Village of Decatur
Van Buren County, MI
Asset Management Program
Stormwater System

FINAL REPORT

October 2017

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ACRONYMS AND ABBREVIATIONS USED

AMFR – Asset management financial review
AMP – Asset management program
CCTV – Closed-circuit television
CIP – Capital improvement plan
Decatur – Village of Decatur
DPW – Department of public works
HDPE – High density polyethylene
GIS – Geographical information system
GPS – Global positioning system
LOS – Level of service
MACP – Manhole assessment certification program
MDOT – Michigan Department of Transportation
NASSCO – National Association of Sewer Service Companies
O&M – Operation and maintenance
PACP – Pipeline assessment certification program
PVC – Polyvinyl chloride
ROW – Right-of-way
SAW – Stormwater, asset management, and wastewater
WAI – Wightman and Associates, Inc.

Executive Summary

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace, or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The program is organized into three components that answer the following questions:

Asset Management Program (AMP):
- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):
- What do we own, where is it, what is the condition, and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:
- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- Where are improvements needed?

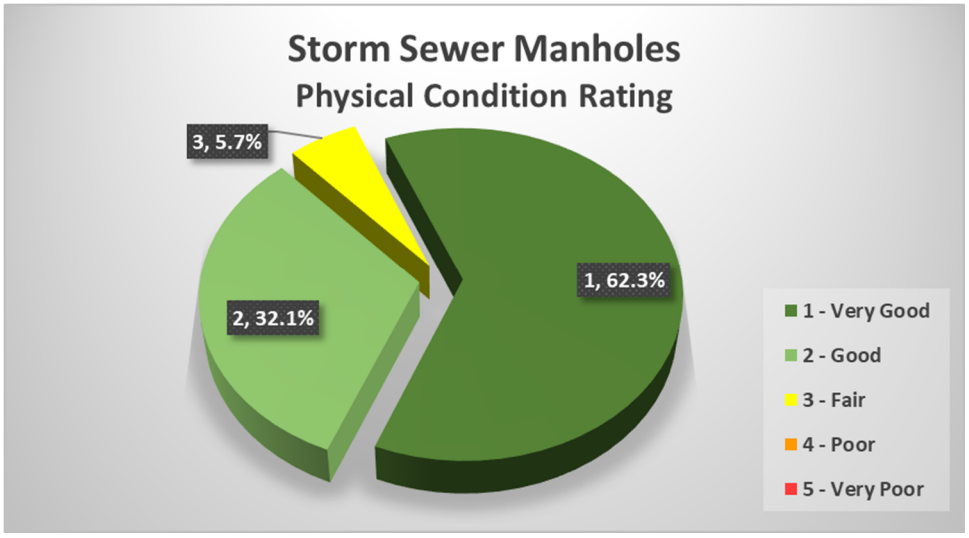
System Description

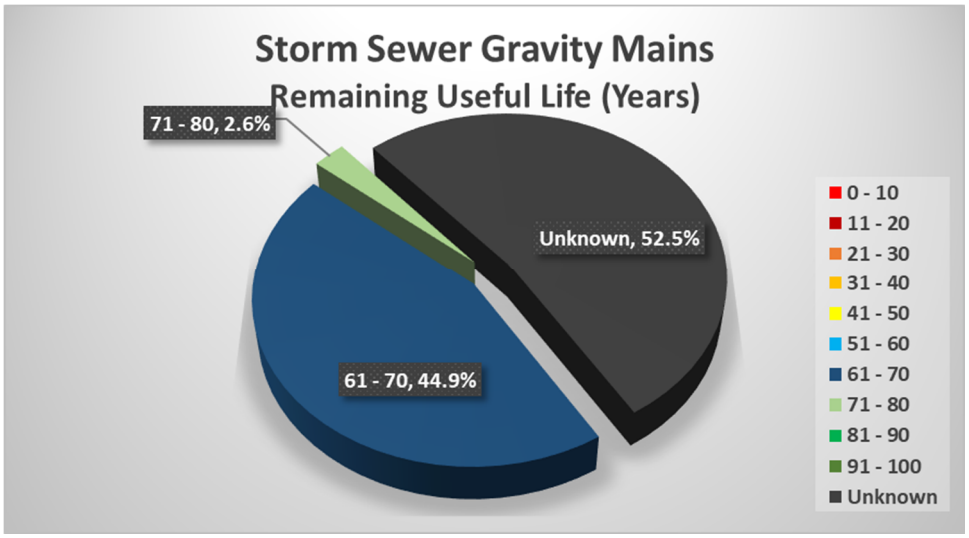
The Village of Decatur operates a stormwater collection and retention system. The stormwater system includes more than 19,400 feet of gravity storm sewer, over 220 structures (inlet structures and storm manholes), ten stormwater discharge points, and two retention basins. The total approximate value of the stormwater collection and retention system is $2,570,000.

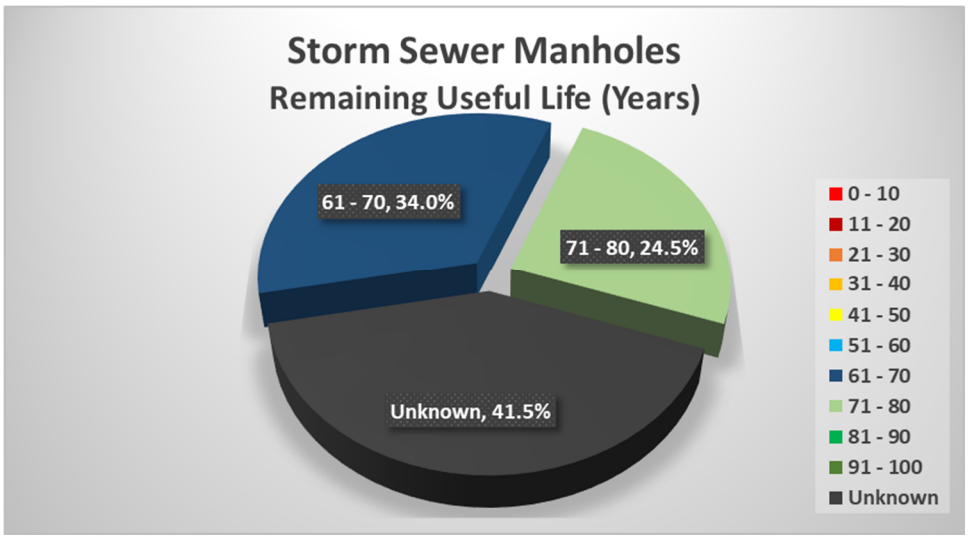
System Condition

The Village of Decatur's stormwater assets that were assessed are generally in fair to good condition and with recommended operation, maintenance, and replacement procedures, will be able to provide the desired level of service. The condition ratings for the major components of the stormwater system are based upon the National Association of Sewer Service Companies Condition Assessment Ratings. However, the storm sewer pipes were not televised and their conditional ratings were based on age (if known) and the condition of the ends of the pipes visible in the stormwater manholes. Many of these assets were assigned a rating of 3 (fair) due to lack of available data to fully assess the assets. It is recommended that the storm sewer system be televised as a capital improvement project to allow for a better assessment of current conditions (details below).

