyard Area. The fixture will be exterior rated with heat trace freeze protection.
- The existing emergency eyewash/shower is piped to cold water line only, which is not in compliance with the tepid water requirement. Hot water supply and return piping will be extended from the Headworks room to the new fixtures. Thermostatic mixing valves will be provided for precise temperature control at each new fixture.
- The existing water heater does not have the capacity to add tempered water to the showers. A new electric water heater is shown and sized on the drawings to provide tempered water to all new and existing fixtures.
- Alarm stations with flow switches will be provided.

## 14.4 Instrumentation

Instrumentation work is limited to integrating the new Eye wash flow sensors into the existing PLC system. Spare input channels are available in the existing I/O cabinet at the main control room.

## 14.5 Electrical

Due to ceiling tiles replacements defined in the architectural improvement section, recessed lighting will be replaced with new LED recessed lighting. The lighting will conform to **Subsection 6.2**.

Eye wash new flow switches monitoring will be wired to the existing PLC cabinet. The wiring for emergency eyewash will conform to **Subsection 6.2**.

# 15. Seven Mile

## 15.1 Safety Improvements

The utility tunnel hatch in the parking lot was recently installed with a flush mount cast iron double leaf hatch which is showing signs of surface oxidation which is normal for that type of installation (Refer to **Figure 15-1**). The hatch is in a public access overflow parking lot, and staff will need to use temporary guard rail and take extra precautions to separate the public from the work area when using the hatch for access.

**Figure 15-1 Utility Tunnel Hatch**

## 15.2 Architectural Building Rehabilitation

The rehabilitation work at Seven Mile will include repairs to the sealant joints, interior and exterior doors, overhead doors, and various coatings throughout the facility.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The existing doors, frames and hardware will be renovated and repaired based on the current conditions at the facility. There are many varying conditions encountered, requiring with different approaches to correcting the condition and included the following work shown on the drawings:

- Existing door frames that have corrosion where it meets the floor/ground surface and have been previously patched, will have the frames removed and replaced. Where the frame is replaced, the door and all hardware will also be replaced.
- Doors with severe corrosion will have the door, frame, and hardware replaced.
- Doors and door frames with minor corrosion will have all corrosion removed and the door and frame repainted.
- Door hardware that does not operate or is damaged will be replaced including locksets, closers, silencers, thresholds and weatherstripping on exterior doors.

The coiling overhead doors were reviewed for current condition and to ensure operation. The following repairs will be completed on the overhead doors and noted in the door schedule on the drawings.

- Door jamb and head channel trim is showing signs of corrosion that will be removed back to bare metal, prepped, primed, and repainted.
- Door track sections have corrosion that will be removed back to bare metal, prepped, primed and repainted.
- Door sill with severe corrosion will have the existing double angle sill removed and replaced with a new stainless steel double angle sill.
- The existing overhead doors weatherstripping on the jambs and heads will be replaced with new weatherstripping.

The coating systems were reviewed throughout the existing facility. In several areas corrosion and failing coatings were observed and will have the surfaces prepared, primed and repainted. The following areas are addressed under this project:

- The exposed CMU walls within the Courtyard will have all loose and peeling paint removed, walls cleaned and prepped, primed and painted.
- The steel trusses in the Headworks Room will have corrosion removed back to bare metal, prepped, primed, and painted.
- The interior painted CMU walls within the Headwork Room will have all peeling paint removed, cleaned and prepped, primed and painted.

## 15.3 Plumbing

The plumbing work at Seven Mile is limited to improvements and repairs to the existing combination emergency eyewash and shower and includes the following scope:

- The existing combination emergency eyewash and shower in the Sodium Hypochlorite Area will remain.
- A second new emergency eyewash and shower will be added to the Sodium Hypochlorite Area.
- The existing emergency eyewash/shower is piped to cold water line only, which is not in compliance with the tepid water requirement. Hot water supply and return piping will be extended from the Headworks room to the new fixtures. Thermostatic mixing valves will be provided for precise temperature control at each new fixture.

- The existing water heater does not have the capacity to provide tempered water to the showers. A new electric water heater is shown and sized on the drawings to provide tempered water to all new and existing fixtures.
- Alarm stations with flow switches will be provided.

## 15.4 Instrumentation

Instrumentation work is limited to integrating the new Eye wash flow sensors into the existing Ovation system.

## 15.5 Electrical

Emergency Eyewash new flow switches monitoring will be wired to existing ovation cabinet. The wiring for emergency eyewash will conform to **Subsection 6.2**.

# 16. St Aubin

## 16.1 Process Mechanical

The St. Aubin SDF is located in Detroit, southwest of the intersection between Atwater Street and DuBois Street. This facility has a tributary area of 1,327 acres and intercepts wet weather flows from the former Chene (B011), DuBois (B012), and St. Aubin (B013) outfalls for preliminary treatment. Dry weather flow (DWF) from the St. Aubin, Dubois, and Chene sewers is directed to the Detroit River Interceptor (DRI) through the VR-18, VR-19, and VR-20 regulator gates. During wet weather the three regulator gates close to divert flow to the St. Aubin SDF for screening and disinfection prior to discharging to the Detroit River. After the wet weather event, the captured volume is drained back into the St. Aubin SDF dewatering pump station which conveys the stored combined sewage to the DRI. When total facility flow exceeds 250 CFS, the Dubois inflatable dam deflates to allow untreated discharge from the Dubois outfall to discharge to the Detroit River. A plan view of St. Aubin SDF's below-grade sewer system layout is provided in **Figure 16-1**.

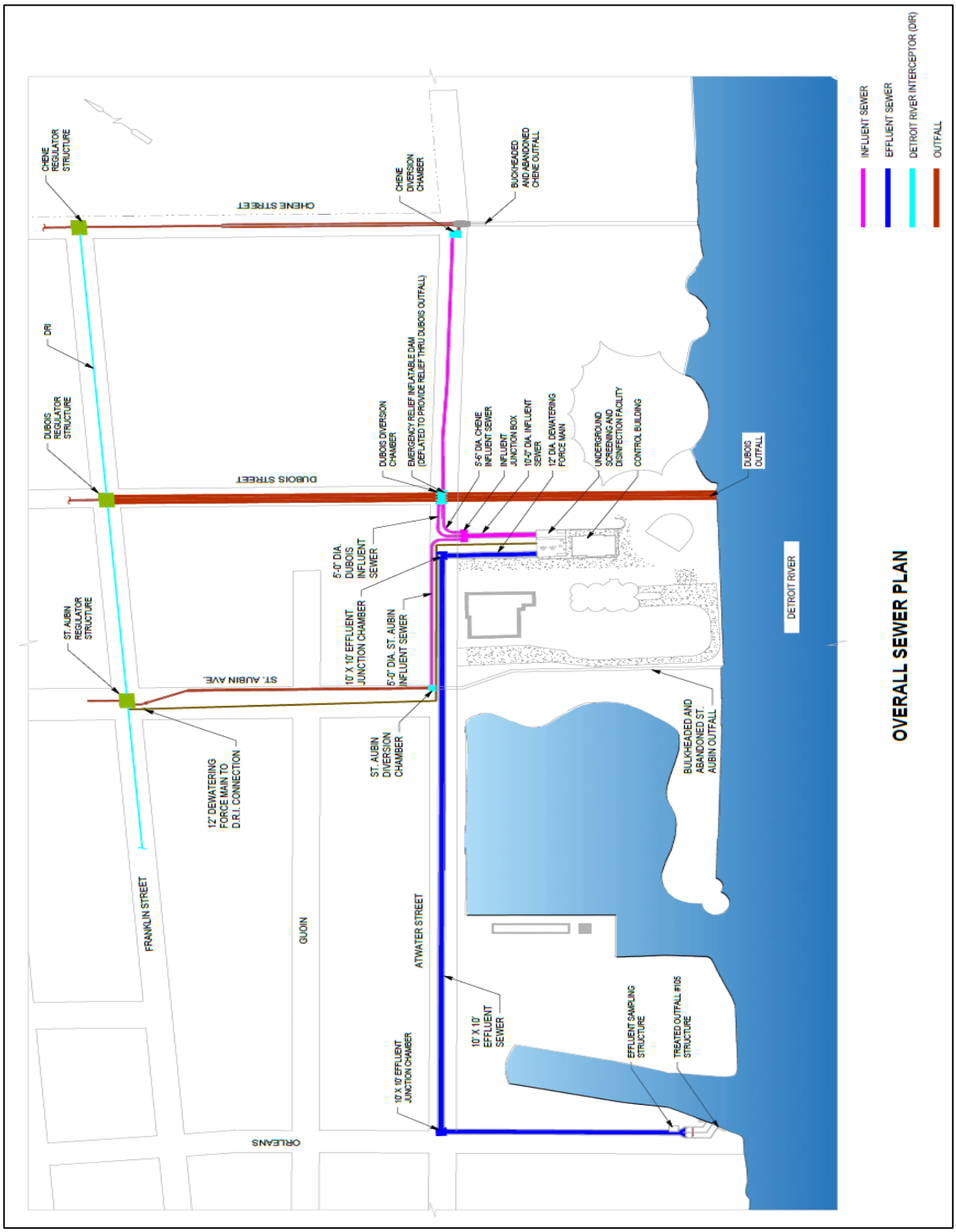



**Figure 16-1 St. Aubin SDF Overall Sewer Plan**

### 16.1.1 Screenings Removal

#### *16.1.1.1 Existing Conditions*

The Romag screen system currently installed at St. Aubin SDF is unique because the equipment is installed within a tank instead of a collection system with the innate crossflow. The facility was originally designed for the dewatering pump station to operate in parallel with the screens during wet weather events to induce a crossflow and include a screenings intake on one end of the screen. Material captured on the bar screens would be raked towards one of the two 10-inch diameter concentrated screenings pipes which direct material (and a portion of the wet weather flow) to the dewatering pump station. The pump station then conveys the screenings to the DRI through a 12-inch force main, for ultimate treatment at the GLWA Water Resource Recovery Facility (WRRF). However, per the current Wet Weather Operational Plan, the dewatering pumps do not currently operate during wet weather events. A plan and section view of the underground screening and disinfection mixing chamber process areas is shown in **Figures 16-2** and **16-3**, respectively.

**Table 16-1** below provides a summary of the existing screens design criteria.

**Table 16-1: Existing Screen Description**

| Parameter | Value |
|---|---|
| Peak Capacity (Total) | 250 CFS |
| No. of Screens | 2 |
| Manufacturer / Model | SAVECO / ROMAG RSW-K |
| Screen Type | Horizontal Bar Screens, Mechanically Cleaned |
| Opening Size | 4 mm |
| Height | 3 ft 7 in |
| Width (Each) | 22 ft |
| Top of Screens (City of Detroit Datum) | Elevation 99.5 ft |
| Screen Cleaning Mechanism | Mechanical Comb |
| Screenings Removal | Pumped To WRRF via Detroit River Interceptor (DRI) |
| No. of Pumps | 3 |
| Pump Capacity (Each) | 1,100 GPM |

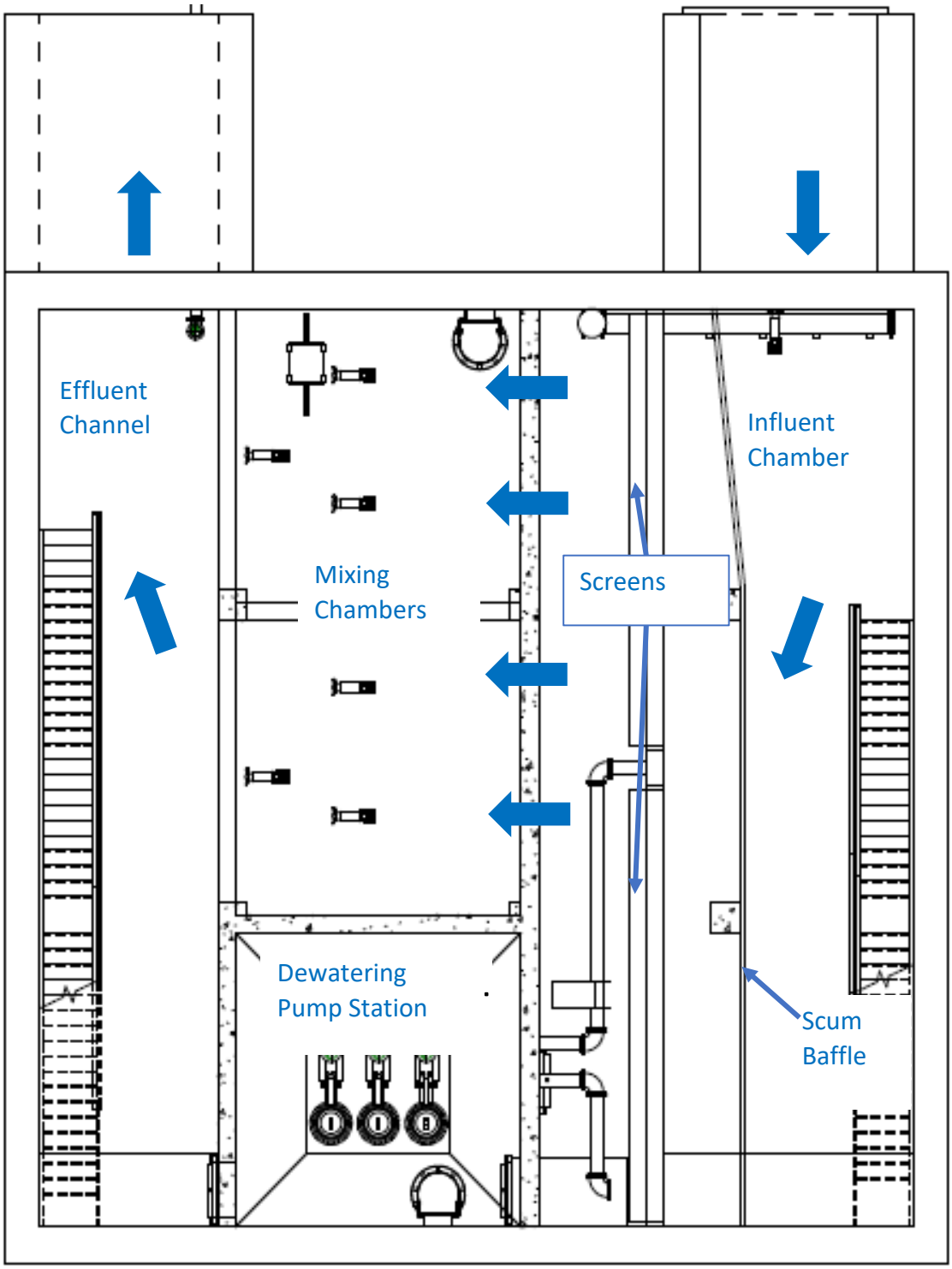



**Figure 16-2 Plan View of St. Aubin SDF Process Areas**

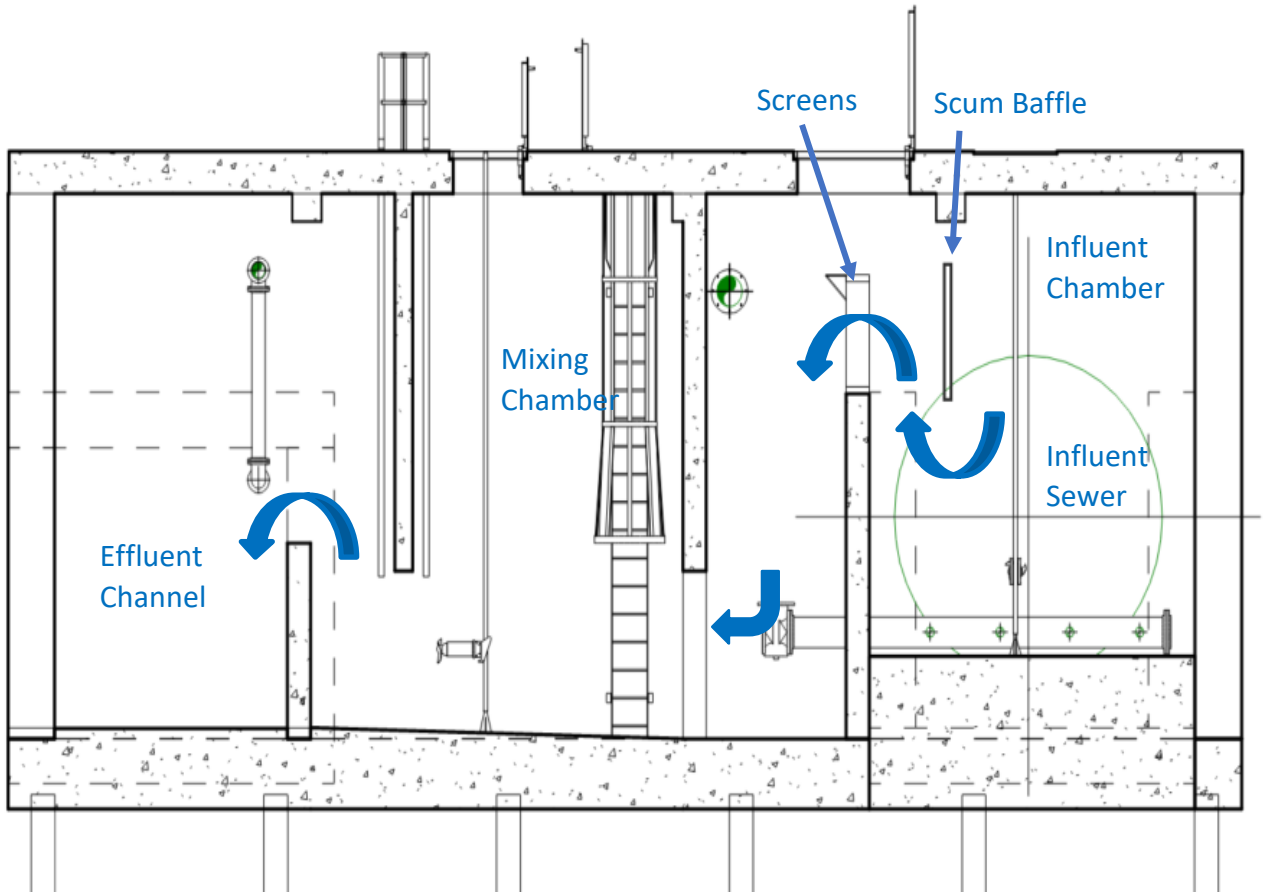



**Figure 16-3 Section View of St. Aubin SDF Process Areas**

Historically, the existing screen technology removal efficiency has been inadequate to meet the operational needs of the facility. Based on input from the manufacturer, the minimum recommended crossflow required for proper screen operation is 10% of screen capacity (i.e., 25 CFS for St. Aubin SDF screens). Therefore, the screen performance is likely the result of insufficient crossflow. This results in material accumulating in front of the screen and decreased operational efficiency. The lack of dewatering pump operation during wet weather events further compounds this situation.

