

**Oakland County Water Resources Commissioner
Pontiac Sewage Disposal System, SAW Grant No. 1225-01
Wastewater System Asset Management Program**

The Oakland County's Water Resource Commissioner/Pontiac Sewage Disposal System applied for and received a grant to further develop its Asset Management Plan for its sanitary system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant.

The Pontiac Sewage Disposal System is operated under the jurisdiction of the Oakland County Water Resources Commissioner (WRC), which owns, operates and maintains the sanitary system. The WRC has various tools used to manage the assets it owns or maintains, including a GIS geodatabase, Computer Maintenance Management System (Cityworks), hydraulic models, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

A. Asset Inventory and Condition Assessment:

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size, material, along with other information need for a given asset type. The geodatabase is integral to WRC's Collaborative Asset Management System (CAMS,) which allows for maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary, combined, and storm water sewer assets, a NASSCO-compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for Pontiac Sewage Disposal System, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 250,000 lineal feet of sanitary underwent condition assessment via televising. In addition, approximately 619 manholes and other related structures were evaluated using the CAMS inspection work orders. Out of the 619 manholes, 366 were identified for potential repair, rehabilitation or replacement. From the 250,000 lft of sewer televised, approximately 53,000 lft was prioritized for major maintenance and approximately 6,000 lft for capital projects. (Note that use of NASSCO scores should only be used to flag or identify pipe that may require further review.

The project’s scope included additional analysis of individual defects and review of the consequence of failure to identify recommendations for the first five year projects.)

Vertical assets, including pump stations, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system. In general, most of the pump stations are in good condition, with certain assets requiring replacement in the near term.

B. Level of Service:

WRC developed an overall level of service goal that will be used as a starting point for each fund. Considerations into the level of service included compliance to regulations, operation, impact to the public and environment, safety and security, and are included in the overall business risk evaluation.

Level of Service Goals

	WRC Base Level of Service Goals	Measurables
Financial Viability and Impact	Emergency repairs can be repaired within Utility Reserve Budgets of the system	Exceedances of reserve budgets
Public Confidence/System Service Impact	Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise).	Number of service interruptions, complaints, and backups
Regulatory Compliance	No state permit violations. Comply with All MDEQ policies.	Number of violations
Safety of Public and Employees	Non-reportable injuries. No lost-time injuries or medical attention required. No impact to public health	Number of injuries and any public health advisories
Redundancy	Comply with 10 State Standards	Number of violations
BRE score	At this time, approximately 25% of the system has been inspected, so no overall score can be determined	System risk score
Staffing	Staffing levels and training maintained to meet level of service	Number of open positions, annual training hours

The Probability of Failure (POF) and Consequence of Failure (COF) scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the annual Long-Range Planning (LRP) process with WRC and its customers.

C. Criticality of Assets:

WRC uses asset optimization software (Power Plan AMP) to assist with prioritization of cost-effective maintenance strategies and capital improvement planning. The software syncs with both the GIS geodatabase and the Cityworks software packages.

Base line Probability of Failure (POF) and Consequence of Failure (COF) factors that WRC configured into the Power Plan software as part of the "Common to All" approach was used to estimate the overall risk of the wastewater collection system assets. For pump stations, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. Assets with the highest risk scores are likely candidates for immediate rehabilitation or replacement. Assets with lower scores should to be analyzed to develop the best life cycle strategy. The Business Risk Evaluation (BRE or Risk) score is the product of the POF and COF, as shown below:

$$BRE (Risk) = POF \times COF$$

Using the WRC Common to All approach, the POF scoring factors for sanitary sewers (from highest to lowest weight) are the NASSCO Quick Structural Rating (QSR), NASSCO Quick Maintenance Rating (QMR), and the percent of useful life remaining, based on age and material. Pipes not inspected use only age and material as a preliminary score. Therefore, sewers with defects found during inspection and the oldest sewers will have the highest POF scores. Because only a portion of the sewerage system has been inspected, the final POF scores are still being developed.

Using the WRC Common to All approach similarly for the COF, the scoring factors for sanitary sewers (from highest to lowest weight) are the depth, diameter, water table (based on NASSCO infiltration defects found during televising) and proximity to a flood zone and major roadway. Therefore, sewers with the highest COF scores would be the larger, deeper sewers, particularly those located in floodplains, high water, or under roads.

By multiplying the POF and COF, the produce becomes the Business Risk Evaluation score, or BRE. Therefore, the most "critical" sewers, or those with highest risk, would be the larger diameter pipes that have been televised with defects found, and that are deep.

The vertical assets, in this case the pump stations were scored for POF based on the asset's physical condition (60%), O&M protocols (25%), and performance (15%). The COF scores were based on the safety of the public and employee (25%), financial impact (15%), public confidence (10%), regulatory compliance (30%), and firm capacity (20%). Therefore, the most "critical" pump stations are those that have a lower physical condition and have higher firm capacities or more regulatory issues.

D. O&M Strategies and Revenue Structure:

O&M strategies for the system were reviewed against the "Common to All" approach developed by WRC. These include determining future sewer cleaning and televising frequency and inspection and maintenance procedures for pump stations. Costs required to implement the selected strategies were estimated and incorporated into the rate review process for the system. The OCWRC worked with Oakland County's Fiscal Services staff to determine if the current rate structures were sufficient to meet the current needs for the management of the wastewater system, and to plan for any adjustments that may be required to meet anticipated future expenses. The Power Plan software provides estimated annual maintenance and capital needs for each fund, which is then reviewed by WRC staff and the local community.

