2025

Capacity, Management, Operation, and Maintenance Program (CMOM)

CITY OF MADISON SEWER UTILITY

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1. INTRODUCTION

I. Background and Information

The Madison Sewer Utility (MSU) is a public utility owned and operated by the City of Madison to provide sanitary sewer service for Madison residents and businesses.

The City of Madison was incorporated as a city in 1856. In April 1885 the Common Council adopted a district sewage plan with construction of the first public sewers occurring the following year. By 1887 the public sewer system served 12,000 Madison residents. Wastewater was conveyed from homes and businesses and discharged directly to Lake Monona and Lake Mendota.

Today the City of Madison's wastewater collection system consists of more than 800 miles of sanitary sewer main, 20,000+ access structures, and 33 lift stations. Every day this system transports 25 million gallons of wastewater from 70,871 Madison homes and businesses to the Nine Springs Wastewater Treatment Plant. The MSU has a service area of 55,029.5 acres and serves 282,005 people.

II. Regulatory Requirements

The Madison Sewer Utility operates under Satellite Sewage Collection System Wisconsin Pollutant Discharge Elimination System (WPDES) General Permit No.WI-0047341-06-0. Coverage under this permit is effective November 1, 2020 and expires on October 31, 2025.

The WI-DNR general permit contact is:

Ashley Brechlin
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This permit is issued under the authority of Chapter 283, Wisconsin Statutes, and applies to satellite sewage collection systems owned and operated by municipalities and non-municipal entities that do not own or operate a wastewater treatment facility. The permit prohibits the discharge of sanitary sewer overflows (SSO) into waters of the state and requires the reporting of any occurrence of an SSO. The permit also requires that satellite collection systems meet the requirements for a capacity, management, operation and maintenance program (CMOM); and submit a compliance maintenance annual report (CMAR) regarding the operation of the sewage collection system.

This permit requires the submittal of a Compliance Maintenance Annual Report (CMAR) by June 30th of each year. Starting August 1, 2016 all permitees were required to implement a capacity, management, operation and maintenance program (CMOM) and submit to the Wisconsin Department of Natural Resources verification that a CMOM program for the sewage collection system has been developed which is consistent with the requirements of s. NR 210.23, Wis. Adm. Code.

This permit requires the Madison Sewer Utility to:

- Develop and maintain written documentation of the CMOM program components.
- Submit annual verification with the submittal of the Compliance Maintenance Annual Report.
- Assure that the CMOM program is consistent with the permittee's program documentation and with the requirements of s. NR 210.23, Wis. Adm. Code.
- Conduct an annual self-audit of activities to ensure the CMOM program is being implemented as necessary to meet the requirements.
- Upon request provide CMOM program documentation, a record of implementation activities and the results of the self-audit to the Wisconsin Department of Natural Resources.

III. What is CMOM?

The primary goal of a CMOM Program is to eliminate preventable sanitary sewer overflows (SSOs). To accomplish this goal CMOM programs are to be designed to ensure that the following general standards as articulated in NR 210.23 are met:

- NR 210.23(3)(a)The sewage collection system is properly managed, operated, and maintained at all times.
- NR 210.23(3)(b)The sewage collection system provides adequate capacity to convey all peak design flows.
- NR 210.23(3)(c)All feasible steps are taken to eliminate excessive infiltration and inflow as defined in s. NR 110.03 (13c), cease sanitary sewer overflows and sewage treatment facility overflows and mitigate the impact of such overflows on waters of the state, the environment, and public health. NR 210.23 Note
- NR 210.23(3)(d)A process is in place to notify the public and other directly affected parties of any incidents of overflows from the sewerage system.
- NR 210.23(3)(e) Annual reports are submitted in accordance with the provisions of ch. NR 208.

IV. Development of the Madison Sewer Utility's CMOM

A. Capacity Maintenance Annual Report (CMAR)

Since 2006 satellite collection systems have been required to complete and electronically submit a Capacity Maintenance Annual Report (CMAR) as part of complying with the terms of the WPDE general permit. The CMAR includes information on annual operation and maintenance activities that maximize the useful life and capacity of these systems and is used as a tool for future planning.

The CMAR uses a 4.0 scale to provide a Grade Point Average (GPA) for each satellite collection system's annual performance. The MSU has had a perfect 4.0 GPA every year since the program's introduction in 2006. The MSU's 2024 CMAR is included in Attachment A.

The 2024 CMAR confirms that the MSU system is well managed and well maintained. The Utility has a Aa1 bond rating. User rates are reviewed annually to assure that funding is adequate to support current operating expenses.

The system has adequate capacity to meet current demand and a comprehensive planning program assures that future capacity demands can be met as well. Aging sewers are replaced in conjunction with street reconstruction projects as well as stand-alone projects when needed. Over $1.8 million annually is allocated to rehabilitate and extend the useful life of aging sewers using trenchless Cured-in-Place Pipe technology. This program has enabled the MSU to decrease its infrastructure deficit.

The Utility has an aggressive preventive maintenance program and as a result a very low incidence of sanitary sewer overflows and basement sewer backups. Nearly 90% of the Utility's maintenance activities are planned, rather than reactive.

B. MSU CMOM Program Organization

The City of Madison Engineering Division's written CMOM Program is organized as recommended by Wisconsin DNR and includes the following sections:

- Section 2 - Goals
- Section 3 - Organization and Management
- Section 4 - Legal Authority
- Section 5 - Operation and Maintenance
- Section 6 - Design and Performance
- Section 7 - Overflow Emergency Response Plan
- Section 8 - Capacity Assurance
- Section 9 - Annual Self-Audit Plan

C. Recommendations for Future

The self-audit, of course, also identified opportunities for improvement. Continually assessing our progress and identifying these opportunities is the sign of a well-managed organization. While the MSU intends to continue its existing programs and practices it also has identified the following opportunities for improvement:

- Review and enhance written construction inspection standards for sanitary sewer installation and develop checklists for same.
- Develop a written asset management plan.
- Update existing safety procedures to create a comprehensive written safety plan.
- Assign a criticality rating to each asset and conduct a formal business risk assessment.
- Develop a force main replacement program.

- Eliminate existing infrastructure deficit and develop plan for funding future replacement and rehabilitation of assets with particular attention to projected peaks.
- Enhance MSU's presence on City's website and use as a means of educating customers.

2. GOALS

I. Background and Information

A. Mission Statement

The mission of the Engineering Division is to provide a multi-faceted combination of Public Works services to the residents and customers of Madison in a fair and consistent manner that allows for and encourages public input. Specific to the Madison Sewer Utility that mission includes providing safe and efficient wastewater collection to the residents of Madison and customers of the Madison Sewer Utility.

II. Goals & Objectives

A. DNR Required

The City of Madison's CMOM program is designed to ensure that the following general standards as articulated in NR 210.23 are met:

1. The sewage collection system is properly managed, operated, and maintained at all times.
2. The sewage collection system provides adequate capacity to convey all peak design flows.
3. NR 210.23(3)(c)All feasible steps are taken to eliminate excessive infiltration and inflow as defined in s. NR 110.03 (13c), cease sanitary sewer overflows and sewage treatment facility overflows and mitigate the impact of such overflows on waters of the state, the environment, and public health.
4. NR 210.23(3)(d)A process is in place to notify the public and other directly affected parties of any incidents of overflows from the sewerage system.
5. NR 210.23(3)(e) Annual reports are submitted in accordance with the provisions of ch. NR 208.

B. MSU Specific

The City of Madison's goals for the operation and maintenance of its wastewater collection system are:

- Convey wastewater to the Nine Springs Wastewater Treatment Plant with minimum inflow, infiltration and exfiltration.
- Prevent public health hazards.
- Reduce inconvenience and damage by responsibly handling service interruptions.
- Eliminate claims and legal fees related to backup by providing immediate, concerned and efficient service to all emergency calls.
- Protect investment by increasing the useful life and capacities of the system and parts.
- Use operating funds efficiently.
- Perform all activities safely and avoid injury.

3. ORGANIZATION & MANAGEMENT

I. CMOM Program Management

NR 210 requires that persons who are responsible for implementing the CMOM program be identified. This includes administration, management, and maintenance personnel or positions, lines of authority of such personnel or positions, internal and external communication responsibilities, and the person or persons who shall report all overflow events to the department.

A. Responsibility

The City Engineer is responsible for ensuring full implementation of the Madison Sewer Utility's CMOM Program. The MSU will fulfill the requirements for CMOM organizational structure by utilizing existing staff and defining job responsibilities accordingly.

B. CMOM Program Manager

The City Engineer has designated Kathy Cryan, Deputy Division Manager, to serve as the CMOM Program Manager. The duties of the CMOM Program manager include:

- Oversee and direct the activities of the City's CMOM Program.
- Prepare all reports required of the Program.
- Serve as custodian for all reports and records associated with the Program.

C. CMOM Program Work Team

Additional CMOM responsibilities are assigned as follows:

- **Sewer System Financial Management**
  Steve Danner-Rivers, Financial Manager is responsible for financial management practices for the MSU.
- **Sewer System Capacity Assessment**
  Mark Moder, P.E. – Principal Engineer 1 is responsible for tracking the capacity of the sanitary sewer system relative to actual and planned base and peak flows.
- **Sewer System Condition Assessment**
  Mark Moder, P.E. – Principal Engineer 1 is responsible for assessing the condition of the sanitary sewer system assets, including the I/I reduction program.
- **Sewer System Operations & Maintenance**
  Ryan Schmidt, Engineering Operations Supervisor, is responsible for daily operation of the sanitary sewer system's maintenance activities.

The ownership, governance and organizational structure of the MSU is elaborated on in the following sections.

II. MSU Organization

A. Ownership and Governing Body

The Madison Sewer Utility is a public utility within the purview of Wis. Stat. § 66.0801 owned and operated by the City of Madison.

The government of the City of Madison is organized and constituted under Wis. Stat. ch. 62 providing for the City Mayor and Aldermanic plan with a Common Council composed of twenty (20) alderpersons, one (1) from each aldermanic district.

The Mayor supervises twenty-nine (29) City departments and divisions. The Mayor is responsible for the appointment and general supervision of all City officers and heads of departments in the performance of their official duties.

The Common Council adopts the City budget and passes laws, policies and regulations that govern the City. This includes the MSU operating and capital budgets. User charges are reviewed and approved by the Common Council as part of the annual budget process. The primary governance of the Madison Sewer Utility is captured in Chapter 35 of the Madison General Ordinances.

The Board of Public Works approves public works projects for the city, holds public hearings relative to assessments for construction, and hears appeals from residents and contractors relative to bids and special assessment notices.

B. Organizational Structure

The City Engineer is responsible for the management of the Madison Sewer Utility under the direction of the Board of Public Works. Three Deputy City Engineers, the Deputy Division Manager, Finance Manager, and Public Information Officer report directly to the City Engineer and are responsible for coordinating the activities and staff of all units of the Division and providing staff and programmatic supervision as required.

A summary of each section's responsibilities is provided on the following pages.

Sewer & Stormwater Utilities

The Sewer & Stormwater Utilities section is responsible for capacity assurance; design and permitting of the collection system; monitoring of industrial and other high strength waste contributors; and review of all development proposals and permit applications related to the sanitary sewer system.

The Section is led by a Deputy City Engineer who is licensed by the State of Wisconsin as a Professional Engineer. A Principal Engineer 1 who is also a licensed Professional Engineering supervises sanitary engineering activities performed by the section's sewer design engineers.

The majority of sanitary sewer design for public works and private development construction of public sanitary sewer facilities is performed in-house.

Public Works & Private Development

The Public Works & Private Development (PW/PD) is responsible for managing all Public Works and Private Development design, bidding, and construction inspection. This section coordinates overall infrastructure planning efforts among City agencies and private utilities to prioritize and schedule projects.

A PW/PD design engineer is assigned to each project and serves as the Project Manager (PM). In this role they are responsible for performing street design and coordinating the design work of other disciplines. With the assistance of the Public Information Officer the PM is also responsible for public information and engagement during planning, design, and construction phases of the projects. The PM works with administrative support staff to bid the project and award the contract.

Post-award the Construction Inspection team oversee construction of infrastructure improvements installed under public works and private development contracts.

The Construction Inspection team is led by a Principal Engineer 1 who reports to the Deputy City Engineer in charge of Public Works & Private Development.

The Construction Inspection team is responsible for inspecting all construction performed under public works and private subdivision contracts to verify facilities are constructed in accordance with plans and specifications. Projects are assigned to a Construction Inspector 2 who has lead responsibility for the assigned projects in their geographic area. The Construction Inspector 2 performs and oversee inspection activities performed by lower-level Construction Inspector 1s and seasonal Engineering Assistants.

In addition to sanitary sewer construction this includes streets, sidewalks, curb and gutter and storm sewer work. The Section also performs preliminary surveys for designers, construction staking and as-built surveys. During construction the Construction Inspector team works closely with the designated PM.

Land Information

The Land Information team is responsible for maintaining current and accurate CAD/GIS records of the City's land base. This team is led by the Land Information Manager who is a licensed professional surveyor.

The LIM reports to the Deputy City Engineer in charge of Public Works & Private Development.

A Public Works Development Manager 1 and GIS Specialist assist the LIM assist in maintaining City's land base including sewer easements.

Engineering Technology

The Engineering Technology team is responsible for managing and maintaining the Engineering Division's CAD, Construction Management, GIS and CMMS systems.

The Engineering Technology Manager reports to the Engineering Division Deputy Manager and oversees the CAD/BIM Manager, three GIS Specialists, and a Program Specialist.

The City uses Autodesk Civil 3D for design and Autodesk Construction Cloud for construction management, Cityworks for work order management, and ESRI products for mapping infrastructure including sanitary sewer assets.

Operations

The Operations Section is responsible for operating and maintaining the City's sanitary sewer and storm sewer and drainage systems.

The Section is led by the Engineering Operations Supervisor who is assisted by three supervisors in overseeing the following areas of sanitary sewer collection system operations and maintenance:

- Preventive Maintenance – scheduled sanitary sewer main cleaning.
- Emergency Response – response to customer complaints, sewer backups and sanitary sewer overflows.
- Fleet Maintenance – preventive maintenance and repair of utility vehicles and equipment.
- CCTV inspection and condition assessment; trenchless rehabilitation and repairs.
- Utility Locating & Marking
- Construction – Repairs and new installations.