Per the DLZ 20% Basis of Design Report dated May 2021, historically the screens have had failures and faults of the raking mechanism that contributes to the decreased screening efficiency due to the insufficient raking of the screenings to the side of the screen during the event. The faults have been due to a combination of issues related to the hydraulic power pack units approaching the end of their useful life, problematic mechanical valves, and the faulting and error logic has not been updated since the original installation.

Another operational concern is that debris accumulates on the back side of the screens between the bars and weir plate as shown in **Figure 16-4**. The debris can interfere with movement of the rake arm mechanism and accelerate screening component wear, resulting in reduced equipment life along with

increased downtime. There is currently no system or mechanism installed for clearing the debris other than manual cleaning.

**Figure 16-4 Photo of Debris Accumulation Between Steel Weir Plate and Back of Screens**

#### *16.1.1.2 Recommendation*

Multiple screen improvement alternatives were considered during the study phase of the project and ranged in scope from rehabilitation of the existing Romag screens to comprehensive facility upgrades to retrofit perforated plate screening technology. Based on the capital and life-cycle cost of the perforated plate screen alternatives, rehabilitation of the existing Romag screens is recommended. Key elements of the rehabilitation will include replacement of worn and damaged mechanical components, installation of post event screen washdown system to clear the base of the weir of grit and sediment and provide space for grit to flow through the overflow control weir for proper drainage.

The configuration of the weir downstream of the screens allows for the accumulation of fine solids. To prevent these solids from being a potential cause of comb binding, it is necessary to add a sprayer system to flush the fine solids back through the screen at the end of a screening event. The sprayer system would involve installing new piping from the existing non-potable water line in the yard between the Control Building and below grade Influent Chamber. The pipe will branch into four headers that will feed washdown water to a series of spray nozzles mounted above the weir on the back side of the screens for each of the four (4) proposed washdown zones. Following wet weather operation, as the water level within the influent chamber begins dropping as part of the dewatering process, the screen washdown

system will be activated automatically. Electric actuated valves on each of the four zones will be operated sequentially to wash down the backside of the screen. The washwater operating duration will initially be set to 5-minutes (adjustable parameter) per zone. A summary of screen washdown system design criteria can be found in **Table 16-2**.

**Table 16-2: Screen Washdown System Design Criteria**

| Parameter | Value |
|---|---|
| **No. Washdown Zones** | 4 (2 per screen) |
| **Flow Capacity per Zone** | 100 gpm @40 psi |
| **Pipe Diameter** | 2-inch |
| **Nozzle Type** | Flat Fan, 45-60 degree |
| **Control** | Automatic / Remote Actuated Valves |
| **Control Scheme** | Post Event, timed sequential zone washdown |

Based on a prior inspection conducted by the then-authorized screen supplier representative, the recommended screen improvements consist of upgrading the control system to include Romag / Saveco's new screen sequencing with jam logic, short-stroke logic, and maximum setting for hydraulic pressure on outgoing and return comb strokes. These measures will help ensure complete cleaning of the screens and enable partial cleaning to keep at least part of the screen cleaned in the event of a jam. Upgrading the hydraulic power packs to Romag / Saveco's latest edition which use electric solenoids that are more operator-friendly than the existing mechanical valves, is also recommended. Maintaining select spare parts in stock such as the hydraulic cylinder and replacement combs is recommended to contend with the long lead times associated with acquiring these key components.

The existing screens will be rehabilitated by addressing known issues with the rakes and incorporate a post-event washdown system. This will improve the existing operation with a relatively simple construction sequence with a low OPCC and life-cycle cost. The details of rehabilitation of the equipment components will be assessed and validated following an on-site inspection by a SAVECO Technician during the detailed design stage, currently scheduled for mid-September 2023.

### 16.1.2 Sodium Hypochlorite Storage Tanks

#### *16.1.2.1 Existing Disinfection System*

A summary of the facility's original disinfection system design criteria as provided in the basis of design document from 1998 is shown in **Table 16-3**. A summary of the existing sodium hypochlorite feed pump design criteria is presented in

**Sodium** hypochlorite is typically delivered in bulk at 12.5% strength and the strength is checked upon deliver and on a monthly basis and recorded. Current GLWA protocol requires that once sodium hypochlorite strength degrades to 5% GLWA reorders chemical and either dumps or adds new hypo with the degraded depending on remaining quantity in storage tank.

Table 16-4. A process flow diagram of St. Aubin's sodium

hypochlorite feed pumps is provided in **Figure 16-5**.

**Table 16-3: Existing Disinfection System Design Criteria Summary**

| Parameter | Value |
|---|---|
| **Peak Flow Rate, cfs** | 250 |
| **Design Sodium Hypochlorite Dose (as chlorine), mg/L** | 10 |
| **Peak Sodium Hypochlorite Dose (as chlorine), mg/L** | 38 |
| **Sodium Hypochlorite Strength (range), %** | 5-15 |
| **Storage Tank Qty. / Total Volume, gals** | 2 / 11,788 |
| **Peak Sodium Hypochlorite Feed Rate @ 10% hypo strength, gpm** | 42.8 |
| **Peak Sodium Hypochlorite Feed Rate @ 8% hypo strength, gpm** | 53.3 |

Sodium hypochlorite is typically delivered in bulk at 12.5% strength and the strength is checked upon deliver and on a monthly basis and recorded. Current GLWA protocol requires that once sodium hypochlorite strength degrades to 5% GLWA reorders chemical and either dumps or adds new hypo with the degraded depending on remaining quantity in storage tank.

**Table 16-4: Sodium Hypochlorite Feed Pump Design Criteria Summary**

| Parameter | Value |
|---|---|
| **Pump Type (All Feed Pumps)** | Hydraulically Actuated Diaphragm |
| **No. of High Flowrate Feed Pumps** | 3 (2 Duty + 1 Standby Unit) |
| **High Flowrate Feed Pump Capacity, gpm** | 22.8 |
| **No. of Low Flowrate Feed Pumps** | 2 (1 Duty + 1 Standby Unit) |
| **Low Flowrate Feed Pump Capacity, gpm** | 7.6 |

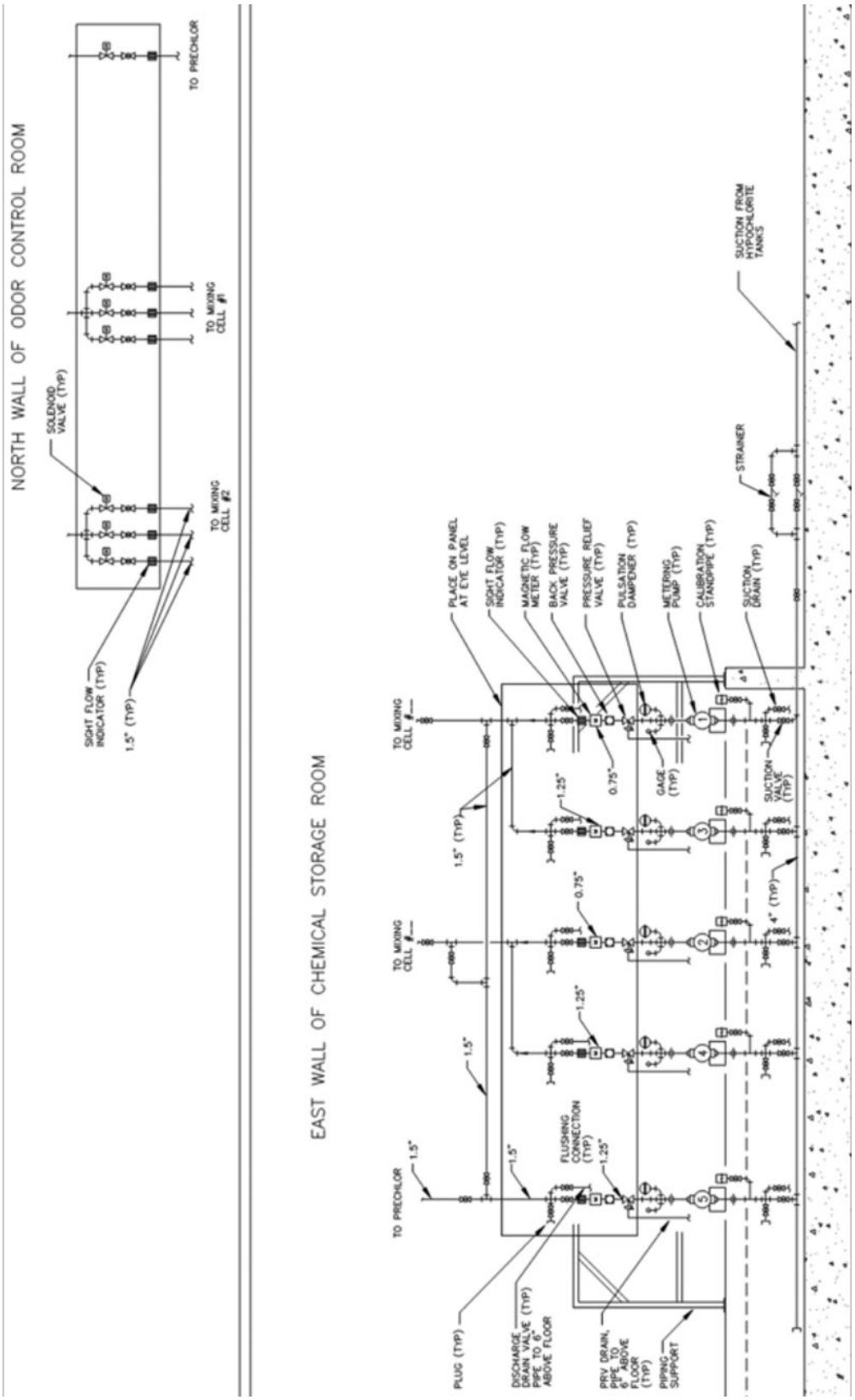



**Figure 16-5 Sodium Hypochlorite Feed Pump Process Flow Diagram**

#### *16.1.2.2 Chemical Storage Tanks*

Currently, two (2) Fiberglass Reinforced Plastic (FRP) chemical storage tanks are used to store sodium hypochlorite on site. Each tank is 10 feet in diameter and has a nominal capacity of 5,894 gallons. The tanks were installed in 2000, when the St. Aubin facility was originally constructed. Two previous tank assessments were conducted in 2019 by Technical Service Professionals (TSP), LLC and GHD. Based on these inspections, the existing chemical storage tanks have reached their expected service life of approximately 20 years and require lining or replacement to provide continued reliable service. As part of the project's study phase, Hazen evaluated storage tank replacement versus tank re-lining options based on both cost and non-cost factors. While tank re-lining offers the benefit of lower capital cost, it also requires a longer construction duration along with a product that has a shorter life expectancy at the completion of construction. Therefore, tank replacement is recommended. Additionally, the new tanks will include railings on top along with ladders to provide safe access for maintenance and operation. To aid in tank replacement, the exterior masonry wall of the existing building was constructed with a control joint to limit the damage to the wall. This wall will be removed during construction to facilitate tank replacement then reconstructed upon installation of both new chemical storage tanks.

#### *16.1.2.3 Chemical Storage Tank Sizing*

Sodium hypochlorite (NaOCl) is currently used as the disinfection agent at the St. Aubin SDF. Sodium hypochlorite is typically available in solutions ranging from 5 to 15 percent by weight of available chlorine. The current supplier for St. Aubin provides sodium hypochlorite as a 12.5 percent solution. Sodium hypochlorite solutions degrade over time, which results in a loss of available chlorine; therefore, a concentration of 5 percent by weight of available chlorine was assumed.

Overflow events occurring from January 2019 to April 2023 and the design storms determined for the Regional Wastewater Collection System (RWCS) model as part of the Wastewater Master Plan were reviewed for the sizing of the chemical storage tanks. **Figure 16-6** summarizes the overflow event volumes evaluated to determine the appropriate tank sizing. One observation that should be noted is that the 10-year, 24-hour storm event is larger than any overflow event observed at this facility in recent history including the June 2021 event that resulted in historical flooding in Detroit.

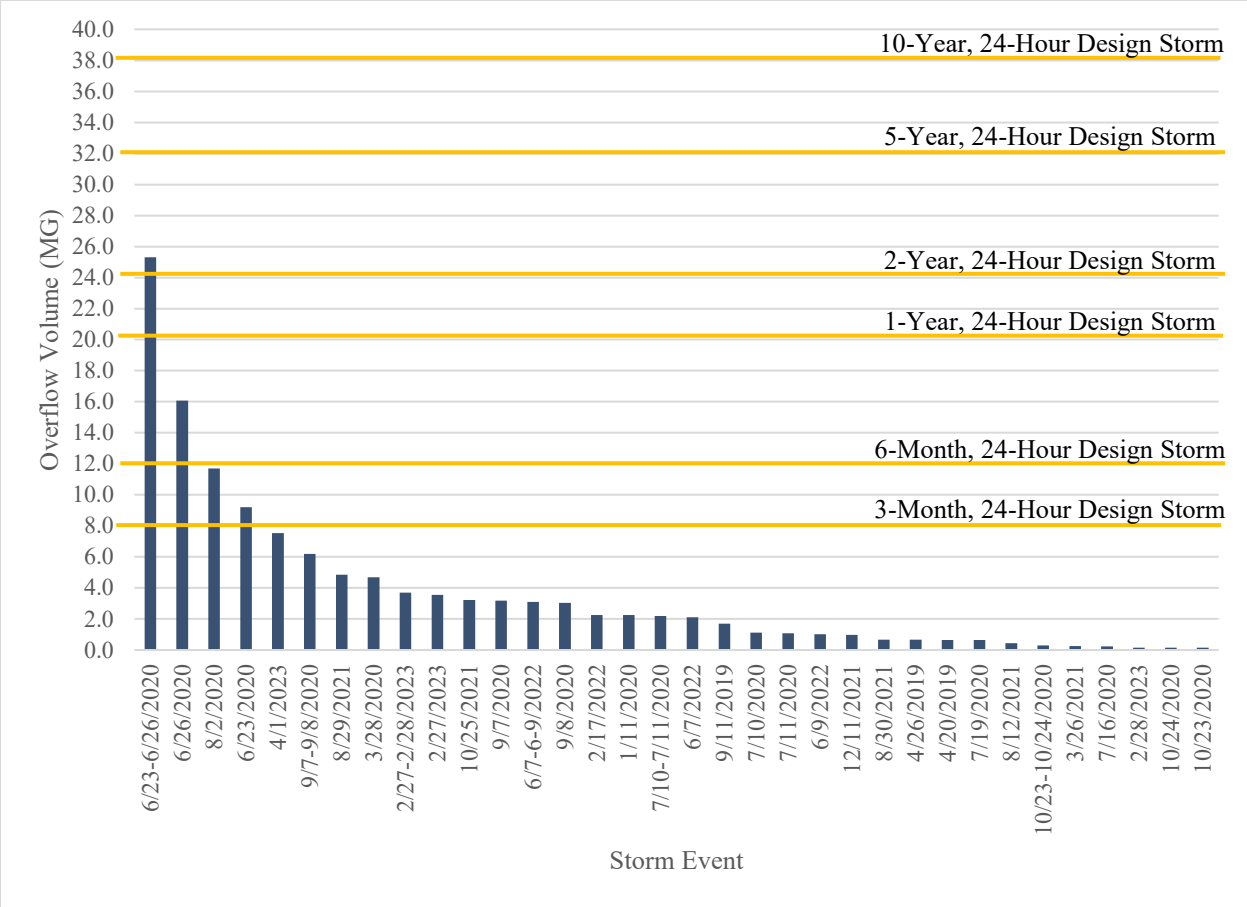



**Figure 16-6 St. Aubin SDF Overflow Event Volumes**

#### *16.1.2.4 Recommendation*

Chemical storage volumes are based on the influent volumes to be treated for the 10-year, 24-hour design storm (largest typical year event assumed to occur for a total volume of 38 MG). The two existing tanks will be replaced with two FRP tanks of equivalent size as stated in **Table 16-5**. The total storage capacity will be sized based on an average dose (as chlorine) of 15 mg/L.

