Seattle Public Utilities

Protecting Seattle's Waterways

Wastewater Collection System: 2022 Annual Report

March 31, 2023

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List of Abbreviations

Term	Definition
BMP	Best Management Practice
CMOM	Capacity, Management, Operations, and Maintenance
CSO	Combined Sewer Overflow
DOJ	U.S. Department of Justice
DNRP	King County Department of Natural Resources and Parks
DWO	Dry Weather Overflow
Ecology	Washington State Department of Ecology
EBI	King County Elliott Bay Interceptor
EPA	U.S. Environmental Protection Agency
FSE	Food Service Establishment
GSI	Green Stormwater Infrastructure (see also NDS, LID)
LID	Low Impact Development (see also NDS, GSI)
LTCP	Long-Term Control Plan
MG	million gallons
MGD	million gallons per day
NDS	Natural Drainage Systems (see also GSI, LID)
NPDES	National Pollutant Discharge Elimination System
PACP	Pipeline Assessment and Certification Program
Public Health	Public Health - Seattle & King County
RCM	Reliability Centered Maintenance
SCADA	Supervisory Control and Data Acquisition
SDOT	Seattle Department of Transportation
SOP	Standard Operating Procedure
SPU	Seattle Public Utilities
SSO	Sewer Overflow

SECTION 1

Introduction

This annual report was prepared to share information with the public on activities Seattle Public Utilities (SPU) is undertaking to improve its wastewater collection system and to meet state and federal regulatory requirements. The report includes updates on the Combined Sewer Overflow (CSO) Reduction Program and the Capacity, Management, Operations and Maintenance (CMOM) Program. The report is organized as follows:

- Section 1: Introduction
- Section 2: Planning Activities
- Section 3: Operation and Maintenance Activities
- Section 4: Capital Activities
- Section 5: Monitoring Programs and Results

Additional information is available at www.seattle.gov/cso.

1.1 The Wastewater Collection System

The City of Seattle's (City's) wastewater collection system is one of the largest in Washington State. It includes sanitary, combined, and partially separated combined sewers, as shown in Figure 1-1. In areas of the City served by sanitary sewers, stormwater runoff flows to a storm drainage system, and sewage is conveyed through City sewers to larger pipelines and treatment facilities owned and operated by King County Department of Natural Resources and Parks (DNRP). In areas of the City with combined sewers, stormwater runoff and sewage flow into the sewers and are conveyed to DNRP facilities. In areas of the City served by partially separated combined sewers, storm drain separation projects were built during the 1960s and 1970s to divert street runoff to the storm drainage system; rooftop and other private property stormwater runoff and sewage continue to flow into the combined sewers.

During storm events, the amount of stormwater in the combined sewers sometimes exceeds the collection system's capacity. When this happens, the collection system overflows through structures designed for this purpose. These wet weather overflows are called Combined Sewer Overflows (CSOs), and the structures where these overflows can occur are called CSO outfalls. There are currently 82 CSO outfalls in SPU's wastewater collection system. As shown in Figure 1-2, the combined sewer basins they serve are located along Lake Washington, the Ship Canal, Puget Sound, Elliott Bay, the Duwamish River, and Longfellow Creek. The goal of SPU's CSO Reduction Program is to reduce the number of CSOs from these outfalls to an average of no more than one per outfall per year based on a 20-year moving average. DNRP owns and operates an additional 39 CSO outfalls in the City of Seattle and has a similar program to reduce CSOs.

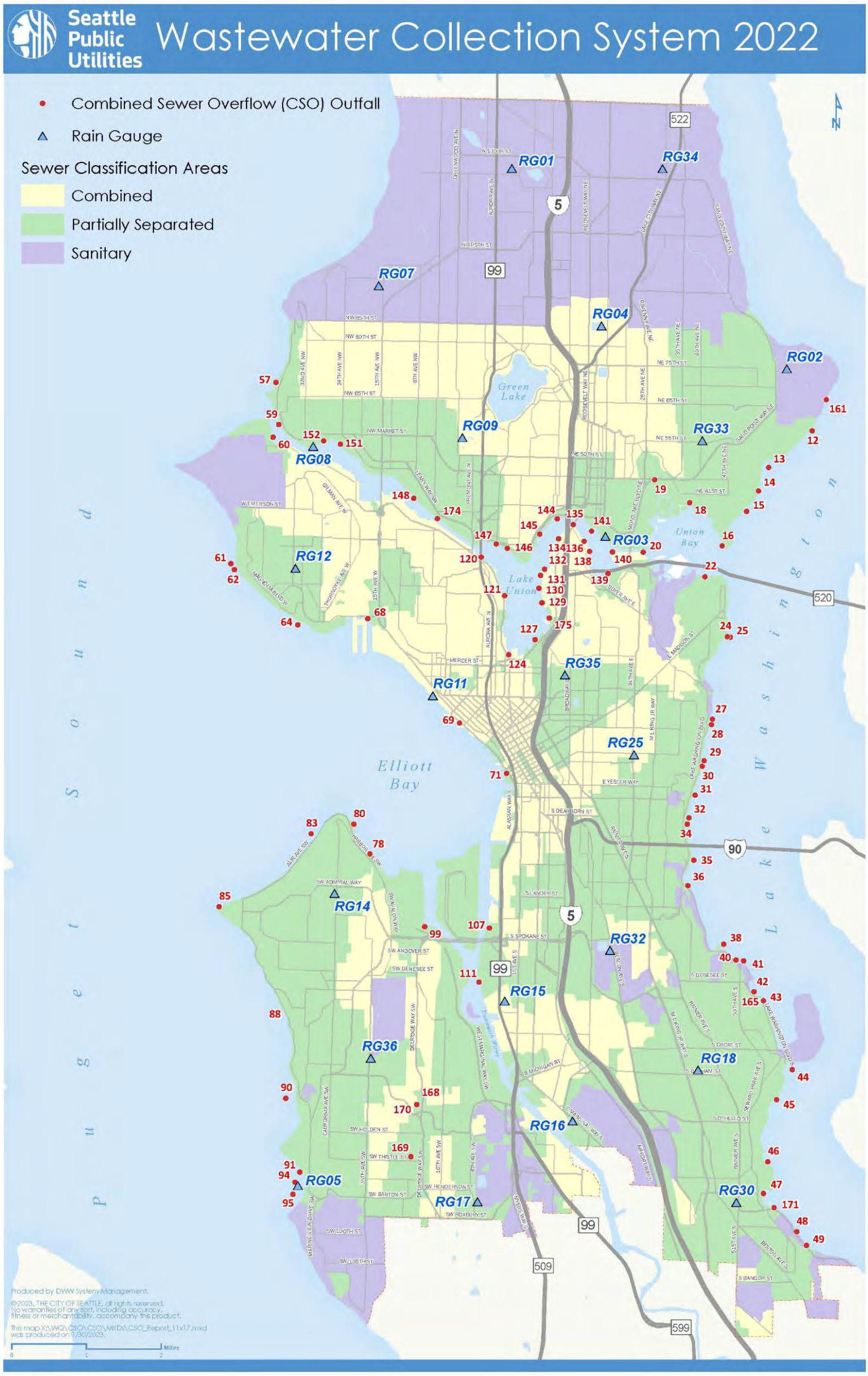

Figure 1-1. City of Seattle Sewer Classification Areas

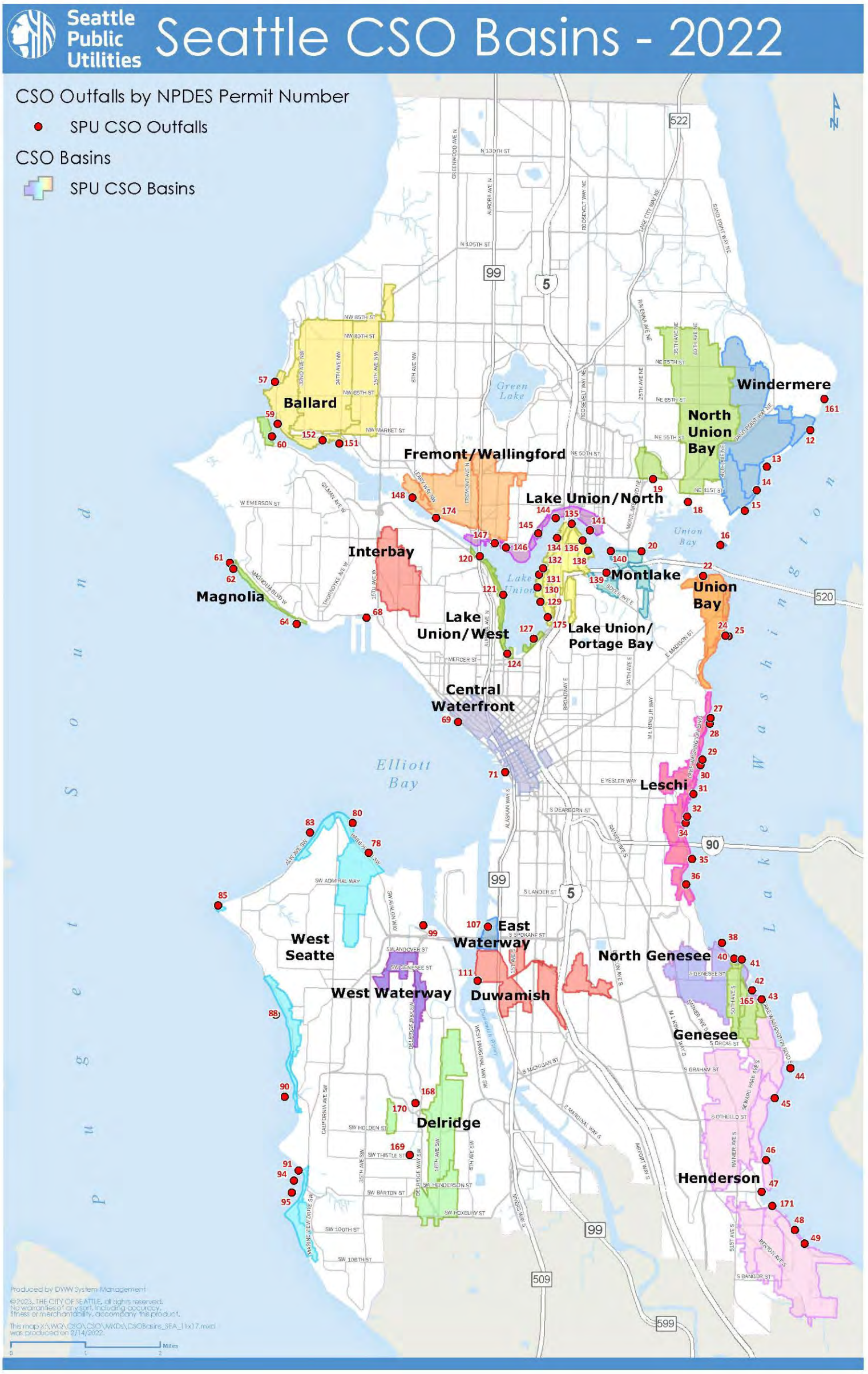

Figure 1-2. City of Seattle Combined Sewer Basins

1.2 Collection System NPDES Permit

The City's wastewater collection system is regulated by the Washington State Department of Ecology (Ecology), through a National Pollutant Discharge Elimination System (NPDES) Permit. Ecology first issued the City an NPDES Permit for CSO discharges in 1975. The permit has been reissued periodically (generally every 5 years), most recently as NPDES Permit WA0031682 issued on March 30, 2016, with an effective date of May 1, 2016. The permit was modified on September 28, 2017, and SPU applied for permit renewal on August 31st, 2020. Ecology reviewed the application and accepted it as complete on December 29, 2020, and administratively extended the permit until a new one is issued.

The NPDES Permit:

- Authorizes CSOs at the 82 outfalls shown in Figures 1-1 and 1-2.
    - Note: Outfall 33, which formerly served the Leschi area and is not shown on these figures, was removed from CSO service on July 22, 2016. Outfalls 150 and 151, which formerly served the Ballard area, were replaced with a single rehabilitated Outfall 151 effective February 27, 2019. Outfall 150 is not shown on these figures. Outfalls 70 and 72, which formerly served the Central Waterfront area and are not shown on these figures, were removed from CSO service on April 24, 2020, and May 26, 2020, respectively.
- Requires that SPU limit the number of CSOs from each controlled outfall to an average of no more than one per outfall per year, based on a 20-year moving average.
- Includes a compliance schedule for CSO control projects and other activities that must be completed by the permit expiration date.
- Prohibits overflows from the CSO outfalls during dry weather. Regardless of their cause (mechanical failure, blockage, power outage, and/or human error), such overflows are called dry weather overflows (DWOs). Based on guidance from Ecology, if the volume of a wet weather overflow is increased because of a mechanical failure, blockage, power outage, and/or human error, the event is called an exacerbated CSO.
- Requires SPU to report DWOs and overflows that occur elsewhere in the collection system (called sewer overflows, abbreviated SSOs, and including basement backups and overflows from maintenance holes and other collection system structures) within specific timeframes.
- Required SPU to apply for permit renewal by October 30, 2020.

1.3 Collection System Consent Decree

The City also must meet the requirements of a Consent Decree with the United States Department of Justice (DOJ), United States Environmental Protection Agency (EPA), and Ecology (Civil Action No. 2:13-cv-678; July 3, 2013). The Consent Decree achieves the following:

- Resolved EPA's and Ecology's complaints that the City had violated the Clean Water Act and its collection system NPDES Permit.
- Sets a schedule for the City to come into compliance with state and federal requirements for controlling CSOs.
- Requires the City to implement a performance based adaptive management approach to system operation and maintenance (O&M), to prevent DWOs and reduce the number of SSOs and exacerbated CSOs.
- Requires the City to work with King County to jointly develop and implement a Joint Operations and System Optimization Plan.
- Requires the City to report annually on Consent Decree required activities.
- Establishes penalties for non-compliance.

On August 6, 2019, SPU submitted a letter to DOJ, EPA, and Ecology describing its interest in renegotiating the terms of the Consent Decree. King County also has a Consent Decree with DOJ, EPA, and Ecology (Civil Action No. 2:13-cv-677; July 3, 2013), and DNRP submitted a similar letter to EPA and Ecology on October 28, 2019. Confidential negotiations involving DOJ, EPA, Ecology, SPU and DNRP were initiated in January 2020 and are ongoing. On March 26th, 2021, SPU submitted a letter to Ecology and EPA notifying the agencies of anticipated Consent Decree milestone violations.

1.4 Collection System Reporting Requirements

SPU's NPDES Permit requires submittal of the following types of reports:

- Monthly discharge monitoring reports. These document the volume, duration, precipitation, and storm duration for each CSO event and are due by the 28th of the following month.
- Reports of SSOs and DWOs. SPU must report any DWOs and certain types of SSOs (those that reach surface waters, the municipal storm system, or other areas with public access) immediately, by phone, to Ecology and Public Health – Seattle & King County (Public Health). Other SSOs must be reported to Ecology online or by phone within 24 hours. SPU must also file a written follow-up report within five days of each DWO or SSO, except those SSOs that are contained within buildings. SSOs that are contained within buildings are summarized quarterly in a spreadsheet.
- Engineering reports, plans, specifications, construction quality assurance plans, and post-construction monitoring plan reports. These are required for specific CSO reduction projects. Many of the due dates are specified in the permit.

Each of the 2022 monthly discharge monitoring reports was completed and submitted on time. All required engineering reports, plans, specifications, and construction quality assurance plans were submitted by their respective deadlines. All DWOs and almost all SSOs were reported by their respective deadlines, and all of the written follow-up reports were submitted on time.

In addition, both the NPDES Permit and the Consent Decree include annual reporting requirements. This report meets these annual reporting requirements. Table 1-1 lists the requirements and identifies where the information is provided.

Table 1-1. 2022 Annual Reporting Requirements		
Source	**Requirement**	**Report Location**
NPDES Permit		
S4.B	Detail the past year's frequency and volume of combined sewage discharged from each CSO outfall	Table 5-4
S4.B	For each CSO outfall, indicate whether the number and volume of overflows has increased over the baseline condition and, if so, propose a project and schedule to reduce the number and volume of overflows to baseline or below	Table 5-5, Section 5.3
S4.B	Explain the previous year's CSO reduction accomplishments	Section 4
S4.B	List the CSO reduction projects planned for the next year	Table 4-1, Section 4
S4.B	Document compliance with the Nine Minimum Controls	Section 3.1
S4.B	Include a summary of the number and volume of untreated discharge events per outfall	Table 5-6
S4.B	Determine and list which outfalls are controlled (no more than one overflow per year on average), using up to 20 years of past and present data, modeling, and/or other reasonable methods	Table 5-8
S4.B	Summarize all event-based reporting for all CSO discharges for the year	Tables 5-4, 5-6, 5-7
Consent Decree		
V.C.26	Report the metrics regarding sewer overflow (SSO) performance included in Appendix D, Paragraph E (1-7): a. SSO performance; b. Number of miles of sewer that were cleaned, inspected, and repaired/replaced/rehabilitated; c. Number of pump station inspections and the capacity of each pump station; d. Number of maintenance holes and force mains inspected and repaired/replaced/rehabilitated; e. Number and type of CSO regulators inspected; f. Summaries of inspections and cleanings of each CSO control structure; and g. Summaries of Fats Oil and Grease (FOG) inspections and enforcement actions taken the preceding year.	 a. Tables 3-3, 3-4, A-1 b. Table 3-1 c. Tables 3-1, A-2, A-3 d. Table 3-1 e. Table 3-1 f. Section 3.1.1 g. Section 3.3
V.D.28	Submit summaries of FOG inspections and enforcement actions taken during the previous year.	Section 3.3
VII.43.a.i	Describe the status of any work plan or report development	Section 2
VII.43.a.ii	Describe the status of any design and construction activities	Section 4

Table 1-1. 2022 Annual Reporting Requirements		
VII.43.a.iii	Describe the status of all Consent Decree compliance measures and specific reporting requirements for each program plan, including: a. The CSO control measures for the Early Action CSO Control Program (Henderson Basins 44, 45, 46, and 47/171); b. The Long-Term Control Plan; c. The Post-Construction Monitoring Program Plan; d. The CMOM Performance Program Plan; e. The FOG Control Program Plan; and f. The Joint Operations and System Optimization Plan between the City of Seattle and King County	a. Section 4.6.3 b. No changes c. Sections 5.4 and 5.5 d. Section 3.2 e. Section 3.3 f. Section 2.1
VII.43.a.iv	Provide the project costs incurred during the reporting period	Table 4-1
VII.43.a.v	Describe any problems anticipated or encountered, along with the proposed or implemented solutions	Sections 3.1.5, 4.1.3, 4.3.1, 4.5, 4.6, and 5.3
VII.43.a.vi	Describe the status of any wastewater collection system permit applications	Section 1.2
VII.43.a.vii	Describe any wastewater collection system reports submitted to state or local agencies	Section 1.4
VII.43.a.viii	Describe any anticipated or ongoing collection system O&M activities	Section 3
VII.43.a.ix	Describe any remedial activities that will be performed in the upcoming year to comply with the Consent Decree	Sections 4.6 and 5.3
VII.43.b	Describe any non-compliance with the requirements of the Consent Decree and include an explanation of the likely cause, the duration of the violation, and any remedial steps taken (or to be taken) to prevent or minimize the violation	Sections 4.3.1, 4.5, 4.6 and 5.3.
Appendix D, Paragraph E	Include the listed CMOM performance metrics.	Tables 3-1, 3-3, 3-4, A-1, A-2, and A-3, and Sections 3.1 and 3.3

SECTION 2

Planning Activities

In 2022, SPU continued planning efforts to help ensure SPU meets Clean Water Act, NPDES Permit, and consent decree requirements in a way that is cost-effective, community centered, and provides the most value to our customers.

