STORM WATER ASSET MANAGEMENT PROGRAM

City of Ionia, MI

How we'll get there: The Action Plan

INTRODUCTION

About this Document

This document is our Storm Water Asset Management Program. It is an internal document which defines how we will apply the principles of asset management to achieve the goals outlined in our Asset Management Plan.

Maintaining our Asset Management Program will be a joint effort of staff and elected officials. We will update our program every year to make sure it is relevant and effective.

Our Commitment

Our storm water system is comprised of pipes, manholes, catch basins, detention basins, and outlets. We operate and maintain them to collect our storm water, manage water quality, and discharge the water into the environment in chosen locations. Currently, each of us pays to operate, maintain and replace those assets through our taxes. At some point in the future, it may be necessary to fund the system through a utility rate structure. Regardless of how we pay for our system, each of us is an owner of the storm water system. As owners, we commit to manage our assets and make decisions based on long-term life cycle cost.

Asset Management Principles

All infrastructure deteriorates with age and requires proactive management to operate, maintain, repair, and eventually replace each physical part, or asset. This progresses over time from routine operation and maintenance through repairs to eventual replacement is the asset's life cycle. Waiting to perform maintenance or make repairs can save money in the short term but may decrease the lifespan of an asset. Replacing assets before they fail does not take full advantage of their value. It is this balance which puts decisions for operations, maintenance, repair, and replacement at the heart of asset management.

Asset management dictates needed actions after considering the condition of an asset, the consequences of its failure, and the action alternatives available. Asset Management drives those solutions with the lowest life cycle cost at the desired Level of Service (LoS).

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Prepared by City of Ionia staff with professional, technical expertise provided by:

Prein&Newhof
PN #2130311

PART 1: DEFINING OUR GOALS – WHAT IS OUR DESIRED LEVEL OF SERVICE?

Our mission is to collect our storm water, manage water quality, and discharge it into the environment in chosen locations. We will proactively manage our storm water collection and treatment assets to meet our desired Level of Service (LoS) goals.

Our community, as owners, must decide the LoS we want. Many factors play into this determination including: compliance with regulations, public health, aesthetics, service reliability, stable costs, etc. We have established these primary goals:

Goal 1: Meet Regulatory Requirements

We will employ at least one staff member who is a certified storm water system operator in order to provide inspection, quality control, and broadened institutional knowledge.

We will maintain our Illicit Discharge program.

Goal 2: Minimize Flooding and Public Hazards

We will perform regularly scheduled monitoring and maintenance on all of our storm water system assets so there are no reasonably preventable flooding events which cause damage.

We will maintain staffing levels and equipment inventory to ensure regular inspection and maintenance of catch basins, pipes, and other system assets.

System extensions and replacements in our system will be designed to meet the planned Level of Service (LoS) of a 10-year 24-hour design storm. Areas where flooding may cause significant damage or create hazards may be designed to a higher LOS.

Goal 3: Manage Storm Water Inflow into our Wastewater System

We will work to identify the sources and magnitude of inflow infiltration (I/I) from our storm water system. If we find significant sources of I/I, we will incorporate improvements into our Capital Improvement Plan to reduce the I/I to meet the EPA guidelines.

We will continue to separate, when found, wastewater from storm water.

Goal 4: Provide Capacity for Community Growth

We will design our storm water system to provide capacity for full community development based on current and approved future land use plans. We will adopt development plans which promote redevelopment over new development to ensure a controlled growth in the storm water system without over-expansion.

Goal 5: Minimize life cycle costs.

We will track asset conditions and evaluate criticality assessments to determine the optimum time for asset maintenance and/or replacement. Our decisions will strike a balance between maximizing the lifecycle use of all assets and minimizing the risks of asset failure.

Goal 6: Maintain Water Quality

We will continue our street sweeping and catch basin cleaning efforts in order to remove accumulated sediment and debris before it reaches system outlets.

We will maintain our Illicit Discharge program to prevent pollutants from entering our system.

We will perform regular maintenance on detention basins and outlets to ensure proper function.

PART 2: INVENTORY - WHAT DO WE OWN?

Our System

Our storm water system includes assets such as collection pipes, culverts, manholes, catch basins, detention basins, and discharge outlets. Vitrified clay pipe (heat-treated clay) and concrete pipe were the main choices for storm sewers in North America for many decades. Material for culverts is typically either concrete or corrugated metal. The metal pipes are subject to rusting and shorter life cycles. Clay brick with mortared joints used to be the primary material for manholes and catch basins. Our system also has structures made with concrete block and precast concrete.

In recent decades, plastic sewer pipe is common in new sewer construction. Although plastics have good corrosion resistance, they are vulnerable to poor installation practices. Given this vulnerability, we typically utilize concrete pipe as our material of choice.

A detailed summary of our storm water system assets are in our Storm Water Evaluation Report and in a detailed asset inventory maintained by our Department of Public Works (DPW).

The DPW keeps a list of non-pipe assets which includes purchase date, original cost, inspection reports, repair history, maintenance schedule, and specifications.