**Table 16-5. Sodium Hypochlorite Storage Tank Design Parameters**

| Parameter | Value |
|---|---|
| **Sodium Hypochlorite Strength, %** | 5 |
| **Proposed Storage Required, gallons** | 10,540 gal |
| **No. of Storage Tanks (Total)** | 2 |
| **Volume per Storage Tank, gallons** | 5,270 gal |
| **Proposed Tank Size (D x H)** | 10 ft x 10 ft |

### 16.1.3 Chemical Feed Pumps

The sodium hypochlorite feed system design criteria are presented in **Table 16-6**.

**Table 16-6. Sodium Hypochlorite Feed Pump Design Parameters**

| Parameter | Value |
|---|---|
| **Facility Peak CSO Flow Rate, cfs** | 250 |
| **Peak Dosage (as Chlorine), mg/L** | 22.5 |
| **Design Dosage (as Chlorine), mg/L** | 15 |
| **Sodium Hypochlorite Strength (range), %** | 5 – 12.5 |
| **Sodium Hypochlorite Effective Density (range), lb Cl/gal** | 0.45 – 1.25 |
| **No. of Feed Pumps** | One Duty + One Standby |
| **Feed Pump Capacity @ 5% hypo strength, gpm / unit** | 54 gpm |

Magnetic drive centrifugal pumps with non-metallic components and seal-less construction have a long history in chemical transfer applications. However, this pump type is generally not used on chemical metering applications because flow can vary significantly with small changes in differential pressure. Positive displacement type pumps typically offer a wider operating range with the ability to provide low feed rates. However, centrifugal pumps are capable of delivering higher feed rates than positive displacement pumps of comparable size and have been successfully utilized in CSO disinfection applications such as GLWA's Conner Creek CSO Facility. In this application at St. Aubin SDF, use of centrifugal pumps for chemical feed applications would require the use of modulating valves to regulate feed rates to the chemical mixing zones while maintaining pump operation near the best efficiency point.

To achieve the required minimum feed rates utilizing centrifugal pumps (compared to positive displacement pumps in similar applications), the recommended control strategy utilizes constant speed pump operation with modulating control valves to vary the flow to each mixing zone, as opposed to varying pump output with the use of a variable frequency drive (VFD). When the pump(s) are initially started, modulating control valve, Sodium Hypochlorite Recirculation Valve (SHCRV), is in the fully open position, allowing flow to be returned to the storage tanks. To meet the required dose set point, modulating control valve(s), Sodium Hypochlorite Feed Valve (SHCFV), will be opened via Ovation. If SHCFV is fully open and additional flow is required to meet the dose set point, SHCRV will be modulated close to direct more flow towards the mixing zones.

#### *16.1.3.1 Recommendation*

While the peristaltic pump technology was recommended in the prior BODR developed by DLZ, Hazen recommends the use of the mag-drive centrifugal pumps at St. Aubin SDF to meet GLWA's desire to standardize equipment and control strategies across all nine CSO facilities. Additionally, the use of mag-drive centrifugal pumps results in a lower number of feed pumps to operate and maintain, while eliminating the need for VFD drives, which results in a lower overall lifecycle cost compared to peristaltic pump technology.

For sodium hypochlorite, vented ball valves will be provided for all isolation valve locations, and diaphragm valves will be designed for modulating valve flow control applications. Conventional ball valves should not be used for sodium hypochlorite since they can rupture from pressure created from off-gassing (as sodium hypochlorite degrades, it off-gasses oxygen which can accumulate inside the port of a non-vented closed ball valve and rupture the ball valve).

To facilitate future pump maintenance, a monorail beam with a ¼ ton capacity electric chain hoist and push operated trolley will be installed above the new pump skids. Given the corrosive environment from the sodium hypochlorite storage tanks, all monorail material including connection hardware will be A316 stainless steel. The monorail will be situated such that the pumps can be picked up, moved, and set down on a cart on the FRP platform located in the northeast corner of the room and removed through the existing doorway. Removable FRP railing will be provided along the south edge of the existing platform.

### 16.1.4 Mixing

The existing mixing system consists of seven (7) induction mixers; one (1) in the Influent Chamber (pre-chlorination) and three (3) in each of the two Mixing Chambers. The pre-chlorination mixer is oriented in the co-current configuration to protect the impeller from ragging. **Figure 16-7** shows the existing mixer system in plan view. Design criteria for the existing system are established in **Table 16-7**.

Effective sodium hypochlorite mixing is required to protect the water quality of the Detroit River by ensuring adequate disinfection of all water discharged. During the study phase of the project Hazen conducted detailed analysis of the existing mixing system with a focus on optimization, with the goal of achieving a reduction in the number of assets and/or the total installed horsepower. It should be noted that GasMastrrr mixer products were used as the basis of the evaluation, due to other mixer manufacturer's stated challenges with obtaining explosion proof drive motors for this application.

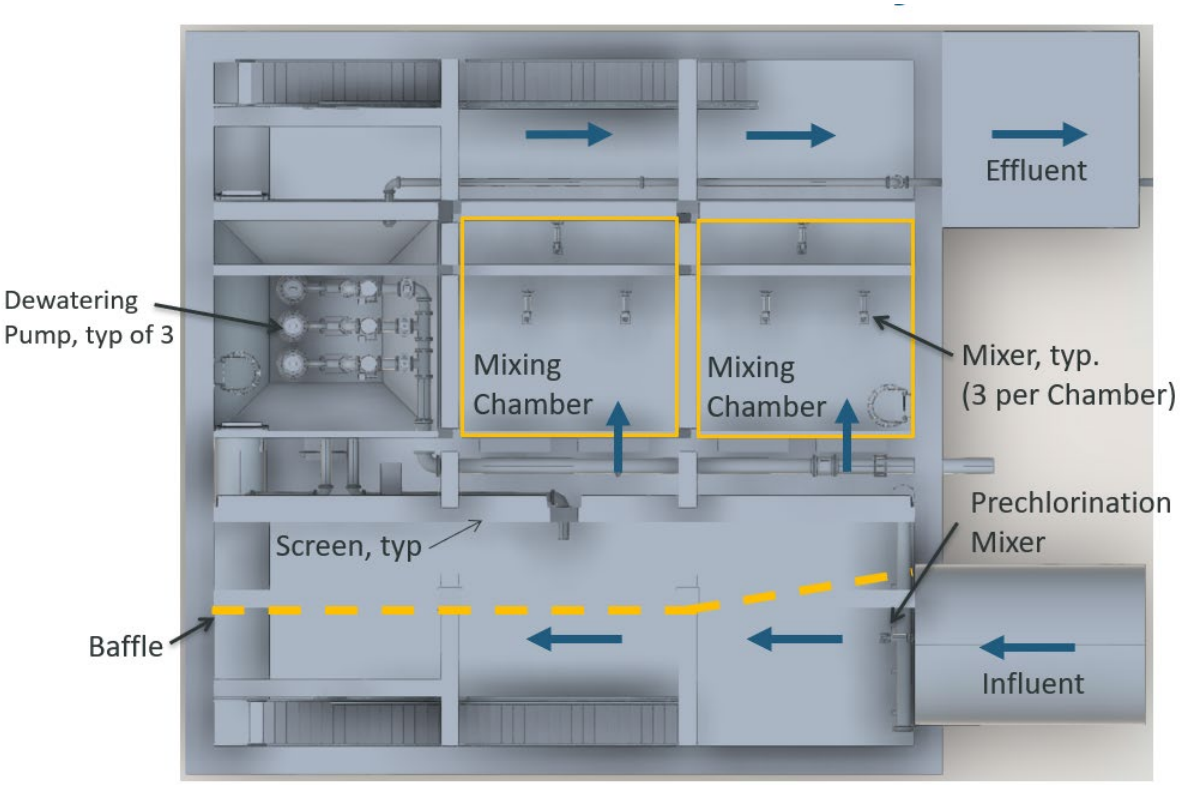



**Figure 16-7 Existing System Plan View**

**Table 16-7: Existing System Design Criteria**

| Parameter | Value |
|---|---|
| **Peak Design Flow** | 250 cfs |
| **Pre-Chlor Mixer Motor** | 7.5 HP |
| **Pre-Chlor Mixer Type** | Vacuum, Axial Flow |
| **Pre-Chlor Minimum Mean Mixing Velocity Gradient, G (1/sec)** | 500/sec |
| **No. of Mixing Chambers** | 2 |
| **No. of Mixers per Chamber** | 3 |
| **Mixing Chamber Detention Time** | 10 seconds |
| **Detention Time in Mixer Zone of Influence** | 2 seconds |
| **Mixer Type** | Vacuum, Axial Flow |
| **Mixer Motor** | 7.5 HP |
| **Mean Velocity Gradient per Chamber, G (1/sec)** | 1 mixer: 650/sec<br>2 mixers: 1000/sec<br>3 mixers: 1650/sec |

#### *16.1.4.1 Pre-Chlorination Mixer*

For the pre-chlorination mixer location *upstream of the screens,* GasMastrrr has a non-vacuum series of mixers, the NV line, which discharge chemical radially rather than axially. The flow pattern for the NV mixer is shown in **Figure 16-8**. The NV mixer impeller is recessed with only three small openings, reducing the surface area most susceptible to ragging on the mixer.

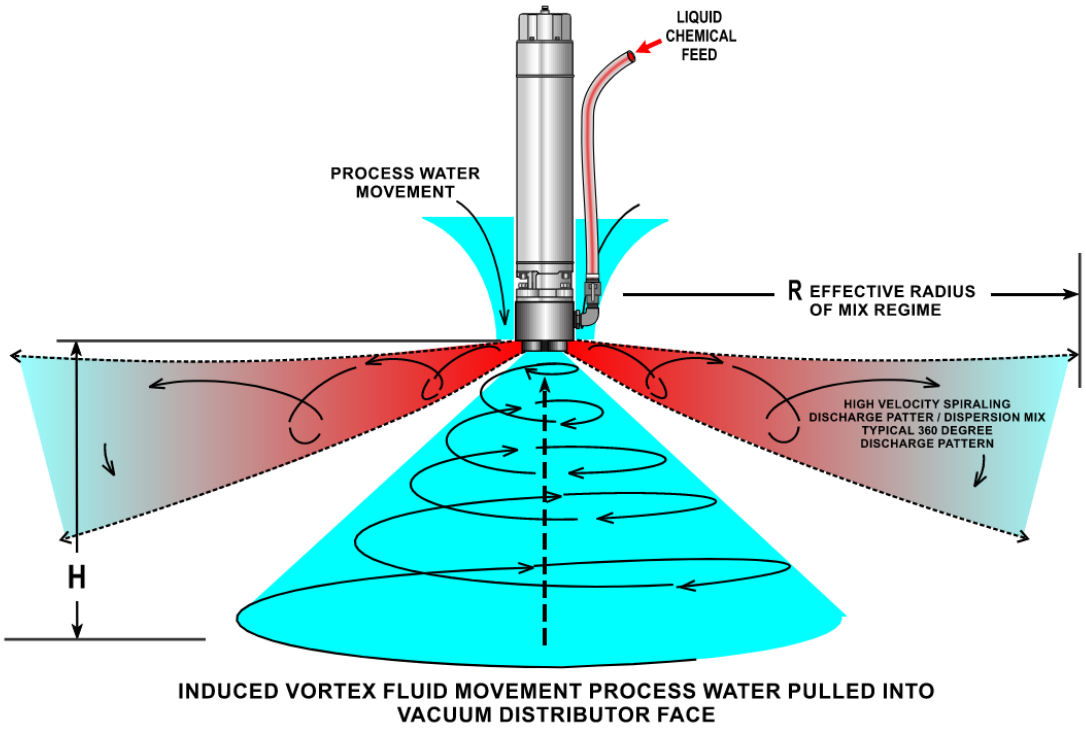



**Figure 16-8 Conceptual Image of Radial Discharge Mixer (courtesy of GasMastrrr)**

For the pre-chlorination location, the preliminary recommendation is a 7.5-HP GasMastrrr NV model mixer with radial discharge pattern, as summarized in **Table 16-8**. This mixer technology will be piloted during the design phase of the project to validate performance and anticipated reduction in O&M effort related to this mixer, prior to finalizing the mixer technology selection.

**Table 16-8: Disinfection Chemical Pre-Chlorination Design Criteria Summary**

| Parameter | Proposed System |
|---|---|
| **No. of Prechlor Mixers** | 1 |
| **Pre-Chlor Mixer Type** | Non-vacuum, Radial Flow |
| **Pre-Chlor Mixer Motor** | 7.5 HP |

Maintaining the co-current orientation of this particular mixer is recommended to prevent ragging and blunt force damage from large objects in the sewer. Protection around the mixer such as a rigid cage is unlikely to reduce maintenance issues and may hamper performance. A cage is therefore not recommended in this application.

#### *16.1.4.2 Mixing Chamber Optimization*

In the mixing chambers, replacing the three mixers per chamber with new axial, non-vacuum mixers at a lower horsepower (5 HP / each), is recommended for St Aubin SDF. The lower horsepower alternative shows comparable performance to the existing 7.5-HP units. The overall power required will be reduced from 22.5 HP per chamber to 15 HP per chamber. The location and arrangement of the mixers in the chambers will remain the same as the existing mixers as seen in **Figure 16-9** avoiding the structural modifications associated with the other mixing chamber alternatives considered, simplifying construction sequencing and reducing construction costs. The CFD results of the proposed improvements are illustrated in **Figure 16-10**.

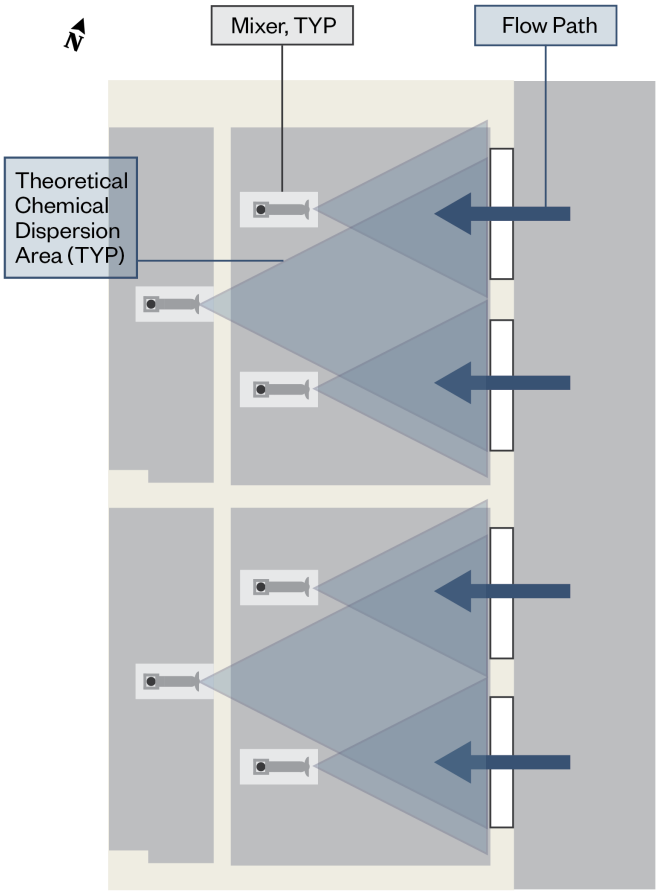



**Figure 16-9 Proposed Mixer Configuration**

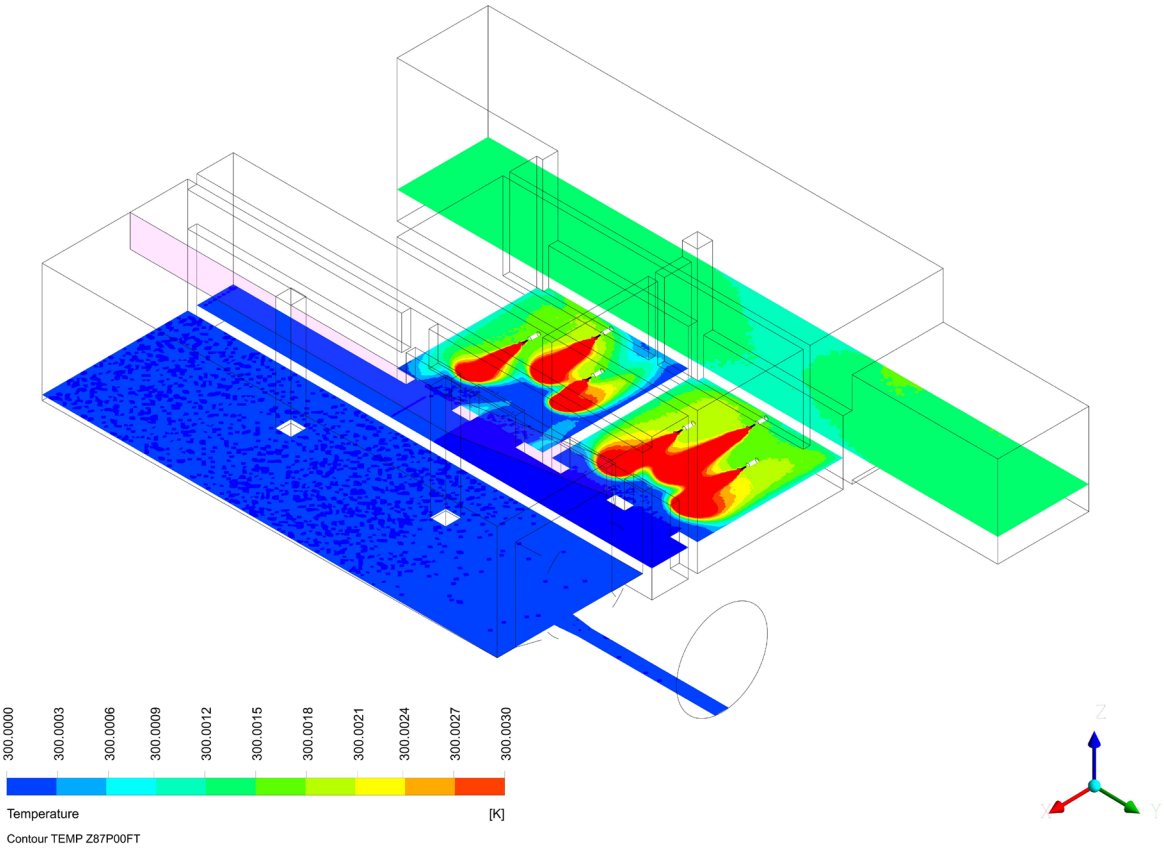



**Figure 16-10 CFD Results of Proposed Improvements**

A summary of the design criteria for the St. Aubin SDF disinfection chemical mixing is shown in **Table 16-9**.

