

# Clinton - Oakland Sewage Disposal System SRF Project Plan

June 26, 2012



## Oakland County Water Resources Commissioner

Public Works Building  
One Public Works Drive  
Waterford, MI 48328

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## Clean Water Revolving Funds SRF/SWQIF Project Plan Submittal Form

<b>Name of the Project</b> Clinton-Oakland Sewage Disposal System SRF Project Plan		<b>Applicant's Federal Employer Identification Number (EIN)</b> 38-6004876W	
<b>Legal Name of Applicant</b> (The legal name of the applicant may be different than the name of the project. For example, a county may be the applicant for bonding purposes, while the project may be named for the particular village or township it serves.) Clinton-Oakland Sewage Disposal System		<b>Areas Served by this Project</b>  Counties <u>Oakland</u>  Congressional Districts <u>9 and 12</u>  State Senate Districts <u>12 and 14</u>  State House Districts <u>43 and 29</u>	
<b>Address of Applicant</b> (Street, PO Box, City, State & Zip)  One Public Works Drive, Building 95 West Waterford, MI 48328-1907			
<b>Brief Description of the SRF Project</b> Divert 13 cfs during significant wet weather events to a proposed a 5.5 Million Gallon above-ground Storage Retention Tank at the Road Commission of Oakland County Site and divert flow from the COSDS to the City of Pontiac Waste Water Treatment Plant to improve the conveyance of sanitary sewage through the COSDS.			
<b>Estimated Total Cost of the SRF Project</b> \$43,920,000		<b>SRF Construction Start Target Date</b> 4th Quarter, 2013	
<b>Brief Description of the SWQIF Project</b>			
<b>Estimated Total Cost of the SWQIF Project</b>		<b>SWQIF Construction Start Target Date</b>	
<b>Name and Title of Applicant's Authorized Representative</b>  Mr. Kevin Larsen, Chief Deputy on behalf of John P. McCulloch, Water Resources Commissioner			
<b>Address of Authorized Representative</b> (if different from above)		<b>Telephone</b> 248-858-0958	<b>FAX</b> N/A
		<b>E-Mail Address</b> larsenk@oakgov.com	
<b>Signature of Authorized Representative</b>		<b>Date</b> June 22, 2012	
<b>Joint Resolution(s) of Project Plan Adoption/Authorized Representative Designation attached</b> check here <input type="checkbox"/>			

A final project plan, prepared and adopted in accordance with the Department's *Clean Water Revolving Funds (SRF and SWQIF) Project Plan Preparation Guidance*, must be submitted by July 1st in order for a proposed project to be considered for placement on a Project Priority List for the next fiscal year. Please send your final project plan with this form to:

REVOLVING LOAN SECTION  
RESOURCE MANAGEMENT DIVISION  
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
PO BOX 30241  
LANSING MI 48909-7741

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# ***Section 1 – Introduction***

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## **1.1 Project Introduction**

The Clinton-Oakland Sewage Disposal System (COSDS) is a regional sewer service district that serves 12 communities in central and northern Oakland County. The Oakland County Water Resources Commissioner (WRC) owns, operates, and is responsible for all maintenance, operation, and administration of the WRC interceptor sewers that serve the district. At this time, a number of system improvements are needed in the COSDS to bring the system into compliance with an existing District Compliance Agreement (DCA) and, to eliminate periodic SSOs, and resolve capacity issues. This 2012 Project Plan was prepared on behalf of the WRC for the purpose of obtaining State Revolving Fund (SRF) loans from the Michigan Department of Environmental Quality (MDEQ) for the construction of improvements to the COSDS.

This 2012 SRF Project Plan examines the needs of the wastewater facilities within the COSDS over a planning period of 20 years, with a focus on the projects that are proposed to begin construction within the next five-year planning period of 2013 to 2018. These projects have been identified as Priority Projects and are listed below:

- 5.5 million gallon Storage Retention Tank (SRT) - Elizabeth Lake Pump Station / Site #7
- Perry Street Diversion to the City of Pontiac Wastewater Treatment Plant

# Section 2 – Project Background

## 2.1 Study Area Characteristics

### 2.1.1 Delineation of Study Area

The COSDS provides sanitary sewer service to 12 cities, villages and townships (CVTs) and includes a regional interceptor system approximately 57 miles in length. The COSDS service area includes all or part of the Cities of Auburn Hills, Rochester Hills, Rochester, and Lake Angelus; the Townships of Independence, Waterford, West Bloomfield, Oakland, Orion, and Oxford; and the Villages of Clarkston, Lake Orion, and Oxford. Figure 2-1 shows the entire COSDS, including the service district and the main interceptors. The activities proposed within this Project Plan are focused on a key hydraulic bottleneck identified downstream of the Elizabeth Lake Pump Station (ELPS). Figure 2-2 illustrates the component of the COSDS that is the focus of the Project Plan.

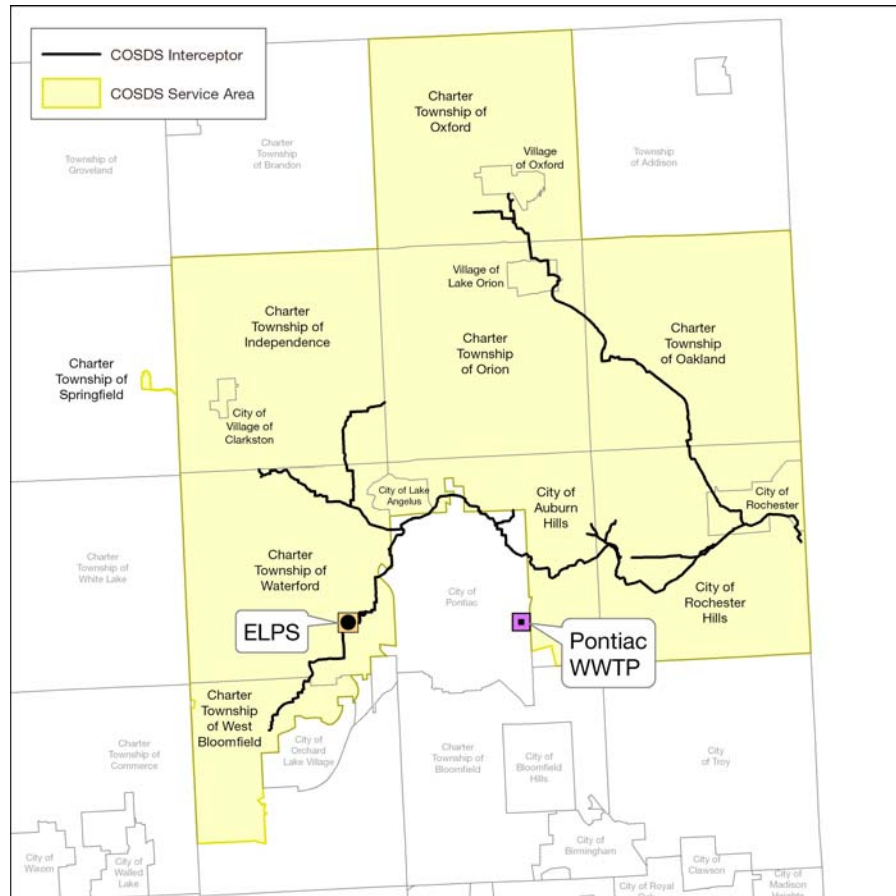
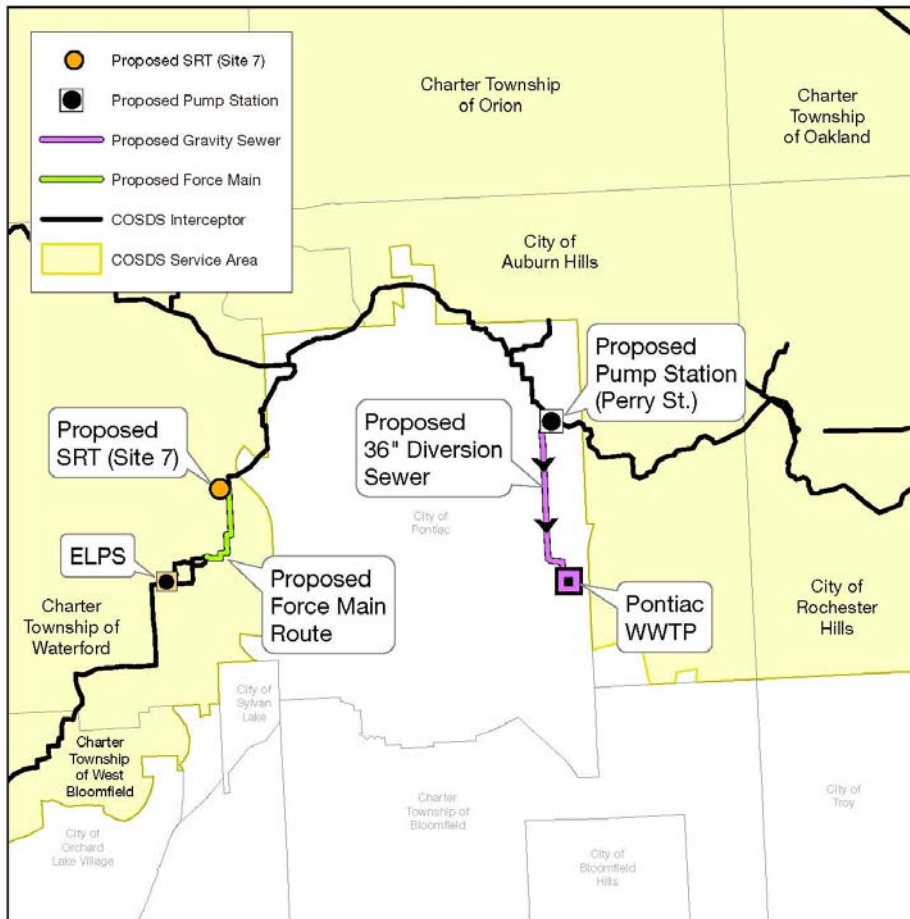


Figure 2-1 - COSDS Service Area



**Figure 2-2 - Study Area with Proposed Projects**

**a) Lakes, Rivers, Ponds, and Wetlands**

The general locations of wetlands are shown in relation to the proposed project locations according to data from the National Wetlands Inventory (NWI) (Figure 2-3). An official field review would need to be performed during design of the project to determine the presence or absence of any potentially regulated Part 303 of Public Act 451 of 1994, as amended wetlands.

**b) Existing Treatment Facilities**

Wastewater from the COSDS is transported to the Oakland-Macomb Interceptor Drain (OMID), which ultimately discharges to the Detroit Water and Sewerage Department (DWSD) for treatment and subsequent discharge to the Detroit River. It consists of two interceptor sub-systems referred to as the Clinton-Oakland and the Paint Creek interceptors.

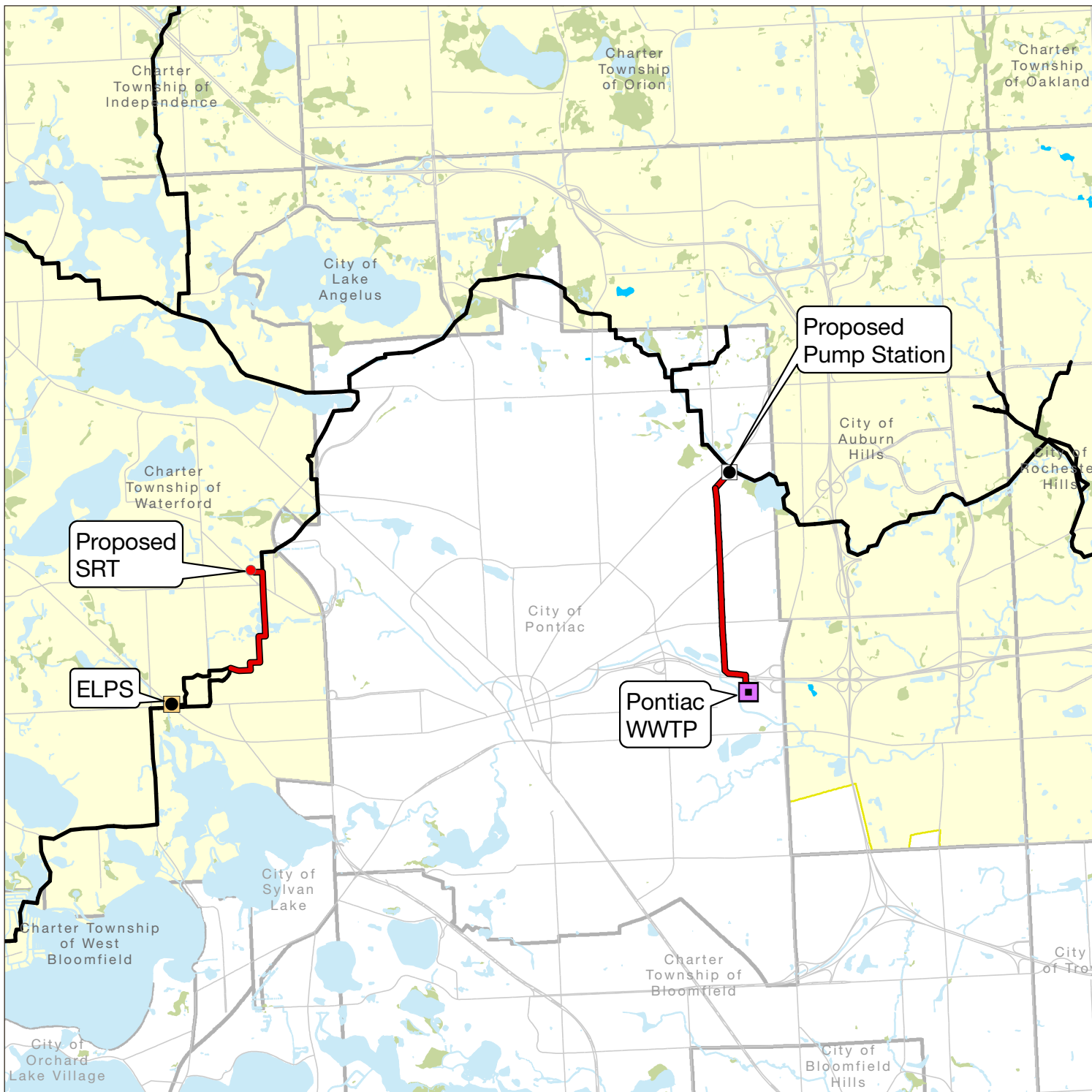
**c) Effluent Disposal Locations**

All wastewater from the COSDS is treated at the City of Detroit’s Wastewater Treatment Plant and discharged to the Detroit River.