2.1 Joint City of Seattle/King County Operations and System Optimization Plan

The City of Seattle's and King County's Consent Decrees direct both agencies to work together to develop a Joint Operations and System Optimization Plan (Joint Plan) and to review the Joint Plan every three years and update it as necessary. In developing the original Joint Plan (submitted to EPA and Ecology in February 2016), DNRP and SPU staff focused on areas in the system that have the greatest potential for operational optimization and developed a set of multi-basin joint commitments. These commitments were reviewed, updated, approved by SPU's Drainage and Wastewater Line of Business Branch Executive and DNRP's Wastewater Treatment Division Director, and included in the Joint Plan Update submitted to EPA and Ecology in January 2019.

The following describes each commitment and the progress made in 2022:

- The Joint System Event Debrief Committee commitment includes preparing for the wet season and debriefing after major storm events to exchange information, reviewing and updating emergency communication protocols between the agencies, discussing meteorological data, evaluating CSO performance, and assessing operational decision impacts on the combined system. To coordinate for the 2022/2023 wet season, a meeting was held in September 2022 to discuss pre-season maintenance activities, system changes, meteorological information, and emergency communication protocols.
- The Data Sharing commitment includes supporting a Joint Operations Information Sharing Team (JOIST), implementing a pilot project for sharing real-time SCADA data, developing data sharing protocols, and improving the regional ability to forecast storms and rainfall intensities.
    - JOIST held two meetings (January and May 2022) during which SPU and DNRP staff shared information on the operation of existing facilities, progress of capital projects, and coordination of Joint Plan commitments.
    - SPU and DNRP held two workshops, one in August and one in September, as part of the annual process to review flow monitoring data collected by each agency and provide recommendations for future monitoring.

  - In 2022, SPU and DNRP signed and approved a data sharing Memorandum of Agreement (MOA). SPU and DNRP are in process of implementing the recommended upgrades to the data sharing platform.

- The Joint Modeling Coordination Committee commitment includes sharing modeling tools and increasing understanding of modeling analyses and system operations while developing stronger working relationships between DNRP and SPU modeling staff and improving efficiencies through better coordination efforts. Members of the Joint Modeling Coordination Committee held meetings in 2021 to review modeling results and coordinate model developments between each agency. In 2021, DNRP completed hydraulic evaluation of the proposed Ship Canal Water Quality Project (SCWQP) 3rd Ave W diversion design. The North Interceptor/Ship Canal model was updated per the 90% drawings for Tunnel Effluent Pump Station (TEPS) and Ballard and per the 100% drawings for Wallingford. The model was updated with the proposed controls for TEPS, as described in the project process control descriptions. In 2022, SPU and DNRP shared modeling results from the Henderson CSO basin. SPU updated the Henderson North CSO model to represent the recent facility improvements while DNRP identified regional impacts to their system from recent SPU projects and are in the process of evaluating potential impacts from proposed SPU retrofits in the South Henderson CSO basins. The DNRP System Model was updated to include the recent SPU Central Waterfront project, the Georgetown Wet Weather Treatment Station, and an improved Interbay Pump Station control algorithm. In addition, these models are being transitioned to the latest versions of the modeling software. The joint modeling work plan, initially developed in 2018, is updated every six months to reflect current and future work. This plan will continue to provide a framework for coordination, standardization, and communication for upcoming modeling work.
- The Coordination during Startup and Commissioning of CSO Control Facilities commitment includes conducting document review, attending commissioning meetings, and implementing data sharing for SPU and DNRP CSO control facilities. In 2022, SPU commissioned Wastewater Pump Station 17 (Beacon Hill) and Wastewater Pump Station 38 (West Seattle), and provided an overview to DNRP during a JOIST meeting.
- The Real Time CSO Notification commitment includes revising both agencies' onsite signs and website information to improve notification of CSO events and communication with customers. See section 3.1.8.
- The Reduce Saltwater Intrusion commitment involves continuing to work together on studies, data, and solutions for reducing intrusion. In November 2021, DNRP and SPU held a coordination meeting to review saltwater intrusion monitoring conducted in 2021. In 2022, SPU and DNRP continued to discuss strategies for reducing saltwater intrusion.
- WTD and SPU kicked off the effort to complete the second update of the JOSOP in 2021, focusing on the progress made to each of the areas depicted above. The second update of the JOSOP was submitted to EPA and Ecology on February 28th, 2022.

2.2 Shape Our Water Plan

SPU's Drainage and Wastewater (DWW) Line of Business is developing Shape Our Water, a 50-year plan for Seattle's water resilience (formerly known as the Integrated System Plan). The purpose of Shape Our Water is to plan future infrastructure investments that improve water quality while providing the greatest community value. The effort will integrate planning across drainage and wastewater systems, emphasize engagement, and focus on leveraging effective partnerships to meet Seattle's infrastructure and receiving water body challenges. Additional information on the intent of this planning process is included at www.shapeourwater.org.

The Shape Our Water Plan is made up of four interrelated stages, described below and shown graphically in Figure 2-1:

- ***Analysis:*** In the data collection and analysis stage, we identified drainage and wastewater system and receiving water body challenges and opportunities and prioritizing the challenges based on risk. Three major comprehensive analysis projects were included in this stage: the Wastewater System Analysis, which was completed in 2019; the Drainage System Analysis, which was completed in 2020; and a drainage and wastewater system Seismic Risk Assessment, which was completed in 2021.
- ***Visioning:*** In the visioning stage, we set the vision and goals for the Shape Our Water plan. The vision was developed through collaboration with our community, City departments, and partner agencies and organizations. In 2020, SPU redesigned our engagement approach in response to COVID-19 related restrictions and shifts in community priorities. Engagement was launched in late 2020 and completed in 2021 (the final Community Vision document is available on www.shapeourwater.org).
- ***Planning:*** The planning stage will identify and sequence near- and long-term investment in the partnerships, programs and projects that will improve receiving water quality and the performance and resilience of our drainage and wastewater systems while optimizing social and environmental benefits for the City. SPU launched the planning stage in 2022 and anticipates substantial completion at the end of 2024.
- ***Implementation:*** The implementation stage will begin in 2024 when the plan is complete. To stay accountable to stakeholders, SPU will monitor and adaptively manage implementation, tracking against identified measures of success. While Shape Our Water is being developed, SPU is also piloting near-term integrated projects in Seattle's neighborhoods. This is an opportunity for SPU and our partners to explore innovative approaches and learn as we develop the plan.

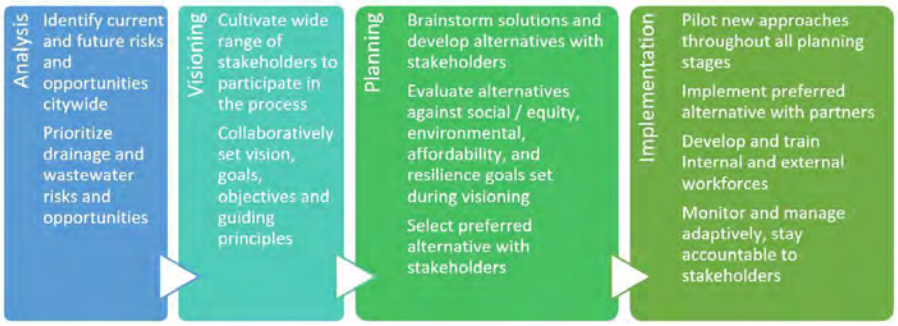

Figure 2-1. Shape Our Water Planning Process

2.3 Long Term Control Plan Update

SPU developed the 2015 Long-Term Control Plan (LTCP) and Integrated Plan (together the "Plan to Protect Seattle's Waterways") in compliance with the CSO reduction planning requirements of the Consent Decree.

In 2022, SPU initiated an LTCP Update process that will include joint CSO planning with DNRP and development of detailed area plans in specific CSO basins. Area plans will reduce CSOs and address short- and long-term drainage and wastewater needs, such as infrastructure capacity upgrades and rehabilitation, flooding, and climate resilience. Through these efforts, SPU will work to help ensure that future CSO investments achieve the Community Vision for Shape Our Water. The LTCP Update is an important opportunity for SPU to partner with other City departments and agencies to deliver community benefits, including mobility, open space, and livability improvements.

Work completed in 2022 to support the LTCP Update included contract solicitation and consultant selection, early project scoping, and hiring of a lead staff person. Progress will continue in 2023 and includes project chartering and preparation necessary to begin area planning in 2024. Completion of the LTCP Update is anticipated in 2026.

SECTION 3

Operation & Maintenance Activities

This section describes the operation and maintenance (O&M) activities SPU undertakes to reduce the number and volume of sewer overflows, dry weather overflows (DWOs), and combined sewer overflows (CSOs).

3.1 Nine Minimum Control Activities

The Federal CSO Control Policy requires municipalities with combined sewer systems to implement nine measures that help reduce the number and volume of sewage overflows without extensive engineering

studies or significant construction costs. The following paragraphs describe the work that was performed in 2022 on each of these nine control measures.

3.1.1 Control 1: Provide System Operations & Maintenance (O&M)

Reduce the magnitude, frequency, and duration of CSOs through proper operation and maintenance (O&M) of the combined sewer system.

Each year SPU performs extensive system O&M activities to reduce the frequency and volume of preventable overflows. Routine maintenance activities include sewer inspections, cleaning, and non-emergency point repairs; catch basin inspection, cleaning, and repairs; control structure and storage structure cleaning; valve and flap gate inspection, cleaning, lubricating, and servicing; and pump station electrical, mechanical, and facilities inspection and servicing.

Figure 3-1. 2022 Inspection and Cleaning in Laurelhurst

SPU uses the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) defect coding system to identify and prioritize pipes to be scheduled for maintenance or rehabilitation. Once a sewer has been identified as having a maintenance-related problem, the sewer is placed on a routine cleaning schedule to prevent future overflows. The initial

cleaning frequency is based on the cause of the initial overflow, and the cleaning frequency is increased or decreased over time as appropriate. Corrective activities include:

- Jetting, for light to medium debris;
- Hydrocutting, for roots and/or grease;
- Rodding, for pipes with an active blockage; and
- Chemical root treatment when roots are present with no grease.

SPU's preventive sewer maintenance frequencies range from once a month to once every ten years. The challenge for sewer utilities is to clean sewers as frequently as necessary to maintain system capacity but no more than necessary, as cleaning sewers shortens the sewer's functional life span.

SPU inspects each of its 93 CSO control structures upstream of its 82 CSO outfalls. The control structures are inspected one to four times per year. During these inspections, crews make observations about flow, water level, sediment, debris, signs of infiltration, structural integrity, and whether the structure is operating as intended. Those observations lead to recommendations for cleaning, repair, and rehabilitation. The crews also perform any needed cleaning and make any necessary repairs. The 2022 inspections showed that the structures were generally in good working condition and did not require any extensive repair.

Pump station electrical and mechanical components are replaced as necessary during pump station maintenance. Since 2008 SPU has used Reliability Centered Maintenance (RCM) at its wastewater pump stations. The objective of RCM is to help ensure the right maintenance is performed at the right intervals, which in turn optimizes life cycle costs while increasing system reliability. In addition, RCM helps ensure the right data is collected and evaluated, adding discipline to decision-making around operations, spare parts inventory, maintenance strategies, and data collection. SPU continues to use, evaluate, and adjust its RCM-based strategies.

3.1.2 Control 2: Maximize Storage of Flows

Maximize the use of the collection system for wastewater storage, in order to reduce the magnitude, frequency, and duration of CSOs.

SPU maximizes storage in its collection system through a multi-faceted approach that includes:

- Regular collection system maintenance, so that existing capacity is available during storm events;
- Ongoing monitoring and evaluation of storage use during storms;
- Modification of storage facilities whose existing capacity is not fully utilized;
- Increasing the height of overflow weirs, when doing so increases collection system storage capacity without creating backups; and
- Eliminating excessive inflow and infiltration.

In 2022, SPU continued to design and construct sewer system improvements to better utilize existing sewer system capacity. Work on these improvements is described in Section 4.1. SPU is also working to optimize the operation of recently constructed storage facilities, as described in Section 4.6.

Table 3-1. 2022 O&M Accomplishments

Activity	Quantity
Miles of mainline pipes cleaned	213.88
Miles of wastewater mainline pipes CCTV	239.02
Miles of mainline pipe repaired/replaced/rehabilitated	4
Number of pump station inspections[1]	818
Number of maintenance holes inspected	65
Number of force mains repaired/replaced/rehabilitated	1
Number of CSO structures inspections	227
Number of CSO structures cleanings	394
Number of CSO HydroBrake inspections	212
Number of CSO HydroBrake cleanings	16
Linear ft of pipe receiving chemical treatment to inhibit root intrusion	146,312
Number of catch basins inspected	13,191
Number of catch basins cleaned	2,102
Number of catch basin repaired	10
Number of catch basin traps replaced	43

1. See Tables A-2 and A-3 for pump station capacity and inspection details.

3.1.3 Control 3: Control Nondomestic Sources

Implement selected CSO controls to minimize CSO impacts resulting from nondomestic discharges.

Two important programs are implemented to help control nondomestic discharges into the Seattle sewer system: The Fats, Oils, and Grease (FOG) Control Program and the Industrial Pretreatment Program.

SPU Wastewater Source Control administers the City's FOG Control Program. This program enforces Seattle Municipal Code requirements relating to prohibited discharge limits and the requirement to pretreat FOG-laden wastewater before discharge to the City sewer system. FOG has a deleterious effect on the sewer system when it undergoes the process of saponification. In this process, FOG chemically reacts with calcium in the wastewater to form hardened, soap-like deposits. As shown in Figure 3-1, the deposits adhere to the inside of sewers and decrease system capacity or cause blockages. These conditions can lead to sewer overflows. SPU enforces this code on commercial and institutional kitchen

facilities and other nondomestic sources through a regulatory education, inspection, and enforcement program. FOG control inspection and enforcement activities conducted in 2022 and work planned in 2023 are summarized in Section 3.3.

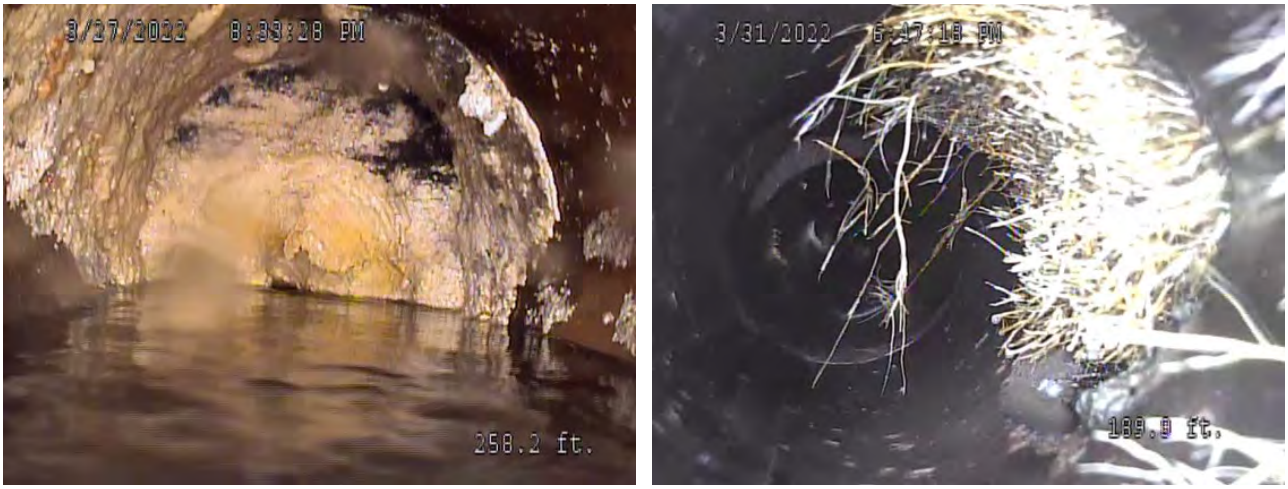

Figure 3-2. 2022 Private side sewer connections demonstrating visible FOG accumulations and impacts from root intrusion

The Industrial Pretreatment Program is administered by King County Wastewater Treatment Division – Industrial Wastewater Program (KCIW). KCIW issues industrial wastewater pretreatment permits that include appropriate discharge limits and conducts regular site inspections and periodic permit reviews. SPU reviews KCIW permits issued to industries as well as CCTV footage of the collection system to assess negative impacts. Industrial discharges found to have negatively impacted the collection system are referred to KCIW for potential enforcement and/or permit modification.

3.1.4 Control 4: Deliver Flows to the Treatment Plant

Operate the collection system to maximize flows to the treatment plant, within the treatment plant's capacity.

SPU maximizes flow to the treatment plant by implementing the measures described in Controls 1 and 2 and by providing ongoing system performance monitoring and analysis.

SPU's Control Center is staffed 24 hours a day and receives real-time Supervisory Control & Data Acquisition (SCADA) information. Control Center staff respond to any alarms at the pump stations that indicate a drop in performance or other problem. In addition, SPU monitors pump station, overflow structure, and outfall flow data as it is collected and uses the data to detect maintenance issues that may be affecting system performance.

In 2022, SPU completed rehabilitation projects at Wastewater Pump Station 17 (Beacon Hill) and Wastewater Pump Station 38 (West Seattle). Each is expected to decrease the frequency and volume of CSOs and maximize flows to the treatment plant.

Following construction completion of any facility that includes operable equipment, SPU completes a stabilization phase. Stabilization includes monitoring and analysis to help ensure the facility is functioning as intended. SPU completed the stabilization phase for the completed sewer system improvement project in East Montlake (Basin 20) in 2022. SPU began the stabilization phase for Wastewater Pump Station 17 (Beacon Hill) and Wastewater Pump Station 38 (West Seattle), which are expected to be complete in 2023.

3.1.5 Control 5: Prevent Dry Weather Overflows

Prevent dry weather overflows; they are not authorized. Report any dry weather overflows within 24 hours and take prompt corrective action.

To help prevent DWOs and exacerbated CSOs, each combined sewer system overflow location is configured with an alarm that is triggered if there is a likely overflow condition. The alarm alerts analysts and/or field crews to assess the situation and take corrective action if possible. In addition, whenever SPU experiences a DWO or exacerbated CSO, SPU investigates to identify the cause and takes action to reduce the possibility of recurrence.

There was one DWO in 2022. On November 13, 2022, 91,599 gallons of sewage overflowed from Outfall 174 to the Lake Washington Ship Canal due to a City contractor-operated pump and bypass system failure. To prevent recurrence, the contractor staffed the bypass 24/7 for the remainder of the bypass phase.

