



*How we'll get there: The Action Plan*



## **INTRODUCTION**

### **About this Document**

This document is our Wastewater 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 our staff and administration. We will update our program every year to make sure it is relevant and effective.

### **Our Commitment**

Our wastewater system includes a complex set of components. We run and maintain them to processes our wastewater and reclaim fresh water from it before we recycle it back into the environment. Our wastewater system includes assets like collection sewers, lift stations, and a wastewater treatment plant which processes and cleans the wastewater. Each of us pays to operate, maintain and replace those assets through our utility rates. In effect, each of us is an owner of the wastewater 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 progression over time from routine operation and maintenance through repairs and 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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## **PART 1: DEFINING OUR GOALS – WHAT IS OUR DESIRED LEVEL OF SERVICE?**

Our mission is to process our wastewater and reclaim the fresh water for release back into the environment. We will do this by proactively managing our wastewater collection and treatment assets to meet our desired Level of Service goals.

Our community, as the system owners, must determine the Level of Service we want from our system. Many factors go into this determination including: compliance with regulations, public health, aesthetics, service reliability, stable rates, etc. We have established primary system goals in a separate document called our Asset Management Plan.

This document, our Asset Management Program, identifies how we plan to meet our goals.

### **Goal 1: Meet Regulatory Requirements**

We will have a minimum of 1 certified wastewater system operator to provide staff coverage, quality control, and broadened institutional knowledge.

We will perform the required testing through a third-party certified laboratory when needed to supplement in-house capabilities.

We will adopt an Industrial Pre-treatment Program if industry development occurs.

### **Goal 2: Minimize Service Interruptions**

We will monitor and maintain all of our wastewater collection and treatment system assets so there are no reasonably preventable service interruptions.

We will maintain service crew levels to ensure continued operations and maintenance activities to limit emergency responses to 10 per year.

### **Goal 3: Minimize Public Hazards**

Environmental conditions such as corrosion, inflow/infiltration, and flooding all affect our wastewater assets. Our asset management plan recognizes this and schedules asset improvement and replacement to minimize failure vulnerability.

Our 24 hour emergency response services will be equipped and staffed to provide maximum 60 minute response times to sewer breaks and major equipment failures. We will strive to limit the duration of service interruptions to less than 6 hours. Our staff will carry cell phones, pagers, and/or other contact mechanisms to facilitate a rapid response.

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**Goal 4: Manage Storm Water Inflow and Ground Water Infiltration**

We will continue to identify the sources and magnitude of both inflow and infiltration (I/I) into our 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 enforce combined sewer separation which maximizes separating of storm water from wastewater. Our Capital Improvement Plan will include projects to meet our flow separation goals.

**Goal 5: Provide Capacity for Community Growth**

We will design our wastewater system to provide capacity for full community development based on current and approved future land use plans. We will finance oversizing costs to help development to the extent possible. We will adopt a rate structure which promotes redevelopment over new development to ensure a controlled growth in the wastewater system without over-expansion.

**Goal 6: 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.

## **PART 2: INVENTORY - WHAT DO WE OWN?**

### **Our System**

Our wastewater system includes assets such as collection sewers, lift stations, and a wastewater treatment plant which filters and purifies the wastewater. A variety of materials including vitrified clay pipe (heat-treated clay) and concrete pipe were the main choices for collection sewers in North America for many decades. Clay pipes are brittle and may crack. Root intrusion at joints is a significant problem. Concrete pipe succumbs to hydrogen sulfide corrosion over time under certain conditions. Both pipes come in short lengths and may leak at the joints.

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.

The majority of our collection sewers were built in the 1990's or before. The material of pipes from the 1990's to present is primarily PVC. Pipes replaced before the 1990's are primarily clay or cast iron.

A detailed summary of our wastewater system assets are in our Wastewater 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 wastewater system in our Geographic Information System (GIS). A GIS contains maps of all collection system assets, lift stations, and the treatment plant 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 wastewater 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 and septic tank 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.

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We will use a customized spreadsheet to track assets in our pumping stations. The spreadsheet will maintain asset inventories, schedule regular O&M activities, and create financial projections for future replacement.

We will also collect location data on sewer services for connection points and cleanouts. Our GIS will house data such as size, material, and installation date.

### **Wastewater Treatment**

Our treatment facility location will be identified in our GIS system. Our spreadsheets will keep treatment asset records including inventories, schedule regular O&M activities, and create financial projections for future replacement.

### **Other Assets**

We will maintain active inventories of assets like trucks, loaders, generators, backhoes, and any other functionally or financially significant assets. We will track data like manufacture date, purchase price, maintenance budget, and warranty information.

Our GIS will be up-to-date to date and store a complete record of our current system inventory. We will use our inventory and database to operate and manage our assets.

