Seattle Public Utilities

Capacity, Management, Operations and Maintenance Program

Program Roadmap 2016-2020

June 2016

CONTENTS

1. SPU's Wastewater Mission

Seattle Public Utilities' (SPU's) mission is to provide efficient and forward-looking utility services that keep Seattle the best place to live. The Drainage and Wastewater (DWW) Line of Business (LOB) helps SPU meet that mission by collecting and conveying wastewater[1] to a treatment plant in order to protect public health and the environment. Regulatory drivers include SPU's wastewater collection system National Pollutant Discharge Elimination System (NPDES) permit and the City's Consent Decree with the Washington State Department of Ecology (Ecology), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Justice (DOJ). Measures of success include the reduction of sewer overflows (SSOs) and combined sewer overflows (CSOs) and the prevention of dry weather overflows (DWOs).

2. What is CMOM?

SPU manages Seattle's wastewater collection system through two significant programs: the 1) Capacity, Management, Operations and Maintenance (CMOM) Program and the 2) Combined Sewer Overflow (CSO) Reduction Program. **The goal of these programs is to keep wastewater in the collection system and deliver it to a wastewater treatment plant.**

Sewer Overflow Terminology

Combined Sewer Overflow (CSO) - An overflow from one of SPU's CSO Outfalls that occurs as a result of rain.

Dry Weather Overflow (DWO) - An overflow from one of SPU's CSO Outfalls that occurs when it's not raining.

Sewer Overflow (SSO) - An overflow that occurs anywhere else in the sewer system, whether or not it's raining.

The CMOM Program focuses on the effective and continuous management, operation and maintenance of Seattle's collection system, including system rehabilitation and capacity. Responding to and proactively preventing sewer overflows (e.g., from maintenance holes, into basements) and dry weather overflows is a major element of the CMOM Program. The CSO Reduction Program focuses on reducing combined sewage discharges from SPU's permitted CSO outfalls to Seattle's waterways.

2.1 Strategies to Manage Seattle's Wastewater System

The DWW LOB employs several strategies to manage the wastewater collection system and reduce sewer overflows:

- Understand the system and its condition
- Maintain the system and its components
- Work with customers to manage inputs, connections and changes to the system
- Operate the system, monitor its performance and adapt in real time

[1] Wastewater is a comprehensive term including industrial waste, sewage and other unpolluted waters. In Seattle, wastewater is carried by a separated sanitary sewer system and a combined (wastewater and stormwater) sewer system.

- Plan ahead to address existing problems and anticipate future needs
- Renew and upgrade the system and its components

2.2 Program Focus and Vision

The CMOM Program has four focus areas for 2016-2020 that will improve maintenance and operations of the wastewater system. Those areas are:

- Enhance CMOM connectivity and coordination
- Increase efficiency and effectiveness in existing programs
- Build the sewer capacity program
- Strengthen the drainage business area

The vision, measures of success, and roadmap initiatives associated with each of these focus areas are identified in Table 1 (next page).

2.3 Program Management

The CMOM Program is managed by a program manager, an assistant program manager and a program management team that consists of key staff involved in the delivery of program elements (e.g., maintenance, system planning, capital project management, operations). The DWW LOB Management Team serves as the oversight body for the program.

A program charter defines the CMOM Program and its structure. The charter includes the program justification, vision, scope, organization, resources, stakeholders, roles and responsibilities, governance framework, change management process, and schedule. The charter is reviewed annually and updated as needed.

Program Roles and Responsibilities

During the CMOM roadmap update, SPU performed a detailed review of how the various divisions within SPU deliver the CMOM Program elements. Figure 1 provides a high level functional organization structure that identifies the key roles and responsibilities within and outside of the DWW LOB.

Key Program Values

Key values that guide the CMOM Program include:

- Promote employee engagement and ownership. Those responsible for the work are key members of each initiative team.
- Promote and look to advance equity in how services are provided.
- Apply asset management principles in our capital, maintenance, and operations work.
- Strive for continuous improvement and embrace performance measurement, feedback and learning.
- Perform work safely.
- Coordinate with King County. Wastewater generated within SPU's service area enters their system and treatment plant. As partners, SPU wants to solve problems and optimally manage wastewater in a manner that works for both organizations.

Table 1 - 2016-2020 CMOM Focus Areas and Associated Vision Statements, Measures of Success and Related Roadmap Initiatives

Focus Area	Vision for 2020+	Measures of Success[2]	Related Roadmap Initiatives
Overall	- Sustainable and reliable infrastructure system. - Eliminate sewer overflows.	- Decrease of 10% per year in sewer overflows	- All
	- Achieve and sustain compliance with the Consent Decree and other regulatory requirements.	- <4 sewer overflows/100 miles of pipe/year (based on 2 year average)	- All
Enhancing CMOM connectivity and coordination	- Well-organized and adequately resourced program (O&M and CIP) that adapts to changing needs and priorities and continuously improves.	- Adopted and implemented Program Management Plan - Adopted and annually reviewed Program Resource Plan ($/staff)	- Improve Program Management and Communication (C1) - Refine Performance reporting (C2) - Adaptively Manage Program Direction (C3) - Improve SOP Management (C4)
	- SPU staff have line-of-sight and understand how their work contributes to eliminating sewer overflows (SSOs and DWOs). They are empowered, supported, and proactively make improvements to their work.	- % of staff that can define CMOM, the program goal, and their contribution to it - Ability to influence change in their work	- Improve Program Management and Communication (C1) - Refine Performance reporting (C2) - Adaptively Manage Program Direction (C3) - Improve SOP Management (C4)

[2] These measures may be refined during the development of the Condition Assessment, Cleaning, and Sewer Renewal strategies.

Focus Area	Vision for 2020+	Measures of Success[2]	Related Roadmap Initiatives
	- Capital investment levels have been identified, balanced among needs, and implemented across the DWW LOB.	- CIP Allocations ($ and % of total CIP): • Pipe Assets • Pump Stations • Capacity	- Develop Renewal Strategy (E6) - Develop Wastewater Master Plan (CAP 3)
Increasing efficiency and effectiveness in existing programs	- Proactive and efficient asset renewal (pipes and pump stations) with an appropriate level of capital investment.	- Fewer structural failure-caused sewer overflows - Fewer emergency rehabilitation projects - Reduced cost ($) per foot of pipe rehabilitated - Reduced time to complete rehab projects - Increased project acceptance level (project quality measure)	- Develop Renewal Strategy (E6) - Develop Pump Station Condition Assessment (E7)
	- Complete condition assessment of all critical sewer pipes by 2019 and on track to complete condition assessment of all sewer pipes by 2026.	- Miles/% of system identified by: • Previously uninspected • Repeat inspection • Critical pipe	- Develop Condition Assessment Strategy (E2)
	- Improving management of fats, oils and grease (FOG) at food service establishments resulting in fewer sewer overflows caused by FOG. On track to complete full program re-development by 2033.	- % overflows due to FOG - Reduced grease entering the system (target <20% increase from current) - Reduced staff time spent on enforcement (target <10%) - Increase FSE FOG code requirement awareness (target >85%)	- Improve FOG Control at FSEs (E10)
	- Proactive and increased root treatment resulting in fewer sewer overflows due to roots and reduced need for sewer cleaning.	- ≥ 10 miles of pipe chemically treated annually by 2020 - % overflows due to roots	- Expand Chemical Root Control (E4)

Focus Area	Vision for 2020+	Measures of Success[2]	Related Roadmap Initiatives
	- On track for completing system-wide cleaning by 2022, while using more efficient cleaning and preventative maintenance protocols.	- % overflows due to FOG/roots/debris - Miles/% system cleaned by: • Previously uncleaned • Previously cleaned • Preventative • Predictive • Critical pipes - Crew efficiency measure	- Develop Cleaning Strategy (E3)
	- Field crews have the training, facilities, and equipment they need to perform efficiently given a growing city and traffic challenges.	- South Crew and Dewatering facilities operational - North Crew and Dewatering facilities in design	- Upgrade Crew Facilities (E5) - Other: Apprenticeship and Journey-level Program improvements
	- Increase in properly functioning side sewers via clear policies and customer engagement.	- Decrease in sewer back-up calls from our customers - # side sewer permits issued (also as % of customers)	- Increase Customer Side Sewer Education (E11) - Develop Side Sewer Assistance Approach (E12)
Building the sewer capacity program	- An adopted Wastewater Master Plan and Capacity Assessment account for development, climate change, and industry innovation; guide long-term wastewater system management; direct capacity investments; and inform sewer renewal needs.	- Level of service is defined - Priority wastewater policies are in place. - Capital funding has been allocated to fund master plan improvements.	- Prepare Wastewater Model (CAP1) - Develop Capacity Level of Service Policy (CAP 2) - Develop Wastewater Master Plan (CAP 3) - Develop I&I Management Policy (CAP 4)

Focus Area	Vision for 2020+	Measures of Success[2]	Related Roadmap Initiatives
Strengthening the drainage[3] business area	- Well-organized and adequately resourced program (O&M and CIP) that adapts to changing needs and priorities and continuously improves.	- Adopted and implemented Program Management Plan - Adopted and annually reviewed Program Resource Plan ($/staff)	- Assess drainage storage facilities (D1) - Develop drainage roadmap (D2)
	- SPU staff have line-of-sight and understand how their daily work contributes to flood reduction and protecting public health and the environment. They are empowered, supported, and proactively make improvements to their work.	- % of staff that can define the drainage program goals and their contribution to it - Ability to influence change in their work	- Assess drainage storage facilities (D1) - Develop drainage roadmap (D2)
	- An adopted Stormwater Master Plan accounts for development, climate change, and industry innovation; guides long-term wastewater system management; directs capacity investments; and informs drainage renewal needs. The plan is integrated with the Wastewater Master Plan.	- Level of service is defined - Priority stormwater policies are in place. - Capital funding has been allocated to fund master plan improvements	- Assess drainage storage facilities (D1) - Develop drainage roadmap (D2)

[3] In this document, “drainage” refers to SPU’s stormwater collection and conveyance system and related services, while “stormwater” refers to the flow within the system.

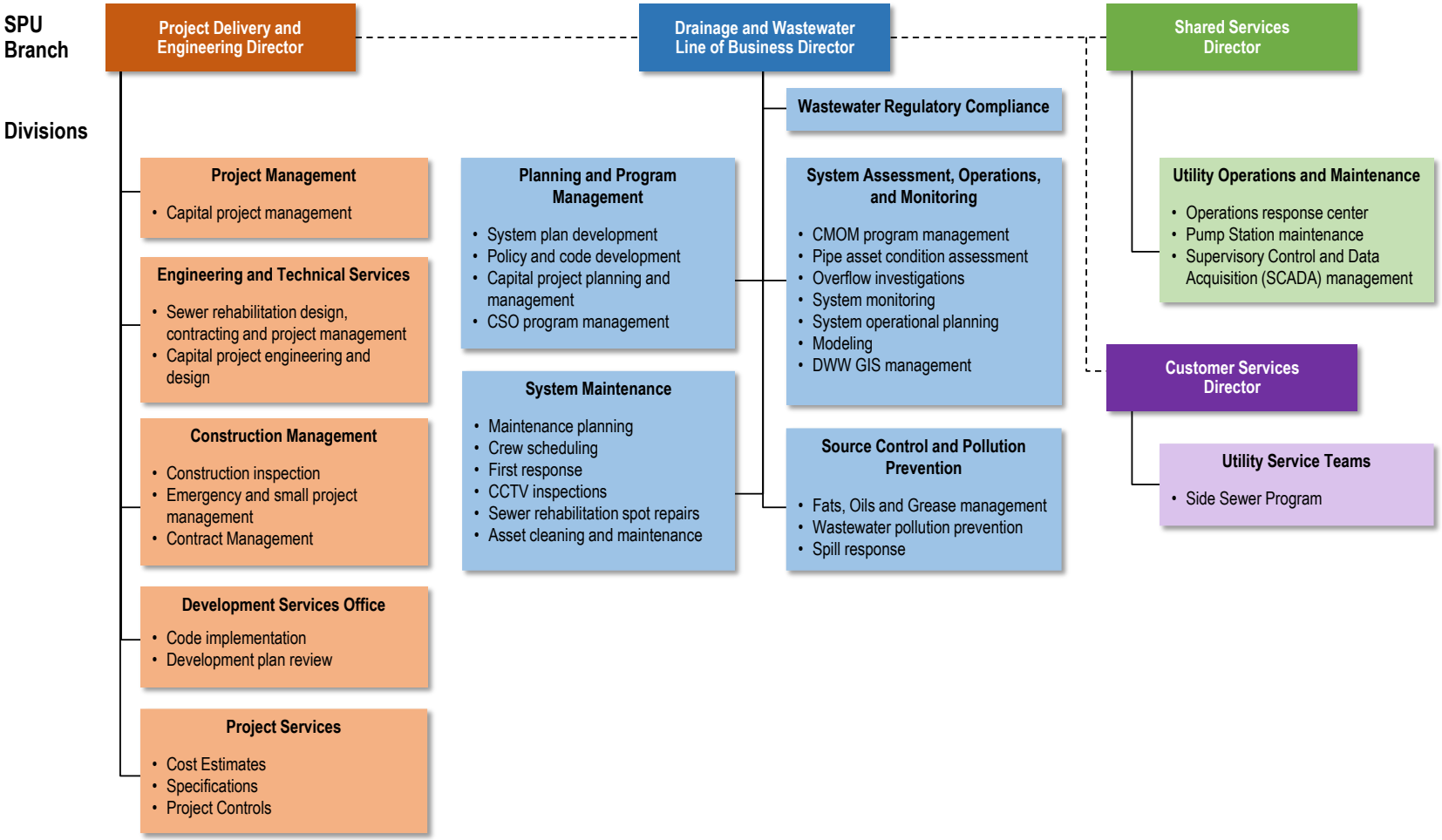


Figure 1 – High Level CMOM Roles and Responsibilities

3. Sewer Overflow Performance

Sewer overflow performance is a key measure in the CMOM program. SPU investigates and tracks the annual number of sewer overflows and calculates the two-year average performance for comparison to the Sewer Overflow Performance Threshold[4] (Figure 2). SPU is currently meeting our performance goal, however, sewer overflows increased in 2015. The desire is to see a 10% reduction in overflows each year.