There were two exacerbated CSOs in 2022, as follows:

1. During a rain event on November 6, 2022, the CSO at Outfall 20 was exacerbated by pump failure at Wastewater Pump Station 13. The total CSO volume was 108,504 gallons.
2. During a rain event on November 29, 2022, the CSO at Outfall 138 was exacerbated by a gate actuator malfunction at the CSO 36 facility. The total CSO volume was 88,700 gallons.

A summary of the DWOs, exacerbated CSOs, and exacerbated sewer overflows from 2017-2022 is included in Table 3-2.

Table 3-2. Dry Weather Overflows (DWOs) and Combined Sewer Overflows (CSOs) and Sewer Overflows Exacerbated by System Maintenance Issues 2017 – 2022

Year	DWOs[1]		CSOs and Sewer Overflows Exacerbated by System Maintenance Issues[1]	
	No. of Overflows	Volume (gallons)	No. of Overflows	Volume (gallons)
2017	0	0	8	465,938
2018	0	0	4	591,114
2019	3[2]	52,205	2	197,886
2020	1	1,892	3[3]	730,808
2021	4	61,533	0	0
2022	1	91,599	2	197,204

1. *DWOs and exacerbated CSOs are included in the table listing all 2022 overflows (Table 5-4). Exacerbated CSOs are also included in the table comparing 2022 CSOs with 2010 baseline (Table 5-5), the tables comparing 2017-2022 discharges (Tables 5-6 and 5-7). and the table assessing whether outfalls meet the CSO performance standard (Table 5-8). Exacerbated Sewer Overflows are not included in Tables 4-5 through 5-8.*
2. *One of these DWOs was caused by a non-City entity.*
3. *One of these events (approximately 250,000-500,000 gallons, conservatively listed as 500,000 gallons in Table 3-2) was an Exacerbated Sewer Overflow.*

3.1.6 Control 6: Control Solids and Floatable Materials

Implement measures to control solid and floatable materials in CSOs.

SPU implements several measures to control floatables, as summarized in the following paragraphs.

Catch basins are designed to prevent floatables from entering the system. Specifically, SPU's catch basins are designed to overflow only when the water level in the catch basin is well above the overflow pipe opening. Because floatables remain on the water surface, they are trapped in the catch basins. Catch basins are inspected and cleaned regularly to remove debris and potential floatables. Catch basin inspection, cleaning, and rehabilitation metrics are included in Table 3-1.

In 2022, SPU continued its Protect Your Pipes: Flush Only Toilet Paper pilot outreach campaign to educate customers that only toilet paper and human waste should be flushed down the toilet. This campaign built on knowledge and materials developed in preceding years. Initial survey, outreach, and focus group results were used to develop new graphics and animated social media materials with three colleges in Seattle: The University of Washington, Seattle University, and Seattle Pacific University. SPU also posted targeted social media ads on Instagram, YouTube, and Spotify via the universities' zip codes. Baseline and post outreach surveys were used to assess how effective the outreach campaigns were. Post outreach surveys showed that students' understanding of sewer system impacts of flushing wipes and other unflushable items increased, and that their rate of flushing wipes decreased by an average of 18 percent.

SPU worked together with Seattle Housing Authority to conduct research in 2020-2021 to inform the development of custom wastewater outreach door hangers. In 2022, SPU delivered 528 wastewater door hangers to five Seattle Housing Authority properties in clog hotspot areas.

In 2022, SPU also provided wastewater site assessment assistance to 224 commercial businesses, including providing stall signage to 79 businesses.

In addition, the City of Seattle runs several solid waste and city cleanup programs to prevent and reduce the amount of street litter, including:

- Street sweeping, including increased efforts for Fall leaf pickup,
- Spring clean,
- Storm drain stenciling,
- Event recycling,
- Public litter and recycling cans,
- Waste free holidays,
- Product bans, and
- Illegal dumping investigation and response.

3.1.7 Control 7: Prevent Pollution

Implement a pollution prevention program focused on reducing the impact of CSOs on receiving waters.

Source Control Pollution Prevention Program

SPU has a fully developed source control program that has been in place since the early 2000's. The program is authorized by the City of Seattle Stormwater Code and Side Sewer Code. The program implements the following source control actions in the City's combined sewer basins:

- Spill Response: SPU performs spill response activities city-wide using a 24 hour per day, 7 day per week call out system. SPU Spill Responders respond to the site, assess the impact and procure resources to mitigate or clean up the spill.
- Water Quality Complaint Investigations: SPU responds to water quality complaints city wide. This program provides outreach and education on proper Best Management Practices (BMPs) to residents and businesses within the City.
- Business Inspections: SPU conducts business inspections to assess how businesses are implementing proper BMPs based on their onsite activities. SPU conducts these inspections in combined sewer basins as resources allow.
- Stormwater Facility Inspections: SPU conducts maintenance inspections of privately-owned stormwater facilities to assess how property owners are maintaining their drainage systems. SPU conducts these inspections in combined sewer basins as resources allow.

Public Education

SPU continued to implement the invigorated Adopt-a-Drain program that was re-launched in 2021. Other SPU public education programs include spring clean, green cleaning, surface water pollution report line, event recycling, and reduce, reuse, and recycle tips. Additionally, SPU works with other City departments on Trees for Seattle, promoting residential tree planting, and with King County on promoting green stormwater infrastructure. SPU's Wastewater Education program includes side sewer maintenance, proper disposal of cooking oil, and what not to flush, described in more detail in Sections 3.1.3 and 3.1.6.

Street Sweeping

Street Sweeping continued in 2022 to reduce the amount of pollutants entering the sewer system. The Seattle Department of Transportation (SDOT) performs street sweeping, including street sweeping downtown streets every night and cleaning alleys three nights per week. In 2022, SDOT street sweeping crews swept 8,530 miles in the SPU combined sewer area, removing 1,255 short dry tons of debris from the street.

Illegal Dumping

The City has made it easier for anyone to report illegal dumping and other issues via the Find It, Fix it app available for mobile phones. In 2022, SPU received 26,879 illegal dumping complaints from customers. More than 919,760 pounds of debris were removed from Seattle's public property. One hundred percent of complaints were addressed in 10 days or less.

Other Pollution Prevention Programs

- Clean City Program: SPU's Clean City Program invests $4 million/year into new and existing programs to clean up litter and garbage across the city. The program pulls together and expands efforts from SPU in concert with Seattle Parks and Recreation and SDOT. These departments work together to service litter collection routes; provide parks and neighborhoods maintenance and trash, debris, and needle collection; and provide trash pick-up from encampments and RVs.
- RV Wastewater Program: The RV Wastewater Program was initiated by SPU's Source Control and Pollution Prevention Division as a response to an increasing frequency and severity of spills of sewage from RVs. Begun in early 2020 as a pilot effort, the program has evolved to provide an offer of monthly wastewater disposal service to RV owners parked and living on Seattle streets. In 2022, the program provided 1,674 wastewater collections. The effort appears to be reducing both the quantity and severity of sewage spills from RVs.

Legal Authority and Administrative Procedures Used for Program Implementation

The following City of Seattle codes provide authority to implement the pollution prevention program in the City's combined sewer basins:

- The Side Sewer Code (SMC 21.16) regulates side sewers and, for example, prohibits discharge of certain materials; requires repair of inoperative or inadequate sewers, drains, or natural

watercourses; and regulates the construction, alteration, repair, and connection of side sewers and service drains. The Side Sewer Code was last substantially amended in 2010, signed by the Mayor on December 20, 2010, and effective on January 5, 2011.

- The Stormwater Code (SMC 22.800-22.808) provides the City with the legal authority to address discharges to the combined sewer system owned and operated by Seattle Public Utilities (SMC 22.800.030.C). The Stormwater Code was revised and became effective July 1, 2021.

Appropriate BMPs

BMPs to be used at businesses and properties are described in the City of Seattle Stormwater Manual, Volume 4: Source Control. The Manual details BMPs that the Stormwater Code requires city-wide and that are appropriate pollution prevention steps in combined sewer basins. The following BMPs from the City of Seattle Directors' Rules SDCI 17-2017/DWW200, Volume 4: Source Control are appropriate for preventing pollution in combined sewer overflow basins:

- BMP1: Eliminate Illicit Connections - All properties are required to examine their systems and obtain permits and eliminate illicit connections if found.
- BMP2: Perform Routine Maintenance - All properties are required to (a) conduct annual inspections of all conveyance, catch basin, detention and treatment systems and (b) maintain the systems per thresholds described in Appendix G of the Directors' Rule. Solids and polluted water removed from these systems must be properly disposed.
- BMP 3: Dispose of Fluids and Wastes Properly - All properties must properly dispose of solid and liquid wastes and contaminated stormwater and sediment.
- BMP 4: Proper Storage of Solid Wastes - All properties are required to implement proper solid waste storage and disposal practices.
- BMP 5: Spill Prevention and Cleanup - Businesses and real properties that load, unload, store, or manage liquids or erodible materials (e.g., stockpiles) must maintain spill plans, equipment and practices to prevent and clean spills, and must follow notification procedures for spills to the drainage and sewer systems.
- BMP 6: Provide Oversight and Training for Staff - Businesses and public entities that have activities requiring BMPs are required to have trained personnel for their implementation.
- BMP 7: Site Maintenance - Businesses and public entities that involve materials or wastes that may come into contact with stormwater are required to implement proper housekeeping practices to minimize discharge of contaminants. Such practices include inspections, avoidance measures (containment, covering, or locating activities away from drainage systems), and sweeping and cleaning procedures.
- BMP 8: Rooftop Dog Runs – Rooftop dog runs must be sized to minimize the volume of stormwater discharged to the sanitary sewer or combined sewer systems.

In addition to implementing BMP's 1-8 for all real property, SDCI 17-2017/DWW200, Volume 4: Source Control also includes minimum requirements for all businesses and public entities for specific activities

that occur in Seattle's drainage basins. For all discharges, source controls shall be implemented to prevent prohibited discharges and prevent contaminants from coming in contact with drainage water or being discharged to the drainage system, public combined sewer, or directly into receiving waters:

- BMP 9: Fueling at dedicated stations, for new or substantially altered fueling stations.
- BMP 10: Mobile fueling of vehicles and heavy equipment.
- BMP 11: In-water and over-water fueling.
- BMP 12: Maintenance and repair of vehicles and equipment.
- BMP 13: Concrete and asphalt mixing and production.
- BMP 14: Concrete pouring, concrete/asphalt cutting, and asphalt application.
- BMP 15: Recycling, wrecking yard, and scrap yard operations.
- BMP 16: Storage of liquids in aboveground tanks.

Source controls include, but are not limited to, segregating or isolating wastes to prevent contact with drainage water; enclosing, covering, or containing the activity to prevent contact with drainage water; developing and implementing inspection and maintenance programs; sweeping; and taking management actions such as training employees on pollution prevention.

3.1.8 Control 8: Notify the Public

Implement a public notification process to inform the citizens of when and where CSOs occur.

SPU, together with Public Health - Seattle & King County, maintains a sewage overflow notification and posting program for Seattle's CSO outfalls. Signs at each outfall identify the outfall and warn of possible combined sewage overflows. The signs previously included the phone number for the CSO Hotline, staffed and managed by Public Health. Public Health also provided a website with detailed information about CSOs, potential public health hazards, and precautions the public may take to protect themselves. In 2019 SPU and DNRP finished an updated design for signs identifying CSO outfalls. The design includes the website address to obtain CSO status, multiple languages, a larger size for visibility, and a new phone number directed to SPU's Operations Response Center, which serves as a single point of contact for both SPU and DNRP CSO outfalls located in the City of Seattle. Installation of the signs at DNRP CSO outfalls was completed in 2019. Installation of the signs at SPU's CSO outfalls was partially completed in 2021 and 2022 due to O&M staffing reductions resulting from the COVID-19 pandemic. SPU is planning to complete installation of the signs at the remaining CSO outfalls in 2023.

Figure 3-3. New CSO Outfall Sign

In addition, King County DNRP has hosted an overflow website since December 2007, providing a map of recent and current DNRP CSOs. In 2009, SPU and DNRP worked together to incorporate SPU information on the DNRP website. In 2015, SPU and DNRP worked together as part of their Joint Operations and System Optimization Plan activities to make the map more user-friendly and interactive and to increase the map information refresh rate. Now the community is able to access near real-time information to assist them in making choices about use of local waters. Figure 3-3 is a screen shot of the zoomable map displayed on the publicly accessible DNRP website.

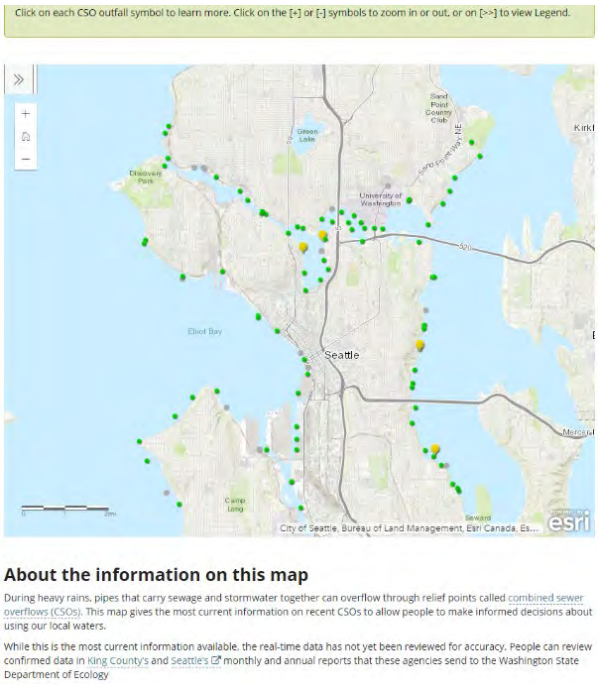

Figure 3-4. CSO Overflow Site Screen Shot

3.1.9 Control 9: Monitor CSOs

Monitor CSO outfalls to characterize CSOs and the effectiveness of CSO controls.

SPU monitors each of its CSO outfalls to detect sewage overflows. SPU also tracks the performance of its flow monitors to help ensure consistent, high-quality measurements. The flow, precipitation, and flow monitor performance monitoring programs and results are summarized in Section 5 of this report.

3.2 CMOM Performance Program Activities

SPU develops and implements program roadmaps that identify program work and improvements for multi-year periods. SPU completed its last plan in 2020, developed a new 5-year plan in 2021, and began implementation of the new plan in 2022. The plans include initiatives in the following core program areas, among others:

- Sewer cleaning;
- Sewer condition assessment; and
- Sewer rehabilitation.

3.2.1 Sewer Cleaning Initiatives

The purpose of the sewer cleaning initiatives is to improve the quality and efficiency of sewer cleaning by standardizing procedures, measuring and tracking the quality of cleaning efforts, providing feedback to crews, and using technology to help identify where changes in cleaning frequency should be considered. Work completed in 2022 and planned for 2023 includes:

- Chemical Root Control Application, Evaluation and Increased Root Cleaning – In an effort to address the root cause of most sanitary sewer overflows, SPU has significantly increased the annual application of chemical root control agents since 2018. In 2022, that increased level of investment continued with nearly 28 miles treated in pipes with known root intrusion. In 2022, SPU completed a comprehensive review of the pipes selected for treatment to help ensure chemical root control activities are most effectively and efficiently applied. In 2023, SPU will continue to target known root hotspots with chemical root control agents.
- Maintenance Strategy – In 2018, SPU began reviewing planning and scheduling processes and preventive maintenance schedules to help ensure maximum efficiency of our cleaning activities. During the first review, sixty percent of the preventive maintenance schedules were validated or fine-tuned. This effort gained newfound attention in 2020 considering COVID-19 related staffing shortages and an even greater need for efficiency. In 2022, SPU started a sewer cleaning optimization project to further refine decision-making around the frequency of maintenance activities. This work will continue into 2023, with an emphasis on coordinating various maintenance activities (e.g., FOG prevention, root control, sewer cleaning) into a coordinated maintenance strategy.

3.2.2 Sewer Condition Assessment Initiatives

The purpose of the condition assessment initiatives is to reduce the risk of sewer overflows through greater understanding of the wastewater collection system condition, leading to more informed decisions about the maintenance and rehabilitation of its components. Work completed in 2022 and planned for 2023 includes:

- Condition Assessment Strategy/Management Areas – In 2017, SPU developed a new approach for scheduling inspection and condition assessment of the entire wastewater collection system every ten years. The system was divided into 100 Management Areas based on system hydraulics, the design and flow of the system, and discharge points to the DNRP system. SPU then developed and applied prioritization criteria and adjusted for practical implementation factors. Work was delayed in 2020 due to COVID-19 staffing shortages and was resumed in 2021. In 2022, SPU caught up on work from 2020/2021 and now plans to complete the first inspection of the entire wastewater collection system by 2024.
- Condition Assessment Strategy Update – In 2022, SPU began planning for the second 10-year cycle of the Condition Assessment Strategy (2023-2033). As discussed in Section 3.2.3 below, continued inspection of the wastewater pipe system every ten years is critical to the Sewer Rehabilitation Strategy. The Rehabilitation Strategy relies on accurate and timely pipe condition information to support rehabilitation project planning and delivery. The risk-based schedule for systematically renewing the pipe system from the Rehabilitation Strategy heavily influenced the update of the Condition Assessment Strategy. In 2023, SPU will be implementing the second 10-year cycle of the Condition Assessment Strategy.

3.2.3 Sewer Rehabilitation Initiatives

The purpose of the rehabilitation initiatives is to prioritize and complete sewer rehabilitation in a timely, efficient, and cost-effective manner. Work completed in 2022 and planned for 2023 includes:

- Rehabilitation Strategy – In 2017, SPU began developing a comprehensive wastewater collection system Rehabilitation Strategy that documents SPU's priorities, our approach to making system rehabilitation investments, and process improvements to improve efficiency. As a part of this effort, SPU has implemented a new risk management software, adopted project delivery process improvements, and completed a long-term capital investment forecast. In 2022, SPU initiated a Rehabilitation Strategy to prioritize capital projects based on risk and equity and establish a planning level capital portfolio. This work includes initiating and executing annual capital projects to repair high risk pipes beginning in 2022.
- Increased Rehabilitation Budget – SPU has increased sewer rehabilitation funding each year since 2013. Sewer renewal spending in 2022 was $29.5 million. SPU plans to continue increasing investment in sewer renewal, spending up to $35 million per year by 2041.

3.2.4 SSO Performance

There were 48 confirmed sewer overflows in 2022, and they are summarized by cause in Table 3-3. The greatest number of sewer overflows were caused by roots and structural failure - gravity (9 events each). Additional information about these overflows can be found in Table A-1 in Appendix A.

On December 27, 2022, the South Park neighborhood experienced a major flooding event when the Duwamish River overtopped its banks due to a combination of king tides, pre-spring snowmelt, a low barometric pressure system, strong onshore westerly winds, and stormwater runoff. The City was unable to conduct routine site investigations to confirm sewer overflows because the entire system was under water. SSO information was gathered through field observations, historical knowledge of system operation, bacteria testing, and anecdotal information from homeowners.