Our Plan

We will keep our system inventory current by storing records of our storm water system in our Geographic Information System (GIS). A GIS contains maps of all pipes, manholes, catch basins, and outlets along with an inventory of non-pipe assets (equipment, buildings, etc.) and asset data pertinent to Operations, Maintenance, and Replacement.

Our Program

Whenever we replace, repair or add to our storm water system we will keep records of each project in our GIS.

Collection System

We will maintain pipe materials data, installation dates, sizes, and other attributes to assist our asset management efforts. Scanned/linked drawings and other records will show pipe locations.

Manhole, catch basin, and outlet locations will initially be identified using aerial photographs and field inspections. When time and budgets allow, we will use either a handheld GPS or surveying to refine asset locations.

Other Assets

We will maintain active inventories of equipment assets.

Our GIS and asset spreadsheets will be up-to-date to date and store a complete record of our current system inventory.

PART 3: RISK OF FAILURE – IN WHAT CONDITION ARE OUR ASSETS?

Our System

To understand how long each of our assets may last, we must track their condition and potential failure risk. A functional asset failure is the primary consideration for Risk of Failure (RoF). However, we also must evaluate the risk of a physical asset failure for pipes, manholes, catch basins, culverts, and outlets. We will use physical inspections and maintenance records to rate their condition.

Our Plan

We will keep our condition assessments current using periodic asset inspections at frequent intervals. The inspection intervals will vary by asset type and expected life. Next, we will score each asset on its likelihood or risk of failure. RoF ratings are on a scale of 1-5 with 5 being the highest RoF.

Our Program

We will assess pipe, manhole, and catch basin conditions on a regular basis based on break/repair records, break history, material, and age. All system data for the distribution network, including RoF ratings, will be maintained within our GIS.

We will hire a contractor to televise inside pipes and manholes on a 20-year cycle.

We will field inspect detention basins every two years for vegetative growth, sediment accumulation, embankment conditions, and outlet condition.

We may inspect higher Consequence of Failure (CoF) assets more frequently.

PART 4: CONSEQUENCE OF FAILURE - WHAT HAPPENS WITH A FAILURE?

Our System

It is important we understand the severity of consequences which may occur if any asset in our system fails. Functional failure consequences can occur when pipes and catch basins become blocked with sediment or debris. Physical failure consequences can occur when we have pipe breaks, outlet washouts, and structure collapses.

Our Plan

We will evaluate the Consequences of Failure (CoF) of each asset, from both a functional and physical failure perspective. We will maintain redundancy on assets with a high CoF. All CoF ratings will be on a scale of 1-5 with 5 being the highest CoF.

Our Program

It is important to understand the severity of consequences which may occur if any asset in our system fails. Functional failure considerations include potential health risks, service interruption, and damage to connected assets. Physical failure considerations include damage to adjacent infrastructure, environmental damage, and property damage. We will consider each of these factors separately and compile them into a single CoF rating for each asset.

For the collection system of pipes, manholes, catch basins, and culverts we will keep all CoF ratings in our GIS.

PART 5: CRITICALITY – HOW DO WE PRIORITIZE?

Our System

We must prioritize our actions to meet our Level of Service (LoS) goals while managing our work loads, utility rates, and minimizing life cycle costs. Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Our Plan

Criticality ratings help us prioritize improvements and with development of our Capital Improvement Plan. Criticality of assets within our system will be determined by multiplying each asset's RoF (1-5) by its CoF (1-5).

Our Program

As with all the components of the Asset Management program, the criticality analysis is an on-going process. The condition of any asset, and therefore its RoF, changes with time. The CoF may also change. We will review the criticality of each asset every year and make adjustments to

account for changes. We will keep our criticality assessments current after performing repairs, improvements, or inspections. When rating an asset's criticality we also consider redundancy which can lower its CoF. We will use criticality assessments when making maintenance, repair, and capital improvement decisions.

PART 6: CAPACITY – DO WE HAVE ENOUGH, NOW AND FOR THE FUTURE?

Our System

Our system must meet service demands both now and into the future based on current and future land use. Over time, flows fluctuate with changes in property use and population. The majority of our system is providing our desired level of flood protection. However, there are a few areas where improvements are required. Analysis of our system capacity is in our Sewer Flow Study report.

Our Plan

We will maintain our storm water assets to provide adequate capacity for existing development and will plan for system improvements which allow our community to grow. We will manage system expansion by balancing needs for community redevelopment/infill and desires for new development.

Our Program

We will plan our storm water system to provide enough capacity for full community development based on current and approved land use plans.

We will implement storm water management regulations to promote on-site infiltration and treatment.

System improvement needs identified in the both the Storm Water System Evaluation and the Sewer Flow Study are shown in our comprehensive Capital Improvement Plan.

PART 7: OPERATIONS AND MAINTENANCE - KEEPING UP WITH ROUTINE WORK

Our System

Certain portions of our system need routine maintenance to continue functioning. Catch basins need sediment removed, structures need repairs, and detention systems kept free of overgrowth. Our system Operations and Maintenance (O&M) demands are stable and we will manage the system to maintain our current service levels. We will use Computerized Maintenance Management System (CMMS) tools to maintain asset inventories and schedule regular O&M activities.