**Figure 2-3 - Lakes, Rivers, Ponds and Wetlands**

# FIGURE 2-3 Lakes, Rivers, Ponds & Wetlands

OAKLAND COUNTY WATER RESOURCES COMMISSIONER



- Proposed Pump Station
- Proposed SRT
- Pontiac WWTP
- Elizabeth Lake Pump Station
- Proposed Improvement
- COSDS Interceptor
- Major Road
- River, Stream, Drain
- Lake
- Detention/Retention Pond
- Wetland
- Municipal Boundary
- COSDS Service Area



**Source:** Data provided by Washtenaw County and the City of Ann Arbor. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

**Coordinate System:** Michigan South NAD 1983 State Plane International Feet

**Map Published:** May 16, 2012



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**d) Sludge Disposal Sites**

There are no sludge disposal sites in the COSDS. Any dewatered solids left over from the vactor operations are landfilled outside the COSDS.

**e) Existing interceptors, collectors, pumping stations, and force mains.**

The existing COSDS consists of two major interceptors, the Paint Creek and the Clinton-Oakland interceptors. Figure 2-1 shows the COSDS district boundaries, pump station and interceptor network.

**f) Population distribution**

The total residential population of the COSDS service area in the year 2010 was estimated to be 241,519. Total equivalent populations, which include equivalent values for commercial and industrial areas, are currently estimated at 291,895. The population distribution, by community, is listed in Table 2-1.

**g) Parks and recreation areas**

See Figure 2-4 for locations of major park and recreation areas within the COSDS.

**2.1.2 Land Use in Study Area**

**a) Current Use**

The existing land use for the communities in the COSDS is summarized in Table 2-2. Land use for the entire COSDS service area is largely residential with some commercial/industrial and little to no agriculture. Figure 2-5 shows a graphical depiction of the existing zoning and land use in the COSDS.

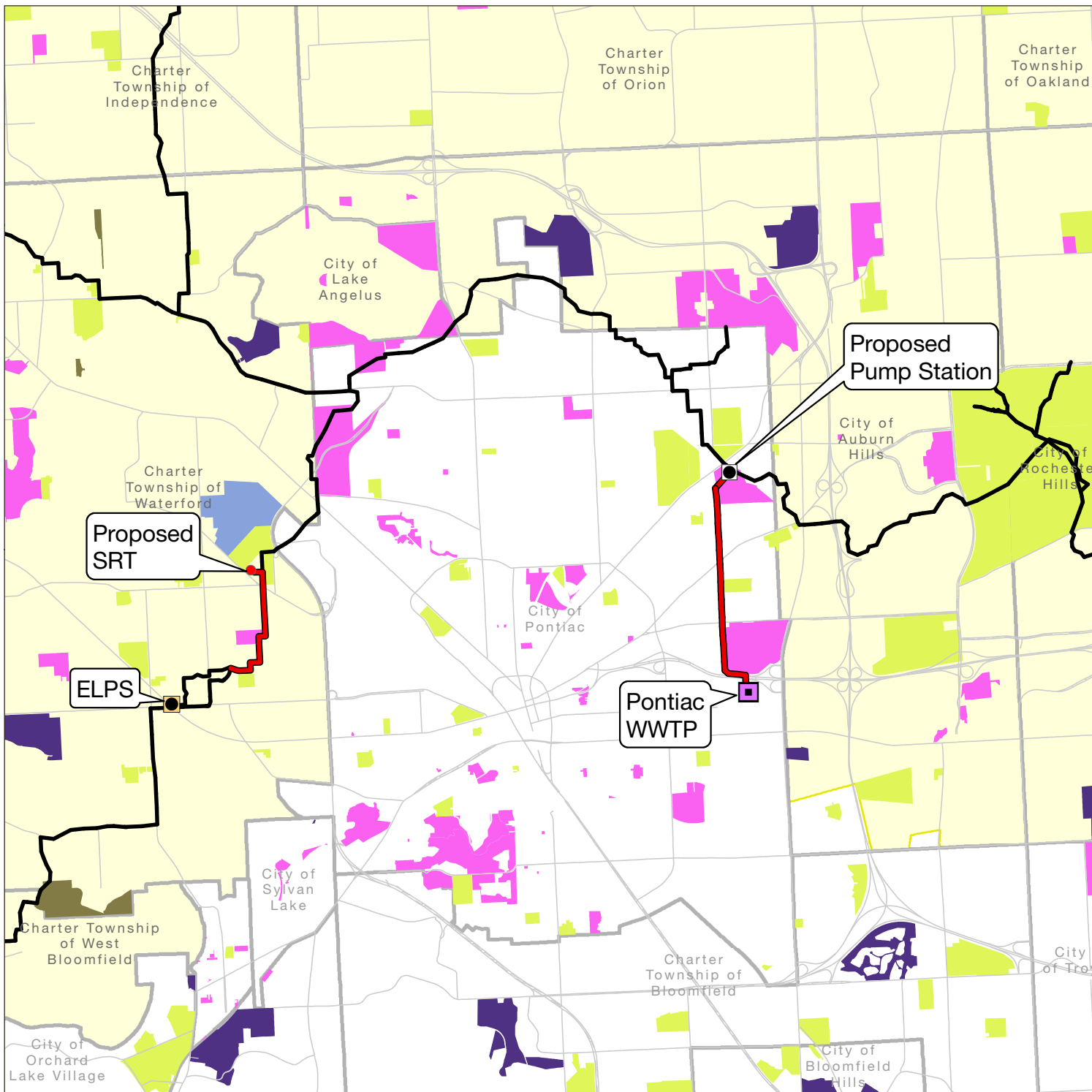
**Table 2-1 - Population Data for the COSDS Communities**

<b>Community</b>	<b>Residential Equivalent Population</b>	<b>Non Residential Equivalent Population</b>	<b>Total Equivalent Population</b>
Independence Township / Village of Clarkston	16,720	0	16,720
City of Lake Angelus	290	0	290
Waterford Township	72,409	0	72,409
West Bloomfield Township	20,550	0	20,550
City of Auburn Hills	14,816	39,029	53,845
Orion Township	18,674	11,347	30,021
Lake Orion Village	2,777	0	2,777
Oakland Township	7,193	0	7,193
Oxford Township	5,953	0	5,953
Village of Oxford	3,302	0	3,302
City of Rochester Hills	67,925	0	67,925
City of Rochester	11,200	0	11,200
<b>TOTALS</b>	<b>241,519</b>	<b>50,376</b>	<b>291,895</b>

\* Current population includes only the population tributary to the COSDS Interceptor

# FIGURE 2-4 Parks & Recreation

OAKLAND COUNTY WATER RESOURCES COMMISSIONER



- Pontiac WWTP
- Elizabeth Lake Pump Station
- Proposed Pump Station
- Proposed SRT
- Proposed Improvement
- COSDS Interceptor
- Major Road
- Recreation Land
- County
- Educational Facility
- Municipality
- Private Owner
- State of Michigan
- Municipal Boundary
- COSDS Service Area



**Source:** Data provided by Washtenaw County and the City of Ann Arbor. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

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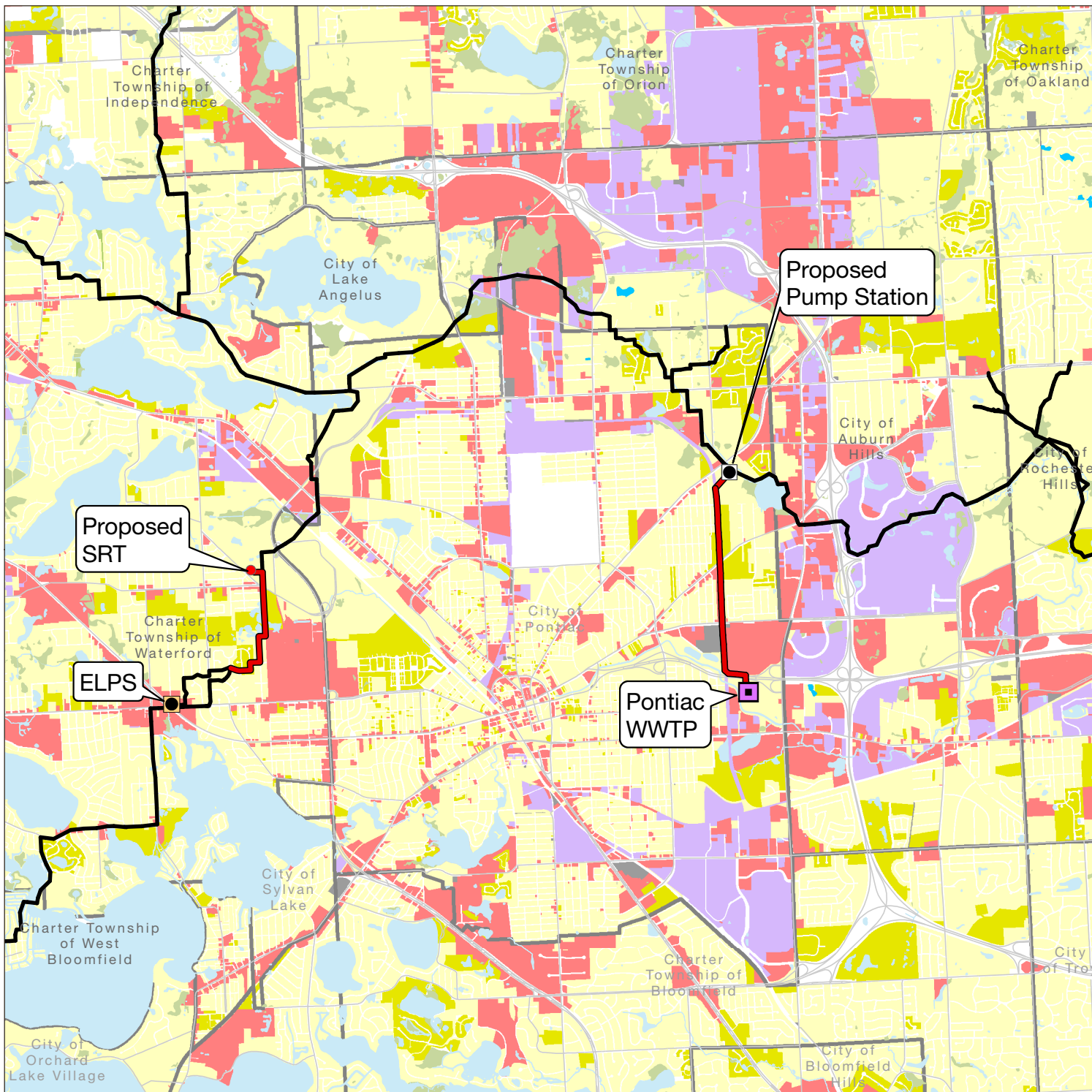
**Map Published:** May 16, 2012



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# FIGURE 2-5 Existing Land Cover & Land Use

OAKLAND COUNTY WATER RESOURCES COMMISSIONER



- Pontiac WWTP
- Elizabeth Lake Pump Station
- Proposed Pump Station
- Proposed SRT
- Proposed Improvement
- COSDS Interceptor
- Major Road
- Municipal Boundary
- Lake
- Detention/Retention Pond
- Wetland
- Residential
- Multi-Family Residential
- Commercial
- Open Space
- Industrial
- Utility



**Source:** Data provided by Washtenaw County and the City of Ann Arbor. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

**Coordinate System:** Michigan South NAD 1983 State Plane International Feet

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**Table 2-2 - Land Use by Community**

Community	Land Area (acres)	Land Use * (%)				
		Residential	Commercial/ Industrial	Agriculture	Public	Other
Independence Township	23,217	64.9	6.2	0.0	12.8	16.1
Village of Clarkston	329	52.1	2.9	0.0	14.4	30.6
Waterford Township	22,556	47.6	9.5	0.0	13.9	29
West Bloomfield Township	19,971	58.4	4.3	0.0	9.2	28.1
City of Auburn Hills	10,644	33.3	36.7	0.0	14.5	15.5
Orion Township	22,170	48.7	9.7	0.0	25.3	16.3
Lake Orion Village	839	32.2	7.7	0.0	5.3	54.8
Oakland Township	23,478	69.5	2.2	1.1	21.3	5.9
Oxford Township	21,696	56.8	19.1	3.4	10.8	9.9
Village of Oxford	941	42.3	16.4	0.0	12.2	29.1
City of Rochester Hills	21,097	57.6	9.8	0.0	17.1	15.5
City of Rochester	2,416	53.4	20.4	0.0	10.8	15.4
City of Lake Angelus	1,049	38.2	0.9	0.0	18.7	42.2

\* Data provided by SEMCOG, based on 2008 land use

**b) Predicted Land Use**

The predicted future land use within the service area is anticipated to follow existing patterns and trends with moderate growth expected in the northern part of Oakland County. This growth will add flows to the COSDS interceptor.