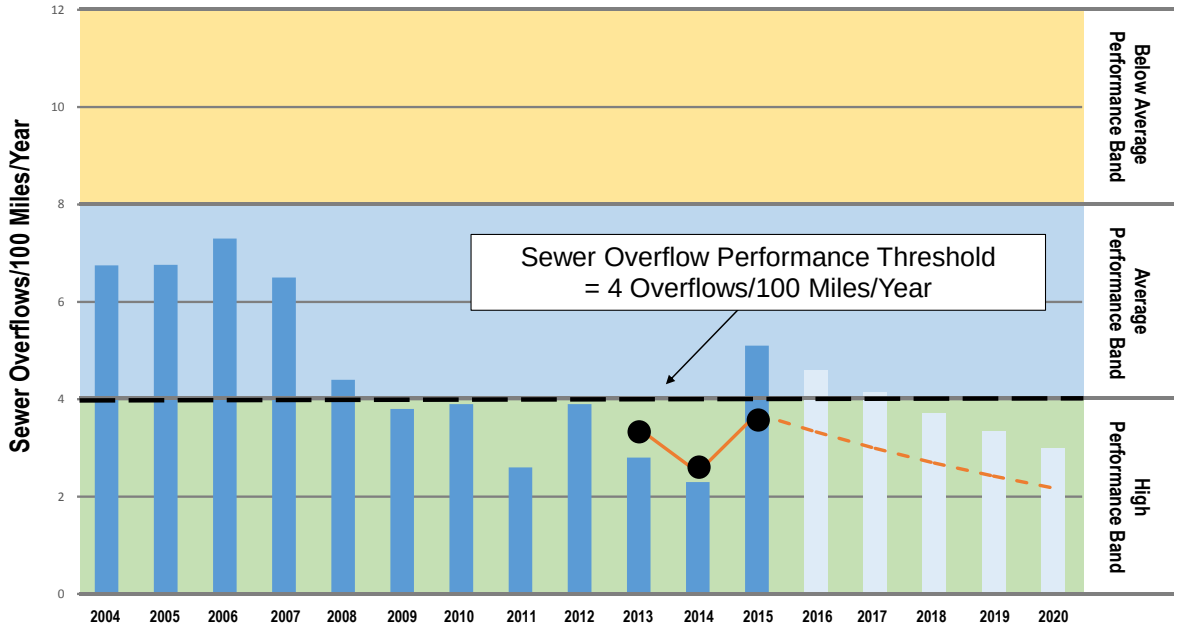


Figure 2 – SPU Sewer Overflow Performance - The bars illustrate the annual number of SPU-responsible sewer overflows. The dots represent the 2-year performance average (note that SPU's performance threshold has only been effective since 2013). The red line illustrates the performance trend. The desired 10% overflow reduction per year is represented by the clear bars and dashed line.

4. CMOM Program History

SPU's CMOM Program began in 2004 with a self-assessment, which compared SPU services and activities to EPA's guidance for a model program to prevent sewer overflows[5] (Figure 3). After an initial

[4] The sewer overflow performance bands and SPU's threshold is based on the performance of multiple wastewater utilities. The 2013 CMOM Performance Program Plan provides more information about the sewer overflow performance bands.

[5] https://www3.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf

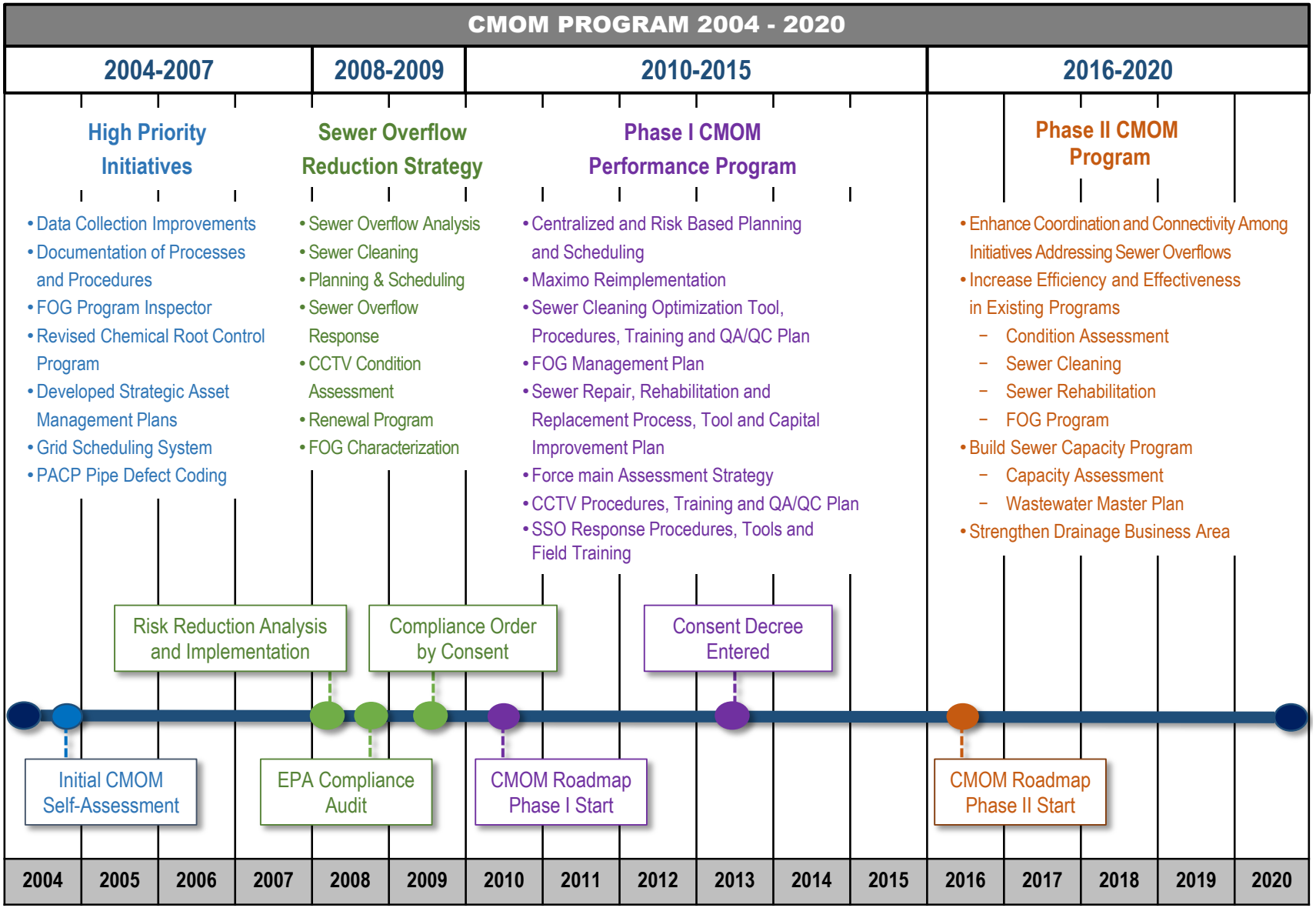


Figure 3 – Timeline Illustrating Major Regulatory Milestones and CMOM Program Activities

period of implementing high priority initiatives from the 2004 self-assessment, SPU began developing its first CMOM roadmap and regulatory strategy with a risk reduction analysis in 2008.

EPA also completed a compliance audit of SPU in 2008, which led to a compliance order between the City and EPA in 2009 and a Consent Decree entered into by the City, Ecology, the EPA, and the DOJ in 2013. Instead of dictating sewer cleaning, inspection, and rehabilitation frequencies and amounts, the Consent Decree allowed SPU to develop and implement an adaptively managed program, defined by a Performance Program Plan. With this approach, SPU has the authority to identify and direct CMOM-related activities, as long as SPU continues to meet the performance threshold of no more than 4 sewer overflows per 100 miles of pipe per year on a 2-year average basis. This non-prescriptive approach allows SPU to optimize its investments in CMOM to deliver the most benefit for the community and the environment.

The initial CMOM Roadmap and Performance Program Plan identified initiatives to be completed from 2010 to 2015. These initiatives improved maintenance planning and scheduling; sewer cleaning; Fats, Oils and Grease (FOG) Program management; sewer repair, replacement and rehabilitation; sewer condition assessment; and sewer overflow response. SPU has completed these initiatives, providing the opportunity to update the CMOM roadmap for the next five years.

SPU performed a second self-assessment in 2015. The self-assessment included a review of CMOM-related activities, staff interviews, identification of strengths and gaps, and development of initiatives to address important gaps. SPU has used the results of that assessment to develop this updated roadmap.

5. CMOM Roadmap

This roadmap identifies and sequences specific initiatives that SPU plans to undertake over the next five years to improve management of the wastewater collection system. The DWW LOB is committed to accomplishing these high-priority initiatives. The intended audience for this document is SPU employees, particularly those in the DWW LOB and involved in CMOM activities.

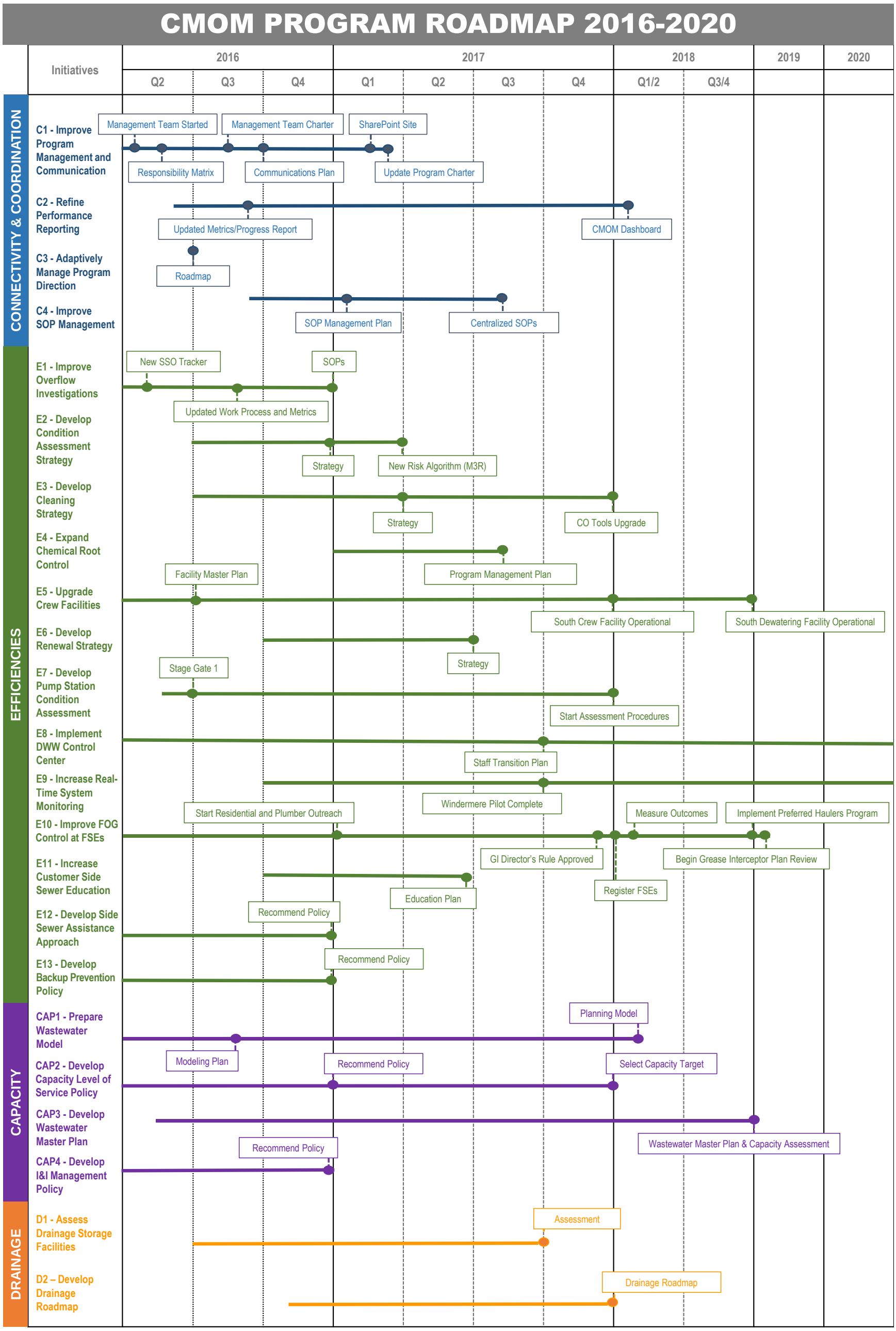
This roadmap is a living document. SPU adaptively manages its wastewater collection system and the CMOM Program. As such, SPU will track progress on the CMOM Program goals and roadmap initiatives as part of program management. Based on that information, SPU will review the roadmap annually and update it accordingly, as defined by the program charter.

