

CITY OF TECUMSEH
COUNCIL STUDY SESSION
TECUMSEH CITY HALL
MONDAY, APRIL 17, 2017
6:00 P.M.

AGENDA

1. Call to order
2. Roll call
3. Approval of Agenda
4. Study Session Topic:
 - A. Wastewater Asset Management Plan, Water Reliability Study, and Preliminary Water & Sewer Rate Projections (Presentation by Tetra-Tech Engineers)
5. Council Comments
6. Adjournment

The City of Tecumseh provides for reasonable accommodations for its programs, services and meetings under Title VI of its Non-Discrimination Policy and Limited English Proficiency Policy, with an advance 7 day notice to Dan Swallow at 517 424 6555.



DRAFT

**WASTEWATER
ASSET MANAGEMENT PLAN**

200-22034-14003

April 2017

WASTEWATER ASSET MANAGEMENT PLAN

April 2017

City of Tecumseh, MI
Utilities Department
309 E. Chicago Boulevard
Tecumseh, MI 48926

EXECUTIVE SUMMARY

In 2014, the City of Tecumseh was awarded a State of Michigan Stormwater, Asset Management, and Wastewater (SAW) Grant to complete design and management services for the sanitary sewer system. The City's SAW Grant provided financial assistance for two completed wastewater projects:

- WWTP Trestle Pipe Replacement
- Union Street Pump Station Replacement

This Asset Management Plan (AMP) is the final item completed as part of the SAW. This AMP has been designed to provide the City with a proactive and sustainable long-term plan to help ensure the well-being of the community and environment.

The AMP approach centers on the following five core elements:

1. Asset Inventory
2. Level of Service
3. Criticality
4. Revenue Structure
5. Capital Improvement Plan

Asset Inventory

Existing City GIS information was used as a basis for the plan, and was augmented with survey data, detailed equipment and collection system asset inventories and cost development. To aid in this analysis, as well as simplify annual reporting needs, the system information has been integrated with Lucity™ Asset Management Software (AMS) which was purchased and implemented as part of this program. The Lucity™ software operates as an extension of the GIS and is primarily a work order and capital improvement planning tool aimed to help the City streamline administrative processes and simplify mandatory reporting.

The current value of the entire wastewater infrastructure exceeds \$53.5 million. The current value of the City's sanitary sewer collection system is estimated at approximately \$40.5 million, with approximately 88% of the system cost associated with gravity mains and manholes with the remaining cost attributed to pump station and force mains. Table ES-1-1 summarizes the quantity and baseline system replacement value (in 2017 \$).

Table ES-1-1 – Collection System Asset Summary and Cost

System Component	Quantity (unit)	Baseline System Value (Current Replacement Cost)
Gravity Mains	255,641 feet	\$25,780,000
Manholes	987 each	\$9,703,000
Pressurized Mains	18,389 feet	\$1,390,000
Pump Stations	10 each	\$3,620,000
	Total	\$40,493,000

The City's Wastewater Treatment Plant includes a collection of 343 assets that represent the total facility processes and are currently estimated at a value of approximately \$13.0 million. Table ES-1-2 summarizes the various WWTP elements and the associated replacement value of those assets (in 2017 dollars).

Table ES-1-2 - WWTP Asset Summary and Cost

Process Location	Assets	Baseline System Replacement Cost
Preliminary/Primary Treatment	47	\$1,898,000
Equalization/Retention Basin	27	\$3,036,000
Aeration System	82	\$2,722,000
Final Settling Tanks	11	\$788,000
Tertiary Filtration/UV Disinfection	44	\$1,578,000
Sludge Treatment	120	\$2,905,000
Chemical Feed System	12	\$120,000
Total	343	\$13,047,000

Level of Service

A major factor in the quality of community life is the quality of the community's facilities, services and amenities. Level of Service is a measure of the amount and/or quality of the public facility which must be provided to meet that community's basic needs and expectations. The City developed a list of key performance indicators (KPIs) to hold as goals for the Level of Service for their sanitary sewer facilities, which can be seen below in Table ES-1-3. The City currently is meeting all of the listed performance goals and will focus on maintaining this high Level of Service.

Table ES-1-3 – Level of Service KPIs

Level of Service Key Performance Indicators
Reduce Basement Backups
Reduce Infiltration/Inflow rates and volumes
Capacity to Convey MDEQ design storm
Reduce Odor Complaints
Clean all sewers at least once in 5-year period
Replace underperforming pump stations
Meet requirement of NPDES permit
Implement Equipment Inventory and Maintenance Tracking System

Criticality

Criticality of assets is a step used to prioritize future improvements so that money is invested in the most needed projects. Criticality is quantified by use of a numerical score called Business Risk Evaluation (BRE).

