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SAW Grant Project Number 1288-01

## EXECUTIVE SUMMARY

The City of Walled Lake (City) undertook the development of an asset management plan for the City's sanitary sewer system. The City contracts with the Oakland County Water Resources Commissioner's Office (WRC) to operate, maintain, and manage the sanitary sewer collection and disposal system. On behalf of the City, the WRC applied for a grant to develop the Asset Management Plan (AMP) for the City of Walled Lake Sewage Disposal System (SDS). The grant was funded through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) program. This grant provides between 100% and 75% grant funding for costs related to developing an asset management program. The SAW program was established by the MDEQ to help communities move toward financial sustainability and become self-sustaining enterprises. The City was awarded a grant in the amount of \$670,090 with a 10% local match of \$67,009.

WRC also received a grant to develop a separate Asset Management Program with a "Common to All" framework (**WRC Common to All Report**). This program provides the general workflows, templates, decision trees, specifications and other elements that can be incorporated into individual asset management plans for communities within Oakland County that WRC contracts with, like the City of Walled Lake.

The report includes program elements related to the City of Walled Lake's wastewater collection system. The Asset Management Plan provides the City of Walled Lake and the WRC with an understanding of the current and future infrastructure needs for the system, as well as evaluates the current and future operational/maintenance and financial needs of the utility. The Asset Management Plan provides a guideline for the City and the WRC to follow to continue to provide the desired quality, level of service, and reliability of wastewater service to the community at the lowest rate possible. The Asset Management Plan was developed by evaluating multiple components of the system including: asset inventory, condition of assets, value of assets, evaluation of risks and failures of assets, capital improvement needs, and current and future financial needs.

The WRC also has the following tools available for use to manage the assets it maintains; GIS geodatabase, collaborative asset management system, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models and an operating and capital improvement project prioritization model. These various tools allow the WRC to evaluate the multiple components of the Walled Lake SDS and establish both short and long-term strategies for the operation of the SDS.



The following summary of the Walled Lake AMP provides basic information of the five major AMP components along with a list of the AMP's major identified assets.

## ASSET INVENTORY AND CONDITION ASSESSMENT

The Walled Lake SDS consists of gravity sanitary sewers, manholes, lift stations, and force mains. As part of the contract with WRC, the City is able to utilize the existing WRC Geographic Information System (GIS) geodatabase as the primary means to record and map the assets. This geodatabase is part of the overall WRC GIS system, which is operated and maintained by the WRC along with Oakland County IT services. The software used is ESRI ArcGIS. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size, and material, along with other specific information for the given asset type. The geodatabase syncs with other WRC software packages and systems, including the WRC's Collaborative Asset Management System (Cityworks) software and the Riva software. These software systems provide asset maintenance planning and tracking, estimate likelihood of failure and consequence of failure using the asset attributions, risk/prioritization models, capacity studies, maintenance records, and capital improvement prioritizing strategies and capital planning.

The WRC has developed condition assessment methods and guidelines that allow for efficient and reliable recording of the asset conditions. The gravity sanitary sewer pipes are reviewed and evaluated to determine their condition utilizing National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Standards. Similarly, the manholes are reviewed and evaluated using the Manhole Assessment and Certification Program (MACP) Standards. Vertical assets are inspected and evaluated using guidelines and information developed by the WRC and included in the **WRC Common to All Report** completed with the SAW Grant.

Over the course of the last year and a half, multiple asset management tasks were completed to further understand the current state and future needs of the system utilizing funding from the MDEQ SAW Grant Program. The condition of the gravity sanitary sewer assets was evaluated based on the video inspection, review, and evaluation of approximately 108,000 lineal feet of pipe. The conditions assessment of approximately 548 sanitary manholes, as well as the vertical assets including a total of four lift stations, were also inspected and inventoried.

The gravity sewer pipe conditions were evaluated using the NASSCO program's Quick Structural Rating (QSR) and a Quick Maintenance Rating (QMR) scoring method. The assessment of the gravity sanitary sewer pipe inspections showed that most of the pipes were in good condition. The sewer pipes with a QSR or QMR score greater than 4100 are considered in fair to poor condition. A total of approximately 10,900 feet (8.7%) of the pipe had a QSR greater than 4100 and approximately 6,960 feet (5.6%) had a QMR greater than 4100. The inspections of the sanitary manholes found that all the manholes were in good condition. The sanitary lift stations were also found to be in good condition based on more recent pump upgrades and equipment improvements.