III. Personnel and Position Descriptions

The 2025 Engineering Division adopted operating budget had 189.1 FTE positions funded. Of these 45.83 FTE are assigned to the MSU and an additional 46.27 FTE to the MSWU. With similar skill sets and cross-training these employees regularly cross-over to perform work for the other utility based on demand. Additionally, the Engineering Division hires seasonal employees in its Construction Inspection staff to meet peak season workloads.

The MSU performs the majority of operations and maintenance majority work in-house. Typically, 100% of sewer main and structure cleaning, CCTV, and repairs are performed in-house. In 2024, however, a force main break was beyond the capability of our in-house crews and had to be turned over to a

contractor. Lift station maintenance and repairs are performed by Madison Metropolitan Sewerage District.

Positions in the Engineering Division cover a wide range of skills and expertise. Current position descriptions exist for all employees. Position descriptions include a description of work, examples of job duties, minimum requirements and any required licenses, certifications or other special qualifications. Position descriptions for these positions can be viewed online at *http://www.cityofmadison.com/HR/classifications/ClassSpecs.cfm.*

IV. Safety, Training and Education Programs

The MSU provides a variety of training to utility staff. The primary focus of training is to ensure the safety of employees and the public as well as enable employees to perform their assigned responsibilities.

Training is provided in a number of formats including on-the-job, in-house classroom, webinars, manufacturer/vendor, offsite industry seminars, workshops and conferences. Safety

The MSU does not have a single employee dedicated to developing safety procedures and providing training. Rather the Engineering Division utilizes a variety of resources to provide these services. This includes the City's Safety Officer, supervisory staff, leadworkers, vendors, equipment manufacturers and consultants.

The MSU's safety program covers the following topics:

- Accident & Incident reporting
- Asbestos
- Bloodborne Pathogens
- Compressed Gas
- Confined Space
- Electrical Safety
- Emergency Action Plan
- Ergonomics
- Fall Protection
- Fire Safety and Flammable Liquids
- First Aid
- General Safety Rules
- Hand Tools and Equipment
- Hazard Communication
- Hearing Conservation
- Hot Work
- Ladder and Scaffolding

- Lead Awareness
- Material Handling and Lifting
- Personal Protection Equipment
- Powered Industrial Trucks
- Respirable Crystalline Silica
- Respiratory Protection
- Trenching and Excavation
- Work Zone and Traffic Safety

Other training or education materials that are pertinent to operation of the collection system include the following:

- CPR, AED & First Aide
- Confined Space Entry
- Competent Person: Excavation Safety – Trenching & Shoring
- OSHA 10
- Commercial Vehicle Driving
- Work Zone & Flagger Safety
- Equipment Safety and Operation

The MSU provides all necessary PPE for employees. This includes, but is not limited to:

- Hard hats with hearing protection and face shield
- Steel toe shoes
- Rubber boots
- ANSI 3 Rain Gear
- ANSI 3 Jacket
- ANSI 2 and 3 vests
- Rubber/disposable gloves
- Safety glasses and goggles
- Ear plugs
- Hand disinfectant
- First aid kit
- 4-gas meters
- Confined space entry equipment (harness, tripod and winch)
- Fire extinguishers
- Explosion proof blowers

The Engineering Division is in the process of updating existing and developing new safety procedures with the intent of creating a comprehensive written safety plan by the end of 2025.

A. Licenses and Registrations

The Engineering Division employs a number of professionals in positions requiring a license or registration issued by the State of Wisconsin. This includes licensure as a Professional Engineer for employees in the following: Engineer 4, Principal Engineer 1 and 2, Deputy City Engineer and City Engineer. Employees at the Engineer 3 level are required to have a valid certificate of Engineer in Training at the time of appointment.

Individuals employed in the Surveyor 2 position are required to be registered as a Land Surveyor by the State of Wisconsin.

B. Certifications

Engineering requires staff overseeing and performing CCTV inspections and condition assessments to have current PACP and MACP certifications from NASSCO. Information on this program is available at *http://www.nassco.org/training_edu/te_pacp.html.*

Staff performing Cured-In-Place Pipe inspection have successfully completed NASSCO's Inspector Training and Certification Program for CIPP. Please refer to *http://nassco.org/training_edu/teinsptrain.html* for more information on this program.

Promotion to the Sewer and Drainage Maintenance Technician 2 level requires the employee to obtain the Collection System Operator certification issued by the Wisconsin DNR.

C. Position Specific Training

Engineers and surveyors participate in regular training to obtain continuing education requirements necessary to maintain their licenses. This includes an Ethics for Engineers developed and provided by the City Attorney, webinars and attendance at professional development seminars, workshops and conferences.

Engineers, surveyors and mapping staff attend CAD/GIS specific training provided by an outside consultant to ensure they have the technical skills necessary to perform their assigned job duties.

All collections systems maintenance staff receive manufacturer training on proper operation and maintenance of sewer cleaning equipment as well as proper nozzle and cleaning tool selection. This training includes classroom and field components. Periodically, Engineering contracts with outside consultants to provide classroom refresher training and field assessments of operators. Additionally, staff are provided training on sewer back up, sanitary sewer overflows and spill response.

The Engineering Division has developed an in-house training program to better prepare employees for assuming construction and repair crew leader positions. This program is provided periodically by in-house staff including engineers, supervisors, surveyors and the City's Safety Officer. Sessions included in the program include the following topics:

- Erosion Control
  - Construction Site Erosion Control - Preventing Sediment Delivery
  - City of Madison Standard Specification for Public Works Construction
  - Standard Detail Drawings
  - Product Acceptability List
  - Madison General Ordinances - Chapter 37
- Utility Cut Restoration
- Earthwork
  - Excavation, Fill and Compaction
  - Materials & Methods
- Concrete
  - City of Madison Standard Specification for Public Works Construction
  - Standard Detail Drawings
- Sanitary Sewer Design and Plan Preparation
- Sewers and Structures
  - City of Madison Standard Specification for Public Works Construction
- Safety
  - DHL Excavator's Guide
  - Work Zone Safety
  - Confined Space Entry
  - Competent Person – Excavation and Trenching
  - Blood Borne Pathogens

The Engineering Division is currently developing formal training curriculum for each classification in the Operations section.

V. Communication

A. CMAR and CMOM Distribution

The Madison Sewer Utility's (MSU) CMAR and CMOM Program will be shared with all MSU staff, elected officials and Board of Public Works. It will also be made available to customers via the City's website.

B. Public Information and Education

Public information and education are a key component of the CMOM Program. While a sanitary sewer system represents a substantial investment for the City it is only when things go wrong that people realize it exists. Communicating what is being done to make sure the system functions as designed is key to stakeholders understanding the importance of these activities.

The MSU communicates with the DNR, MMSD, elected officials, Board of Public Works, customers and other stakeholders on a regular basis. Communications include, but are not limited to, the following:

- Providing notification of SSOs.

- Budget requirements and user rates.
- Coordinating and communicating system reconstruction and rehabilitation efforts.
- Informing elected officials and Board of Public Works members of collection system activities on a regular basis.
- Updating the website and providing other information to customers to keep them updated on system activities.
- Individual communications with customers to address complaints/questions.
- Attending the bi-monthly MMSD Commission Meetings and meeting annually with MMSD staff to review issues of mutual concern (City of Madison contributes 60% to 65% of the total flow to MMSD).
- An occasional informational billing inserts and one or more sewer related articles in the annual customer newsletter.
- Occasional targeted mailings to specific customers to alert them to ongoing behavior problems – i.e. – flushing of rags into the sewer causing blockage or lift station problems.

While the MSU does not have a formal public relations program it does participate in a number of initiatives to expose youth to the important work we do. This includes internship opportunities for high school and college students and hosting youth groups at our Operations facility.

In 2019 the Engineering Division hired a Public Information Officer (PIO). Projects that the PIO is currently engaged in coordinating the annual newsletter for the Sewer and Stormwater Utilities, "Waterways" and administering Public Informational Meetings for public works projects.

VI. Customer Service

The City of Madison's service philosophy is to:

- Put our customers as the focus of everything we do.
- Educate first, regulate when necessary.
- Support and inspire each other.
- Continuously improve the City's services.

This philosophy permeates the MSU and is a part of our culture. It guides our employees in everything they do. Of particular importance to our customers is how we respond to an emergency call reporting a problem such as a basement backup, noisy/missing lid, odor, etc. An overview of the MSU's emergency response procedure is provided below. More detailed information regarding SSO response procedures on is provided in Section 6 Emergency Overflow Procedures.

A. Emergency Response

Regularly scheduled MSU crews are available Monday through Friday 7:30 AM to 11:00 PM as well as

from 9:00 AM to 11:00 PM on Saturdays and Sundays. This includes City-observed holidays. Emergency crews are called in for emergency calls outside of these hours. Additionally, an Engineering Manager is on-call 24/7.

Upon receiving a call from a customer office staff create a work order in the CMMS and dispatch to a crew. Customer service records include location, customer name and phone (optional), nature of complaint/request, dates of request, all work performed and resolution, cause of problem, all employees involved (who received complaint/request, who responded, who worked on resolution, etc.). After hours calls are answered and dispatched by the Water Utility's 24-hour Operator.

It is the MSU's expectation that an MSU crew respond to an emergency call (i.e. sewer backup, missing lid) within one (1) hour. The MSU meets this goal 100% of the time.

B. Communication Methods

The City uses a variety of methods to communicate with its customers. These are described in the following sections.

Website

The City of Madison website provides residents access to a wealth of information. Sewer specific information includes:

- Emergency contacts
- Sewer Back Up Prevention and Clean Up
- Current and historical budgets
- Project overview, map with location, plans, specifications, status, schedule and points of contact
- Optional warranty program for private sewer laterals
- Homeowner's ownership and maintenance responsibilities for private laterals
- Link to the City's Report A Problem site

Social Media

The Engineering Division has a social media presence on facebook and twitter.

Newsletter

The Engineering Division publishes "*Madison Waterways"*, a semi-annual newsletter with news from the City's sanitary and storm water utilities. This newsletter is distributed to more than 60,000 Madison homes and businesses. Current and archived editions can be viewed at https://www.cityofmadison.com/engineering/stormwater/documents/MadisonWaterways2019.pdf.

Other Printed Literature

The City currently has a variety of printed literature which it uses to communicate with customers regarding the sewer system:

- Informational pamphlet, which describes what to do in the event of a sewer back up and how to avoid such an event. This pamphlet has been sent to customers with their water/sewer bill on annual basis.
- Door hanger - every time the City responds to a sewer back up call – whether the problem is in the City's main or the property owner's private system – the responding crew provides the property owner with a door hanger indicating what and where the problem was and what, if any action they should take. A copy of the informational pamphlet described above is attached to this door hanger.
- Guide to Dealing with a Sewer Back Up - recently developed brochure aimed at educating property owners on how to safely clean up after a sewer back up.
- FOG Brochure – describing FOG, impact on the system and tips to avoid problems.
- Flushable? Brochure from MMSD describing problems caused by flushing wipes and other so-called flushable materials.

ListServes

Residents are able to sign up to receive project status updates to minimize the impact construction has on their daily lives.

Public Hearings

The Board of Public Works meets twice each month. All meetings have a public hearing component to provide interested residents the opportunity to voice their opinions on projects.

Neighborhood meetings are held during the planning stages of reconstruction projects to gather input from elected officials and residents.

Field Staff

Field staff are the face of the MSU. Field staff interact directly with our residents every day.

On-site construction inspection staff provide an invaluable link with residents throughout the life a Public Works construction project. Inspectors respond to inquiries from businesses, property owners, tenants, private utilities, contractors and the general public regarding inspection and construction considerations related to assigned projects, and work with these individuals and groups to resolve the problems which the construction may cause them.

Operations staff work in the City's neighborhoods on a daily basis. We encourage staff to take the time to educate them customers interested in the work they are performing.

Surveys

Periodic surveys are done to assess resident satisfaction with services.

Mailings

Residents living within an area where sewer reconstruction or rehabilitation is scheduled to occur are notified by first class mail. Additional notices are required for certain projects. For example, contractors performing CIPP lining are required to send a letter to all affected property owners prior to the start of work and then place a door hanger at each property 72 hours prior to each specific main being lined.

VII. Internal Communication

An overview of MSU's internal communication methods is provided in the following sections.

A. Meetings

Management team meetings are held monthly with minutes distributed to all employees.

The City Engineer meets monthly with each section to address and review sewer related issues.

The Sewer/Drainage Engineering and Operations Sections meet monthly to review upcoming projects, discuss recommendations for reconstruction and rehabilitation and other issues of common interest.

The Engineering Division Deputy Manager meets with all Operations Supervisors on a weekly basis to discuss work plans, personnel, and any sewer related issues.

Periodic meetings of work groups (i.e. collection system cleaning, CCTV inspection, construction, etc.) are held to discuss upcoming projects, review system failures and discuss equipment and training needs.

Supervisors have daily interaction with field crews. This includes reviewing assignments in the morning and then again in the afternoon to discuss work accomplished and what remains to be done. Supervisors also visit with crews in the field throughout the day to assess compliance with safety requirements and standard operating procedures as well as troubleshoot issues and provide feedback.

B. Written Communication

The MSU uses written communication in a variety of manners to communicate internally. This includes administrative procedure memorandums, standard operating procedures, memos, emails, and a monthly employee newsletter.

Written procedures for emergency response are particularly important. The Engineering Division has written procedures which cover emergencies such as basement back-ups, sewage overflows, pump

failures, electrical outages, worker accidents, as well as everyday operations and maintenance activities. These written procedures cover communication and specific notification requirements.

A digital Engineering On-Call Supervisor manual includes contact lists, standard operating procedures and vehicle and equipment inventories. Overtime callback lists with names, position and current phone numbers for Operations employees are updated and emailed to supervisors on a daily basis.

Specific SSO Notification to the Public, DNR and MMSD procedures are detailed in Section 7 Emergency Overflow Procedures. All Engineering On-Call Supervisors and Operations staff have received a copy of this document and understand their responsibilities.