5.1 Initiatives

The 2016-2020 roadmap identifies 23 initiatives. The Roadmap Graphic (Figure 4) illustrates all 23 initiatives, along with their key milestones and anticipated timelines grouped by the four focus areas:

- Connectivity and Coordination
- Efficiencies
- Capacity
- Drainage

The following sections describe each initiative. Each description includes the purpose, need for the initiative, level of effort and key elements. In addition to providing general information, the descriptions also serve as a starting point for project scoping that will be undertaken by various project teams. Appendix A identifies more specific staffing information for each initiative.



Note: Implementation is a key project phase that will occur for most initiatives. To keep the roadmap simple, implementation is not reflected here.

Figure 4 – CMOM Roadmap

Focus Area: Connectivity and Coordination

C1 - Improve Program Management and Communication

Project Purpose: Improve communication, management direction, and line-of-sight between day-to-day activities and sewer overflow reduction goals. Increase employee engagement and organizational commitment to the program and to eliminating sewer overflows.

Project Need: CMOM integrates many programs, projects, and day-to-day activities to accomplish sewer overflow reduction goals. Many people are involved and often take actions that have unintended or unknown "ripple effects" on others. In order to get work done, SPU also relies on a series of work groups that each perform a portion of the overall process. Coordination and communication are key to the CMOM Program functioning well. This initiative will increase communication about the purpose, staff responsibilities and progress of CMOM, as well as establish a strong mid-level management team to track progress, identify priorities, resolve issues, and address barriers and needs.

Current Condition/Practice: A broad range of SPU staff lacks a clear understanding of CMOM as a program. Many groups are involved in delivering on the CMOM Program activities, but they are not all connected to the program goals, or to others that rely on their work. Program leadership has been difficult to sustain given key staffing changes over the past few years.

Key Project Elements:

- Develop a CMOM Responsibility Matrix that identifies the work that is being done under the CMOM umbrella, broken out by program elements and the staff or work groups involved. Update the matrix as changes occur.
- Establish a CMOM Management Team of section managers and meet regularly. The role of the team is to identify CMOM priorities, discuss resourcing, troubleshoot issues, provide staff direction, resolve conflicts, and make program recommendations to the DWW LOB Management Team. Work includes establishing the team, developing a team charter, and meeting regularly. As part of this element, the team will also more fully define program governance and decision making authority.
- Establish and implement a program communication plan. This will include what information SPU will share with staff and how that information will be shared (tied to the C2 - Refine Performance Reporting initiative), for example, yearly SSO counts and causes. Provide regular (e.g., quarterly) updates to DWW LOB staff, hold informational sessions on major CMOM initiatives, and establish highly visible and accessible places for CMOM status information (e.g., SPU InWeb home page).
- Develop a CMOM SharePoint site. This is important to create a central place for staff to access, store and share key program information.
- Define how SPU will track and monitor CMOM Program implementation. Identify the process, timing and staff responsible.
- Define how SPU will make periodic reviews and program updates and refinements. Include the process, timing, and staff responsible.
- Update the program charter to reflect refinements made as part of this initiative and the other Connectivity and Communication initiatives.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: CMOM Program Management staff will take the lead on this, working closely with the CMOM Management Team. There will be more work in the first quarter of the initiative as staff develop a team charter and communication plan. Effort is expected to decrease after that.

Proposed Timeline:

Initiated Q2 2016 and ongoing

- Responsibility Matrix completed Q2 2016
- CMOM Management Team Charter to be completed by Q3 2016
- Communication Plan to be completed by Q3 2016
- SharePoint site to be available by Q1 2017
- CMOM Program Charter updated by Q1 2017

Key Team Members:

- CMOM Program Management
- SharePoint Lead
- CMOM Management Team

Related Projects:

- C2 - Refine Performance Reporting
- C3 - Adaptively Manage Program Direction

C2 - Refine Performance Reporting

Project Purpose: To track CMOM Program progress using current performance metrics, provide a basis for making program adjustments, facilitate management decisions, provide useful feedback to staff and report progress to various program stakeholders.

Project Need: SPU is committed to adaptive management of the CMOM Program. To do so, SPU tracks program elements, compares results against agreed upon goals and makes adjustments. Program Managers also need to clearly communicate progress made toward agreed upon goals and report progress toward Consent Decree commitments to regulators. Staff performing the work need a performance feedback mechanism and to have direct line-of-sight to SPU's overall goals.

Current Condition/Practice: There are several different CMOM reporting processes that are fragmented and time consuming. Many stakeholders request information at different intervals and no one report currently meets all reporting needs. Reporting is not fully automated or transparent within the utility. Also, SPU adopted new performance metrics and goals in 2015 and needs to incorporate them into performance reports.

Key Project Elements:

- Undertake a thorough review of current performance reporting needs, including the purpose, audience, and frequency of each need. Compare current reporting with those needs to identify any gaps.
- Produce a refined CMOM Program Progress Report that covers as many reporting needs as possible in one format. Include sewer overflow performance, Strategic Business Plan (SBP) Action Plan progress, and Service Level reporting (SSOs, Sewer Cleaning & Closed Circuit Television (CCTV) inspection mileage year-to-date), among other program performance measures in the report.
- Include performance indicators from the new Condition Assessment, Cleaning and Renewal Strategies to be developed within the year.
- Automate report preparation whenever possible and integrate with the anticipated CMOM Dashboard project.
- Document responsibilities for report inputs, ownership, and any training or communication necessary to implement the new reporting process. Remove any information that is no longer needed.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: The project lead will perform the majority of this work. The main audience for the CMOM Program performance reporting is at the leadership level, so division and deputy directors will be involved in the project.

The Condition Assessment, Cleaning and Renewal Strategies are inputs to this project. The timing of those initiatives may cause schedule delays to this project.

Proposed Timeline:

Initiated Q2 2016 and ongoing

- Updated metrics progress report to be complete by Q3 2016
- CMOM Dashboard to be complete by Q4 2017

Key Team Members:

- CMOM Program Management
- CMOM Management Team
- Data Leads

Related Projects:

- C1 - Improve Program Management and Communication
- C3 - Adaptively Manage Program Direction
- E2 - Develop Condition Assessment Strategy
- E3 - Develop Cleaning Strategy
- E6 - Develop Renewal Strategy

Additional Notes:

See Carrie Parker's existing report linked from SPU InWeb

See existing CMOM Dashboard in Cognos

Related SPU projects include:

- CMOM Tools Redevelopment
- CMOM Dashboard
- Strategic Business Plan (SBP) Action Plans
- SPU Performance Management Initiative

C3 - Adaptively Manage Program Direction

Project Purpose: Develop and implement additional CMOM initiatives and adaptively manage implementation over the next five years to further reduce SSOs in alignment with the Consent Decree and SPU's Strategic Business Plan goals.

Project Need: To ensure progress toward reducing sewer overflows, SPU began developing a CMOM Roadmap in 2008 that identified CMOM initiatives to be completed during the period from 2010 to 2015. SPU included key CMOM initiatives in the CMOM Performance Program Plan submitted to Ecology and the EPA in 2013, as required by the City of Seattle's Consent Decree. SPU has completed the key CMOM initiatives and, in accordance with the approved CMOM Performance Program Plan, SPU is using adaptive management principles to identify additional initiatives that will make up a roadmap for 2016 to 2020, provide further reductions in sewer overflows, and help meet SPU's Strategic Business Plan goals.

Current Condition/Practice: SPU's existing CMOM Roadmap provided programmatic direction for several years, with more detail for the early years of implementation and less detail for the later years. The 2010 to 2015 Roadmap focused more on defining and completing short-term tasks, and less on how SPU would sustain CMOM work over time. SPU is developing the 2016 to 2020 CMOM Roadmap with involvement of multiple groups within SPU engaged in CMOM activities. SPU intends this new roadmap to be more dynamic and adaptive, with adjustments made annually so that there are clearer ties between the CMOM Roadmap initiatives and sewer overflow reduction.

Key Project Elements: This project will set the direction for SPU's CMOM Program from 2016 to 2020. It will build on the accomplishments of the previous five years.

- Conduct a comprehensive review of the existing CMOM Roadmap, program documents, progress reports and deliverables.
- Complete a CMOM Self-Assessment, based on EPA's "Guide for Evaluating Capacity, Management, Operations and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems," dated January 2005.
- Analyze opportunities for improvement identified during the CMOM Self-Assessment and synthesize the priority opportunities into CMOM Roadmap initiatives.
- Develop a CMOM Responsibility Matrix to map roles and responsibilities affecting CMOM Program success across SPU and other relevant City of Seattle departments.
- Prioritize and sequence proposed initiatives, including identifying ongoing SPU activities supporting CMOM Program success and linking initiatives to sewer overflow reductions.
- Identify critical implementation requirements including SPU resources, levels of effort and budget estimates.
- Provide a mechanism for input, feedback and approval of CMOM Roadmap initiatives and periodic (annual) revisions.
- Perform an annual review of the CMOM Performance Program Plan and update it as appropriate.

The main deliverable is this CMOM Roadmap document. Based on annual reviews, it may be appropriate to update the CMOM Performance Program Plan.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: SPU initiated the CMOM Roadmap Update in June 2015.

Proposed Timeline:

Initiated in 2015 and updated CMOM Roadmap to be completed in Q2 2016

Key Team Members:

- CMOM Program Management
- CMOM Management Team

Related Projects:

- All

Additional Notes:

- See SPU CMOM Roadmap Project Charter, 2015
- See SPU CMOM Performance Program Plan, 2013
- See SPU CMOM Roadmap and Implementation Plan, 2011

C4 - Improve Standard Operating Procedure (SOP) Management

Project Purpose: Develop a plan and associated processes to manage Standard Operating Procedures (SOPs), including how they will be organized, reviewed, stored, and updated.

Project Need: The DWW LOB uses a number of SOPs that document SPU's operating procedures and practices for the inspection, maintenance and rehabilitation of assets. An SOP Management Plan is important to SPU's ongoing effort to improve the efficiency and effectiveness of operations and maintenance work, and also to meet the specific requirements relating to SOPs in the Consent Decree. The product of this project will be a clearly defined process for the management of DWW LOB SOPs and a centralized place for all SOPs to be stored that is well known, convenient and accessible to frequent users.

Current Condition/Practice: SPU operations and maintenance staff perform standardized work that has been well documented in a variety of SOPs. Those SOPs are located within various folders in various network drive locations with no indexing or cataloging available. There is no one repository for SOPs, no clearly defined ownership of each SOP and no standardized process for regular reviews to ensure the SOPs are current and useful. There is also no clear and concise standard formatting for the SOPs.