**2.1.3 Surface and Ground Waters**

The southern portion of the COSDS, including West Bloomfield, Orion Township, Lake Orion Village and Rochester Hills, utilizes drinking water from the extensive distribution system from the City of

Detroit Water and Sewerage Department (DWSD) System. The remainder of the COSDS study area utilizes either individual private wells or a community water system.

The vast majority of the COSDS lies within the Clinton River watershed. A small portion of the study area is located in the headwaters of the Rouge River. The Rouge and Clinton Rivers are both EPA Great Lakes Areas of Concern. Both watersheds are covered by a Total Maximum Daily Load (TMDL) for *E. coli* and the Rouge River also has a TMDL for biota.

The Clinton River and its tributaries are used for recreational activities, including canoeing, kayaking, fishing and other passive uses. Each municipality in the COSDS, as well as Oakland County, maintain MS4 storm water permit coverage and participate in collaborative watershed management efforts with the various subwatershed advisory groups.

## **Economic Characteristics**

### **a) Economic Structure and Major Employers**

Table 2-3 lists the major employment categories and employment distribution for the COSDS communities.

**Table 2-3 - Current Job Estimates by Industry (SEMCOG, 2005)**

	Independence Township	Village of Clarkston	Waterford Township	West Bloomfield Township	City of Auburn Hills	Orion Township	Lake Orion Village	Oakland Township	Oxford Township	Village of Oxford	City of Rochester Hills	City of Rochester	City of Lake Angelus
Natural Resources & Mining	C	C	17	C	0	C	0	C	C	0	C	0	0
Manufacturing	368	C	945	120	6,948	3,947	0	C	897	367	6,930	1,026	0
Wholesale Trade	129	0	781	286	3,008	170	C	C	109	28	854	71	0
Retail Trade	816	36	4,401	2,075	3,227	1,624	54	368	459	92	4,635	451	0
Transportation & Warehousing	C	C	1,337	71	362	C	C	0	C	27	345	153	0
Utilities	0	0	C	0	0	0	0	0	0	0	0	0	0
Information	43	0	C	153	400	75	C	12	C	68	152	C	0
Financial Activities	504	136	1,180	1,177	2,794	155	71	41	129	98	935	535	C
Professional, Scientific, & Technical Services	285	21	759	813	12,686	567	43	223	34	73	2,933	589	0
Management of Companies & Enterprises	C	0	4	C	5,684	0	C	0	0	C	C	0	0
Administrative, Support, & Waste Services	251	C	1,315	729	5,760	787	C	C	C	C	2,416	532	C
Education Services	1,134	0	2,903	1,773	3,484	760	C	326	344	240	2,273	340	0
Health Care & Social Assistance	1,371	C	1,858	4,126	1,651	753	306	92	353	110	4,487	671	0
Leisure & Hospitality	1,387	C	2,738	2,273	4,644	942	200	138	355	238	2,347	750	C
Other Services	250	7	877	462	376	299	28	28	114	57	714	527	C
Public Administration	99	C	1,581	426	392	108	C	C	C	C	375	C	0
<b>Total</b>	<b>6,649</b>	<b>635</b>	<b>21,097</b>	<b>14,570</b>	<b>51,416</b>	<b>10,246</b>	<b>1,090</b>	<b>1,861</b>	<b>3,136</b>	<b>1,613</b>	<b>29,779</b>	<b>5,897</b>	<b>21</b>

Note: "C" indicates data blocked due to confidentiality concerns of ES-202 files.

**b) Median Annual Household Income**

Median annual household income, as well as the percentage of households in poverty, for the COSDS communities is listed in Table 2-4. This information was taken from the 2010 Census data or latest available estimates.

**Table 2-4 - Median annual household income and percentage of households in poverty**

<b>Community</b>	<b>Median Household Income</b>	<b>Households in Poverty</b>
Independence Township	\$80,536	2.5%
Village of Clarkston	\$57,786	5.6%
Waterford Township	\$55,573	9.9%
West Bloomfield Township	\$99,713	2.7%
City of Auburn Hills	\$49,558	13.4%
Orion Township	\$78,155	3.2%
Lake Orion Village	\$48,797	4.6%
Oakland Township	\$110,997	2.6%
Oxford Township	\$69,071	4.3%
Village of Oxford	\$59,397	5.8%
City of Rochester Hills	\$78,086	6.5%
City of Rochester	\$76,603	6.2%
City of Lake Angelus	\$131,078	3.3%



Table 2-5 lists the jobs forecast for the COSDS communities for years 2010 and 2035. Source: SEMCOG 2035 Forecast.

**Table 2-5 - Jobs Forecast**

Community	Jobs Forecast	
	2010	2030
Independence Township	8,420	9,974
Village of Clarkston	940	940
Waterford Township	29,948	33,481
West Bloomfield Township	20,923	21,768
City of Auburn Hills	60,604	70,292
Orion Township	11,896	14,237
Lake Orion Village	1,758	1,745
Oakland Township	2,277	2,427
Oxford Township	3,947	4,712
Village of Oxford	2,406	2,583
City of Rochester Hills	37,294	43,537
City of Rochester	8,508	9,196
City of Lake Angelus	30	65

**c) Economic Characteristics Affecting Population Growth**

The recent economic downturn has resulted in a very slight decrease in water and wastewater usage in the COSDS. The current economic forecast, as indicated by the job forecast, shows steady, gradual growth through 2030. Therefore, it is anticipated that wastewater needs will remain relatively constant through the planning period.

## 2.2 Existing Facilities

### 2.2.1 Method of Wastewater Treatment

Wastewater from the COSDS is discharged to the Oakland Macomb Interceptor Drain (OMID) with ultimate discharge to the DWSD system for treatment at the Detroit Wastewater Treatment Plant. The Detroit WWTP uses an activated sludge treatment process and discharges treated effluent to the Detroit River.

The City of Pontiac Wastewater Treatment Plant (COP WWTP) is near the COSDS interceptor, although it currently receives no flow from the COSDS. Given the recent downward trend in population within the City of Pontiac, the COP WWTP has spare treatment capacity and can accept some wastewater flow from the COSDS interceptor. Recently, the WRC and the City of Pontiac reached an agreement to allow a partial diversion from the COSDS interceptor to the COP WWTP. This scenario is beneficial to both the City of Pontiac and the COSDS communities, as it reduces reliance on DWSD and takes advantage of local treatment opportunities. This will have an overall positive economic benefit on the City of Pontiac and the communities tributary to the COSDS.

### 2.2.2 Method of Sludge Handling and Disposal

With the exception of vector spoils, the vast majority of solids are transported through the interceptor system to the City of Detroit. Any solids removed from the sewer system during routine inspection and maintenance are taken to the WRC septage disposal site in Pontiac (located outside the limits of the COSDS). There, they are dried and sent to a landfill for disposal.

### 2.2.3 Type of Collection Facilities

The original Clinton Oakland System was constructed in the late 1960s and early 1970s. It consists of two interceptor sub-systems referred to as the Clinton-Oakland and the Paint Creek interceptors. Both interceptors have flow capacities ranging from 2 cfs to 200 cfs depending on the diameter and slope of the specific section of the interceptor. There is also the Gibson-Avon Arm, which collects sanitary sewage from a portion of the City of Rochester Hills. The hydraulic capacity of the downstream end of the Gibson-Avon system is approximately 26 cfs.

Local sanitary collector sewers are owned and operated by the individual communities within the COSDS.

The WRC maintains the interceptor system through a rigorous 7-year rotating maintenance program that includes sewer televising, cleaning, inspection and repair. Any issues identified during the inspection process are programmed for maintenance and are promptly resolved.

#### **2.2.4 Facilities Locations**

Figure 2-1 shows the location of the COSDS Interceptor sewer and the Elizabeth Lake Pump Station (ELPS), which is the only pumping facility along the COSDS Interceptor. A list of industrial users, along with their NPDES permit numbers, is included in Appendix A.

#### **2.2.5 Design Capacity, Existing Flows and Waste Characteristics**

The COSDS contract outlet capacity (which includes flow from the Clinton Oakland and Gibson Arm interceptors) is 140 cfs. The recently signed agreement between the COSDS and the OMID, defines this maximum allowable flow as the COSDS component at the OMID outlet. Current average dry weather flow for the system is approximately 47.7 cfs. Wastes discharged to the COSDS are typical of municipal sewage.

#### **2.2.6 Septage**

There is one septage receiving facility in the COSDS. It is located on Oakland Avenue in Pontiac. This facility is used by the WRC, several municipalities and licensed septage haulers.

#### **2.2.7 Industrial Discharges**

A list of industrial users and their associated NPDES permit numbers is located in Appendix A.

#### **2.2.8 Average and Peak Dry and Wet Weather Flows**

Average and peak dry weather flows for the COSDS are approximately 47.7 cfs and 70.0 cfs, respectively.

#### **2.2.9 Infiltration and Inflow Problems**

The WRC tracks inflow and infiltration through its extensive meter network in the COSDS. There are over 45 high accuracy meters that are utilized for flow meter based billing. Quarterly analysis of these meters includes tracking nighttime infiltration and wet weather peaking factors. These meters have been in service for over 10 years with detailed meter analysis available since 2007. I/I issues can be easily identified through this process and programmed for further investigation. As of the date of this SRF Project Plan, there were 4 incremental meter districts with unexplained, high peak wet weather flows that are currently under investigation in the COSDS.

#### **2.2.10 Combined Sewers**

There are no combined sewers in the COSDS.

### **2.2.11 System Bypasses and SSOs**

The COSDS has not experienced any SSOs since 2004.

### **2.2.12 Combined Sewer Overflows**

There are no combined sewers or combined sewer overflows in the COSDS.

### **2.2.13 Pump Station Capacities**

The COSDS includes one regional pump station. The Elizabeth Lake Pump Station (ELPS) pumps flows from the southwest part of the COSDS. Wastewater from West Bloomfield Township and portions of Waterford Township are tributary to the ELPS. It is reported that the station was originally constructed in 1968 and last rehabilitated in 2003. The ELPS has a firm capacity of 53.8 cfs.

### **2.2.14 Pump Station Adequacy**

The ELPS has adequate pumping capacity to handle all upstream flows. The WRC controls the operating pumping rates below firm capacity so as to avoid hydraulic surcharging in the COSDS interceptor downstream of the ELPS.

### **2.2.15 Operation or Maintenance Problems**

Currently, there are few to no operation and maintenance problems in the COSDS. The WRC utilizes a perpetual 7-year rotating maintenance cycle that includes sewer televising, cleaning, inspection and repair. Problems that are identified through their maintenance program are programmed for repair.

Current operation and maintenance problems in the COSDS are primarily related to capacity restrictions in the COSDS Interceptor. This has resulted in surcharged sewers and intermittent SSOs that occur during heavy or extended wet weather events.

Improvements proposed in this project plan will address pipe capacity issues within the COSDS Interceptor from immediately downstream of the Elizabeth Lake Pump Station through Rochester Hills. See Figure 2-6 for an illustration of the hydraulic bottleneck in the COSDS Interceptor.