The charts on the next page summarize the conditional ratings for the components of the storm sewer system that could be physically assessed and the estimated remaining useful life for the various asset classes in the stormwater system, in ten-year increments.


Storm Sewer Manholes
Physical Condition Rating
3, 5.7%
1, 62.3%
2, 32.1%
1 - Very Good
2 - Good
3 - Fair
4 - Poor
5 - Very Poor


Storm Sewer Gravity Mains
Remaining Useful Life (Years)
71 - 80, 2.6%
Unknown, 52.5%
61 - 70, 44.9%
0 - 10
11 - 20
21 - 30
31 - 40
41 - 50
51 - 60
61 - 70
71 - 80
81 - 90
91 - 100
Unknown


Storm Sewer Manholes
Remaining Useful Life (Years)
61 - 70, 34.0%
71 - 80, 24.5%
Unknown, 41.5%
0 - 10
11 - 20
21 - 30
31 - 40
41 - 50
51 - 60
61 - 70
71 - 80
81 - 90
91 - 100
Unknown

Capital Improvements

A capital improvement plan has been prepared to identify when critical assets should be improved. A list of the recommended improvement for the next 20 years is included in Section V of this report with additional details provided in Appendix E.

As previously noted, since the condition of the storm sewer pipes was not investigated by televising, no recommendations for capital improvements to the storm sewer piping itself could be made. As such, there are no recommended capital projects beyond televising the storm sewer system and developing a master plan for the storm sewer system.

System Operations

System operations were reviewed and the following recommendations were made to provide the desired level of service:

- Maintain preventative maintenance operations to continue to provide proactive care of the system including cleaning the sumps of all storm sewer structures on an annual basis.
- Track operation and maintenance progress through the GIS-based work order system.
- Use the report generation features of the work order system to notify Village of Decatur officials and customers on the status of repairs and responses to complaints.
- Consistently update the GIS system as components of the storm sewer system are repaired and replaced.
- Attach updated field drawings or photographs within the GIS system.

Cash Flow and Rates

Since there is no independent revenue source for stormwater systems, a long-term cash flow analysis cannot be completed and there are no user rates to adjust.

Implementation

The following steps should be taken to implement the program:

- Follow proposed Operation and Maintenance recommendations as outlined in Appendix G.
- Receive training on the Work Order System and GIS model and implement use of both resources.
- Plan, bid, and complete the capital improvements outlined in Appendix E.

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I. Introduction, Team, and Mission Statement

A utility Asset Management Program (AMP) identifies the desired level of service for that utility at the lowest life cycle cost for rehabilitating, repairing, or replacing the assets associated with that utility system. In 2012, the State of Michigan enacted Legislation through Public Acts 511, 560, 561, and 562, establishing a grant program to assist communities in developing AMPs, titled the Stormwater, Asset Management, and Wastewater (SAW) grant program. The Village of Decatur (Decatur) received a grant through this program to develop an AMP for their stormwater and wastewater collection systems. This report outlines the various components of the Decatur stormwater system AMP, including implementation recommendations.

The purpose of this report is as follows:

- List and determine the condition and remaining life of all stormwater assets.
- Determine the desired level of service for the system.
- Determine the criticality of all identified assets as they relate to the desired level of service.
- Develop a capital improvements program for the system, identifying the improvements necessary to maintain the desired level of service.
- Develop revenue systems that will support the desired level of service for the utility system.
- Summarize methods to implement the AMP.

A useful AMP is a continually changing process and is periodically updated to reflect changes in the goals of the utility and the ongoing deterioration of the assets that make up the utility. The initial AMP was developed by the following team of officials, staff, and consultants (the Asset Management Team):

The Village of Decatur

- Aaron Mitchell: Village Manager
- Mathew Newton: Village Clerk and Treasurer
- Jim Ebeling: Public Works Foreman
- Evelyn Avery: Utility Billing Clerk

Wightman & Associates, Inc. Staff, Project Engineer, and Managers

- Mickey Bittner, P.E.: Client Principal
- Kevin Marks, P.E.: Account Manager
- Frank LaPierre: Grant Program Manager
- Jeff Edwards, P.E.: Project Engineer
- Ryan Miller: GIS Manager

The Asset Management Team adopted the following Mission Statement:

The Village of Decatur is committed to improving and maintaining protection of the environment, public health, and safety and of the performance of our stormwater utility system assets, while minimizing the long-term cost of operating those assets. We will strive to maintain the highest-quality customer service at the lowest life cycle cost possible.

II. Asset Inventory

The first step in developing an AMP is to identify the equipment, infrastructure, personnel, tools, and anything else that comprises or services the utility in question.

A. Description

Decatur owns and operates a stormwater collection and retention system. The collection system consists of over 3.5 miles of gravity sewer pipes and more than 220 buried structures (storm sewer manholes and stormwater inlet structures). In addition to the pipes and structures in the collection system, there are two retention basins and 10 discharge points to ditches, surface water bodies, wetlands, and the retention basins.

The first retention basin is located just north of the village limits on the north side of County Road 352 at N. Phelps Street and it accepts stormwater collected from along N. Phelps Street. The second retention basin is located between E. Beers Street and E. Bronson Street northeast of S. Phelps Street. This retention basin accepts stormwater collected from along S. George Street, E. Beers Street, and E. and W. Bronson Street. Stormwater collected throughout Decatur is also discharged to the county drain leading to Mud Lake, the wetlands on the east side of County Road 668 south of the Village, and to Lake of the Woods.

In addition to the stormwater assets previously discussed, there is a substantial amount of storm sewer and two retention basins within the Village limits along Delaware Street/M-51 that are owned and operated by the Michigan Department of Transportation (MDOT). The assets owned by MDOT are not included as a part of this AMP.

With a thorough knowledge of the basic layout of the stormwater system, a comprehensive inventory of all stormwater collection and retention system assets owned by Decatur was performed using as-built utility drawings and on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the stormwater collection and retention system were prepared using Geographical Information System (GIS) software. The mapping was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment. The ability to accurately locate utility assets will allow for quicker responses to and resolution of service calls, ensuring the highest level of customer service and ongoing efficiency in labor usage.

Condition assessments, Record/As-Built drawings, maintenance records, and other data are also accessible through the GIS maps mentioned above, allowing staff easy access to all records for the stormwater system in one location. This can also allow staff to access all available information while in the field with a hand-held device, potentially eliminating the need to return to the office to gather additional information.

Table 1, on the next page, contains a summary of the stormwater system assets owned by Decatur that were identified and included in the stormwater AMP.