Key Project Elements:

The end product will be an established SOP repository, as well as a process for maintaining the SOPs. The SOP Management Plan tasks will include the following:

- Compile a list of all existing SOPs and store all SOPs in one place.
- Identify all SOP owners.
- Create an SOP repository.
- Identify a steward to manage the SOP repository.
- Document the SOP management process and workflow.
- Prepare an implementation and communication plan for the new SOP management process.
- Create a standardized template for future SOPs.
- Document a process for developing new SOPs and revising existing SOPs.
- Review the existing SOPs for relevance and identify any SOP gaps.
- Prepare a plan to monitor and track conformance with existing SOPs.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: SPU expects to contact many people in the DWW LOB to identify the SOPs they manage and collect general information about the SOPs, but these people may not need to be a part of a project team. The project lead and CMOM SharePoint site leader will perform the majority of the

work. Uncertainty about the schedule for a CMOM SharePoint site may delay the completion of this project or necessitate an interim solution to SOP management that does not involve SharePoint.

Proposed Timeline:

Initiated in Q3 2016 and expected to be completed by Q3 2017

- SOP Management Plan to be completed by Q1 2017
- Centralized SOPs to be available in Q3 2017

Key Team Members:

- CMOM Program Management
- SharePoint Lead
- CMOM Management Team

Related Projects:

- E1 - Improve Overflow Investigations
- E2 - Develop Condition Assessment Strategy
- E3 - Develop Cleaning Strategy
- E4 - Expand Chemical Root Control
- E7 - Develop Pump Station Condition Assessment
- E8 - Implement DWW Control Center
- E10 - Improve FOG Control at FSEs

Additional Notes: Seattle IT will determine the timeline for the CMOM SharePoint site, but has not yet done so. This project will be dependent upon that schedule.

Having a more centralized and transparent management process for SOPs will support DWW LOB managers by helping them understand work processes and specific job tasks and identify potential gaps in training or skills required to perform those tasks effectively.

See SOP Management Plan Project Folder - J:\FldOps\WS681\Secure\CMOM Program Files\04-Projects\SOP Management Plan

Focus Area: Efficiencies

E1 - Improve Overflow Investigations

Project Purpose: Identify and implement ways to streamline and improve the sewer overflow investigation and reporting process.

Project Need: The investigation and reporting process ensures SPU understands the underlying cause of sewer overflow events and recommends appropriate actions to avoid a reoccurrence. This information is critical for meeting regulatory commitments, forms the basis for any assignment of regulatory penalties, and guides changes and improvements to wastewater services. Several recent regulatory and organizational changes make now a good time to review and improve the investigation and reporting process:

- A new wastewater National Pollutant Discharge Elimination System (NPDES) permit went into effect May 1, 2016, with different requirements.
- SPU is shifting to a Maximo-based investigation system, to better integrate with field-based data and work flow management.
- It is a priority to use staff as effectively and efficiently as possible in order to deliver DWW services.

Current Condition/Practice: SPU dispatches DWW First Response Crews (FRC) to the overflow site upon receiving notice that a sewer overflow is occurring. The crews are responsible for containing the overflow, re-establishing sewer service, and identifying the initial cause of the overflow. Crews are also responsible for notifying Ecology. Office staff then complete further investigation and reporting. Office staff review work order history, asset history, and CCTV records, and may talk with customers to confirm the overflow cause and sequence of events. Office staff also recommend preventive maintenance schedule or procedural changes to reduce the risk of a future overflow. The Investigation Team prepares a letter to Ecology documenting specifics about the overflow (as identified in the NPDES permit). These letters are due within five days of SPU becoming aware of the overflow. The team keeps a spreadsheet of the overflows and their associated details. Staff also prepares quarterly and annual reports for Ecology.

Key Project Elements:

- Verify regulatory requirements.
- Document the current investigation and reporting work flow process.
- Update the current process according to the new NPDES permit and new use of Maximo for overflow investigations. Identify gaps and possible changes in the work flows that will save time and resources. This may also include changes in the work flow processes of other teams (e.g., First Response Crews).
- Identify internal communication and issue resolution methods. This includes the current SSO After Action monthly meetings, and the establishment of the CMOM Management Team to provide direction and address uncertainties, changes, risks, and improvements.
- Prepare an SOP for overflow investigations and reporting. Include guidelines, decision trees, or other written direction for determining the overflow cause, when a 5-day letter is or is not sent to Ecology, information to include in the letter to Ecology, and details for other portions of the work flow process, as needed.

- Identify performance metrics for the overflow investigation and reporting process and team. Integrate these metrics into employee performance expectations and reviews, CMOM Program performance measures and reporting, and program communication.
- Document the expertise and experience needed to conduct the overflow investigations, as well as the tools and systems used (e.g., software).
- Described overflow investigation and reporting curriculum and training needs. Implement as needed to plan for succession, ensure coverage for times when key staff are out of the office, and provide curriculum refreshers.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: This work needs to occur in the second and third quarters of the year to avoid the wet season when overflows occur more often.

Proposed Timeline:

Initiated in Q2 2016 and expected to be completed by Q4 2016

- New SSO Tracker available in Q2 2016
- Updated work process and metrics to be in place in Q3 2016
- Revised SOPs completed by Q4 2016

Key Team Members:

- SSO Investigations
- CMOM Program Management

Related Projects:

- C1 - Improve Program Management and Communication
- C2 - Refine Performance Reporting
- C4 - Improve SOP Management

E2 - Develop Condition Assessment Strategy

Project Purpose: Develop a risk-based plan for evaluating the condition of SPU sewer pipes, in alignment with Strategic Business Plan goals.

Project Need: SPU has over 1400 miles of sewer pipes with a median age of 80 years. These pipes and associated maintenance holes, especially those of an older age or certain materials, can fail and cause voids, overflows, and other problems. Effectively preserving the integrity and function of the wastewater system requires a proactive approach to understanding the condition of all pipes and maintenance holes. Understanding the condition of assets is also critical for making the right capital investments at the right time.

Current Condition/Practice: SPU's condition assessment program is mainly reactive, focused on assessing assets that experience service disruptions. There is no planned approach in place to assess all system assets on a priority basis, and some assets have never been assessed. There is also no scheduled maintenance hole condition assessment program. CCTV is the primary method of condition assessment, while dye and smoke testing are seldom used. SPU does not evaluate, quantify, and document infiltration and inflow, nor use it as one of the criteria to prioritize sewer system assessments and make decisions regarding sewer rehabilitation.

Key Project Elements: This project will develop and implement a comprehensive Condition Assessment Strategy for the wastewater system. The strategy will:

- Document SPU's condition assessment goals.
- Prioritize areas for condition assessment, building from the 2015 pipe criticality analysis and other relevant information. This includes identifying and applying prioritization criteria.
- Describe the condition assessment work flow process and responsibilities, including any feedback loops. Account for all condition assessment requests, including those that are project-related, in advance of planning, entire system proactive scheduling, new or warranty assets, and emergency or urgent requests.
- Evaluate the use of a variety of assessment tools, including CCTV, smoke testing, dye testing, and visual inspection. Identify if the use of any tools will be expanded or reduced.
- Assess the resources (e.g., staff and funding) needed to meet the assessment goals and compare to current resourcing levels. Identify additional resources needed, if applicable.
- Define equipment and software needs (e.g., CCTV QA/QC, M3R technology tools).
- Identify performance measures at various levels in the strategy, including progress toward assessment goals (percent of system assessed, number of overflows due to structural failure) and measures of the efficiency and effectiveness of staff (e.g., CCTV crews, assessors).
- Describe data collection, analysis and reporting systems and mechanisms (e.g., PACP coding, M3R risk-algorithm, GIS asset condition layer).
- Document condition assessment SOPs, including identifying those that need to be updated or revised.
- Provide ongoing training, certification, and feedback mechanisms.
- Define how to manage and adapt the condition assessment program through time.

- Develop an implementation plan and schedule for priority condition assessment work identified through the strategy.

Deliverables will include the above items, along with others identified during project scoping.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months – 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: SPU will do some additional tasks, like developing the M3R tool and other software development work, after developing the strategy.

Proposed Timeline:

Initiated at the start of Q3 2016 and expected to be completed by the end of Q1 2017

- Condition Assessment Strategy completed by the end of Q4 2016
- New risk algorithm implemented in M3R Tool by Q1 2017

Key Team Members:

- CMOM Program Management
- CCTV Inspections
- Crew Scheduling
- Condition Assessor
- GIS Analyst
- Sewer Rehab Program/Project Manager

Related Projects:

- C2 - Refine Performance Reporting
- E3 - Develop Cleaning Strategy
- E6 - Develop Renewal Strategy
- CAP3 - Develop Wastewater Master Plan (including capacity analysis)

Additional Notes:

- Risk-Based CCTV Scheduling is a component of this project that is required by Consent Decree and is due at the end of Q4 2016.
- See EMA's "SPU Condition Assessment Program Plan Outline."
- This project is related to the CMOM technology tool upgrades (M3R, CCTV QA/QC).

E3 - Develop Cleaning Strategy

Project Purpose: Develop a plan for cleaning all of SPU's gravity sewer pipes by 2022, in alignment with Strategic Business Plan goals that maximize crew efficiency and effectiveness while reducing sewer overflows due to blockages.

Project Need: SPU uses pipe cleaning as a primary means to reduce the risk of sewer overflows and invests significant resources in the work annually. SPU does the work mainly through regularly-scheduled preventative maintenance activities (PMs). The current cleaning strategy and PM schedule result in significant crew inefficiencies, as pipes adjacent to one another can be on drastically different cleaning cycles, while other pipes may not be on the right cycle to reflect the associated risk. SPU does not group work geographically, resulting in crews spending a lot of time driving between work sites. Because PMs drive cleaning work, there are portions of the system that have never been cleaned, as well as some pipe that is cleaned unnecessarily. There are also concerns that excessive cleaning may cause damage to pipes, overflows may be caused by pipe condition, and inappropriate cleaning methods may be used. A strategy will significantly help improve the efficiency and effectiveness of pipe cleaning crews.

Current Condition/Practice: SPU's cleaning program is based on using problems as triggers for preventative maintenance schedules. About 36% of SPU's mainlines are on a PM schedule that ranges in frequency from every month to every 8 years. Approximately 8,000 pipe segments are maintained at least once every 24 months and an average of 6,000-7,000 maintenance related work orders are created each year. Requests for new or modified PM schedules come from a variety of sources and there is insufficient strategy guidance for the work schedulers to balance maintenance needs and crew time investment. Often the rationale behind why a PM was scheduled in the first place is unknown. The current scheduled PM workload is beyond crew capacity.

Key Project Elements: This project will develop and implement a comprehensive Cleaning Strategy for the wastewater system. The strategy will:

- Document SPU's cleaning goals and approach (group by pipe network and geographically).
- Prioritize areas for cleaning, linked to the Condition Assessment Strategy priorities.
- Define cleaning work flow processes and responsibilities, as well as feedback loops in the process.
- Identify process and efficiency improvements. Review all PMs (which can be deleted, reset etc.). Define the processes for changing PMs (including governance) and for approving and scheduling cleaning work.
- Assess resources (e.g., staff and funding) needed to meet the cleaning goals compared to current resourcing levels. Identify additional resources needed, if applicable.
- Document equipment and software needs (e.g., Cleaning Optimization Tools (COTools)/Read-only Tools (ROCOTools), Cleaning QA/QC, Productivity Tool).
- Provide for performance measurement at various levels in the strategy, including progress toward cleaning goals (% system cleaned, # of overflows due to debris/maintenance mistake) and measures of the efficiency and effectiveness of cleaning staff.
- Describe data collection, analysis and reporting systems and mechanisms.
- Develop cleaning SOPs, including identifying those that need to be updated or revised.

- Provide for on-going training, certification, and feedback mechanisms.
- Manage and adapt the cleaning program through time.
- Prepare an implementation plan and schedule for priority cleaning work identified through the strategy.

The deliverable is a document that addresses the above items, as well as others identified during project scoping.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: SPU will do some items, like reviewing existing PMs and upgrading CO Tools, after developing the strategy. A comprehensive PM review could take a large investment of resources.

Proposed Timeline:

Initiated in Q3 2016 and expected to be completed by the end of Q4 2017

- Cleaning Strategy completed by the end of Q1 2017
- Upgrade of CO Tools by Q4 2017

Key Team Members:

- Maintenance Strategist
- Maintenance Planner/Analyst
- District Crew Management
- CMOM Program Management

Note that FOG Program Inspectors and the Pollution Prevention Coordinator (among others) currently rely on ROCOTools for information. They will need to be involved in developing the strategy.

Related Projects:

- C2 - Refine Performance Reporting
- C4 - Improve SOP Management
- E2 - Develop Condition Assessment Strategy
- E4 - Expand Chemical Root Control
- E6 – Develop Renewal Strategy
- E10 - Improve FOG Control at FSEs

Additional Notes: This project is related to the CMOM technology tool upgrades (COTools, Cleaning QA/QC).