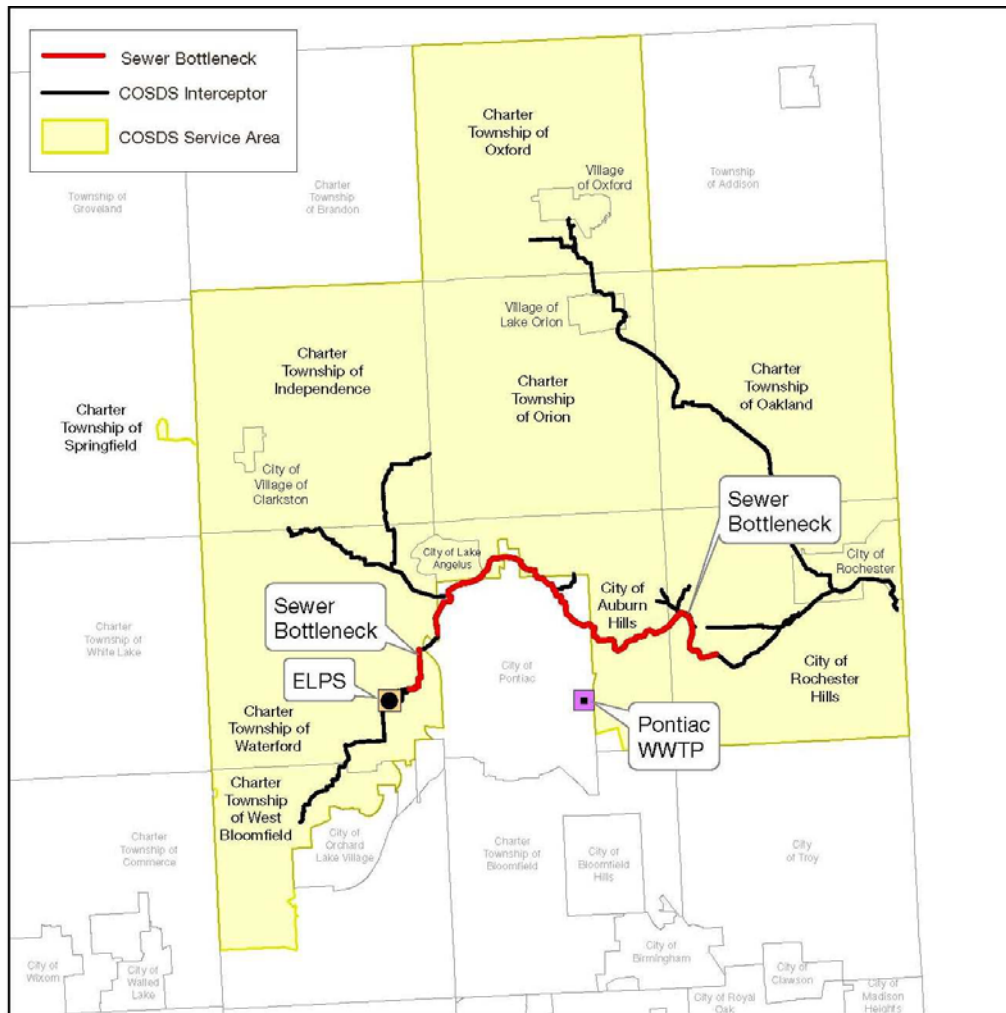


Figure 2-6 - COSDS Interceptor: Locations of Capacity Restriction

## 2.3 Need for Project

### 2.3.1 Method of Wastewater Treatment

Although the WRC is currently in compliance with state permit obligations, there has been concern about the ability of the COSDS Interceptor to convey wet weather flows without overflows. After reported SSO events in 2004, the MDEQ initiated an enforcement effort with the WRC (then OCDC) in May 2006.

### 2.3.2 Orders

The enforcement effort that began in 2006 culminated in a hold on Part 41 permit applications (August 2009) for Waterford Township (within the COSDS service area). In September 2009, a District Compliance Agreement (DCA) that was signed by the MDEQ and WRC (DCA-WRC-2009-01). The first key task completed as part of the DCA was the development of the *COSDS Master*

Plan (OHM, January 2010). The Master Plan identified two key hydraulic bottlenecks in the COSDS Interceptor that are susceptible to surcharge during wet weather events. The Master Plan was submitted to the MDEQ (then DNRE) per the DCA requirement. In April 2010, the MDEQ (DNRE) requested a course of action to address hydraulic deficiencies by July 1, 2010.

After coordination with MDEQ (DNRE) staff, a final Proposed Action Plan was submitted to the MDEQ (DNRE) in September 2010. This action plan included specific steps to address hydraulic deficiencies in the COSDS Interceptor, including the projects recommended in this Project Plan. The MDEQ approved the revised Proposed Action Plan and made it a formal amendment to the DCA.

All correspondence related to WRC / MDEQ agreements and actions, including the Proposed Action Plan (September 2010) is located in Appendix B.

### **2.3.3 Water Quality Problems**

The study area is located within the Clinton River watershed. There are no known water quality problems within the Clinton River watershed that are the result of the operation of the COSDS Interceptor.

### **2.3.4 Projected Needs for the Next 20 Years**

As detailed in the 2010 COSDS Master Plan, future population growth in Oakland County will add flows to the COSDS Interceptor and worsen the existing condition. Although the majority of the COSDS Interceptor has additional capacity to handle future flows, the two locations identified in this report as hydraulically deficient will require system improvements to reduce wet weather flow rates. The needs are focused on two key areas of known hydraulic deficiencies (see Figure 2-6 for an illustration of the area of the documented hydraulic restriction):

- Upstream improvements: needed to relieve hydraulic pressures in the upstream reaches of the COSDS Interceptor. These improvements are targeted at or near the Elizabeth Lake Pump Station (ELPS), as the COSDS Interceptor is experiencing hydraulic surcharge downstream of this location. The improvements are intended to mitigate the peak flow through the storage of wet weather flows.
- Downstream improvements: needed to relieve hydraulic pressures in the downstream reaches of the COSDS Interceptor. These improvements are targeted at or near Lake Galloway Park (City of Pontiac), as the COSDS Interceptor is experiencing hydraulic surcharge downstream of this location. The improvements are intended to mitigate the peak flow through the diversion of 30% of the instantaneous flow from the COSDS Interceptor to the City of Pontiac Wastewater Treatment Plant (COP WWTP).

### **2.3.5 Future Environment without the Proposed Project**

There are several negative outcomes that would result if the proposed projects in this Project Plan were not implemented:

1. Future growth and continued aging of the local sewer systems would result in higher wet weather flows. This would increase the likelihood of SSOs and would result in the COSDS Interceptor failing to meet Michigan's SSO Policy of having "*on average less than one overflow per ten years.*"
2. The inability to divert flows to the City of Pontiac WWTP would subject the WRC (and the rate payers within the COSDS service area) to higher costs due to anticipated rate increases from the DWSD. Furthermore, it would have a negative impact on the economy in Oakland County, as the City of Pontiac would not benefit from the revenue resulting in increased flow rates from the proposed flow diversion.

## **2.4 Population Data**

### **2.4.1 Current and Future Population Estimates**

Current population data for the COSDS study area served by the existing facilities and population projections through the next 20+ years is listed in Table 2-6.

**Table 2-6 - Current Population and Projections**

<b>Community</b>	<b>Current Total Equivalent Population *</b>	<b>Year 2020 Population Projection **</b>	<b>Year 2030 Population Projection **</b>	<b>Year 2035 Population Projection **</b>
Independence Township / Village of Clarkston	16,720	17,153	17,472	16,035
City of Lake Angelus	290	291	336	336
Waterford Township	72,409	70,928	71,148	71,113
West Bloomfield Township	20,550	20,883	21,590	20,757
City of Auburn Hills	53,845	55,011	55,426	55,947
Orion Township / Lake Orion Village	32,798	33,966	34,630	34,633
Oakland Township	7,193	8,839	10,039	10,678
Oxford Township	5,953	7,119	7,709	7,728
Village of Oxford	3,302	3,797	3,928	3,937
City of Rochester Hills	67,925	72,067	72,072	72,036
City of Rochester	11,200	13,586	13,715	13,734
<b>COSDS TOTALS</b>	<b>291,895</b>	<b>303,640</b>	<b>308,065</b>	<b>306,934</b>

\* Current population includes only the population tributary to the COSDS Interceptor

\*\* Future population based on SEMCOG-projected populations for Oakland County (2040 Forecast)

## 2.5 Environmental Setting

### 2.5.1 Cultural Resources

There are five (5) State or nationally registered historical sites located within one mile of the recommended COSDS projects according to the Michigan Center for Geographic Information (<http://www.michigan.gov/cgi/>) and the National Register of Historical Places ([www.nationalregisterofhistoricplaces.com](http://www.nationalregisterofhistoricplaces.com)). None of these historical sites will be affected by the proposed projects. A completed Section 106 Review Application and submittal to the Michigan State Historic Preservation Office are included in Appendix G (this submittal includes a figure showing the locations of the historic sites). This site will not be affected by the proposed project.



## 2.5.2 Natural Environment

Figures 2-3 and 2-5 show the natural features and land use within the service area, respectively.

### a) Climate

Weather conditions are not expected to adversely impact this project. The climate of the service area is moderated by the Great Lakes with the average frost-free season extending from approximately mid-April to mid-November. Winter temperatures average around the freezing point in January and February, but overnight lows are typically between 15 degrees F and 20 degrees F. Deep freezes with temperatures below 15 degrees F usually occur at least once each winter and last for a few days to two weeks.

Summer temperatures average around 72 degrees F in July and August with afternoon highs of 85 degrees F common. The last two weeks in July and the first two weeks in August are typically the hottest weeks of the year. Temperatures above 90 degrees F are not uncommon. In general, summer hot spells last longer and occur more frequently than do winter deep freezes.

Table 2-7 shows the average monthly temperature for each month as provided by the Michigan State Climatologist Office.

**Table 2-7 - Average Monthly Temperature for Southeast Michigan**

Month	Temperature (°F)
January	23
February	27
March	36
April	48
May	59
June	68
July	73
August	71
September	63
October	52
November	40
December	28

Data in Table 2-8 shows the average precipitation amounts for each month. Precipitation is more prevalent during the months of May and June (6.73 inches), averaging more than three inches above

that of January and February (3.66 inches). During the months of May, June, July and August, thunderstorms occur on an average of five to six days per month.

Snowfalls of greater than one inch typically occur three days each month during December, January, and February, two days in March and one day in April. During March and April, and other winter months, these snowstorms alternate with rain, freezing rain, and sleet.

**Table 2-8 - Monthly Precipitation Data (Source: Detroit Metro Airport)**

Month	Minimum (24 Hour)	Maximum	Monthly Average
January	1.72	3.63	1.91
February	1.23	2.68	1.75
March	1.18	4.48	2.47
April	1.97	5.40	3.22
May	2.87	5.88	3.31
June	2.62	6.60	3.42
July	2.19	6.02	3.10
August	3.21	7.70	3.28
September	2.97	5.83	2.16
October	2.11	4.87	2.48
November	1.52	3.31	2.32
December	3.71	6.00	2.27

**b) Air Quality**

Air quality in Michigan is monitored by the State through the Michigan Air Quality Monitoring Program. There are monitoring stations scattered throughout Michigan. However, a large concentration of the stations is located in southeast Michigan.

There are seven monitoring stations in southeast Michigan that record ozone levels. These stations are operated by state and local agencies. According to the 2002 Annual Air Quality Report for Michigan, all seven monitoring sites were above the 0.08-ppm ozone limit in 2002. When averaged over a 3-year period from 2000-2002, only one of the seven sites was in compliance. The EPA initially had a one-hour ozone standard in place. At that time, all Michigan counties were in compliance. In 1997, the standards became stricter, now requiring counties to meet an eight-hour ozone standard.

The one-hour standards for carbon monoxide (CO) were not exceeded by any of the counties in southeast Michigan. There was, however one monitoring location in Detroit that exceed the eight hour standards for CO in 1994. Since then, the CO levels have continually decreased.

All of the monitoring in metro Detroit measured well below the standards for sulfur dioxide, nitrogen dioxide, and lead. None of the proposed projects are anticipated to negatively impact the air quality of the COSDS service area.

**c) Wetlands and Coastal Zones**

Wetlands within the COSDS service area are mainly located along the Paint and Stoney Creeks, and the Upper and Main Branches of the Clinton River, as well as their tributaries. There are also wetlands located in the vicinity of the numerous inland lakes within the COSDS service area. There are no coastal zones located in the service area.

Wetlands are present within close proximity of the project areas. Regulated wetlands under Part 303, Wetlands Protection of the Natural Resources and Environmental Protection Agency (NREPA), include wetlands connected to, or within 500 feet of the Clinton River. If construction is to occur in these areas as a result of the COSDS SRF Project Plan, WRC shall apply for the appropriate permits.

The illustrations of the proposed projects include wetland locations, based on existing state and federal wetland inventories.

**d) Floodplains**

Although there are mapped floodplains in the vicinity of the proposed Perry Street diversion pump station, the proposed facility will be constructed outside of the mapped floodplain. The FEMA floodplain at the proposed Perry Street diversion site is illustrated in Figure 2-7. The proposed 5.5 MG SRT (Elizabeth Lake Pump Station / Site #7) is not within the vicinity of a FEMA floodplain.



facility is proposed to be located on park property, it will be located adjacent to the entrance drive and will not interfere with the park facilities, which include a playground, softball diamonds, tennis courts, basketball courts, bathrooms, and a fishing dock. According to the draft *Parks and Recreation Master Plan* (December 2011, City of Pontiac), the facilities at Galloway Lake Park are in generally poor condition and in need of repair. Figure 2-4 shows the major recreational facilities in the area.