Asset Description	Quantity	Units
30” Storm Sewer	40	LF
24” Storm Sewer	1,226	LF
18” Storm Sewer	2,705	LF
15” Storm Sewer	1,659	LF
12” Storm Sewer	11,313	LF
10” Storm Sewer	1,210	LF
8” Storm Sewer	674	LF
6” Storm Sewer	592	LF
4-foot Diameter Manhole	54	EA
Inlet Structure	167	EA
Storm Water Discharge Point	10	EA
Storm Water Retention Pond	2	EA

Table 1 - Village of Decatur stormwater collection and retention system assets

B. System Maps

A map of the stormwater collection and retention system is included in Appendix A. An electronic version of the map is available at the Decatur Village Offices on dedicated computers and on several handheld tablets for ease of use in the field.

C. Asset Conditions

The focus of the Decatur stormwater APM was to locate and document the stormwater assets present in the system. However, after completing the comprehensive inventory of the utility system assets, limited conditional assessments of all assets that could be visually inspected were performed. These conditional assessments provided the information needed to assess the physical condition and functionality of these assets. Wightman and Associates, Inc. (WAI) performed limited conditional assessments on the retention ponds, manholes, and inlet structures within the stormwater collection system. However, no closed-circuit televising (CCTV) was conducted within the storm sewer system.

After the field inspection was complete, overall asset conditions were assessed using a systematic method to produce consistent, useful information. This information was used to make decisions about asset rehabilitation, replacement, and/or the need for further inspections. The asset conditions for assets that were physically inspected were based on the National Association of Sewer Service Companies (NASSCO) numerical grading system, which defines the severity of observed defects or the condition of the asset. The numerical system uses numbers ranging from 1 to 5 as shown in Table 2 below. This ranking considers both the immediate defect and the likelihood of further deterioration of the defect.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 2 - NASSCO conditional assessment system

The storm sewer manholes were assessed in accordance with the NASSCO Manhole Assessment Certification Program (MACP) and any defects noted in the visible portions of the storm sewer piping

were graded according to the guidelines of the NASSCO Pipeline Assessment Certification Program (PACP). Once the individual defects were graded, an overall condition rating was applied to each storm sewer manhole based on the worst defect rating noted within the manhole. However, due to the limited amount of pipeline that was physically assessed, the overall condition rating for the storm sewer pipe was based on remaining life as described in Section II.D below. Figure 1 shows the condition ratings for the storm sewer manholes.

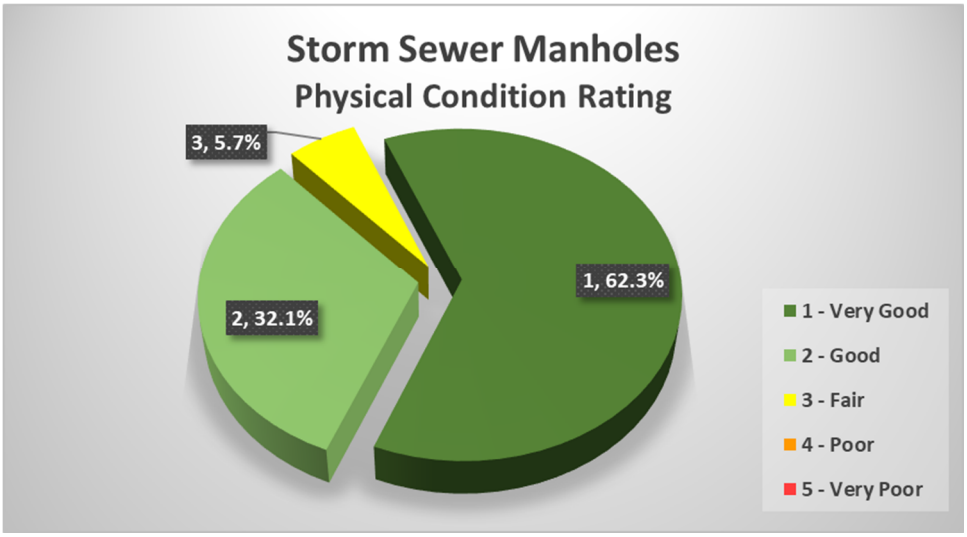


Figure 1 - Storm sewer manhole physical condition rating

The condition of the retention basins was also assessed. Table 3 shows the condition of the individual retention basins throughout the stormwater system owned by Decatur. Additionally, since some of the stormwater collected from the Village is discharged to the MDOT retention basins, they are listed in Table 3. However, they were not assessed as part of this AMP.

Retention Basin GIS Identification	Condition	Location
swDA-2	MDOT owned	North of E. Delaware St. east of Burke St.
swDA-3	Good	North of Village Limit on Phelps St./County Road 352
swDA-4	Very Good	Middle of block between S. Phelps St. and S. George St. north of E. Bronson St. and south of E. Beers St.
swDB-5	MDOT owned	North of W. Delaware St. west of Mills St.

Table 3 - Stormwater retention basin condition ratings

D. Remaining Life

Remaining life estimation is another method commonly used to characterize the condition of assets – especially those assets that were not physically assessed (such as by visual inspection or utilizing CCTV inspection). Remaining life is defined as the duration of time remaining until an unacceptable condition exists or an asset no longer meets its primary function.

Remaining useful life for storm sewers is dependent on the materials used in construction. Storm sewer pipe materials have evolved over the years, beginning with brick and non-reinforced concrete, transitioning to corrugated metal, clay and reinforced concrete and, more recently, to reinforced concrete, plastic (HPDE), and PVC piping. Figure 2, on the next page, shows the percentages of the various pipe

materials that are present in the storm sewers throughout the Decatur stormwater collection system. The pipe materials are included as an attribute in each asset's entry in the electronic GIS mapping database.

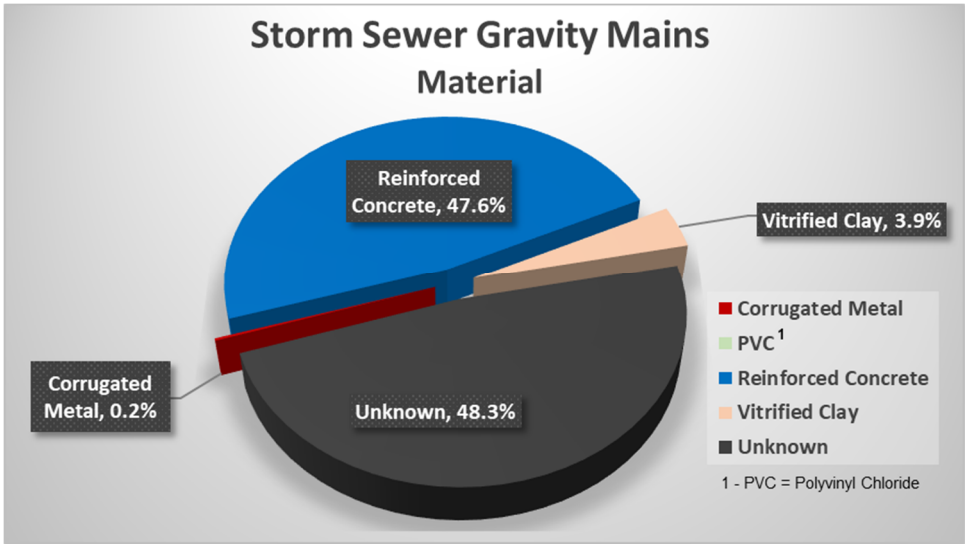


Figure 2 - Storm sewer gravity main pipe materials

There are several methods utilized to estimate the remaining life of an asset:

- The simplest method uses a typical useful life table, which lists the estimated total life of an asset type from its first day of use to when it is estimated to fail to function. Based upon the actual age of the asset, the remaining useful life is calculated. This method does not consider the current condition of the asset or any other factors.
- A second method utilizes a typical useful life table as well, but applies a factor to the calculation based upon the current condition of the asset.
- A third method utilizes actual decay curves based upon the maintenance and failure experience of a specific asset or asset class for the utility in question. This is the most accurate method. However, most utilities do not have the historical data necessary to develop the decay curves.