**Table 16-9: Disinfection Chemical Mixing Chamber Design Criteria Summary**

| Parameter | Proposed System |
|---|---|
| **No. of Mixing Chambers** | 2 |
| **No. of Mixers per Chamber** | 3 |
| **Mixing Chamber Detention Time** | 10 seconds |
| **Detention Time in Mixer Zone of Influence** | 3 seconds |
| **Mixer Type** | Non-vacuum, Axial Flow |
| **Mixer Motor** | 5.0 HP |
| **Mean Velocity Gradient per Chamber, G (1/sec)** | 1000/sec |

### 16.1.5 Disinfection Control Strategy

Based on the NPDES permit requirements, the operational goals for total residual chlorine (TRC) at the discharge location are as follows:

- 1.5 mg/L TRC as an event average value and
- 2.0 mg/L (November – April) or 3.0 mg/L (May – October) TRC as an event instantaneous maximum value.

#### *16.1.5.1 Control Modes*

Three modes will be provided for automatic control of chlorine dosing during a wet weather event and are summarized in **Table 16-10**.

TRC Mode approximates how the facility is operated now in manual mode, in which operators adjust the chlorine feed rate to achieve a desired TRC in the mixing chambers while not exceeding the goals for maximum TRC at the discharge structure. In TRC Mode, the chemical feed rate will be controlled automatically and in proportion to facility flow to achieve the target mixing chamber TRC selected by the operators. TRC Mode requires an online TRC analyzer at the mixing chambers and requires operators to adjust the target mixing chamber TRC value based on monitoring the discharge TRC value.

In CT Mode, the facility control program determines the target mixing chamber TRC based on the CT goal for the facility, influent flow rate, and the TRC value at the discharge, within the limits of acceptable TRC at both locations established by GLWA. CT Mode requires two online TRC analyzers, one at the mixing chambers and one at the discharge structure. CT Mode will calculate CT based on the average of the TRC values at these locations. When high flows and short contact times prevent the target CT value from being achieved, CT Mode will function similar to TRC Mode, with the exception that the control program will adjust the mixing chamber TRC target downwards automatically if the discharge TRC value exceeds its maximum.

Dose Mode is provided as an alternative to TRC Mode and CT Mode and is intended to be used only if the online TRC analyzer at the mixing chamber is not in service. Dose Mode is an improvement over full manual control because the chemical feed rate will be flow paced with the facility influent flow based on the dose target input by the operator. Dose Mode will require frequent manual checks of TRC in the mixing chamber and discharge structure and adjustments to the target dose during events.

**Table 16-10: Disinfection Control Strategy Modes**

| Control Mode | Control Action |
|---|---|
| **TRC Mode** | Set the desired mixing chamber TRC value, such as 4 mg/L. |
| | Update the target mixing chamber TRC as needed during the event, or program different TRC targets for different times after startup. |
| **CT Mode** | Input desired CT value (or use default such as 150 mg-min/L). This value can be adjusted with password protection by experienced |

| Control Mode | Control Action |
|---|---|
| | personnel. Operators would not adjust the CT target value during an event. |
| | Set limits for allowable TRC values at mixing chamber (minimum and maximum) and at discharge (maximum). Operators can adjust allowable TRC values during an event. |
| | Controller will adjust dose to achieve the mixing chamber TRC that provides the desired CT value at current flow rate and current discharge TRC, except that the mixing chamber and discharge TRC values will not be allowed to exceed the maximums set by the operator. |
| **Dose Mode** | Operator enters desired dose such as 20 mg/L. |
| | Operator adjusts desired dose as the event continues based on initial TRC observed. |
| | Requires regular operator checks of initial TRC and adjustments to target dose. |
| | This mode can be used if the TRC monitor is out of service. |

### 16.1.6 Sample Pumps

With the proposed addition of a TRC analyzer at St. Aubin, a filtration system is recommended to reduce the cleaning frequency required on the TRC analyzer. For automatic self-flushing capability on a filter with process water, a minimum of 40 psi is required (value based on Amiad TAF 50-micron unit). Currently one sample pump is installed in the North mixing chamber at the St. Aubin SDF to support disinfection process control. The existing sample pump is rated for 50 gpm at 50 feet TDH. With static head and friction headloss, the pressure at the Control Building's lab is approximately 5-10 psi, which is too low for most filtration systems with 50–100-micron openings. Sample pump system design criteria are presented in **Table 16-11**.

**Table 16-11: Underground Utility Sample Pump Design Criteria**

| Parameter | Value |
|---|---|
| **Sample pump flow rate** | 50 gpm |
| **Elevation at Sample Pump (Detroit Datum)** | 95.00 ft |
| **Elevation at Lab (Detroit Datum)** | 110.00 ft |
| **Pressure required for Amiad TAF 50-micron Filter** | 40 psi |
| **Headloss in 2" PVC from Sample Pump to Lab** | 6 psi |
| **TDH required for sample pump (minimum)** | 57 psi |
| **No. of Sample Pumps** | Two<br>(One Duty at Underground Facility, One Duty at Outfall) |

In addition to the sample pump in the underground facility at St. Aubin, a second sample pump at the outfall will need to be similarly replaced to provide the required pressure for the filter upstream of a new TRC analyzer. The static head and friction losses for the outfall sample pump are lower than the

underground facility sample pump. Although the outfall pump has a lower total dynamic head (TDH) requirement, since the TRC analyzer has a 5-150 psi influent pressure range, installing the same sample pump at both locations is acceptable and recommended for standardizing equipment across the facility.

#### *16.1.6.1 TRC Analyzers*

The two types of TRC analyzers available are colorimetric (reagent based) and amperometric (reagentless), which are compared in **Table 16-12**. GLWA has previously piloted both analyzer technologies at their CSO facilities with varying degrees of success. According to GLWA staff, the main challenge experienced during the TRC analyzer pilots was related to the filtration system upstream of the unit. Specifically, low pressure from the sample pumps impacted the filters performance related to filter media cleaning.

**Table 16-12: TRC Analyzer Technology Comparison**

| Considerations | Colorimetric (Reagent) | Amperometric (Reagentless) |
|---|---|---|
| **Measurement Principle** | • Chemical reaction that produces a color change.<br>• Color intensity is proportional to the chlorine concentration. | • Electrode the generates an electrical current in the presence of chlorine.<br>• Magnitude of the current is proportional to the chlorine concentration. |
| **Measuring Range** | • Concentrations as low as 0.01 ppm<br>• Up to 10 ppm<br>• HF Scientific offers 15ppm | • Concentrations as low as 0.05 ppm<br>• Up to 20ppm |
| **Accuracy** | • Typical ±5%<br>• High accuracy ±2%<br>• Accuracy decreases with increased measurement range<br>• 10ppm+ @ ±10% | • Typical ±5%<br>• Dependent on pH levels<br>• Higher pH – lower accuracy |
| **Maintenance Requirements** | • Frequent calibration<br>• Reagent replacement/refill | • Periodic cleaning of the electrodes |
| **Interferences** | • Other chemicals that may cause color changes. | • Dissolved solids<br>• Oxidizing agents |
| **Common Applications** | • Spot checking and process control | • Continuous monitoring in water distribution systems |
| **Other Considerations** | • Cycle time: 60 seconds and higher | • Membrane life shortened if allowed to dry out<br>• Reading stabilization time after calibration or high concentration readings |
| **Manufacturers** | • SWAN AMI Codes-II TC<br>• HF Scientific CLX-XT2<br>• HACH CL17sc | • HACH CLF10sc |

Colorimetric TRC analyzers are recommended for monitoring both directly downstream of the mixing chambers and at the outfall. A colorimetric style TRC analyzer is recommended due to the potential that the amperometric technology analyzers could become saturated during usage due to the higher dose rates

required to disinfect CSO flows and are therefore considered a less reliable alternative for this application. GLWA currently plans to pilot additional colorimetric type TRC analyzers as well as filter technologies to determine if one manufacturer's equipment is preferred over the others based on reliability and ease of O&M. **Table 16-13** indicates the requirements for the TRC analyzer to be piloted.

**Table 16-13: TRC Analyzer Requirements**

| Parameter | Value |
|---|---|
| **Inlet Pressure Range (TRC Analyzer)** | 5 – 150 psi |
| **Inlet Pressure with Amiad Filter (Minimum)** | 45 psi |
| **Inlet Tube Diameter** | ¼" NPT |
| **Desired Flow Range** | 200 mL/min (0.05 gpm)<br>Flow rate set to fill cuvette to correct level every time. |
| **Filtration (micron)** | CLX filter – 60 micron<br>Additional filtration reduces frequency of cleaning basket filter |

In addition to piloting the TRC analyzers and filter technology during design, additional sampling at St. Aubin to confirm the TRC sample pump is receiving a well-mixed and representative sample is recommended. The location of the new sample pump in the effluent conduit will be confirmed with jar testing during an event.

#### *16.1.6.2 Water Quality Monitoring*

In addition to TRC analyzers, GLWA has previously utilized Total Suspended Solids (TSS) sensor at St. Aubin SDF to monitor water quality of the influent flows. While the influent sample pump was removed from service and there is currently no plans to reinstall the unit, a TSS sensor will be incorporated into the mixing chamber sampling system. Realtime TSS values will be available to inform operators of water quality downstream of screening, particularly during scenarios when the facility is operating in manual mode.

### 16.1.7 Summary of Recommendations for the Process Mechanical Design

A summary of recommendations for the key aspects of the process mechanical design is provided in **Table 16-14**.

**Table 16-14: Key Approaches at St Aubin SDF**

| Process Area | Design Recommendations |
|---|---|
| **Screening** | • Replace damaged and worn mechanical screen components.<br>• Install a post event washdown system to clear the sediment that deposits on the backside of the screen in the trough located between the screen media and water surface control weir.<br>• Upgrade screening control system with latest version and replace hydraulic power pack. |
| **Sodium Hypochlorite Storage Tanks** | • Replace existing storage tanks with two FRP tanks of equivalent size. |
| **Chemical Feed Pumps** | • Replace the five (5) existing diaphragm pumps with two (2) mag-drive centrifugal pumps in a duty/standby configuration.<br>• In conjunction with constant speed motors, automated modulating control valves will be utilized to feed sodium hypochlorite over the desired range to the three mixing zones (two mixing chambers and pre-chlorination). |
| **Feed pump discharge configuration (e.g. manifold loop, dedicated pump per mixing zone, etc.)** | • Pressurized recirculation loop supplying flow control valves with one control valve per mixing zone, similar to GLWA's Conner Creek CSO chemical feed system arrangement. |
| **Mixing** | • At the pre-chlorination location, pilot testing of the GasMastrrr radial discharge, 7.5-HP NV mixer is recommended prior to finalizing a mixer technology.<br>• Replace the three 7.5-HP mixers in each chamber (6 units total) with new axial, non-vacuum mixers that are 5-HP/each, based on the results of the CFD analysis. |
| **Disinfection Control Strategy** | • Primary automatic operating mode will be TRC Mode. Operators will be able to target higher TRC in the mixing chamber based on water quality observed.<br>• Other modes of operation will include:<br>o CT Mode<br>o Dose Mode<br>o Manual operation |
| **TRC Analyzer** | • A colorimetric style TRC analyzer is recommended due to the potential that the amperometric technology analyzers could become saturated during usage due to the higher dose rates required to disinfect CSO flows and are therefore considered a less reliable alternative for this application. |

## 16.2 Safety Improvements

Based on conversations with GLWA O&M staff, at least once a month, operators must climb above the chemical storage tanks to access and operate the valves located above, see **Figure 16-11**. No fall protection is in place for the operators accessing these valves, which presents a significant fall hazard. The chemical storage tanks and piping are being replaced during this project; therefore, the new NPW

water valves (used for chemical dilution and tank cleaning) will be relocated to a more accessible location. Additionally, the new storage tanks will be furnished with guard railing along the top with a swing gate at the top of the access ladder.

**Figure 16-11 Sodium Hypochlorite Area Valve Access Presents Fall Hazard**

The outfall hatch shown in **Figure 16-12** presents a special concern due to the limited space for an employee to step off the ladder upon exiting the confined space. Directly behind the ladder is an unprotected opening which presents an increased fall risk. A removeable guardrail will need to be installed around the hatch along with a davit arm and personal fall arrest system to assist in entering and exiting the space. Additionally, the lower opening will be covered with netting to prevent any accidental falls into the opening and the steps removed. Confined space entry equipment (i.e., Davit arm system) will then be used to lower staff into and raised out of the confined space.

**Figure 16-12 Outfall Hatch Fall Hazard**

## 16.3 Architectural Building Rehabilitation

The rehabilitation work at St. Aubin will include repairs to the sealant joints, painting of interior and exterior doors and frames, painting of the overhead door jamb and head opening trim, and replacement of the high performance coating in the Chemical Storage Room. Work at the Facility will also be completed to support the other work being completed at the facility.

The sealant repairs are primarily focused on the exterior of the building. The repairs will include the removal of the existing sealant and back material. The joints will then be cleaned, new backer road installed, the joint primed, and new sealant installed. The sealant replacement includes the following joint locations:

- Perimeter of doors in exterior walls.
- Perimeter of window and louver openings in exterior walls.
- Exterior masonry control joints.
- Cove joint sealant around the exterior perimeter of the building where paved surfaces meet the building's exterior wall.

The existing doors are showing typical wear and tear with some minor scratches and corrosion present. All of the doors will be prepped, primed and repainted. Similarly, the head and jamb trim at the exterior overhead doors has some minor corrosion that will be removed, prepped, primed and painted.

The high-performance floor coating in the chemical storage room is showing signs of wear. This along with the demolition of existing pump pads, installation of new equipment pads and other changes in this room, the floor coating will be replaced with a new high performance coating. The new coating will be a 4-coat Novalac Vinyl Ester high performance coating system. The floor installation would also include

forming a new cove base and extending the coating up the containment walls to 6-inches above the grade. The new flooring will also be installed over all vertical and horizontal surfaces of the new and existing equipment and pump pads. The floor coating will have to be coordinated by the contractor to ensure areas that will be covered in the finish work get coated prior to installation of the new component. An example of this would be coating the floor under the chemical storage tank after the one is removed and prior to the installation of the new tank.

The existing Supply Fan Room will have the existing fan removed and the room will be converted to a Storage Room and will entail the following work:

- Infill existing floor opening where the supply fan duct is removed.
- Demolition of the existing wall that created the plenum space. This will include the patching of the existing floor and the adjacent walls that are to remain.
- Demolition the precast hollow core planks that capped the plenum space and are bearing on the wall that is to be removed.
- To maintain the exterior appearance the existing louver will remain, however a new insulated blank-off panel will be installed. The interior side of the louver opening will have a new 4-inch CMU infill wall constructed.
- The entire room will be painted.

To support and facilitate the removal and replacement of the chemical storage tanks the following work will be required:

- The existing masonry knock-out wall including face brick and back-up CMU will be removed. The Contractor will need to provide a temporary enclosure where the wall is opened to secure the facility and maintain weather tightness while the work is performed.
- Once the tank replacement is complete, the wall will be reconstructed to match the current condition. The existing scored masonry on the exterior portion of the knock-out panel will be salvaged and reinstalled.
- The walls within the Chemical Storage room will be repainted due to some wear at the base of the wall, the new wall that is constructed at the knock-out wall locations, and the changing of piping and hanger locations.

## 16.4 HVAC

HVAC improvements at St. Aubin include replacement of two fans. Supply fan SF-1 is being replaced to allow for more storage within the facility. The existing supply fan SF-1 feeding the underground screening area will be removed. The fan room will be turned into a storage room. The new fan will be installed outdoors on grade, behind St. Aubin SDF facility's main building. The new fan will be selected for the same airflow and reconnect to the existing underground concrete duct. This will be a utility type fan with intake weather hood, mounted on a concrete pad, with outlet oriented down into the duct. The fan wheel will be of spark resistant construction.

Exhaust fan EF-2 feeding Chemical Storage has failed due to corrosion. The inline fan will be completely removed from the building. The wall opening will be reused for a new centrifugal fan and backdraft damper. The fan will be wall mounted on the exterior.

Both fans will have corrosion resistant construction.

## 16.5 Instrumentation

The new chemical system equipment will be tied into the station's main control system. The current Rockwell-based control system is in the process of being replaced under GLWA Contract 2004538 with an Ovation platform, including all of the operator workstations and I/O panels. Coordination with the 2004538 project has occurred and new equipment provided under this design will utilize spare I/O and an allocation for future I/O in the new Ovation I/O panels.

The disinfection system will be replaced with a pressure manifold based approach that utilizes modulating valves to control the chemical feed to the various application points. New level sensors and a fill panel will be provided for the chemical tanks, as well as flowmeters on the feed lines. Refer to section 16.1.5 for details on the disinfection system and its control strategy.

