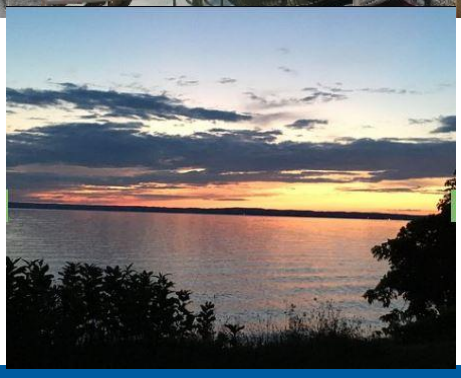
CLEAN WATER STATE REVOLVING FUND PROJECT PLAN ASSET MANAGEMENT PLAN AMENDMENT TO THE WASTEWATER TREATMENT PLANT UPGRADES

FOR CITY OF CHEBOYGAN

Draft: March 28, 2021
HRC Job No. 20191207







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SECTION 1.0 — ASSET MANAGEMENT PLAN

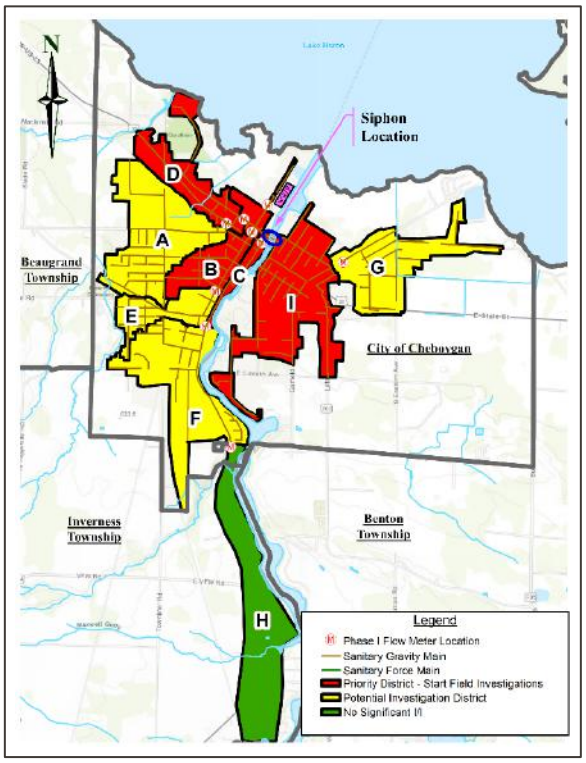
1.1 BACKGROUND

The City of Cheboygan (the City) owns and operates its sanitary sewer collection system and Wastewater Treatment Plant (WWTP). The sanitary sewer collection system collects sewage from the City and Inverness Township. The system consists of approximately 670 manholes. The gravity sewer includes approximately 40 miles of sewer ranging from 8-inch to 24-inch diameter. Existing sewers and manholes in the collection system have construction years reported as 1881, making sections of the collection system 140 years old.

Prior to the 1970s, the sanitary sewer operated as a combined system with both stormwater runoff and sanitary sewage collected in the same sewer pipes. Through separation efforts from 1976 to 1979, the combined sewers were separated. Up through the 1970s, new homes were built with footing drains connected directly to the sanitary sewer system. In 1977, the City ordinance was revised mandating all new homes to be constructed with footing drains connected to a sump pump which discharges to the ground surface. Despite these efforts, the City still experiences high wet weather flows (WWF) which are attributed to the aging sewer lines and manholes, unidentified stormwater connections, sump pumps, and footing drain connections. The average dry weather flow (DWF) recorded at the WWTP is 1.8 mgd and is approximately 450% higher than the raw sewage attributable to the tributary population (of 0.40 mgd), and in recent years, fish have been found on the bar screen at the WWTP (refer to Figure 1). Given these conditions, the City embarked upon an expansive, multi-phased sanitary sewer system study.