For the Decatur AMP, the remaining useful life has been calculated using the second method, a typical useful life table modified by current condition factors. Determining the useful life of an asset is as much art as it is science. Table 4 presents the typical useful lives for the asset types included in the Decatur stormwater system.

Asset Type	Typical Useful Life (years)
Gravity Sewer Pipe (HDPE, PVC)	100
Gravity Sewer Pipe (ABS Plastic, Concrete)	75
Gravity Sewer Pipe (Corrugated Metal)	50
Manholes/Structures	80
Outfalls	75
Retention Basins – Open	50
Infiltration Basins	100
Land	Unlimited

Table 4 - Typical useful lives for stormwater assets

These useful life values have been increased or decreased for each specific asset based upon industry-standard specifications for materials and components. For those stormwater assets in the Decatur storm sewer system where the ages of the existing assets could be determined, the estimated remaining life of the asset is included as an attribute for that asset in the GIS mapping database. The estimated remaining life of the storm sewer piping and manholes, in ten-year increments, is shown below in Figure 3 and Figure 4, respectively.

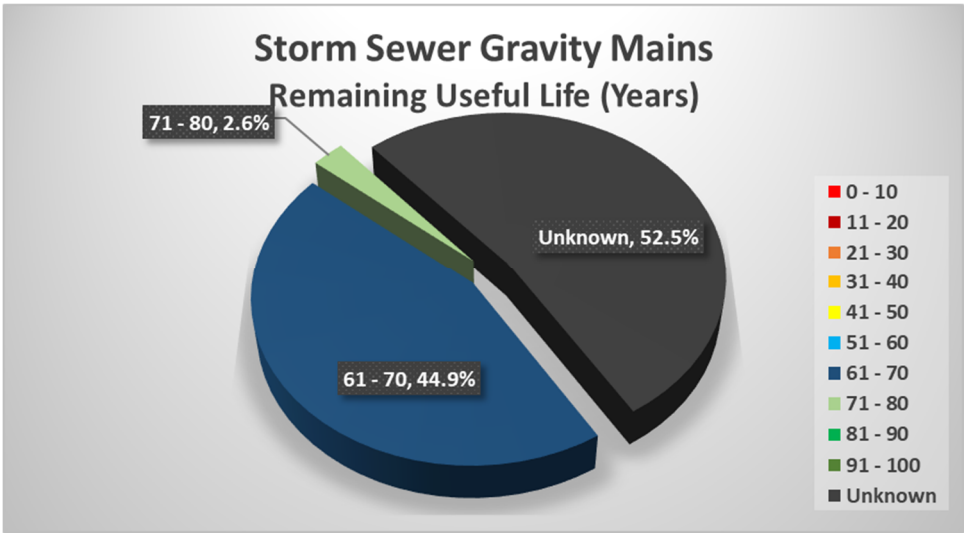


Figure 3 - Storm sewer gravity main remaining useful life

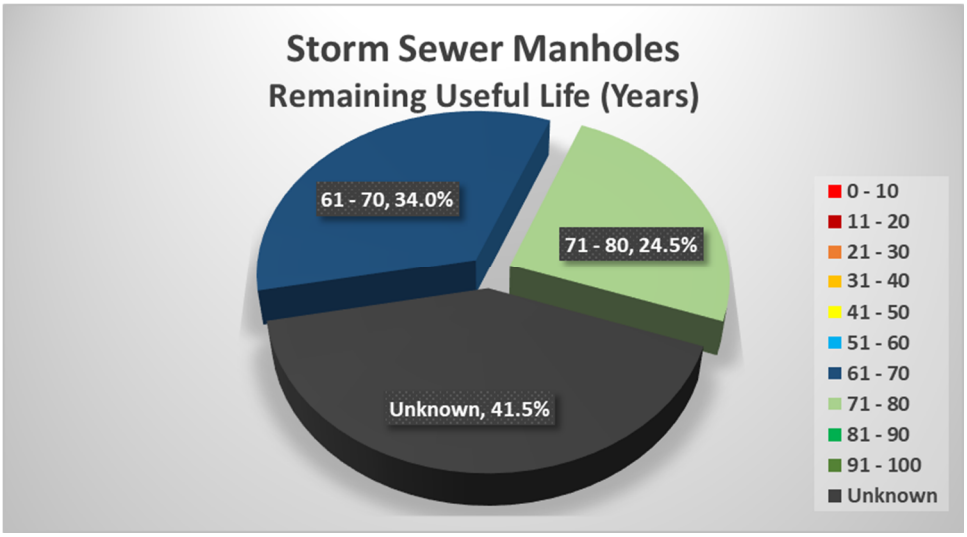


Figure 4 - Storm sewer manhole remaining useful life

For those assets within the stormwater system where physical assessments were not completed (mainly the storm sewer piping), the current condition was assessed based upon the age of the asset and its remaining useful life. If the age of those assets was unable to be determined, a condition rating of "3" (fair) was assigned to the asset. These ratings are included as an attribute in each asset's entry in the electronic GIS mapping database.

E. Replacement Value

The replacement value of an asset is the cost to replace the asset after it has exhausted its useful life. Obtaining exact costs for asset replacement is complex and can involve the development of detailed plans to aid in the development of the estimate. Developing a reasonable estimate of the replacement value of an asset utilizing average unit price construction costs is an adequate method and has been used for this plan. The average unit prices and the quantities of the various system components used to develop the replacement costs are shown in Appendix B. The costs shown include engineering costs, construction contingencies, and restoration costs such as paving, gravel, lawn, etc. The quantities of the various components of each asset class were obtained from the GIS system or as-built drawings. The estimated replacement value for the stormwater collection and retention system is $2,570,000.

III. Level of Service

The Level of Service (LOS) defines the way in which the Owner desires the facility or utility to perform over the long term. The LOS should ensure that all regulatory requirements are met and should include any technical, managerial, or financial components the Owner deems necessary to meet customer expectations. The LOS is a fundamental part in defining how the Decatur stormwater system will be operated and maintained in the future. As with all components of the AMP, defining the desired LOS will be an ongoing process.

