

Section 3 – Operational Assessment

Asset management helps wastewater utilities identify resources, optimize operations, improve communications and plan for future needs. Within this section you will find a CMOM (*Capacity, Management, Operations, and Maintenance*) Checklist and additional information on the implementation of the Asset Management Form.

Exhibit 3.1 - Understanding a CMOM Program

What is CMOM?

Purpose of a CMOM

How to use

Exhibit 3.2 - Asset Management Form

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Sewer Use Ordinance

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Training

Safety

Customer Service

Equipment & Collection System Maintenance

Equipment Parts Inventory

Management Information System

Mapping

Inspections

Cleanings

Manhole Inspection and Assessment

Pump Stations Assessment

Capacity Assessment

Tracking Sanitary Sewer Overflows

Overflow Emergency Response Plan

Smoke and Dye Testing

Hydrogen Sulfide Monitoring and Control

Infrastructure Security



About the CMOM Program Self Assessment Checklist

Introduction

A sanitary sewer collection system is a vital element of any community's infrastructure and a critical component of the wastewater treatment process. The nation's sanitary sewer infrastructure has been built over the last 100 years or more using a variety of materials, design standards, installation techniques, and maintenance practices. As this valuable infrastructure ages, the importance of preventive and predictive maintenance increases.

What is CMOM?

CMOM stands for "capacity, management, operations, and maintenance." It is a flexible, dynamic framework for municipalities to identify and incorporate widely-accepted wastewater industry practices to:

- Better manage, operate, and maintain collection systems
- Investigate capacity constrained areas of the collection system
- Respond to sanitary sewer overflow (SSO) events

The CMOM approach helps municipal wastewater utility operators provide a high level of service to customers and reduce regulatory noncompliance. CMOM can help utilities optimize use of human and material resources by shifting maintenance activities from "reactive" to "predictive"—often leading to cost savings through avoided overtime, emergency construction costs, increased insurance premiums, and the possibility of lawsuits. CMOM information and documentation can also help improve communications with the public, other municipal works and regional planning organizations, and regulators.

In CMOM planning, the utility selects performance goal targets, and designs CMOM activities to meet the goals. The CMOM planning framework covers operation and maintenance (O&M) planning, capacity assessment and assurance, capital improvement planning, and financial management planning. Information collection and management practices are used to track how well each CMOM activity is meeting the performance goals, and whether overall system efficiency is improving. On an ongoing basis, activities are reviewed and adjusted to better meet the performance goals. As the CMOM program progresses, performance goals can change. For instance, an initial goal may be to develop a geographic information system (GIS) of the system. Once the GIS is complete, a new goal might be to use the GIS to track emergency calls and use the information to improve maintenance planning.

An important component of a successful CMOM program is to periodically collect information on current systems and activities and develop a "snapshot-in-time" analysis. From this analysis, the utility establishes its performance goals and plans its CMOM program activities.

Additional information describing CMOM can be found at: www.epa.gov/npdes/ss0 or www.epa.gov/region4/water/wpeb/pdfs/self-audit_review2-3.pdf.

About this Checklist (Continued)

What is the purpose of the CMOM program checklist?

This document is a screening-level tool that can help utilities evaluate CMOM programs and identify general areas of strength and weakness. Completing this CMOM assessment will allow the utility to flag CMOM program areas that need improvement and establish priorities for additional, more detailed assessments. In addition, the checklist will allow the utility to compare annual performance (e.g., percent of employees meeting training standards).

This document is not intended to be all-inclusive. It addresses the types of practices EPA believes should be considered by most utilities when implementing a CMOM program. However, the ways in which utilities use the information gathered through the checklist will depend on the complexity and site-specific issues facing individual collection systems. When reviewing the questions, utilities should use their judgment to determine if the question is reasonable for their collection system size and design.

How do I use this checklist?

The questions on the checklist will request answers in three different formats:

- Check yes, no, or not applicable (NA),
- Fill in the blank, and
- Check all that apply.

At the end of each section, additional space is provided to allow for comments on or explanations of the answers recorded (information that will be useful to the utility in follow-on planning). Each utility should make an effort to answer all the questions that are applicable to its system. If a particular question takes a significant amount of time to answer, this could be an indication of an area of weakness. Utilities should plan to invest approximately one day to complete the checklist.

This document is designed to help utilities perform an initial evaluation of CMOM activities. **It is not intended to serve as an absolute indicator of a successful CMOM program, nor will all of the questions apply to every utility.** By working through these questions, utilities will be able to identify strengths and areas for improvements in their CMOM programs. If a utility has a significant number of “no” answers or very few items selected in the checklist, this could indicate an area of weakness. The utility manager then can make a more detailed evaluation, including identifying specific actions needed to address areas for improvement.