C. Technology

The Engineering Division has an in-house Technology team that manages and administers a variety of software to design, construct, maintain, and operate the City's sanitary sewer system. This includes, but is not limited to:

- Civil 3D - design
- Autodesk Construction Cloud - contract administration and construction management
- ESRI Arc Map - GIS
- Cityworks - work order management
- ITpipes - CCTV inspections
- SewerAI - sewer inspection coding and condition ratings
- KorTerra - utility locate requests

The City operates a two-radio way radio system that is used by MSU for communicating with field personnel. Supervisors and crew leaders also have cell phones.

City lift stations are connected via telemetry to MMSD's SCADA system and monitored remotely.

D. Inter-Agency Communication

The Engineering Division routinely communicates and interacts with other City agencies. These efforts are focused on coordinating replacement and expansion of the City's infrastructure with the needs of other utilities and private developers.

E. Other

The City of Madison is working to build employee engagement and equity across all of the various City Departments and Divisions. The Engineering Division is actively involved in this initiative and has Engagement and Equity committees composed of employees in positions throughout the organization.

The Safety Committee is composed of the City's Safety Coordination and Engineering Operations supervisors and field staff. Its mission is to promote a safe and healthy workplace. The committee reviews accident and incident reports, develops and updates safety procedures, discusses potential issues and concerns, evaluates PPE, etc. A separate Crash team reviews all incidents involving motorized vehicles and equipment to determine if they were preventable and provide retraining as needed.

Prior to equipment purchases supervisors, operators and maintenance staff are included in product demonstrations to ensure that the MSU is purchasing the correct equipment for each job.

VIII. Financial Management

A. Funding

The Madison Sewer Utility is funded by a utility fee based on potable water consumption. The utility fee provides a dedicated source of funds for the operation, maintenance, rehabilitation, and improvement of the City's sanitary sewer system.

Because the sanitary sewer utility fee is a user fee and not a tax, all properties regardless of ownership are required to pay for the services provided by the City's sanitary sewer system. This includes non-profit entities such as churches, schools and institutions, as well as properties owned by the City of Madison, Dane County, the State of Wisconsin and the federal government.

The rates charged to a respective customer are broken into 2 primary components: 1) A fixed "demand" charge which is based upon the fixed facility cost to serve the respective customer demand, regardless of actual volume the customer uses; and 2) A volume charge that is the cost to convey and treat that specific volume of sewerage that the customer discharges.

An 11% rate increase is anticipated in 2025 due to increased treatment charges, increased debt service for capital projects, and reduced volumes. The average annual fee for residential users for 2025 is estimated to be $467.58.

B. Rate Study

User charges are evaluated and adjusted on an annual basis as part of the operating budget process.

The Madison Common Council directed the Sewer Utility as follows: *"The Sewer Utility shall examine whether a 'progressive' residential rate structure that will incrementally charge higher rates for greater users of the service (i.e. the charge for volume) could be implemented in 2017 and whether such a rate structure would be reasonable and not unjustly discriminatory."*

In order to respond to the Council's directive, the Utility issued an RFP for consultants to perform a rate study to look at the following:

- Examine present billing model / rate setting established in Chapter 35 to determine if it is reasonable or if other models could be justifiable or appropriate.
- Examine the effect of a 'tiered' rate structure for the volume side of the respective billing.
- Perform equity analysis for the various options of rate change considered to determine impact on lower income households.

This study resulted in the MSU moving expenditures that relate to the maintenance of the collection system from being 65% Fixed Demand and 35% Volume to being 50/50. This was phased in over a three-year period from 2018 to 2020.

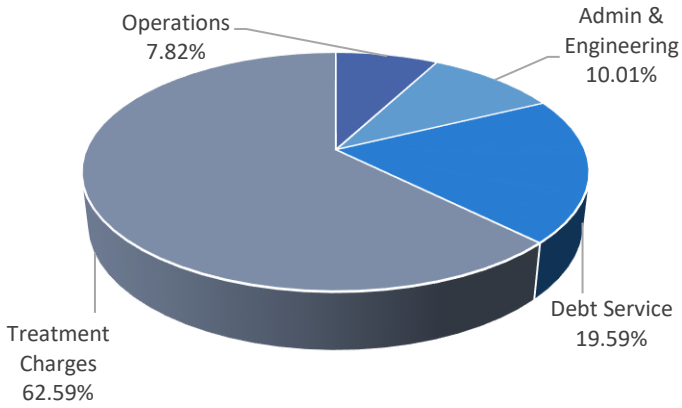
C. Budget

The Engineering Division prepares and submits the Madison Sewer Utility (MSU) operating and capital budgets to the Madison Common Council for review and approval. Rates are reviewed as part of this process to ensure that the MSU has adequate funds to fulfill its mission. This is an annual process, however the MSU also has a five-year CIP to ensure that projects are planned, budgeted, designed and constructed to maintain system functionality as the system ages and the City grows.

Current and historical budgets are available on the City's website at *http://www.cityofmadison.com/finance/.*

Operating Budget

The MSU's annual adopted operating budget in 2025 is $63 million. Wastewater treatment is by far the MSU's most significant cost. In 2025 62.59% of the annual operating budget is allocated for wastewater treatment. Spending on system operations and maintenance represented 7.82% of total spending in 2025.



Capital Improvement Program

The MSU's annual adopted capital budget for 2025 is $15.862 million. The Capital Improvement Program (CIP) projects funds for the prioritized replacement of assets that have outlived their useful life, rehabilitation of existing assets to extend their useful life and increased capacity to meet current and project demand. Rehabilitation and replacement recommendations are incorporated into the CIP. An overview of CIP projects is provided in the following sections.

- **Reconstruction**

  This program involves the replacement of older, problematic sewers in coordination with the City's Street Reconstruction and Pavement Management Program or as standalone projects. Typically, this provides for the replacement of clay sewers that are difficult to maintain, nearing the end of their service life, have a significant repair cost, or are undersized. The Sewer Utility encourages residents to replace the portion of their sewer lateral that lies within the public right-of-way by offering to fund 75% of the cost. Six-inch mains under streets that are being reconstructed will be replaced because they do not meet current codes. Sewers beneath streets being resurfaced are evaluated for replacement on a case-by-case basis.

- **Trenchless Rehabilitation**

  This program provides for the trenchless rehabilitation using CIPP. This process can extend the useful life of existing sewer mains by 50 years, address infiltration issues and provide reliable service to current and future users. This program enables the City to line nine miles of sanitary sewer main every year.

  The cost of rehab using this technology is less than 20% of the cost to remove and replace using open-cut construction. While extremely cost-effective, CIPP is not a suitable method of rehabilitation for every sanitary sewer main. In 2011 the City identified nearly 2 million linear feet of sanitary sewer which would be candidates for rehab using CIPP over the next 75 years.

  In addition to the obvious economic benefits, CIPP rehabilitation provides significant environmental and social benefits. Trenchless project timelines are much shorter than open-cut pipeline installations. Site erosion is non-existent. Vehicle, bicycle and pedestrian traffic disruptions are minimal and, when they do occur, are of short duration. There is no need to purchase and transport additional quantities of asphalt concrete and trench restoration materials. There is no loss of pavement life. These benefits translate directly to a smaller carbon footprint with available studies indicating that trenchless projects producing 80 percent lower green house gas emissions than open-cut pipeline installation methods.

- **Lift Station and Force Main Rehabilitation**

  This program funds capitalized repairs and rehabilitation of the Sewer Utility's 33 wastewater lift stations and force mains. This item also funds any unanticipated major repairs and equipment replacement.

- **Lift Station Emergency Stand-by Generators**

  This program funds design and installation of emergency stand-by generators at MSU lift stations to provide uninterrupted service in the event of a power outage.

- **Sewer Maintenance Access Improvements**

  This program establishes permanent sewer maintenance access roads, trails, or paths in areas where access was not well established with initial installation or where access has gradually declined due to numerous factors. Problem areas are identified, assessed and prioritized on an

ongoing basis.

- **Sewer Impact Fee Districts**
  This program is for the extension of sanitary sewer service to developing areas and upgrades related to increased density within the Transit-Oriented Development Overlay Zoning corridor. Impact fees districts are established to recover the costs of extending and upgrading sanitary sewer service to these areas.

- **Utilities Materials Handling Site**
  This project is for creation of a new site for disposal of excess cut from repair operations.

- **Sewer Backwater Valve Reimbursement**
  This program funds participating property owners 75% reimbursement up to $1,500 for sewer backwater valve installation.

D. Bond Rating

In November 2024 Moody's Investors Services upgraded the MSU's outstanding bonds to Aa1 from Aa2 and assigned a Aa1 rating to the City's Sewer System Revenue Bonds, Series 2024-E with a proposed par amount of $16 million. Moody's rational to upgrade the MSU's rating was as follows:

"The upgrade of the sewer revenue bonds to Aa1 reflects sustained growth in the sewer enterprise's liquidity and improved debt service coverage as a result of recent rate increases. The system closed fiscal 2023 with 228 days cash on hand and annual debt service coverage of 2.3x. The financial strength of the sewer enterprise is also bolstered by its relationship to the City of Madison (Aaa stable), which owns and operates the system and maintains much larger financial operations with healthy reserves. The system's debt burden will remain low at about 1.1x revenue because of modest borrowing plans and the limited scope of the system, which only handles collection. Wastewater treatment is performed by a separate entity, the Madison Metropolitan Sewerage District. Median family income is strong at 120% of the US, and the large customer base includes the Wisconsin state capital and the University of Wisconsin's flagship campus."

E. Plant Value

Governmental Accounting Standards Board Statement 34 (GASB 34) establishes requirements for reporting operations and capital assets. It requires local government entities to create an inventory, and assess the condition, of all municipal assets. This data is critical for determining the MSU's financial rating as well prioritizing defects for a phased replacement/rehabilitation plan of action.

The City calculates plant value on an annual basis using the straight-line depreciation method. The MSU's 2024 plant value was $208,101,556.90. The replacement value of the collection is estimated to be $389,183,305. The table below summarizes the current and replacement values of the system by major asset category.

ASSET CATEGORY	USEFUL LIFE	QUANTITY	U/M	CURRENT VALUE	REPLACEMENT VALUE
Gravity Main	75/100	4,146,251	LF	$ 150,024,309.04	$ 277,270,829
CIPP	50	431,600	LF	$ 16,189,124.90	$ 28,862,240
Structures	75/100	19,618	EA	$ 32,941,099.57	$ 68,008,749
Force Main	65	51,338	LF	$ 2,115,483.74	$ 3,543,417
Pump Stations	10 to 50*	34	EA	$ 6,831,539.65	$ 11,498,070

**Each pump station consists of multiple components (i.e. building, wet/dry well, pumps, controls, etc.) each of which has a different expected useful life.*

IX. Asset Management

The U.S. EPA defines asset management as "maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost. Lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing or replacing an asset. "

Asset management is implemented through an asset management program which typically includes a written asset management plan. As part of developing the MSU's CMOM Program, the City of Madison Engineering used the Water Environmental Research Foundation's (WERF) "Fundamentals of Asset Management" to assess where the current state of asset management.

A draft asset management plan was prepared in 2017 but never was formally adopted or implemented. The majority of components of asset management plan are in place and are used to effectively manage the MSU's assets. Currently, staff is working on a pilot project to assess risk and prioritize investments in the system. Development and formal implementation of a written asset management plan would, however, only enhance the MSU's operation.

4. LEGAL AUTHORITY

I. Requirements

NR 210.23 (4)(c) specifies that the Madison Sewer Utility (MSU) should have legally binding authority in place to ensure the following:

1. Infiltration and inflow sources, including infiltration and inflow into building sewers, private interceptor sewers, or other such sources on private property, are subject to oversight and control, as necessary.
2. New sewers and connections, including building sewers and private interceptor sewers are designed, constructed, installed, tested, and inspected to meet all applicable current engineering and construction standards.
3. New and rehabilitated sewers, lift stations and other collection system components or appurtenances are installed, tested, and inspected to meet all applicable current standards.
4. If applicable, sewage flows from municipal satellite or other privately owned sewage collection systems are, as necessary, monitored, and controlled. Notwithstanding all other provisions of this chapter, any publicly owned treatment works may establish specific requirements to regulate sewage flows from satellite sewage collection systems.
5. Solid or viscous pollutants, such as fats, oils, and greases, are not discharged into the sewage collection system in amounts that will cause or contribute to obstruction to the flow in the sewer.
6. Procedures are in place to implement enforcement actions for non−compliance with established legal authorities.

II. Sewer Use Ordinance (SUO)

The primary legal authority for the Madison Sewer Utility (MSU) is granted in Chapter 35 of the Madison General Ordinances. Chapter 35 – The Public Sewage System. The full text of this ordinance is available online.

The SUO contains definitions, restrictions, and requirements and provides the City the ability to:

1. Establish rates and collect charges.
2. Regulate and control discharges.
3. Specify design, connections and permitting requirements.
4. Operate and maintain the public sewer system.
5. Enforce ordinance requirements.

The Ordinance is reviewed periodically and updated as needed. The most recent Ordinance update was on December 15, 2022, and provided for amendments to align with the City's gender-inclusive policies.

A. Inflow & Infiltration Control

The City's SUO provides the necessary MSU oversight and control authority over Infiltration and inflow sources, including infiltration and inflow into building sewers, private interceptor sewers, or other such sources on private property. Clear water discharge is specifically prohibited by the Ordinance.

The City's SUO prohibits discharge of storm water, ground water, rainwater, street drainage, roof runoff, and subsurface drainage to the Public Sewerage System. It also prohibits the discharge of unpolluted water, including but not limited to, cooling water, process water or blow down from cooling towers or evaporative coolers, discharge from swimming pools, unless specifically authorized by the City Engineer.

Polluted storm water runoff and ground water from limited areas may be discharged to the sanitary sewer upon approval of the Engineer and the Chief Engineer of the Madison Metropolitan Sewerage District, subject to payment of applicable charges and fees and compliance with conditions required by the Engineer and the Chief Engineer of the Madison Metropolitan Sewerage District.

City staff are continuously on watch for this sort of activity or illegal connections. When illegal connections are discovered, they are ordered to be disconnected and generally resolved fairly quickly.

Section 35.02(6)(d) provides that the City Engineer has the powers and authority for inspection and sampling any component of the sewer system "to ensure accurate billing and compliance with this Ordinance."