E4 - Expand Chemical Root Control

Project Purpose: Increase the use and effectiveness of chemical root control to reduce root-related sewer blockages and overflows.

Project Need: One of the major causes of sewer overflows in the SPU wastewater collection system is root intrusion. Root-related blockages have consistently caused a significant number of overflows from SPU's system in the last six years. In 2015, SPU evaluated the effectiveness of the root control program. This initiative will implement recommendations from that program evaluation. Increasing the use of chemical root control may also have the benefit of reducing wear on pipes from mechanical cleaning.

Current Condition/Practice: SPU uses sewer cleaning and chemical root control to manage root intrusion. SPU currently treats a small selection of pipes once per year, during the dry season. Treatment is only allowed during months with little to no rain and specifically on dry days.

Key Project Elements: This project will build upon existing chemical root control practices and develop and implement an expanded Chemical Root Control Program. Program development and implementation will:

- Start from the 2015 Root Control Program Evaluation Technical Memorandum (authored by HDR).
- Prioritize areas for chemical root control, linked to the Cleaning and Condition Assessment Strategies as applicable.
- Identify chemical root treatment work flow processes and responsibilities, as well as feedback loops in the process to evaluate the effectiveness of chemical treatment.
- Identify needs regarding staffing, budget, and contracting mechanisms.
- Identify any equipment or software needs.
- Determine performance metrics that integrate with overall CMOM goals and the Cleaning Strategy.
- Identify data collection, analysis and reporting systems and mechanisms.
- Develop Chemical Root Control SOPs, as applicable. Given that SPU anticipates continuing to contract this work out, contractor guidelines may be more appropriate.
- Provide for management and adaptation of the Chemical Root Control Program through time.
- Include an implementation plan and schedule.

The deliverable is a document that addresses the above items, as well as others identified during project scoping. This will likely take the form of a program management plan.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Proposed Timeline:

Initiated in Q1 2017 and expected to be completed by Q3 2017

- New Program Management Plan available by Q3 2017

Key Team Members:

- Chemical Root Control Program Manager
- Maintenance Strategist
- Data Analyst
- CMOM Program Management

Related Projects:

- C2 - Refine Performance Reporting
- E2 - Develop Condition Assessment Strategy
- E3 - Develop Cleaning Strategy

E5 - Upgrade Crew Facilities

Project Purpose: Improve crew facilities so field staff is adequately set up and supported to perform their work.

Project Need: SPU field crews need a home-base from which to operate, as well as the ability to fill, empty, and otherwise maintain trucks and other equipment during their shifts. The current facilities lack space and amenities required to support the crews and their location leads to spending significant time driving between sites and sitting in traffic. This initiative will improve the crew facilities so they can be more efficient.

Current Condition/Practice: For the most part, SPU's field crews operate out of sub-optimal facilities that do not have adequate space or amenities to adequately support their work. Some of the challenges include:

- The DWW South Crews will soon be forced out of a shared City facility to make way for more transportation-related needs.
- The DWW North Crews operate out of a shared facility and lack critical amenities (e.g., showers, locker rooms).
- There is only one SPU facility that accepts sewer grit in Seattle. That facility is undersized and inconveniently located for south-end crews.
- The two catch basin decant sites in Seattle are undersized. This requires more frequent maintenance work at the sites, which often does not occur due to other pressing needs.
- Traffic in Seattle continues to build, causing long travel times between field sites. This affects the amount of work that can be done and makes crews less efficient.

Key Project Elements:

- Establish a DWW-only South Crew facility
- Construct and begin operating a new south-end dewatering facility for sewer grit and catch basin decant materials.
- Complete and implement the SPU Facility Master Plan. This assessment includes examining the distribution of "satellite" facilities around Seattle to improve geographic distribution and reduce travel times.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☒ High (5000+)	☒ Long (>2 years)

Proposed Timeline:

Initiated in 2015 and expected to be completed by Q4 2018

- Facility Master Plan completed by early Q3 2016

- South Crew Facility operational by end of Q4 2017 (2016 property acquisition and design, 2017 construction)
- South Dewatering operational by end of Q4 2018 (2016 design, 2017-2018 Construction)

Key Team Members:

- DWW LOB Representatives
- Project Managers
- DWW Maintenance
- DWW Deputy Director

Related Projects:

- E2 - Develop Condition Assessment Strategy
- E3 - Develop Cleaning Strategy
- E6 - Develop Renewal Strategy

E6 - Develop Renewal Strategy

Project Purpose: Define SPU's approach to sewer renewal[6] priorities and investments. Identify improvements to increase the speed and efficiency of renewal work.

Project Need: SPU has identified sewer asset renewal as an action item in the Strategic Business Plan and expects to add $7.5M to the capital budget for renewal work in the next four years. At the same time, Seattle's aging sewer infrastructure is desperately in need of attention as pipe failures are leading to sewer overflows. This strategy will identify renewal priorities, work flow processes, resourcing needs, and possible improvements. The intended outcome is a plan for renewing sewer assets in a more proactive manner with stable resourcing (staff and funds).

Current Condition/Practice: Problems discovered during CCTV inspections drives most sewer renewal work. Based on Pipe Assessment and Certification Program (PACP) coding, an algorithm identifies high-risk pipes for the pipe assessment team. That team then evaluates the situation and recommends whether to take action in the form of a repair, lining or replacement project. They produce a work packet that can either go to DWW field crews to complete, or to the Project Delivery and Engineering Branch to compile with other sites into a contract. Currently, more work packets have been produced than DWW crews can complete in the next year. Rehabilitation needs, once identified, take a minimum of 18 months to be constructed by contractors. "Demand" based projects, such as those related to transportation projects, are fit in as SPU is able, without dedicated resourcing.

Key Project Elements:

- There has been quite a bit of work done in this area. This initiative will start from that previous work, which includes the 2015 Wastewater Pipe Strategic Asset Management Plan, 2015 pipe criticality assessment, and Expanded Sewer Rehabilitation Program Technical team recommendations.
- Revisit Strategic Business Plan sewer renewal action plan and goals.
- Identify appropriate performance measures to use to track progress. Past measures have included lines of pipe renewed and amount of money spent. The chosen performance measures should take into consideration unintended consequences (e.g., tracking miles leads to a preference for lining projects).
- Identify renewal approach and priorities, and tie them to the priority areas selected for condition assessment. Include project based and emergency work needs in assessment and strategy development. Assess the ability to group needs and approach the Seattle Department of Transportation (SDOT) with priority asset replacement needs.
- Evaluate new lining and replacement technologies.
- Evaluate, improve and document guidelines describing the approach for when SPU repairs, lines or replaces. This will be in the form of a decision tree.

[6] "Renewal" encompasses rehabilitation (e.g., lining), replacement, and repair of sewer assets.

- Identify the work flow processes and possible improvements.
- Identify resources (staff time, consultant and contractor resources, funding) and allocation. Assess possible resource use strategies and make recommendations about resources, including staffing.
- Update 2015 Programmatic Business Case for Sewer Rehabilitation and Strategic Asset Management Plan as needed.

Level of Effort Estimate:

Staff time (SPU and Consultant):	**Project duration:**
☐ Low (<1000 hours)	☒ Short (<6 months)
☒ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Proposed Timeline:

Initiate in Q4 2016 and completed by Q2 2017

Key Team Members:

- CMOM Program Management
- Condition Assessor
- Engineering/Rehab/Small Project Delivery
- Sewer Rehab Crew
- Wastewater Planning
- GIS Analyst
- Corporate Asset Manager

Related Projects:

- E2 - Develop Condition Assessment Strategy
- E3 – Develop Cleaning Strategy
- CAP 2 - Develop Capacity Level of Service Policy
- CAP 3 - Develop Wastewater Master Plan
- CAP4 - Develop Inflow and Infiltration Management Policy

E7 - Develop Pump Station Condition Assessment

Project Purpose: Develop an ongoing condition assessment program for the sewer pump stations.

Project Need: SPU needs to initiate a risk-based condition assessment program for pump station assets. This will allow maintenance staff to prioritize their activities. Asset managers will be able to effectively plan and implement capital improvements and maintenance actions, as well as have a real-time understanding of the condition of SPU assets.

Current Condition/Practice: SPU currently collects condition information on very few of its pump station assets. As a result, it has been challenging to properly identify and plan capital replacements and prioritize maintenance activities. As part of the recently approved Pump Station and Force Main Strategic Asset Management Plan (SAMP), SPU has committed to develop a more comprehensive risk-based condition monitoring program.

Key Project Elements: As part of this initiative the following key elements will be addressed:

- Adapt a mobile device (tablet) condition assessment application to sync with Maximo so that crews can use it to collect information in the field.
- Define aspects and distress mode information that SPU needs to collect.
- Develop condition assessment procedures.
- Migrate asset risk scores to Maximo.
- Develop training materials and train selected SPU staff to perform condition assessments.
- Acquire necessary equipment for condition assessment.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: Stage Gate 1 will be developed by the end of the 2nd Quarter of 2016. Level of effort will be defined in the Stage Gate 1.

Proposed Timeline:

Initiated in Q2 2016 and expected to be completed by Q4 2017

- Stage Gate 1 is expected by the end of Q2 2016
- New assessment procedures will be implemented by the end of Q4 2017

Key Team Members:

- Pump Station Maintenance Planner
- Pump Station Capital Program Manager
- Maximo Specialist

- IT Specialist
- Pump Station Maintenance Manager

Additional Notes: Corporate Asset Management is leading a project to refine SPU's asset hierarchy.

E8 - Implement DWW Operations Control Center

Project Purpose: Develop a DWW Operations Control Center, including location and full staff resourcing.

Project Need: SPU is in the process of converting portions of the combined sewer system from a passive operating system to an active real-time operating system. Real-time operations requires technical teams that understand system performance to ensure systems are operating properly to reduce the risk of sewer overflows and CSO occurrence. There is also more reliance on 24/7 system monitoring to ensure adverse system impacts are proactively identified and proper corrective actions are initiated.

Current Condition/Practice: Currently the DWW system is monitored by the SPU Water Control Center (WCC). The WCC provides alarm response for the DWW system and contacts System Operations Planning and Analysis (SOPA) and/or Machinists to take follow-up actions. SPU's Water and DWW systems are not similar and system operational response needs are also not similar in nature. The WCC operators are not trained in DWW system hydraulics and performance and are not able to proactively identify issues and determine corrective actions that are required to reduce the risk of sewer overflows and CSO.

Key Project Elements: This project will develop a plan and implement the delivery of a DWW Operations Control Center. Plan development and implementation will:

- Define a strategy for System Operations.
- Identify resources needed to implement the operations strategy (including staff and funding needs).
- Develop an Instrumentation and Control (I&C) Master Plan to support the development of the operations strategy.
- Identify equipment and software needs to implement the I&C Master Plan.
- Provide on-boarding and training for staff.
- Facilitate operational modeling to support ongoing training of DWW Control Center staff.
- Identify Control Center functional requirements.
- Deliver the DWW Control Center.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☒ Long (>2 years)

Proposed Timeline:

Initiated in Q1 2016 and expected to be completed by 2024

- Staff Transition Plan completed by the end of Q3 2017

Key Team Members:

- Project Manager
- SOPA Technical Lead
- DWW LOB Representative
- SCADA Lead
- Electrical Instrumentation and Control Designer
- Control Center Expert

Related Projects:

- E9 – Increase Real-Time System Monitoring
- All DWW CIP projects that have assets capable of real-time operation or that require 24/7 monitoring.

E9 - Increase Real-Time System Monitoring

Project Purpose: Develop a real-time monitoring program to deploy increased monitoring equipment in the DWW system to better track system performance trends.

Project Need: Develop a DWW operations strategy that deploys monitoring equipment throughout the system to increase real-time monitoring information available for the system. Develop trend analysis from the monitoring equipment and create alarms to identify when the system is operating outside known trends. This approach is needed to help DWW transition towards a proactive operations strategy that will allow more targeted maintenance within the system.

Current Condition/Practice: Real-time data currently only exists at CSO overflow locations and at DWW pump stations. SPU currently contracts out 24/7 monitoring to consultants (ADS). If alarms occur, ADS calls the Operations Response Center (ORC) who sends out the First Response Crew (FRC) to respond to on-site issues. It can take up to 2.5 hours for FRC crews to arrive on-site.

Key Project Elements: This project will deploy monitoring equipment throughout the DWW system to provide real-time information for proactive system operations. The strategy will:

- Identify monitoring equipment that will provide the data required.
- Develop data delivery options (e.g., cloud vs. SCADA) and evaluate implementation costs and data security.
- Develop trends from existing and new data.
- Develop alarm response protocols.
- Evaluate IT solutions to process the data.
- Identify locations to install the equipment to ensure effective and efficient data collection within the system.
- Benchmark with other utilities that have developed and deployed this type of system.
- Coordinate with King County.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☒ Long (>2 years)

Level of Effort Notes: SPU can deploy this concept on a small scale for a beta test to analyze the potential benefits. The security aspect of the effort is the most difficult to coordinate with either IT or SCADA.