BRE is defined as the product of probability of failure (POF) of an asset and the consequence of failure (COF) for that asset. That is, $BRE = POF \times COF$, with numerical values assigned for both POF and COF.

POF is based on the condition of the asset. For this project, the age of each asset was identified and evaluated with additional information such as equipment records, staff observations and field condition analysis. In the case of the collection system, nearly all of the manholes and 48,000 feet of sewer were inspected to assign a condition rating to the assets.

COF is based on the consequence to the utility, public and environment of the asset failing. Numerical scores were assigned to each asset based on these factors.

A BRE was subsequently determined for each asset in the City’s system. These BRE ratings, combined with City Staff experience, were used to define a Capital Improvement Plan for the City of Tecumseh.

Revenue Structure

The City completed a revenue structure that demonstrated the City’s wastewater utility generates sufficient revenue to fund the operation and maintenance at the wastewater utility. The SAW grant does not require the City to find capital improvements through wastewater rates although Tecumseh, like most municipalities typically does. A separate report has been prepared to analyze the ability of the City’s rates to implement the CIP in this report.

Capital Improvement Plan

A 20-year capital improvement plan was developed for both the collection system and the WWTP using the results of the business risk evaluation conducted in this AMP. The capital improvement plan identifies areas in the collection system and specific parts of the WWTP processes where funding should be provided over the next 20 years. This capital improvement plan should be routinely updated to ensure that it includes short- and long-term needs. It will provide the City with defensible documentation for setting aside and safeguarding funds for projects.

Table ES-1-4 - City of Tecumseh 20-Year Capital Improvement Plan (2017-2037)

Project Number	Description	Project Year	Project Cost
WWTP – 1	Sludge Pump Replacement Ph 1	2018	\$196,000.00
CS - 1	2018 Trunk Sewer Improvements	2018	\$689,000.00
CS - 2	Country Club Pump Station Replacement	2018	\$193,000.00
WWTP - 2	Transformer Replacement	2020	\$299,000.00
WWTP - 3	Actuator Replacement	2020	\$303,000.00
CS - 3	Grade 5 Defect Repairs Ph 1	2020	\$259,000.00
CS - 4	Cyl-Tec Pump Station Replacement	2023	\$434,000.00
CS - 5	Evans Creek Trestle Pipe Rehabilitation	2023	\$242,000.00
CS - 6	Grade 5 Defect Repairs Ph 2	2023	\$239,000.00
WWTP - 4	Digester Demolition and Structural Improvements	2023	\$789,000.00
WWTP - 5	Polymer System Replacement	2023	\$180,000.00
CS - 7	Grade 5 Defect Repairs Ph 3	2024	\$442,000.00
WWTP - 6	Sludge Pump Replacement Ph 2	2025	\$540,000.00
CS - 8	Westhaven Pump Station Replacement	2026	\$466,000.00
CS - 9	Grade 4 Defect Repairs (annual 2026-36)	2027	\$662,000.00
WWTP - 7	Generator Replacement	2028	\$2,851,000.00
WWTP - 8	Tank Mechanism Replacement	2028	\$2,662,000.00

CS - 10	Grade 4 Defect Repairs (annual 2026-36)	2029	\$695,000.00
WWTP - 9	Multi-stage Blower Replacement	2030	\$483,000.00
WWTP - 10	PLC and SCADA Upgrades	2030	\$341,000.00
CS - 11	Grade 4 Defect Repairs (annual 2026-36)	2031	\$730,000.00
WWTP-11	Filter Media and UV Bulb Replacement	2032	\$478,000.00
CS - 12	Grade 4 Defect Repairs (annual 2026-36)	2033	\$767,000.00
CS - 13	Grade 4 Defect Repairs (annual 2026-36)	2035	\$806,000.00
	5-year	Subtotal	\$1,939,000.00
	Remaining	Subtotal	\$13,807,000.00
		Total	\$15,746,000.00

Future Steps

Beginning in 2013, any major municipal wastewater system in the state of Michigan whose permit expires on October 1, 2012 or after will be including an asset management program requirement. This requirement will accompany an updated set of reporting requirements associated with operating the City's WWTP and collection system. The Lucity™ AMS is designed to provide detailed reports regarding specific performance measures which will be essential to completing annual MDEQ reporting requirements. The City will be required through their permit to submit reports including specific information regarding what capital improvement projects were completed, how much was spent on sewer cleaning, preventative maintenance, and other measures.

This AMP, inclusive of the GIS model of the sewer system and Lucity™ AMS, are intended to be worked as a unit to assist City staff in operating, maintaining and upgrading the City's wastewater infrastructure efficiently and cost effectively. It will be a living set of documents that will require an on-going process of recording information to help the decision makers best manage the needs of the City's wastewater infrastructure.