B. New Sewers and Connections

New sewers and connections, including building sewers and private interceptor sewers are designed, constructed, installed, tested, and inspected to meet all applicable current engineering and construction standards. No connection shall be made to any sanitary sewer if the connection pipe is carrying flow from a building foundation drain.

C. Inspection and Testing

New and rehabilitated sewers, lift stations and other collection system components or appurtenances are installed, tested, and inspected to meet all applicable current standards.

All Public Works construction is performed in accordance with the City of Madison Standard Specifications, which for sanitary sewer purposes are in compliance with Department of Natural Resources requirements. The City Specifications are also approved periodically by the DNR, as those Specifications are part of all permit submittals for new sewer extensions.

D. Sewer Flows from Other Systems

When applicable, sewage flows from municipal satellite or other privately owned sewage collection systems are, as necessary, monitored, and controlled. Notwithstanding all other provisions of this chapter, any publicly owned treatment works may establish specific requirements to regulate sewage flows from satellite sewage collection systems.

Much of the City's sewer boundaries abut neighboring Municipal Sewer boundaries. In many cases there are overlapping sewers, some swapping of customers and some passing of flow between Municipal boundaries. The City continues to formally account for all of these areas with either formal agreements or in some cases absorbing neighboring Town Sewer Districts into the Madison Sewer Utility.

In the past, the City took over a small Sewer District from the Town of Verona. In 2015, the City took over two Sewer Districts in the Town of Burke. There are no remaining Sewer Districts in the Town of Burke and only 1 in the Town of Verona, and it is completely isolated from the Madison Sewer Utility. In 2016 the City took over the Blooming Grove Regas Sewer District. This was followed by the City assuming control of the Blooming Grove Sanitary Districts #2 and #10 in 2017. There are no remaining sewer district in the Town of Blooming Grove. In 2017 the Town of Middleton transferred its one Sewer District to the City of Madison.

The final attachment for the Town of Madison to the cities of Fitchburg and Madison occurred on October 31, 2022. At that time sewers were transferred to the cities of Fitchburg and Madison based on the 2002 Intergovernmental Agreement.

Lastly, there is some comingling of sewerage with both the Cities of Fitchburg and Monona and 3 customers in the Village of McFarland. The McFarland customers are handled by formal agreement. Much of the Fitchburg comingling is covered by formal agreement and some other areas by informal agreement. We work closely with Monona for any comingled sewers with both formal and informal agreements as appropriate.

E. Fat, Oil and Grease Control

Madison's Sewer Use Ordinance prohibits discharges to the public sewer system which cause or can cause either alone or with other substances the obstruction of flow or damage to the public sewerage system; and/or the prevention of effective maintenance or operation of the wastewater facilities.

Specific prohibited FOG discharges include but are not limited to:

1. Any wastewater from industrial plants containing floatable oils, fats, or greases.
2. Wax, grease, oil, plastic or any other substance that solidifies or becomes discernably viscous.
3. Wastewater containing more than fifty (50) milligrams per liter of petroleum oil, or biodegradable cutting oils, or products of mineral oil origin.

4. Wastewater containing more than three hundred (300) mg/l of oil or grease of animal or vegetable origin.

Larger industrial type grease dischargers, such as creameries, no longer exist in Madison system. The Madison Sewer Utility does have, however, numerous customers that contribute excessive fats, oils or grease (FOG) to the system. The present dischargers consist primarily of restaurants and kitchen type facilities such as a school or grocery deli.

Restaurant Class Rate Structure

In 2018 the Madison Sewer Utility implemented a 3-tiered rate structure for restaurants and similar heavy food preparation businesses. The goal of this program is to educate customers and provide them a financial incentive to properly maintain their grease traps.

Chapter 35 of the Madison General Ordinances was revised to establish a sanitary sewer billing rate classification for food establishments. The composition of wastewater produced at food establishments contains higher levels of food waste as well as fats, oils, and greases, all of which cost more to treat at the wastewater treatment plant in comparison to typical wastewater from homes and office buildings. The intention of the ordinance revision is to shift the costs of treating the higher strength sewage away from standard sewer customers to the customers that generate it, as well as to encourage better maintenance of grease trap systems.

Food establishments are required to submit a grease trap maintenance report annually. Reports are due before April 1 each year. A submission is required for each restaurant and food service location. If there are multiple restaurants that share a grease trap, a grease trap maintenance report will be required for each restaurant. These reports consist of when the trap was cleaned and by whom, method of disposal of the grease, and inspection notes to check for cracks or other structural deficiencies of the trap.

Failure to submit annual grease trap maintenance reports results in the customer being moved to Tier 3 sanitary sewer utility rates. Customer moved to the Tier 3 rate can be moved back to the Tier 1 or 2 rate with successful completion of the required maintenance and online reporting.

Tier 1 is comprised of businesses that actively participate in a recognized and approved organics (food scraps)/composting collection and recycling program and provide evidence of participation. They have a slightly lower sewer billing rates compared to the other tiers because composting leads to less food waste down the drain.

Tier 2 consists of majority of the restaurant and food establishments. These facilities have grease traps in good standing and are submitting proof of grease trap maintenance a minimum of once a year. New food establishments start at this tier by default.

Tier 3 are food establishments who have failed to submit their grease trap maintenance report.

- Tier 1 Sewer Rate: *Sewer Usage Charge* plus 28%
- Tier 2 Sewer Rate: *Sewer Usage Charge* plus 56%

- Tier 3 Sewer Rate: *Sewer Usage Charge* plus 120%

Participants may be audited with an onsite inspection by the Madison Sewer Utility for compliance.

Mixed-Use Buildings

Some food establishments are part of a multi-use building or strip malls and share a water meter with residential and/or non-food related businesses. These facilities may be subject to only a portion of the building being assessed at the Restaurant Sewer Rates.

Preventive Maintenance

The City's preventive maintenance program provides for every section of sanitary sewer gravity main being cleaned at least once every three (3) years. The City's sewer cleaning activities are categorized as follows:

- Emergency – in response to sewer back up calls from residents.
- Preventive Maintenance – regularly scheduled maintenance performed on historically problematic lines; frequency of cleaning ranges from 1 time per year to 1 time per month.
- Area Cleaning – Standard cleaning cycle of once every three years.
- TV Cleaning – Cleaning done in advance of CCTV inspection.

Note that we are exploring changing the standard cycle for cleaning sewers serving newer, lower density subdivisions to once every 5 years.

As part of its FOG Program, the City has mapped restaurant class businesses in GIS. CCTV inspection of the sewer mains to which these businesses connect will be used to identify maintenance issues and optimize cleaning frequencies, equipment and tools.

Education

The Sewer Utility will develop a comprehensive FOG communications plan to educate sewer residents and businesses.

F. Pretreatment or Industrial Control Programs

The Madison Sewer Utility functions primarily for collection and conveyance, with treatment addressed by a regional entity, the Madison Metropolitan Sewerage District (MMSD). The Madison Sewer Utility is over 60% of the average daily flow to the MMSD Nine Springs wastewater treatment plant.

MMSD sets parameters for acceptable waste and enforces an Industrial permit program including pretreatment. The Madison Sewer Utility incorporates those requirements as needed on behalf of MMSD. The Madison Sewer Utility also has an interest from a surcharge billing perspective for customers with stronger effluent.

G. Illicit Discharges by Commercial or Industrial Users

All connections to the public sewer system are regulated by Section 35.02(4)(c) and require a permit issued by the City Engineer. In addition, the ordinance requires that industrial users be permitted by the Director of the Madison Metropolitan Sewerage District prior to connection.

Sec. 35.02(5)(d) allows the City and MMSD the following alternatives to accepting wastewater in excess of those limitations enumerated in the City's sewer use ordinance:

1. Reject the wastes;
2. Require pretreatment;
3. Control the quantities and rates of discharge; and/or
4. Recover the increased costs of handling and treating such wastes.

Sec. 35.02(5)(f) prohibits the discharge of wastes from septic tanks, industrial or domestic waste holding tanks, seepage pits, grease traps, mobile public toilets, permanent or portable privies, or liquid industrial wastes directly into a manhole or other opening in the Public Sewerage System without a permit issued by the Engineer and approved by the Chief Engineer of the Madison Metropolitan Sewerage District is prohibited.

Sec. 35.02(5)(g) requires the installation of grease, oil and sand traps at repair garages, gasoline stations, car washes and other commercial establishments where, in the opinion of the Engineer, necessary to prevent the discharge of sand, flammable wastes, oil or grease in the amounts exceeding the limits established in the City's sewer use ordinance.

The ordinance includes a reporting requirement for accidental discharges of prohibited wastes or wastewater to the public sewer system.

H. Private Lateral Inspections / Repairs

Per Ordinance, the laterals are the responsibility of the property owner, from the building to the point of connection. Section 35.02(6)(d) provides that the City Engineer has the powers and authority for inspection and sampling any component of the sewer system "to ensure accurate billing and compliance with this Ordinance."

Existing sanitary lateral sewers may be used in connection with new building only when they are found, on examination test by the Engineer or the Plumbing Inspector, to meet the requirements of this ordinance.

A permit is also required to remove or abandon an existing lateral. In 2013 the City implemented a requirement to install a short liner at the sanitary lateral connection to the sanitary sewer main as well as require the lateral be properly plugged at the property line.

In 2019 the City ended its relationship with the National League of Cities Sewer Line Warranty Program to provide a "warranty" or lateral insurance program. This coverage is now available through a number of sources including homeowner's insurance carriers.

I. Enforcement Actions

Procedures are in place to implement enforcement actions for non−compliance with established legal authorities. The City Engineer is responsible for enforcement of the provisions of the City's Sewer Use Ordinance. Section 35.04(2) provides for a fine of not less than twenty-five dollars ($25) nor more than two hundred dollars ($200) per day for each and every violation.

III. Service and Management Agreements

The Madison Sewer Utility has the service and management agreements with the following agencies.

A. City of Madison Engineering Division

The Engineering and Administration service handles design and construction inspection and obtaining permits for the construction of any additions to the collection system. Industrial and other high strength waste contributors are monitored and special bills are prepared by the Engineering Division. The service also handles the review and inspection of various permits related to the sanitary sewer system including excavation permits and sewer plugging permits.

The Engineering Operations section is responsible for assuring that the City's sanitary collection system operates as designed and to maximize the useful life of these assets. Sanitary maintenance activities include emergency response and preventive maintenance cleaning; CCTV inspection and condition assessment; flow monitoring and smoke testing; structure inspections; identify candidates for repair and rehabilitation; providing pre-design/post-construction pipe surveys for designers, inspectors and mapping; repair of defects in mains and structures; and utility locating and marking to protect underground facilities from damage.

B. City Attorney

The City Attorney provides professional legal representation to the Madison Sewer Utility as an entity, including ordinance enforcement, legislative counsel services and general counsel services.

C. Finance

The Finance's Accounting Division maintains a separate set of books for the Madison Sewer Utility and oversees independent audits. Its Risk Management Division provides a variety of insurance coverage including property, liability and worker's compensation.

D. Water Utility

The Madison Water Utility provides metering and billing services for the MSU.

E. Information Technology

The Information Technology Department operates and maintains a secure computer network for the MSU and provides required hardware, standard software, and related technical support. The Engineering Division has its own technology team that implements and administers software used for design, survey, construction management, work order management, and utility mapping.

F. Madison Dane County Public Health (MDCPH)

Administers private, onsite sewerage disposal systems. With that, MDCPH works closely with the Engineering Administrative staff for conversion of properties to the sewer system when applicable or identifying properties that may be in violation of either the Madison Sewer Utility Ordinance or MDCPH Ordinance for onsite systems.

G. Madison Metropolitan Sewage District

MMSD monitors and maintains the MSU's thirty-four (34) lift stations. Most of the lift stations are monitored at the MMSD Plant via telemetry. MMSD and MSU cooperate in sharing of resources for special maintenance needs or emergency responses. MMSD's laboratory performs all of the MSU's effluent analysis for the surcharge billing program. MSU staff work closely with the MMSD pretreatment coordinator and the MMSD design and system engineers on a weekly or even daily basis.

5. Operations & Maintenance Program

I. Goals and Objectives

An effective maintenance program keeps the sewer system running smoothly and helps prevent premature deterioration of components. Planning should be performed annually and updated throughout the year as needed to address changing conditions. Maintenance activities are either planned (i.e., CCTV inspection of sewer mains in the system every 10 years, cleaning all sewer mains a minimum of once every three years) or unplanned (i.e., defect repair, emergency blockage removal).

The City of Madison's sanitary sewer collection system consists of 809 miles of sewer mains connected by 20,269 sanitary access structures. This system is supported by 33 pumping stations and transports 25 million gallons of raw sewage per day from Madison homes and businesses to the Nine Springs Wastewater Treatment Plant.

The City of Madison's goals for the operation and maintenance of its wastewater collection system are to:

- Convey wastewater to the Nine Springs Wastewater Treatment Plant with minimum inflow, infiltration and exfiltration.
- Prevent public health hazards.
- Reduce inconvenience and damage by responsibly handling service interruptions.
- Eliminate claims and legal fees related to backup by providing immediate, concerned and efficient service to all emergency calls.
- Protect municipal investment by increasing the useful life and capacities of the system and parts.
- Use operating funds efficiently.
- Perform all activities safely and avoid injury.

In order to achieve these goals the City has developed and implemented policies and procedures which provide for the:

- Execution of a routine preventive maintenance plan designed to prevent service interruption and protect capital investment.
- Immediate investigation of all complaints and prompt correction of faulty conditions.
- Routine or follow up inspection of system for physical damage and elimination of the cause.
- Consideration of personnel safety in all operations.
- Recognition of public ownership and the provision of courteous, efficient and prompt service.

Collection system operations and maintenance is an essential element of a CMOM program. The Madison Sewer Utility's O&M Program is designed to optimize the performance of the collection system

and over time reduce the frequency of overflows, basement back-ups, complaints, sewer pipe failures, lift station failures and peak flows as well as provide recommendations for future rehabilitation, repair and replacement projects.

This chapter outlines the specific O&M programs that the City currently has in place.

II. GRAVITY SEWER SYSTEM

A. CCTV Inspection

The City of Madison is working towards a goal of inspecting and assessing the condition of the entire sanitary sewer system on a 10-year cycle. Closed-circuit televising is the primary means of inspection and condition assessment. Surveys are performed in ITpipes software which is PACP compliant.