Figure 1 - Fish Caught on WWTP Bar Screen

Figure 2 - 2019 Infiltration/Inflow Study Results



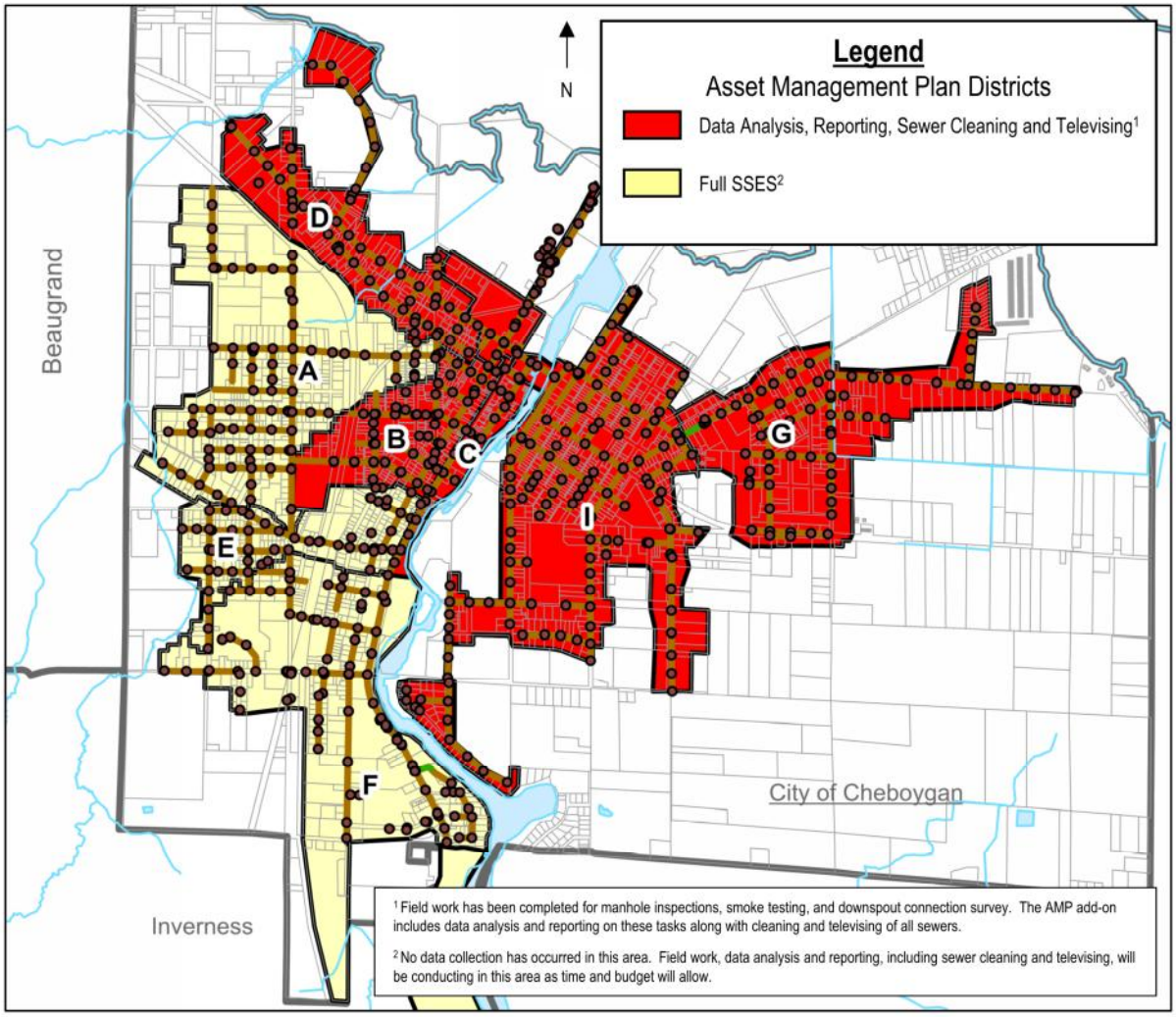
Starting in May 2019 through July 2019, the City conducted a sanitary sewer meter study throughout the entire sanitary sewer service area delineating the system into nine (9) sewer districts. The results of the meter study, *Infiltration and Inflow Study*, dated September 27, 2019, (I/I Study) indicate that all nine (9) districts are a contributing source of I/I with four (4) of the districts being categorized as the highest priority districts recommended for further investigations. These four (4) districts, in order of priority, are B, I, D and C (refer to Figure 2).