#### **h) Topography**

The COSDS consists of two gently undulating to very hilly end moraine bands separated by three major outwash plains. The moraines are of the Saginaw and Huron-Erie systems, and the outwash plains are the Commerce, Drayton, and Oxford plains. These landforms have a northeast to southwest orientation. The study area slopes generally to the southeast and varies in elevation from more than 1,000 feet in Oxford Township and 960 feet in Waterford to less than 680 feet in the City of Rochester Hills.

#### **i) Geology**

The geology of the Study Area will not affect the choice of alternatives.

#### **j) Soils**

The soils within the COSDS service area are predominantly moderately well drained to well drained and are loamy or loamy and sandy throughout. Some are underlain by gravelly sand. The hazard of erosion is generally moderate to severe in this area. Measures are needed to control erosion and thereby reduce sedimentation in streams.

#### **k) Agricultural Resources**

There are no prime or unique farmlands in the study area.

#### **l) Fauna and Flora**

A review of the US Fish and Wildlife Service “County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species” for Oakland County has identified the following species known to occur within the service area (Table 2-9).

**Table 2-9 - Endangered Species within Oakland County**

<b>Common Name</b>	<b>Status</b>	<b>Habitat</b>
Indiana Bat	Endangered	Summer Habitat includes small to medium river and stream corridors with well developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula.
Eastern massasauga	Candidate	
Rayed Bean Mussel	Proposed as Endangered	Clinton River
Snuffbox	Proposed as Endangered	Small to medium sized creeks in areas with a swift current and some larger rivers.

The presence of the threatened and/or endangered species does not prohibit construction activities, but would require that during the engineering design of the improvements that a competent biologist/botanist performs a field survey to verify conditions.

**m) Unique Features**

There are no known additional unique features that would be affected by this project other than those previously described.

## ***Section 3 – Analysis of Alternatives***

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This section identifies different alternatives for the two key reaches of the COSDS with identified hydraulic deficiencies. The proposed improvements include:

- Upstream Hydraulic Relief: COSDS interceptor wet weather storage and flow diversion projects in the vicinity of the Elizabeth Lake Pump Station (ELPS)
- Downstream Hydraulic Relief: COSDS interceptor wet weather storage and flow diversion projects in the vicinity of Galloway Lake Park (Perry Street, City of Pontiac)
- Single System Improvement Option: COSDS interceptor flow diversion to address both upstream and downstream hydraulic deficiencies

### **3.1 Identification of Potential Alternatives - Upstream Hydraulic Relief**

#### **3.1.1 No Action**

The WRC is concerned about the limited capacity in this section of the COSDS interceptor and the risks of additional potential SSOs during higher wet weather flows. Since no action would not address the potential for SSOs, this is not considered a principal alternative.

#### **3.1.2 Optimal Performance of Existing Facilities**

The WRC utilizes a perpetual 7-year rotating maintenance cycle that includes sewer televising, cleaning, inspection and repair. Problems that are identified through their maintenance program are programmed for repair.

The existing (and ongoing) flow metering program provides an accurate assessment of the hydraulic performance and capacity of the COSDS interceptor, and this ongoing analysis reveals that the system is currently operating as designed. Additional system maintenance will not enhance the hydraulic capacity of the COSDS interceptor.

There is only one pump station in the COSDS interceptor (Elizabeth Lake Pump Station), and there are no operational modifications to this pump station alone that would address the hydraulic deficiencies in the upstream reaches of the COSDS interceptor.

As such, Optimal Performance of Existing Facilities is not considered as a principal alternative.

### **3.1.3 5.5 MG SRT - Elizabeth Lake Pump Station to Site #7 (RCOC Property) - Regional Alternative**

This alternative involves a proposed 5.5 MG SRT at the Road Commission of Oakland County (RCOC) property (Site #7). This alternative was investigated due to relatively low land acquisition costs, as compared to alternatives sites that will result in significant land purchase and relocation costs. This alternative will require the construction of approximately 1.5 miles of force main to extend the existing ELPS force main to the RCOC property and modifications to the ELPS to accommodate modified force main hydraulic characteristics. The SRT would be used only for significant wet weather events and would be needed, on average, less than once per year.

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

### **3.1.4 5.5 MG SRT - Elizabeth Lake Pump Station to Site #2 (Strip Mall) - Regional Alternative**

This alternative involves a proposed 5.5 MG SRT at a commercial property (Site #2) immediately adjacent to the Elizabeth Lake Pump Station (ELPS). This alternative was investigated to determine if a shorter force main could justify the additional land acquisition costs associated with a tank on the site of an existing strip mall. This alternative is the same concept as the Site #7 SRT, except for the siting of the SRT and the length of force main. The SRT would be used only for significant wet weather events and would be needed, on average, less than once per year.

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

### **3.1.5 Partial Flow Diversion from Elizabeth Lake Pump Station to City of Pontiac WWTP - Regional Alternative**

This alternative involves diverting flow from the COSDS interceptor (at the ELPS) to the City of Pontiac WWTP. The maximum diverted flow rate, 13 cfs, is equivalent to the proposed flow diversion in the storage (SRT) options and results in the same resultant flow rate in the COSDS interceptor downstream of the ELPS. Under this alternative, no storage is required. However, this alternative requires over two miles of force main from the ELPS to the City of Pontiac WWTP.

The City of Pontiac WWTP currently has spare treatment capacity and can receive additional flow from a proposed diversion.

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.



## **3.2 Identification of Potential Alternatives - Downstream Hydraulic Relief**

### **3.2.1 No Action**

The WRC is concerned about the limited capacity in this section of the COSDS interceptor and the risks of additional potential SSOs during higher wet weather flows. Since no action would not address the potential for SSOs, this is not considered a principal alternative.

### **3.2.2 Optimal Performance of Existing Facilities**

The WRC utilizes a perpetual 7-year rotating maintenance cycle that includes sewer televising, cleaning, inspection and repair. Problems that are identified through their maintenance program are programmed for repair.

The existing (and ongoing) flow metering program provides an accurate assessment of the hydraulic performance and capacity of the COSDS interceptor, and this ongoing analysis reveals that the system is currently operating as designed. Additional system maintenance will not enhance the hydraulic capacity of the COSDS interceptor.

There is only one pump station in the COSDS interceptor (Elizabeth Lake Pump Station), and there are no operational modifications to this pump station alone that would address the hydraulic deficiencies in the downstream reaches of the COSDS interceptor.

As such, Optimal Performance of Existing Facilities is not considered as a principal alternative.

### **3.2.3 5.0 MG SRT - Galloway Lake Park at Perry Street - Regional Alternative**

This alternative involves a 5.0 MG SRT at Galloway Lake Park in the City of Pontiac. This location is directly adjacent to the COSDS interceptor, and inflow/outflow piping would be minimized. As this site is used as a city park, it would be desirable to construct a below-grade cast-in-place reinforced concrete tank so as to preserve the use of the park grounds above the tank. This alternative differs from the proposed project, as there would be no flow diversion to the City of Pontiac WWTP under this SRT alternative. Instead, peak flows would be stored in the SRT and discharged back to the COSDS interceptor following a wet weather event.

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

### **3.2.4 Perry Street Diversion - Pump Station and Gravity Sewer - Regional Alternative**

This alternative involves a pump station at the Galloway Lake Park (Perry Street, City of Pontiac) with a short force main and approximately 2 miles of sanitary sewer from the COSDS interceptor to the City of Pontiac WWTP. This pump station would operate continuously and will divert

approximately 30% of the total COSDS service area flow rate to the City of Pontiac (for both dry weather and wet weather flows). Flow rates would range from 14 cfs to 47 cfs. Flow rates would be controlled by VFDs at the pump station.

The City of Pontiac WWTP currently has spare treatment capacity and can receive additional flow from a proposed diversion. The City of Pontiac will be further expanding their WWTP in 2013 to accept all proposed wet weather flow from the proposed Perry Street diversion. Prior to full WWTP expansion, the diversion rate at the proposed Perry Street diversion can be controlled by throttling the pumps at the diversion structure / pump station. An agreement between the WRC and the City of Pontiac will guarantee that the City of Pontiac WWTP will have adequate capacity to receive all diverted flows by the end of 2017 (the final year of the DCA-defined Proposed Action Plan).

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

### **3.2.5 Perry Street Diversion: Gravity Sewer - Regional Alternative**

This alternative involves a gravity-only diversion from the COSDS interceptor to the City of Pontiac WWTP. This alternative was explored to determine the feasibility and cost of a diversion option that does not include pumping. As part of this alternative analysis, two gravity sewer alignment options were explored. Each alignment is approximately 2 miles in length. This diversion would operate continuously and will divert approximately 30% of the total COSDS service area flow rate to the City of Pontiac (for both dry weather and wet weather flows). Flow rates would range from 14 cfs to 47 cfs. Flow rates would be controlled by an automated gate near the diversion structure.

The City of Pontiac WWTP currently has spare treatment capacity and can receive additional flow from a proposed diversion (see Section 3.1.9 for a description of the Pontiac WWTP capacity issue).

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

## **3.3 Identification of Potential Alternative - Single System Improvement Option**

### **3.3.1 Full Diversion from ELPS to the City of Pontiac WWTP**

This alternative was explored as a single solution that would replace the need for the two proposed projects (upstream and downstream improvements). This alternative includes modifications to the ELPS and the construction of over 2 miles of force main from the ELPS to the City of Pontiac WWTP. Under this scenario, enough flow is removed from the COSDS interceptor to address the upstream and downstream hydraulic bottlenecks. ***The present worth cost of this alternative was compared to the sum of the two proposed projects in order to determine whether it would be cost-effective as a system-wide solution.***

The City of Pontiac WWTP currently has spare treatment capacity and can receive additional flow from a proposed diversion (see Section 3.1.9 for a description of the Pontiac WWTP capacity issue).

A technical memorandum for this alternative is provided in Appendix C. This is a principal alternative.

### **3.4 Analysis of Principal Alternatives - Upstream Hydraulic Relief**

#### **3.4.1 5.5 MG SRT - Elizabeth Lake Pump Station (ELPS) to Site #7 (RCOC Property)**

This alternative involves diverting 13 cfs during significant wet weather events to a proposed 5.5 MG SRT at the Road Commission of Oakland County (RCOC) property (Site #7). This alternative will require the construction of approximately 1.5 miles of 24-inch force main to extend the existing ELPS force main to the RCOC property and modifications to the ELPS to accommodate modified force main hydraulic characteristics. The SRT would be an above-ground prestressed wire-wound concrete tank. SRT discharge would occur by gravity through a 15-inch sewer and discharge directly to the COSDS interceptor at the RCOC property. A technical memorandum for this alternative is provided in Appendix C.

##### **3.4.1.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$19,330,000. The present worth of this alternative is \$14,798,829.

##### **3.4.1.2 Staging Construction**

Staging of the project will not be necessary.

##### **3.4.1.3 Partitioning the Project**

Partitioning of the project will not be necessary.

##### **3.4.1.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed route of the force main is expected to be primarily along existing roadways. The proposed tank will be constructed on RCOC property and will be isolated from public areas.

The force main will be constructed within wetlands south of Pontiac Lake Road. The wetlands and adjacent open water areas would need to be protected during construction to minimize any

impacts. Construction alternatives will include direction drilling or boring/jacking to avoid disturbance of sensitive environmental areas along the force main route.

#### **3.4.1.5 Implementability and Public Participation**

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the proposed SRT, force main, and pump station modifications.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in an established residential community with paved streets and maintained lawns. It is expected that the residents will have concerns regarding damage to lawns, loss of trees and shrubs close to sewer alignment, removal and replacement of roads, traffic detours, temporary road closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the force main and SRT.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

#### **3.4.1.6 Technical and Other Considerations**

- Sludge and Residuals - The 5.5 MG SRT will need to be flushed after each wet weather event to avoid malodorous conditions and to remove solids from the tank. This operation will occur, on average, less than once per year.
- Industrial Pretreatment - Wet weather flows being diverted into the proposed SRT do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - This alternative demonstrates one of two sites that is being considered for a storage tank (SRT).

- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.
- Contamination of the Project Site - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### **3.4.2 5.5 MG SRT - Elizabeth Lake Pump Station to Site #2 (Strip Mall)**

This alternative involves diverting 13 cfs during significant wet weather events to a proposed 5.5 MG SRT at an existing strip mall along Highland Road (just north of Elizabeth Lake Road). This alternative will require the purchase of private property and relocation of existing businesses in the strip mall. The SRT would be an above-ground prestressed wire-wound concrete tank. SRT discharge would occur by gravity through a 15-inch sewer and discharge directly to a Waterford Township sanitary sewer collector. A technical memorandum for this alternative is provided in Appendix C.

#### **3.4.2.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$21,370,000. The present worth of this alternative is \$16,253,246.

#### **3.4.2.2 Staging Construction**

Staging of the project will not be necessary.

#### **3.4.2.3 Partitioning the Project**

Partitioning of the project will not be necessary.

#### **3.4.2.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed tank will be constructed on the site of an existing strip mall. Consideration will need to be given for isolation of the construction area from pedestrians, as this tank would be built in a commercial area.