The results of these assessment conditions were inputted into the existing software program to help further develop the inventory of the assets and evaluate the asset risks. The information and data within the software systems were then used to develop the Asset Management Plan for the City of Walled Lake SDS.

## **LEVEL OF SERVICE**

The WRC has developed overall level of service goals that the Walled Lake SDS should provide. The level of service goal includes how the SDS should perform based on the technical, managerial, and financial operations of the system. The operation of the SDS shall, at a minimum, meet all state and federal regulations and requirements as well as meet all the WRC level of service goals including; customer communication, measure of its performance, determination of critical assets, setting goals and objectives, safety and security, public and environmental impacts, and financial management.

WRC sets the minimum standard for sewer pipes using the NASSCO scoring method. Generally, sewer pipes with QSR and QMR scores of less than 4100 are considered acceptable. This is a high level of service that has been discussed with and agreed upon by the City. The goal is to provide service that is proactive and not reactive. Specific areas of the system that are considered problematic are routinely monitored. All lift stations are on a regular maintenance schedule. Sanitary sewer overflows due to flaws in the system and major disruptions due to system failures are considered unacceptable. Maintaining this level of service requires consistent rate revenue and periodic rate increases. The City Manager interfaces directly with City Council to stress the importance of keeping the sanitary sewer system in good working order for the ultimate benefit to the community.

## **CRITICALITY OF ASSETS**

The WRC utilizes their asset optimization software, Riva, to facilitate and prioritize both the maintenance and capital improvements plans of the system, considering both the risk and financial means. The optimization software works with both the GIS geodatabase and the Cityworks software to allow for all asset data and information to be considered. The WRC uses a scoring process, based on the measurement of two aspects of the asset, to determine the asset's overall risk. The Likelihood of Failure (LOF) and the Consequence of Failure (COF) scores are used to estimate the overall risk or the Business Risk Exposure (BRE) score. The WRC has configured the calculation of these risk scores, within the software system, based on the methods in the ***WRC Common to All Report***.

The inspection and evaluation of the gravity sanitary sewer and manhole assets were reviewed and the data included in the software to allow for a more accurate calculation of the risks. The lift stations were also inspected and evaluated as individual assets and the LOF and COF scores were determined and included in the software to estimate the overall risk score. Most of the assets, within the SDS, have low scores for both the LOF and COF, as well as the overall BRE score.



The gravity sanitary sewer includes approximately 95% of the assets with a low LOF and the remaining with a moderate LOF score. The COF scores for the gravity sewer pipes resulted in 98% of the assets being low, with the remaining 2% falling in the moderate and high categories.

The non-gravity sewer (force main) assets all have a low LOF. The COF scores for the force main sewer pipes are considerably higher based on the asset type. The force main pipes have only 18% in the low COF category with most of the force main, or 81%, having a moderate COF and only 1% with a high COF.

The inspections and evaluations of all four of the lifts stations resulted in each one of them having low scores for both the LOF and COF scores.

### **O&M STRATEGIES AND REVENUE STRUCTURE**

The Operation and Maintenance (O&M) strategies for the Walled Lake SDS were evaluated based on the guidelines developed by the WRC in the *WRC Common to All Report*. The O&M strategies include regulating the consistency of the sewer cleanings, televising frequency, inspection frequency, and maintenance procedures for the assets. The costs required to perform these strategies were estimated and included into the rate review process for the system.

The WRC works with the City to determine if the current rate structures are sufficient to meet the current management needs of the Walled Lake SDS. They also work together to make any required adjustments that are needed to plan for both the O&M costs as well as projected expenses that may develop in the future. The software system helps calculate the estimated annual maintenance and capital financial needs for the SDS.