Following submittal of the I/I Study, a plan to conduct a Sanitary Sewer Evaluation Survey (SSES) in the priority areas was developed and data collection commenced in May 2020. During data collection, all SSES tasks were included in the priority districts (B, C, D, and I) as well as in District G.

1.2 PROPOSED PROJECT

The proposed project for this Asset Management Plan (AMP) Add-On includes completion of the 2020 SSES districts B, C, D, I and G and extending the study to include districts A, E and F as time and budget will allow (meaning within the time and budget constraints of the AMP Add-On with the WWTP Clean Water State Revolving Fund (CWSRF) loan documents). As indicated by the I/I Study, all districts are contributing excessive infiltration and/or inflow. District H includes the collection system for Inverness Township, of which the City is not responsible, and therefore the City will not be pursuing investigations for that district. Figure 3 shows the AMP Project districts and the work required for each.

Figure 3 - AMP Districts



The tasks involved in completing the AMP project work are listed as follows:

1. Clean and Televise Siphon
2. Manhole Inspections
3. Smoke Testing
4. Clean and Televise Sewers
5. Outfall Inspections and Dye Testing
6. Wet Weather Flow Observations
7. Groundwater Elevation Study
8. Downspout Connection Survey
9. GIS Updates
10. Funding Assistance

The tasks for the AMP are described as follows.

1. Clean and Televise Siphon
   The City's collection system utilizes a dual-siphon to connect the east side of the sewer system to the west side where the WWTP is located. Adequate functioning of this siphon is critical to providing the necessary level of service to the sanitary sewer users east of the river. This task is included as part of the original work for the SSES and has not yet been completed.

2. Manhole Inspections
   This task involved field investigating approximately 406 manholes in priority areas B, C, D, I and G. The purpose of individual manhole inspections is to determine the general physical condition of the manholes in the study area and note any deficiencies that might allow the infiltration/inflow (I/I) of storm water runoff and/or groundwater infiltration into the sanitary sewer system. The data generated from the manhole inspections will be used to determine the required manhole rehabilitation. The field work for this task was completed for districts B, C, D, I and G with the only remaining work including data analysis and reporting. This task will be extended to include field work, data analysis and reporting for approximately 120 manholes in districts A, E and F as time and budget will allow.

3. Smoke Testing
   This task involved smoke testing approximately 406 manholes in priority areas B, C, D, I and G. Smoke testing is a relatively inexpensive and quick method of detecting infiltration/inflow sources in sewer systems and highlight sources that are not necessarily detectable during manhole inspections and sewer televising inspections. The main objective of this method is to detect I/I sources such as roof drains, cellar, yard and area drains, foundation drains; abandoned building sewers; faulty connections, illegal connections, and storm sewer cross connections. The field work for this task was completed for districts B, C, D, I and G with the only remaining work including data analysis and reporting. This task will be extended to include field work, data analysis and reporting for approximately 120 manholes in districts A, E and F as time and budget will allow.

4. Clean and Televise Sewers
   This task includes the cleaning and closed-circuit televising (CCTV) of the City's sanitary sewers. There is approximately 140,000 linear feet (lft) of sewer ranging in size between 6 and 30-inch. This task has not yet been completed in any district and will be extended to include the following districts in order of priority as time and budget will allow B, C, D, I, G, A, E and F.

5. Outfall Inspections and Dye Testing
   This task involves inspecting the bulkheaded outfalls along the river to ensure the bulkheads are sealed adequately and are preventing any river water from leaking into the sanitary sewer system. This task is not

district specific but is of high priority. Field work under this task is partially complete and will be further investigated during the CCTV work. Data analysis and reporting is still required as part of the AMP.

6. Wet Weather Flow Observations
   This task includes observation of key structures during wet weather events. Field work for this task was completed for districts B, C, D, I and G, and the only remaining work involves data analysis and reporting. This task will not be required for districts A, E and F.