No wetlands or environmentally-sensitive areas will be encountered with this project.

### 3.4.2.5 Implementability and Public Participation

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the proposed SRT and related piping.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in commercial area with paved streets and sidewalks. It is expected that adjacent business owners will have concerns about damage to pavement, grassed areas, loss of trees and shrubs, removal and replacement of roads and parking lots, traffic detours, temporary road closures, and surface restoration. In addition, this option is expected to involve the acquisition of land for construction and future maintenance of the SRT and related piping.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

### 3.4.2.6 Technical and Other Considerations

- Sludge and Residuals - The 5.5 MG SRT will need to be flushed after each wet weather event to avoid malodorous conditions and to remove solids from the tank. This operation will occur, on average, less than once per year.
- Industrial Pretreatment - Wet weather flows being diverted into the proposed SRT do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - This alternative demonstrates one of two sites that is being considered for a storage tank (SRT).
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.
- Contamination of the Project Site - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### **3.4.3 Partial Flow Diversion from Elizabeth Lake Pump Station to City of Pontiac WWTP**

This alternative involves diverting flow from the COSDS interceptor (at the ELPS) to the City of Pontiac WWTP. The maximum diverted flow rate, 13 cfs, is equivalent to the proposed flow diversion in the storage (SRT) options and results in the same resultant flow rate in the COSDS interceptor downstream of the ELPS. *Due to the WRC's contract with DWSD on flow diversions, a wet weather-only diversion is not acceptable. Instead, any diversion needs to be a constant diversion of a specified percentage of instantaneous flow, applying to both dry and wet weather events.*

This project will require upgrades to the ELPS to accommodate higher friction losses in a 2-mile reach of proposed force main. Two parallel force mains will need to be constructed as part of this alternative, as the variation in flow rates (less than 3 cfs to 13 cfs) will require two separate force main diameters in order to maintain adequate flow velocities and pump operations. The force main sizes will be 12-inch (low flows) and 24-inch for wet weather flows. Approximately 3,000 lineal feet of gravity sewer (21-inch diameter) will be constructed immediately upstream of the City of Pontiac WWTP.

Under this alternative, no storage is required. A technical memorandum for this alternative is provided in Appendix C.

#### **3.4.3.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$47,016,000. The present worth of this alternative is \$38,312,972.

#### **3.4.3.2 Staging Construction**

Staging of the project will not be necessary.

#### **3.4.3.3 Partitioning the Project**

Partitioning of the project will not be necessary.

#### **3.4.3.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed force main will be constructed along roadways in residential and commercial areas.

No wetlands or environmentally-sensitive areas will be encountered with this project.

### 3.4.3.5 Implementability and Public Participation

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the force main and pump station modifications.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in residential and commercial areas with paved streets and sidewalks. It is expected that adjacent property owners will have concerns about damage to pavement, grassed areas, loss of trees and shrubs, removal and replacement of roads and parking lots, traffic detours, temporary road closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the force main.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

### 3.4.3.6 Technical and Other Considerations

- Sludge and Residuals - Sludge or residuals will not be generated by this alternative.
- Industrial Pretreatment - Wet weather flows being diverted do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - No alternative routes were explored for the proposed force main. The proposed alignment was selected to minimize disruption to higher traffic roadway corridors.
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.



- *Contamination of the Project Site* - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### **3.5 Analysis of Principal Alternatives - Downstream Hydraulic Relief**

#### **3.5.1 5.0 MG SRT - Galloway Lake Park at Perry Street**

This alternative involves diverting 13 cfs during significant wet weather events to a proposed 5.0 MG SRT at Galloway Lake Park in the City of Pontiac. This location is directly adjacent to the COSDS interceptor, and inflow/outflow piping would be minimized. As this site is used as a city park, it will be necessary to construct a 300-ft x 150-ft below-grade cast-in-place reinforced concrete tank so as to preserve the use of the park grounds above the tank. This project will include a diversion structure and 24-inch gravity sewer to direct wet weather flows into the SRT. The SRT would be dewatered by pumping and would be emptied over a 1.5-day period.

This project will include green design components, including the installation of pervious pavement on restored parking and driveway surfaces.

A technical memorandum for this alternative is provided in Appendix C.

##### **3.5.1.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$34,130,000. The present worth of this alternative is \$26,484,992.

##### **3.5.1.2 Staging Construction**

Staging of the project will not be necessary.

##### **3.5.1.3 Partitioning the Project**

Partitioning of the project will not be necessary.

##### **3.5.1.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed SRT will be constructed in an active city park and immediately adjacent to Perry Street at the parking lot of Galloway Lake Park.

The SRT site and related piping is adjacent to a FEMA floodplain and Galloway Creek. The construction of the SRT will be outside of the floodplain. The diversion structure and associated SRT inlet/outlet piping will be constructed along the creek banks. Streambank restoration techniques will be implemented during and after the SRT construction to avoid a negative impact to the riparian corridor.

#### **3.5.1.5 Implementability and Public Participation**

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the SRT facility.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in a city park. It is expected that park users will have concerns about park access, damage to playing surfaces (i.e. softball diamonds), loss of trees and shrubs, removal and replacement of roads and parking lots, temporary park closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the SRT facility. This project would include restoration activities intended to maintain or enhance the usability of the park amenities.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

#### **3.5.1.6 Technical and Other Considerations**

- Sludge and Residuals - The 5.0 MG SRT will need to be flushed after each wet weather event to avoid malodorous conditions and to remove solids from the tank. This operation will occur, on average, less than once per year.
- Industrial Pretreatment - Wet weather flows being diverted into the proposed SRT do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.

- Alternative Sites and Routes - An alternative tank site was explored on the west side of Galloway Lake Park. Due to the topography in the park area, it was determined that the alternate tank location would require too much additional excavation and would result in additional disruption to the park area. The proposed tank location was selected to minimize park disruption and the cost of inlet/outlet piping.
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.
- Contamination of the Project Site - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### **3.5.2 Perry Street Diversion - Pump Station and Gravity Sewer**

This alternative involves diverting flow from the COSDS interceptor (at the Galloway Lake Park, Perry Street) to the City of Pontiac WWTP. The diversion will consist of a pump station (four 8,000 GPM pumps with VFDs), short force main, and approximately 2 miles of 36-inch gravity sewer.

The pump station will divert 30% of the total flows from the COSDS service area for both dry weather and wet weather scenarios, with flow rates ranging from 14 cfs (ADWF) to 47 cfs (design wet weather event). *A 30% flow diversion is the maximum allowed diversion under the WRC's contract with DWSD and this diversion maximizes the local economic benefit by treating more wastewater locally. Due to the WRC's contract with DWSD on flow diversions, a wet weather-only diversion is not acceptable. Instead, any diversion needs to be a constant diversion of a specified percentage of instantaneous flow, applying to both dry and wet weather events.*

The 36-inch gravity sewer will be constructed along the Grand Trunk Western Railroad (GTWRR) right-of-way, thereby minimizing disruption to roadways and residential areas.

Under this alternative, no storage is required. A technical memorandum for this alternative is provided in Appendix C.

#### **3.5.2.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$24,440,000. The present worth of this alternative is \$22,157,194.

#### **3.5.2.2 Staging Construction**

Staging of the project will not be necessary.

#### **3.5.2.3 Partitioning the Project**

Partitioning of the project will not be necessary.

#### **3.5.2.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed pump station will be constructed in an active city park and immediately adjacent to Perry Street at the parking lot of Galloway Lake Park.

The pump station and related piping are adjacent to a FEMA floodplain and Galloway Creek. The construction of the pump station will be wholly outside of the floodplain. The diversion structure and associated piping will be constructed along the creek banks. Streambank restoration techniques will be implemented during and after the pump station construction to avoid a negative impact to the riparian corridor.

The sanitary sewer will cross several wetland areas along the GTWRR corridor. Prior to design, the wetland areas will be delineated and evaluated for quality. Where wetland areas are encountered, the sanitary sewer will be constructed by trenchless methods (boring and jacking or directional drilling). The cost estimate in this Project Plan reflects the assumption that trenchless construction will be necessary through wetland areas.

#### **3.5.2.5 Implementability and Public Participation**

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the pump station and associated force main / sanitary sewer.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in a city park. It is expected that park users will have concerns about park access, damage to playing surfaces (i.e. softball diamonds), loss of trees and shrubs, removal and replacement of roads and parking lots, temporary park closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the pump station. This project would include restoration activities intended to maintain or enhance the usability of the park amenities.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

### 3.5.2.6 Technical and Other Considerations

- Sludge and Residuals - Sludge or residuals will not be generated by this alternative.
- Industrial Pretreatment - Wet weather flows being diverted into the proposed SRT do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the “Recommended Standards for Sewage Works” as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - No alternative routes were explored for the proposed force main or sanitary sewer. The proposed alignment was selected to take advantage of the railroad corridor and minimize disruption to higher traffic roadway corridors.
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.
- Contamination of the Project Site - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### 3.5.3 Perry Street Diversion - Gravity Sewer

This alternative involves diverting flow from the COSDS interceptor (at the Galloway Lake Park, Perry Street) to the City of Pontiac WWTP. The diversion will consist of a diversion control structure and approximately 2 miles of 48-inch gravity sewer.

Diversion structure will consist of a diversion manhole at the COSDS interceptor and an adjacent structure with automated control gates to control the flow rate to 30% of the total flows from the COSDS service area for both dry weather and wet weather scenarios. Diverted flow rates will range from 14 cfs (ADWF) to 47 cfs (design wet weather event). *Due to the WRC's contract with DWSD on flow diversions, a wet weather-only diversion is not acceptable. Instead, any diversion needs to be a constant diversion of a specified percentage of instantaneous flow, applying to both dry and wet weather events.*

The 48-inch gravity sewer has two alignment alternatives. Alignment A will be constructed along the Grand Trunk Western Railroad (GTWRR) right-of-way, thereby minimizing disruption to roadways and residential areas. Alignment B will be constructed along a residential street for the northern half

of the alignment and along the GTWRR right-of-way for the southern half of the alignment. Alignment A is generally deeper than Alignment B. Both alignments will require rib and lagging tunneling techniques, given that the majority of the gravity sewer would be deeper than 35 feet and would be constructed at minimum slope.

Under this alternative, no storage is required. A technical memorandum for this alternative (including discussion of both gravity sewer alignment options) is provided in Appendix C.

### **3.5.3.1 Monetary Evaluation**

The detailed preliminary cost estimates and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for Alignment A of this alternative is \$37,590,000. The present worth of Alignment A is \$28,208,566. The total preliminary cost estimate for Alignment B of this alternative is \$33,790,000. The present worth of Alignment B is \$25,376,882.

### **3.5.3.2 Staging Construction**

Staging of the project will not be necessary.

### **3.5.3.3 Partitioning the Project**

Partitioning of the project will not be necessary.

### **3.5.3.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary relief sewer. The proposed pump station will be constructed in an active city park and immediately adjacent to Perry Street at the parking lot of Galloway Lake Park.

The project will take place in a city park. It is expected that park users will have concerns about park access, damage to playing surfaces (i.e. softball diamonds), loss of trees and shrubs, removal and replacement of roads and parking lots, temporary park closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the SRT facility. This project would include restoration activities intended to maintain or enhance the usability of the park amenities.

No wetlands or environmentally-sensitive areas will be encountered with this project. Although there are wetlands along both proposed sewer alignments, pipe tunneling would avoid direct impacts to existing wetlands. Tunneling access pits will be located away from existing wetlands.

### 3.5.3.5 Implementability and Public Participation

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the diversion structure, flow control structure and associated gravity sewer.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in a city park. It is expected that park users will have concerns about park access, damage to playing surfaces (i.e. softball diamonds), loss of trees and shrubs, removal and replacement of roads and parking lots, temporary park closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the proposed diversion and flow control structures. This project would include restoration activities intended to maintain or enhance the usability of the park amenities.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

### 3.5.3.6 Technical and Other Considerations

- Sludge and Residuals - Sludge or residuals will not be generated by this alternative.
- Industrial Pretreatment - Wet weather flows being diverted into the proposed SRT do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - The two alternative routes (A and B) were the only two alignments considered for the sanitary sewer.
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.

- *Contamination of the Project Site* - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

### **3.6 Analysis of Principal Alternatives - Single System Improvement Option**

#### **3.6.1 Full Diversion from Elizabeth Lake Pump Station (ELPS) to the City of Pontiac WWTP**

This alternative involves modifications to the ELPS and the construction of over 2 miles of 36-inch force main to divert 100% of the flows entering the ELPS to the City of Pontiac WWTP. This project includes significant upgrades to the pumps at ELPS to provide additional head necessary to pump flows through a longer force main. This alternative would provide adequate capacity for dry weather flows and future design wet weather flows.

The existing pumps at the ELPS would be replaced with higher head pumps, including new pumps, motors, controls, and related electrical upgrades.

The force main would be constructed along an alignment that takes advantage of a Rails to Trails pathway, thereby reducing disruption to heavily-traveled roadways and commercial/residential areas.