A new washdown system will be added for the screens comprising of four control valves, 2 per screen. These will be used at the end of a wet weather event to aid in cleaning. Refer to section 16.1.1.2 for details on the screening operational control strategy.

## 16.6 Electrical

Power and lighting improvement in this section will conform to the criteria established in subsection 6.2.

St. Aubin recently updated lighting with LED lighting. However, the lighting is poor on top of basin and inside the basin in the mixing and disinfecting chamber. Additional exterior LED lighting on top of basin and additional interior explosion proof LED lighting are required to meet operation needs.

There are no exterior outlets on top of basin or on the exterior wall of the facility near the basin. Exterior outlets are required to meet maintenance and operational needs.

There are three motor control centers located in the electrical room. The motor control centers are manufactured by Allen Bradley. Upon visual assessment, all equipment is in very good condition and should see full-service life with the implementation of normal maintenance. The motor control centers are rated at 800 amp, 480V, 3 phase. There are additional spare capacity and spare starters in existing Motor Control Centers to accommodate any additional mechanical and process equipment and it is not anticipated that any major additional equipment will be required tables 16-15, 16-16 and 16-17.

Existing chemical feed pumps and control panels will be removed from the Chemical Feed and Storage Area.

New quick disconnects will be installed for existing dewater pumps and new mixers and new sample pumps. Including pumps located at the outfall.

New starters for chemical feed pumps and sample pumps will be installed in existing motor control center MCC-A. Existing motor starters for existing mixers will have thermal unit replaced and reused for new 5 HP mixers.

New flushing valves will be powered from existing motor control centers. Remote hand station will be located at the ground level.

Existing exhaust fan EF-3 and heating and ventilating unit HV-1 are currently fed from MCC-B and they are on normal power. These two loads will be refed from standby power MCC-A.

All instruments will be wired for monitoring and control to new I/O control panel located in the electrical room.

The electrical load tabulations are provided in **Tables 16-15, 16-16, and 16-17**.

## Table 16-15: MCC-A Load Tabulation

TABLE 1615 MCC-A Load Tabulation

| Item | Description | Voltage | KW | HP | Power Factor | Total # | Load Factor | Diversity | Connected KVA | Running KVA | Connected 480V Amp | Running 480V Amp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dewatering Pumps 3 | 480 | | 40.0 | 0.90 | 1.0 | 75.0% | 75.0% | 33.16 | 18.65 | 39.88 | 22.43 |
| 2 | Rapid Mixers 1, 3, 5, 7 | 480 | | 7.5 | 0.90 | 4.0 | 75.0% | 75.0% | 24.87 | 13.99 | 29.91 | 16.82 |
| 3 | Disinfection Influen drain pump | 480 | | 1.0 | 0.90 | 3.0 | 75.0% | 75.0% | 2.49 | 1.40 | 2.99 | 1.68 |
| 4 | Screen 1 & 2 CTRL | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 5 | Chemical feed pump 2 | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 6 | Chemical feed pump 3 | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 7 | Odor control supply Fan | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 8 | Disinfection sampling pump | 480 | | 1.0 | 0.90 | 1.0 | 75.0% | 75.0% | 0.83 | 0.47 | 1.00 | 0.56 |
| | | | | | | | Total : | | 86.20 | 48.49 | 103.69 | 58.33 |

## Table 16-16: MCC-B Load Tabulation

TABLE 1617 MCC-C Load Tabulation

| Item | Description | Voltage | KW | HP | Power Factor | Total # | Load Factor | Diversity | Connected KVA | Running KVA | Connected 480V Amp | Running 480V Amp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TLP-A Trnasformer | 480 | 45.00 | | 1.00 | 1.0 | 75.0% | 75.0% | 45.00 | 25.31 | 54.13 | 30.45 |
| 2 | Dewatering Pumps 1 & 2 | 480 | | 40.0 | 0.90 | 2.0 | 75.0% | 75.0% | 66.31 | 37.30 | 79.76 | 44.87 |
| 3 | Rapid Mixers 2, 4, 6 | 480 | | 7.5 | 0.90 | 3.0 | 75.0% | 75.0% | 18.65 | 10.49 | 22.43 | 12.62 |
| 4 | F-Dam CTRL PNL | 480 | 2.00 | | 0.90 | 1.0 | 75.0% | 75.0% | 2.22 | 1.25 | 2.67 | 1.50 |
| 5 | Control panels CPA & CPB | 480 | 2.00 | | 0.90 | 1.0 | 75.0% | 75.0% | 2.22 | 1.25 | 2.67 | 1.50 |
| 6 | Chemical feed pump 4 | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 7 | Chemical feed pump 5 | 480 | | 7.5 | 0.90 | 1.0 | 75.0% | 75.0% | 6.22 | 3.50 | 7.48 | 4.21 |
| 8 | Influent Flow control Gate | 480 | | 0.5 | 0.90 | 1.0 | 75.0% | 75.0% | 0.41 | 0.23 | 0.50 | 0.28 |
| 9 | Influent Flush Valve | 480 | | 1.0 | 0.90 | 1.0 | 75.0% | 75.0% | 0.83 | 0.47 | 1.00 | 0.56 |
| 10 | Influent Sampling Pump | 480 | | 5.0 | 0.90 | 1.0 | 75.0% | 75.0% | 4.14 | 2.33 | 4.99 | 2.80 |
| | | | | | | | Total : | | 152.23 | 85.63 | 183.11 | 103.00 |

## Table 16-17: MCC-C Load Tabulation

TABLE 1616 MCC-B Load Tabulation

| Item | Description | Voltage | KW | HP | Power Factor | Total # | Load Factor | Diversity | Connected KVA | Running KVA | Connected 480V Amp | Running 480V Amp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MCC-A | 480 | 48.49 | | 1.00 | 1.0 | 100.0% | 100.0% | 48.49 | 48.49 | 58.33 | 58.33 |
| 2 | MCC-C | 480 | 85.63 | | 1.00 | 1.0 | 100.0% | 100.0% | 85.63 | 85.63 | 103.00 | 103.00 |
| 3 | EF-1 | 480 | | 0.5 | 0.90 | 1.0 | 75.0% | 75.0% | 0.41 | 0.23 | 0.50 | 0.28 |
| 4 | EF-2 | 480 | | 1.0 | 0.90 | 1.0 | 75.0% | 75.0% | 0.83 | 0.47 | 1.00 | 0.56 |
| 5 | EF-3 | 480 | | 1.5 | 0.90 | 1.0 | 60.0% | 60.0% | 1.24 | 0.45 | 1.50 | 0.54 |
| 6 | Odor CTRL Misc pumps | 480 | | 5.0 | 0.90 | 1.0 | 75.0% | 75.0% | 4.14 | 2.33 | 4.99 | 2.80 |
| 7 | DWH-1 | 480 | 4.00 | | 0.90 | 1.0 | 75.0% | 75.0% | 4.44 | 2.50 | 5.35 | 3.01 |
| 8 | HV-1 | 480 | | 3.0 | 0.90 | 1.0 | 75.0% | 75.0% | 2.49 | 1.40 | 2.99 | 1.68 |
| 9 | OCF-1 | 480 | | 5.0 | 0.90 | 1.0 | 75.0% | 75.0% | 4.14 | 2.33 | 4.99 | 2.80 |
| | HV-1 | 480 | | 5.0 | 0.90 | 1.0 | 75.0% | 75.0% | 4.14 | 2.33 | 4.99 | 2.80 |
| 10 | PDP-R1 | 480 | 2.00 | | 0.90 | 1.0 | 75.0% | 75.0% | 2.22 | 1.25 | 2.67 | 1.50 |
| | | | | | | | Total : | | 158.19 | 147.41 | 190.28 | 177.31 |

# 17. Construction Schedule

The construction schedule was developed utilizing the Critical Path Method (CPM) of scheduling in Primavera P6 Professional, Version 20.12.

The schedules were developed using the following documents / information:

- Integrated Alternatives Evaluation Report.
- Engineering Design Abstracts.
- Design Cost Estimate.
- Input from Project Team, Industry Professionals, and Experienced Contractors.
- AACE Recommended Practices (RPs).
- Lessons learned from similar projects.

## 17.1 Work Breakdown Structure

A Work Breakdown Structure was developed that divides the work in to three (3) main sections: General Conditions, Submittals/Procurement, and Construction. These three sections are further detailed as shown in **Table 17-1**.

**Table 17-1: Work Breakdown Structure**

| WBS Code | WBS Name |
|---|---|
| **GLWA-CSO** | **GLWA CSO Facilities Improvements** |
| **GLWA-CSO.1** | **GENERAL CONDITIONS** |
| GLWA-CSO.1.1 | Milestones |
| **GLWA-CSO.2** | **SUBMITTALS / PROCUREMENT** |
| GLWA-CSO.2.0 | Division 00 - Procurement & Contracting Requirements |
| GLWA-CSO.2.1 | Division 01 - General Requirements |
| GLWA-CSO.2.3 | Division 03 - Concrete |
| GLWA-CSO.2.4 | Division 04 - Masonry |
| GLWA-CSO.2.6 | Division 06 - Wood, Plastics, and Composites |
| GLWA-CSO.2.7 | Division 07 - Thermal & Moisture Protection |
| GLWA-CSO.2.8 | Division 08 - Openings |
| GLWA-CSO.2.9 | Division 09 - Finishes |
| GLWA-CSO.2.22 | Division 22 - Plumbing |
| GLWA-CSO.2.23 | Division 23 - HVAC |
| GLWA-CSO.2.26 | Division 26 - Electrical |
| GLWA-CSO.2.43 | Division 43 - Process Gas & Liquid Handling |
| GLWA-CSO.2.44 | Division 44 - Pollution & Waste Control Equipment |
| **GLWA-CSO.3** | **CONSTRUCTION** |
| **GLWA-CSO.3.1** | **Baby Creek SDF** |
| GLWA-CSO.3.1.1 | Safety Improvements |
| GLWA-CSO.3.1.2 | Architectural Rehabilitation |

| | |
|---|---|
| GLWA-CSO.3.1.3 | Electrical Improvements |
| GLWA-CSO.3.1.4 | Instrumentation Improvements |
| **GLWA-CSO.3.2** | **Belle Isle CSO** |
| GLWA-CSO.3.2.1 | Safety Improvements |
| GLWA-CSO.3.2.2 | Architectural Rehabilitation |
| GLWA-CSO.3.2.3 | Electrical Improvements |
| GLWA-CSO.3.2.4 | Instrumentation Improvements |
| **GLWA-CSO.3.3** | **Conner Creek CSO** |
| GLWA-CSO.3.3.1 | Safety Improvements |
| GLWA-CSO.3.3.2 | Architectural Rehabilitation |
| GLWA-CSO.3.3.3 | Electrical Improvements |
| **GLWA-CSO.3.4** | **Hubbell-Southfield CSO** |
| GLWA-CSO.3.4.1 | Safety Improvements |
| GLWA-CSO.3.4.2 | Architectural Rehabilitation |
| GLWA-CSO.3.4.3 | Electrical Improvements |
| **GLWA-CSO.3.5** | **Leib SDF** |
| GLWA-CSO.3.5.1 | Safety Improvements |
| GLWA-CSO.3.5.2 | Architectural Rehabilitation |
| GLWA-CSO.3.5.3 | Electrical Improvements |
| **GLWA-CSO.3.6** | **Oakwood CSO** |
| GLWA-CSO.3.6.1 | Safety Improvements |
| GLWA-CSO.3.6.2 | Architectural Rehabilitation |
| GLWA-CSO.3.6.3 | Electrical Improvements |
| **GLWA-CSO.3.7** | **Puritan Fenkell CSO** |
| GLWA-CSO.3.7.1 | Safety Improvements |
| GLWA-CSO.3.7.2 | Architectural Rehabilitation |
| GLWA-CSO.3.7.3 | Electrical Improvements |
| **GLWA-CSO.3.8** | **Seven Mile CSO** |
| GLWA-CSO.3.8.1 | Safety Improvements |
| GLWA-CSO.3.8.2 | Architectural Rehabilitation |
| GLWA-CSO.3.8.3 | Electrical Improvements |
| **GLWA-CSO.3.9** | **St Aubin SDF** |
| GLWA-CSO.3.9.1 | Safety Improvements |
| GLWA-CSO.3.9.2 | Architectural Rehabilitation |
| GLWA-CSO.3.9.3 | Chemical System Improvements |
| GLWA-CSO.3.9.4 | Underground Facility |
| GLWA-CSO.3.9.5 | HVAC Improvements |
| GLWA-CSO.3.9.6 | Screenings Improvements |
| GLWA-CSO.3.9.7 | Electrical Improvements |
| GLWA-CSO.3.9.8 | Instrumentation Improvements |
| GLWA-CSO.3.9.9 | Outfall |
| | |

## 17.2 Construction Milestones

The detailed construction schedule was prepared using Primavera P6 Professional Version 20.21 software. A listing of the resultant milestones is presented in **Table 17-2**Table 17-2. The duration is listing in consecutive calendar days (ccds).

**Table 17-2: Milestones**

| Milestone | Milestone Date | Duration (ccds) |
|---|---|---|
| Notice to Proceed | November 19, 2025 | - |
| Construction Substantial Completion | July 22, 2027 | 611 |
| Project Closeout | January 18, 2028 | 180 |
| Project Completion | January 18, 2028 | - |

Additional intermediate milestones can be added as the design progresses.

## 17.3 Assumptions

Two calendars were used in the construction schedules:

- 5-day 8-hour work week with basic holidays for standard activities. Holidays include:
    - New Year's Day
    - Martin Luther King Day
    - Presidents Day
    - Memorial Day
    - Independence Day
    - Labor Day
    - Columbus Day
    - Veterans Day
    - Thanksgiving
    - Christmas
- Seven-day work week without holidays for calendar day activities, such as overall duration, milestones and activities that run continuously regardless of day of the week such as testing run time or concrete cure time.

The following assumptions apply to this schedule:

- Contractors will perform most of the work during normal daylight hours, nominally 7 a.m. to 5 p.m., Monday through Friday, in an 8-hour shift. No allowance has been made for additional shift or weekend work.
- Permits, except typical construction permits, were assumed to be obtained prior to start of construction but could float out to the start of construction. At this time, we are not aware of

any permit that will impede the ability to start actual construction work. An allowance was made for obtaining typical construction permits.
- All shop drawings / plans are shown to be submitted within the two to three months of the contract notice to proceed (NTP). Two (2) review cycles are anticipated for each submittal.
- Except for milestone and contract duration type activities, the schedule durations are in working days with standard holidays.
- Pressure testing of piping is included in the piping installation activities. No separate activities are included for these tasks.

The Contractor cannot start physical work activities until all permits are obtained and the Health and Safety Plan is approved.

## 17.4 Schedule Critical Path

The Notice to Proceed is scheduled for November 10, 2025. With a contract duration of 611 ccds, the Substantial Completion dates is July 22, 2027.

The critical path originates with the Noice to Proceed, followed by the procurement of chemical storage tanks and pumps for the St. Aubin SDF. The critical path continues through installation, start-up and testing of Chemical Storage Tank No.2 and associated pumps, piping and controls. Once Tank No.2 and associated equipment are operational, the critical path moves to Demolition of Tank No.1 and associated pumps and piping. Following demolition, the critical path continues through installation start-up and testing of Chemical Storage Tank No.1 and associated pumps, piping and controls. Once Tank No.1 and associated equipment are operational, the critical path moves to installation of chemical mixers and sample pumps in the Underground Facility. The critical path terminates with completion of the instrumentation tie-in to the Main Station Control System the St Aubin SDF and the granting of Substantial Completion.

# 18. Permitting

This project will require a Michigan Environment, Great Lakes and Energy (EGLE) Part 41 Wastewater Construction Permit typically submitted at the 90% stage of design. Typical permit acceptance time is 45 days but could take as long as 150 days.

For the building construction work at the Baby Creek and Hubbel-Southfield facilities, the project will require a Building Permit plan review with the City of Dearborn. The other seven (7) CSO facilities are within the City of Detroit jurisdiction. Those facilities will require a Building Permit plan review through the City of Detroit's Buildings, Safety Engineering and Environmental Department (BSEED). Stamped/sealed drawings and specifications are required for both. Both enforcement authorities are required by statute to provide a response within 30 days of starting the plan review. The fee structure varies for the two entities, but typically the 30-day cycle starts after submittal of documents and payment of plan review fees.

The current project scope includes site and civil work only at the St. Aubin facility. Per Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451 if the location is within 500 ft of surface waters, then a Soil Erosion Sedimentation Control (SESC) permit will be required. The SESC enforcement agency in the City of Detroit, is Wayne County and the SESC permit application will need to be filed with the county. Response to a SESC permit application is typically received within 30 days.

If there is a change in scope and site or civil work is added at any of the facilities for this project, then SESC permits for those sites will most likely be needed. The Baby Creek and Hubbell-Southfield facilities are located within the City of Dearborn, and the enforcement agency for the SESC permit is the City of Dearborn Building Department. For the other seven (7) facilities located within the City of Detroit, the enforcement agency is Wayne County.

# 19. Opinion of Probable Construction Cost

The opinion of probable construction costs (OPCC) was developed for the CSO Facilities Improvements project. The improvements will be further refined during the detailed design phase with input from GLWA staff. Refinements during design may result in changes to sizing, details, etc. which may result in changes to the estimated construction costs.