Sanitary mains are currently televised as follows:

- Post Cleaning – Mains are randomly selected to be televised following scheduled cleaning to evaluate cleaning effectiveness.
- Post-SSO/Basement Sewer Back – Any sewer involved in an SSO or basement sewer back up is televised within 24 hours. This enables staff to evaluate pipe maintenance and structural conditions and identify appropriate action to avoid reoccurrence.
- Pre-Acceptance – All newly constructed and reconstructed sewer mains are cleaned and televised prior to acceptance by the City. This is to ensure that the sewer was constructed per plans and specifications and to provide wye connection locations for system mapping.
- Prior to Street Resurfacing or Reconstruction – All mains located within streets scheduled for resurfacing or reconstruction are televised to assess condition and identify any structural issues that should be resolved prior to resurfacing as well as provide information required for design of reconstruction projects.
- Special Requests – These include requests from field technicians and supervisors based on field observations, reported issues and complaints, sewer evaluation studies, investigations, etc.

CCTV inspection and condition assessment data is used to:

- Identify maintenance issues and optimize cleaning frequencies, equipment and tools
- Identify structural defects
- Identify areas of infiltration
- Identify illegal connections
- Provide condition assessment scores (structural and maintenance) for each pipe segment
- Establish an objective methodology for identifying and prioritizing pipes for reconstruction and trenchless rehabilitation
- Improve budget forecasting through expanded knowledge of pipe condition and maintenance needs

- Establish baseline pipe condition following pipe rehabilitation, new pipe installation, or liner installation
- Provide highly accurate measurement data for mapping purposes

B. Sanitary Access Structure Inspection

Sanitary access structures are inspected when mains are cleaned or televised and in advance of reconstruction projects. This ensures that every structure is inspected a minimum of once every three years.

The structure inspection performed at the time of main cleaning or CCTV is a quick inspection designed to identify any issues in need of maintenance or repair. Operators note any observed problems and submit to a supervisor for resolution. The supervisor determines if additional investigation is required or if a work order should be created. Repairs are performed in-house.

Structure inspections performed in advance of a reconstruction project are for design purposes and are much more involved. These inspections are performed using an IBAK PANORAMO SI 3D Optical Manhole Scanner. This scanner provides a complete 360º view of the manhole using two high resolution digital cameras to scan the entire interior of the manhole.

Surveys are performed in ITpipes software which is MACP compliant. Survey grade GPS is used to locate each structure. Location and structural information is available for updating GIS records.

C. Condition Assessment

Condition assessment is an important tool in managing and operating the City's sanitary sewer collection system. Based on the condition of the main or structure, recommendations are made for future inspection and cleaning schedules as well as repair, rehabilitation or replacement.

Digital inspection data dating back to 2000 is available to compare historical and current asset condition to assess deterioration rates. The results of all inspections are documented and referred to, as needed, for applicable regulatory reporting and internal planning and budgeting.

In 2023 we implemented using artificial intelligence to code sanitary sewer inspection videos. In addition to providing more consistent data it enables us to inspect more footage per year with the same resources.

Condition assessment data is used in the development of the City's five-year capital improvement program. Staff use this data to identify sewer mains needing rehabilitation or replacement then develop cost estimates for recommended options and establish priorities. When determining the priority of repairs, rehabilitation or replacement, we consider not only the structural condition of the pipe, but the criticality, maintenance condition and location.

We are currently working on a pilot project to assess and quantify risk to prioritize capital investments and better allocate limited resources.

D. Other Inspection Activities

The City uses a variety of other inspection and monitoring activities as needed to assess the condition, performance and capacity of its sanitary sewer system. These include flow monitoring, dye testing and smoke testing.

E. Cleaning

The City's preventive maintenance program provides for every section of sanitary sewer gravity main being cleaned at least once every three (3) years. The City's sewer cleaning activities are categorized as follows:

- Emergency – in response to sewer back up calls from residents.
- Preventive Maintenance – regularly scheduled maintenance performed on historically problematic lines; frequency of cleaning ranges from 1 time per year to 1 time per month.
- Area Cleaning – Standard cleaning cycle of once every three years.
- TV Cleaning – Cleaning done in advance of CCTV inspection.

Emergency Cleaning

Every report of a sanitary sewer overflow (SSO) sewer back up is a top priority for the City. Our objective is to respond as quickly as possible, remedy the situation, determine the cause and identify actions necessary to prevent reoccurrence.

- **Sanitary Sewer Overflow**
  The City's standard procedure for handling a sanitary sewer overflow detailed in Chapter 6.

- **Basement Sewer Back Up**
  The City of Madison Engineering Division's standard procedure for handling a basement sewer back up call is to dispatch a crew to check the City's sanitary sewer main that serves that particular property. If it is determined that there is a blockage in the City's sanitary sewer main, action is taken to relieve the blockage. If the City's main is operating normally, indications are that the private building sewer is the cause of the sewer back up. In this case, it is the responsibility of the property owner to clear the blockage. In either case, the crew contacts the property owner or resident and notifies them of what they found. Contact is made in person, by telephone or, as a last resort, by leaving a door hanger.

  Additionally, every sewer main back up is televised to determine the reason for such back up. Where there are structural deficiencies the best method of rehab (i.e. point repair,

replacement, lining, etc.) is determined. Additional specialized cleaning (i.e. grease treatment, chain cutter on vactor, etc.) may be scheduled for lines where there appears to be no structural deficiency, but additional cleaning is required. Such lines are then placed on the appropriate preventive maintenance schedule.

Preventive Maintenance

Lines that have a history of problems (i.e. sewer back ups, roots, grease, etc.) have been identified and the best cleaning method and frequency of cleaning necessary determined. CCTV inspections and historical maintenance data including repairs, sewer back ups, cleaning activities, types (roots, rags, grease, paper, grit, etc.) and levels (low to extremely high) of debris removed as reported by equipment operators is used to refine the City's preventive maintenance program and ensure optimal system operation.

These lines are on a preventive maintenance (PM) schedule and cleaned anywhere from 1 to 12 times per year.

- **Area Cleaning**
  The City's standard cleaning cycle is once every three years. All lines that do not require more frequent preventive maintenance schedule are scheduled for cleaning by area once every three years. This ensures that these lines continue to function as designed. The first full three-year cleaning cycle was completed in 2004. The City is looking at ways to determine the most efficient and cost-effective frequency for cleaning lines in this category.

- **CCTV Cleaning**
  All mains are thoroughly cleaned prior to CCTV inspection. This is necessary to ensure that the entire pipe surface is visible and that its condition can be properly assessed.

- **Root Control**
  The City does not use chemical root control. A pilot project was conducted from 1996 to 2001 and it was determined that a vactor equipped with a chain cutter was the most efficient and cost-effective means of root control. All mains with a history of root problems are specifically assigned to be cleaned by a Vactor equipped with a chain cutter.

Siphon Cleaning

There are 21 active inverted siphons in the collection system. Cleaning frequencies for siphons range from bimonthly to once every 3 years depending its performance history.

F. Repairs

The City performs sanitary main and structure repairs and smaller scale installations in-house.

Both traditional open-cut excavation and CIPP lining are used to perform main repairs and smaller installations. Structure repairs performed in-house include invert repairs, casting adjustments and replacements, chimney seal installations, and sealing as well as smaller scale reconstructions and new installations.

The City has also implemented specific repair programs aimed at reducing I&I. These include the installation of CIPP spot liners to abandon laterals no longer in use and programmed replacement of "pin-type" castings.

G. Equipment & Staffing

Inspection and Condition Assessment

CCTV main and structure inspections and condition assessments are performed in-house.

The City has three closed circuit video inspection systems that allow for internal inspection of pipes from 6" to 48" in diameter. These systems include:

- IBAK 4K Panoramo 2 Digital Scanning Sewer Inspection System
- IBAK SD Orion Camera (T66/T76 tractors) pan and tilt camera with steerable tractor and scissors lift
- IBAK HD Orion Camera (T66 tractor) pan and tilt camera with steerable tractor

Structure inspections are performed using the following systems:

- IBAK 4K PANORAMO® SI 3D Optical Manhole Scanner
- Insta360 x3 360 Portable Structure Camera

Our portable structure camera consists of a 360 GoPro type camera, external light source and either a climbing rope or extension pole. The capabilities allow our department to complete MACP Level 2 inspections anywhere, anytime and without ever making a Confined Space Entry.

Surveys are performed in ITpipes software. Condition assessment is performed in SewerAI. Both programs are PACP and MACP compliant.

Survey grade GPS is used to locate each structure. Location and structural information is available for updating GIS records.

Three (3) full-time crews that perform sanitary and storm sewer main and structure inspections, trenchless repairs, and monitoring activities. Each crew consists of a CCTV Technician and Laborer. In 2024, these crews spent 6,213.65 hours televising sanitary facilities. This is equivalent to 2.99 FTE positions or 1.5 FTE two-person crews. All staff involved in performing CCTV inspection and condition assessment are PACP and MACP certified.

Other inspection activities also performed in-house include:

- Flow monitoring. The City has five (5) ISCO 2150 area velocity flow monitors and bands for pipes ranging from 8” to 48” in diameter. Flow monitors are equipped to provide remote data retrieval and alarms via cellular network. Data is stored and available for viewing and analysis in Flowlink.
- Smoke testing. The City has used smoke testing to help detect sources of infiltration and inflow (I/I) to the sewer system, including area drains, abandoned sewer laterals, storm sewer cross connections, roof downspouts, faulty service connections and illegal connections. Smoke testing equipment includes a Superior Manhole Smoke Blower, plugs of various sizes, air compressor, hoses and remote plug installation and retrieval tools.
- Dye testing. The City uses dye testing to identify live lateral connections and cross-connections.

The CCTV Inspection and Trenchless Rehab Supervisor is responsible for overseeing inspection and condition assessment activities.

Cleaning

Sanitary sewer cleaning activities are performed in-house.

The City has a variety of sewer cleaning equipment available to perform this work including:

- Nine (9) truck mounted “Vactor” combination hydraulic/vacuum sewer cleaning machines.
- One (1) truck mounted jetter.
- One (1) hydraulic sewer cleaning skidsteer attachment for sewers in easements.

The City employs twelve full-time crews to perform sanitary and storm sewer main and structure cleaning. Each crew consists of a Sewer & Drainage Maintenance Technician and Laborer. In 2024, these crews spent 28,562.22 hours cleaning sanitary facilities. This is equivalent to 13.73 FTE positions or 6.87 FTE two-person crews.

The Sewer Maintenance Supervisor is responsible for overseeing all cleaning activities.

Repairs

The City has the following equipment available to perform sanitary main and structure repairs including:

- Wheeled Excavator
- Tracked Excavator
- Loader/Backhoe
- Tracked Mini-Excavator
- Tandem and tri-axle dump trucks (6)
- One-ton dump trucks (16)
- Skidsteers (6)
- 6” Dri-Prime Pump (2)

- Well Points
- Packers and compressor for CIPP point liners (6” to 21” diameter)

Additionally, vactors are used to hydro-excavate in areas where utilities are tightly congested. CCTV is used to locate and place CIPP liners used for point repairs.

The City employs four full-time crews to perform sanitary and storm sewer repairs and installations. Crew composition and size varies based on the complexity and scope of work to be performed. In 2024, these crews spent 8,276.79 hours repairing sanitary facilities. This is equivalent to 3.98 FTE positions or 1.33 FTE three-person crews.

The Construction Supervisor is responsible for overseeing all repair activities.

III. Lift Stations

The City’s collection system has 33 lift stations. The City contracts with the Madison Metropolitan Sewage District (MMSD) to operate and maintain its lift stations. All but one lift station is connected to MMSD’s Supervisory Control Data Acquisition (SCADA) alarms. This station is scheduled to be reconstructed at which time telemetry will be added to connect to MMSD’s SCADA system. Pump station and related equipment maintenance is tracked in MMSD’s CMMS.

A. Inspection

MMSD inspects each lift station on a weekly basis. The inspections are performed by mechanics and a maintenance worker. All pumps are started and observed for potential problems. The wet well is inspected for debris build-up and levels. The station and grounds are also inspected. Minor adjustments are performed on-site at this time. Work orders are generated if major problems are noted.

Lift stations are also inspected on an annual basis by MMSD’s Electrical, Mechanical Maintenance. and Buildings and Grounds Supervisors to review the condition of the pump stations, pumps and associated equipment. MMSD makes recommendations to the City for replacement and rehabilitation of the facilities and equipment.

B. Maintenance

Pumps and associated equipment are maintained by MMSD mechanics. Pump preventative maintenance is scheduled according to pump manufacturer and MMSD mechanic recommendations.

The City cleans wet wells a minimum of two times each year in conjunction with MMSD as part of their interceptor cleaning program. MMSD inspects lift station wet wells on a weekly to identify any debris, rags, or grease build-up that would require additional cleaning.

IV. Force Mains

A. Inspection

The City has not historically inspected force mains due to the inability to access by camera. Different technologies to inspect the condition of the force mains are currently being reviewed. The City staff is also reviewing the ability to accurately locate older force mains that were installed without tracer wire. This will assist in utility locates as required by Diggers Hotline.

B. Isolation Valves

There are no isolation valves located on the force mains.

C. Air Release Valves

There are 3 air release valves located on City force mains. These are inspected and cleaned twice a year by MMSD.

V. OTHER

A. Easements

The City has 373,153 linear feet of sewer main located in easements through private property. The City maintains easements as necessary to provide emergency and scheduled maintenance access.

The City has identified a number of sewers where maintenance access is a problem. The City has an annual capital project to fund access improvements. Additionally, sewer located in easements where access is problematic are programmed for lining so as to decrease the frequency of cleaning and need to access on a routine basis.

B. Grease Trap Inspections

Grease trap inspections are performed by the City of Madison Building Inspection Unit at the time of installation. The Madison/Dane County Public Health Department performs annual inspections of all restaurants and food preparation facilities. This includes inspection of grease traps.

Engineering works with Building Inspection and Madison/Dane County Public Health to resolve grease trap related issues.

C. Sampling

The City's Sewer Use Ordinance requires customers whose effluent exceeds the established limits for domestic wastewater to participate in a monitoring program to determine wastewater characteristics

and constituents. Monitoring is either performed by the customer under an approved monitoring program or by the City itself. Currently, the City performs sampling to monitor 14 customers under this program.