The Asset Management Team selected the following statements to define the desired LOS for the Decatur stormwater system:

1. We will strive to maintain compliance with all regulatory requirements at all times.

2. Should a blockage or break occur, we will correct the problem as soon as possible to minimize any future flooding.

3. We will develop and implement a preventive maintenance program to reduce the likelihood of the occurrence of a blockage or breakage.

4. We will respond to customer complaints during normal business hours. Communication with the complainant or customers affected will occur.

5. We will maintain an asset management program for the system and provide reports on an as needed basis.

6. We will develop a work order system to identify, assign and track preventative and reactive work on the system and report on the status of work orders to the Village on an as needed basis.

7. We will inform the customers of our desired level of service and report on the compliance with the level of service to the Village on an as needed basis.

IV. Criticality

Not all assets are equally important to a utility's operation. While some assets may have a high likelihood of failure, their failure may cause little to no disruption in the ability of the utility to meet their LOS. Correspondingly, some assets may be unlikely to fail but their failure may cause a catastrophic disruption to the utility's ability to meet their desired LOS. Criticality is a rating that is applied to the assets in an AMP that considers both the likelihood and the consequences of an asset failing.

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

For assets in the stormwater collection and retention system, the likelihood of failure was determined according to the conditional rating of the asset using the criteria listed in Table 2 on page 7 with consideration given to the remaining asset life. The methodology of examining the asset conditions and assigning conditional ratings to the assets was discussed previously in Sections II.C and II.D.

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail.

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a stormwater asset, social costs and/or the costs of collateral damage caused by the failure can even outweigh the cost of repairing the failure itself. The consequence of failure for Decatur stormwater assets was assessed using the criteria presented in Table 5 on the next page.

Consequence of Failure Rating	Social Effects	Collateral Damage Effects
1 (Insignificant)	Minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	Minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	Limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	Moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	Extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 5 - Consequence of failure rating scheme for stormwater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the stormwater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the stormwater collection system is shown in Figure 5 and Figure 6 below and on the next page.

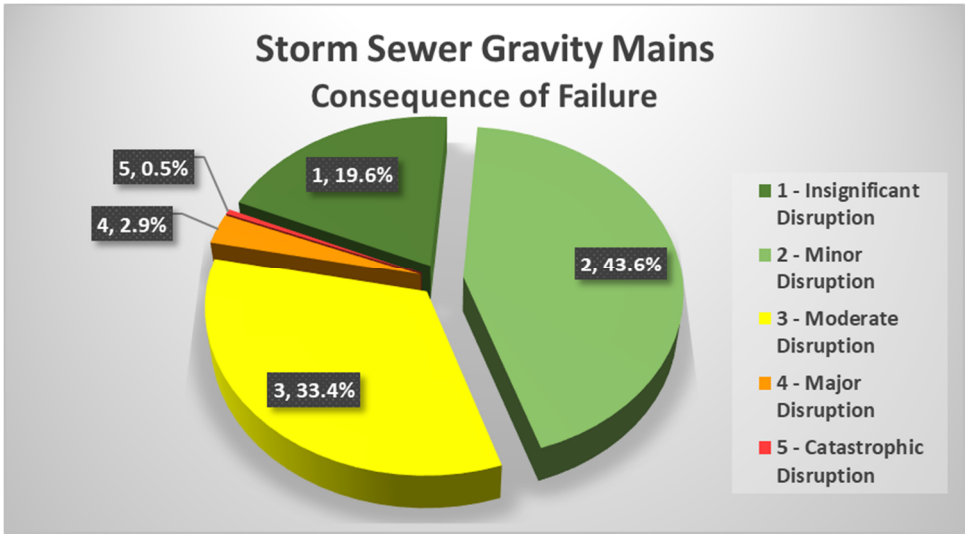


Figure 5 - Storm sewer gravity main consequence of failure rating

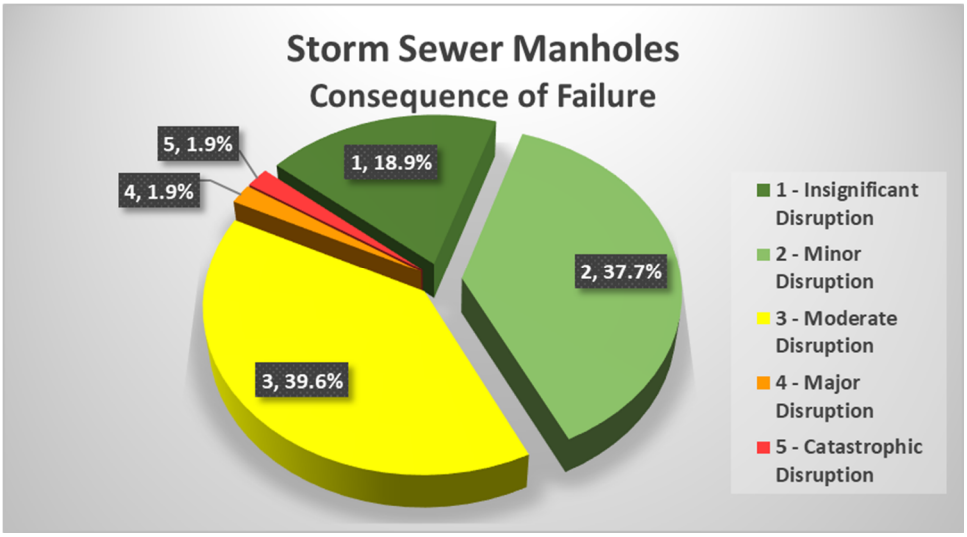


Figure 6 - Storm sewer manhole consequence of failure rating

C. Criticality Maps

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 6 below. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the stormwater collection system showing asset criticality is included in Appendix D.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 6 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project.

V. Capital Improvement Plan

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired LOS can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The planning

period for a CIP is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during that period.

B. Recommended Stormwater System Projects

Table 7 lists the recommended capital improvement projects for the next twenty years for the stormwater system. Where appropriate, the estimated project costs shown in Table 7 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. Detailed descriptions and cost estimates for each project listed can be found in Appendix E.

Priority	CIP Year	Project Name	Estimated Cost[1]
1	2018	Develop Stormwater System Master Plan	$ 19,000
2	2019	Closed Circuit Televising of Storm Sewer – 2019	$ 18,000
3	2020	Closed Circuit Televising of Storm Sewer – 2020	$ 18,000
4	2021	Closed Circuit Televising of Storm Sewer – 2021	$ 18,000
5	2022	Closed Circuit Televising of Storm Sewer – 2022	$ 18,000
6	2023	Closed Circuit Televising of Storm Sewer – 2023	$ 18,000
Total Estimated Project Cost for Twenty Year Stormwater CIP (current dollars) =			$ 109,000
Total Estimated Project Cost for Twenty Year Stormwater CIP (future dollars) =			$ 120,000

Table 7 - Recommended stormwater system capital improvement projects

In addition to the capital improvement projects listed above, sufficient funds must also be budgeted to continue to provide the routine operation and maintenance (O&M) services required to maintain the desired LOS within the Decatur stormwater system.