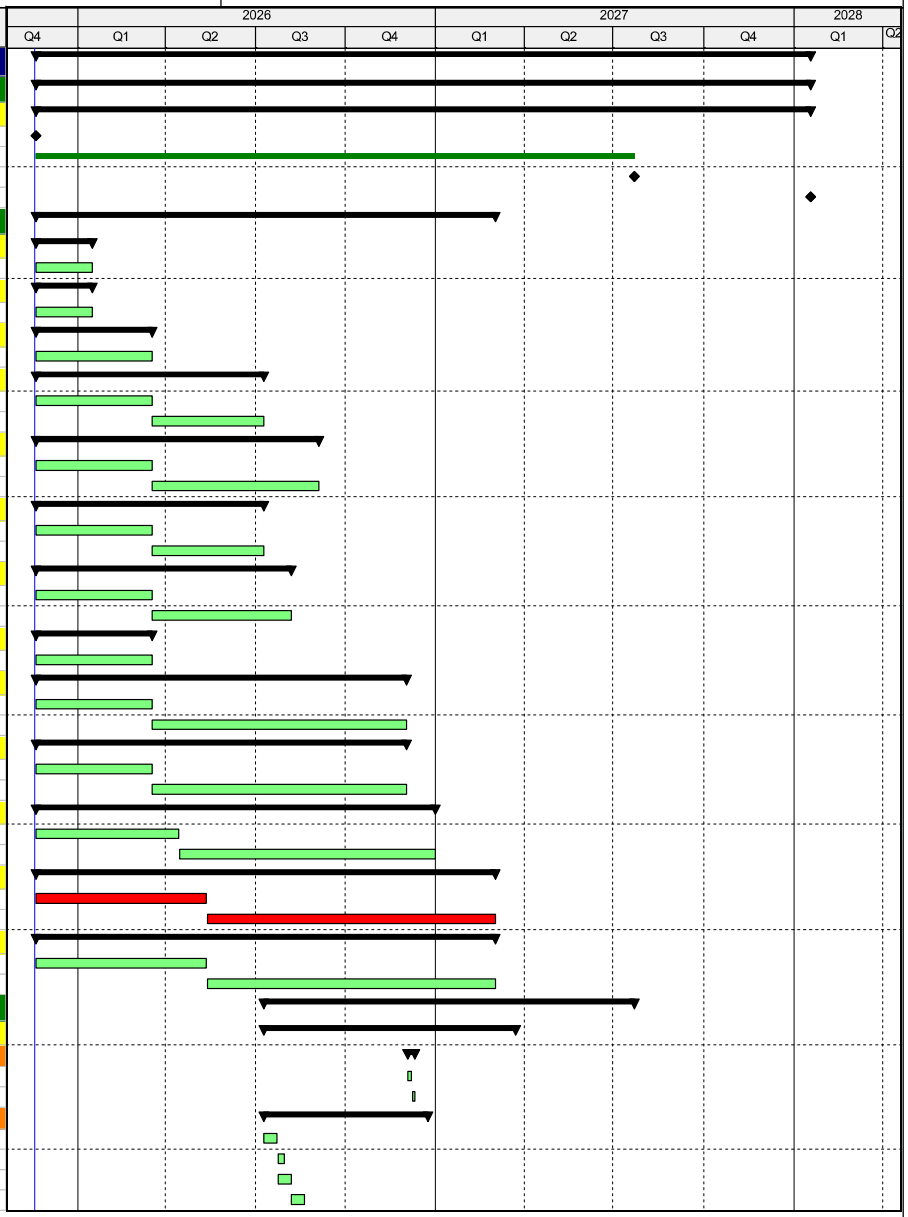
The OPCC is in 2023 dollars and represent average bidding conditions. The OPCC includes a contingency of 30 percent to compensate for detailed improvements not yet included. Based on the level of project definition, the OPCC is Class 3 as defined by the Association for the Advancement of Cost Engineering (AACE) and as such, have an expected accuracy range of +30% to -20% of the OPCC. A summary of the estimated construction costs for the improvements are shown in **Table 19-1**.

**Table 19-1: Opinion of Probable Construction Costs (OPCC)**

| Project Element | OPCC | |
|---|---|---|
| Architectural Improvements | $ | 2,127,000 |
| Structural Improvements | $ | 1,337,000 |
| Process Mechanical Improvements | $ | 927,000 |
| Plumbing Improvements | $ | 21,000 |
| HVAC Improvements | $ | 34,000 |
| Electrical Improvements | $ | 610,000 |
| Instrumentation and Controls Improvements | $ | 348,000 |
| **SUBTOTAL COST** | **$** | **5,434,000** |
| Division 1 Costs | $ | 2,511,000 |
| Bonds and Insurance | $ | 315,000 |
| General Conditions Overhead & Profit | $ | 2,546,000 |
| Design Contingency | $ | 3,2412,000 |
| **TOTAL COST** | **$** | **14,048,000** |

Note: 1. OPCC accuracy range is +30% to -20%, in accordance with AACE Class 3 estimate.

| Activity ID | Activity Name | Rem Dur | Start | Finish | Total Float |
|---|---|---|---|---|---|
| **GLWA CSO Facilities Improvements** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| **GENERAL CONDITIONS** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| **Milestones** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| CSO-10000 | Notice to Proceed | 0 | 19-Nov-25 | | 0 |
| CSO-10010 | Project Duration | 611 | 19-Nov-25 | 22-Jul-27 | 0 |
| CSO-10020 | Substantial Completion | 0 | | 22-Jul-27 | 0 |
| CSO-10030 | Final Completion | 0 | | 18-Jan-28 | 0 |
| **SUBMITTALS / PROCUREMENT** | | 320 | 19-Nov-25 | 02-Mar-27 | 90 |
| **Division 00 - Procurement & Contracting Requirements** | | 40 | 19-Nov-25 | 16-Jan-26 | 270 |
| CSO-10040 | Obtain Work Permits | 40 | 19-Nov-25 | 16-Jan-26 | 270 |
| **Division 01 - General Requirements** | | 40 | 19-Nov-25 | 16-Jan-26 | 270 |
| CSO-10050 | Submit / Approve EHASP | 40 | 19-Nov-25 | 16-Jan-26 | 270 |
| **Division 03 - Concrete** | | 80 | 19-Nov-25 | 17-Mar-26 | 330 |
| CSO-10120 | Submit / Approve Concrete Drawings / Material | 80 | 19-Nov-25 | 17-Mar-26 | 330 |
| **Division 04 - Masonry** | | 160 | 19-Nov-25 | 09-Jul-26 | 195 |
| CSO-10130 | Submit / Approve Brick & Masonry Materials | 80 | 19-Nov-25 | 17-Mar-26 | 195 |
| CSO-10140 | Fab & Deliver Brick & Masonry Materials | 80 | 18-Mar-26 | 09-Jul-26 | 195 |
| **Division 06 - Wood, Plastics, and Composites** | | 200 | 19-Nov-25 | 03-Sep-26 | 195 |
| CSO-10190 | Submit / Approve FRP Stairs, Railings & Gates Drawings / Material | 80 | 19-Nov-25 | 17-Mar-26 | 195 |
| CSO-10200 | Fab & Deliver MFRP Stairs, Railings & Gates | 120 | 18-Mar-26 | 03-Sep-26 | 195 |
| **Division 07 - Thermal & Moisture Protection** | | 160 | 19-Nov-25 | 09-Jul-26 | 200 |
| CSO-10210 | Submit / Approve Roofing System | 80 | 19-Nov-25 | 17-Mar-26 | 200 |
| CSO-10220 | Fab & Deliver Roofing System | 80 | 18-Mar-26 | 09-Jul-26 | 200 |
| **Division 08 - Openings** | | 180 | 19-Nov-25 | 06-Aug-26 | 205 |
| CSO-10230 | Submit / Approve Door, Windows, Hatches | 80 | 19-Nov-25 | 17-Mar-26 | 205 |
| CSO-10240 | Fab & Deliver Door, Windows, Hatches | 100 | 18-Mar-26 | 06-Aug-26 | 205 |
| **Division 09 - Finishes** | | 80 | 19-Nov-25 | 17-Mar-26 | 320 |
| CSO-10250 | Submit / Approve Paint / Floor Coating Systems | 80 | 19-Nov-25 | 17-Mar-26 | 320 |
| **Division 22 - Plumbing** | | 260 | 19-Nov-25 | 02-Dec-26 | 144 |
| CSO-10060 | Submit / Approve Plumbing Equipment, Piping & Appurtenances | 80 | 19-Nov-25 | 17-Mar-26 | 144 |
| CSO-10070 | Fab & Deliver Plumbing Equipment, Piping & Appurtenances | 180 | 18-Mar-26 | 02-Dec-26 | 144 |
| **Division 23 - HVAC** | | 260 | 19-Nov-25 | 02-Dec-26 | 125 |
| CSO-10080 | Submit / Approve SF1 and EF-2 Drawings / Equipment | 80 | 19-Nov-25 | 17-Mar-26 | 125 |
| CSO-10090 | Fab & Deliver SF-1 & EF-2 | 180 | 18-Mar-26 | 02-Dec-26 | 125 |
| **Division 26 - Electrical** | | 280 | 19-Nov-25 | 31-Dec-26 | 130 |
| CSO-10100 | Submit / Approve Electrical Equipment / Material | 100 | 19-Nov-25 | 14-Apr-26 | 130 |
| CSO-10110 | Fab & Deliver Electrical Equipment / Material | 180 | 15-Apr-26 | 31-Dec-26 | 130 |
| **Division 43 - Process Gas & Liquid Handling** | | 320 | 19-Nov-25 | 02-Mar-27 | 0 |
| CSO-10150 | Submit / Approve Chemical System Equipment | 120 | 19-Nov-25 | 12-May-26 | 0 |
| CSO-10160 | Fab & Deliver Chemical System Equipment | 200 | 13-May-26 | 02-Mar-27 | 0 |
| **Division 44 - Pollution & Waste Control Equipment** | | 320 | 19-Nov-25 | 02-Mar-27 | 70 |
| CSO-10170 | Submit / Approve Screening Equipment | 120 | 19-Nov-25 | 12-May-26 | 70 |
| CSO-10180 | Fab & Deliver Screening Equipment | 200 | 13-May-26 | 02-Mar-27 | 70 |
| **CONSTRUCTION** | | 260 | 10-Jul-26 | 22-Jul-27 | 0 |
| **Baby Creek SDF** | | 175 | 10-Jul-26 | 23-Mar-27 | 85 |
| **Safety Improvements** | | 6 | 03-Dec-26 | 10-Dec-26 | 144 |
| CSO-10260 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 144 |
| CSO-10270 | Install Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 144 |
| **Architectural Rehabilitation** | | 116 | 10-Jul-26 | 24-Dec-26 | 144 |
| CSO-10280 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 205 |
| CSO-10290 | Repair Interior Expansion Joints in Hallway | 5 | 24-Jul-26 | 30-Jul-26 | 235 |
| CSO-10300 | Replace Bricks & Repair Mortar Cracks | 10 | 24-Jul-26 | 06-Aug-26 | 205 |
| CSO-10310 | Tuckpoint Mortar Joints | 10 | 07-Aug-26 | 20-Aug-26 | 205 |




Remaining Work | Critical Remaining Work | Actual Level of Effort
Actual Work | Remaining Level of Effort | Summary



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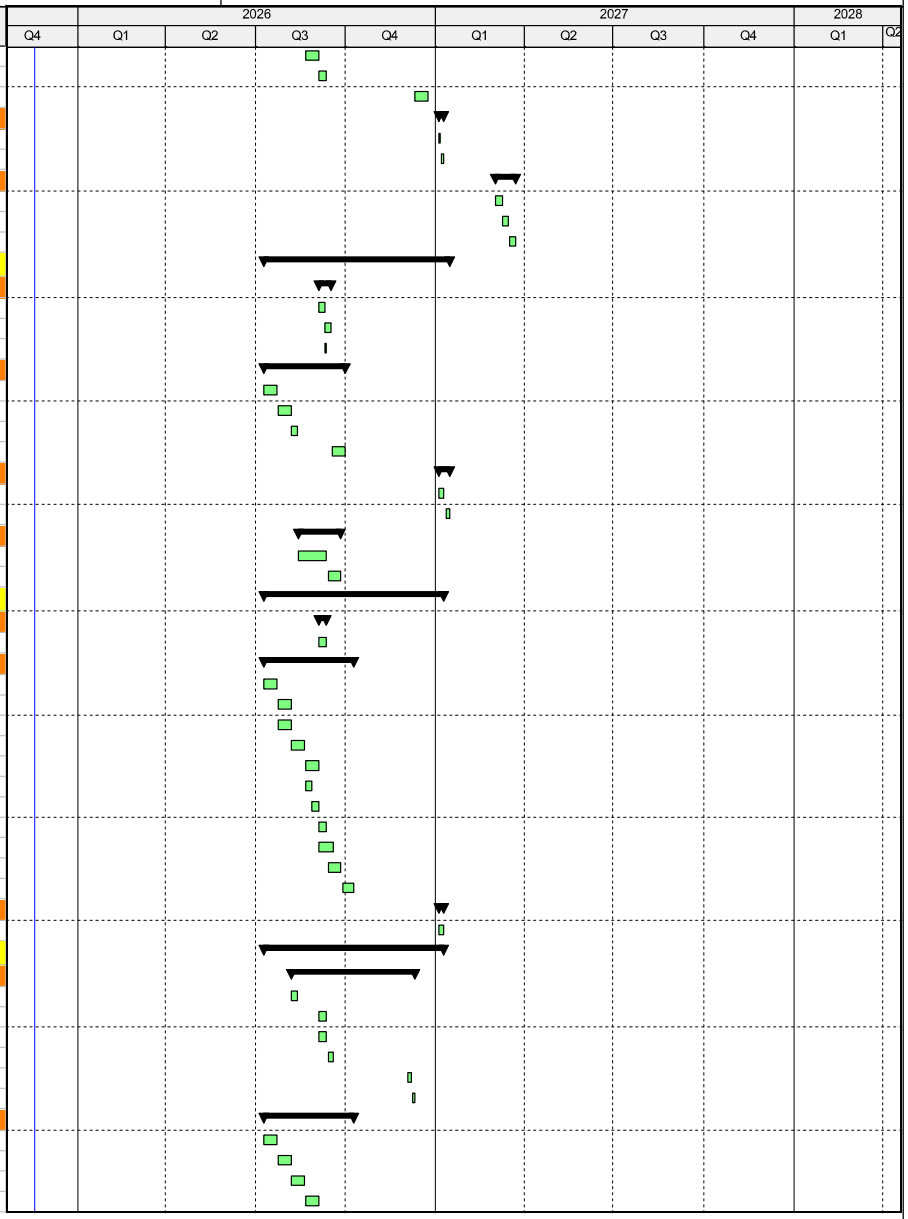
GLWA CSO Facilities Improvements | Project Schedule | As of 19-Nov-25