Table 3-3. 2022 Sewer Overflows by Category

Category	Primary Cause of Sewer Overflows	Number of 2022 Sewer Overflows
1	Roots	9
2	FOG	2
3	Debris	3
4	Structural Failure – Gravity	9
5	Structural Failure – Force Main	0
6	Capacity – Gravity	2
7	Pump Station – Mechanical	1
8	Pump Station - Capacity	5
9	Power Outage	0
10	Operator Error	0
11	Maintenance Error	1
12	Pressure Release	0
13	City Construction	4
14	New Facility Startup	0
15	Private Side Sewer Issue	2
16	Capacity – King County	4
17	Private Construction	4
18	Other Agency Construction	0
19	Vandalism	2
20	Extreme Weather Event (≥25year)	1
	Total for Categories 1 – 20	**49**
	Total for Categories 1 – 15	**38**

SSO performance for the years 2013 through 2022 is summarized in Table 3-4. SSO performance measures the effectiveness of SPU's CMOM Program and helps ensure SPU is focusing its efforts on activities that help prevent sewer overflows. For these reasons, the SSO performance calculation excludes sewer overflows that are beyond SPU's ability to control, including sewer overflows caused by extreme weather events (for example, rainfall with a recurrence interval of 25 years or more), other agency construction, private construction, King County capacity and vandalism. This table shows that SPU is continuing to meet the performance target of no more than 4 SSOs per 100 miles of sewer per year, based on a two-year moving average.

Table 3-4. 2013-2022 SSO Performance

Year	Number of SSOs[1]	SSOs/100 Miles of Sewer[2]	2-Year Average SSOs/ 100 Miles of Sewer
2013	40	2.8	3.3
2014	36	2.5	2.7
2015	72	5.1	3.8
2016	38	2.7	3.8
2017	41	2.9	2.8
2018	14	1.0	1.9
2019	22	1.5	1.3
2020	44	3.1	2.3
2021	43	3.0	3.1
2022	38	2.7	2.9

1. *Numbers in this column include only the sewer overflows included in the SSO performance calculation and exclude sewer overflows caused by extreme weather events, other agency construction, private construction, King County capacity constraints, and vandalism.*
2. *SPU has 1,420 miles of sewers.*

To remain in the high-performing utility band and continue reducing the annual number of SSOs, SPU analyzes each SSO and identifies appropriate follow-up actions, including system modifications and/or increased maintenance where appropriate. SPU also reviews SSO data on an ongoing basis, looking for any patterns or trends that can be addressed through adaptive management of the CMOM Program.

3.3 FOG Control Program Activities

In 2022, the lingering economic impacts from the pandemic continued to be felt by the restaurant industry, and in turn, the SPU FOG Program. As a result, the focus and processes used by SPU in implementing the FOG Control Program remained altered from pre-COVID standards to meet the challenges faced by the businesses and residents within the community. The ongoing shift in our work processes allowed SPU to continue to implement the FOG Management Plan. Details of the process

changes SPU Wastewater Source Control carried out in response to the COVID-19 pandemic are outlined in the paragraphs below.

The purpose of the Fats, Oils, and Grease Control Program is to reduce the number of FOG-related sewer overflows by developing and implementing a FOG Control Program Plan. The four basic elements of the FOG Control Plan are:

1. Implement the FOG Management Plan;
2. Implement the Food Service Establishment (FSE) Inventory Management Plan;
3. Update and implement Standardized Operating Procedures (SOPs) and Engagement Plan;
4. Conduct FOG Inspector Training.

Work completed in 2022 and planned for 2023 is described in the following sections.

3.3.1 Implement the FOG Management Plan

Data analysis of SPU FOG hotspots indicates a nearly even distribution of hotspots between commercial and residential sources. To mitigate these sources, the FOG Management Plan has two areas of focus, as described in the following sections.

3.3.1.1 Residential – Community Engagement

In residential areas, SPU utilizes a community engagement-based program to increase awareness of the deleterious impacts of FOG discharges from homes. SPU has continued to develop and update new resources, including in-language, trans-created materials. Below are the highlights of SPU's residential efforts in 2022:

- Delivered outreach materials to 258 single-family residential customers located in or near FOG "hotspot" areas, and provided 93 sink strainers;
- Our communications contractor, Cascadia Consulting Group, also conducted FOG specific outreach to 118 additional multifamily property managers in FOG "hotspot" areas;
- Delivered 347 FOG flyers to multifamily residents;
- Delivered 755 doorhangers to multifamily residents;
- Delivered 224 sink strainers to multifamily residents;
- Ordered 1,000 grease canisters to provide during 2023 single-family and multifamily residential outreach;
- Continued transcreation of outreach materials to better serve the community and expand our program reach, including transcreation of the wastewater/FOG residential outreach card into Amharic, Vietnamese, Korean, Tagalog, and Somali;
- Through our customer service web portal and individual inquiries, distributed 4,320 FOG educational flyers (primarily to multi-family property owners and managers).

Figure 3-5. 2022 Residential FOG Maintenance

3.3.1.2 Commercial – Regulatory FOG Program

Per the Fats, Oils, and Grease Control Program Plan, SPU focuses resources to provide the greatest impact in reducing FOG in the wastewater collection system from commercial sources. To accomplish this, SPU utilizes a risk-based system for prioritizing inspections and enforcements. The commercial FOG program consists of restaurant engagement, site assessment, inspections, and enforcement. In 2022, COVID related obstacles, such as staffing levels, remained a barrier to providing in-person, onsite assessments, and inspections at the same rate as pre-COVID years.

In 2020, SPU migrated to a new Aquatics Compliance Platform database system. In 2022, the new database platform continued to evolve by going live with the Hauler Self Reporting portal and the Facility Portal, allowing businesses to start logging their cleanings directly into the database from their computer, tablet, or smart phone. The introduction of the Hauler Portal allows grease interceptor waste haulers to report their own cleaning activities directly into the FOG database. Once a hauler has an account and is associated with a facility, they may submit cleaning records in real time. Additionally, once a cleaning has been submitted, a new cleaning is automatically scheduled based on the periodicity set by SPU. A local service provider, West Coast Grease Traps, is the first company to begin using the Hauler Self Reporting Portal. West Coast Grease Traps was onboarded into the system by a member of the Wastewater Source Control Team, and to date, they have reported performing maintenance at 71 facilities and have submitted over 500 cleanings (Figure 3-6).

In 2022, Seattle began to onboard individual food service establishments in the Facility Self Reporting Portal. This self-reporting allows SPU to gather maintenance information from businesses that typically

self-clean their grease interceptors. Business owners and staff can now log into the portal and select which interceptor they would like to submit a cleaning for, associated with their specific facility. Once the appropriate interceptor is chosen, the reporting party inputs the cleaning date, depth of interceptor, depth of FOG, and depth of food solids within the interceptor, if FOG is leaving the outlet, if it needs repair, disposal location, before and after photos, as well as comments. Wastewater Source Control worked with Cascadia, SPU's contracted engagement firm, to pilot the onboarding process.

Over the course of two months, outreach coordinators visited 53 businesses scattered throughout Seattle to onboard them to the Aquatic Informatics platform, check on Fats, Oil, and Grease (FOG) maintenance, and provide free resources. Of those 53 businesses, only 14 agreed to be onboarded at the time of visit. The low onboarding rate is being viewed as an opportunity to learn how to better work with our customers. Cascadia was able to provide SPU with outreach key findings and Aquatic Informatics software platform roadblocks that were encountered.

Figure 3-6. Example of Hauler Created GI Cleaning Entry from Aquatic Informatics

Additionally, in 2022, Seattle Public Utilities worked with a subcontracted production company, Via Creatives, which created a series of videos for food service establishment training purposes. The first video, titled "Why FOG Compliance is Important," explains the importance of Implementing best management practices within commercial kitchens. Video two, titled "FOG BMP's and Kitchen Tips," explains best management practices that should be used in facility kitchens to prevent fat oils and

grease from entering the sanitary system. Video 3, “How Grease Interceptors Work,” describes the inner workings of a grease interceptor, both hydromechanical and gravity driven. Video 4, “How to Clean a Grease Trap,” features an employee of a local business cleaning their hydromechanical grease interceptor in a step-by-step process. Each video is only a few minutes long and was designed to give a high-level overview to help prevent FOG laden waters from entering sanitary systems through education. As part of this project, Cascadia produced a FOG “How to Clean Your Grease Interceptor” poster for facility owners and managers to post as a quick reference guide (Figure 3-7).

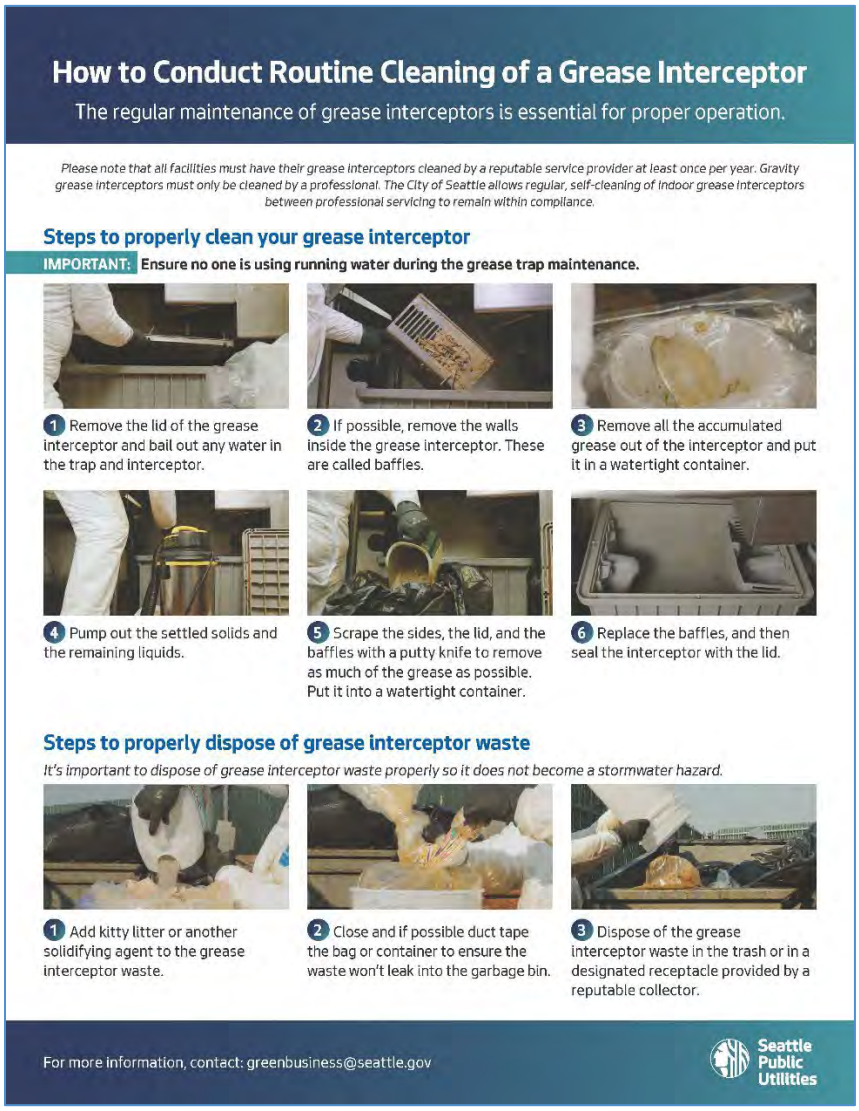

Figure 3-7. "How to Clean Your Grease Interceptor" facility poster

Other 2022 highlights included:

- Completed 746 FSE FOG discharge risk assessments and regulatory compliance inspections. This number includes 389 “High Priority” facility inspections. Inspections include FOG education, data

collection, an evaluation of FOG discharge risk, and an assessment of compliance with Seattle Municipal Code. Due to ongoing COVID-19 impacts, the number of inspections completed remains below the stated annual goal of 1,200 total inspections, including 388 "High Priority" facility inspections;
- 167 Phone Audit inspections in lieu of FSE FOG discharge risk assessments and regulatory compliance inspections;
- Continued collaboration with the King County Plumbing and Gas Piping Program which has led to increased plan review for FSEs and a more thorough interpretation and enforcement of the Seattle/King County Plumbing Code as it pertains to FOG pretreatment.

Although their production remained impacted by COVID-19, SPU's contracted engagement firm (Cascadia) completed the following commercial, FOG-related engagement tasks:

- Provided FOG site assessment assistance to 299 businesses, including providing FOG maintenance logs, kitchen posters, and sink strainers to 112 businesses;
- Delivered free spill kits to 140 facilities, including 88 FSEs, as part of a Seattle EnviroStars Program multi-faceted conservation, pollution prevention, and recycling campaign;
- Developed four commercial videos on how to install a grease interceptor, interceptor maintenance, FOG best management practices, and how to use the new online reporting tool. Videos were translated into Spanish, Vietnamese, and Cantonese;
- Developed a "How-to-clean-your-grease-interceptor" card to accompany the videos, which was also translated into Spanish, Vietnamese, and Simplified Chinese;
- Provided site visits to 53 foodservice businesses to introduce them to the Aquatic Informatics platform and provide FOG BMPs and resources.

2023 goals and efforts include the following activities:

- Conduct regulatory compliance inspections on a minimum of 90% of all Priority 1 and 2 facilities as identified in the Aquatics Compliance Platform;
- Conduct regulatory compliance inspections on 90% of facilities scheduled in 2023 per the periodicity set in Aquatics Compliance Platform;
- Continue initial risk assessments for new FSEs and facilities connected to Category 3, 4, 5, and 6 mainlines;
- Conduct a reassessment of facilities that discharge to high priority sewer mainlines annotated during initial assessment as "no" or "inadequate" pretreatment and conduct Notice of Violation enforcement to achieve code compliance;
- Continue collaboration with King County Plumbing and Gas Piping Program as well as the Plumbers and Pipe Fitters Training Center;
- Engage with business districts, neighborhood organizations, and area restaurant associations to collaborate on maintenance reporting and other FOG Program project rollouts;
- Craft a Director's Rule to support and expand existing Seattle Municipal Code (deferred from 2021);
- Complete and pilot online FSE registration and maintenance reporting project (deferred from 2021);

- Craft and implement a "Preferred Service Provider" Program for companies who install, repair, and maintain grease interceptors (deferred from 2022).

3.3.2 FSE Inventory Management Plan

The FSE Inventory Management Plan describes SPU's approach for collecting, using, and managing FSE data. SPU utilizes Aquatics Compliance Platform software to store and maintain FSE related data. In 2022, SPU updated the FSE database quarterly by uploading an updated listing of FSEs permitted through Seattle & King County Public Health. An ongoing and automated quarterly report is obtained via the Public Health database to help ensure FSE information in the FOG database remains current.

In 2022, SPU continued to work with developers for the Aquatics Compliance FOG Platform. This online database includes web access portals for SPU staff, FSE Owners/Management, and Service Providers. Direct access by FSEs and Service Providers went live in 2022. This allows SPU to obtain maintenance information, including photographs, which will greatly enhance SPU's ability to assess proper maintenance and functionality of grease interceptors outside of the compliance inspection process over the coming years.

3.3.3 Standard Operating Procedures

SPU FOG Inspectors reviewed all FOG Standard Operating Procedures (SOPs) in 2022. As a result of this review, for the Linko Database SOP, SPU began an overhaul to convert this document to the updated Aquatics Compliance Platform User's Manual and Data Entry SOP. This annual review process:

- Helps ensure field staff are familiar with and are utilizing SOPs;
- Helps ensure SOPs accurately reflect actual field activity processes; and
- Empowers and expands the capabilities, ownership, and buy-in of field inspectors by providing them with a voice in the program process development.

SPU has developed and maintains the following SOPs relating to the FOG Management Plan:

1. FOG Regulatory Inspection SOP
2. Aquatics Compliance Platform User's Manual and Data Entry SOP (in progress)
3. FOG Enforcement SOP
4. FOG GIS & Hotspot SOP
5. FOG Violation and Enforcement SOP
6. FOG Characterization and Risk Assignment SOP
7. FOG Remote Inspector User's Manual and SOP

3.3.4 FOG Inspector Training

Due to continued COVID precautions, opportunities for training were limited. However, continued education and training of FOG Inspectors remains a fundamental component of the SPU FOG Program. FOG Inspector training in 2022 included the following activities:

- In-house informal discussions with FOG Inspectors concerning procedural changes brought about by technology improvement projects and program improvements. These sessions occur bi-weekly during FOG Team meetings and in conjunction with software and procedural updates;
- FOG Team Members attended the Western States Alliance FOG Forum in May 2022;
- FOG Team members actively participated in periodic online meetings of the APWA PREFOG Sub-Committee.

In 2023, SPU will continue to participate in the activities outlined above and seek out other training resources and opportunities.

3.4 Annual Review of Operations and Maintenance Manuals

SPU regularly reviews its operations and maintenance manuals and updates them when necessary. They are available for O&M staff to access through a dedicated SharePoint site for wastewater facility documentation. Equipment specific operations and maintenance instructions and procedures are maintained as job plans in SPU's computer maintenance management system.

In 2015, SPU submitted O&M manuals to Ecology and EPA for the new operable CSO storage facilities at Windermere and Genesee. In 2016, SPU reviewed and updated the O&M Manuals for Windermere and Genesee. The updates mainly consisted of modifications to control logic made to the facilities operations during the stabilization phase. In 2018, SPU submitted an O&M Manual for the Henderson North CSO storage facility. In 2019, SPU reviewed and updated the control logic for the Windermere, Genesee, Henderson and Delridge facilities. In 2020, SPU submitted an O&M Manual for the Portage Bay (Basin 138) sewer system improvement project. In 2022, SPU completed review of the 60% Draft O&M Manual for the Ship Canal Water Quality Project.

SECTION 4

Capital Activities

This section describes activities SPU is undertaking to reduce the number and volume of sewage overflows and implement the Plan to Protect Seattle's Waterways. Included is a summary of progress made in 2022 and work that SPU plans to complete in 2023. During 2022, SPU continued to proactively monitor and control scope, schedule, and budget on each of its major projects. In addition, SPU applied considerable attention to applying lessons learned across capital projects. 2022 project spending is summarized in Table 4-1.

Table 4-1. 2022 Plan Implementation Spending

Project Name	Amount Spent
Ship Canal Water Quality Project	$73,403,240
Central Waterfront CSO Reduction Project (70,71,72)	$886,776
Delridge 168/169 CSO Control	$49,055
Pearl Street Drainage & Wastewater Project	$2,096,968
Sewer System Improvement Projects (Retrofits)	$702,104
Pump Station Rehabilitation	$5,832,512
Outfall Rehabilitation	$24,558
Sewer Renewal	$29,517,429
RainWise	$1,345,378
NDS Partnering	$283,866
South Park Water Quality Facility	$891,518
Expanded Street Arterial Sweeping	$824,420
Total	**$115,857,824**

4.1 Sewer System Improvement Projects

SPU made significant progress on a variety of combined sewer system improvement projects in 2022, as summarized in the following paragraphs.