The City also performs sampling on as needed basis in response to SSOs, basement sewer back ups or field observations by staff.

The City has five (5) portable ISCO 3710 composite samplers to perform this work.

D. Hydrogen Sulfide and Odor Control

The City's sanitary sewer system has no hydrogen sulfide or odor control issues.

E. Standard Operating Procedures

The City has identified the need to develop standard operating procedures (SOPs) for all collection system activities that are performed by staff. Currently, written standard operating procedures exist for the following:

- Accident and Incident Reporting
- CCTV Inspection
- Drug and Alcohol Testing
- Cleaning – Hydraulic
- Cleaning – Mechanical
- Locating and Marking
- One Call Procedure
- Power Outage Response Plan
- Private Sanitary Sewer Lateral Failure
- Public Sanitary Sewer Main Failure
- Sanitary Smoke Testing

6. DESIGN AND PERFORMANCE

Sanitary sewers typically have a 100-year life cycle. This makes proper design and construction key to minimizing the total life cycle cost of these assets.

The City of Madison Engineering Division is responsible for ensuring that new sewers and connections are properly designed and constructed and that new connections of inflow sources are prohibited.

I. Design Criteria

The goals of standard design criteria are to streamline design and reduce operation costs. Good design and proper installation prevent long-term operating and maintenance problems.

A. NR210 Requirements

NR 210 requires that the following design and performance standards and procedures be established or adopted to maintain control over the design, construction, and inspection of the sewage collection system, including building sewers and private interceptor sewers on private property:

1. Standards and specifications for the design and installation of new sewers, lift stations, and other appurtenances and for rehabilitation and repair projects.

2. Procedures and requirements for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.

B. Standards Used by City

The design and performance standards that the City of Madison follows are contained in state codes and the City of Madison Standard Specifications for Public Works Construction. A brief description of each is provided in the following sections. These standards establish requirements for collection system design, construction, inspection and final approval.

State Plumbing Code

Department of Commerce COMM 82, Wisconsin Administrative Code—Design, Construction, Installation, Supervision, Maintenance and Inspection of Plumbing must be followed when designing and constructing residential and commercial plumbing and pipes.

State Sewerage System Code

Department of Natural Resources Chapter NR 110, Wisconsin Administrative Code—Sewerage Systems must be followed when designing and constructing sewage conveyance systems.

City of Madison Standard Specification for Public Works Construction

The City of Madison has adopted uniform standards for the construction of new sewers and connections. These standards are included in the City's Standard Specifications for Public Works Construction and are reviewed and updated on an annual basis.

The City of Madison Standard Specification for Public Works includes specifications and standard detail drawings for construction of sanitary facilities. The sanitary sewer standards establish acceptable materials and practices for the design and construction of additions and improvements to the City's sanitary sewer system. These standards apply to both public and private sanitary sewer and to sanitary service sewer laterals.

The Standard Spec includes design criteria and standard construction details and can be viewed online at *http://www.cityofmadison.com/business/pw/specs.cfm*

II. Design and Permitting

The Engineering Division's Sewer and Drainage Section (S&D) is responsible for the design and permitting of all City sanitary and stormwater infrastructure. The S&D Section employs twelve engineers, seven of whom are registered Professional Engineers and performs the majority of sewer design work in-house. This includes projects constructed through the City's Public Works contracting process and those constructed by private developers.

A. Public Works Contracts

Each year the City's Capital Improvement Program (CIP) includes funds to provide sewer improvements and additions. The major project focus areas are listed below:

- Replacement of aging sewers that are difficult to maintain, nearing the end of their service life, have a significant repair cost and/or are undersized. This includes replacement of all six-inch mains under streets that are being reconstructed.
- Subsidizing replacement of the portion of their private sewer lateral located within the public right-of-way in conjunction with sewer replacement projects.
- Infiltration & inflow improvements.
- Trenchless Sewer Rehabilitation to rehabilitate failing sewers that meet certain criteria but do not necessitate the need for a complete replacement by means of open cutting.
- Additions to the collection system to facilitate new development.

S&D Engineers are responsible for designing these projects to comply with established standards. Engineers work closely with Operations staff to ensure that sewers are built with

operations and maintenance in mind. A particular focus is placed on making structures accessible for maintenance. The City has an annual project to address existing access issues.

B. Private Development

New subdivision development and infill redevelopment projects are required to comply with the Madison Comprehensive Plan which regulates land use within the City. As part of the application process the Engineering Division determines if the existing sanitary sewer has adequate capacity to handle the additional flow to be generated by the proposed development.

The developer is responsible for installing new sanitary sewer to serve the new subdivision or redevelopment. All sewers must be designed and installed per the City of Madison Standard Specifications for Public Works Construction. The City of Madison Engineering Division either reviews the developer's plans and specifications to ensure compliance with these requirements or designs the sewer system at the developer's cost.

Sewer installation is performed by the developer's contractor which must be prequalified by the City to perform sanitary sewer installation work.

III. Inspection and Testing

The Engineering Construction Inspection Section performs inspection of construction activities to ensure compliance with contract plans, specifications and other requirements. Construction inspection also includes all sewer connections to the City's collection system.

Inspectors are responsible for ensuring that the project is installed as designed and resolving any constructability issues that may arise during the project as well as overseeing all required testing. Inspectors are also responsible for taking measurements and record information to be used to determine quantities for partial and final payments and creation of "as built" drawings of completed construction projects.

Testing specific to each system component is described in the following sections.

A. Sanitary Sewer Gravity Main

Pipe is inspected upon delivery to the site. Any pipe found to have cracks, flaws, or other defects is rejected.

All gravity sanitary sewers are required to pass a leakage test, mandrel test and inspection by a closed circuit internal television system prior to acceptance by the City.

Leakage Test

The leakage test may be either a water infiltration test or a low-pressure air test. This method is not used for testing mains with active laterals as the system is not closed.

Mandrel Test

At the request of the Engineer, pipe 8-inches and larger are tested for acceptance with an approved go/no-go mandrel not less than thirty (30) days after the pipe has been installed, the backfill compacted, and other underground utilities within close proximity (such as water main) have been installed and backfilled but before paving is constructed. For acceptance, the mandrel must pass through the entire section between sewer access structures in one pass when pulled by hand without the use of excessive force.

Closed Circuit Internal Television System

The City performs CCTV inspection of all sanitary sewer mains prior to acceptance. In the event defects in the sewer are detected by the closed circuit television inspection, the Contractor shall correct such defects prior to acceptance and final payment for sewers completed.

B. Sanitary Sewer Force Main

All completed sections of force main are hydrostatically field tested for exfiltration of water.

C. Sewer Access Structures

Sewer access structures are individually tested for infiltration when directed by the Engineer. The rate of infiltration shall not exceed two hundred (200) gallons per day per mile of vertical height (wall only) per inch internal diameter (or maximum horizontal dimension of structure).

D. Trenchless Rehabilitation

Engineering Operations staff are responsible for inspecting CIPP installations. Staff overseeing and performing these inspections have completed NASSCO's Inspector Training and Certification Program (ITCP).

Following installation, samples from each inversion are collected by the inspector and sent to an independent lab for testing.

The Contractor is also required to perform a detailed closed-circuit television inspection in accordance with NAASCO's Pipeline Assessment and Certification Program (PACP) standards, after installation of the CIPP liner and reconnection and grouting of the service connections. PACP certified staff in the Operations Section review each video prior to acceptance to verify that the finished liner is continuous over the entire length of the installation and free of significant visual defects, damage, deflection, holes, leaks and other defects; that there is no infiltration of groundwater observed; and that all live service connections entrances are accounted for and unobstructed.

IV. Records Updates

As-built surveys were performed by Engineering Technology staff. This data in combination with structural observations included in the CCTV survey provide highly accurate data for mapping of new sanitary sewer assets. The process of manually creating these assets in GIS is labor-intensive and the lag between an asset being installed and placed in use and being available in GIS for establishing preventive maintenance schedules as well as responding to emergency calls was problematic. In response the City established a goal of sanitary sewer records being available in GIS within 90 days of installation.

In 2018 we converted from MicroStation to Autodesk products for design and from Integraph to Arc products for GIS. Since then, we have been able to automate the conversion of project design CAD files to GIS to create sanitary sewer assets with an “as designed” status. This process makes records available earlier for operations.

7. SSO EMERGENCY OVERFLOW RESPONSE PLAN

I. AUTHORITY

The City of Madison Sanitary Sewer Overflow Emergency Response Plan (SSOERP) is prepared pursuant to Wisconsin Department of Natural Resource permit # WI-0047341- 06-0, to facilitate proper incident response and reporting.

It is the policy of the City of Madison Engineering Division to prevent the bypassing or overflowing of wastewater from the public sewerage system to the environment. Prevention of bypasses or overflows of wastewater shall be considered an emergency, and the available resources of the City of Madison shall be employed to diminish the potential of, or to mitigate an actual bypass or overflow event.

Our goal is to “not spill a drop”.

II. GENERAL

The term "sanitary sewer overflow" (SSO), as used in this permit, means a discharge of sewage to waters of the state or to the land surface from a sanitary sewage collection system prior to the point the collection system enters the wastewater treatment facility. SSO’s include discharges from collection systems that occur on or run onto private property, except it does not include basement or building back-ups. SSO’s could occur from permanently installed overflow structures or pipes that automatically or manually allow a discharge of wastewater, and from other discharge locations such as broken sewers, dislodged manhole covers caused by sewer surcharges, or portable pumps used to relieve excess flow in the sewage collection system.

Prompt response is essential to ensure that the adverse effects of an SSO on public health, water quality and customer service of any such overflow are minimized. The City of Madison Sanitary Sewer Overflow Emergency Response Plan (SSOERP) is designed to ensure that every report of a sewer overflow is investigated, and the appropriate emergency response crews are dispatched immediately.

The SSOERP further includes provisions to ensure compliance with the WDNR notification and reporting requirements.

A. Objectives

The primary objectives of the SSOERP are to:

- Protect public health and the environment.

- Satisfy regulatory agencies and waste discharge permit conditions which address procedures for managing sewer overflows.
- Minimize the risk of enforcement actions against the City of Madison.

Additional objectives of the SSOERP are to:

- Protect the City's wastewater collection system and system personnel.
- Protect private and public property beyond the collection system.
- Provide appropriate customer service.

B. Organization of Sanitary Sewer Overflow Response Plan

The key elements of the SSOERP are addressed individually as follows:

- Section III - Overflow Response Procedure
- Section IV - Public Notification Procedure
- Section V - Regulatory Agency Notification Procedure
- Section VI - Distribution and Maintenance of SSOERP

III. OVERFLOW RESPONSE PROCEDURE

The overflow response procedure presents a strategy for the City of Madison to mobilize emergency response crews, materials, tools and equipment to correct or repair any condition, which may cause or contribute to an unpermitted discharge. The plan considers a wide range of potential system failures that could create an overflow to surface waters, land or buildings.

A. Receipt of Information Regarding a Sanitary Sewer Overflow

The City of Madison Engineering Division's Operations Section has primary responsibility for receiving reports of possible sanitary sewer overflows. The Division maintains a 24-hour emergency telephone number to receive calls reporting such occurrences. This line is attended by the Engineering Operations Staff during regular business hours (Monday through Friday, 6:30 AM to 4:30 PM). After hours calls are answered by the City of Madison Water Utility 24 Hour Operator.

Upon receipt of a call reporting a sanitary sewer overflow the dispatcher shall collect the following information:

1. Time and date of call.
2. Specific location.
3. Description of problem.
4. Caller's name and phone number;

5. Other relevant information that will enable the emergency response crews, if required, to quickly locate, assess and stop the overflow.

The dispatcher shall relay the information by radio to the emergency crew nearest to the overflow location. If the call is received during regular business hours the dispatcher shall also notify an Engineering Operations supervisor.

If the call is received after regular business hours the Water Utility shall notify the Emergency Response Crew (ERC) by radio. If the ERC confirms an overflow the Sewer and Drainage Technician leading the crew shall contact the Engineering On-Call Supervisor directly to notify him/her of the SSO.

In addition to reports from the public, Engineering personnel may detect an SSO in the course of their regular duties. In these instances the SSO shall be reported immediately to the Engineering dispatcher. The protocol established above for data collection and response shall apply.

B. Dispatch of Appropriate Crews to Site of Sanitary Sewer Overflow

Failure of any element within the wastewater collection system that threatens to cause or causes an SSO shall trigger an immediate response to isolate and correct the problem. Emergency crews and equipment are available 24 hours per day and shall be dispatched to any site of a reported SSO immediately.

Dispatcher Responsibilities

- Upon receipt of a reported SSO the dispatcher shall contact the nearest emergency crew by radio and relay the information collected from the caller.
- The dispatcher shall also notify an Engineering Operations supervisor (EOS). The dispatcher shall provide the EOS with the information collected from the caller and inform him/her as to which crew has been dispatched and their estimated time of arrival at the site.
- The dispatcher shall ensure that the entire message has been received and acknowledged by each crew dispatched to the SSO. All standard communications procedures shall be followed. All employees being dispatched to the site of an SSO shall proceed immediately to the site of the overflow. Any delays or conflicts in assignments must be immediately reported to the EOS for resolution.

Emergency Response Crew(s) Responsibilities

- The first emergency response crew responding to the SSO shall report their findings to an EOS.

- Emergency response crews shall use discretion in assisting property owner(s)/occupant(s) as reasonably as they can. Crews shall not enter private property unless directed to by a supervisor.

Engineering Operations Supervisor Responsibilities

- Upon receiving confirmation of an SSO from the ERC, an Engineering Operations supervisor shall notify:
  - Logan Prichard of the Madison Dane County Public Health Department by telephone (608) 999-0268 (Cell), (608) 243-0357 PHMDC Office, or (608) 267-3913 (PHMDC 24 Hour Emergency Line).
  - Ashley Brechlin of the Wisconsin Department of Natural Resources by telephone at (608) 438-9930 or email at ashley.brechlin@wisconsin.gov providing as much information as is available at the time. The City Engineer, Deputy Division Manager, and the Principal Engineer in charge of the Sewer Section.
- An Engineering Operations supervisor shall communicate with the responding crew to determine what additional resources are required and have those resources deployed to the SSO site. The EOC shall remain in contact with the responding crew until the SSO is resolved.