E. Long Term Funding/Capital Improvement Plan:

Capital Improvement Plans identify system upgrade, rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. Power Plan was used to model asset deterioration and assist with identifying capital improvement needs for the near and long term. Costs for anticipated capital projects in the near term are also incorporated into the rate process.

- Approximately \$360,000 of capital projects were recommended over the next five years, which includes additional inspection of sewers that were televised as part of this project.
- Approximately \$469,000 of major maintenance projects were recommended over the next three years.
- Capital projects for years 5 to 20 will be identified after the additional inspection takes place. The WRC asset optimization software is currently budgeting for additional projects based on age alone, and prioritizing them based on consequence of failure. The proposed major maintenance and CIP projects will continue to be reviewed on an annual basis as more condition data is collected.

F. Contact Information:

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Primary Contact Name	System Manager	WRC Project Manager	Consultant Name
Mr. Jim Nash Water Resources Commissioner One Public Works Drive Building 95 West Waterford, MI 48328 248.858.0958	Mr. Ben Lewis, PE Manager WRC Office One Public Works Drive Building 95 West Waterford, MI 48328 248.858.1539	Mr. Ben Lewis, PE Manager WRC Office One Public Works Drive Building 95 West Waterford, MI 48328	Mr. Andrew McCune, PE Wade Trim 25251 Northline Road Taylor, MI 48180 734.947.9700 248.858.1539

G. Grant Amounts:

The original grant amount awarded to the Pontiac Sewage Disposal System was:

- \$2,000,000, with a match amount of \$0 (City of Pontiac is classified as a disadvantaged community) for completion of an asset management plan for the wastewater system.
- \$0, with a match amount of \$0 for completion of an asset management plan for the storm water system.
- \$0, with a match amount of \$0 for planning and design costs related to the project.
- Final, actual costs spent as part of the grant will be available after the last disbursement request.

SUMMARY OF ASSETS IN PONTIAC SEWAGE DISPOSAL SYSTEM:

See attached summary.

ASSET SUMMARY

Pontiac Sewer

Structures

Asset Type	Count
SewageLiftStation	11
SewerAccessPoint	2
SewerCleanout	3
SewerManhole	6,129
Total Structure Assets:	6,145

Pipe Materials

Material	Length (FT)	Segment Count
ABS Truss	3,570	22
Brick or Block	8,221	33
Cast Iron	11,051	12
Clay or VCP	1,111,112	5,013
Concrete	31,994	134
Corrugated Metal	6,598	8
Ductile Iron	3,949	22
HDPE	2,209	8
Non-reinforced Concrete	889	3
PVC	77,363	393
Reinforced Concrete	104,934	462
Truss	94,928	477
Unknown	237	4
Total Length (FT):	1,457,056	Total Segments: 6,591

Pipe Diameters

Pipe Diameter	Length (FT)	Segment Count
Non-Circular	90	1
4	2,238	13
6	6,086	40
8	875,349	3,987
10	148,623	736
12	122,139	572

ASSET SUMMARY

Pontiac Sewer

14	188	1
15	75,324	319
16	1,392	6
18	65,238	294
20	9,693	16
21	24,499	88
22	3,007	10
24	30,155	142
27	11,494	50
30	24,964	84
36	34,628	133
42	7,060	33
48	3,601	15
54	1,187	5
60	1,914	14
66	4,598	19
72	2,672	9
78	916	4

Total Length (FT):	1,457,056	Total Segments:	6,591
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Vertical Assets

Asset Type	Count
ANTENNASTRUCTURENS	11
COMMINUTORGRINDERNS	2
ELECTRICEQUIPMENTNS	65
FACILITYMETERNS	12
GENERALEQUIPMENTNS	6
GENERATORNS	10
HEATINGANDCOOLINGNS	9
INSTRUMENTATIONNS	66
PIPINGNS	20
PLANTVALVENS	26
PUMPNS	24
SCREENNS	2
STRUCTURENS	8

ASSET SUMMARY

Pontiac Sewer

VARIABLESPEEDCONTROLN	7
VENTILATIONNS	11
Total Vertical Assets:	279



**Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness**

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

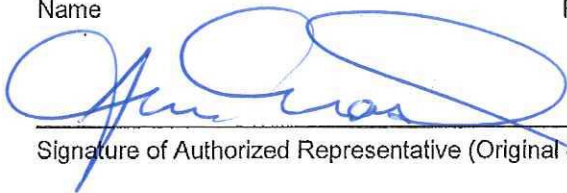
The Pontiac Sewage Disposal System (legal name of grantee) certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1225-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

- 1) Funding Gap Identified: Yes or No
If No - Date of the rate methodology approval letter: 10-11-2016
- 2) Significant Progress Made: Yes or No Copy attached
(The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
- 3) Date of rate methodology review letter identifying the gap: _____
- 4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on _____

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ben L. Lewis at 248-858-1539 lewisbe@oakgov.com
Name Phone Number Email


Signature of Authorized Representative (Original Signature Required) 5/24/17
Date

Jim Nash Oakland County, Water Resources Commissioner
Print Name and Title of Authorized Representative