Proposed Timeline:

Initiated Q4 2016 and expected to be completed by 2024

- Complete Windermere pilot project by the end of Q3 2017

Key Team Members:

- Project Manager
- Modeling Lead
- SOPA Technical Lead
- SCADA Lead
- Control Center Coordinator

Related Projects:

- E8 - Implement a DWW Operations Control Center
- CAP1 - Prepare Wastewater Model

E10 - Improve Fats Oils and Grease (FOG) Control at Food Service Establishments (FSEs)

Project Purpose: Better control FOG at FSEs to reduce the amount entering the wastewater system. This initiative will increase effectiveness and efficiencies in the FOG program, as well as reducing sewer overflows due to blockages and system cleaning needs.

Project Need: Approximately 40% of the FOG entering the wastewater system comes from FSEs and that is estimated to rise as Seattle's population grows. SPU currently manages FOG from FSEs primarily through an inspection-enforcement process that is not particularly effective at reducing FOG entering the system. This initiative will implement a number of projects to improve SPU's program processes and tools available to FSEs to better control FOG and promote long-term behavior change.

Current Condition/Practice: SPU's FOG Program team consists of a supervisor, three inspectors, and an assistant inspector and is responsible for an $800k annual budget. The team inspects FSEs in FOG "hot spots" and areas with a history of sewer overflows due to FOG. Through inspections, the FOG Program team can require FSEs to install and maintain grease interceptors.

Challenges to the program's effectiveness include:

- Enforcement-focused: Staff rely heavily on individual FSE inspections, often leading to enforcement actions. Inspectors spend 50 to 70% of their time on enforcement in an adversarial role that provides limited benefits.
- Inadequate plan review: Grease Interception (GI) devices are not installed according to Uniform Plumbing Code (UPC) requirements in FSE kitchens during the Plumbing Permit process. As a result, approximately 50% of FSE kitchens have no GI and of those that do, many do not meet sizing and connection requirements.
- Ineffective maintenance: FSEs do not maintain GI devices at a frequency to provide effective grease capture.

Key Project Elements: This initiative will lead to a program that focuses on outcomes (e.g., reduced FOG entering the system, fewer FOG-caused overflows, reduced time spent on enforcement) and uses a continuous process improvement model. The eight improvement projects include:

- Develop a Director's Rule to clarify FOG control and grease interceptor code requirements to facilitate implementation.
- Register FSEs as potential FOG dischargers as a means to increase awareness of code requirements and issue risk-based discharge authorizations tailored to specific FSEs' needs.
- Update designers' and plumbers' knowledge to ensure that GIs are installed and that they meet minimum UPC requirements.
- Implement plan review to confirm plumbers install GI to meet minimum UPC requirements.
- Develop a Preferred Haulers program that will assist FSEs with proper maintenance of GIs and assist SPU with compliance tracking. In such a program, registered Preferred Haulers will be accountable for meeting the GI maintenance frequency specified in the discharge authorization and submitting records on behalf of the FSE.
- Require FSEs to submit records verifying GI maintenance to reinforce adequate maintenance behaviors.

- Expand residential outreach so that households implement kitchen Best Management Practices to reduce residential brown grease washed down the drain.
- Develop a system for tracking and monitoring progress on FOG outcomes.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☒ Long (>2 years)

Proposed Timeline:

Initiated Q1 2016 and ongoing

- Residential and plumber outreach started by Q4 2016
- GI Director's Rule approved by end of Q4 2017
- FSEs registered by start of Q1 2018
- Outcomes measures by Q1 2018
- Preferred Haulers Program implemented by end of Q4 2018
- GI plan review initiated by Q1 2019

Key Team Members:

- FOG Program Manager
- FOG Inspectors

Related Projects:

- E2 - Develop Condition Assessment Strategy
- E3 - Develop Cleaning Strategy

Additional Notes: See the FOG Program Technical Report and business case from February of 2016 for more details about this initiative.

E11 - Increase Customer Side Sewer Education

Project Purpose: Increase customers' awareness about side sewers around responsibility, condition, maintenance and repair.

Project Need: Side sewers make up a significant portion of Seattle's wastewater system. In Seattle, private property owners are responsible for the side sewer from their home or business to the connection on SPU's mainline. Their responsibilities include maintenance, repair, and replacement. Customers are often not aware that they are responsible for their side sewers and that the condition of their side sewer may negatively impact them or the wastewater system they are connected to. This project will develop and implement a side sewer education plan to provide important information to customers about their side sewers, and prepare a solid educational foundation for working with customers on future side sewer initiatives.

Current Condition/Practice: SPU and the Department of Construction and Inspection provide some information on their websites[7] about side sewers. In the past, SPU alerted homeowners when they saw issues with their side sewers (e.g., roots) during CCTV inspections. That process was discontinued, but may be helpful to decrease root impacts to mainlines and help customers avoid backups.

Key Project Elements:

- Build from the existing information that is available on the websites.
- Work with the side sewer coordination team and the Pollution Prevention Coordinator to identify important side sewer information SPU wants to distribute.
- Work with the Customer Service Branch DWW communications lead. This position is a new hire that will focus on wastewater messaging.
- Develop an education plan to define the priority messages SPU wants to distribute (e.g., roots, FOG), identify how SPU can best deliver those messages, what role the existing websites will play and how SPU will measure success.
- Evaluate notifying customers about side sewer issues that SPU sees during CCTV. Identify the resources needed to take this action and any risks/concerns with re-implementing this prior practice.

[7] SPU: http://www.seattle.gov/util/MyServices/DrainageSewer/YourPropertysSideSewer/index.htm
DCI permit website: http://www.seattle.gov/dpd/permits/permittypes/sidesewer/default.htm

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Proposed Timeline:

Initiate in Q4 2016 and expect to be completed by the end of Q2 2017

- Education Plan completed by the end of Q2 2017

Key Team Members:

- Outreach and Education Project Manager
- DWW Communications Strategist
- Pollution Prevention Coordinator
- Claims Representative
- CMOM Program Management

Related Projects:

- E12 - Develop Side Sewer Assistance Approach
- E13 - Develop Backup Protection Policy
- CAP4 - Develop Inflow and Infiltration Management Policy

Additional Notes: This will also build from and connect to SPU's "Make it a Straight Flush" messaging.

E12 - Develop Side Sewer Assistance Approach

Project Purpose: Identify an approach to assist customers with repair and replacement of their side sewers. Develop a policy recommendation to help private property owners address the costs of private side sewer repair and/or replacement.

Project Need: In Seattle, private property owners are responsible for the total life cycle costs of side sewers from their home or business to the connection on SPU's mainline. Their responsibilities include maintenance, repair, and replacement. The costs for repair and replacement can be very high for property owners (e.g., up to tens of thousands of dollars), depending upon the scope of the problem and the need to restore street and sidewalk surfaces in the right-of-way. Permitting and contractor requirements can also be daunting for homeowners to undertake. The City has no program, policy or financial mechanism aimed to help property owners with their side sewers. As such, side sewers often go unnoticed until an emergency occurs, creating a financial and logistical hardship for the customer under urgent conditions.

Current Condition/Practice: Currently, the City does not inspect side sewers, nor is there a code requirement for property owners to conduct routine inspections and maintenance to identify and prevent leaks, backups or line failures. Often property owners are unaware they have an issue with their side sewers until a leak is detected or a backup occurs. In some cases, a side sewer may be incorrectly connected to a drainage line, often stemming from contractor error. In all cases, the property owner is responsible to choose a course of action and pay for the costs, including any right of way repairs to surface streets and sidewalks needed as a result.

Key Project Elements: This approach will develop and evaluate several options for improving customer assistance with side sewer issues. The initiative will identify a policy recommendation for management review. Project tasks include:

- Document major issues surrounding private side sewer repair and replacement.
- Identify current programs, policies, or financial mechanisms used by other utilities and agencies to assist private property owners with side sewer work.
- Develop and evaluate options to assist customers with side sewer repairs and replacements.
- Develop a policy recommendation and review with DWW LOB management.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: This effort is expected to take fewer than 200 total hours from the core team and stakeholders. It does not include an implementation plan or strategy, which would be developed after policy approval.

Proposed Timeline:

Initiated in Q1 2016 and expected to be completed by Q4 2016

- Recommended policy is expected by Q4 2016

Key Team Members:

- Project Manager
- Policy Lead
- Side Sewer Code Expert
- Source Control Expert
- Customer Side Sewer Expert
- Service Equity Advisor

Related Projects:

- E11 - Increase Customer Side Sewer Education
- E13 - Develop Backup Prevention Policy
- CAP3 - Develop Wastewater Master Plan
- CAP4 - Develop Inflow and Infiltration Management Policy

Additional Notes: This project is related to other 2016-17 policy development work being carried out as part of the development of the Wastewater Master Plan.

E13 - Develop Backup Prevention Policy

Project Purpose: Develop a policy that identifies when and how sewer backup prevention tools will be provided to customers.

Project Need: Customers can experience a sewer backup into their home due to a blockage or lack of capacity in SPU's sewer main. Some customers are more susceptible to backups due to their elevation, the elevation or hydraulics of the sewer main and its maintenance holes, and the mechanical plumbing system in their home or business. Backup prevention devices (e.g., valves, pumps) can be used to reduce overflows and better protect customers from issues in the wastewater system. In some cases, installing such devices on private side sewers can be less costly than making capital investments in the system.

SPU does not have consistent guidance or programs to reduce sewer backups to private homes or businesses through prevention devices. Project teams looking at using such devices struggle with questions about the costs and logistics to install, maintain, inspect and replace such devices, as well as the service equity of using such devices in place of making system upgrades.

Current Condition/Practice: SPU has installed one type of backup prevention (i.e., backwater valves) for a limited number of customers as part a capital project or in addressing a claim. Although the customers have agreed to take responsibility for maintaining the devices, devices do not appear to be maintained as needed and several customers have experienced backups after a prevention device has been installed due to lack of proper maintenance. Other customers have declined to receive a prevention device due to the requirements SPU places in such agreements.

Key Project Elements: The initiative will develop a sewer backup prevention policy recommendation. Specifically, the team will:

- Define what SPU wants to accomplish via backup prevention (i.e., the policy objective).
- Clearly identify issues with the current SPU approaches to reducing sewer backups, including the installation of and payment for backwater valves.
- Identify and assess possible approaches including how devices are designed, installed, maintained, repaired and replaced.
- Develop a policy recommendation.
- Identify related policy and procedural issues that will be addressed in the future.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: The initial project level of effort is 150 hours for the lead, 50 hours for each core team member, and 25 hours for each stakeholder.

Proposed Timeline:

Initiated in Q2 2016 and expected to be completed by Q4 2016

- Recommended policy to be expected by the end of Q4 2016

Key Team Members:

- Project Manager/Policy Lead
- Capital Project Planner
- Modeling Technical Lead
- Claims Representative
- Customer Side Sewer Expert

Related Projects:

- E11 - Increase Customer Side Sewer Education
- E12 - Develop Side Sewer Assistance Approach
- CAP3 - Develop Wastewater Master Plan

Additional Notes: SPU has included sewer backup prevention in several past and current sewer capacity projects. These include capital projects in the Broadview, Pearl Street and South Park neighborhoods. This policy initiative will build from lessons learned and inform SPU's future approach (capital and otherwise) to backup prevention.

Focus Area: Capacity

CAP1 - Prepare Wastewater Model

Project Purpose: Develop and implement a wastewater modeling plan to ensure adequate tools (i.e., models) are available for assessment of the wastewater system's ability to meet levels of service (i.e., capacity assessment).

Project Need: A wastewater model of appropriate quality provides a strong basis for assessing system capacity. This is needed for many purposes, including to successfully complete system master planning, design capital projects, review proposed development impacts, evaluate peak wet weather flows, and identify infiltration and inflow. The modeling plan developed and implemented as a result of this initiative will focus on supporting the wastewater master planning effort, which is a current SPU priority.

Current Condition/Practice: SPU completed a calibrated system-wide wastewater model that includes all SPU-owned facilities (e.g., pipes greater than 8-inch diameter, weirs, and maintenance holes) in early 2016. This wastewater conveyance model is representative of the 2012 state of the system. It provides a means to assess capacity throughout the city and SPU currently uses it to design capital projects. However, in some locations, additional model calibration to flow monitoring data will increase confidence in the results and better serve master planning objectives.