4.1.1 Delridge (Basin 99) HydroBrake Retrofit Project

Delridge Basin 99 is located at the north end of the Delridge neighborhood in West Seattle, just south of the West Seattle Bridge. In 2019, SPU replaced the Basin 99 HydroBrake flow restriction device with an automated sluice gate. This new sluice gate allows SPU to achieve a consistent discharge flowrate to the King County regional sewer system and more optimally utilize the existing offline storage tank, thereby reducing the frequency and volume of Basin 99 CSOs. Construction Completion was achieved on December 9, 2019. In 2020 and 2021, SPU monitored the facility and adjusted its performance to meet

the design intent. There are two operational modes that this facility switches between during wet weather (depending on the regional sewer system condition) and 2020 was spent optimizing the primary operational mode's settings. In 2021, SPU optimized the secondary mode. In 2022, SPU monitored the performance of the new facility and found that it was not operating optimally. Upon investigation, SPU discovered an error in the code. SPU corrected the programming and will continue to monitor the performance and make further modifications, as needed, in 2023.

Figure 4-1. New Basin 99 Sluice Gate (left) and Actuator Motor (right)

4.1.2 Magnolia (Basin 60) Pump Station 22 Rehabilitation Project

Basin 60 is located in the Lawtonwood neighborhood of Magnolia, on the west side of Seattle. The sewer system improvement for this basin includes increasing the pumping capacity of Pump Station 22 from 0.86 MGD to 4.0 MGD, rehabilitating other station assets, and replacing the aging 8-inch diameter force main with a 12-inch diameter force main and a new connection to King County's Fort Lawton Tunnel.

Construction began in September 2019 and was completed in 2020, before the regulatory construction completion milestone of December 31, 2020. The rehabilitated pump station operates using a variable frequency drive (VFD), which is a new approach to managing system flows through SPU's pump stations. In 2021 SPU monitored and adjusted the station's VFD performance throughout the year to verify that the pumps operate at the design intent. Long term simulation modeling indicates that Outfall 60 is now meeting the performance standard of 1 overflow per year on a twenty-year average. SPU continued to monitor performance in 2022 and will continue to do so in 2023.

Figure 4-2. New Basin 60 pumps being installed (left) and New Basin 60 connection to King County trunk sewer (right)

4.1.3 East Montlake (Basin 20) Pump Station and Force Main Rehabilitation Project

East Montlake Basin 20 is located in central Seattle, just south of the Ship Canal Cut and east of Montlake Basin 140. The sewer system improvement for this basin, similar to the project in Magnolia Basin 60, includes increasing the pumping capacity of Pump Station 13 from 0.9 MGD to 2.8 MGD, rehabilitating other assets of the station, and replacing the aging 8-inch diameter force main with a 12-inch diameter force main.

Construction of this pump station rehabilitation project began in April 2020 to accommodate an eagle breeding window, as specified by the Washington Department of Fish and Wildlife construction permit. The intent was to complete the project by the regulatory construction completion milestone of December 31, 2020. However, due to COVID-19 pandemic-caused delays in the shipping of essential equipment, the need to socially distance field workers (elongating the construction schedule), and other delays caused by vendor illness, the project was delayed past the regulatory milestone. SPU notified Ecology and EPA of a potential milestone violation by letter dated November 4, 2020, and provided an update on February 1, 2021. SPU completed the sewer system improvement and sent Ecology and EPA a notification of construction completion letter on May 28, 2021. In 2022, SPU monitored and adjusted

the operation of the pump station's variable frequency drives to help ensure its performance meets the design intent. In 2023, SPU will continue to monitor and make operational adjustments as needed.

Figure 4-3. Operational Testing of Upgraded Pump Station 13 (left) and new pumps and valving (right)

4.1.4 Portage Bay (Basin 138) HydroBrake Retrofit Project

Portage Bay Basin 138 is located on the west side of Portage Bay and is bounded by State Highway 520 to the south and Interstate 5 to the west. The sewer system improvement for this basin includes replacing the HydroBrake at the existing offline storage tank with an automated sluice gate and rehabilitating and increasing the pumping capacity of Pump Station 20 from 1.1 MGD to 1.5 MGD. The rehabilitated pump station operates using VFDs, and new automated controls will allow the sluice gate to manage flows at the pump station's new higher peak flowrate, better utilizing existing offline storage and reducing overflow volumes and frequency.

Construction began in early 2020 and was completed before the regulatory construction completion milestone of December 31, 2020. Due to the complex hydraulic components of this facility, gate settings were adjusted and monitored in 2021. In 2022, SPU monitored the performance of the gate and improved the PID control logic to meet the design intent. In 2023, SPU will continue to monitor performance and make operational adjustments, as needed.

Figure 4-4. Installation of Basin 138 slide gate (left) and new higher capacity pumps (right)

4.2 Ship Canal Water Quality Project

The Ship Canal Water Quality Project (SCWQP) is a joint SPU-DNRP project that will control CSOs from SPU's Wallingford, Fremont, and Ballard areas (Outfalls 147, 151, 152, and 174) and DNRP's 3rd Avenue West (DSN 008) and 11th Avenue Northwest (DSN 004) outfalls.

On July 27, 2016, the City of Seattle and King County signed a Joint Project Agreement (JPA) to guide implementation, operation, and cost-sharing of the SCWQP. SPU is the lead for construction and implementation of the tunnel, and will own, operate, and maintain the tunnel and its related structures. DNRP will continue to own its two outfall structures. SPU and DNRP have also chartered both the Joint Oversight and the Project Review and Change Management Committees to provide policy guidance and senior level management oversight, support, and direction to the project.

In 2022, the project team made significant progress on project design and construction:

- Construction of the Storage Tunnel work package continued. Mining continued on the 18 ft.-10 in. diameter storage tunnel, which was over 50% complete at the end of 2022, and the 8 ft. diameter conveyance tunnel under the Ship Canal, which was approximately 50% complete at the end of 2022. Other 2022 accomplishments include structural completion of three below grade diversion structures at the North Queen Anne site, structural completion of the large mechanical/electrical vault at the East Ballard site, and structural completion of the below grade diversion structure at the Fremont site.

- The Tunnel Effluent Pump Station (TEPS) work package team completed 100% design as a joint deliverable with the Ballard Conveyance work package. In 2020, the Ship Canal Program decided to merge the TEPS and Ballard Conveyance design documents into a single construction contract. This decision will greatly reduce coordination and construction risks for the two projects. The combined project design received design approval from the Seattle Design Commission and submitted 100% plans and specifications to Ecology and EPA.
- The programmatic Construction Quality Assurance Plan was updated and submitted to Ecology.
- The Wallingford Conveyance work package team completed the bidding process, resulting in execution of a construction contract. Construction is scheduled to begin in early 2023. In addition, Ecology and EPA approved the final plans and specifications.
- Finally, SPU executed a $59M amendment to its 2021 State Revolving Fund loan with Ecology for the Ship Canal Water Quality Project.

Issues encountered in 2022 include:

- The Storage Tunnel work package's tunnel boring machine (TBM), Mudhoney, encountered a 12 ft.-diameter boulder, which impacted construction progress. Eventually, the TBM successfully ground through the boulder, and the cost and schedule impacts are still being negotiated.
- Continued slower-than-planned progress in mining of the 18 ft.-10 in. diameter storage tunnel has extended construction of the Storage Tunnel work package and delayed construction of the TEPS/Ballard Conveyance work package, which will likely delay the overall construction completion date. In addition to the impacts of the boulder as discussed in the previous bullet, these delays are in part due to impacts during the COVID-19 period, such as workforce shortages, supply chain issues, etc. Both SPU and DNRP have notified Ecology and EPA of these potential force majeure delays.
- One dry weather sewer overflow occurred due to failures in the contractor's sewer bypass system. The failures were investigated, and corrective measures were implemented. The bypass system has since been removed as it is no longer needed.

Figure 4-5. Construction of 8ft. diameter tunnel beneath Lake Washington Ship Canal

Highlights from SPU's 2022 community outreach for the Ship Canal Project include:

- Delivered project briefings to SPU's Customer Review Panel (a group established to provide input and review progress on SPU's Strategic Business Plan) as well as community groups, business associations, and nonprofits.
- Delivered presentations to the Seattle Mayor's Office, Seattle City Council, the King County Regional Water Quality Committee, Ecology, and EPA.
- Conducted numerous stakeholder briefings with property owners and businesses along the tunnel alignment and proposed project sites, with a focus on the upcoming Wallingford Conveyance construction project.
- Delivered regular listserv updates on Storage Tunnel construction progress to over 2,000 recipients approximately monthly.
- Presented papers on the SCWQP at several regional and national conferences.

Figure 4-6. 8 ft. Aerial view of the West Shaft Site in Ballard

In 2023, all of the SCWQP projects will be in construction. The project team anticipates the following activities and accomplishments:

- Completion of the 18 ft-10 in diameter storage tunnel and the 8 ft. diameter tunnel in the Storage Tunnel work package. Substantial completion of the Storage Tunnel work package is forecasted for early 2024; therefore, nearly all of the remaining work in the contract will be completed in 2023.
- The combined TEPS/Ballard Conveyance work package will complete the bidding process and begin construction. The conformed documents will be submitted to Ecology and EPA for approval of final plans and specifications.
- The Wallingford Conveyance work package will begin construction.

SPU's planned 2023 outreach activities include:

- Conduct outreach to contractors ahead of bid advertisement for the combined TEPS/Ballard Conveyance work package.
- Deliver project briefings at organizations, boards and/or associations focused on potential project impacts to trees, bicycles, pedestrians, residents, and industry.
- Continue to deliver listserv updates, notices, and mailers along the project work areas, as appropriate and necessary.
- Continue stakeholder briefings and attend community meetings. Community outreach regarding construction impacts will be a focus prior to the start of construction for Wallingford Conveyance and TEPS/Ballard Conveyance work packages.

- Provide project information via fact sheets, website, listserv, and other materials.

4.3 Central Waterfront CSO Reduction Project (Basins 70, 71, 72)

To control combined sewer overflows from the south end of the Central Waterfront, SPU has installed approximately 2,000 linear feet of new 24 to 36-inch diameter sewer and connecting combined sewer basins 70, 71, and 72. The project has eliminated Outfalls 70 (University Street) and 72 (Washington Street) and now limits CSOs from Outfall 71 (Madison Street) to no more than one per year on average.

SPU and Seattle's Office of the Waterfront are coordinating construction of these sewer system modifications and the Waterfront Seattle Alaskan Way-Elliott Way (S King Street to Bell Street) Project, because critical portions of both City projects are located where the Alaskan Way Viaduct stood and neither of these City projects could be completed until the Alaskan Way Viaduct was demolished. Attempting to complete the CSO control project prior to demolition of the Viaduct would have resulted in significant additional cost, additional disruption to businesses and the travelling public, additional risk of failure of the then-compromised viaduct structure itself, and risk that the completed improvements would be damaged during subsequent demolition work. In addition, the Viaduct could not be demolished until the new SR-99 tunnel was complete, or there would have been major additional disruption to businesses and the travelling public. WSDOT was solely responsible for completing the new SR-99 tunnel and the Viaduct demolition; the City was not able to direct the activities of WSDOT or its tunneling or demolition contractors and therefore was not able to accelerate WSDOT's schedule for completing SR-99 and demolishing the Viaduct.

In the Plan to Protect Seattle's Waterways, SPU indicated that construction of the Basins 70, 71, 72 CSO control project would be complete by the end of 2020. This completion date was based on construction beginning in 2017, which coincided with WSDOT's original schedule for completion of SR-99 and demolition of the Viaduct. On October 22, 2015, WSDOT and STP notified the Washington State Legislature's Joint Transportation Committee that resumption of the tunneling on SR-99 was delayed until December 23, 2015. This delay in tunneling resumption, and subsequent delays in the State's work, pushed the SR-99 completion and Viaduct demolition schedules beyond the point where the City could assure that the CSO control project would be completed by 2020. Consequently, SPU submitted notification of this force majeure event the same day.

Viaduct demolition was completed in late 2019. The Waterfront Seattle Alaskan Way-Elliott Way (S King Street to Bell Street) Project, including the South Central Waterfront (Basins 70, 71, 72) CSO control project, was bid, awarded and construction commenced in 2019, with CSO construction work starting at the end of 2019/beginning of 2020. Also in 2019, SPU completed the final measures to mitigate impacts of the completed project on our customers. Construction of the project will continue in 2023 with the completion of the Madison Ave Outfall Weir Structure – the final operational system component – in early 2023. Substantial completion is projected to occur by early 2024.

The WSDOT-caused delay is not expected to cause or contribute to endangerment of public health, welfare, or the environment. Outfalls 70 and 72 were controlled before construction began and have

since been removed from CSO service (on April 24 and May 26, 2020, respectively), and the discharge from Outfall 71 is a relatively small portion of the City's CSO volume.

Figure 4-7. Central Waterfront Construction – Dewatering System

4.4 Longfellow Starts Here Project (Basins 168, 169)

Longfellow Starts Here (previously known as the Longfellow Creek Water Quality Improvement Project) is a community driven, long-term project to control CSOs from Delridge Basins 168 and 169. The ultimate goal of this project is to identify the best pairing of CSO reduction and stormwater quality projects and programs that improve the water quality of Longfellow Creek while meeting the community's needs and vision, using the lens of racial equity. Longfellow Starts Here (LSH) is currently in Options Analysis, which is broken into 2 phases. Each "option" in this project is an infrastructure scenario - a suite of projects and programs that collectively meet the performance goals for the basins over time, while providing other co-benefits. The tools and frameworks needed to create infrastructure scenarios are developed in the first phase (Phase A). Infrastructure scenarios are developed and evaluated in collaboration with stakeholders in the second phase (Phase B).

In 2020, SPU delivered the majority of Phase A. The tools and frameworks developed in Phase A define the component pieces of a potential infrastructure scenario, including the cost and performance of all the major types of CSO reduction and stormwater quality projects and programs, characterization of how those projects and programs fit within an urban design context, the location of opportunities, needs, and limitations in the basins, and the opportunities for workforce development and arts-based engagement to empower communities of color within the area.

In 2021, SPU finished documenting Phase A, and worked on developing a plan for Phase B. Phase B kicked off mid-year 2022 with initiating a City family community engagement coordination group to bring together multiple departments working on efforts within the Delridge community. The intent of this group was to identify opportunities to work together and leverage each other's work so that we did not burden the community with separate City engagement processes. In 2022, work also started on developing the scope for identifying and developing inflow and infiltration (I&I) pilot programs that could be initiated relatively quickly and help to fill data gaps on I&I approaches that will help support scenarios development within LSH. The I&I pilot programs could also be applied more broadly within other CSO basins in the city.

In 2023, SPU will focus on reconnecting with the community and continuing to support City family collaboration in addition to identifying and developing the pilot programs to test in the basin. Following development and initiating implementation of the pilot programs, Phase B will shift focus to the development and evaluation of potential infrastructure scenarios with City family and external stakeholders. Phase B will identify CSO reduction and stormwater quality approaches that best support the community's vision for southern Delridge.

4.5 Leschi (Basins 26 – 36)

The Leschi area is in east Seattle bordering Lake Washington and comprises Basins 26 through 36. Over a dozen individual sewer system improvements were implemented in this area in two phases: Phase 1, which was completed in 2015, and Phase 2, which was completed in 2016. Phase 1 improvements were described in the 2014 Annual Report. Phase 2 improvements were detailed in the 2016 Annual Report. As part of the improvements, Outfalls 26 and 33 were sealed and removed from service.

Based on flow monitoring data, it is apparent that the constructed sewer improvements changed the flow characteristics of the Leschi Area. As a result of the changed flow characteristics, together with recent changes in precipitation patterns, the constructed improvements did not reduce CSOs as much as expected. Modeling conducted in 2018, together with flow monitoring in 2019, 2020, and 2021 show that Outfalls 27, 29, 35, and 36 meet the CSO performance standard and Outfalls 28, 30, 31, 32, and 34 are not controlled to the CSO standard (see Table 5-8).

Because the Leschi area flow characteristics have changed and the location of the CSO control issue has shifted (for example, Basin 30 was not previously identified in the "if needed" Leschi CSO Control Project), SPU believes it is prudent to look again at the options for controlling the Leschi Area instead of moving forward with the originally identified off-line storage pipes. As part of this re-look, SPU will be working with DNRP to determine whether the most cost-effective and technically sound control measure involves partnering on DNRP's Montlake (DSN 014) CSO control project. This analysis will be completed as part of DNRP's future LTCP update work effort.

On June 14, 2018, SPU submitted a Notification of Potential Milestone Violation notifying Ecology and EPA of the possibility that SPU might not meet the Leschi CSO Control Project Engineering Report submittal milestones. On June 26, 2019, SPU submitted a request to EPA and Ecology for modification of

the Engineering Report Milestone to have more time to develop revised control alternatives and partnership opportunities with DNRP.

4.6 Pearl Street Drainage and Wastewater Improvement Project

In 2022, SPU completed construction of the Pearl Street Drainage and Wastewater Improvement Project. The project was designed to improve capacity of the combined sewer system to help reduce storm-related combined sewer backups and flooding. SPU spent a total of $18.8 million, including $10 million obtained in competitive loan funding through the Public Works Board loan program.

The Pearl Street project area is in the west Beacon Hill area of Seattle. This neighborhood has experienced repeated combined sewer backups onto the public right-of-way and into homes and private properties. In addition to the sewer backups, there had been significant stormwater flooding associated with the adjacent Maple Elementary School and the Maplewood Playfield (Seattle Dept. of Parks and Recreation facility), located in the upper portion of the Pearl St. basin. High groundwater in the area also contributes to sewer capacity issues.

To improve sewer system capacity, approximately 1,200 linear feet of new pipes were installed. In addition, approximately 300 linear feet of existing undersized pipes were upsized via trenchless technologies to meet wastewater capacity needs. The project also installed a 250,000-gallon underground storage tank to detain flows during large storm events and to regulate flows leaving the basin to protect the downstream system from other overflows. To protect homes against extreme storm events, the project provided reimbursement to property owners for voluntary installation of privately owned backwater valves.

Furthermore, SPU partnered with the Seattle Department of Transportation and the Washington State Department of Transportation for all work within and through those agencies' public rights-of-way. SPU made improvements to multiple public rights-of-way with new roadway infrastructure and plantings, to meet partner agency requests and to mitigate community concerns.

In 2023, SPU will continue to test and onboard the new facility.

4.7 CSO Control Supplemental Compliance Plans

4.7.1 Windermere Supplemental Compliance Plan

In 2015 SPU completed construction of a 2.05 million-gallon (MG) storage tank near Magnuson Park on the south side of NE 65th Street to reduce the number of overflows from Outfall 13. Hydraulic modeling to assess facility performance was completed in Summer 2016. The modeling showed that, although the project significantly reduced overflows from Basin 13, the 20-year average was 1.6 CSOs/year. On October 4, 2016, SPU submitted a Supplemental Compliance Plan to Ecology and EPA outlining the steps SPU plans to take to meet the CSO standard. Ecology and EPA approved the Plan on January 5, 2017.

Per the approved Plan, in 2017 SPU evaluated operational adjustments to the recently constructed control structures and submitted a technical memorandum summarizing its findings on December 28, 2017. SPU found that the two main control gates in the Windermere Area needed to be reprogrammed and recalibrated to better respond to changes in flow. The evaluation also found that Basin 15 was barely exceeding the CSO standard (at 1.1 CSO per year based on modeling), so SPU submitted a Supplemental Compliance Plan for Basin 15 on April 17, 2018.