7. Groundwater Elevation Study
   This task involved the installation and monitoring of up to 20 groundwater sites located throughout the City's sewer system for a monitoring period of 12 months. A potential benefit of collecting this data from gauges throughout the City's sewer system is assistance with prioritizing future rehabilitation. As well, a benchmark of groundwater elevations will be established, and data can be collected from time to time whenever system monitoring is required. This task is not district specific. Field work for this task will continue through September 2021, with data analysis and reporting to follow.

8. Downspout Connection Survey
   This task involved field investigations and inventory of all downspouts in approximately 1450 parcels within districts B, C, D, I and G to estimate any potential connectivity to the sanitary sewer system. The field work for this task was completed for districts B, C, D, I and G with the only remaining work including data analysis and reporting. This task will be extended to include field work, data analysis and reporting for approximately 420 parcels in districts A, E and F as time and budget will allow.

9. GIS Updates
   Work under this task includes obtaining City plans and documents related to the City's sanitary sewer or combined sewer system for purposes of hyperlinking all sanitary sewer system documents to the City's GIS system. As well, building age, water usage, and historical information related to reactive sanitary sewer cleaning and homeowner claims will also be added to the City's GIS system. Work under this task in ongoing and applies to all districts involved in the AMP.

10. Funding Assistance
    Work under this task includes providing the necessary documents as required for drawing funds from the CWSRF loan.

1.3 IMPACT ON USER COST

The SSES AMP add-on will be paid for by user charges. The total monthly increase in costs for residential users is estimated to be $1.66; this is a 14% increase to the estimated impact from the WWTP upgrades (refer to Table 1). The estimated cost for each task for the $2 million AMP add-on is listed in Table 2 with estimated project schedule listed in Table 3.

Table 1 - Estimated User Charge

Descriptions	WWTP SRF	SSES AMP Add-On	TOTAL Loan
Loan Amount	$16,000,000	$2,000,000	$18,000,000
Percent of Principal Forgiveness	25%		
Amount of Principal Forgiveness	$4,000,000	$0	$4,000,000
Total Project Cost	**$12,000,000**	**$2,000,000**	**$14,000,000**
Interest Rate (FY21)	2.125%	2.125%	2.125%
Term (years)	30	30	30
No of Residential Users	1,822	1,822	1,822
Total Annual Debt Repayment	$545,100	$90,900	$635,900
Total Annual Debt Repayment for Residential Users*	$218,040	$36,360	$254,360
Total Monthly Residential Cost for Project	$9.97	$1.66	$11.64
Percent Increase to Monthly Residential Cost for SSES Add-on		14%	
Total Cost of Loan	$16,353,000	$2,727,000	$19,077,000
Interest Paid	$4,353,000	$727,000	$5,077,000

* Per the WWTP SRF, residential users make up 40% of the billable sewer revenue.

Table 2 - Estimated AMP Cost per Task

SRF AMP ADD-ON TASK NO.	TASK	HRC Budget	Cleaning and Televising Contractor	Total
1	Clean and Televise Siphon	$34,000	$50,000	$84,000
2	Manhole Inspections	$99,350		$99,350
3	Smoke Testing	$60,176		$60,176
4	Clean and Televise Sewers	$154,200	$1,324,320	$1,478,520
5	Outfall Inspection and Miscellaneous Dye Testing	$26,111		$26,111
6	Wet Weather Flow Observations	$27,901		$27,901
7	Ground Water Elevation Study	$40,750		$40,750
8	Downspout Connection Survey	$103,409		$103,409
9	GIS Updates	$57,642		$57,642
10	Funding Assistance	$22,140		$22,140
	TOTALS:	$625,679	$1,374,320	$2,000,000

Table 3 - Estimated AMP Schedule

TASK NO.	Project	2021				2022												2023					
		9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Fiscal Year		2022										2023											
Estimated Expenditure per Fiscal Year		$954,695										$1,045,304											
1	Clean and Televise Siphon																						
2	Manhole Inspections																						
3	Smoke Testing																						
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9	GIS Updates																						
10	Funding Assistance																						

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