## **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, lift station and treatment equipment and structures. We will use break history, maintenance records, corrosion, and age to rate their condition. Non-pipe assets such as, buildings, wells, and storage tanks can be inspected to determine their physical condition.

### **Our Plan**

We will keep our condition assessments current using periodic asset inspections at frequent intervals frequent enough to document reasonably expected condition changes. The inspection intervals will vary by asset type and its 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 sewer pipe and manhole 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.

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We will clean pipes and use Closed Circuit Television to look inside sewer pipes and manholes on a 10-year cycle. We will clean septic tanks on a 5 year cycle and inspect septic tanks on a 20-year cycle.

We will exercise equipment and valves to make sure they are in working order. Exercise frequency will be based on the Consequence of Failure (CoF) for each asset. We will keep all asset data in our GIS.

Condition information updates on the assets within the lift stations and wastewater treatment plant will be included as part of routine maintenance and operations activities.

We may inspect higher CoF assets more often.

## **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 pumps stop working, valves cannot open or close, and when sewers become broken or blocked. Physical failure consequences can occur when we have sewer main breaks or catastrophic equipment failures.

### **Our Plan**

We will evaluate the 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 we 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 and manholes, we will keep all CoF ratings in our GIS. For all other assets, we will store CoF in customized asset spreadsheets.



## **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 an 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. System analysis shows we are currently meeting peak flow needs but we must make improvements to meet estimated future flows. A detailed analysis of our system capacity is in our Sewer Flow Study report.

### **Our Plan**

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

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We will consider paying for capacity oversizing costs which help development to the extent possible. However, we will adopt a rate structure which promotes redevelopment over new development to ensure controlled growth without over-expansion.

System improvement needs identified in the both the Wastewater 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, on-going service to continue functioning. Our system Operations and Maintenance (O&M) demands are stable and we will manage the system to maintain stability. We will use spreadsheets 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 with minimal overtime.
2. Use in-house staff to verify proper function of all system assets such as valves, pumps, motors, and other mechanical equipment.
3. We will hire outside consultants and contractors when we need specialized technical or equipment capabilities.

### **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 roots, debris, and/or grease derived from system condition assessment data and calculated flows (calculations for predicted flow rates and

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velocities to verify cleansing flows). System cleaning frequency and status data will be kept in our GIS.

#### **Lift Stations and Wastewater Treatment Plant**

We will continue operating these facilities and perform maintenance as dictated by site-specific operations and maintenance plans. This includes inspecting lift stations twice per year and assets within the treatment plant during scheduled maintenance. We will keep O&M manuals on file to document and schedule recommended maintenance. Asset cleaning frequency and status data will be kept in our spreadsheets.

#### **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 monitor the break history of the sewers and record the date and locations of breaks using the GIS. We will track maintenance activities to identify assets requiring higher than expected maintenance levels.

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 wastewater system are in our Sewer Flow Study and Wastewater System Evaluation Reports. These reports identify the scope and priorities of proposed wastewater system improvements such as 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

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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 wastewater 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 financial forecasts based on number of users, current rates, and cash balances
- Adjusting utility rates 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 perform proactive repairs with in-house staff and equipment if possible. We will contract for repairs beyond our available staff resources or abilities.

We will rehabilitate or replace pipes, manholes, valves, 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**

We will fund our system costs through our wastewater system billings.

### **Our Plan**

We will maintain a life cycle forecast of estimated costs, income from rates, and cash balances. We will use this forecast to establish sustainable and stable utility rates. This helps our residential, business, and industrial owners in their long-term financial planning and is an economic development advantage when recruiting new employers.

We will fund system O&M with cash through the rate structure and we plan to maintain minimum cash balance equal to 12 months of budgeted O&M. This will also allow us to pay cash for emergency repairs and minor unanticipated asset replacements.

We will pay cash for planned system repairs and replacements if that can be accomplished with a stable rate structure and suitable cash reserves. We may borrow funds to pay for significant expenditures so we can stabilize rates and maintain reasonable cash balances.

### **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 sustainable and stable utility rates.

We will pay cash for system operations and maintenance through the rate structure and will maintain a minimum cash balance as set by the system goals.

We will cash-fund planned system repairs and replacements if that can be accomplished with a stable rate structure and cash balances not exceeding our base cash balance by a factor of 2.5. We may borrow for significant expenditures to stabilize rate impacts and maintain reasonable cash reserves. We will maintain and update our CIP every year and review it with our financial advisor to confirm acceptable rates and cash balances.

We will, at a minimum, raise rates equal to the rate of inflation on an annual basis to maintain a steady Level of Service and stable rate base.

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

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- User rates.

## **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 wastewater system, we can meet our desired Level of Service goals at the lowest possible long-term cost.