Our Plan

We have established the following O&M goals:

1. Maintain staffing and equipment levels so in-house staff can perform routine O&M activities.

2. Use in-house staff to verify proper function of all system assets.

3. Hire outside consultants and contractors when specialized technical or equipment capabilities are needed.

Our Program

Staffing and Equipment

We will monitor crew workloads and production rates to establish general workload goals for our crews. This will include periodic review of crew size, methods, and equipment to maximize staff efficiency and effectiveness. We will evaluate equipment ownership vs. rental using annual cost of service analyses. We will adjust staffing levels using normalized workload projections and workload goals.

Collection System Cleaning

We will clean the system using in-house staff and equipment. We will set cleaning frequency on the accumulation rate of sediment and debris. System cleaning frequency and status data will be kept in our GIS.

Supporting Assets

We plan to renew our maintenance equipment and other supporting assets on a scheduled replacement cycle. This will allow us to keep reliable equipment in service for operating and maintaining the system to achieve our Level of Service goals.

System Management

We will track maintenance activities to identify assets requiring higher than expected maintenance levels. Those will be evaluated for replacement under CIP activities.

We will perform O&M activities to extend the useful life of these assets until full rehabilitation or replacement is more cost effective. We will use our software systems to manage this data and keep our planned activities up to date. We will maintain regularly scheduled O&M activities, plan/schedule appropriate replacements, and coordinate activities with work on other assets sharing common space (i.e. within the same road right-of-way).

PART 8: CAPITAL IMPROVEMENTS–CONTINUING SYSTEM RENEWAL

Our System

Improvement recommendations for our storm water system are in our Flow Study and Storm Water System Evaluation Reports. These reports identify the scope and priorities of proposed storm water system improvements such as storm sewer pipe replacements, equipment replacements, and major O&M activities.

Our Plan

We will incorporate the recommendations of the sewer reports into a comprehensive CIP which will document the major projects we plan to complete within the next 10 years. Criticality ratings set the order and timing of projects. Project timing often is driven by the availability of outside funding such as loans and grants. We will maintain and update our comprehensive CIP every year.

Our Program

Planning for capital improvements is a continual management process. The CIP shows our foreseeable project priorities based on available information. The CIP may adjust every year and will consider the following influences:

- Outside funding sources (grants and loans) may become available for certain types of projects from time to time. When this happens, we will reprioritize to make best use of available funds.
- Changes in asset condition assessments.
- Changes in economic conditions such as costs of materials, labor, and financing.
- Coordination with road work and other utility work may force timing changes in system improvements. Roadway conditions often change after severe winters, for example. Where utility projects require below-street excavation, coordinating utility and road projects is essential to get the lowest life cycle cost. As roadway conditions change and paving plans are revised, the storm water system project dates may move, too.

We will keep the CIP up to date every year by:

- Adjusting the cost estimates for capital projects based on current market pricing
- Reconsidering capital improvements priorities based on any updated criticality assessments
- Reconsidering implementation years for upcoming capital projects to coordinate with changing conditions of roads and other utilities
- Adjusting budgets according to changed conditions to be consistent with our long term financial strategy.

We will make miscellaneous system repairs as-needed if they are small enough to do without project plans or project-specific budgeting. We will keep budgeting for repairs based on prior year expenses and known system repair needs. When deciding on system repairs, we will consider an asset's criticality with planned rehabilitation and replacement projects.

We will rehabilitate or replace pipes, manholes, catch basins, culverts, , and equipment when doing so provides the lowest life cycle cost. We will identify these projects in our CIP.

PART 9: FINANCIAL STRATEGY–RATE PLANNING AND STABILITY

Our System

Actions on our storm water system are funded through our General Fund, Street Funds or through charges to private development when required to support that development.

Our Plan

We will maintain a life cycle forecast of expected costs to minimize and stabilize budget impacts.

Recognizing that our storm water system is a utility similar to our drinking water and wastewater systems, we will evaluate the potential establishment of a storm water utility. Establishment of a storm water utility would include development of a rate structure and billing system. It could relieve some of the budget demands on the General Fund and Street Fund while maintaining an equitable assessment of storm system costs.

Our Program

We will maintain a life cycle forecast of expected costs, income from rates, and cash balances. The early years of our forecast come from our CIP cost estimates while the later years of the forecast are projected from our system inventory and life cycle data. We will use this forecast to establish stable fund balances.

We will evaluate the establishment of a storm water utility.

To keep the financial strategy current with changing conditions, we plan to update these each year:

- Spending and income projections;
- Our long term financial strategy;
- CIP.

SUMMARY

Our Asset Management Program outlines how we will achieve our Asset Management Plan goals. We will adjust it from time to time as new/improved tools, software, and evaluation techniques are developed. Regardless of those changes, we will incorporate Asset Management into our everyday activities, including system improvements and master planning. By proactively managing our storm water system, we can meet our desired Level of Service goals at the lowest possible long-term cost.