General Information

CHECKLIST COMPLETED BY:

Name _____

Date _____

Daytime Telephone Number _____

UTILITY CONTACT INFORMATION

Utility Name _____

LOCATION

Street Address _____

Street Address (continued) _____

City _____ State _____ Zip _____

STAFF

Name _____

Title _____

Email _____

Phone () - Fax () -

PERMITTED TREATMENT & COLLECTION FACILITIES

NPDES or STATE PERMIT #

PERMITTEE/CO-PERMITTEE/JURISDICTIONS

PERMIT COVERAGE

WWTP Effluent	Collection System	Wet-Weather Facility
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<input type="text"/>	_____
<input type="text"/>	_____
<input type="text"/>	_____
<input type="text"/>	_____
<input type="text"/>	_____
<input type="text"/>	_____

Collection System Description

SYSTEM INVENTORY

		<input type="text"/> NUMBER	# of Treatment facilities	Conveyance & Pumping		
Treatment Facilities	WWTP design capacity	<input type="text"/> MGD		Gravity Sewers	Force Mains	Pump Stations
	Average daily flow	<input type="text"/> MGD		<i>Pipes and pumps</i>		
	Average dry weather flow	<input type="text"/> MGD		Length/quantity		
Access & Maintenance				<i>Age of system</i>		
	Manholes	<input type="text"/> NUMBER		0 - 25 years old	<input type="text"/> % PERCENT	<input type="text"/> % PERCENT
	Number of air vacuum relief valves	<input type="text"/> NUMBER		26 - 50 years old	<input type="text"/> % PERCENT	<input type="text"/> % PERCENT
				51 - 75 years old	<input type="text"/> % PERCENT	<input type="text"/> % PERCENT
				>76 years old	<input type="text"/> % PERCENT	<input type="text"/> % PERCENT
				Number of inverted siphons _____		

SERVICE AREA CHARACTERISTICS

Service area	<input type="text"/> ACRES	<table border="1"> <tr> <th colspan="5">Number of Service Connections</th> </tr> <tr> <td>Residential</td> <td>Commercial</td> <td>Industrial</td> <td colspan="2">TOTAL</td> </tr> <tr> <td><input type="text"/> NUMBER</td> <td>+</td> <td><input type="text"/> NUMBER</td> <td>+</td> <td><input type="text"/> NUMBER</td> <td>=</td> <td><input type="text"/> NUMBER</td> </tr> </table>				Number of Service Connections					Residential	Commercial	Industrial	TOTAL		<input type="text"/> NUMBER	+	<input type="text"/> NUMBER	+	<input type="text"/> NUMBER	=	<input type="text"/> NUMBER
Number of Service Connections																						
Residential	Commercial					Industrial	TOTAL															
<input type="text"/> NUMBER	+	<input type="text"/> NUMBER	+	<input type="text"/> NUMBER	=	<input type="text"/> NUMBER																
Service population	<input type="text"/> PEOPLE																					
Annual precipitation	<input type="text"/> INCHES																					
Collection system service lateral responsibility (check one)																						
<input type="checkbox"/> At main line connection only		<input type="checkbox"/> Beyond property line/clean out																				
<input type="checkbox"/> From main line to property line or easement/cleanout		<input type="checkbox"/> Other: _____																				
Combined Sewer Systems																						
What percent of sewer system is served by combined sewers (i.e., sanitary sewage and storm water in the same pipe)?					<input type="text"/> % PERCENT																	

Collection System Description

	Gravity Sewers	Force Mains
PIPE DIAMETER		
8 inches or less	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
9 - 18 inches	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
19 - 36 inches	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
>36 inches	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
PIPE MATERIALS		
Prestressed concrete cylinder pipe (PCCP)	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
High density polyethylene (HDPE)	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Reinforced concrete pipe (RCP)	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Polyvinyl chloride (PVC)	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	N/A <small>PERCENT</small>
Vitrified clay pipe (VCP)	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	N/A <small>PERCENT</small>
Ductile iron	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Non-reinforced concrete pipe	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Asbestos cement pipe	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Cast iron	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Brick	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Fiberglass	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>
Other (<i>Explain</i>) _____	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>	<input style="width: 50px; height: 20px; border: 1px solid black;" type="text" value="%"/> <small>PERCENT</small>

Engineering Design (ED)

ED-01	Is there a document which includes design criteria and standard construction details?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-02	Is there a document that describes the procedures that the utility follows in construction design review?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-03	Are WWTP and O&M staff involved in the design review process?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-04	Is there a procedure for testing and inspecting new or rehabilitated system elements both during and after the construction is completed?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-05	Are construction sites supervised by qualified personnel (such as professional engineers or certified engineering technicians) to ascertain that the construction is taking place in accordance with the agreed upon plans and specifications?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-06	Are new manholes tested for inflow and infiltration?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-07	Are new gravity sewers checked using closed circuit TV inspection?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-08	Does the utility have documentation on private service lateral design and inspection standards?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
ED-09	Does the utility attempt to standardize equipment and sewer system components?	<input type="checkbox"/> YES	<input type="checkbox"/> NO

Satellite Communities and Sewer Use Ordinance (SUO)

SUO-01 Does the utility receive flow from satellite communities? IF NO, GO TO PAGE 6 YES NO

SUO-02 What is the total area from satellite communities that contribute flow to the collection system? (*Acres or square miles*) _____

SUO-03 Does the utility require satellite communities to enter into an agreement? IF NO, GO TO QUESTION SUO-06. YES NO

SUO-04 Does the agreement include the requirements listed in the sewer use ordinance (SUO)? YES NO

SUO-05 Do the agreements have a date of termination and allow for renewal under different terms? YES NO