The SDS currently operates on an as-needed basis therefore the current rate has not had a significant increase in many years. The SDS does not have a long-term maintenance plan and with the system just beginning to age, a maintenance and rehabilitation plan and budget is needed to prolong the lifetime of the system.

The SAW grant allowed for the inspection of the sewer assets and to help identify problem areas, immediate needs, and the establishment of a maintenance program. The results did not indicate any immediate needs or emergency repairs in the system. However, several rehabilitation maintenance projects were identified to be resolved soon. These maintenance activity costs could be spread out over multiple years to help reduce the financial impact on customers.

The current rate structure is sufficient to sustain the system and ensure the desired level of service. Future changes will need to be made to plan for proposed rehabilitation projects. The costs for the proposed projects were estimated and then used to determine the required funds needed for future projects. The finances to pay for these projects would then be funded through a future rate increase. The rate increase per Residential Equivalent Unit (REU) that would be required to meet the estimated project costs is approximately 8.5%, taking the monthly REU rate from \$75.26 to \$81.72.



## LONG TERM FUNDING/CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) provides a guide to identify the long-term needs, improvements, rehabilitation, and replacement needs for the utility for a period of 10 years or more. The CIP would have a more detailed plan for the first two years. The CIP will allow the utility to plan and budget for these expenditures and consider the anticipated project costs during the rate process.

Infrastructure improvement priorities have been developed based on the current evaluation of the system. The most immediate improvements, recommended to be completed within the two-year horizon, include sewer rehabilitation or replacement of 32 gravity sewer assets that will cost approximately \$426,500.

The proposed improvement projects are summarized as follows:

### Year One (Total of 21 sewer assets; rehabilitation cost of \$267,500)

- Rehabilitation of approximately 4,400 lineal feet of 8” sanitary sewer.
- Rehabilitation of approximately 270 lineal feet of 12” sanitary sewer.
- Complete removal and replacement of approximately 320 lineal feet of 8” sanitary sewer and approximately 200 lineal feet of 15” sanitary sewer.

### Year Two (Total of 11 sewer assets; rehabilitation cost of \$159,000)

- Rehabilitation of approximately 2,900 lineal feet of 8” sanitary sewer.

## WALLED LAKE SDS - SUMMARY OF ASSETS

Below is a summary of the horizontal and vertical assets within the Walled Lake SDS:

Gravity and Non-Gravity Sewer Assets by Material

Sewer Assets by Material	Gravity or Non-Gravity Sewer Pipe	Total Length (FT)	Number of Assets
ABS	Gravity	16,316	88
C-14	Gravity	65,842	316
Cast Iron	Non-Gravity	5,534	4
Clay or VCP	Gravity	8,032	39
Non-reinforced Concrete	Gravity	2,311	13
PVC	Gravity	7,444	44
Reinforced Concrete	Gravity	16,803	72
Truss	Gravity	7,815	40
<b>Total</b>		<b>130,097</b>	<b>616</b>



#### Gravity and Non-Gravity Sewer Assets by Size

Sewer Assets by Diameter	Total Length (FT)	Number of Assets
6"	2,661	3
8"	113,129	552
10"	10,147	41
12"	3,926	18
15"	234	2
<b>Total</b>	<b>130,097</b>	<b>616</b>

#### Additional Assets

Asset Description	Horizontal or Vertical	Number of Assets
Gravity Sewer Manhole	Horizontal	614
Sanitary Sewer Lift Station	Vertical	4

### CONCLUSION WALLED LAKE SDS - SUMMARY OF ASSETS

The AMP is a document that summarizes the assets within the Walled Lake SDS. The AMP provides a resource to be used by the WRC, the City, utility managers, operation and maintenance staff, etc. to help make decisions regarding their assets. The AMP will provide guidance for determining any improvements, annual budgets, rate development, required staff, and public communication.

The City of Walled Lake Sanitary Disposal System is well maintained and operated. The planning and improvements that were completed over that last several years have enabled the City and the Oakland County WRC to provide reliable and high quality service to the community.

In general, the system is currently at a relatively low likelihood of failure with isolated areas that will require improvement in the near future. As the Walled Lake SDS is mostly built out, periodic evaluation and continued maintenance of the system's assets is key to reducing risks due to failure.