NOTE: For SSO events occurring outside of regular business hours the Engineering On-Call Supervisor shall assume EOS responsibilities.

C. Overflow Containment, Correction and Clean Up

This section describes actions to be performed by the City of Madison emergency response crew during an SSO. The objectives of these actions are:

- To protect public health, environment and property from sanitary sewer overflows and restore surrounding area back to normal as soon as possible.
- To establish perimeters and control zones with appropriate traffic control measures, vehicles or use of natural topography (e.g., hills, berms).
- To promptly notify the WDNR and MDCPHD with preliminary overflow information and potential impacts.
- To contain the sewer overflow to the maximum extent possible including preventing the discharge of sewage into surface waters.
- To minimize the City of Madison exposure to regulatory agency action.

1. Responsibilities Upon Arrival

It is the responsibility of the first personnel who arrive at the site of a sewer overflow to

protect the health and safety of the public by mitigating the impact of the overflow to the extent possible. Should the overflow not be the responsibility of the City of Madison but there is imminent danger to public health, public property, or to the quality of waters of the U.S., then prudent emergency action should be taken until the responsible party assumes responsibility and takes appropriate action.

Emergency Response Crew(s) Responsibilities

- Determine the cause of the overflow (e.g. sewer line blockage, pump station mechanical or electrical failure, sewer line break, etc.)
- Take immediate steps to stop the overflow (e.g. relieve pipeline blockage, pump and haul wastewater, manually operate pump station controls, repair pipe, etc.)
- Extraordinary steps may be considered where overflows from private property threaten public health and safety (e.g., an overflow running off private property into the public right-of-way.)

Engineering Operations Supervisor Responsibilities

- Notify Dane County Madison Public Health, Wisconsin Department of Natural Resources, and designated Engineering Division management.
- Provide all necessary field supervision and relay pertinent information to all personnel as they arrive at the SSO site.
- Identify and request, if necessary, additional personnel, materials, supplies, equipment and/or to assist in the determination of its cause, correct the cause and/or minimize the impact of the overflow.
- Make an initial assessment of possible damage to private and public property.
- Take still photographs and/or video footage of the outdoor area of the sewer overflow and impacted area in order to thoroughly document the nature and extent of impacts.

Engineering Division Management

- Ensure that provisions of this overflow response plan and other directives are met.

Coordination with Hazardous Materials Response Team

- Upon arrival at the scene of a sewer overflow, should a suspicious substance or odor not common to the sewer system be detected, the response crew should

immediately contact an Engineering Operations supervisor for guidance before taking further action.

- Should the EOS determine the need to alert the hazardous material response team, the crew shall await the arrival of the Fire Department to take over the scene.
- Upon arrival of the Fire Department, the crew shall take direction from the person with the lead authority of that team. Only when that authority determines it is safe and appropriate shall Engineering personnel proceed under the SORP with the containment, clean-up activities and correction.

2. Initial Measures for Containment

Initial measures to contain the overflow shall include, but not be limited to:

- Immediate steps to contain the overflow (e.g., block or bag storm drains, recover through vacuum truck, divert into downstream manhole, etc.)
- Determining the immediate destination of the overflow (e.g. storm drain, street curb gutter, body of water, creek bed, etc.) and implementing measures to prevent the overflow from reaching surface waters.

The EOS shall ensure that the initial measures taken by the ERC are sufficient to contain the overflowing sewage and recover sewage that has already been discharged, minimizing impact to public health or the environment.

Additional Measures Under Potentially Prolonged Overflow Conditions

In the event of a prolonged sewer line blockage or a sewer line collapse, a determination may be made to set up a portable by-pass pumping operation around the obstruction. If so, continuous or periodic monitoring of the by-pass pumping operation shall be implemented as required. Appropriate measures shall be taken to determine the proper size and number of pumps required to effectively handle the sewage flow.

3. Clean-Up

The overflow site shall be secured to prevent contact by members of the public until the site has been thoroughly cleaned. Posting, if required, should be undertaken pursuant to Section IV.

Sewer overflow sites shall be thoroughly cleaned after an overflow with readily identifiable residue (e.g., sewage solids, papers, rags, plastics, rubber products) remaining. Where practical, the area shall be thoroughly flushed and cleaned of any sewage or wash-down water. Where appropriate, the overflow site shall be disinfected

and deodorized. Solids and debris shall be flushed, swept, raked, picked-up, and transported for disposal in accordance with applicable regulations and policies.

Where sewage has discharged into a body of water that may contain fish or other aquatic life, the Wisconsin Department of Natural Resources shall be contacted for specific instructions.

D. Sanitary Sewer Overflow Report

The SSO Notification Summary Report (WDNR Form 3400-184 rev. 07/17) contains the information required by the WDNR.

The Principal Engineer in charge of the Sewer Section is responsible for submitting the completed SS) Notification form to the Wisconsin DNR via the WDNR Switchboard as soon as possible but no later than 5 days of the SSO.

The Principal Engineering is also responsible for ensuring that the Overflow Report is provided to the City Engineer, Deputy Division Manager, and Utilities Services Supervisor are provided a copy of the SSO report. It is very important to obtain all possible information regarding the SSO in order to provide accurate reports to the WDNR. Information collected regarding the sewer overflow should include the following:

- Determination as to whether the sewer overflow did or did not reach surface waters
- Determination of the start time of the sewer overflow by one of the following methods:
  - Date and time information received and/or reported to have begun and later substantiated by the emergency response crew or the EOS
  - Visual observation
- Determination of the stop time of the sewer overflow by one of the following methods:
  - When the blockage is cleared or flow is controlled or contained; or
  - The arrival time of the sewer investigator or response crew, if the overflow stopped between the time it was reported and the time of arrival.
- Determination of the rate and volume of the sewer overflow in gallons per minute (GPM) by one of the following criteria:
  - Direct observations of the overflow; or
  - Measurement of actual overflow from the sewer main.
  - When the rate of overflow is known, the volume of the overflow shall be determined by multiplying the duration of the overflow by the overflow rate.
  - When the rate of overflow is not known, investigate the surrounding area for evidence of ponding or other indications of overflow volume.
- Photographs of the event, when possible.
- Assessment of any damage to the exterior areas of public/private property.

E. Customer Satisfaction

Under Wisconsin law, the City of Madison has no legal liability for damages caused by a sewer backup, unless it fails to reasonably conduct inspections of the main line or fails to remove an obstruction in the main upon receiving notice of the obstruction.

Regardless, it is in the City's interest to ensure that residents are protected from the potential health risks associated with exposure to raw sewage.

IV. PUBLIC ADVISORY PROCEDURE

The City shall notify the public of any SSO promptly following any SSO occurrence. This section describes the actions the City of Madison shall take, in cooperation with the Wisconsin Department of Natural Resources and the Madison Dane County Public Health Department, to limit public access to areas potentially impacted by unpermitted discharges of pollutants to surface water bodies from the wastewater collection system.

A. Temporary Signage

The MDCPHD has primary responsibility for determining when to post notices of polluted surface water bodies or ground surfaces that result from uncontrolled wastewater discharges. The postings do not necessarily prohibit use of recreational areas, unless posted otherwise, but provide a warning of potential public health risks due to sewage contamination.

B. Press Release

The City shall notify the public of any SSO by means of a press release posted to the City's website and distributed to known local media outlets. Sample text for such press release is provided below:

The City of Madison had a discharge of untreated wastewater from its (collection system component i.e. lift station, sewer main, etc.) located at (address) of approximately (X) gallons. The discharge occurred on (date and time) for approximately (X) hours. The untreated wastewater was contained and did not enter our surface waters. Crews (specify action taken, i.e. blockage removed, pipe repaired, et.) to prevent further discharge. This notice is provided in compliance with the Wisconsin Department of Natural Resources Administrative Code and the City of Madison's Capacity, Maintenance, Operations & Management (CMOM) Program. For more information contact (Name, phone, email).

V. REGULATORY AGENCY NOTIFICATION & REPORTING

The Regulatory Agency Notification Plan establishes procedures that the City of Madison shall follow to provide formal notice to the Wisconsin Department of Natural Resources (WDNR) as necessary in the event of an SSO. The City shall report all sanitary sewer overflows as follows:

A. Notification within 24 Hours

The City shall notify Ashley Brechlin of the Wisconsin Department of Natural Resources by telephone at (608) 438-9930 or email at ashley.brechlin@wisconsin.gov as soon as practicable, but no later than 24 hours from the time the City becomes aware of the overflow.

B. Report within 5 Days

The City shall, no later than five days from the time the permittee becomes aware of a SSO, provide to the DNR the information identified in this paragraph using DNR form number 3400-184. If a SSO lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow.

A copy of form 3400-184 rev. 11/13 for reporting SSO's is available in F:\Encommon\On Call Supervisor\SOPs\Sanitary Sewer Overflow or online at https://dnr.wi.gov/topic/Wastewater/documents/3400-184.pdf. As indicated on the form, additional information may be submitted to supplement the information required by the form. The completed SSO Notification form shall be submitted to the Wisconsin DNR via the WNDR Switchboard as soon as possible but no later than 5 days of the SSO.

The following information shall be included in the report, in accordance with the numbered items in s. NR 210.21 (4) (b), Wis. Adm. Code:

1) The date and location of the overflow.
2) The surface water to which the discharge occurred, if any.
3) The duration of the overflow and an estimate of the volume of the overflow. Note: The duration of the overflow equals the estimated time when the overflow began and stopped when sewage may have discharged and is not the same as the length of time precipitation occurred. The volume of all overflow discharges shall be reported as a numerical value (do not report "unknown"). The potential overflow volume may be calculated knowing the flow capacity of the sewer and the overflow duration.
4) A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe.
5) The estimated date and time when the overflow began and stopped or will be stopped.
6) The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information. *Note: If the SSO is associated with wet weather event, provide data on the amount and duration of the rainfall or snow melt for each separate event.*
7) Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps.
8) A description of the actual or potential for human exposure and contact with the wastewater from the overflow.

9) Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps.
10) To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the SSO and were within the same area of the sewage collection system as the SSO.
11) The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available under sub. (1), including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow. SSO's can be demonstrated as unavoidable by showing that the discharge meets each of criteria a. through d. below:
    a) The discharge resulted from a temporary, exceptional incident that was either:
        i) Necessary to prevent loss of life, personal injury, or severe property damage.
        ii) Beyond the reasonable control of the operator. Incidents beyond the reasonable control of the operator would include:
            (1) Exceptional acts of nature.
            (2) Third party actions that could not be reasonably prevented, including vandalism that could not be avoided by reasonable measures.
            (3) Blockages that could not be avoided by reasonable measures.
            (4) Unforeseeable sudden structural, mechanical or electrical failure that could not be avoided by reasonable measures.
    b) The discharge had no feasible alternative.
    c) The discharge was not caused by any of the following:
        i) Operational Error
        ii) Improperly designed or constructed collection system facilities
        iii) Inadequate collection system facilities or components
        iv) The lack of appropriate preventive maintenances
        v) Careless or improper oversight
    d) Steps to stop the discharge, address the source of the problem, and mitigate potential impacts form the discharge were taken as soon as possible after becoming aware of the release.

The completed report shall be signed by the City Engineer. The completed, signed form shall be scanned and emailed to Thomas Meronek - Wisconsin Department of Natural Resources at ashley.brechlin@wisconsin.gov.

A copy of this report shall also be provided to downstream municipal sanitary sewer system owner(s), if any, and to Todd Gebert, MMSD at toddg@madsewer.org.

An annual summary of all City sanitary bypasses and overflows must be submitted to the WDNR as part of the City's annual Capacity, Management Annual Report no later than June 30th of each year. This report shall be submitted online at the site designated by the WDNR.

VI. MAINTENANCE OF SSOERP

The SSOERP shall be reviewed annually and amended as appropriate to ensure that it remains current.

VII. ABBREVIATIONS

SSOERP means Sanitary Sewer Overflow Emergency Response Plan

SSO means Sanitary Sewer Overflow

WDNR means Wisconsin Department of Natural Resources

MMSD means Madison Metropolitan Sewerage District

MDCPHD means Madison Dane County Public Health Department

ERC means Emergency Response Crew

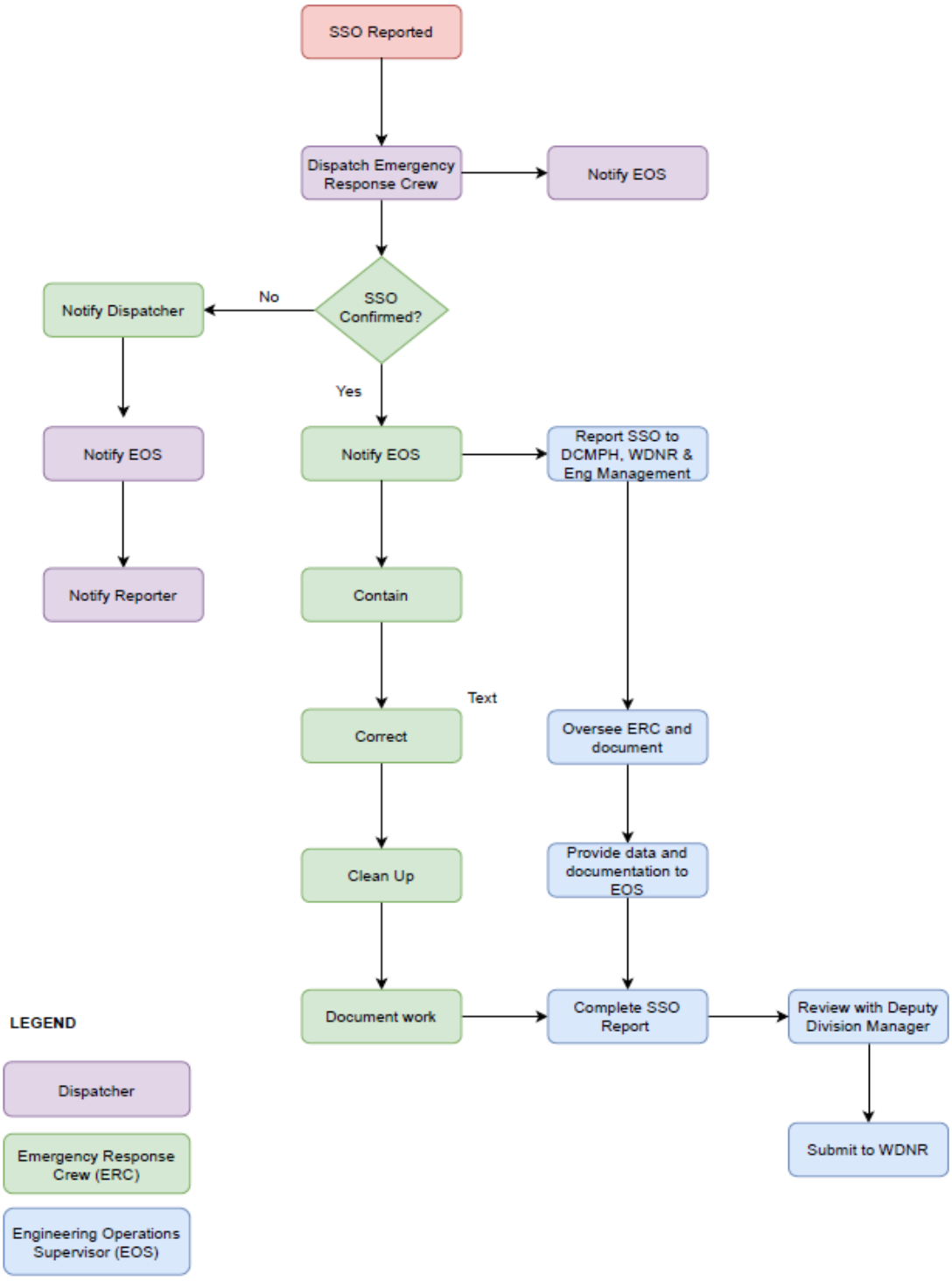
EOS means Engineering Operations Supervisor