SUO-06 Does the utility maintain the legal authority to control the maximum flow introduced into the collection system from satellite communities? YES NO

SUO-07 Are standards, inspections, and approval for new connections clearly documented in a SUO? YES NO

SUO-08 Does the SUO require satellite communities to adopt the same industrial and commercial regulator discharge limits as the utility? YES NO

SUO-09 Does the SUO require satellite communities to adopt the same inspection and sampling schedules as required by the pretreatment ordinance? YES NO

SUO-10 Does the SUO require that satellite communities or the utility to issue control permits for significant industrial users? YES NO

SUO-11 Does the SUO contain provisions for addressing overstrength wastewater from satellite communities? YES NO

SUO-12 Does the SUO contain procedures for the following? (*Check all that apply*)

Inspection standards Pretreatment requirements Building/sewer permit issues

SUO-13 Does the SUO contain general prohibitions of the following materials? (*Check all that apply*)

Fire and explosions hazards Corrosive materials Obstructive materials

Oils or petroleum Material which may cause interference at the wastewater treatment plant

SUO-14 Does the SUO contain procedures and enforcement actions for the following? (*Check all that apply*)

Fats, oils, and grease (FOG) Storm water connections to sanitary lines (downspouts)

Infiltration and inflow Defects in service laterals located on private property

Building structures over the sewer lines Sump pumps, air conditioner connections

Organizational Structure (OC)

OC-01 Is an organizational chart available that shows the overall personnel structure for the utility, including operation and maintenance staff? YES NO

OC-02 Are up-to-date job descriptions available that delineate responsibilities and authority for each position? YES NO

OC-03 Are the following items discussed in the job descriptions? *(Check all that apply)*

<input type="checkbox"/> Nature of work to be performed	<input type="checkbox"/> Examples of the types of work
<input type="checkbox"/> Minimum requirements for the position	<input type="checkbox"/> List of licenses required for the position
<input type="checkbox"/> Necessary special qualifications or certifications	<input type="checkbox"/> Performance measures or promotion potential

OC-04 What percent of staff positions are currently vacant? _____ %

OC-05 On average how long do positions remain vacant? *(months)* _____

OC-06 What percent of utility work is contracted out? _____ %

Internal Communications (IC)

IC-01 Which of the following methods are used to communicate with utility staff? (*Check all that apply*)

Regular meetings

Bulletin boards

E-mail

Other (walkie talkie/pager)

IC-02 How often are staff meetings held? (*e.g., Daily, Weekly, Monthly, etc.*) _____

IC-03 Are incentives offered to employees for performance improvements?

YES

NO

IC-04 Does the utility have an “Employee of the Month/Quarter/Year” program?

YES

NO

IC-05 How often are performance reviews conducted? (*e.g. Semi-annually, Annually, etc.*) _____

IC-06 Does the utility regularly communicate/coordinate with other municipal departments?

YES

NO

Budgeting (BUD)

BUD-01	What is the average annual fee for residential users?	\$ _____
BUD-02	How often are user charges evaluated and adjusted? (<i>e.g. annually, biannually, etc.</i>)	_____
BUD-03	Are utility-generated funds used for non-utility programs?	<input type="checkbox"/> YES <input type="checkbox"/> NO
BUD-04	Are costs for collection system operation and maintenance (O&M) separated from other utility services such as water, storm water, and treatment plants? IF NO, GO TO QUESTION BUD-07.	<input type="checkbox"/> YES <input type="checkbox"/> NO
BUD-05	What is your average annual (O&M) budget?	\$ _____
BUD-06	What percentage of the utility's overall budget is allocated to maintenance of the collection system?	_____ %
BUD-07	Does the utility have a Capital Improvement Plan (CIP) that provides for system repairs/replacements on a prioritized basis?	<input type="checkbox"/> YES <input type="checkbox"/> NO
BUD-08	What is your average annual CIP budget?	\$ _____
BUD-09	What percentage of the maintenance budget is allotted to the following maintenance?	
	Predictive maintenance (tracking design, life span, and scheduled parts replacements)	_____ %
	Preventive maintenance (identifying and fixing system weaknesses which, if left unaddressed, could lead to overflows)	_____ %
	Corrective maintenance (fixing system components that are functioning but not at 100% capacity/efficiency; for example partially blocked lines)	_____ %
	Emergency maintenance (reactive maintenance, overflows, equipment breakdowns)	_____ %
BUD-10	Does the utility have a budgeted program for the replacement of under-capacity pipes?	<input type="checkbox"/> YES <input type="checkbox"/> NO
BUD-11	Does the utility have a budgeted program for the replacement of over-capacity pipes?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Training (TR)

- TR-01 Does the utility have a formal job knowledge, skills, and abilities (KSA) training program? YES NO
- TR-02 Does the training program address the fundamental mission, goals, and policies of the utility? YES NO
- TR-03 Does the utility have mandatory training requirements identified for key employees? YES NO

TR-04 What percentage of employees met or exceeded their annual training goals during the past year? _____ %