VI. Asset Management Financial and Revenue Structure

As previously mentioned, one of the primary goals of an AMP is to develop a long-term plan for revenues capable of supporting the required capital improvements in addition to routine O&M costs. However, unlike a sanitary sewer AMP, where a source of revenue exists from sanitary sewer user fees, stormwater systems have no separate stream of revenue. Improvements to the stormwater system are usually funded as a part of a street improvement project and routine O&M costs are covered in the day-to-day operations of the DPW. As such, an in-depth asset management financial review (AMFR) cannot be conducted and a revenue structure cannot be developed for the stormwater system.

A. Operation and Maintenance Evaluation and Recommendations

Consistent and thorough maintenance of the stormwater collection and retention system will enable it to operate at the desired LOS for its expected life. Preventative maintenance is often cited by most communities but is seldom practiced to the desired or necessary extent. O&M on an "emergency basis" is the usual procedure in many communities.

The current O&M procedures were evaluated during the development of the asset management program to determine if changes are needed to meet the desired LOS. In the past, the Decatur Department of Public Works (DPW) has tried to incorporate some of the typical periodic O&M procedures, but has often

[1] Estimated CIP project costs shown include both engineering fees and a contingency budget, where appropriate.

ended up operating on an "emergency" maintenance basis. They have recently been working on revising their O&M program and putting more of a focus on preventative maintenance.

O&M responsibilities for the Decatur stormwater system are performed by DPW staff. The Village Manager ultimately oversees the services completed by the DPW and reports to the Village Council on the activities of the DPW.

After a review of the current Decatur O&M program, the following general recommendations are made with regards to the GIS model developed as part of the AMP to help meet the desired LOS:

1. Use the new work order program that will be supplied with the GIS model to track O&M progress, including preventative maintenance activities such as cleaning inlets and jetting problem pipes.
2. Utilize the report generation feature of the new work order and GIS model to notify the Village Council as well as utility customers on the status of repairs and responses to complaints.
3. Consistently update the GIS model as stormwater system assets are repaired and replaced through planned and emergency repairs.

VII. Asset Management Program Implementation

AMPs are designed to provide a plan for effectively meeting LOS goals and the Mission Statement, which may change over time as new requirements are imposed by regulatory agencies and expectations from customers and communities change. The program is also intended to work in conjunction with the GIS component of the AMP to provide a reference for personnel who will become part of the Asset Management Team after implementation.

Implementation of the AMP involves execution of the CIP projects identified in Section V and sustaining and making improvements to the system O&M. In the course of performing regular maintenance and routine replacement of components, the work order tracking system provided with the GIS software will allow the DPW and Village officials to monitor the progress of routine and preventative maintenance activities.

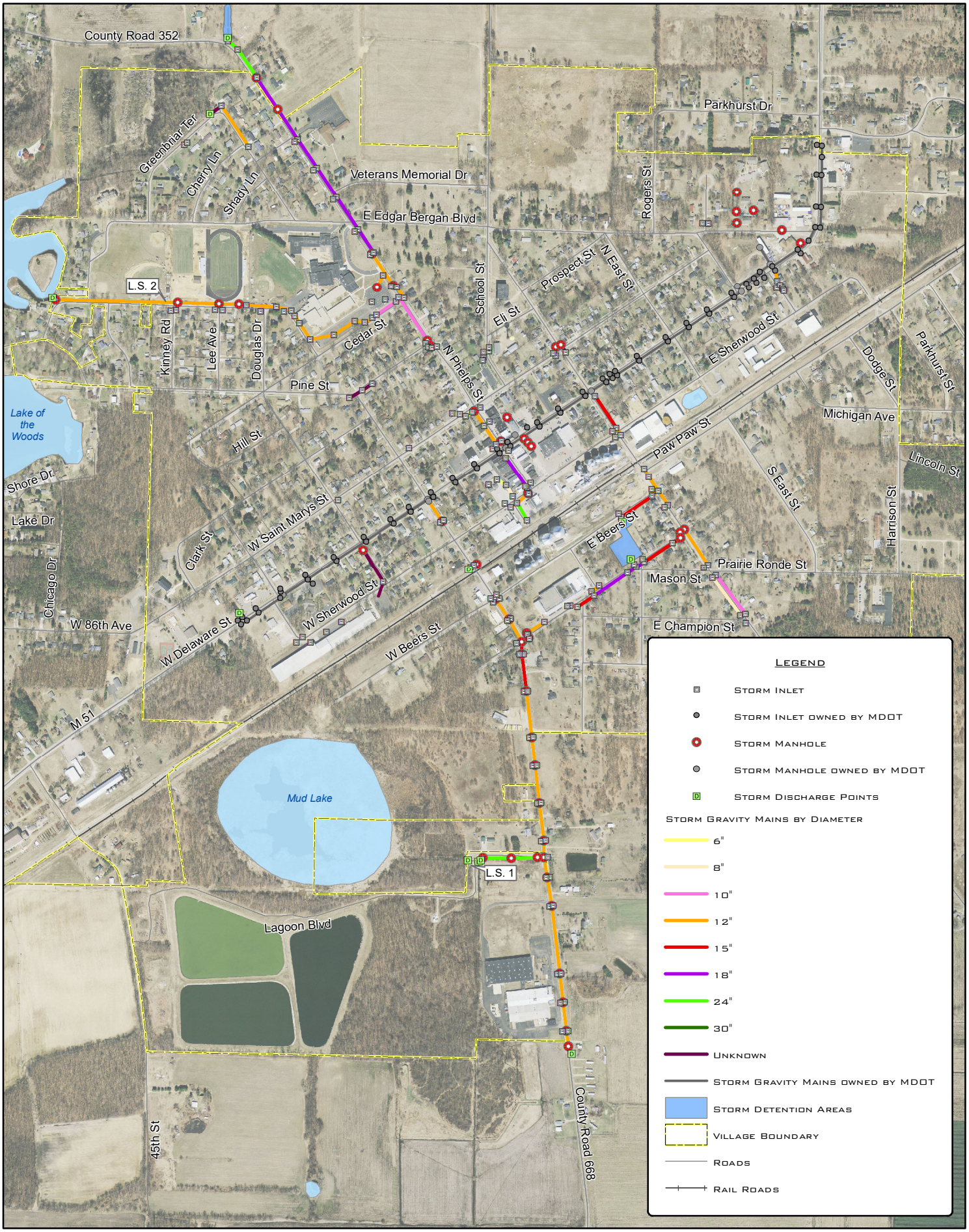
The GIS component of the AMP requires consistent updating to ensure that the DPW and Village staff have the most current information at hand. This includes entering information as assets are replaced and updated and tracking routine and non-routine maintenance activities. This information will be of use in determining if specific areas of the system will require additional resources or repairs moving forward.