VIII. APPENDIX

A. Sanitary Sewer Overflow Response Tracking Protocol Flowchart

Appendix A – SSO Response Flow Chart

Sanitary Sewer Overflow Response Process



8. CAPACITY ASSURANCE PLANNING

I. Background

Capacity assurance planning is fundamental to the CMOM approach. NR 210.23 of the Wisconsin Administrative Code requires that satellite system operators ensure that the sewage collection system provides adequate capacity to convey all peak design flows. A program to periodically assess the capacity of the sewage collection system is required of all permit holders.

A CMOM Program includes an assessment of the adequacy of the collection system to convey wastewater for new connections. It also reviews the system's current flow to identify problem areas along with appropriate short-term (i.e. increased scheduled cleaning, repairs, etc.) and long-term (i.e. lining, replacement, rerouting, etc.) measures to maximize flow capacity.

II. Current Capacity

The City of Madison collection system currently has adequate capacity to convey all peak design flows. The system is able to reliably convey sewage to the treatment plant during both dry and wet weather events and has no areas with chronic basement back-ups or sanitary sewer overflows. We use a peaking factor of 4.0 when designing local sewers and 3.0 for interceptor sewers and larger lift stations.

While the system does have a few areas with flat sewers (less than prescribed design slope) they are not problematic as maintenance frequency can be increased on a case-by-case basis. We also have several "siphons" that work reasonably well but also require more frequent maintenance. Surcharging issues, bottlenecks or constrictions that hinder system performance are not a factor. There are no sewers or manholes with severe corrosion issues. There are no known sewers with severe defects that affect flow capacity. There are no lift station capacity or pumping issues.

The City's CCTV inspection, preventive maintenance cleaning, and repair programs are designed to ensure that the system's flow capacity is maximized. Lines with a history of excess debris, solids or grease accumulation and/or heavy root growth are cleaned at an increased frequency.

A. Flow Modeling

Currently, flow calculations for specific basins are performed based on a variety of theoretical and observed conditions. These include population, acreage, water consumption, wet weather peaking factors, flow depths, flow monitoring, etc.

The City is currently developing a flow model for the downtown/campus area to analyze the collection system hydraulics, master planning and/or collection system rehabilitation and replacement optimization.

B. Flow Monitoring

The City does not have any permanent flow meters in its pumping stations. Each of the 59 pumps is equipped with an elapsed time meters. Pump run time is monitored by MMSD, with data readily available.

The City performs flow monitoring on an as needed basis. It has five (5) portable ISCO 2150 area velocity flow monitors and bands for pipes ranging from 8" to 48" in diameter. Flow monitors are equipped to provide remote data retrieval and alarms via cellular network. Data is stored and available for viewing and analysis in Flowlink.

III. Planning for Growth

The City of Madison's sanitary sewer system continues to experience significant growth. Over the next 40 years it is projected to add approximately 100,000 new residents and 70,000 new jobs and the City's sanitary sewer system will need to accommodate the anticipated demand.

The primary areas of growth are projected to be on the City's northeast and southwest sides as well as high-density residential development projects on the Isthmus.

A. Comprehensive plan

In 1999 the Wisconsin Legislature passed comprehensive planning legislation commonly referred to as "Smart Growth". This legislation requires Wisconsin municipalities to adopt a comprehensive plan as 20-year a guide for future development and redevelopment and for future land use decisions to be consistent with the adopted plan.

The City of Madison Common Council adopted its first comprehensive plan in 2006. In 2018 the City adopted the "Imagine Madison" Comprehensive Plan. The Plan and annual program updates can be viewed at https://www.cityofmadison.com/dpced/planning/comprehensive-plan/3894/. The Plan prioritizes the City's values and specifies strategies for achieving them. The Plan is intended to provide a framework and guide the City's long-term investments.

Typically, development on the periphery of the City will attach to or require construction of a new regional interceptor sewer of MMSD. Therefore, ultimate capacity is closely coordinated with MMSD at the time the new areas are brought into the Central Urban Service Area, the first step in making the areas eligible for sewer service and growth.

B. New Connections and Extensions

The Sewer Utility provides for extensions of the public sanitary wastewater system as the City grows and develops along its boundaries. Typically, the sewers are designed or approved by the City Engineer and

constructed by the Developer under the inspection of the City Engineer. Upon successful completion, the City accepts ownership of the new sewer. The design or approval of the proposed sewer will include a determination of adequate wastewater conveyance capacity to accommodate the proposed development and / or redevelopment.

Some of the more noteworthy recent development and redevelopment related studies include the City's continued monitoring of wastewater flow levels in the City's two areas with the highest amount of population growth: downtown campus area and E. Washington Corridor East of the capitol up to the Yahara River.

Overall, the City's key mainline sewer on Frances St., Broom St. and E. Washington Ave. continue to operate at acceptable levels with residual capacity for continued population growth. Some of the smaller tributaries within basins have required sewer replacements because the sewer mains are undersized for the new development.

The most recent development that required sewer upgrades in the downtown campus area was 327 W. Gorham St. This is a 1,142-bedroom apartment development that required 2 blocks (549 ft) of 8" diameter sewer main on N. Broom St. being replaced with a 15" diameter sewer main.

The E. Washington corridor has a development under construction at 306 S. Paterson St./ 838 Williamson St. which resulted in sewer upgrades being necessary. This 232- bedroom development resulted in 1,048 ft of 10" diameter sewer main needing to be replaced with a 15" diameter sewer main.

IV. Inflow and Infiltration

The City's collection system is currently able to manage peak wet weather flows. Typically, we observe high pumping run times at pumping stations in low lying areas. These wet weather flow increases do not typically result in sanitary sewer overflows or basement sewer backups.

High I/I can result in SSOs and the inability to provide the level of service and capacity for its customers. As such I/I reduction is a high priority for the MSU's long range planning.

A. Identifying sources of I&I

The City has an on-going inspection program to identify areas experiencing I/I. The City performs field investigations, such as CCTV inspection, flow monitoring and smoke testing to identify inflow and infiltration.

These investigations are typically based on high flows/pump run times reported by MMSD, resident complaints and staff or consultant recommendations. Data from these field investigations is used to enhance O&M programs and to provide repair, rehabilitation and replacement recommendations.

B. Quantifying I&I

It is difficult to provide an accurate projection of how much clear water is infiltrating into the City of Madison's sanitary sewer system. On average the City conveys 23 MGD per day to MMSD's Nine Springs WWTP. This represents approximately 60% of MMSD's daily flow.

The MMSD Collection System Evaluation dated 2005 compared satellite systems' wastewater generation to water sales. The study calculated a wastewater to water sales ratio for satellite systems. A ratio greater than 1.0 was cited as an indicator of an I&I problem. In 2024 the City of Madison generated 9.19 billion gallons of wastewater while the Madison Water Utility billed for 7.92 billion gallons. The resultant rate of Wastewater to Water Sales for Madison was 1.16.

While this data indicates there is an I&I problem it is not possible to quantify how much is from the MSU system verses MMSD. MMSD does not use monitors to calculate the MSU's wastewater volume. Rather, it deducts all other customers' flows from the total flow at the treatment plant and then attributes the balance to the MSU. As such it is probable that the MSU is being billed for I&I from MMSD interceptors.

C. Areas with I&I

The City has Inflow/ Infiltration (I/I) studies underway in basins where we have observed wastewater pump run time spikes during rain events or in the days following rain events. The City has identified 3 areas of interest: Hargrove/Johns Street area, Truax Airport, and Midtown Pumping Station) where we have historically observed high pump run times during wet weather events. Pump run time and flow monitoring data combined CCTV inspection have been used to identify issues in these areas and develop strategies for reducing I/I. Point repairs, open-cut and trenchless are being to remedy isolated defects. Replacement and manhole-to-manhole lining are used to address mains with numerous defects.

A summary of these areas with progress to date is provided below:

- **Mid-Town Lift Station Basin**

  The Mid-Town basin which is less than 20 years old continues to experience higher pump run times during rain events. We have raised, wrapped manholes, grouted holes showing signs of I/I in manholes located off pavement. CCTV has not identified the source of I/I in the main. In 2024, 12 structures in the low lying main greenway adjacent to the ponds were exposed and wrapped.

- **Johns Street/Hargrove Area**

  In 2012 high run times at MMSD's Johns Street Pumping Station (Pump Station #6) and basement sewer backups during wet weather events prompted the City to perform a flow monitoring study and extensive televising of the sanitary sewers in this area.

Since the initial 2012 study on the Hargrove/Johns St. Area, 49,135 LF of mains have been replaced, upsized, or lined in the Hargrove/Johns area. Private sewer laterals are replaced as part of the street reconstruction projects.

- **Truax Area**

Inflow/ Infiltration studies were conducted in the Truax Airport Lift Station both in 2004 and 2015. Since then, 14,385 of sewer main has been replaced or lined. In addition, 19 structures have been lined.

The 3 basins have shown reduction in I/I but we are still seeing spikes after rain events with pump run times reaching 155% of the normal flow in Hargrove/ Johns, 184% in Truax Airport Basin, and 175% in Mid-Town Pumping Station. The City plans to continue to make improvements and monitor in these 3 basins going forward.

Future studies and recommendations will be undertaken as the Sewer Utility's budget warrants. The Madison Sewer Utility will continue to prioritize studies and engineering projects in flood-prone areas based on input received by City residents during the planning process.

D. Current Initiatives to Reduce I&I

The City continues to address I/I reduction through its maintenance, rehab and reconstruction programs. The following annual projects to reduce I&I are included in the City's Capital Improvement Program:

- Replacement of Existing Sewers with Reconstructed Streets: This project involves the replacement of older, problematic sewers in coordination with the City's Street Reconstruction and Pavement Management Program or as 'stand-alone' projects. Typically this provides for the replacement of clay sewers that are difficult to maintain, nearing the end of their service life, have a significant repair costs, or are undersized. Virtually all 6" diameter sewer is automatically replaced if within the limits of a street reconstruction or street resurfacing project. Also, the Sewer Utility encourages residents to replace the portion of their sewer lateral that lies within the public right-of-way by offering to fund 75% of the cost if done with the street project.
- Trenchless Rehabilitation of Existing Sewers: This project provides for the lining of 9 miles of sanitary sewer each year using Cured-in-Place Pipe (CIPP). Lining is used to address infiltration issues as well as extend the useful life of existing mains. Pipes targeted for CIPP rehab include those located within areas that will address inflow and infiltration problems, where clear water flow enters the sewer system, reducing pipe capacity and increasing treatment costs. Mains in areas with problematic access are also systematically improved to allow better access for periodic maintenance and repair.

- Replacement of “Pin-Type” Castings: This program provides for inventorying and replacing castings which have an open hole lid with our current, standard casting which has a gasketed, locking lid.
- Continue to review flows during wet weather events to reduce I/I. Problems during wet weather events and SSOs are analyzed to determine the root cause of these problems.
- Continuous enforcement of ordinances to ensure that I/I is reduced.

E. Wet Weather Relief Points or Overflow Structures

The system has no wet weather relief points or overflow structures.

F. Sewer Evaluation and Capacity Assurance Plan

Currently, the City is not required to have a sewer evaluation and capacity assurance plan (SECAP). If capacity in the sewer system becomes a problem, DNR may require a SECAP. If required to have a SECAP, then the DNR may require additional monitoring requirements, reduction of I/I, and expansion of the existing collection system or treatment plant.

The City will continue to evaluate the system and implement on-going and recommended CMOM programs to ensure that a SECAP is not required.

9. SELF-EVALUATION

I. Background

Periodic review and evaluation of any program is an essential step in determining if the programs goals and objectives are being achieved. CMOM audit activities are intended to evaluate program implementation and effectiveness and correct any deficiencies in the CMOM program. The MSU's audit plan is described in the following sections.

II. Monitoring

On an annual basis the CMOM Work Team will be responsible for monitoring activities to provide for the following:

- Verify compliance with all WPDES permit requirements
- Review program goals and objectives and progress towards meeting
- Update and review performance metrics and trend analysis to measure program effectiveness
- Identify any deficiencies and recommend steps to be taken to resolve

III. Reporting

A. Annual CMOM Program Report

An annual report will be issued to update stakeholders on the MSU's CMOM Program activities.

B. Capacity Management Annual Report

The MSU will complete and submit Capacity Management Annual Report (CMAR) to Wisconsin DNR no later than June 30th of each year.

IV. CMOM Plan Updates

The CMOM Plan will be updated to incorporate applicable recommendations for the program and performance metrics based on monitoring and audit findings.

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