- TR-05 Does the utility provide training in the following areas? *(Check all that apply)*
- | | | |
|---|---|--|
| <input type="checkbox"/> Safety | <input type="checkbox"/> Traffic control | <input type="checkbox"/> Public relations |
| <input type="checkbox"/> Routine line maintenance | <input type="checkbox"/> Record keeping | <input type="checkbox"/> SSO/Emergency response |
| <input type="checkbox"/> Confined space entry | <input type="checkbox"/> Electrical and instrumentation | <input type="checkbox"/> Pump station operations and maintenance |
| <input type="checkbox"/> Other | <input type="checkbox"/> Pipe repair | <input type="checkbox"/> CCTV and trench/shoring |
| | <input type="checkbox"/> Bursting CIPP | |

- TR-06 Are operator and maintenance certification programs used? IF NO, GO TO QUESTION TR-08 YES NO
- TR-07 Are operator and maintenance certification programs required? YES NO
- TR-08 Is on-the-job training progress and performance measured? YES NO

TR-09 Which of the following methods are used to assess the effectiveness of the training? *(Check all that apply)*

None Periodic testing Drills Demonstrations

TR-10 What percentage of the training offered by the utility is in the form of the following?

Manufacturer training _____ %	In-house classroom training _____ %
On-the-job training _____ %	Industry-wide training _____ %

Safety (SAF)

- SAF-01 Does the utility have a written safety policy? YES NO
- SAF-02 How often are safety procedures reviewed and revised? (*e.g. Semiannually, Annually, etc.*) YES NO
- SAF-03 Does the utility have a safety committee? YES NO
- SAF-04 Are regular safety meetings held with the utility employees? YES NO
- SAF-05 Does the utility have a safety training program? YES NO
- SAF-06 Are records of employee safety training kept up to date? YES NO

- SAF-07 Does the utility have written procedures for the following? (*Check all that apply*)
- | | |
|---|---|
| <input type="checkbox"/> Lockout/tagout | <input type="checkbox"/> Biological hazards in wastewater |
| <input type="checkbox"/> Material safety data sheets (MSDS) | <input type="checkbox"/> Traffic control and work site safety |
| <input type="checkbox"/> Chemical handling | <input type="checkbox"/> Electrical and mechanical systems |
| <input type="checkbox"/> Confined spaces permit program | <input type="checkbox"/> Pneumatic and hydraulic systems safety |
| <input type="checkbox"/> Trenching and excavations safety | |

SAF-08 What is your agency's lost-time injury rate? _____ % or _____ hours

- SAF-09 Are the following equipment items available and in adequate supply? (*Check all that apply*)
- | | |
|--|--|
| <input type="checkbox"/> Rubber/disposable gloves | <input type="checkbox"/> Full body harness |
| <input type="checkbox"/> Confined space ventilation equipment | <input type="checkbox"/> Protective clothing |
| <input type="checkbox"/> Hard hats, safety glasses, rubber boots | <input type="checkbox"/> Traffic/public access control equipment |
| <input type="checkbox"/> Antibacterial soap and first aid kit | <input type="checkbox"/> 5-minute escape breathing devices |
| <input type="checkbox"/> Tripods or non-entry rescue equipment | <input type="checkbox"/> Life preservers for lagoons |
| <input type="checkbox"/> Fire extinguishers | <input type="checkbox"/> Safety buoy at activated sludge plants |
| <input type="checkbox"/> Equipment to enter manholes | <input type="checkbox"/> Fiberglass or wooden ladders for electrical work |
| <input type="checkbox"/> Portable crane/hoist | <input type="checkbox"/> Respirators and/or self contained breathing apparatus |
| <input type="checkbox"/> Atmospheric testing equipment and gas detectors | <input type="checkbox"/> Methane gas or optical vector (OVA) analyzer |
| <input type="checkbox"/> Oxygen sensors | <input type="checkbox"/> Lower explosion limit (LEL) metering |
| <input type="checkbox"/> H ₂ S Monitors | |

SAF-10 Are safety monitors clearly identified? YES NO

Customer Service (CS)

CS-01 Does the utility have a customer service and public relations program? IF NO GO TO QUESTION CS-03 YES NO

CS-02 Does the customer service program include giving formal presentations on the wastewater field to the following? *(Check all that apply)*

Schools and universities Local officials Media Building Inspector(s)

Community gatherings Businesses Citizens Public utility officials

CS-03 Are employees of the utility specifically trained in customer service? YES NO

CS-04 Are there sample correspondence, Q/A's, or "scripts" to help guide staff through written or oral responses to customers? YES NO

CS-05 What methods are used to notify the public of major construction or maintenance work? *(Check all that apply)*

Door hangers Newspaper Fliers Signs Other None

Public radio or T.V. announcements

CS-06 Is a homeowner notified prior to construction that his/her property may be affected? YES NO

CS-07 Do you provide information to residents on cleanup and safety procedures following basement backups and overflows from manholes when they occur? YES NO

CS-08 Does the utility have a customer service evaluation program to obtain feedback from the community? YES NO

CS-09 Do customer service records include the following information? *(Check all that apply)*

Personnel who received the complaint or request Name, address, and telephone number of customer

Nature of the complaint or request Location of the problem

To whom the follow-up action was assigned Date the follow up action was assigned

Date of the complaint or request Cause of the problem

Date the complaint or request was resolved Feedback to customer

Total days to end the problem

CS-10 Does the utility have a goal for how quickly customer complaints (or emergency calls) are resolved? IF NO, GO TO THE NEXT PAGE. YES NO