Under this alternative, no storage is required. A technical memorandum for this alternative is provided in Appendix C.

##### **3.6.1.1 Monetary Evaluation**

The detailed preliminary cost estimate and present worth analysis for this alternative are included in Appendix D. The total preliminary cost estimate for this alternative is \$45,740,000. The present worth of this alternative is \$38,358,278.

##### **3.6.1.2 Staging Construction**

Staging of the project will not be necessary.

##### **3.6.1.3 Partitioning the Project**

Partitioning of the project will not be necessary.

##### **3.6.1.4 Environmental Evaluation**

Typical construction disturbances such as noise, dust, and traffic disruptions are expected during the construction of the sanitary force main and pump station upgrades.



No wetlands or environmentally-sensitive areas will be encountered with this project.

### **3.6.1.5 Implementability and Public Participation**

The Owner, WRC, will fund the project with money collected from user charges. The WRC is able to manage the construction and operation, maintenance, and repair of the pump station and associated force main / sanitary sewer.

User fees associated with this alternative include capital costs and operation and maintenance (O&M) costs. These may be of concern to the public as the construction cost is significant.

The project will take place in residential and commercial areas with paved streets and sidewalks. It is expected that adjacent property owners will have concerns about damage to pavement, grassed areas, loss of trees and shrubs, removal and replacement of roads and parking lots, traffic detours, temporary road closures, and surface restoration. In addition, this option is expected to involve the acquisition of easements for construction and future maintenance of the force main.

When the WRC enters into a contract with a construction company to build the project, public information meetings should be held to inform the public of the anticipated scope of work, construction schedule, project management staff, emergency contact information, and expected traffic disruption.

### **3.6.1.6 Technical and Other Considerations**

- Sludge and Residuals - Sludge or residuals will not be generated by this alternative.
- Industrial Pretreatment - Wet weather flows being diverted do not include industrial wastewater that would require pretreatment.
- Growth Capacity - The growth capacity within the service area was evaluated and taken into account in the recommendations. The population was projected based on regional planning estimates for Oakland County over the 20 year planning period.
- Areas Currently Without Sewers - There are no significant areas within the study area of this alternative that are currently without sewer service.
- Reliability - This alternative demonstrates sound engineering principles and complies with the established requirements as outlined in the "Recommended Standards for Sewage Works" as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers.
- Alternative Sites and Routes - No alternative routes were explored for the proposed force main. The proposed alignment was selected to minimize disruption to higher traffic roadway corridors.
- Combined Sewer Overflows - This section of the COSDS does not have combined sewers.

- *Contamination of the Project Site* - The MDEQ Part 201 site list of contaminated sites at <http://www.deq.state.mi.us/part201ss> was reviewed for areas along the proposed force main route and SRT location. No contaminated sites were listed.

## **Section 4 – Selected Alternatives**

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### **4.1 Description of the Selected Alternatives**

The selected alternatives involve separate projects at the upstream and downstream reaches of the COSDS interceptor, including the 5.5 MG SRT at Site #7 for the upstream reach and the Perry Street Diversion (Pumped) at the downstream reach.

#### **4.1.1 Relevant Design Parameters**

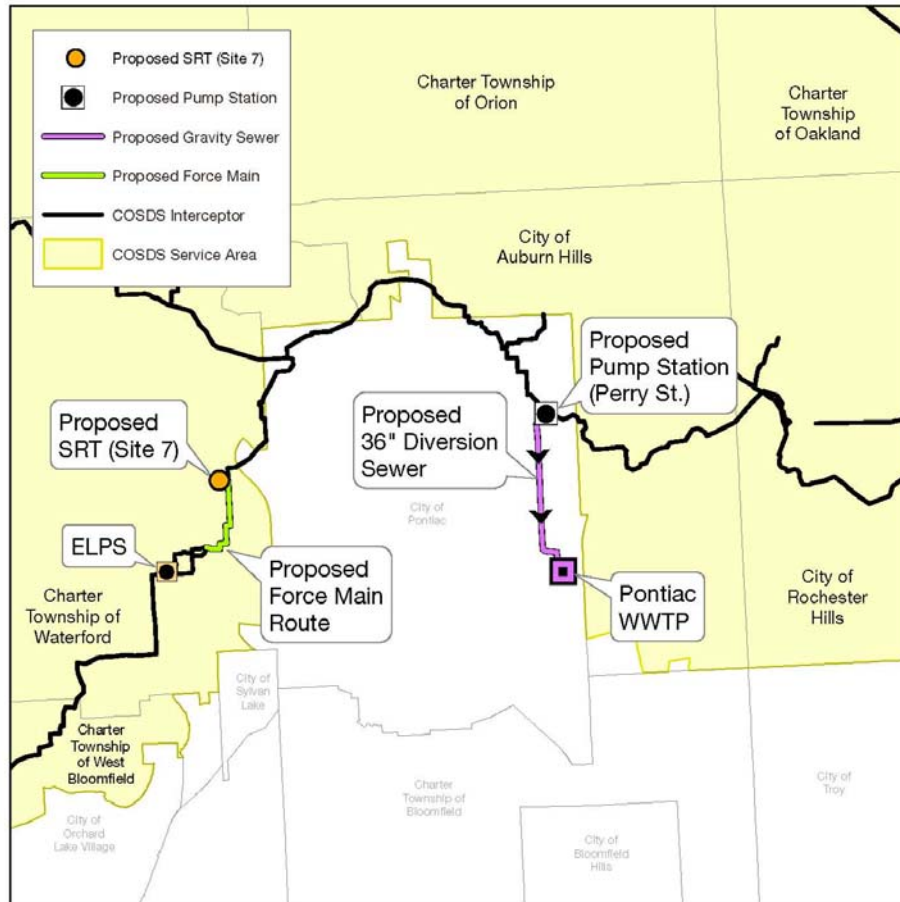
- The 5.5 MG SRT at Site #7 (upstream regional solution) as outlined in Section 3.4.1 and as described in the technical memorandum in Appendix C: This alternative involves diverting 13 cfs during significant wet weather events to a proposed 5.5 MG SRT at the Road Commission of Oakland County (RCOC) property (Site #7). This alternative will require the construction of approximately 1.5 miles of 24-inch force main to extend the existing ELPS force main to the RCOC property and modifications to the ELPS to accommodate modified force main hydraulic characteristics. The SRT would be an above-ground prestressed wire-wound concrete tank. SRT discharge would occur by gravity through a 15-inch sewer and discharge directly to the COSDS interceptor at the RCOC property.
- The Perry Street Diversion, Pumped (downstream regional solution) as outlined in Section 3.5.2 and as described in the technical memorandum in Appendix C: This alternative involves diverting flow from the COSDS interceptor (at the Galloway Lake Park, Perry Street) to the City of Pontiac WWTP. The diversion will consist of a pump station (four 8,000 GPM pumps with VFDs), short force main, and approximately 2 miles of 36-inch gravity sewer. The pump station will divert 30% of the total flows from the COSDS service area for both dry weather and wet weather scenarios, with flow rates ranging from 14 cfs (ADWF) to 47 cfs (design wet weather event). The 36-inch gravity sewer will be constructed along the Grand Trunk Western Railroad (GTWRR) right-of-way, thereby minimizing disruption to roadways and residential areas. No storage is required (other than the wet well volume at the pump station).

#### **4.1.2 Controlling Factors**

The COSDS is currently under an District Compliance Agreement (DCA). This DCA sets a specific schedule for system hydraulic improvements, focusing on the two hydraulic bottlenecks in the COSDS interceptor. The system evaluation indicates that the SRT (upstream) option and the diversion (downstream) option greatly reduce the potential for an SSO within the COSDS interceptor. Additionally, the communities within the COSDS service area will experience a positive economic impact because of the diversion of wastewater to the City of Pontiac WWTP. This diversion will utilize local available treatment capacity and will make the COSDS less susceptible to the impacts of anticipated future rate hikes by the DWSD.

### 4.1.3 Project Maps

Figure 4-1 illustrates the two proposed project areas. Detailed project maps for the selected alternatives are included in the technical memoranda in Appendix C.



**Figure 4-1 - Selected Alternative Project Locations**

### 4.1.4 Sensitive Features

As part of the force main for the Site #7 SRT, several wetlands will be crossed. Trenchless construction methods will be utilized where wetlands are encountered along the project alignment.

As part of the sanitary sewer alignment for the Perry Street diversion to the City of Pontiac WWTP, several wetlands will be crossed. Trenchless construction methods will be utilized where wetlands are encountered along the project alignment.

#### 4.1.5 Mitigation of Environmental Impacts

During construction, the WRC will follow the required standards for soil erosion and sedimentation control. For construction along the Galloway Creek (Perry Street Diversion project), any work along the creek banks will be carefully designed so as to avoid streambank disruption. Environmental impacts will be minimized to the extent required.

#### 4.1.6 Schedule for Design and Construction

The design and construction schedules shown below are dependent on approval of the SRF Project Plan. In addition, the schedules may fluctuate based on the ranking on the Project Priority List.

Below is the proposed schedule for submittal of the final project plan.

Advertise Public Hearing	May 20, 2012
Project Plan Draft on Display	May 21, 2012
Submit Draft Project Plan to MDEQ	May 23, 2012
Public Hearing	June 20, 2012
Resolution to Adopt the Final Project Plan	June 27, 2012
Final Project Plan Submittal to MDEQ	June 29, 2012

To construct the selected alternative, the WRC is requesting a SRF loan closing for Q4 of 2013. For the Perry Street Diversion project, design would start in the fall of 2012 and construction would commence in the fall of 2013.

The 5.5 MG SRT (ELPS to Site #7) will be designed in 2013 and constructed in the summer of 2014.

#### 4.1.7 Cost Summary

The total estimated cost for the selected alternatives is \$43,770,000. Detailed cost estimates for each of the proposed projects are included in Appendix D.

### 4.2 Authority to Implement the Selected Alternative

The Applicant, WRC, has the legal authority, capability, and willingness to plan, finance, build, operate and maintain the proposed COSDS improvements.

### 4.3 User Costs

A user cost analysis was performed for each project and is summarized in Table 4-1. It has been determined that cost allocations to users will be common to all within the COSDS service area.

**Table 4-1 - User Cost Analysis**

<b>Project Name</b>	<b>Initial Capital Investment</b>	<b>Annual Debt Retirement</b>	<b>Annual O&amp;M</b>	<b>COSDS Service Area Population</b>	<b>Annual Cost per Household*</b>	<b>Annual Cost per Household* with O&amp;M</b>
5.5 MG SRT Site #7	\$19,330,000	\$1,239,964	\$30,000	241,519	\$15.40	\$15.77
Perry Street Diversion (Pumping)	\$24,440,000	\$1,567,756	\$300,000	241,519	\$19.47	\$23.20
<b>Total</b>	<b>\$43,770,000</b>	<b>\$2,807,720</b>	<b>\$330,000</b>	<b>241,519</b>	<b>\$34.87</b>	<b>\$38.97</b>

\*Assumes average household of three people

## ***Section 5 – Evaluation of Environmental Impacts***

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The WRC plans to address two different reaches of the COSDS interceptor. These improvements consist of constructing a 5.5 MG SRT near the Elizabeth Lake Pump Station to manage excessive wet weather flow rates and constructing a diversion structure, pump station and sanitary sewer at Galloway Lake Park (City of Pontiac) to divert flow from the COSDS interceptor to the City of Pontiac WWTP, which has spare treatment capacity. The impacts of these projects, both beneficial and adverse will be discussed individually as each project carries different impacts.

### **5.1 Analysis of Impacts - 5.5 MG SRT Near Elizabeth Lake Pump Station (Site #7 Tank Location)**

The main benefit of this project is to reduce peak wet weather flows in the COSDS interceptor and reduce the potential for SSOs. The diversion of 13 cfs during the design wet weather event will allow the COSDS interceptor to operate without a hydraulic surcharge.

Adverse environmental impacts are generally limited to short term construction impacts, such as temporary noise, dust, and traffic disruptions.

#### **5.1.1 Direct Impacts**

##### **5.1.1.1 Construction Impacts**

Construction of the proposed SRT and force main will be contained within existing easements or rights-of-way. The force main will follow the alignment of the existing COSDS interceptor, so existing easements can be used for the force main alignment.

The construction of the 5.5 MG SRT will occur on Road Commission for Oakland County (RCOC) property. Discussions have already commenced between the WRC and the RCOC on the placement of a tank on their property. Any pavement removed will be replaced in-kind.

A sensitive feature impacted by this alternative involves the crossing of open water and wetland areas south of Pontiac Lake Road. Where wetlands or sensitive water features are encountered, the force main will be constructed using trenchless methods. Required permits through the MDEQ for this crossing will be secured during engineering design.

A review of the U.S. Fish and Wildlife Service “County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species” for Oakland County has identified rare, threatened, endangered or special concern species known to occur within the COSDS service area. A list of those species is provided in Section 2.

Archaeological, Historical, or Cultural Resources are expected to be unaffected by the SRT and force main project. There are no impacts upon historic neighborhoods, buildings or

streetscapes proposed with this alternative. A section 106 review application has been submitted to the State Historic Preservation Office (SHPO) and is included in Appendix G.