DPW staff and Village officials will have the opportunity to attend training provided by WAI in using and navigating the GIS system. This training will be conducted as a general session for the Village to familiarize staff to the capabilities of the asset management software followed by sessions customized by role to coach employees on the specific features that will be of use to them.

Completion of the projects within the CIP will require planning, design, bidding, and analysis services to be performed by an engineering services provider. Estimated costs for these activities are included in the project estimates for each project identified within the CIP (as appropriate). Community budgeting should also include the cost of maintenance of the GIS program, either using community staffing rates or through an annual maintenance agreement with a GIS consultant.

Appendix A

Storm Sewer System Map



VILLAGE OF DECATUR

STORMWATER SYSTEM

0 250 500 1,000
Scale 1 in = 1,000 Feet

SYSTEM MAP
7/20/2017

130776

Appendix B

Replacement Values

ENGINEER'S ESTIMATE

PROJECT: **Stormwater, Asset Management, Wastewater Grant**

CLIENT: **Village of Decatur, Van Buren County, Michigan**

DATE: October 2017

Estimated Storm Sewer System Replacement Value

Quantity	Unit of Measure	Item Description		Unit Price *		Subtotal
40	LF	30" Storm Sewer	@	$ 165	$	7,000
1,226	LF	24" Storm Sewer	@	$ 160	$	197,000
2,705	LF	18" Storm Sewer	@	$ 115	$	312,000
1,659	LF	15" Storm Sewer	@	$ 100	$	166,000
11,313	LF	12" Storm Sewer	@	$ 85	$	962,000
1,210	LF	10" Storm Sewer	@	$ 85	$	103,000
674	LF	8" Storm Sewer	@	$ 80	$	54,000
592	LF	6" Storm Sewer	@	$ 80	$	48,000
54	EA	4' Diameter Storm Manhole	@	$ 2,600	$	141,000
167	EA	Inlet Structure	@	$ 2,200	$	368,000
10	EA	Storm Water Discharge Point	@	$ 7,200	$	72,000
0.34	ACRE	Storm Water Detention Pond - swDA-3	@	$ 93,000	$	32,000
1.18	ACRE	Storm Water Detention Pond - swDA-4	@	$ 93,000	$	110,000

ESTIMATED STORM SEWER SYSTEM REPLACEMENT VALUE $ 2,570,000

** Note - Unit prices include construction and restoration costs, engineering fees, and construction contingencies.*

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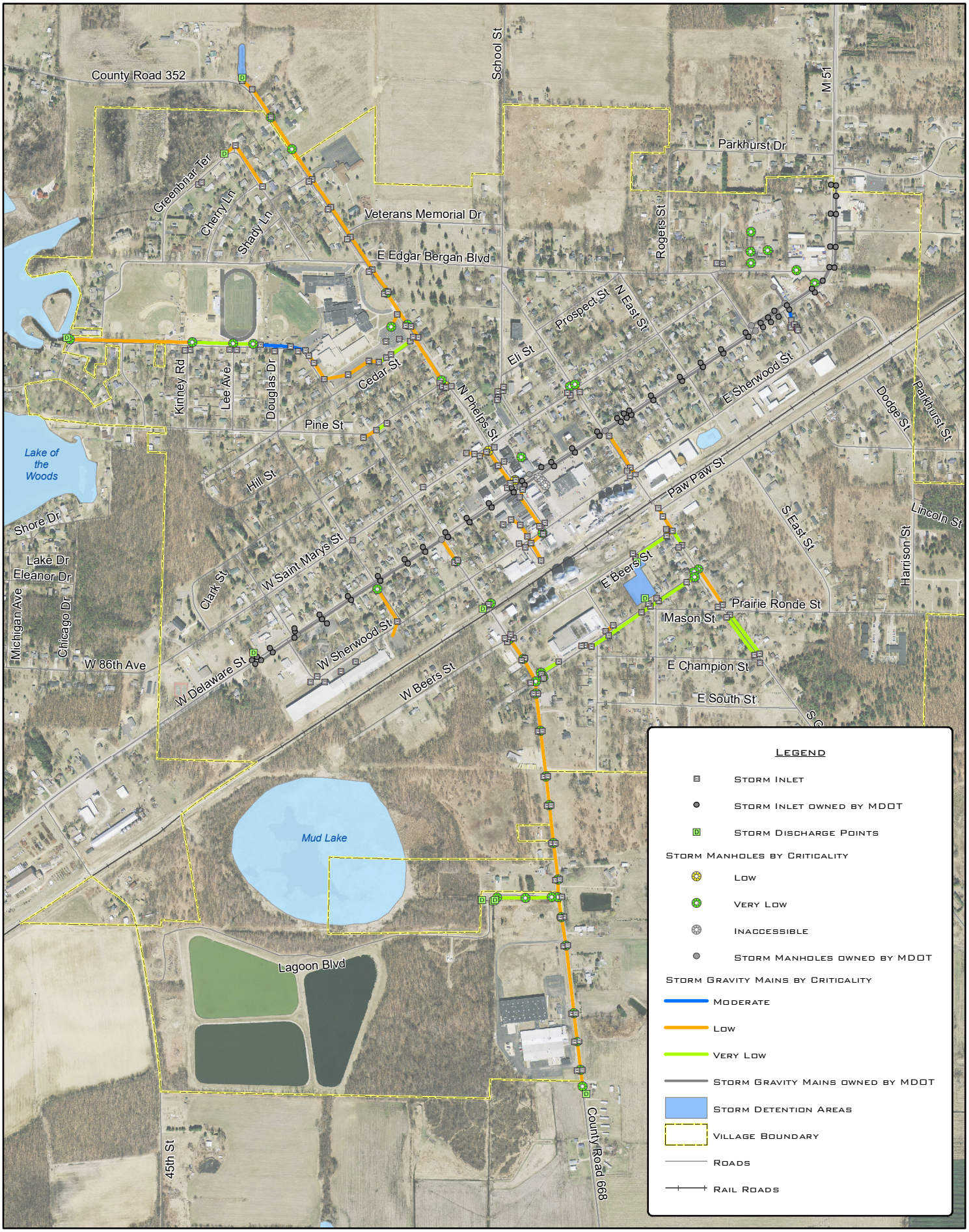
Appendix C

Not Used

Appendix D

Storm Sewer Criticality Map



VILLAGE OF DECATUR

STORMWATER SYSTEM

0 250 500 1,000
Scale 1 in = 1,000 Feet

CRITICALITY MAP
7/20/2017

130776

Appendix E

Stormwater System CIP Project Descriptions and Cost Estimates

Summary of Stormwater Capital Improvement Projects

Village of Decatur

Year	Project Name	Estimated Cost
2018	Develop Stormwater System Master Plan	$ 19,000
2019	Closed Circuit Televising of Storm Sewer - 2019	$ 18,000
2020	Closed Circuit Televising of Storm Sewer - 2020	$ 18,000
2021	Closed Circuit Televising of Storm Sewer - 2021	$ 18,000
2022	Closed Circuit Televising of Storm Sewer - 2022	$ 18,000
2023	Closed Circuit Televising of Storm Sewer - 2023	$ 18,000

Total Estimated Project Cost for Twenty Year Stormwater CIP = $ 109,000

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Capital Improvement Plan

Village of Decatur

Project Year:	**2018**
Total Project Cost:	**$19,000**

Project Title: Develop Stormwater System Master Plan

System: Stormwater

Project Description

Develop a master plan for the Decatur stormwater collection and retention system.