CS-11 What percentage of customer complaints (or emergency calls) are resolved within the timeline goals? _____ %

Equipment and Collection System Maintenance (ESM)

ESM-01 Is a maintenance card or record kept for each piece of mechanical equipment within the collection system? IF NO, GO TO QUESTION ESM-03. YES NO

ESM-02	Do equipment maintenance records include the following information? <i>(Check all that apply)</i>		
<input type="checkbox"/>	Maintenance recommendations	<input type="checkbox"/>	Maintenance schedule
<input type="checkbox"/>	Instructions on conducting the specific maintenance activity	<input type="checkbox"/>	A record of maintenance on the equipment to date
<input type="checkbox"/>	Other observations on the equipment		

ESM-03 Are dated tags used to show out-of-service equipment? YES NO

ESM-04 Is there an established system for prioritizing equipment maintenance needs? YES NO

ESM-05	What percent of repair funds are spent on emergency repairs?	_____ %
--------	--	---------

ESM-06 Are corrective repair work orders backlogged more than six months? YES NO

ESM-07 Do collection system personnel coordinate with state, county, and local personnel on repairs, before the street is paved? YES NO

Equipment Parts Inventory (EPI)

EPI-01	Have critical spare parts been identified?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-02	Are adequate supplies on hand to allow for two point repairs in any part of the system?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-03	Is there a parts standardization policy in place?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-04	Does the utility have a central location for storing spare parts?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-05	Does the utility maintain a stock of spare parts on its maintenance vehicles?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-06	Does the utility have a system in place to track and maintain an accurate inventory of spare parts?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EPI-07	For those parts which are not kept in inventory, does the utility have a readily available source or supplier?	<input type="checkbox"/> YES	<input type="checkbox"/> NO

Management Information System (MIS)

- MIS-01 Does the utility have a management information system (MIS) in place for tracking maintenance activities? *(Either electronic or good paper files)* IF NO, GO TO PAGE 15. YES NO
- MIS-02 Are the MIS records maintained for a period of at least three years? YES NO
- MIS-03 Is the MIS able to distinguish activities taken in response to an overflow event? YES NO

MIS-04 Are there written instructions for managing and tracking the following information? *(Check all that apply)*

<input type="checkbox"/> Complaint work orders	<input type="checkbox"/> Scheduled inspections	<input type="checkbox"/> Compliance/overflow tracking
<input type="checkbox"/> Scheduled work orders	<input type="checkbox"/> Sewer system inventory	<input type="checkbox"/> Equipment/tools tracking
<input type="checkbox"/> Customer service	<input type="checkbox"/> Safety incidents	<input type="checkbox"/> Parts inventory
<input type="checkbox"/> Scheduled preventive maintenance	<input type="checkbox"/> Scheduled monitoring/sampling	

MIS-05 Do the written instructions for tracking procedures include the following information? *(Check all that apply)*

<input type="checkbox"/> Accessing data and information	<input type="checkbox"/> Updating the MIS
<input type="checkbox"/> Instructions for using the tracking system	<input type="checkbox"/> Developing and printing reports

MIS-06 How often is the management information system updated? *(Check one)*

<input type="checkbox"/> Immediately	<input type="checkbox"/> Within one week of the “incident”
<input type="checkbox"/> Monthly	<input type="checkbox"/> As time permits

System Mapping (MAP)

MAP-01 Are “as built” plans (record drawings) or maps available for use by field crews in the office and in the field? YES NO

MAP-02 Is there a procedure for field crews to record changes or inaccuracies in the maps and update the mapping system? YES NO

MAP-03 Do the maps show the date the map was drafted and the date of the last revision? YES NO

MAP-04 Do the sewer line maps include the following? *(Check all that apply)*

<input type="checkbox"/> Scale	<input type="checkbox"/> Street names	<input type="checkbox"/> Pipe material
<input type="checkbox"/> North arrow	<input type="checkbox"/> SSOs occurrences/CSOs outfalls	<input type="checkbox"/> Pipe diameter
<input type="checkbox"/> Date the map was drafted	<input type="checkbox"/> Flow monitors	<input type="checkbox"/> Installation date
<input type="checkbox"/> Date of last revision	<input type="checkbox"/> Force mains	<input type="checkbox"/> Slope
<input type="checkbox"/> Service area boundaries	<input type="checkbox"/> Pump stations	<input type="checkbox"/> Manhole rim elevation
<input type="checkbox"/> Property lines	<input type="checkbox"/> Lined sewers	<input type="checkbox"/> Manhole coordinates
<input type="checkbox"/> Other landmarks (Roads, water bodies, etc.)	<input type="checkbox"/> Main, trunk, and interceptor sewers	<input type="checkbox"/> Manhole invert elevation
<input type="checkbox"/> Manhole and other access points	<input type="checkbox"/> Easement lines and dimensions	<input type="checkbox"/> Distance between manholes
<input type="checkbox"/> Location of building laterals		