Key Project Elements: This project will develop and implement a wastewater modeling plan. The plan and implementation will:

- Identify locations where capacity assessment is needed to support the wastewater master planning effort, including sewer overflow locations and CSO basins where regulatory compliance is uncertain.
- Summarize existing wastewater system model resolution. The resolution will be assessed by comparing calibration locations and the quality of calibration.
- Develop a plan to refine the wastewater model to support the Wastewater Master Plan. The modeling plan will include a schedule for wastewater model implementation, which will agree with the master plan schedule.
- Arrange for flow monitoring necessary to increase model resolution at locations of interest. This includes siting and installation of flow meters, ongoing data review, and final characterization of flow monitoring information for use in modeling.
- Update model hydraulic information to represent current (i.e., 2016) conditions. This includes incorporating current King County facility operations, recent SPU capital projects, and current GIS data for SPU facilities (e.g., pipes, maintenance holes), etc.
- Calibrate the model using updated hydraulic information and flow monitoring information.
- Document the modeling work for future reference.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☒ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: The modeling plan will be completed by mid to late summer 2016. This is critical so that flow monitoring can occur during the next wet season (Fall 2016 - Spring 2017). Completion of the plan will require an increased level of effort from the project team, particularly the modeling staff. Effort associated with implementation of the plan will be spread over time, beginning when the plan is completed and continuing to 2018.

Proposed Timeline:

Initiated in Q1 2016 and expected to be completed by Q1 2018

- Modeling Plan will be completed in Q3 2016
- Planning model is expected to be completed by the end of Q1 2018

Key Team Members:

- Project Manager
- Modeling Lead
- Modeling Technical Experts
- System Planner
- CMOM Program Management
- System Operations Technical Lead

Related Projects:

- E9 - Increase Real-Time System Monitoring
- CAP2 - Develop Capacity Level of Service Policy
- CAP3 - Develop Wastewater Master Plan
- CAP4 - Develop Inflow and Infiltration Management Policy

CAP 2 - Develop Capacity Level of Service Policy

Project Purpose: Determine the level of sewer service target(s) for wastewater system capacity.

Project Need: While the regulation for the performance of the wastewater system is clear, SPU has not resolved exactly how that regulation will translate into a level of service for wastewater system capacity that guides system planning and project design.

Current Condition/Practice: The SPU Strategic Business Plan states the level of service around wastewater system capacity as: Limit SPU-related sewer overflows to no more than 4 per 100 miles of pipe per year. This is a mandatory threshold set by SPU's regulatory drivers.

Key Project Elements: Develop a capacity level of service with two parts: Level of Service Policy development in 2016 and capacity level of service target analysis and selection as part of the Wastewater Master Plan in 2017.

- Policy development will set level of service categories, objectives, and metrics for DWW and provide guidance on using those level of service categories, objectives, and metrics to set DWW level of service targets for SPU projects and programs.
- The Wastewater Master Plan will define level of service targets for wastewater capacity though an assessment of capacity level of service that the wastewater system provides in current conditions, a technical and economic assessment of a suite of level of service options, customer engagement around "willingness to pay" for specific levels of service, and the selection of a wastewater capacity level of service target for the plan.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☒ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: While the policy development is expected to take nine months, and the target for competing the Level of Service selection for the Wastewater Master Plan is about 18 months, the technical and financial analysis required to select a specific level of service and work that will be necessary to adopt that level of service will be very intensive.

Proposed Timeline:

Initiated in Q1 2016 and expected to be completed by Q4 2017

- Recommended policy is expected Q4 2016
- Capacity target selected for use in the Wastewater Master Plan by end of Q4 2017

Key Team Members:

- Project Manager
- Capital Project Manager
- System Planner

- Policy Lead
- Modeling Technical Lead
- CMOM Program Management
- Project Delivery/Engineering

Related Projects:

- E13 - Develop Backup Protection Policy
- CAP1 - Prepare Wastewater Model
- CAP3 - Develop Wastewater Master Plan
- CAP4 - Develop Inflow and Infiltration Management Policy

CAP 3 - Develop Wastewater Master Plan and Capacity Assessment

Project Purpose: Identify and prioritize city-wide projects, programs and policies to improve the wastewater system (with a particular focus on system capacity) and meet designated wastewater performance goals and targets.

Project Need: The Wastewater Master Plan needs to select the right projects, policies and programs to respond to the following drivers:

- The need to rehabilitate and repair aging infrastructure more proactively.
- The need to be ready to address known or anticipated regulatory requirements.
- The need to incorporate projections for growth and development, as well as climate change, in improvements to the DWW system.
- The need to do more with less by:
    - Leveraging major public and private project opportunities.
    - Setting transparent and consistent methods that identify and sequence wastewater, stormwater, and natural asset capital investments.
    - Setting and planning to achieve DWW service level goals that are consistent with economic realities and DWW rate paths.

Current Condition/Practice: SPU identifies problems in the wastewater system in a number of different ways. SPU prioritizes them using criteria developed by individual programs, and the higher priority solutions enter the stage gate process for further study.

Key Project Elements: The Wastewater Master Plan will be a city-wide evaluation of the wastewater system needs and prioritization of system problems in order to best allocate resources for system improvements. The Wastewater Master Plan will have an approved project charter and project management plan that will further specify the content of the Master Plan.

Generally, the Wastewater Master Plan will:

- Develop a Stakeholder Engagement Strategy;
- Set wastewater system Performance Goals and Targets (Levels of Service or LOS);
- Describe and justify Master Plan boundaries;
- Develop a map of areas where Performance Goals and Targets are not currently achieved (wastewater system “capacity assessment”);
- Select ranking criteria;
- Use the criteria to prepare a prioritized list of system problems;
- Document prioritized system problems including source analysis and limitations and opportunities associated with each problem;
- Assess alternatives using the Triple Bottom Line;
- Prepare an implementation strategy for the preferred alternative;
- Document Stage Gate 1 for Projects and Programs in the preferred alternative;

- Complete policy intake forms for Policies and Regulations in preferred alternative; and
- Recommend preparation actions for the next planning cycle.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☐ Medium (6 months - 2 years)
☒ High (5000+)	☒ Long (>2 years)

Level of Effort Notes: This project is a long term, resource intensive project with a high level of technical analysis.

Proposed Timeline:

Initiated in Q2 2016 and expected to be completed by Q4 2018

Key Team Members:

- Project Manager
- System Planners
- Capital Planner
- Project Delivery/Design Engineer
- Modeling Technical Lead
- CMOM Program Management

Related Projects:

- E2 - Develop Condition Assessment Strategy
- E6 - Develop Renewal Strategy
- E7 - Develop Pump Station Condition Assessment
- E11 - Increase Customer Side Sewer Education
- E12 - Develop Side Sewer Assistance Approach
- E13 - Develop Backup Prevention Policy
- CAP1 - Prepare Wastewater Model
- CAP2 - Develop Capacity Level of Service Policy
- CAP4 - Develop Inflow and Infiltration Management Policy

CAP 4 - Develop Inflow and Infiltration Management Policy

Project Purpose: Develop and adopt a policy that identifies how SPU will manage inflow and infiltration to the sewer system.

Project Need: SPU's wastewater system has capacity constrained areas where sewer overflows can occur during storms. Water that does not need treatment can enter the sewer system through inflow and infiltration (I&I), taking up valuable sewer pipe capacity. SPU does not have any specific program or integrated approach to reduce I&I into the wastewater collection system. This initiative will evaluate approaches and options to better manage I&I and develop a policy to formalize SPU's approach to reducing I&I into the system.

Current Condition/Practice: SPU addresses I&I on a case-by-case basis through capital and maintenance-related projects. Project teams often struggle with how to best reduce I&I to meet their project goals given that utility-endorsed guidance does not exist and consistency between project approaches is a concern. Several current projects, for example Broadview and South Park, are assessing ways to reduce I&I to restore capacity and reduce sewer overflows.

Key Project Elements: This initiative will develop an I&I policy recommendation. Specifically, the team will:

- Clearly identify I&I-related concerns and issues.
- Identify possible approaches and opportunities to address I&I.
- Define what SPU wants to accomplish via I&I management (i.e., the policy objective)
- Develop an I&I management policy.
- Identify related policy and procedural issues that will be addressed in the future.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☒ Low (<1000 hours)	☐ Short (<6 months)
☐ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Level of Effort Notes: The initial project level of effort is 150 hours for the lead, 50 hours for each core team member, and 25 hours for each stakeholder

Proposed Timeline:

Initiated in Q1 2016 and expected to be completed by Q4 2016

Key Team Members:

- Project Manager
- Policy Lead
- Condition Assessor
- I&I Subject Matter Expert

- Modeling Lead
- Engineering Lead

Related Projects:

- E11 - Increase Customer Side Sewer Education
- E12 - Develop Side Sewer Assistance Approach
- CAP3 - Develop Wastewater Master Plan

Focus Area: Drainage

D1 - Assess Drainage Storage Facilities

Project Purpose: Investigate existing SPU stormwater storage facilities and document the original intent of each facility, the design standards used, the current condition and functional assessment of the facility and any recommendations for capital improvements, maintenance or repairs, modifications to maintenance protocols, standard operating procedures and GIS map changes.

Ideally this project would have been identified through the Drainage Roadmap project, however, there is a pressing need to get this work done sooner.

Project Need: SPU owns, operates, and maintains stormwater storage facilities designed to provide flow control and/or water quality treatment to alleviate flooding, minimize erosion of small stream channels or other water resources, and reduce pollutants entering the City's receiving waters. These facilities fall under different regulatory requirements according to their functions and characteristics. Maintenance, operations and safety considerations may be unique for each facility. As SPU constructs new stormwater facilities, relevant facility operating plans, design drawings, standard operating procedures, and other important information that guides SPU staff in the efficient management and operation of the facility to function as intended are cataloged. SPU intends to improve documentation and understanding of older stormwater facilities in order to more effectively operate and maintain them in a similar manner.

Current Condition/Practice: SPU's stormwater storage facilities were designed and constructed at different times and for different purposes. Maintenance, operations and safety considerations vary among the facilities, as does availability of design documentation, maintenance history records, drawings and other relevant information that would assist SPU in characterizing the condition and functionality of its existing facilities. The origins and rationale for preventative maintenance protocols are not consistently applied or completely understood. As a result, SPU intends to conduct a comprehensive review that will set the stage for future operations and maintenance of these facilities.

Key Project Elements: This project will:

- Review existing drainage facility documentation and data sources, as well as drainage related information gathered during the CMOM Roadmap Update, including available operations and maintenance plans and procedures, information about the facilities available from SPU's GIS and from the Maximo work management system, and drainage complaint data from the vicinity of the facilities.
- Conduct site visits to investigate field conditions, assess current functionality and condition and identify missing information.
- Document a condition and functional assessment for each facility along with recommendations for improvement.

The deliverable is a condition and operations assessment and recommendations for each facility.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Proposed Timeline:

Initiated Q3 2016 and expected to be completed by Q3 2017

Key Team Members:

- Project Manager
- SOPA Manager
- Drainage Subject Matter Experts
- Engineering Lead
- Maintenance Planner
- Stormwater Code Expert (maintenance requirements lead)

Related Projects:

- C3 - Adaptively Manage Program Direction
- D2 - Develop a Drainage Roadmap

D2 - Develop a Drainage Roadmap

Project Purpose: Develop a guidance document for SPU's drainage programs and activities, similar to this CMOM Roadmap, to identify and prioritize gaps and improvement opportunities.

Project Need: There is a large amount of ongoing work in the Drainage business area. However, SPU has focused its investment on wastewater needs in recent years and as a result, has somewhat neglected the drainage system. Through this initiative, SPU will clearly define and organize the drainage work, identify a common program direction, assess gaps and opportunities, and prioritize existing and proposed work. This will lead to effective and focused allocation of limited resources.

Current Condition/Practice: SPU undertakes important drainage work to reduce flooding and address stormwater-related impacts to Seattle's waterways. This includes:

- Policy work (e.g., Seattle's stormwater code)
- Program work performed in compliance with the Municipal Separated Storm Sewer System (MS4) NPDES permit (e.g., drainage system mapping, stormwater source control, structural stormwater control, illicit discharge detection & elimination, and drainage system operations and maintenance)
- Flood response
- Stream management
- Flow monitoring
- Sediment clean-up

There is more work to be done than resources (i.e., funds, staff time) available.

Key Project Elements: This initiative will develop a Drainage Roadmap that is similar to and complements this CMOM Roadmap. The roadmap development process will assist SPU with defining current work, identifying the direction for future drainage program development, and identifying and prioritizing gaps and opportunities. The initiative will also help balance investments between the wastewater and drainage business areas, ensuring a comprehensive approach across the DWW LOB.