In 2018 SPU implemented the recommended gate programming changes. Since then SPU has continued to monitor their performance. In 2023, SPU will continue to work with DNRP to identify other short-term system operational improvements.

4.7.2 Genesee Supplemental Compliance Plan

In 2015 SPU completed the construction of a 380,000-gallon storage tank and a 120,000-gallon storage tank to reduce overflows from Outfalls 40, 41, and 43. The project was constructed in two parking lots along Lake Washington Boulevard S at 49th Avenue S and at 53rd Avenue S. Each has a facility vault, diversion sewer, and a force main with motor-operated gates to control the flow of wastewater like the Windermere storage facility.

In February 2016, SPU found significant root intrusion in the Lake Line that conveys combined sewage from the two newly constructed CSO storage tanks to Wastewater Pump Station 5. This root intrusion caused the tanks to fill prematurely during storms and drain too slowly after each storm.

These issues prevented SPU from updating the hydraulic model and completing the modeling work needed to determine whether the Genesee Area was controlled to the Consent Decree performance standard. Consequently, SPU submitted a Supplemental Compliance Plan to Ecology and EPA on March 8, 2017, requesting more time to complete flow monitoring and hydraulic modeling. Ecology and EPA approved the SCP on May 30, 2017. SPU cleaned the Lake Line and, in 2017, monitored flows in the Genesee Area.

In June of 2018, SPU submitted a Revised Supplemental Compliance Plan to Ecology, noting that the storage tanks have significantly reduced overflows in the Genesee Area but four basins are still exceeding the 1 CSO per year standard. The Basins are 40, 41, 42 and 43. Similar to the steps taken in the Windermere Area, SPU evaluated possible operational improvements in the Genesee Area, which led to the recommendation to revise the programming of two control gates and install a new gate controller on CSO Storage Facility 9. In 2019, SPU implemented these operational improvements. SPU began to monitor those improvements in 2020 and throughout 2021 and 2022, and will continue to do so in 2023.

4.7.3 South Henderson Supplemental Compliance Plan

In 2015-2016 SPU constructed the following improvements to the combined system in the South Henderson Area:

- The 52nd Ave S Conveyance Project (Basins 47B and 171), which included a new diversion system and a pipeline to convey peak flows to DNRP's Henderson Pump Station.
- Pump Station 9 Upgrade (Basin 46), which included pumping and mechanical upgrades to SPU's pump station to better handle peak flows coming down from the sewer lake line.
- Henderson 47C Retrofit (Basin 47C), which included installing a new higher weir in the 47C control structure to optimize upstream storage and improve overflow monitoring.

In late 2016, hydraulic modeling was used to assess the performance of these improvements. The modeling showed that Basin 46 is meeting the CSO performance standard and Basins 47 and 171 are not. Prior to construction of these improvements, Basin 47 averaged 15.7 CSOs per year and Basin 171 averaged 7.4 CSOs per year. Based on 2016 modeling, the completed projects decreased the average frequency to 4.1 CSOs per year from Basin 47 and 3.3 CSOs per year from Basin 171.

Because the two basins were not yet meeting the CSO performance standard, on March 22, 2017, SPU submitted a Supplemental Compliance Plan to Ecology and EPA describing the additional steps that will be taken to control CSOs from Basins 47 and 171. Ecology and EPA approved the Plan on May 19, 2017.

In 2017, SPU evaluated these basins and identified operational adjustments to the recently constructed control structures. SPU submitted a Technical Memorandum summarizing the evaluation on September 29, 2017. The main recommendation was to remove an orifice plate in Sub-Basin 47B to achieve the desired design flowrate, and this adjustment was implemented by December 29, 2017. SPU then conducted flow monitoring and hydraulic modeling to assess the effectiveness of the orifice plate removal. In March 2019, SPU submitted a technical memorandum summarizing results. Orifice plate removal reduced Basin 47 overflows to 3.1 CSOs/year and Basin 171 overflows to 2.5 CSOs/year. However, both outfalls still exceed the one CSO per year standard. In 2020, SPU identified and modeled potential operational adjustments. In 2021 and 2022, SPU coordinated with DNRP to evaluate the impact of the operational adjustments on downstream DNRP infrastructure. In 2023, SPU will continue to coordinate with DNRP on the operational adjustments.

4.7.4 Magnolia 62 Supplemental Compliance Plan

In the 2016 Annual Report, SPU noted that the 20-year average CSO frequency at Magnolia Outfall 62 had increased in recent years to 1 per year (1997 – 2016). On March 21, 2018, SPU verbally notified Ecology and EPA that the frequency of CSOs from Outfall 62 had increased to a 20-year average of 1.1 per year (1998 – 2017) and that Outfall 62 no longer met the CSO performance standard. On April 3, 2018, SPU submitted a Supplemental Compliance Plan to Ecology and EPA, describing the remedial measures SPU will pursue to control the outfall. Following receipt of comments from Ecology and EPA on April 19, 2018, and a site visit with Ecology during Summer 2018, SPU submitted a revised Supplemental Compliance Plan on September 6, 2018.

The revised Supplemental Compliance Plan was approved on October 24, 2018. SPU committed to raise the Basin 62 CSO weir by December 31, 2018, and report on its functionality by March 31, 2019. On August 27, 2018, SPU installed a metal weir plate on the existing concrete weir wall, raising the weir 6.4

inches. SPU also evaluated how to inspect and clean (if required) the beach line (gravity conveyance from Basin 61 to Basin 64) as this line may be partially occluded with sediment. SPU submitted a technical memorandum to Ecology on June 27, 2019, summarizing the inspection and cleaning approach. However, preliminary monitoring data collected in 2018 and 2019 shows that the new weir plate is effective in reducing overflows. To determine if the weir raising was successful in keeping overflows to one or less per year, SPU submitted a revised Supplemental Compliance plan on June 27, 2019, requesting additional time to deploy flow monitors in 2019 and 2020 to be able to recalibrate the hydraulic model. In 2021, SPU recalibrated the model and performed long term simulations and found that weir raising was effective and the outfall is now meeting the performance standard.

4.8 South Park Water Quality Facility

The South Park Water Quality Facility is one of the stormwater improvement projects included in the approved Plan to Protect Seattle's Waterways. The intent of the facility is to treat stormwater runoff from the existing 7th Avenue South drainage basin, a highly industrial basin in the City's South Park neighborhood, and discharge treated water to the Lower Duwamish Waterway. The South Park Water Quality Facility will work in conjunction with the South Park Pump Station, which is in construction and, when complete, will enable the existing stormwater collection system and outfall to function during all tidal conditions in the Lower Duwamish Waterway.

In 2018, SPU determined that the South Park Pump Station will require full use of the site previously slated for both the Pump Station and the Water Quality Facility. In 2019, SPU continued evaluation of other potential Water Quality Facility sites in the industrial area of the South Park neighborhood. In 2021, SPU's Asset Management Committee approved the recommendation to purchase property for the purpose of building a regional, stormwater quality improvement facility in the South Park neighborhood, and SPU selected three consultant teams to support the site cleanup, Water Quality Facility, and community investment elements of the project. In 2022, the project initiated a formal, supervised MTCA cleanup process with Ecology, began discussions regarding remedial investigations on the identified property for purchase, and began the options analysis project phase. In 2023, SPU will complete remedial investigations on the identified property, evaluate options for the Water Quality Facility, and develop and implement a community engagement plan.

4.9 Green Stormwater Infrastructure

The term green stormwater infrastructure (GSI) describes a variety of measures that use soil to absorb stormwater or slow the rate of stormwater entering the sewer system. Green solutions control the sources of pollution by slowing, detaining, or retaining stormwater so that it does not carry runoff into nearby waterways. This reduces the volume and timing of flows into the system. GSI facilities also are referred to as natural drainage systems (NDS) and they are a type of low impact development (LID). Examples of GSI include:

- RainWise – A program that provides homeowners with rebates for installing rain gardens and cisterns on their own property.

- Roadside bioretention – Deep-rooted native plants and grasses planted in a shallow depression in the public right-of-way, such as the planting strip adjacent to homes.

SPU's general goal is to use green solutions to reduce CSOs. SPU and DNRP continue to work together to help ensure GSI projects in the City of Seattle use a consistent approach. Collaborative work in 2022 included:

- Delivering UIC Well inspection training.
- Finalized presettling guidance.
- Developed draft guidance for underdrain inlet design.

In 2023, planned collaborative work includes:

- Developing design standards for weirs.
- Developing guidance for conveyance swale design and applicability.

4.9.1 RainWise Program

Since 2010, RainWise has offered rebates to property owners in the combined sewer areas of Seattle. Eligible property owners are alerted about the program through regular mailings, public meetings, and media events. By visiting the RainWise website at www.700milliongallons.org, property owners can learn about green stormwater technologies and are presented with solutions appropriate for their property. Through this site, they are also able to find trained contractors.

Over 800 contractors, landscape designers and similar professionals have been trained in the program since 2009. In 2022, the Rainwise Program offered one webinar-based training for contractors and launched an online contractor skill-building series. In 2023, the RainWise Program plans to build out the online contractor orientation and skill-building platform.

There are currently 35 active contractors listed on the RainWise website that are available to bid and install systems for RainWise customers. Of them, eleven are multilingual. In 2022, we continued to update the list to include only those contractors that responded to our surveys and have completed installations in the last two years. In addition, there are several contractors with RainWise training who choose not to be on the RainWise list because they develop RainWise elements as part of larger projects.

COVID-19 continued to impact the RainWise Program in 2022. The Program moved to a blend of online and in-person outreach events and developed a hybrid delivery model for the contractor orientation. The Program continued to accept rebate paperwork electronically, which substantially reduced timelines for processing rebates.

In 2022, eight contractor meet-ups were offered to connect interested participants with participating contractors. Additionally, the RainWise Program and its community partners held 13 informational

webinars and nine in-person events for potential RainWise customers to learn about the program, talk with satisfied participants, and meet contractors. In an ongoing effort to provide equitable outreach, all events were either offered in multiple languages or direct translation was available at the regular event.

In addition to previous efforts to improve outreach, education and program delivery to potential customers and contractors, the RainWise program implemented recommendations from the program's racial equity toolkit, which guides program efforts related to Black, Indigenous, and People of Color (BIPOC) communities, customers, and contractors. In 2022, SPU added in-language assistance (Spanish, Vietnamese, Chinese) to promotional graphics and mailings, and stabilized and expanded the partnership with Seattle Conservation Corps to store and purchase a cistern supply for the program. Translation and transcreation of materials continued to be provided.

Upon completion, installations are inspected by a RainWise inspector and property owners apply for the rebate. 2022 RainWise rebates for rain gardens remained at up to four dollars per square foot of roof area controlled. In 2022, rebates for cisterns equaled 69 percent or more of the rain garden rate, depending on the size of the cistern and contributing area.

Figure 4-8: RainWise customers sharing their rain garden (left) and cistern (right) installations

Since program inception, 1,241 installations have been rebated in combined sewer basins managed by SPU. These installations control approximately 38 acres of impervious roof area and an estimated 18.8 million gallons (MG) per year of stormwater, and they provide an estimated 341,245 gallons of CSO control volume. In 2022, the RainWise Program rebated 54 projects in the Ballard, Duwamish, North Union Bay, Fremont, Genesee, Henderson, Highland Park, Leschi, Madison Park, Montlake, Portage Bay, Queen Anne, and Windermere basins.

The RainWise Program continues to operate under an MOA with DNRP to make RainWise rebates available to customers whose properties are located in the City of Seattle and within CSO basins served by DNRP, including Green Lake, University, Montlake, Capitol Hill/Central District, Highland Park, and South Park.

SPU will continue to offer its RainWise Program in 2023.

4.9.2 NDS Partnering

In 2015, the Natural Drainage System (NDS) Partnering Program developed the methodology, budget, and schedule required to achieve the NDS Partnering Program commitments in the approved Plan to Protect Seattle's Waterways. In 2018, the Program began construction of the 30th Ave NE Sidewalk and NDS Project, the first partnership project with the Seattle Department of Transportation (SDOT), meeting the NDS Partnering regulatory milestone of issuing construction NTP by July 2019. Construction was completed in early 2019. In 2020, the second partnership project with SDOT was constructed, the 12th Ave NE Sidewalk and NDS Project. Similar to the 30th Ave NE project, this project constructed sidewalk and NDS along two blocks within the Thornton Creek Basin. The NDS provides separation between the street and the new sidewalk and treats stormwater runoff from 12th Ave NE.

In 2022, SPU completed options analysis on the **North Thornton NDS Project**. Work under this project included outreach and engagement with community and identifying potential project blocks with potential partnership opportunities (such as with SDOT and the community).

In 2022, SPU began construction of the **Longfellow NDS Project.** This project includes three sites, two with a significant partnership with SDOT for pedestrian improvements. In addition, this site includes 1% for Art dollars to work with an artist to bring art to the Kenyon project site, a blackberry covered street end where the project will construct bioretention, a new pedestrian boardwalk over a wetland, and a bridge over Longfellow Creek to create a safe community space. This project will be completed by summer 2023.

In 2022, design of the **South Thornton Creek NDS Project** and **Broadview NDS Project** continued. The South Thornton NDS Project completed design and will address localized flooding issues and improve pedestrian mobility through construction of bioretention cells and walkways. On several blocks the walkways will be built in partnership with SDOT. Figure 4-9 shows a picture of the current conditions on the South Thornton NDS Wedgewood site, including a large flooding site, which is on a walking route to an elementary school. Figure 4-10 shows a rendering of what is proposed at this site. The Broadview NDS project will work through several design issues that slowed its progress and will complete design in 2023.

Figure 4-9. South Thornton NDS Wedgewood Site - Before

Figure 4-10. South Thornton NDS Wedgewood Site - After

Finally, in 2022 the **Pipers NDS** and **Holden NDS** projects worked through Options Analysis. For Pipers NDS, this work included community outreach and bringing a consultant on board to help develop concepts for the project area to address identified needs, such as flooding and system capacity issues and partnership potential with SDOT for walkways. The Holden NDS project was initially identified by SDOT and the community as a potential opportunity to help slow traffic by installing curb bulbs. The project team engaged with the community and completed Options Analysis with a concept that helps meet the community goal.

In 2023, 30% design and community outreach will continue and be completed for the North Thornton Creek NDS Project and Holden NDS projects. The Pipers NDS project will complete Options Analysis, select a preferred options, and begin 30% design. The Longfellow NDS Project will complete construction in Summer 2023. The South Thornton NDS Project will begin construction in Spring 2023. The Broadview NDS Project will complete design in 2023 and begin construction in 2024.

Due to a variety of issues, including lack of adequate resources and complex site issues that slowed down options analysis, the North Thornton NDS and Pipers NDS projects identified that they will not meet the Integrated Plan deadline of construction completion by December 28, 2025. SPU notified Ecology and EPA of the anticipated Consent Decree milestone violations on December 5, 2022.

4.10 Expanded Arterial Street Sweeping Program

This program expanded the City's arterial street sweeping program, per commitments in the Plan to Protect Seattle's Waterways. During 2022, the team continued implementing the expanded program. SDOT street sweeping crews swept just over 9,000 miles in the municipal separate storm sewer system area, capturing 164 dry tons of total suspended solids (TSS) equivalent (130% of planned commitments). Key tasks involved in completing the work included:

- Continued to utilize overtime to address difficulties maintaining a full crew due to a tight labor market and high turnover; and
- Implemented a Commercial Driver's License Training Academy to build a pool of internal candidates.

During 2023, the team will continue to implement the expanded program and adapt as needed to meet the regulatory targets. The key tasks planned for this year include:

- Continue sweeping established routes;
- Increase sample collection frequency; and
- Continue to incorporate protected bike lanes into the program.

The City is on schedule to meet the annual commitment of capturing 122 tons of TSS equivalent in 2023.

SECTION 5

Monitoring Programs and Results

This section provides a brief overview of SPU's precipitation and flow monitoring programs and presents 2022 results, including CSO overflow details, 5-year average overflow frequencies, and a summary of the outfalls meeting the CSO control standard.

5.1 Precipitation Monitoring Program

SPU collects precipitation data from a network of 22 rain gauges located throughout the City of Seattle, as shown in Figure 1-1. No changes were made to the network of permanent rain gauges in 2022.

Two tables summarizing 2022 precipitation monitoring results are included in this report:

- Table 5-1 provides precipitation by gauge and by month; and
- Table 5-2 summarizes the last five years of precipitation monitoring results by year and by month.

Normal annual rainfall, averaged citywide, is 34.94 inches. In 2022, every SPU rain gauge exceeded that amount. Totals ranged from 37.53 inches to 44.45 inches, and the average was 40.98 inches.

5.2 Flow Monitoring Program

In 2022, SPU's flow monitoring consultant operated and maintained 70 monitoring points while SPU staff operated and maintained an additional 24 monitoring points, for a total of 94 continuous monitoring sites.

Dedicated monitoring program staff review flow monitoring results on a regular basis and evaluate data quality and flow monitor performance. If emerging problems are identified during these reviews (such as data showing slow storage tank drainage or missing data), the issues are rapidly addressed by requesting field service from the monitoring consultant or from the SPU Drainage and Wastewater crews. The consultant and SPU staff also perform site-specific troubleshooting.

Each month, the consultant's lead data analyst and senior engineer and SPU monitoring staff review and analyze any apparent overflows that occurred the previous month, taking into consideration rainfall, knowledge of site hydraulics, and the best available monitoring data. When needed, SPU meets with consultant staff to make a final determination regarding whether an overflow occurred, and any necessary follow-up actions are documented.

5.3 Summary of 2022 Monitoring Results

Several tables summarizing 2022 flow monitoring and flow monitor performance are included in the following pages of this report:

- Table 5-3 shows the 2022 flow monitor performance by outfall and month;

- Table 5-4 provides the details of all 2022 discharges by outfall and date;
- Table 5-5 includes the most recent 5-year overflow frequency for each outfall and compares 2022 and baseline CSO conditions;
- Table 5-6 compares 2017-2022 CSOs by outfall;
- Table 5-7 compares 2017-2022 CSOs by receiving waterbody;
- Table 5-8 shows which outfalls met the CSO performance standard for controlled outfalls in 2022.

Exacerbated CSOs and DWOs are included in the table listing all 2022 overflows (Table 5-4).

Observations and conclusions from these tables include:

- System-wide, flow monitors were in service an average of 99.9%. With the exception of monitors at Outfalls 16, and 68, each SPU flow monitoring station was in service over 99% of the time. The monitors at Outfalls 16, and 68 were in service no less than 98.1% of the time.
- There were 279 CSOs in 2022, totaling 131.6 million gallons (MG).
- As noted in Section 3.1.5, there were also 1 DWO and two exacerbated CSOs.
- Approximately 32 percent of the 2022 CSO volume was discharged from Outfall 152 (Ballard), which serves the largest combined sewer area of any of the City of Seattle combined sewer basins.
- The four outfalls that will be controlled by the Ship Canal Water Quality Project (Outfalls 147, 151, 152, and 174) contributed 46 percent of the 2022 CSOs (128 of the 279 CSOs) and 48 percent of the 2021 CSO volume (63.2 of the 131.6 MG).