MAP-05 Are the following sewer attributes recorded? *(Check all that apply)*

<input type="checkbox"/> Size	<input type="checkbox"/> Invert elevation	<input type="checkbox"/> Separate/combined sewer
<input type="checkbox"/> Shape	<input type="checkbox"/> Material	<input type="checkbox"/> Installation Date

MAP-06 Are the following manhole attributes recorded? *(Check all that apply)*

<input type="checkbox"/> Shape	<input type="checkbox"/> Depth	<input type="checkbox"/> Age
<input type="checkbox"/> Type (e.g., precast, cast in place, etc.)	<input type="checkbox"/> Material	

MAP-07 Is there a systematic numbering and identification method/system established to identify sewer system manhole, sewer lines, and other items (pump stations, etc.)? YES NO

Internal TV Inspection (TVI)

- TVI-01 Does the utility have a standardized pipeline condition assessment program? YES NO
- TVI-02 Is internal TV inspection used to perform condition assessment? IF NO, GO TO PAGE 17. YES NO
- TVI-03 Are there written operation procedures and guidelines for the internal TV inspection program? YES NO

TVI-04 Do the internal TV record logs include the following? *(Check all that apply)*

<input type="checkbox"/> Pipe size, type, length, and joint spacing	<input type="checkbox"/> Internal TV operator name
<input type="checkbox"/> Distance recorded by internal TV	<input type="checkbox"/> Cleanliness of the line
<input type="checkbox"/> Results of the internal TV inspection (including a structural rating)	<input type="checkbox"/> Location and identification of line being tele-vised by manholes

- TVI-05 Is a rating system used to determine the severity of the defects found during the inspection process? YES NO
- TVI-06 Is there documentation explaining the codes used for internal TV results reporting? YES NO

TVI-07 Approximately what percent of the total defects determined by TV inspection during the past 5 years were the following?

Failed coatings or linings _____ %	Line deflection _____ %
House connection leaks _____ %	Joint separation _____ %
Illegal connections _____ %	Crushed pipes _____ %
Pipe corrosion (H ₂ S) _____ %	Collapsed pipes _____ %
Fats, oil, and grease _____ %	Offset joints _____ %
Broken pipes _____ %	Root intrusions _____ %
Debris _____ %	Minor cracks _____ %
Other _____ %	

- TVI-08 Are main line and lateral repairs checked by internal TV inspection after the repair(s) have been made? YES NO

Sewer Cleaning (CLN)

CLN-01	What is the system cleaning frequency? (the entire system is cleaned every "X" years)	_____
CLN-02	What is the utility's plan for system cleaning (% or frequency in years)?	_____
CLN-03	What percent of the sewer lines are cleaned, even high/repeat cleaning trouble spots, during the past year?	_____ %
CLN-04	Is there a program to identify sewer line segments, with chronic problems, that should be cleaned on a more frequent schedule?	<input type="checkbox"/> YES <input type="checkbox"/> NO
CLN-05	Does the utility have a root control program?	<input type="checkbox"/> YES <input type="checkbox"/> NO
CLN-06	Does the utility have a fats, oils, and grease (FOG) program?	<input type="checkbox"/> YES <input type="checkbox"/> NO
CLN-07	What is the average number of stoppages experienced per mile of sewer pipe per year?	_____ %
CLN-08	Has the number of stoppages increased, decreased, or stayed the same over the past 5 years? <input type="checkbox"/> Increased <input type="checkbox"/> Decreased <input type="checkbox"/> Stayed the same	
CLN-09	Are stoppages plotted on maps and correlated with other data such as pipe size and material or location?	<input type="checkbox"/> YES <input type="checkbox"/> NO
CLN-10	Do the sewer cleaning records include the following information? <i>(Check all that apply)</i> <input type="checkbox"/> Date and time <input type="checkbox"/> Method of cleaning <input type="checkbox"/> Identity of cleaning crew <input type="checkbox"/> Cause of stoppage <input type="checkbox"/> Location of stoppage or routine cleaning activity <input type="checkbox"/> Further actions necessary/initiated	
CLN-11	If sewer cleaning is done by a contractor are videos taken of before and after cleaning?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Manhole Inspection and Assessment (MAN)

MAN-01 Does the utility have a routine manhole inspection and assessment program? IF NO, GO TO QUESTION MAN-06. YES NO

MAN-02 Are the results and observations from the routine manhole inspections recorded? YES NO

MAN-03 Does the utility have a goal for the number of manholes inspected annually? YES NO

MAN-04 How many manholes were inspected during the past year? _____

MAN-05 Do the records for manhole/pipe inspection include the following? *(Check all that apply)*

<input type="checkbox"/> Conditions of the frame and cover	<input type="checkbox"/> Presence of corrosion
<input type="checkbox"/> Evidence of surcharge	<input type="checkbox"/> If repair is necessary
<input type="checkbox"/> Offsets or misalignments	<input type="checkbox"/> Manhole identifying number/location
<input type="checkbox"/> Atmospheric hazards measurements (especially hydrogen sulfide)	<input type="checkbox"/> Wastewater flow characteristics (flowing freely or backed up)
<input type="checkbox"/> Details on the root cause of cracks or breaks in the manhole or pipe including blockages	<input type="checkbox"/> Accumulations of grease, debris, or grit
<input type="checkbox"/> Recording conditions of (corbel, walls, bench, trough, and pipe seals)	<input type="checkbox"/> Presence of infiltration, location, and estimated quantity
	<input type="checkbox"/> Inflow from manhole covers