| Activity ID | Activity Name | Rem Dur | Start | Finish | Total Float |
|---|---|---|---|---|---|
| CSO-10320 | Replace / Repair Doors & Hardware | 10 | 21-Aug-26 | 03-Sep-26 | 205 |
| CSO-10330 | Replace / Repair Overhead Doors | 5 | 04-Sep-26 | 11-Sep-26 | 205 |
| CSO-10340 | Prep & Paint Interior & Exterior of Facility | 10 | 11-Dec-26 | 24-Dec-26 | 144 |
| **Electrical Improvements** | | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| CSO-10350 | Install Light Pole at Bypass Gates | 2 | 04-Jan-27 | 05-Jan-27 | 135 |
| CSO-10360 | Install Exterior Receptacles | 3 | 06-Jan-27 | 08-Jan-27 | 135 |
| **Instrumentation Improvements** | | 15 | 03-Mar-27 | 23-Mar-27 | 85 |
| CSO-10370 | Install Flow & Level Monitoring for Chemical Tanks | 5 | 03-Mar-27 | 09-Mar-27 | 85 |
| CSO-10380 | Install Flow Meter at Emergency Wet Weather Bypass Conduit | 5 | 10-Mar-27 | 16-Mar-27 | 85 |
| CSO-10390 | Install Level Sensor at Outfall Chamber | 5 | 17-Mar-27 | 23-Mar-27 | 85 |
| **Belle Isle CSO** | | 130 | 10-Jul-26 | 15-Jan-27 | 130 |
| **Safety Improvements** | | 8 | 04-Sep-26 | 16-Sep-26 | 212 |
| CSO-10410 | Install Fall Protection Gates at Chemical Tanks | 3 | 04-Sep-26 | 09-Sep-26 | 197 |
| CSO-10400 | Demo Concrete Slab at Emergency Exit / 2nd Floor Stairway | 5 | 10-Sep-26 | 16-Sep-26 | 197 |
| CSO-10420 | Reorient Personnel Hatches | 2 | 10-Sep-26 | 11-Sep-26 | 215 |
| **Architectural Rehabilitation** | | 58 | 10-Jul-26 | 30-Sep-26 | 197 |
| CSO-10430 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 205 |
| CSO-10440 | Tuckpoint Mortar Joints | 10 | 24-Jul-26 | 06-Aug-26 | 205 |
| CSO-10450 | Repair Glass in Office/Control Room | 5 | 07-Aug-26 | 13-Aug-26 | 205 |
| CSO-10460 | Prep & Paint Interior & Exterior of Facility | 10 | 17-Sep-26 | 30-Sep-26 | 197 |
| **Electrical Improvements** | | 10 | 04-Jan-27 | 15-Jan-27 | 130 |
| CSO-10470 | Install Exterior Lighting | 5 | 04-Jan-27 | 08-Jan-27 | 130 |
| CSO-10480 | Install Emergency Lights / Exist Signs in Odor Control Room & Basement | 5 | 11-Jan-27 | 15-Jan-27 | 130 |
| **Instrumentation Improvements** | | 30 | 14-Aug-26 | 25-Sep-26 | 205 |
| CSO-10490 | Install Gas Detection System | 20 | 14-Aug-26 | 11-Sep-26 | 205 |
| CSO-10500 | Install Actuator Remote Hand Stations for Dewatering Valves | 10 | 14-Sep-26 | 25-Sep-26 | 205 |
| **Conner Creek CSO** | | 125 | 10-Jul-26 | 08-Jan-27 | 135 |
| **Safety Improvements** | | 5 | 04-Sep-26 | 11-Sep-26 | 195 |
| CSO-10510 | Install Fall Protection Railings at Bar Screens | 5 | 04-Sep-26 | 11-Sep-26 | 195 |
| **Architectural Rehabilitation** | | 65 | 10-Jul-26 | 09-Oct-26 | 195 |
| CSO-10540 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 195 |
| CSO-10550 | Repair Sealant - Control Joints in Slab Over Basin | 10 | 24-Jul-26 | 06-Aug-26 | 220 |
| CSO-10560 | Replace Bricks & Repair Mortar Cracks | 10 | 24-Jul-26 | 06-Aug-26 | 195 |
| CSO-10570 | Tuckpoint Mortar Joints | 10 | 07-Aug-26 | 20-Aug-26 | 195 |
| CSO-10580 | Replace / Repair Doors & Hardware | 10 | 21-Aug-26 | 03-Sep-26 | 195 |
| CSO-10520 | Place Concrete Topping at Southeast Corner of Screening Building | 5 | 21-Aug-26 | 27-Aug-26 | 220 |
| CSO-10530 | Install Scuppers in Screening Building Slab | 5 | 28-Aug-26 | 03-Sep-26 | 220 |
| CSO-10590 | Replace / Repair Overhead Doors | 5 | 04-Sep-26 | 11-Sep-26 | 195 |
| CSO-10600 | Replace Ceiling Tiles in Offices | 10 | 04-Sep-26 | 18-Sep-26 | 205 |
| CSO-10610 | Prep & Paint Interior Walls, Columns & Beams | 10 | 14-Sep-26 | 25-Sep-26 | 195 |
| CSO-10620 | Prep & Coat Mechanical Room Floor | 10 | 28-Sep-26 | 09-Oct-26 | 195 |
| **Electrical Improvements** | | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| CSO-10630 | Install LED lights in Office Ceilings | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| **Hubbell-Southfield CSO** | | 125 | 10-Jul-26 | 08-Jan-27 | 135 |
| **Safety Improvements** | | 86 | 07-Aug-26 | 10-Dec-26 | 154 |
| CSO-10640 | Replace Deck Access Hatches, Covers & Grating | 5 | 07-Aug-26 | 13-Aug-26 | 235 |
| CSO-10650 | Install Fall Protection Railings at Bar Screens | 5 | 04-Sep-26 | 11-Sep-26 | 195 |
| CSO-10660 | Install Fall Protection Gates at Odor Control Room Walkway & Piping Gallery Access Platform | 5 | 04-Sep-26 | 11-Sep-26 | 210 |
| CSO-10670 | Install Guardrails & Gates at Stair/Ladder Access Hatches | 5 | 14-Sep-26 | 18-Sep-26 | 210 |
| CSO-10680 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 149 |
| CSO-10690 | Install Tankless Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 149 |
| **Architectural Rehabilitation** | | 65 | 10-Jul-26 | 09-Oct-26 | 195 |
| CSO-10700 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 195 |
| CSO-10710 | Replace Bricks & Repair Mortar Cracks | 10 | 24-Jul-26 | 06-Aug-26 | 195 |
| CSO-10720 | Tuckpoint Mortar Joints | 10 | 07-Aug-26 | 20-Aug-26 | 195 |
| CSO-10730 | Replace / Repair Doors & Hardware | 10 | 21-Aug-26 | 03-Sep-26 | 195 |




Remaining Work | Critical Remaining Work | Actual Level of Effort
Actual Work | Remaining Level of Effort | Summary



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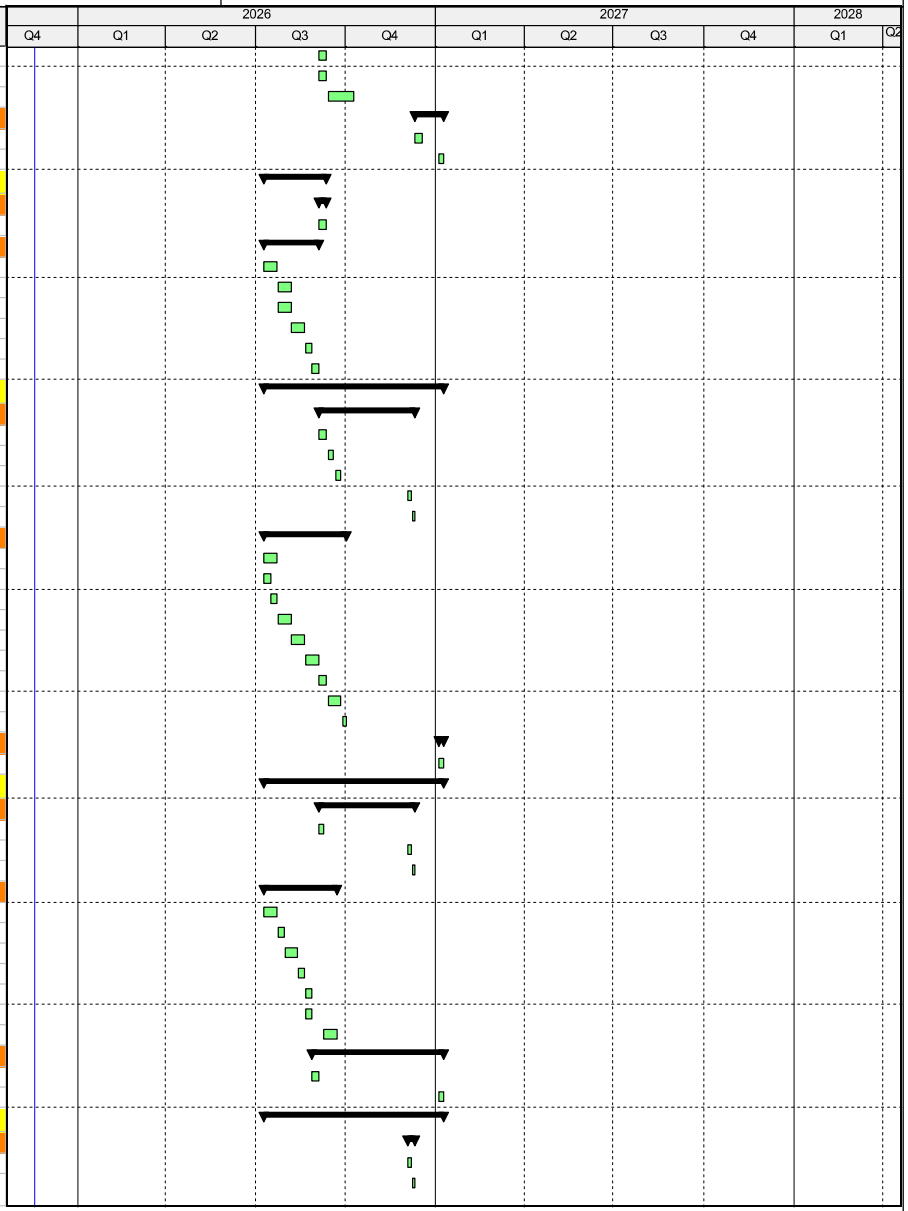
| Activity ID | Activity Name | Rem Dur | Start | Finish | Total Float |
|---|---|---|---|---|---|
| CSO-10740 | Replace / Repair Overhead Doors | 5 | 04-Sep-26 | 11-Sep-26 | 195 |
| CSO-10750 | Replace Ceiling Tiles in Personnel Areas | 5 | 04-Sep-26 | 11-Sep-26 | 210 |
| CSO-10760 | Prep & Paint Interior & Exterior Trusses at Headworks | 20 | 14-Sep-26 | 09-Oct-26 | 195 |
| **Electrical Improvements** | | 19 | 11-Dec-26 | 08-Jan-27 | 135 |
| CSO-10770 | Connect Tankless Water Heater & Flow Sensors | 5 | 11-Dec-26 | 17-Dec-26 | 149 |
| CSO-10780 | Install LED lights in Personnel Areas | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| **Leib SDF** | | 45 | 10-Jul-26 | 11-Sep-26 | 215 |
| **Safety Improvements** | | 5 | 04-Sep-26 | 11-Sep-26 | 215 |
| CSO-10790 | Install Fall Protection Railings at Chemical Tanks | 5 | 04-Sep-26 | 11-Sep-26 | 215 |
| **Architectural Rehabilitation** | | 40 | 10-Jul-26 | 03-Sep-26 | 220 |
| CSO-10800 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 220 |
| CSO-10810 | Replace Bricks & Repair Mortar Cracks | 10 | 24-Jul-26 | 06-Aug-26 | 220 |
| CSO-10820 | Replace Stone Windowsills & Glass Block Windows | 10 | 24-Jul-26 | 06-Aug-26 | 220 |
| CSO-10830 | Tuckpoint Mortar Joints | 10 | 07-Aug-26 | 20-Aug-26 | 220 |
| CSO-10840 | Repair Doors & Replace Hardware | 5 | 21-Aug-26 | 27-Aug-26 | 220 |
| CSO-10850 | Repair Overhead Doors | 5 | 28-Aug-26 | 03-Sep-26 | 220 |
| **Oakwood CSO** | | 125 | 10-Jul-26 | 08-Jan-27 | 135 |
| **Safety Improvements** | | 66 | 04-Sep-26 | 10-Dec-26 | 154 |
| CSO-10860 | Extend Railings at Pump Station Stairway | 5 | 04-Sep-26 | 11-Sep-26 | 200 |
| CSO-10870 | Install Fall Protection Gates at Chemical Storage Tanks | 5 | 14-Sep-26 | 18-Sep-26 | 205 |
| CSO-10880 | Install Conduit Ramps on Basin Roof | 5 | 21-Sep-26 | 25-Sep-26 | 205 |
| CSO-10890 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 149 |
| CSO-10900 | Install Tankless Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 149 |
| **Architectural Rehabilitation** | | 60 | 10-Jul-26 | 02-Oct-26 | 200 |
| CSO-10910 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 200 |
| CSO-10920 | Repair Roof & Flashing | 5 | 10-Jul-26 | 16-Jul-26 | 200 |
| CSO-10930 | Repair Exterior Wall Flashing | 5 | 17-Jul-26 | 23-Jul-26 | 200 |
| CSO-10940 | Replace Bricks & Repair Mortar Cracks | 10 | 24-Jul-26 | 06-Aug-26 | 200 |
| CSO-10950 | Tuckpoint Mortar Joints | 10 | 07-Aug-26 | 20-Aug-26 | 200 |
| CSO-10960 | Replace / Repair Doors & Hardware | 10 | 21-Aug-26 | 03-Sep-26 | 200 |
| CSO-10970 | Replace / Repair Overhead Doors | 5 | 04-Sep-26 | 11-Sep-26 | 200 |
| CSO-10980 | Prep & Paint Interior & Exterior Surfaces | 10 | 14-Sep-26 | 25-Sep-26 | 200 |
| CSO-10990 | Prep & Install High Performance Floor Coating Throughout Facility | 5 | 28-Sep-26 | 02-Oct-26 | 200 |
| **Electrical Improvements** | | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| CSO-11000 | Connect Eyewash Flow Switch Monitoring to PLC | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| **Puritan Fenkell CSO** | | 125 | 10-Jul-26 | 08-Jan-27 | 135 |
| **Safety Improvements** | | 66 | 04-Sep-26 | 10-Dec-26 | 149 |
| CSO-11010 | Install FRP Stairs in Chemical Room | 2 | 04-Sep-26 | 08-Sep-26 | 208 |
| CSO-11020 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 149 |
| CSO-11030 | Install Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 149 |
| **Architectural Rehabilitation** | | 52 | 10-Jul-26 | 22-Sep-26 | 208 |
| CSO-11040 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 215 |
| CSO-11050 | Replace Stone Banding & Repair Mortar Cracks | 5 | 24-Jul-26 | 30-Jul-26 | 215 |
| CSO-11060 | Tuckpoint Mortar Joints | 10 | 31-Jul-26 | 13-Aug-26 | 215 |
| CSO-11070 | Repair Doors & Replace Hardware | 5 | 14-Aug-26 | 20-Aug-26 | 215 |
| CSO-11080 | Repair Overhead Doors | 5 | 21-Aug-26 | 27-Aug-26 | 215 |
| CSO-11090 | Replace Ceiling Tiles in Personnel Areas | 5 | 21-Aug-26 | 27-Aug-26 | 220 |
| CSO-11100 | Prep & Paint Headworks Walls | 10 | 09-Sep-26 | 22-Sep-26 | 208 |
| **Electrical Improvements** | | 90 | 28-Aug-26 | 08-Jan-27 | 135 |
| CSO-11110 | Install Lights in Personnel Areas | 5 | 28-Aug-26 | 03-Sep-26 | 220 |
| CSO-11120 | Connect Water Heater & Flow Sensors | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| **Seven Mile CSO** | | 125 | 10-Jul-26 | 08-Jan-27 | 135 |
| **Safety Improvements** | | 6 | 03-Dec-26 | 10-Dec-26 | 149 |
| CSO-11130 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 149 |
| CSO-11140 | Install Tankless Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 149 |




Remaining Work | Critical Remaining Work | Actual Level of Effort
Actual Work | Remaining Level of Effort | Summary



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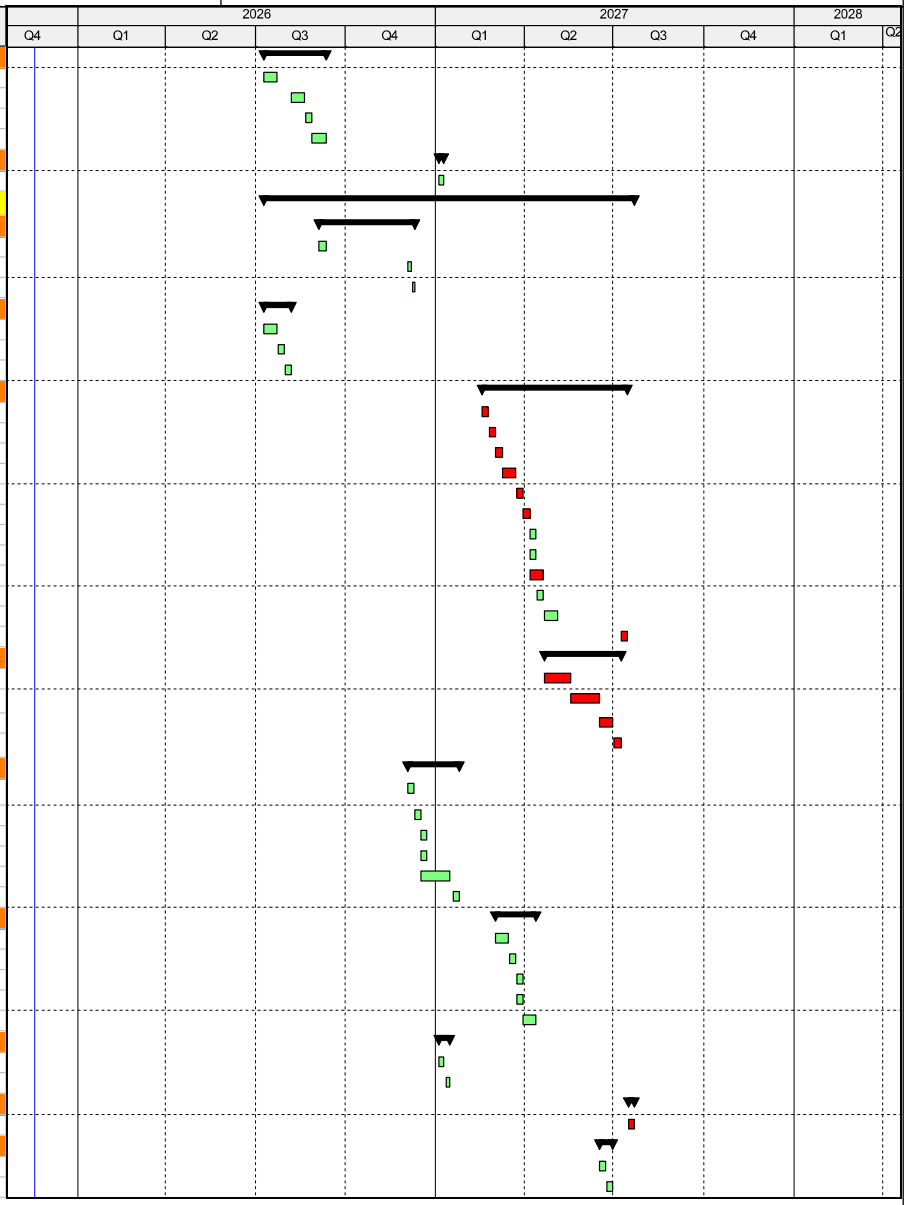
GLWA CSO Facilities Improvements | Project Schedule | As of 19-Nov-25