One outfall that was reported to be controlled in SPU's baseline report and has been uncontrolled in recent years is Outfall 139 in the Montlake Area. In July 2016, SPU increased the pumping capacity of Wastewater Pump Station 25 by approximately 20 percent to increase the rate of flow to DNRP. SPU will continue to monitor the performance of the pump station to refine the remaining control volume estimate ahead of possible partnership with DNRP on a Montlake area CSO storage project.

Table 5-8 indicates that the 2003-2022 20-year moving average number of CSOs per year at two outfalls identified as controlled in SPU's NPDES Permit exceeded the State CSO performance standard: Outfalls 59 and 68. SPU notified Ecology and EPA of the Outfall 59 noncompliance in the 2018 Annual Report, attributed to the unexpected failure of a force main serving Wastewater Pump Station (WWPS) 43. The 2018 Annual Report reported that SPU was in the process of replacing the force main using emergency contracting procedures. Prior to the force main break, Outfall 59 averaged 0.4 CSOs/year. For the period 2003-2022, Outfall 59 averaged 1.2 CSOs/year, including 11 exacerbated CSOs that occurred while WWPS 43 was bypassed in 2017-2019. Now that the WWPS 43 force main has been replaced, SPU believes that Outfall 59 is once again controlled.

SPU notified Ecology and EPA of the Outfall 68 noncompliance in the 2019 Annual Report. As noted in Table 5-8, some of the 5 CSOs that occurred in 2015-2016 and contributed to the 2001-2020 average of 1.2 CSOs/year were likely exacerbated by a partially clogged HydroBrake. SPU plans to continue monitoring this outfall to determine whether additional action is needed and, if so, the type of action.

In 2017, SPU notified Ecology and EPA that Outfall 62 no longer met the CSO performance standard and submitted a Supplemental Compliance Plan. On August 27, 2018, SPU raised the Basin 62 overflow weir to optimize use of the existing sewer system. Based on hydraulic modeling conducted in February 2021, and using modeling for the period 2001 through August 27, 2018 and flow monitoring for the remaining period, the 2003-2022 average number of CSOs is 0.5 CSOs/year and the outfall is considered controlled.

5.4 CSO Control Post-Construction Monitoring

Post-Construction Monitoring Program (PCMP) in-situ sediment sampling was completed at Outfall 44 on September 1, 2020. The sampling was performed by King County staff. Sampling was completed successfully, in accordance with the approved Quality Assurance Project Plan/Sediment Analysis Plan (QAPP/SAP). Seven sediment samples and one duplicate sample were collected in the vicinity of Outfall 44. The analytical results of these samples were included in the Outfall 44 Post Construction Monitoring Program report dated April 29, 2022.

5.5 Integrated Plan Post-Construction Monitoring

The Integrated Plan, Volume 3 of the Plan to Protect Seattle Waterways, included a commitment to monitor the individual performance of the three Integrated Plan projects (NDS Partnering, South Park Water Quality Facility, and Expanded Arterial Street Sweeping) as data is available and to monitor overall performance once data is available from all three projects. Table 5-9 summarizes the Integrated Plan performance targets and the data that is available to date. As noted, overall performance is not assessed because performance data is not yet available on the South Park Water Quality Facility and NDS Partnering.

City staff completed the Expanded Arterial Street Sweeping Program post-construction monitoring sampling activities on December 20, 2018. A final report on the Street Sweeping Program post-construction monitoring was submitted with the 2018 Annual Report. As described in Section 4.7 and Section 4.8.2, the South Park Water Quality Facility and many of the NDS Partnering projects have not been constructed, so no post-construction monitoring was conducted during 2022.

Table 5-1. 2022 Precipitation by Gauge and by Month (inches)												
Rain Gauge	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
RG01	6.70	3.54	2.90	2.91	3.82	2.82	0.32	0.19	0.12	2.36	6.14	8.17
RG02	6.04	3.51	2.98	2.62	3.87	2.73	0.15	0.04	0.10	3.00	5.47	7.89
RG03	7.29	3.75	2.87	2.91	3.83	3.20	0.20	0.06	0.08	2.72	5.92	8.14
RG04	7.00	3.82	3.07	2.96	4.24	3.13	0.24	0.18	0.10	2.47	5.81	8.29
RG05	6.81	4.01	2.39	2.96	2.89	2.42	0.39	0.14	0.28	2.22	5.89	8.26
RG07	7.31	3.55	2.94	2.73	4.22	2.86	0.46	0.12	0.13	2.32	5.56	7.85
RG08	7.47	4.03	2.85	2.77	3.60	2.15	0.46	0.10	0.04	2.33	5.13	8.42
RG09	7.47	3.87	3.08	3.04	4.44	2.93	0.35	0.14	0.11	2.63	6.14	8.39
RG11	7.13	3.79	2.54	2.50	3.37	2.69	0.28	0.11	0.04	2.34	5.84	8.14
RG12	7.29	3.72	2.42	2.48	3.41	2.56	0.41	0.12	0.01	2.15	4.81	8.15
RG14	7.58	4.42	3.06	3.31	3.66	3.00	0.43	0.21	0.06	2.51	6.52	8.94
RG15	7.05	4.20	3.04	2.95	3.52	2.42	0.19	0.08	0.04	2.38	6.19	8.03
RG16	7.17	4.20	3.13	3.05	3.41	2.48	0.14	0.02	0.10	2.43	6.31	8.10
RG17	7.38	4.23	2.95	3.05	3.39	2.44	0.25	0.09	0.16	2.51	6.39	8.17
RG18	7.27	4.30	3.26	2.77	3.54	2.65	0.16	0.11	0.23	3.18	7.71	9.27
RG25	7.44	4.06	2.95	3.09	3.77	2.74	0.18	0.14	0.06	2.61	6.15	8.01
RG30	7.75	4.73	3.49	3.12	3.96	2.68	0.14	0.01	0.15	2.74	7.05	8.40
RG32	7.13	3.99	3.17	2.79	3.56	2.66	0.19	0.10	0.05	2.45	6.66	8.66
RG33	7.02	3.84	3.24	3.07	4.26	3.36	0.17	0.18	0.12	2.81	5.61	7.98
RG34	6.80	3.59	3.17	2.85	3.89	3.04	0.17	0.15	0.10	2.47	5.73	7.70
RG35	7.51	4.04	2.84	3.30	3.75	2.92	0.24	0.15	0.06	2.73	6.39	8.86
RG36	7.95	4.35	3.00	3.27	3.57	2.61	0.36	0.24	0.07	2.59	6.69	8.47
Monthly Average	**7.21**	**3.98**	**2.97**	**2.93**	**3.73**	**2.75**	**0.27**	**0.12**	**0.10**	**2.54**	**6.10**	**8.29**

Table 5-2. 2018-2022 Average Precipitation by Month (inches)					
Month/Year	**2018**	**2019**	**2020**	**2021**	**2022**
January	8.11	3.28	8.40	8.51	7.21
February	2.75	4.16	4.11	3.87	3.98
March	2.12	1.50	3.38	3.13	2.97
April	5.34	2.57	1.69	0.84	2.93
May	0.21	1.11	3.28	1.04	3.73
June	1.26	0.69	1.82	2.03	2.75
July	0.01	1.31	0.15	0.02	0.27
August	0.21	1.18	0.42	0.20	0.12
September	1.18	3.01	2.94	2.99	0.10
October	3.42	2.70	2.89	4.71	2.54
November	4.72	1.72	5.43	8.44	6.10
December	6.02	7.21	6.28	5.19	8.29
Annual Total	**35.35**	**30.43**	**40.79**	**40.96**	**40.98**

Table 5-3. 2022 Flow Monitor Performance by Outfall and Month

Outfall Number	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec		2022 Cumulative	
	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)
12	2.3	99.7	0.0	100.0	1.6	99.8	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	3.8	100.0
13	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	39.2	94.7	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	39.2	99.6
14	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
15	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	4.8	99.4	0.0	100.0	0.0	100.0	4.8	99.9
16	0.0	100.0	0.0	100.0	51.3	93.1	103.0	85.7	0.0	100.0	0.0	100.0	6.4	99.1	0.0	100.0	6.4	99.1	0.0	100.0	0.0	100.0	0.0	100.0	167.1	98.1
18	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
19	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
20	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
22	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
24	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
25	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
27	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
28	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
29	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	2.0	99.7	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	2.0	100.0
30	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
31	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
32	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
33	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	N/A	0.0	NA	0.0	NA
34	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	29.6	95.9	0.0	100.0	0.0	100.0	0.0	100.0	29.6	99.7
35	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
36	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0

Outfall Number	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec		2022 Cumulative	
	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)
38	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
40	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	3.3	99.5	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	3.3	100.0
41	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	3.3	99.5	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	3.3	100.0
42	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
43	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
44	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
45	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
46	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
47	0.0	100.0	0.0	100.0	0.0	100.0	2.8	99.6	1.4	99.8	0.0	100.0	0.0	100.0	5.8	99.2	0.0	100.0	1.1	99.9	1.3	99.8	0.0	100.0	12.3	99.9
48	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
49	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	1.3	99.8	0.0	100.0	1.3	100.0
57	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
59	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
60	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
61	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
62	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
64	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
68	0.0	100.0	0.0	100.0	0.0	100.0	41.5	94.2	25.2	96.6	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	2.7	99.6	35.8	95.0	6.6	99.1	111.7	98.7
69	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
70	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	N/A	0.0	NA	0.0	NA
71	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
72	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	NA	0.0	N/A	0.0	NA	0.0	NA
78	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0

Outfall Number	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec		2022 Cumulative	
	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)
80	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
83	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
85	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
88	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
90	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	2.1	99.7	0.0	100.0	2.1	100.0
91	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	7.4	99.0	0.0	100.0	7.4	99.9
94	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	10.1	98.6	0.0	100.0	10.1	99.9
95	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
99	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
107	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
111	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
120	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
121	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
124	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	61.1	91.5	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	61.1	99.3
127	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
129	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
130	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	59.1	91.8	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	59.1	99.3
131	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
132	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
134	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
135	0.0	100.0	0.0	100.0	52.3	93.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	52.3	99.4
136	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
138	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0

Outfall Number	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec		2022 Cumulative	
	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)	Downtime (hrs)	Uptime (%)
139	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
140	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
141	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
144	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
145	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
146	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
147	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
148	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
150/151	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
152	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
161	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
165	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
168	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	1.1	99.9	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	1.1	100.0
169	0.0	100.0	0.0	100.0	0.0	100.0	16.9	97.7	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	16.9	99.8
170	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
171	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
174	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
175	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
TOTAL:	2.3	100.0	0.0	100.0	105.1	99.8	164.2	99.7	26.6	100.0	128.7	99.8	46.7	99.9	5.8	100.0	36.0	99.9	8.6	100.0	57.8	99.9	6.6	100.0	588.4	99.9

Notes:

1. Downtime refers to the number of hours that the CSO monitor was out of service, and therefore, no overflow data is available.
2. Uptime refers to the percentage of time during the month that the CSO monitor was in service and therefore, overflow data is available.

Table 5-4. 2022 CSO Details by Outfall and Date								
Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	12	City of Seattle	Lake Washington	01/02/22	8,674	2.95	13.72	1.90
				02/28/22	869	0.42	40.40	2.41
				Total	9,543	3.37	54.12	4.31
				Average	4,772	1.69	27.06	2.16
WA0031682	13	City of Seattle	Lake Washington	01/02/22	1,174,950	13.55	23.93	2.30
				01/06/22	4,655,861	20.23	122.78	5.30
				02/28/22	1,152,505	8.30	54.65	3.17
				04/04/22	20,227	0.67	12.31	0.67
				12/24/22	78,162	1.02	21.81	1.53
				12/26/22	897,506	43.22	103.87	4.59
				Total	7,979,211	86.98	339.35	17.56
				Average	1,329,868	14.50	56.56	2.93
WA0031682	14	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	15	City of Seattle	Lake Washington	01/02/22	81,883	3.93	13.85	1.90
				01/07/22	8,278	2.37	121.65	5.28
				12/24/22	119,656	2.73	18.97	1.46
				12/25/22	75,124	3.80	57.53	2.93
				Total	284,941	12.83	212.00	11.57
				Average	71,235	3.21	53.00	2.89

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	16	City of Seattle	Union Bay	*No combined sewer overflows during 2022*				
WA0031682	18	City of Seattle	Union Bay	01/02/22	1,544,587	5.83	16.40	2.10
				01/07/22	1,646,346	13.67	122.78	5.30
				12/26/22	206,526	1.33	57.67	2.94
				Total	3,397,459	20.83	196.85	10.34
				Average	1,132,486	6.94	65.62	3.45
WA0031682	19	City of Seattle	Union Bay	*No combined sewer overflows during 2022*				
WA0031682	20	City of Seattle	Union Bay	01/02/22	34,439	1.75	13.82	1.90
				11/06/22	108,504	2.75	106.82	1.83
				Total	142,943	4.50	120.63	3.73
				Average	71,472	2.25	60.32	1.87
WA0031682	22	City of Seattle	Union Bay	*No combined sewer overflows during 2022*				
WA0031682	24	City of Seattle	Lake Washington	01/02/22	25,917	1.25	13.10	1.63
				01/06/22	74,891	11.75	120.18	5.07
				Total	100,808	13.00	133.28	6.70
				Average	50,404	6.50	66.64	3.35
WA0031682	25	City of Seattle	Lake Washington	01/02/22	56,821	1.23	13.03	1.63
				01/06/22	48,925	11.63	120.10	5.06

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				Total	105,746	12.86	133.13	6.69
				Average	52,873	6.43	66.57	3.35
WA0031682	27	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	28	City of Seattle	Lake Washington	01/02/22	14,272	2.17	12.07	1.47
				01/07/22	11,033	1.60	121.50	5.35
				06/03/22	132	0.07	33.43	0.19
				10/22/22	4,634	0.35	27.77	0.60
				12/24/22	4,416	0.97	18.02	1.41
				Total	34,487	5.16	212.78	9.02
				Average	6,897	1.03	42.56	1.80
WA0031682	29	City of Seattle	Lake Washington	01/02/22	92,687	3.63	13.40	1.66
				01/06/22	156,945	19.37	122.53	5.36
				02/28/22	5,756	1.37	40.38	2.48
				12/24/22	36,345	1.33	18.48	1.45
				Total	291,733	25.70	194.80	10.95
				Average	72,933	6.43	48.70	2.74
WA0031682	30	City of Seattle	Lake Washington	01/02/22	61,824	3.33	13.10	1.63
				01/06/22	21,611	18.92	122.10	5.36
				12/24/22	60	0.75	17.75	1.35
				Total	83,495	23.00	152.95	8.34

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				Average	27,832	7.67	50.98	2.78
WA0031682	31	City of Seattle	Lake Washington	01/02/22	467,811	9.58	18.10	1.89
				01/06/22	1,167,321	24.67	122.78	5.37
				02/28/22	358,769	14.83	53.12	3.36
				12/24/22	162,964	3.67	20.67	1.55
				12/25/22	121,047	4.08	58.92	2.83
				Total	2,277,912	56.83	273.58	15.00
				Average	455,582	11.37	54.72	3.00
WA0031682	32	City of Seattle	Lake Washington	01/02/22	76,442	7.10	16.90	1.88
				01/06/22	208,216	23.10	122.78	5.37
				02/28/22	2,060	2.07	41.15	2.54
				Total	286,718	32.27	180.83	9.79
				Average	95,573	10.76	60.28	3.26
WA0031682	33	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	34	City of Seattle	Lake Washington	01/02/22	4,552	1.00	13.10	1.63
				Total	4,552	1.00	13.10	1.63
				Average	4,552	1.00	13.10	1.63
WA0031682	35	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	36	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	38	City of Seattle	Lake Washington	01/02/22	110,528	6.10	41.78	1.63
				01/06/22	730,468	17.23	143.42	4.94
				02/28/22	160,963	10.97	51.02	3.54
				12/24/22	6,922	0.50	20.53	1.37
				Total	1,008,881	34.80	256.75	11.48
				Average	252,220	8.70	64.19	2.87
WA0031682	40	City of Seattle	Lake Washington	01/03/22	269,938	11.40	48.58	1.83
				01/06/22	870,428	21.85	143.42	4.94
				02/28/22	698,254	20.27	60.53	3.79
				Total	1,838,620	53.52	252.53	10.56
				Average	612,873	17.84	84.18	3.52
WA0031682	41	City of Seattle	Lake Washington	01/03/22	269,938	11.40	48.58	1.83
				01/06/22	870,428	21.85	143.42	4.94
				02/28/22	698,254	20.27	60.53	3.79
				Total	1,838,620	53.52	252.53	10.56
				Average	612,873	17.84	84.18	3.52
WA0031682	42	City of Seattle	Lake Washington	01/02/22	40,382	5.10	40.48	1.62
				01/06/22	166,660	13.13	140.35	4.86
				02/28/22	140,428	14.27	54.92	3.75

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				Total	347,470	32.50	235.75	10.23
				Average	115,823	10.83	78.58	3.41
WA0031682	43	City of Seattle	Lake Washington	01/02/22	278,966	21.33	55.60	1.93
				01/06/22	502,331	23.92	143.42	4.94
				02/28/22	694,672	33.75	65.87	3.89
				Total	1,475,969	79.00	264.88	10.76
				Average	491,990	26.33	88.29	3.59
WA0031682	44	City of Seattle	Lake Washington	01/06/22	4,911,212	36.48	143.42	4.94
				02/28/22	3,532,202	24.67	65.87	3.89
				12/27/22	500,639	20.08	101.07	4.41
				Total	8,944,053	81.23	310.35	13.24
				Average	2,981,351	27.08	103.45	4.41
WA0031682	45	City of Seattle	Lake Washington	01/02/22	46,309	1.50	36.73	1.38
				01/07/22	8,950	0.57	134.13	4.64
				Total	55,260	2.07	170.86	6.02
				Average	27,630	1.03	85.43	3.01
WA0031682	46	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	47	City of Seattle	Lake Washington	01/02/22	544,057	7.07	114.63	2.09
				01/06/22	986,345	27.90	214.33	5.31

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				01/11/22	6,774	0.50	24.38	1.10
				02/27/22	1,279,277	28.03	59.50	4.21
				10/31/22	30,593	1.23	11.30	0.96
				11/29/22	58,205	5.20	17.93	1.85
				12/24/22	144,020	4.80	18.07	1.69
				12/26/22	90,950	8.10	60.20	3.15
				Total	3,140,221	82.83	520.35	20.36
				Average	392,528	10.35	65.04	2.55
WA0031682	48	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	49	City of Seattle	Lake Washington	01/02/22	644,433	14.07	122.63	2.29
				01/06/22	2,989,919	31.92	217.37	5.34
				01/11/22	56,096	14.42	41.58	1.71
				02/28/22	3,801,094	28.92	63.62	4.26
				11/30/22	228,243	4.03	18.47	1.86
				12/24/22	376,817	5.08	19.25	1.69
				12/26/22	417,436	8.95	62.03	3.16
				Total	8,514,038	107.39	544.95	20.31
				Average	1,216,291	15.34	77.85	2.90
WA0031682	57	City of Seattle	Puget Sound - Central	12/27/22	307,223	2.03	91.78	4.49
				Total	307,223	2.03	91.78	4.49
				Average	307,223	2.03	91.78	4.49