MAN-06 Does the utility have a grouting program? YES NO

Pump Stations (PS)

PS-01	Are Standard Operation Procedures (SOPs) and Standard Maintenance Procedures (SMPs) used for each pump station?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-02	Are there enough trained personnel to properly maintain all pump stations?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-03	Is there an emergency operating procedure for each pump station?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-04	Is there an alarm system to notify personnel of pump station failures and overflow?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-05	Percent of pump stations with back up power sources	_____ %	
PS-06	Does the utility use the following methods when loss of power occurs? <i>(Check all that apply)</i> <input type="checkbox"/> On-site electrical generators <input type="checkbox"/> Portable electric generators <input type="checkbox"/> Alternate power source <input type="checkbox"/> Other <input type="checkbox"/> Vacuum trucks to bypass pump station		
PS-07	Is there a procedure for manipulating pump operations (manually or automatically) during wet weather to increase in-line storage of wet weather flows?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-08	Are wet well operating levels set to limit pump start/stops?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-09	Are the lead, lag, and backup pumps rotated regularly?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-10	Are operation logs maintained for all pump stations?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-11	Are the original manuals that contain the manufacturers recommended maintenance schedules for all pump station equipment easily available?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-12	On average, how often were pump stations inspected during the past year?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-13	Are records maintained for each inspection?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PS-14	Average annual labor hours spent on pump station inspection	_____	
PS-15	Percent of pump stations with pump capacity redundancy	_____ %	
PS-16	Percent of pump stations with dry weather capacity limitations	_____ %	
PS-17	Percent of pump stations with wet weather capacity limitations	_____ %	
PS-18	Percent of pump stations calibrated annually	_____ %	
PS-19	Percent of pump stations with permanent flow meters	_____ %	

Capacity Assessment (CA)

- CA-01 Does the utility have a flow monitoring program? YES NO
- CA-02 Does the utility have a comprehensive capacity assessment and planning program? YES NO
- CA-03 Are flows measured prior to allowing new connections? YES NO
- CA-04 Do you have a tool (hydraulic model, spreadsheet, etc.) for assessing whether adequate capacity exists in the sewer system? IF NO, GO TO QUESTION CA-06. YES NO
- CA-05 Does your capacity assessment tool produce results consistent with conditions observed in the system? YES NO

CA-06 What is the ratio of peak wet weather flow to average dry weather flow at the wastewater treatment plant? _____

CA-07 How many permanent flow meters are currently in the system? (Include meters at pump stations and wastewater treatment plants) _____

CA-08 How frequently are the flow meters checked? (e.g. Daily, Weekly, Monthly, etc.) _____

- CA-09 Do the flow meter checks include the following? (Check all that apply)
- Independent water level Velocity reading Downloading data
- Checking the desiccant Cleaning away debris Battery condition

- CA-10 Are records maintained for each inspection? IF NO, GO TO QUESTION CA-12. YES NO

- CA-11 Do the flow monitoring records include the following? (Check all that apply)
- Descriptive location of flow meter Frequency of flow meter inspection
- Type of flow meter Frequency of flow meter calibration

- CA-12 Does the utility maintain any rain gauges or have access to local rainfall data? YES NO
- CA-13 Does the utility have any wet weather capacity problems? YES NO
- CA-14 Are low points or flood-plain areas monitored during rain events? YES NO
- CA-15 Does the utility have any dry weather capacity problems? YES NO
- CA-16 Is flow monitoring used for billing purposes, capacity analysis, and/or inflow and infiltration investigations? YES NO

Tracking SSOs (TRK)

TRK-01 How many SSO events have been reported in the past 5 years? _____

TRK-02 What percent of the SSOs were less than 1,000 gallons in the past 5 years ? _____ %

TRK-03 Does the utility document and report all SSOs regardless of size? YES NO

TRK-04 Does the utility document basement backups? YES NO

TRK-05 Are there areas that experience frequent basement or street flooding? YES NO

TRK-06 Approximately what percent of SSOs discharges were from each of the following in the last 5 years?

Manholes _____ %	Main and trunk sewers _____ %	Structural bypasses _____ %
Pump stations _____ %	Lateral and branch sewers _____ %	

TRK-07 Approximately what percent of SSOs discharges were caused by the following in the last 5 years?