| Activity ID | Activity Name | Rem Dur | Start | Finish | Total Float |
|---|---|---|---|---|---|
| **Architectural Rehabilitation** | | 45 | 10-Jul-26 | 11-Sep-26 | 215 |
| CSO-11150 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 225 |
| CSO-11160 | Replace / Repair Doors & Hardware | 10 | 07-Aug-26 | 20-Aug-26 | 215 |
| CSO-11170 | Repair Overhead Doors | 5 | 21-Aug-26 | 27-Aug-26 | 215 |
| CSO-11180 | Prep & Paint Interior & Exterior Walls & Trusses | 10 | 28-Aug-26 | 11-Sep-26 | 215 |
| **Electrical Improvements** | | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| CSO-11190 | Connect Tankless Water Heater & Flow Sensors | 5 | 04-Jan-27 | 08-Jan-27 | 135 |
| **St Aubin SDF** | | 260 | 10-Jul-26 | 22-Jul-27 | 0 |
| **Safety Improvements** | | 66 | 04-Sep-26 | 10-Dec-26 | 154 |
| CSO-11200 | Install Removable Guardrail, Davit & Netting at Outfall Hatch | 5 | 04-Sep-26 | 11-Sep-26 | 215 |
| CSO-11210 | Remove / Install Emergency Eyewashes & Showers | 3 | 03-Dec-26 | 07-Dec-26 | 149 |
| CSO-11220 | Install Tankless Electric Hot Water Heater & Piping | 3 | 08-Dec-26 | 10-Dec-26 | 149 |
| **Architectural Rehabilitation** | | 20 | 10-Jul-26 | 06-Aug-26 | 230 |
| CSO-11230 | Repair Exterior Sealant - Doors, Windows & Masonry | 10 | 10-Jul-26 | 23-Jul-26 | 230 |
| CSO-11240 | Prep & Painting Interior & Exterior Doors | 5 | 24-Jul-26 | 30-Jul-26 | 230 |
| CSO-11250 | Replace Ceiling Tiles in Personnel Areas | 5 | 31-Jul-26 | 06-Aug-26 | 230 |
| **Chemical System Improvements** | | 105 | 17-Feb-27 | 15-Jul-27 | 5 |
| CSO-11290 | Demo Masonry Knock-out Wall | 5 | 17-Feb-27 | 23-Feb-27 | 0 |
| CSO-11300 | Demo Chemical Tank 2 & Pumps 1&2 / Associated Piping & Controls | 5 | 24-Feb-27 | 02-Mar-27 | 0 |
| CSO-11310 | Install Chemical Storage Tank 2 & Pumps 2 / Associated Piping & Controls | 5 | 03-Mar-27 | 09-Mar-27 | 0 |
| CSO-11320 | Start-up & Test Pump 2 | 10 | 10-Mar-27 | 23-Mar-27 | 0 |
| CSO-11330 | Demo Chemical Tank 1 & Pumps 3-5 / Associated Piping & Controls | 5 | 24-Mar-27 | 30-Mar-27 | 0 |
| CSO-11340 | Install Chemical Storage Tank 1 & Pump 1 / Associated Piping & Controls | 5 | 31-Mar-27 | 06-Apr-27 | 0 |
| CSO-11350 | Install Fall Protection Railings & Gates at Chemical Tanks | 5 | 07-Apr-27 | 13-Apr-27 | 55 |
| CSO-11360 | Construct Chemical Storage Room Wall | 5 | 07-Apr-27 | 13-Apr-27 | 55 |
| CSO-11370 | Start-up & Test Pump 1 | 10 | 07-Apr-27 | 20-Apr-27 | 0 |
| CSO-11380 | Paint Chemical Storage Room | 5 | 14-Apr-27 | 20-Apr-27 | 55 |
| CSO-11390 | Prep & Install Floor Coating in Chemical Storage Room | 10 | 21-Apr-27 | 04-May-27 | 55 |
| CSO-11550 | Install TRC Analyzer | 5 | 09-Jul-27 | 15-Jul-27 | 0 |
| **Underground Facility** | | 55 | 21-Apr-27 | 08-Jul-27 | 0 |
| CSO-11510 | Install Chemical Mixers Chamber 1 | 20 | 21-Apr-27 | 18-May-27 | 0 |
| CSO-11520 | Install Chemical Mixers Chamber 2 | 20 | 19-May-27 | 16-Jun-27 | 0 |
| CSO-11530 | Install Chemical Mixer Influent Channel | 10 | 17-Jun-27 | 30-Jun-27 | 0 |
| CSO-11540 | Install Sample Pump | 5 | 01-Jul-27 | 08-Jul-27 | 0 |
| **HVAC Improvements** | | 35 | 03-Dec-26 | 25-Jan-27 | 125 |
| CSO-11400 | Demo SF-1 Fan, Planks & Walls | 5 | 03-Dec-26 | 09-Dec-26 | 125 |
| CSO-11410 | Demo EF-2 Fan | 5 | 10-Dec-26 | 16-Dec-26 | 125 |
| CSO-11420 | Infill Floor Opening | 5 | 17-Dec-26 | 23-Dec-26 | 140 |
| CSO-11430 | Install Insulated Blankoff Panel | 5 | 17-Dec-26 | 23-Dec-26 | 140 |
| CSO-11440 | Install New SF-1 and EF-2 Fans and Duct Work | 20 | 17-Dec-26 | 15-Jan-27 | 125 |
| CSO-11450 | Paint Fan Supply / Storage Room | 5 | 19-Jan-27 | 25-Jan-27 | 125 |
| **Screenings Improvements** | | 30 | 03-Mar-27 | 13-Apr-27 | 70 |
| CSO-11460 | Install Hydraulic Power Packs | 10 | 03-Mar-27 | 16-Mar-27 | 70 |
| CSO-11470 | Rehabilitate Existing Screens | 5 | 17-Mar-27 | 23-Mar-27 | 70 |
| CSO-11480 | Install Upgraded Screen Control System | 5 | 24-Mar-27 | 30-Mar-27 | 70 |
| CSO-11490 | Install Screen Flushing / Washdown System | 5 | 24-Mar-27 | 30-Mar-27 | 70 |
| CSO-11500 | Start-up & Test Screen System | 10 | 31-Mar-27 | 13-Apr-27 | 70 |
| **Electrical Improvements** | | 10 | 04-Jan-27 | 15-Jan-27 | 130 |
| CSO-11260 | Install LED lights in the Mixing & Disinfection Chamber | 5 | 04-Jan-27 | 08-Jan-27 | 130 |
| CSO-11270 | Install Exterior Lights & Receptacles | 5 | 11-Jan-27 | 15-Jan-27 | 130 |
| **Instrumentation Improvements** | | 5 | 16-Jul-27 | 22-Jul-27 | 0 |
| CSO-11280 | Connect Chemical Systems to Stations Main Control System | 5 | 16-Jul-27 | 22-Jul-27 | 0 |
| **Outfall** | | 10 | 17-Jun-27 | 30-Jun-27 | 15 |
| CSO-11560 | Install TRC Analyzer | 5 | 17-Jun-27 | 23-Jun-27 | 15 |
| CSO-11570 | Install Sample Pump | 5 | 24-Jun-27 | 30-Jun-27 | 15 |




Remaining Work | Critical Remaining Work | Actual Level of Effort
Actual Work | Remaining Level of Effort | Summary



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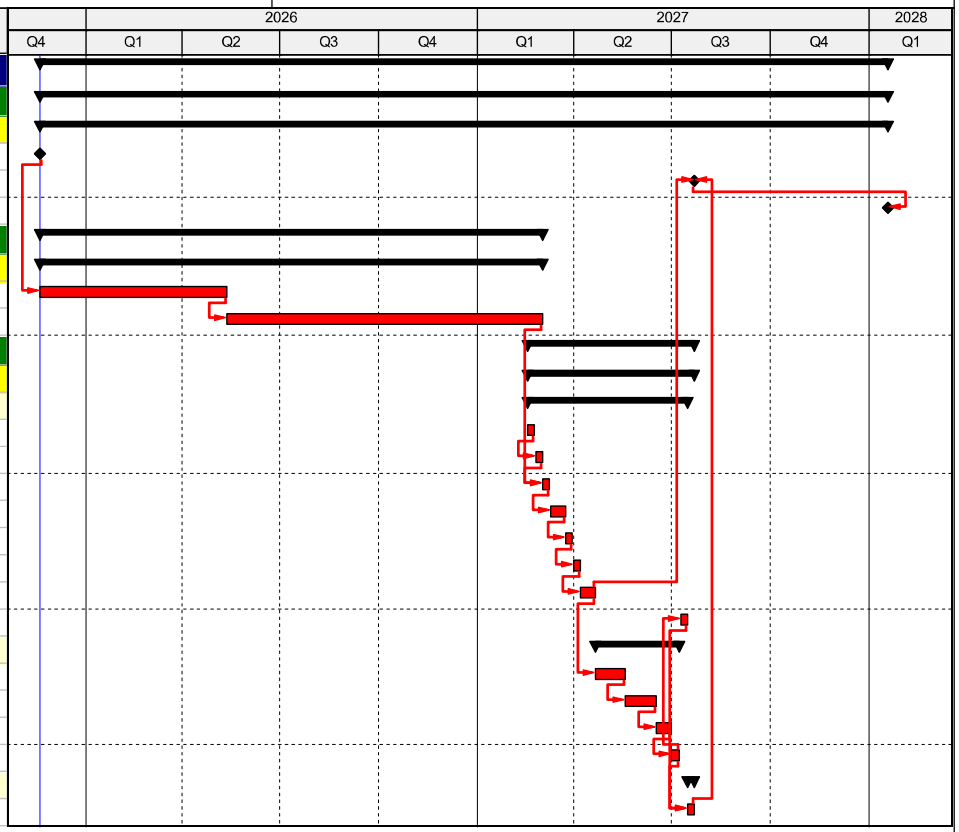
GLWA CSO Facilities Improvements | Critical Path | As of 19-Nov-25

| Activity ID | Activity Name | Rem Dur | Start | Finish | Total Float |
|---|---|---|---|---|---|
| **GLWA CSO Facilities Improvements** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| **GENERAL CONDITIONS** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| **Milestones** | | 791 | 19-Nov-25 | 18-Jan-28 | 0 |
| CSO-10000 | Notice to Proceed | 0 | 19-Nov-25 | | 0 |
| CSO-10020 | Substantial Completion | 0 | | 22-Jul-27 | 0 |
| CSO-10030 | Final Completion | 0 | | 18-Jan-28 | 0 |
| **SUBMITTALS / PROCUREMENT** | | 320 | 19-Nov-25 | 02-Mar-27 | 0 |
| **Division 43 - Process Gas & Liquid Handling** | | 320 | 19-Nov-25 | 02-Mar-27 | 0 |
| CSO-10150 | Submit / Approve Chemical System Equipment | 120 | 19-Nov-25 | 12-May-26 | 0 |
| CSO-10160 | Fab & Deliver Chemical System Equipment | 200 | 13-May-26 | 02-Mar-27 | 0 |
| **CONSTRUCTION** | | 110 | 17-Feb-27 | 22-Jul-27 | 0 |
| **St Aubin SDF** | | 110 | 17-Feb-27 | 22-Jul-27 | 0 |
| **Chemical System Improvements** | | 105 | 17-Feb-27 | 15-Jul-27 | 0 |
| CSO-11290 | Demo Masonry Knock-out Wall | 5 | 17-Feb-27 | 23-Feb-27 | 0 |
| CSO-11300 | Demo Chemical Tank 2 & Pumps 1&2 / Associated Piping & Controls | 5 | 24-Feb-27 | 02-Mar-27 | 0 |
| CSO-11310 | Install Chemical Storage Tank 2 & Pumps 2 / Associated Piping & Controls | 5 | 03-Mar-27 | 09-Mar-27 | 0 |
| CSO-11320 | Start-up & Test Pump 2 | 10 | 10-Mar-27 | 23-Mar-27 | 0 |
| CSO-11330 | Demo Chemical Tank 1 & Pumps 3-5 / Associated Piping & Controls | 5 | 24-Mar-27 | 30-Mar-27 | 0 |
| CSO-11340 | Install Chemical Storage Tank 1 & Pump 1 / Associated Piping & Controls | 5 | 31-Mar-27 | 06-Apr-27 | 0 |
| CSO-11370 | Start-up & Test Pump 1 | 10 | 07-Apr-27 | 20-Apr-27 | 0 |
| CSO-11550 | Install TRC Analyzer | 5 | 09-Jul-27 | 15-Jul-27 | 0 |
| **Underground Facility** | | 55 | 21-Apr-27 | 08-Jul-27 | 0 |
| CSO-11510 | Install Chemical Mixers Chamber 1 | 20 | 21-Apr-27 | 18-May-27 | 0 |
| CSO-11520 | Install Chemical Mixers Chamber 2 | 20 | 19-May-27 | 16-Jun-27 | 0 |
| CSO-11530 | Install Chemical Mixer Influent Channel | 10 | 17-Jun-27 | 30-Jun-27 | 0 |
| CSO-11540 | Install Sample Pump | 5 | 01-Jul-27 | 08-Jul-27 | 0 |
| **Instrumentation Improvements** | | 5 | 16-Jul-27 | 22-Jul-27 | 0 |
| CSO-11280 | Connect Chemical Systems to Stations Main Control System | 5 | 16-Jul-27 | 22-Jul-27 | 0 |




Remaining Work | Critical Remaining Work | Summary
Actual Work | Remaining Level of Effort | Milestone



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# Appendix L.
# Population Projections

# GLWA Service Area Population Projections

| County | Population and Households | ACS 2020 | Cencus 2010 | Change 2010-2020 | Pct Change 2010-2020 | SEMCOG July 2023 | SEMCOG 2050 | SEMCOG Predicted Change 2023-2050 | SEMCOG Predicted Pct Change 2023-2050 |
|---|---|---|---|---|---|---|---|---|---|
| Macomb | Total Population | 690,694 | 655,935 | 34,759 | 5.3% | 686,963 | 761,303 | 74,340 | 10.8% |
| Macomb | Group Quarters Population | 5,254 | 4,092 | 1,162 | 28.4% | 5,808 | 7,372 | 1,564 | 26.9% |
| Macomb | Household Population | 685,440 | 651,843 | 33,597 | 5.2% | 681,155 | 753,931 | 72,776 | 10.7% |
| Macomb | Housing Units | 289,894 | 277,884 | 12,010 | 4.3% | 294,588 | | | |
| Macomb | Households (Occupied Units) | 277,938 | 258,955 | 18,983 | 7.3% | 285,444 | 309,879 | 24,435 | 8.6% |
| Macomb | Residential Vacancy Rate | 4.1% | 6.8% | -2.7% | | 3.1% | | | |
| Macomb | Average Household Size | 2.47 | 2.52 | -0.05 | -2.0% | 2.39 | 2.43 | 0.05 | 1.9% |
| | | | | | | | | | |
| Oakland | Total Population | 929,633 | 880,949 | 48,684 | 5.5% | 925,075 | 1,000,813 | 75,738 | 8.2% |
| Oakland | Group Quarters Population | 11,172 | 8,548 | 2,624 | 30.7% | 14,637 | 17,218 | 2,581 | 17.6% |
| Oakland | Household Population | 918,461 | 872,401 | 46,060 | 5.3% | 910,438 | 983,595 | 73,157 | 8.0% |
| Oakland | Housing Units | 404,012 | 385,927 | 18,085 | 4.7% | 409,785 | | | |
| Oakland | Households (Occupied Units) | 382,031 | 355,768 | 26,263 | 7.4% | 392,005 | 413,953 | 21,948 | 5.6% |
| Oakland | Residential Vacancy Rate | 5.4% | 7.8% | -2.4% | | 4.3% | | | |
| Oakland | Average Household Size | 2.40 | 2.45 | -0.05 | -2.0% | 2.32 | 2.38 | 0.05 | 2.3% |
| | | | | | | | | | |
| Wayne | Total Population | 1,488,151 | 1,520,873 | (32,722) | -2.2% | 1,479,057 | 1,498,077 | 19,020 | 1.3% |
| Wayne | Group Quarters Population | 18,217 | 21,556 | (3,339) | -15.5% | 19,980 | 24,170 | 4,190 | 21.0% |
| Wayne | Household Population | 1,469,934 | 1,499,317 | (29,383) | -2.0% | 1,459,077 | 1,473,907 | 14,830 | 1.0% |
| Wayne | Housing Units | 658,984 | 691,820 | (32,836) | -4.7% | 664,682 | | | |
| Wayne | Households (Occupied Units) | 584,556 | 583,846 | 710 | 0.1% | 598,288 | 590,788 | (7,500) | -1.3% |
| Wayne | Residential Vacancy Rate | 11.3% | 15.6% | -4.3% | | 10.0% | | | |
| Wayne | Average Household Size | 2.51 | 2.57 | -0.05 | -2.1% | 2.44 | 2.49 | 0.06 | 2.2% |
| | | | | | | | | | |
| TOTAL | Total Population | 3,108,478 | 3,057,757 | 50721 | 1.7% | 3,091,095 | 3,260,193 | 169,098 | 5.5% |
| TOTAL | Group Quarters Population | 34,643 | 34,196 | 447 | 1.3% | 40,425 | 48,760 | 8,335 | 20.6% |
| TOTAL | Household Population | 3,073,835 | 3,023,561 | 50274 | 1.7% | 3,050,670 | 3,211,433 | 160,763 | 5.3% |
| TOTAL | Housing Units | 1,352,890 | 1,355,631 | -2741 | -0.2% | 1,369,055 | | | |
| TOTAL | Households (Occupied Units) | 1,244,525 | 1,198,569 | 45956 | 3.8% | 1,275,737 | 1,314,620 | 38,883 | 3.0% |
| TOTAL | Residential Vacancy Rate | 8.0% | 11.6% | -3.6% | | 6.8% | | | |
| TOTAL | Average Household Size | 2.47 | 2.52 | -0.05 | -2.1% | 2.39 | 2.44 | 0.05 | 2.1% |

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