This project will set the direction for SPU's drainage system capacity, management, operations and maintenance initiatives from 2017 to 2021. It will build on the information gathered during the preparation of the CMOM Roadmap Update and will follow a parallel development process.

The project will:

- Review existing drainage system programs, documentation (e.g., Stormwater Management Plan) and data sources and identifying ongoing SPU drainage activities.
- Develop an organizational matrix that maps drainage system management roles and responsibilities.
- Conduct a drainage self-assessment following EPA's "Guide for Evaluating Capacity, Management, Operations and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems" (2005) and adapted as appropriate for SPU's drainage system and stormwater management programs.
- Analyze improvement opportunities and develop those opportunities into Roadmap initiatives.
- Prioritize and sequence initiatives.
- Identify critical implementation requirements including SPU resources, levels of effort and budget estimates.

- Define a mechanism for input, feedback and approval of Drainage Roadmap initiatives and periodic (annual) revisions.

The deliverable is a Drainage Roadmap document, similar to this wastewater-focused CMOM Roadmap.

Level of Effort Estimate:

Staff time (SPU and Consultant):	Project duration:
☐ Low (<1000 hours)	☐ Short (<6 months)
☒ Medium (1000-5000 hours)	☒ Medium (6 months - 2 years)
☐ High (5000+)	☐ Long (>2 years)

Proposed Timeline:

Initiated in Q4 2016 and completed by Q4 2017

Key Team Members:

- Project Manager
- CMOM Program Management
- System Planner
- Stormwater Regulatory Compliance
- Drainage Subject Matter Expert
- Drainage System Operations
- Drainage Maintenance Planner

Related Projects:

- E8 - Implement Drainage and Wastewater Operations Control Center
- CAP4 - Develop Inflow and Infiltration Management Policy
- D1 - Assess Drainage Storage Facilities

Additional Notes: Many of the SPU drainage programs in place are related to compliance with the Stormwater NPDES permit. SPU does a good job at compliance with that permit and tracking and reporting on progress. It is important to note that the permit applies to the City of Seattle, with SPU as the manager of the permit. This is a different arrangement than the wastewater NPDES permit which is specific to SPU. SPU intends to develop a Drainage Master Plan starting in 2018 and to be completed by 2021.

APPENDIX A - Initiatives Grouped by Program Direction

In this table, SPU team members are identified first by their project role and work section, and then by name. Key team members are the people most involved in the project. It is expected that there will be additional subject matter experts, stakeholders and other reviewers involved as appropriate in each project. SPU will identify those additional people during more detailed project scoping. SPU expects that consultants will be assisting in this work, but they are not noted here.

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
Connectivity and Coordination	C1 - Improve Program Management and Communication	CMOM Program Management	- SAOM/CMOM	- Julie Crittenden - Ann Corbitt
		SharePoint Lead	- SAOM/CMOM	- Michelle Honeycutt
		CMOM Management Team	- Select DWW LOB section managers	- CMOM Management Team[8]
	C2 - Refine Performance Reporting	CMOM Program Management	- SAOM/CMOM	- Ann Corbitt - Julie Crittenden
		CMOM Management Team	- Select DWW LOB section managers	- CMOM Management Team
		Data Leads	- Key data managers and users	- TBD

[8] CMOM Management Team = Julie Crittenden, Ann Corbitt (CMOM), Deb Maxfield (Maintenance Strategy and Planning), Carrie Parker (All-City Crews), Dave Jacobs (SOPA), Leslie Webster (System Planning), Tracy Tackett (Capital Projects), Tanya Treat (CIP Design)

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
	C3 – Adaptively Manage Program Direction	CMOM Program Management	- SAOM/CMOM	- Julie Crittenden - Ann Corbitt
		CMOM Management Team	- Select DWW LOB section managers	- CMOM Management Team
	C4 - Improve SOP Management	CMOM Program Management	- SAOM/CMOM	- Ann Corbitt
		SharePoint Lead	- SAOM/CMOM	- Michelle Honeycutt
		CMOM Management Team	- Select DWW LOB section managers	- CMOM Management Team
Efficiencies	E1 - Improve Overflow Investigations	SSO Investigations	- SAOM/CMOM	- Vickie Kobayashi - Lori Randle - Michelle Honeycutt - Kelly Doyle
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
	E2 - Develop Condition Assessment Strategy	CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
		CCTV Inspections	- All City Crews	- Carrie Parker
		Crew Scheduling	- Maintenance Strategy and Planning	- Deb Maxfield/Other
		Condition Assessor	- SAOM/CMOM	- Jeff Williams

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
		GIS Analyst	- SAOM/Technical Services	- David Shin
		Sewer Rehab Program/Project Manager	- Sewer Rehab PDEB	- Glenn Hasegawa, Reed Blanchard or Susie Larson
	E3 - Develop Cleaning Strategy	Maintenance Strategist	- Maintenance Strategy and Planning	- Deb Maxfield
		Maintenance Planner/Analyst	- Maintenance Strategy and Planning	- Teresa Burch-Ko or Chris Baker
		District Crew Management	- North and South District Crews	- Andres Macadangdang - Ray Bernardez
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
	E4 - Expand Chemical Root Control	Chemical Root Control Program Manager	- Maintenance Strategies and Planning	- Gig Hudi - Deb Maxfield
		Maintenance Strategist	- Maintenance Strategies and Planning	- Deb Maxfield
		Data Analyst	- Work Management Support	- Chris Baker
		CMOM Program Management	-	- Vickie Kobayashi
	E5 - Upgrade Crew Facilities *South Crew Facility*	DWW LOB Representative	- System Maintenance	- John Holmes

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
	South Dewatering Facility	DWW LOB Representative	- SAOM/CMOM	- Julie Crittenden
	SPU Facility Master Plan	Project Managers	- Planning and Program Management	- Ben Marre
		DWW Maintenance	- System Maintenance	- John Holmes
		DWW Deputy Director	- DWW LOB	- Madeline Goddard
	E6 - Develop Renewal Strategy	CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
		Condition Assessor	- SAOM/CMOM	- Jeff Williams
		Engineering/Rehab/Small Project Delivery	- Sewer Rehab PDEB	- Glenn Hasegawa, Reed Blanchard or Susie Larson
		Sewer Rehab Crew	- All City Crews	- Carrie Parker
		Wastewater Planning	- System Planning	- Leslie Webster or Don Anderson
		GIS Analyst	- SAOM/Technical Services	- David Shin
		Corporate Asset Manager	- Corporate Services	- Lilin Li
	E7 - Develop Pump Station Condition Assessment	Pump Station Maintenance Planner	- Shared O&M/ Maintenance	- Ray Brown
		Pump station Capital Program Manager	- Capital Portfolio Management	- Alexander Mockos or Brent Robinson

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
		Maximo Specialist	- Work Management Support	- Bob Bleiler - Sharon Esdaille
		IT Specialist	- Technology Program Office	- Duncan Monroe
		Pump Station Maintenance Manager	- Shared O&M/ Maintenance	- Jeff Simmons
	E8 - Implement a DWW Operations Control Center	Project Manager	- SAOM/SOPA	- Dave Jacobs
		SOPA Technical Lead	- SAOM/SOPA	- Corinne DeLeon
		DWW LOB Representative	- Capital Portfolio Management	- TBD
		SCADA lead	- Shared O&M/SCADA	- Bob Keenan
		Electrical Instrumentation and Control Designer	- Engineering & Technical services/CIP Design	- Tim Kim
		Control Center Expert	- Shared O&M/ System Operations	- Tom Walker
	E9 – Increase Real-Time System Monitoring	Project Manager	- SAOM/SOPA	- Dave Jacobs
		Modeling Lead	- SAOM/Modeling	- Justin Twenter

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
		SOPA Technical Lead	- SAOM/SOPA	- Kevin McCracken
		SCADA Lead	- Shared O&M/SCADA	- Bob Keenan
		Control Center Coordinator	- SAOM/SOPA	- Corinne DeLeon
	E10 – Improve FOG Control at FSEs	FOG Program Manager	- Source Control and Pollution Prevention	- Gary Christiansen
		Fog Inspectors	- Source Control and Pollution Prevention	- TBD
	E11 - Increase Customer Side Sewer Education	Outreach and Education Project Manager	- Customer Service/ Resource Conservation	- Rachel Garrett
		DWW Communications Strategist	- Strategy and Communication	- Miles Mayhew
		Pollution Prevention Coordinator	- Source Control and Pollution Prevention	- Julie Howell
		Claims Representative	- Risk and Quality Assurance	- Lizzie Brodeen-Kuo
		CMOM Program Management	- SAOM/CMOM	- Ann Corbitt

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
	E12 - Develop Side Sewer Assistance Approach	Project Manager	- Planning, Policy and Regulatory Compliance	- Kevin Burrell
		Policy lead	- Planning, Policy and Regulatory Compliance	- Brian Landau
		Side Sewer Code Expert	- Planning, Policy and Regulatory Compliance	- Cris Horbelt
		Source Control Expert	- Source Control and Pollution Prevention	- Adam Bailey
		Customer Side Sewer Expert	- Customer Service/ Utility Services Team	- Michael Sullivan
		Service Equity Advisor	- Director's Office/ Environmental Justice and Service Equity Team	- Steve Hamai
	E13 - Develop Backup Prevention Policy	Project Manager/Policy Lead	- Planning, Policy and Regulatory Compliance	- Brian Landau
		Capital Project Planner	- Capital Portfolio Management	- Sahba Mohandessi
		Modeling Technical Lead	- SAOM/Modeling	- Justin Twenter
		Claims Representative	- Risk and Quality Assurance	- Lizzie Brodeen-Kuo
		Customer Side Sewer Expert	- Customer Service/ Utility Services Team	- Michael Sullivan

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
Capacity	CAP1 - Prepare Wastewater Model	Project Manager, Modeling Lead	- SAOM/Modeling	- Justin Twenter
		Modeling Technical Experts	- SAOM/Modeling	- Tai Ovbiebo - Sal Sailik
		System Planner	- System Planning	- Leslie Webster
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
		System Operations Technical Lead	- SAOM/SOPA	- Corinne DeLeon/other
	CAP2 – Develop Capacity Level of Service Policy	Project Manager/System Planner	- System Planning	- Leslie Webster
		Capital Project Manager	- Capital Portfolio Management	- Don Anderson
		Policy Lead	- Planning, Policy and Regulatory Compliance	- Brian Landau
		Modeling Technical Lead	- SAOM/Modeling	- Justin Twenter
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
		Project Delivery/Engineering	- Engineering and Technical Services/CIP Design	- Liz Anderson
	CAP3 - Develop Wastewater Master Plan	Project Manager	- Capital Portfolio Management	- Don Anderson

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
		System Planners	- System Planning	- Leslie Webster - Annalisa McDaniel
		Capital Planner	- Capital Portfolio Management	- Tracy Tackett
		Project Delivery/Design Engineer	- Engineering & Technical services/CIP Design	- TBD
		Modeling Technical Lead	- SAOM/Modeling	- Justin Twenter
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden
	CAP4 - Develop Inflow and Infiltration Management Policy	Project Manager/Policy Lead	- Planning, Policy and Regulatory Compliance	- Brian Landau
		Condition Assessor	- SAOM/CMOM	- Jeff Williams
		I&I Subject Matter Expert	- PDEB Project Management	- Grace Manzano
		Modeling Lead	- SAOM/Modeling	- Sal Sailik
		Engineering Lead	- Engineering & Technical services/CIP Design	- Susie Larson
Drainage	D1 – Assess Drainage Storage Facilities	Project Manager	- SAOM/SOPA	- Donna Pacanovsky
		SOPA Manager	- SAOM/SOPA	- Dave Jacobs
		Drainage Subject Matter Experts	- SAOM/Technical Services	- Deb Heiden - Joe Starstead

Program Direction	Initiative	Key Team Members	Division/Work Section	Proposed Staff
		Engineering Lead	- Engineering & Technical services/CIP Design	- TBD
		Maintenance Planner	- Maintenance Strategy and Planning	- TBD
		Stormwater Code Expert	- Planning, Policy and Regulatory Compliance	- Sherell Ehlers
	D2 - Develop a Drainage Roadmap	Project Manager	- TBD	- TBD
		CMOM Program Management	- SAOM/CMOM	- Julie Crittenden - Ann Corbitt
		System Planner	- System Planning	- Leslie Webster
		Stormwater Regulatory Compliance	- Planning, Policy and Regulatory Compliance	- Kate Rhoads or Kevin Buckley
		Drainage Subject Matter Expert	- SAOM/Technical Services	- Deb Heiden or Amy Minichillo
		Drainage System Operations	- SAOM/SOPA	- Donna Pacanovsky
		Drainage Maintenance Planner	- Maintenance Strategy and Planning	- Deb Maxfield/other