Debris buildup _____ %	Root intrusion _____ %	Excessive infiltration and inflow _____ %
Collapsed pipe _____ %	Capacity limitations _____ %	Fats, oil, and grease _____ %
Vandalism _____ %		

TRK-07A What percentage of SSOs were released to:

Soil _____ %	Basements _____ %	Paved area _____ %
Surface water (rivers/lakes/streams) _____ %	Coastal, ocean, beaches _____ %	

TRK-07B For surface water releases, what percent are to areas that could affect:

Contact recreation (beaches, swimming, areas) _____ %	Drinking water sources _____ %
Shellfish growing areas _____ %	

TRK-08 How many chronic SSO locations are in the collection system? _____

TRK-09 Are pipes with chronic SSOs being monitored for sufficient capacity and/or structural condition? YES NO

TRK-10 Prior to collapse, are structurally deteriorating pipelines being monitored for renewal or replacement? YES NO

Overflow Emergency Response Plan (OERP)

OERP-01 Does the utility have a documented OERP available for utility staff to use? IF NO, GO TO QUESTION OERP-04. YES NO

OERP-02 How often is the OERP reviewed and updated? (*Annually, Biannually, etc.*) _____

OERP-03 Are specific responsibilities detailed in the OERP for personnel who respond to emergencies? YES NO

OERP-04 Are staff continuously trained and drilled to respond to emergency situations? YES NO

OERP-05 Do work crews have immediate access to tools and equipment during emergencies? YES NO

OERP-06 Does the utility have standard procedures for notifying state agencies, local health departments, the NPDES authority, the public, and drinking water authorities of significant overflow events? YES NO

OERP-07 Does the procedure include a current list of the names, titles, phone numbers, and responsibilities of all personnel involved? YES NO

OERP-08 Does the utility have a public notification plan? YES NO

OERP-09 Does the utility have procedures to limit public access to and contact with areas affected with SSOs? (*Procedure can be delegated to another authority*) YES NO

OERP-10 Does the utility use containment techniques to protect the storm drainage systems? YES NO

OERP-11 Do the overflow records include the following information? (*Check all that apply*)

<input type="checkbox"/> Date and time	<input type="checkbox"/> Location	<input type="checkbox"/> Any remediation efforts
<input type="checkbox"/> Cause(s)	<input type="checkbox"/> How it was stopped	<input type="checkbox"/> Estimated flow/volume discharged
<input type="checkbox"/> Names of affected receiving water(s)	<input type="checkbox"/> Duration of overflow	

OERP-12 Does the utility have signage to keep public from effected area? YES NO

Smoke and Dye Testing (SDT)

SDT-01	Does the utility have a smoke testing program to identify sources of inflow and infiltration?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-01A	Does the utility have a smoke testing program to identify sources of inflow and infiltration in illegal connectors?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-01B	Does the utility have a smoke testing program to identify sources of inflow and infiltration in house laterals (private service laterals)?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-02	Are there written procedures for the frequency and schedule of smoke testing?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-03	Is there a documented procedure for isolating line segments?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-04	Is there a documented procedure for notifying local residents that smoke testing will be conducted in their area?	<input type="checkbox"/> YES	<input type="checkbox"/> NO

SDT-05	What is the guideline for the maximum amount of the line to be tested at one time? (Feet or Miles)	_____	
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SDT-06	Are there guidelines for the weather conditions under which smoke testing should be conducted?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-07	Does the utility have a goal for the percent of the system smoke tested each year?	<input type="checkbox"/> YES	<input type="checkbox"/> NO

SDT-08	What percent of the system has been smoke tested over the past year?	_____ %	
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SDT-09	Do the written records contain location, address, and description of the smoking element that produced a positive result?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-10	Does the utility have a dye testing program?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-11	Are there written procedures for dye testing?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SDT-12	Does the utility have a goal for the percent of the system dye tested each year?	<input type="checkbox"/> YES	<input type="checkbox"/> NO

SDT-13	What percent of the main collection system has been dye tested over the past year?	_____ %	
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SDT-14	Does the utility share smoke and dye testing equipment with another utility?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
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Hydrogen Sulfide Monitoring and Control (HSMC)

HSMC-01 How would you rate the systems vulnerability for hydrogen sulfide corrosion? *(Check only one)*

- Not a problem Only in a few isolated areas A major problem

HSCM-02 Does the utility have a corrosion control program? YES NO

HSCM-03 Does the utility take hydrogen sulfide corrosion into consideration when designing new or replacement sewers? YES NO

HSCM-04 Does the utility have written procedures for the application of chemical dosages? YES NO

HSCM-05 Are the chemical dosages, dates, and locations documented? YES NO

HSCM-06 Does the utility document where odor is a continual problem in the system? YES NO

HSCM-07 Does the utility have a program in place for renewing or replacing severely corroded sewer lines to prevent collapse? YES NO

HSCM-08 Are the following methods used for hydrogen sulfide control? *(Check all that apply)*

- | | | |
|---|--|---|
| <input type="checkbox"/> Aeration | <input type="checkbox"/> Chlorine | <input type="checkbox"/> Potassium permanganate |
| <input type="checkbox"/> Iron salts | <input type="checkbox"/> Sodium hydroxide | <input type="checkbox"/> Biofiltration |
| <input type="checkbox"/> Enzymes | <input type="checkbox"/> Hydrogen peroxide | <input type="checkbox"/> Other |
| <input type="checkbox"/> Activated charcoal canisters | | |

HSCM-09 Does the system contain air relief valves at the high points of the force main system? YES NO

HSCM-10 How often are the valves maintained and inspected? *(Weekly, Monthly, etc.)* _____

HSMC-11 Does the utility enforce pretreatment requirements? YES NO

Infrastructure Security

Although outside the scope of a CMOM program, municipal wastewater utilities should also consider security vulnerabilities. To reduce the threat of both intentional and natural disasters, the utility should take steps to implement appropriate countermeasures and develop or update emergency response plans.