Project Justification/Benefit

Currently there is no master plan for stormwater in the Village of Decatur. Individual drainage issues on projects are addressed in such a manner so as to alleviate the immediate problem without consideration for future stormwater system needs. Development of a stormwater master plan will give the Village a basis for designing and constructing storm sewer additions or replacements with future capacity in mind. It will also serve as a basis for the Village to develop their own stormwater regulations and guidelines.

Project Funding Source	
SAW grant	
Bonds/Grants/Other Financing Source	$19,000
Assessments	
Wastewater Fund	
TOTAL	**$19,000**

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Village of Decatur

Project Title: Develop Stormwater System Master Plan

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
1	LS	Develop storm sewer master plan	$ 15,000	$ 15,000

Project Costs			
Construction Costs (Subtotal)		$	15,000
Engineering	0 %	$	-
Construction Observation	0 %	$	-
Contingency	25 %	$	3,800
TOTAL		**$**	**19,000**

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Capital Improvement Plan

Village of Decatur

Project Year:	**2019**
Total Project Cost:	**$18,000**

Project Title: Closed Circuit Televising of Storm Sewer - 2019

System: Stormwater

Project Description

Run closed circuit televising equipment through 1/5 of the storm sewer system.

Project Justification/Benefit

Conducting closed circuit televising of the storm sewer system will allow the condition of the storm sewer pipes to be more accurately determined and identify defects in need of repair.

Project Funding Source	
SAW grant	
Bonds/Grants/Other Financing Source	$18,000
Assessments	
Wastewater Fund	
TOTAL	**$18,000**

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Village of Decatur

Project Title: Closed Circuit Televising of Storm Sewer - 2019

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
4,100	LF	Closed circuit televising	$ 1	$ 4,100
1	EA	Analysis of televised data	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)	$	14,100
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,600
TOTAL	**$**	**18,000**

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Capital Improvement Plan

Village of Decatur

Project Year:	**2020**
Total Project Cost:	**$18,000**

Project Title: Closed Circuit Televising of Storm Sewer - 2020

System: Stormwater

Project Description

Run closed circuit televising equipment through 1/5 of the storm sewer system.

Project Justification/Benefit

Conducting closed circuit televising of the storm sewer system will allow the condition of the storm sewer pipes to be more accurately determined and identify defects in need of repair.

Project Funding Source	
SAW grant	
Bonds/Grants/Other Financing Source	$18,000
Assessments	
Wastewater Fund	
TOTAL	**$18,000**

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Village of Decatur

Project Title: Closed Circuit Televising of Storm Sewer - 2020

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
4,100	LF	Closed circuit televising	$ 1	$ 4,100
1	EA	Analysis of televised data	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)	$	14,100
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,600
TOTAL	**$**	**18,000**

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Capital Improvement Plan

Village of Decatur

Project Year:	**2021**
Total Project Cost:	**$18,000**

Project Title: Closed Circuit Televising of Storm Sewer - 2021

System: Stormwater

Project Description

Run closed circuit televising equipment through 1/5 of the storm sewer system.

Project Justification/Benefit

Conducting closed circuit televising of the storm sewer system will allow the condition of the storm sewer pipes to be more accurately determined and identify defects in need of repair.

Project Funding Source	
SAW grant	
Bonds/Grants/Other Financing Source	$18,000
Assessments	
Wastewater Fund	
TOTAL	**$18,000**

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Village of Decatur

Project Title: Closed Circuit Televising of Storm Sewer - 2021

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
4,100	LF	Closed circuit televising	$ 1	$ 4,100
1	EA	Analysis of televised data	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)	$	14,100
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,600
TOTAL	**$**	**18,000**

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Capital Improvement Plan

Village of Decatur

Project Year:	**2022**
Total Project Cost:	**$18,000**

Project Title: Closed Circuit Televising of Storm Sewer - 2022

System: Stormwater

Project Description

Run closed circuit televising equipment through 1/5 of the storm sewer system.

Project Justification/Benefit

Conducting closed circuit televising of the storm sewer system will allow the condition of the storm sewer pipes to be more accurately determined and identify defects in need of repair.

Project Funding Source

SAW grant	
Bonds/Grants/Other Financing Source	$18,000
Assessments	
Wastewater Fund	
TOTAL	**$18,000**

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Project Title: Closed Circuit Televising of Storm Sewer - 2022

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
4,100	LF	Closed circuit televising	$ 1	$ 4,100
1	EA	Analysis of televised data	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)	$	14,100
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,600
TOTAL	**$**	**18,000**

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Capital Improvement Plan

Village of Decatur

Project Year:	**2023**
Total Project Cost:	**$18,000**

Project Title: Closed Circuit Televising of Storm Sewer - 2023

System: Stormwater

Project Description

Run closed circuit televising equipment through 1/5 of the storm sewer system.

Project Justification/Benefit

Conducting closed circuit televising of the storm sewer system will allow the condition of the storm sewer pipes to be more accurately determined and identify defects in need of repair.

Project Funding Source

SAW grant	
Bonds/Grants/Other Financing Source	$18,000
Assessments	
Wastewater Fund	
TOTAL	**$18,000**

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Village of Decatur

Project Title: Closed Circuit Televising of Storm Sewer - 2023

Quantity	Unit of Measure	Item Description	Unit Price	Subtotal
4,100	LF	Closed circuit televising	$ 1	$ 4,100
1	EA	Analysis of televised data	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)	$	14,100
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,600
TOTAL	**$**	**18,000**

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Appendix F

Not Used

Appendix G

Preventative Maintenance

Village of Decatur

STORM COLLECTION AND RETENTION SYSTEM PREVENTATIVE MAINTENANCE PROGRAM RECOMMENDATION			
Asset	**Procedure**	**Recommended Frequency**	**Notes**
Cleanouts	Inspect lamp hole	Bi-annually	Village does not currently have cleanouts on storm sewer
	Inspect cleanout	Bi-annually	
	Flush cleanout	As Needed	
Culverts	Inspect culvert	Annually	
Detention Basins	Inspect detention basin	Bi-annually	
Discharges	Inspect discharges	Bi-annually	
Inlets	Inspect catch basin	Annually	
	Inspect rear yard inlet	Bi-annually	Village does not currently have any rear yard inlets
	Inspect roof inlet	Bi-annually	Roof rain connections to the storm sewer system are not currently allowed
	Inspect open lid manhole inlet	Bi-annually	Village does not currently have any open lid manhole inlets
	Inspect closed lid manhole inlet	Bi-annually	
	Inspect standard inlet	Bi-annually	
Manholes	Structure inspection	Annually	

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