Letters regarding the proposed project have been sent to the required Tribal Preservation Officers and copies are included in Appendix G.

Traffic impacts are expected to be minor with the construction of this alternative, as the construction will be primarily limited to local (minor) roads. The crossing of Watkins Lake Road may require trenchless construction so as to avoid lane closures and pavement disruption.

Impacts on surface waters and ground waters are expected with this alternative but will be minimized using a number of methods. Soil erosion and sedimentation control will be performed following county and state regulations. The use of silt fence, inlet filters, and check dams throughout the project is anticipated. There will be no impacts to groundwater users as all water users within the project area are on public water supply systems.

#### **5.1.1.2 Operational Impacts**

There will be no adverse operational impacts associated with this project. Tank and forcemain construction can occur independent of the COSDS interceptor, thereby providing continuous service of the interceptor throughout the project.

During the proposed Elizabeth Lake Pump Station upgrades, pump operations will need to be closely monitored to allow for continuous operations while some of the pump/motor hardware is replaced.

#### **5.1.1.3 Social Impacts**

Increased user costs are anticipated with this project. Table 4-1 in Section 4 outlines the project cost and impacts on user fees.

Construction will increase the number of temporary construction-related jobs and will help to retain existing positions.

Local traffic patterns will be minimally affected.

### **5.1.2 Indirect Impacts**

#### **5.1.2.1 Changes in the rate, density or type of residential, commercial or industrial development, and the associated transportation changes**

There will be no changes regarding the above due to this project.



#### **5.1.2.2 Changes in land use**

There will be no changes regarding the above due to this project.

#### **5.1.2.3 Changes in air or water quality due to facilitated development**

There will be no changes regarding the above due to this project. There is no correlation to development as a result of this project.

#### **5.1.2.4 Changes to the natural setting or sensitive features resulting from secondary growth**

There will be no changes regarding the above due to this project.

#### **5.1.2.5 Impacts on cultural, human, social, and economic resources**

There will be no changes regarding the above due to this project.

#### **5.1.2.6 Impacts on areas of aesthetics**

There will be no changes regarding the above due to this project.

#### **5.1.2.7 Resources consumption over the useful life of the treatment works, especially the generation of solid wastes**

There will be no additional resource consumption or generation of solid wastes over the useful life of this project.

### **5.1.3 Cumulative Impacts**

#### **5.1.3.1 Siltation**

Siltation will only occur during the construction of this project and proper soil erosion and sedimentation control measures will be implemented.

#### **5.1.3.2 Water quality impacts**

There will be no water quality impacts from direct discharges and nonpoint sources with this project.

### **5.1.3.3 Indirect impacts from development**

There is no correlation to development as a result of this relief sewer project.

### **5.1.3.4 Impact of multiple public works projects occurring in the same vicinity**

There will be no impacts upon business or residential access or traffic patterns due to this project.

### **5.1.3.5 Fiscal impacts on the municipality resulting from multiple public works projects occurring in the same time frame**

User costs have been evaluated and an analysis is provided in Table 4-1 in Section 4. Loan repayment is proposed through the use of the WRC sewer fund.

## **5.2 Analysis of Impacts - Perry Street Diversion (Pumped)**

The main benefit of this project is to reduce peak wet weather flows in the COSDS interceptor and reduce the potential for SSOs. The secondary benefit is to provide treatment of wastewater locally, using available capacity at the City of Pontiac WWTP only 2 miles south of the proposed diversion location. The proposed flow diversion will allow the COSDS interceptor to operate without a hydraulic surcharge.

Adverse environmental impacts are generally limited to short term construction impacts, such as temporary noise, dust, and traffic disruptions.

### **5.2.1 Direct Impacts**

#### **5.2.1.1 Construction Impacts**

Construction of the proposed pump station will occur on City of Pontiac property (Galloway Lake Park). All park facilities disturbed during construction will be replaced in-kind. It is anticipated that an easement will be procured for the construction and operation of the pump station. The proposed force main and sanitary sewer will be contained within existing easements and rights-of-way.

A sensitive feature impacted by this alternative involves the crossing of wetland areas along the Grand Trunk Western Railroad right-of-way south of Galloway Lake Park. Where wetlands are encountered, the sanitary sewer will be constructed using trechnless methods or mitigation opportunities will be identified. Required permits through the MDEQ for wetland areas will be secured during engineering design. Prior to design, a Phase 1 Environmental Site Assessment (ESA) will be performed to identify any potential environmental issues along the proposed sewer alignment.

A review of the U.S. Fish and Wildlife Service “County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species” for Oakland County has identified rare, threatened, endangered or special concern species known to occur within the COSDS service area. A list of those species is provided in Section 2.

Archaeological, Historical, or Cultural Resources are expected to be unaffected by the Perry Street Diversion project. There are no impacts upon historic neighborhoods, buildings or streetscapes proposed with this alternative. A section 106 review application has been submitted to the State Historic Preservation Office (SHPO) and is included in Appendix G.

Letters regarding the proposed project have been sent to the required Tribal Preservation Officers and copies are included in Appendix G.

Traffic impacts are expected to be minor with the construction of this alternative, as the construction will be primarily limited to an abandoned railroad corridor. The crossings of University Drive and Featherstone Street may require trenchless construction so as to avoid lane closures and pavement disruption.

Impacts on surface waters and ground waters are expected with this alternative but will be minimized using a number of methods. Soil erosion and sedimentation control will be performed following county and state regulations. The use of silt fence, inlet filters, and check dams throughout the project is anticipated. There will be no impacts to groundwater users as all water users within the project area are on public water supply systems.

#### **5.2.1.2 Operational Impacts**

There will be no adverse operational impacts associated with this project. Pump station and sewer construction can occur independent of the COSDS interceptor, thereby providing continuous service of the interceptor throughout the project. The pump station will not be connected to the COSDS interceptor until the entire system is in place and ready for service.

Coordination will be necessary with the City of Pontiac WWTP to ensure the facility is prepared for increased flow rates upon the pump station startup.

#### **5.2.1.3 Social Impacts**

Increased user costs are anticipated with this project. Table 4-1 in Section 4 outlines the project cost and impacts on user fees.

Construction will increase the number of temporary construction-related jobs and will help to retain existing positions.

Local traffic patterns will be minimally affected.

## **5.2.2 Indirect Impacts**

### **5.2.2.1 Changes in the rate, density or type of residential, commercial or industrial development, and the associated transportation changes**

There will be no changes regarding the above due to this project.

### **5.2.2.2 Changes in land use**

There will be no changes regarding the above due to this project.

### **5.2.2.3 Changes in air or water quality due to facilitated development**

There will be no changes regarding the above due to this project. There is no correlation to development as a result of this project.

### **5.2.2.4 Changes to the natural setting or sensitive features resulting from secondary growth**

There will be no changes regarding the above due to this project.

### **5.2.2.5 Impacts on cultural, human, social, and economic resources**

The treatment of wastewater at a *local* facility (City of Pontiac WWTP) will help to reduce wastewater transport/pumping costs to the DWSD system, and will increase revenue to local municipalities, as a percentage of sewer rates will be retained by local municipalities. This should create an overall positive economic impact to the area. Furthermore, the reduction in flows to DWSD will make the COSDS communities less susceptible to future DWSD rate hikes.

### **5.2.2.6 Impacts on areas of aesthetics**

The construction of a pump station at Galloway Lake Park will result in an additional building near the park entrance. The pump station will not displace any existing park amenity.

### **5.2.2.7 Resources consumption over the useful life of the treatment works, especially the generation of solid wastes**

The diversion of wastewater to a local treatment plant will better utilize existing treatment capacity and should reduce overall resource consumption, as 30% of the COSDS flows will no longer have to be transported a longer distance to DWSD treatment works.

### **5.2.3 Cumulative Impacts**

#### **5.2.3.1 Siltation**

Siltation will only occur during the construction of this project and proper soil erosion and sedimentation control measures will be implemented.

#### **5.2.3.2 Water quality impacts**

There will be no water quality impacts from direct discharges and nonpoint sources with this project.

#### **5.2.3.3 Indirect impacts from development**

There is no correlation to development as a result of this relief sewer project.

#### **5.2.3.4 Impact of multiple public works projects occurring in the same vicinity**

There will be no impacts upon business or residential access or traffic patterns due to this project.

#### **5.2.3.5 Fiscal impacts on the municipality resulting from multiple public works projects occurring in the same time frame**

User costs have been evaluated and an analysis is provided in Table 4-1 in Section 4. Loan repayment is proposed through the use of the WRC sewer fund.

## **Section 6 – Mitigation**

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### **6.1 General**

Typical construction mitigation techniques are expected for these two projects and significant impacts to any sensitive areas are not anticipated.

### **6.2 Short-Term Construction Related Mitigation**

Traffic control during construction will be required following MMUTCD requirements to increase worker, driver, and pedestrian safety. Dust, noise, soil erosion and sedimentation control measures will be required throughout construction. Disturbed roads, sidewalks, driveways, vegetation and adjacent utilities will be restored to pre-disturbed conditions or better.

- 5.5 MG SRT (Site #7) – Access to side streets may be temporarily restricted at times. Access to local residential and commercial properties will be maintained.
- Perry Street Diversion (Pumped) – Construction will be primarily contained within Galloway Lake Park and the Grand Trunk Wester Railroad right-of-way. Access to local residential and commercial properties will be maintained during construction. Work within the floodplain and floodway of the Galloway Creek will be limited.

### **6.3 Mitigation of Long-Term Impacts**

No long-term or irreversible adverse impacts are anticipated.

#### **6.3.1 General Construction**

- 5.5 MG SRT (Site #7) – Construction of the forcemain adjacent to existing open water areas and wetlands will require a permit from the MDEQ. Federal and State environmental laws and regulations will be followed. The force main is proposed to be constructed using trenchless methods in this area.
- Perry Street Diversion (Pumped) – Construction will be primarily contained within Galloway Lake Park and the Grand Trunk Wester Railroad (GTWRR) right-of-way. There are wetlands located along the GTWRR right-of-way. As such, construction of the 36-inch sanitary sewer through this corridor will require a permit from the MDEQ. Federal and State environmental laws and regulations will be followed. Where wetland are confirmed, the sanitary sewer will be constructed using trenchless methods or appropriate wetland mitigation strategies will be developed.

### **6.3.2 Siting Decisions**

- 5.5 MG SRT (Site #7) – The site for the storage tank and force main were determined after reviewing several site alternatives. Appendix C contains the associated technical memoranda for alternate site analysis.
- Perry Street Diversion (Pumped) – the selected location provided the most direct and cost-effective option for a connection between the COSDS interceptor and the City of Pontiac WWTP.

### **6.3.3 Operational Impacts**

- 5.5 MG SRT (Site #7) – There are no adverse potential operational impacts for this storage option. The SRT will be used less than once per year on average.
- Perry Street Diversion (Pumped) – There will be no adverse operational impacts associated with this project. The intent of this project is to relieve hydraulic pressure on the COSDS interceptor and take advantage of local wastewater treatment capacity (City of Pontiac WWTP).

## **6.4 Mitigation of Indirect Impacts**

Indirect impacts are expected to be negligible as no new development is anticipated as a result of these projects.

### **6.4.1 Master Plan and Zoning**

There will be no changes necessary to the local master plan or zoning as a result of these projects.

### **6.4.2 Ordinances**

There will be no changes necessary to the local ordinances as a result of these projects.

### **6.4.3 Staging of Construction**

Staging of construction will not be necessary for installation of these projects.

## ***Section 7 – Public Participation***

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### **7.1 Public Meetings on Project Alternatives**

Several project meetings were held with WRC and community staff to review project concepts during the early planning phases. A presentation was also held on May 17, 2012 to discuss the recommended projects and project alternatives with staff from COSDS member communities and receive comments.

### **7.2 The Formal Public Hearing**

#### **7.2.1 Public Hearing Announcement**

Availability of the draft project plan was advertised in the May 20, 2012 edition of the Oakland Press. Copies of the Project Plan were available for public review at the Office of the Oakland County Water Resources Commissioner located at One Public Works Drive, Building 95 West, Waterford, MI 48328. A public hearing was held on June 20, 2012 at the WRC offices in Waterford to review the Project Plan recommendations and receive public comments. A copy of the advertisement and affidavit confirming publication are included in Appendix E.

#### **7.2.2 Public Hearing Transcript**

A copy of the public hearing transcript, transcribed by a stenographer from recordings of the proceedings, is included in Appendix E.

#### **7.2.3 Public Hearing Contents**

Contents of the public hearing, as specified in the SRF project plan preparation guidance document, were discussed during the public hearing. A copy of the power point presentation is included in Appendix E.

#### **7.2.4 Comments Received and Answered**

The names and addresses of the people who attended the public hearing, written comments, applicant's responses, and a description of changes (if any) which were made to the project as a result of the public participation process are included in Appendix E.

### **7.3 Adoption of the Project Plan**

The Water Resources Commissioner's resolution adopting the final project plan for wastewater system improvements and designating an authorized project representative is included in Appendix F.