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	59	City of Seattle	Salmon Bay	01/02/22	38,329	0.39	33.92	1.60
				12/27/22	2,477[2]	1.68	90.98	4.40
				Total	40,806	2.07	124.90	6.00
				Average	20,403	1.04	62.45	3.00
WA0031682	60	City of Seattle	Salmon Bay	12/27/22	15	0.07	88.62	4.12
				Total	15	0.07	88.62	4.12
				Average	15	0.07	88.62	4.12
WA0031682	61	City of Seattle	Elliott Bay	01/02/22	24,944	3.07	82.00	1.69
				12/24/22	283	0.20	17.95	1.43
				12/27/22	11,453	0.27	87.25	4.20
				Total	36,680	3.54	187.20	7.32
				Average	12,227	1.18	62.40	2.44
WA0031682	62	City of Seattle	Elliott Bay	12/27/22	133	0.07	87.12	4.19
				Total	133	0.07	87.12	4.19
				Average	133	0.07	87.12	4.19
WA0031682	64	City of Seattle	Elliott Bay	*No combined sewer overflows during 2022*				
WA0031682	68	City of Seattle	Elliott Bay	01/02/22	438,861	5.25	84.73	2.07
				12/24/22	38,713	0.60	18.85	1.58

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				Total	477,574	5.85	103.58	3.65
				Average	238,787	2.93	51.79	1.83
WA0031682	69	City of Seattle	Elliott Bay	01/02/22	150,299	3.75	11.97	1.62
				01/07/22	32,611	0.33	120.97	5.18
				06/05/22	123,160	0.47	65.83	1.37
				12/24/22	126,402	1.13	18.72	1.57
				Total	432,472	5.68	217.48	9.74
				Average	108,118	1.42	54.37	2.44
WA0031682	70	City of Seattle	Elliott Bay	*No combined sewer overflows during 2022*				
WA0031682	71	City of Seattle	Elliott Bay	*No combined sewer overflows during 2022*				
WA0031682	72	City of Seattle	Elliott Bay	*No combined sewer overflows during 2022*				
WA0031682	78	City of Seattle	Elliott Bay	*No combined sewer overflows during 2022*				
WA0031682	80	City of Seattle	Puget Sound	*No combined sewer overflows during 2022*				
WA0031682	83	City of Seattle	Puget Sound	*No combined sewer overflows during 2022*				
WA0031682	85	City of Seattle	Puget Sound	*No combined sewer overflows during 2022*				

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	88	City of Seattle	Puget Sound	01/02/22	42,430	1.95	35.80	1.96
				Total	42,430	1.95	35.80	1.96
				Average	42,430	1.95	35.80	1.96
WA0031682	90	City of Seattle	Puget Sound	*No combined sewer overflows during 2022*				
WA0031682	91	City of Seattle	Puget Sound	01/07/22	9[2]	0.70	118.48	4.66
				12/27/22	9[2]	1.38	91.58	3.96
				Total	18	2.08	210.07	8.62
				Average	9	1.04	105.03	4.31
WA0031682	94	City of Seattle	Puget Sound	*No combined sewer overflows during 2022*				
WA0031682	95	City of Seattle	Puget Sound	01/02/22	3,568	2.00	12.38	1.38
				01/07/22	8,919	1.42	110.22	4.40
				06/05/22	18	0.25	83.18	1.02
				Total	12,505	3.67	205.78	6.80
				Average	4,168	1.22	68.59	2.27
WA0031682	99	City of Seattle	West Waterway - Duwamish	01/02/22	373,654	6.48	17.95	1.68
				01/06/22	454,895	9.02	113.15	4.48
				02/28/22	259,400	11.05	52.30	3.61
				Total	1,087,950	26.55	183.40	9.77
				Average	362,650	8.85	61.13	3.26

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	107	City of Seattle	East Waterway - Duwamish	01/02/22	66,086	5.53	15.37	1.71
				01/06/22	5,495	30.93	120.23	4.95
				02/27/22	38,155	11.00	41.50	2.77
				04/04/22	8	0.03	10.92	0.72
				10/31/22	1,307	0.53	5.75	0.85
				11/22/22	9,733	2.67	8.33	1.06
				11/29/22	14,730	5.17	17.10	1.56
				12/24/22	32,305	3.13	19.75	1.60
				12/25/22	18,312	1.57	56.42	2.66
				Total	186,131	60.56	295.37	17.88
				Average	20,681	6.73	32.82	1.99
WA0031682	111	City of Seattle	Duwamish River	01/02/22	303,944	5.43	16.87	1.80
				01/06/22	108,857	3.20	111.83	4.61
				11/22/22	317	0.58	6.30	0.91
				12/24/22	31,380	2.17	19.08	1.55
				Total	444,498	11.38	154.08	8.87
				Average	111,125	2.85	38.52	2.22
WA0031682	120	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	121	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	124	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	127	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	129	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	130	City of Seattle	Lake Union	06/05/22	36,864	0.20	65.53	1.29
				Total	36,864	0.20	65.53	1.29
				Average	36,864	0.20	65.53	1.29
WA0031682	131	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	132	City of Seattle	Lake Union	06/05/22	165,695	0.43	65.67	1.31
				Total	165,695	0.43	65.67	1.31
				Average	165,695	0.43	65.67	1.31
WA0031682	134	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	135	City of Seattle	Lake Union	06/05/22	6,225	0.43	65.70	1.31
				Total	6,225	0.43	65.70	1.31
				Average	6,225	0.43	65.70	1.31
WA0031682	136	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	138	City of Seattle	Portage Bay	01/02/22	503,638	5.80	15.52	2.04
				11/29/22	88,700	2.27	13.32	0.97
				12/24/22	30,134	0.53	17.17	1.28
				12/26/22	12,135	1.93	56.73	2.88
				Total	634,607	10.53	102.73	7.17
				Average	158,652	2.63	25.68	1.79
WA0031682	139	City of Seattle	Portage Bay	01/02/22	302,579	7.25	15.48	2.04
				02/28/22	65,034	2.08	40.23	2.41
				06/05/22	5,913	0.25	65.58	1.30
				11/29/22	21,173	0.67	11.55	0.63
				12/24/22	4,455	0.67	17.50	1.35
				Total	399,154	10.92	150.35	7.73
				Average	79,831	2.18	30.07	1.55
WA0031682	140	City of Seattle	Portage Bay	01/02/22	339,504	8.67	17.07	2.11
				01/07/22	93,020	6.58	122.07	5.29
				02/28/22	148,337	11.33	49.73	3.07
				06/05/22	73,790	0.92	65.83	1.31
				12/24/22	107,623	2.25	18.92	1.46
				12/26/22	88,580	2.75	57.42	2.93
				Total	850,854	32.50	331.03	16.17
				Average	141,809	5.42	55.17	2.70

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	141	City of Seattle	Portage Bay	*No combined sewer overflows during 2022*				
WA0031682	144	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	145	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	146	City of Seattle	Lake Union	*No combined sewer overflows during 2022*				
WA0031682	147	City of Seattle	Lake Union	01/02/22	1,525,442	34.42	136.32	2.76
				01/06/22	1,738,005	39.75	220.57	5.56
				01/10/22	107,378	35.58	36.02	1.04
				01/13/22	17,778	0.83	71.77	1.43
				01/20/22	828	0.08	22.03	0.19
				01/30/22	6,029	0.42	6.35	0.19
				02/20/22	2,979	0.33	32.23	0.24
				02/26/22	1,500,771	47.67	52.52	3.11
				03/03/22	1,269	0.25	107.93	3.41
				03/14/22	11,146	8.58	55.72	0.61
				03/18/22	15,648	7.25	38.60	0.60
				03/23/22	24,477	0.33	6.42	0.32
				03/30/22	6,023	7.67	11.85	0.45
				04/03/22	349,480	5.00	11.37	0.88
				04/09/22	3,286	0.17	44.77	0.22
				04/18/22	2,591	0.17	15.45	0.40

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				04/25/22	5,133	0.83	3.65	0.17
				05/02/22	13,272	0.75	5.62	0.39
				05/06/22	12,852	0.67	34.48	0.64
				05/12/22	51,161	1.92	7.15	0.42
				05/15/22	28,286	3.75	36.50	0.54
				05/19/22	91	0.08	23.57	0.36
				05/26/22	4,266	0.25	0.28	0.04
				05/29/22	96,280	9.25	39.38	1.08
				06/02/22	60,474	12.75	33.25	0.34
				06/04/22	141,702	11.17	84.08	1.32
				06/09/22	113,432	4.33	12.18	0.85
				10/21/22	901	0.17	11.28	0.40
				10/28/22	46,618	4.75	5.30	0.64
				10/30/22	104,916	4.08	19.42	0.85
				11/03/22	14,183	1.00	40.62	0.67
				11/06/22	226,511	4.50	8.07	0.96
				11/07/22	108,633	2.58	41.90	1.73
				11/22/22	127,228	5.83	9.27	0.98
				11/25/22	12,010	6.42	6.93	0.83
				11/27/22	19,051	0.42	9.67	0.19
				11/29/22	99,638	5.92	16.73	0.99
				12/09/22	76,523	22.92	85.27	1.42
				12/20/22	24,974	0.92	68.93	0.42
				12/24/22	818,419	7.83	21.55	1.73

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				12/25/22	2,009,926	52.00	100.52	4.73
				12/29/22	319,817	19.08	44.12	0.91
				Total	9,849,427	372.67	1639.62	45.01
				Average	234,510	8.87	39.04	1.07
WA0031682	148	City of Seattle	Lake Washington – Ship Canal	01/02/22	79,255	1.77	107.48	2.03
				12/24/22	58,652	1.10	18.17	1.56
				Total	137,907	2.87	125.65	3.59
				Average	68,954	1.44	62.82	1.80
WA0031682	150/151	City of Seattle	Salmon Bay	01/02/22	1,133,059	9.07	30.00	2.24
				01/06/22	127,818	31.33	131.03	5.08
				01/10/22	10,068	35.03	37.72	1.06
				01/13/22	65	0.23	73.35	1.46
				01/20/22	6,493	0.17	22.70	0.13
				01/30/22	1	0.08	6.12	0.21
				02/20/22	84	0.12	16.75	0.24
				02/26/22	122,449	43.50	48.47	3.21
				03/03/22	99	0.08	107.97	3.60
				03/04/22	13	0.03	133.15	3.75
				03/14/22	8	0.08	47.77	0.32
				03/19/22	1	0.17	35.07	0.41
				03/21/22	1	0.08	89.40	0.90
				03/23/22	1	0.08	5.92	0.29

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				03/30/22	7,968	3.33	7.43	0.30
				04/03/22	2,694	3.33	10.45	0.86
				05/02/22	39	0.08	3.47	0.22
				05/29/22	8,108	1.73	31.27	0.58
				06/03/22	27,096	0.37	34.18	0.24
				06/05/22	1,858	0.17	82.28	0.98
				06/09/22	41	0.08	8.65	0.32
				10/21/22	2,552	18.27	28.85	0.58
				10/28/22	8,782	0.40	0.75	0.25
				10/30/22	5,854	1.83	5.97	0.70
				11/06/22	6,328	4.27	5.72	0.56
				11/07/22	2,813	0.28	41.82	1.29
				11/22/22	812	5.35	8.73	0.85
				11/25/22	110	0.77	23.83	0.43
				11/27/22	30	0.10	0.27	0.12
				11/29/22	42,096	4.93	15.77	0.97
				12/09/22	10	20.27	54.98	1.24
				12/20/22	28	0.03	39.97	0.35
				12/24/22	483,542	7.73	22.85	1.56
				12/25/22	651,609	51.10	101.68	4.73
				12/29/22	19,910	27.83	165.95	5.67
				Total	2,672,440	272.30	1480.27	45.70
				Average	76,355	7.78	42.29	1.31

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	152	City of Seattle	Salmon Bay	01/02/22	19,112,104	129.42	136.32	5.39
				01/10/22	1,102,007	71.98	74.35	1.50
				01/20/22	78,670	0.33	22.83	0.13
				01/30/22	18,255	1.20	6.57	0.23
				02/20/22	43,615	0.60	17.15	0.27
				02/26/22	5,900,723	58.58	61.80	3.42
				03/03/22	35,714	0.97	108.77	3.64
				03/04/22	28,497	0.60	133.15	3.75
				03/14/22	27,981	8.73	55.87	0.49
				03/18/22	143,742	7.53	39.10	0.62
				03/21/22	84,928	3.00	91.73	1.01
				03/23/22	179,506	1.80	6.47	0.32
				03/30/22	86,481	7.95	11.85	0.45
				04/03/22	2,536,182	5.42	10.95	0.87
				04/09/22	13,377	0.45	6.20	0.23
				04/18/22	10,368	0.47	14.70	0.34
				04/21/22	3,737	0.33	27.90	0.31
				05/02/22	135,694	2.47	5.68	0.40
				05/06/22	10,241	16.58	49.87	0.76
				05/10/22	6	0.08	1.08	0.12
				05/12/22	220,111	2.25	7.97	0.32
				05/15/22	178,743	5.53	34.65	0.53
				05/18/22	25,530	18.68	23.87	0.26
				05/29/22	137,516	8.42	37.87	0.84

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				06/03/22	203,075	7.95	41.72	0.36
				06/04/22	288,054	11.42	84.18	1.07
				06/09/22	598,401	4.90	12.55	0.65
				10/21/22	30,507	18.67	29.25	0.60
				10/28/22	303,951	4.45	4.68	0.52
				10/30/22	543,053	4.67	6.72	0.76
				11/02/22	41,796	1.23	2.50	0.30
				11/03/22	56,602	1.33	40.60	0.65
				11/06/22	826,829	6.40	7.68	0.70
				11/07/22	277,508	7.92	42.12	1.29
				11/22/22	441,311	7.50	9.53	0.91
				11/25/22	256,207	7.55	28.60	0.80
				11/27/22	10,624	0.57	0.63	0.13
				11/29/22	1,141,350	10.87	19.70	1.06
				12/03/22	4,799	0.98	7.78	0.52
				12/09/22	360,458	22.80	62.52	1.39
				12/20/22	11,188	0.57	40.33	0.36
				12/24/22	3,002,728	10.67	24.87	1.58
				12/25/22	2,876,671	55.08	105.53	4.75
				12/29/22	617,439	15.83	167.12	5.68
				Total	42,006,279	554.73	1725.30	50.28
				Average	954,688	12.61	39.21	1.14
WA0031682	161	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
WA0031682	165	City of Seattle	Lake Washington	01/02/22	446	1.75	36.10	1.35
				Total	446	1.75	36.10	1.35
				Average	446	1.75	36.10	1.35
WA0031682	168	City of Seattle	Lake Washington	01/03/22	1,876,256	15.25	31.93	2.15
				01/06/22	4,126,428	20.92	120.82	5.08
				02/28/22	1,573,413	16.38	62.69	3.72
				Total	7,576,097	52.55	215.44	10.95
				Average	2,525,366	17.52	71.81	3.65
WA0031682	169	City of Seattle	Lake Washington	01/03/22	960,699	15.20	30.13	2.15
				01/06/22	2,771,846	20.28	120.82	5.08
				02/28/22	2,865,949	18.90	59.72	3.67
				12/26/22	560,745	12.55	90.57	3.85
				Total	7,159,239	66.93	301.25	14.75
				Average	1,789,810	16.73	75.31	3.69
WA0031682	170	City of Seattle	Lake Washington	*No combined sewer overflows during 2022*				
WA0031682	171	City of Seattle	Lake Washington	01/02/22	885,740	7.25	114.73	2.09
				01/06/22	1,798,669	28.00	214.40	5.31
				01/11/22	30,965	0.50	24.33	1.10
				02/27/22	2,590,199	28.17	59.53	4.21

Permit No	Outfall No	Facility Name	Receiving Water	CSO Events				
				Starting Date	Volume (gallons)	Duration (hours)	Storm Duration (hours)	Precipitation (inches)
				10/31/22	78,002	1.17	11.17	0.94
				11/29/22	189,140	5.17	18.10	1.86
				12/24/22	323,037	4.83	18.25	1.69
				12/26/22	219,308	8.17	60.42	3.15
				Total	6,115,060	83.26	520.94	20.35
				Average	764,383	10.41	65.12	2.54
WA0031682	174	City of Seattle	Lake Washington Canal	01/02/22	2,802,649	10.27	113.55	2.47
				01/06/22	2,981,498	22.23	220.45	5.55
				01/11/22	33,720	0.60	19.38	0.55
				02/27/22	2,316,493	19.97	50.48	3.08
				04/04/22	360,296	2.00	11.15	0.88
				06/05/22	1,006	0.17	82.95	1.30
				10/28/22	155,413[2]	1.35	6.00	0.65
				11/13/22	91,599[1]	4.90	0.00	0.00
				Total	8,742,674	61.49	503.97	14.48
				Average	1,092,834	7.69	63.00	1.81
WA0031682	175	City of Seattle	Lake Union	06/05/22	78,276	0.40	65.70	1.31
				Total	78,276	0.40	65.70	1.31
				Average	78,276	0.40	65.70	1.31

Notes:
1. Dry Weather Overflow
2. Exacerbated CSO

Table 5-5. Comparison of 2022 and Baseline CSOs by Outfall								
Outfall Number	2018 - 2022 Average CSO Frequency (No./year)	2022 CSO Discharge Events			Receiving Water	2010 Baseline CSO		2022 CSOs Compared to 2010 Baseline CSOs
		Frequency (No./year)	Duration (hours)	Volume (gallons)		Frequency (No./year)	Volume (MG/year)	
12	1.4	2	3.37	9,543	Lake Washington	0	0	Above
13	3.6	6	86.98	7,979,211	Lake Washington	12	6.7	Frequency Below, Volume Above
14	0.2	0	0.00	0	Lake Washington	0	0	Equals
15	2	4	12.83	284,941	Lake Washington	1.2	0.3	Frequency Above, Volume Below
16	0.4	0	0.00	0	Lake Washington	0	0	Equals
18	1.8	3	20.83	3,397,459	Union Bay	6.6	0.5	Frequency Below, Volume Above
19	0.2	0	0.00	0	Union Bay	0.2	0	Frequency Below, Volume Equals
20	2	2	4.50	142,943	Union Bay	2.6	0.1	Frequency Below, Volume Above
22	0.2	0	0.00	0	Union Bay	0.7	0.1	Below
24	0.8	2	13.00	100,808	Lake Washington	0.2	0	Above
25	0.8	2	12.86	105,746	Lake Washington	2.8	1.6	Below
27	0	0	0.00	0	Lake Washington	0	0	Equals
28	4.4	5	5.16	34,487	Lake Washington	15	0.4	Below
29	2.2	4	25.70	291,733	Lake Washington	4.7	0.3	Below
30	2	3	23.00	83,495	Lake Washington	5.4	0.7	Frequency Below, Volume Above
31	3.6	5	56.83	2,277,912	Lake Washington	9.3	0.5	Frequency Below, Volume Above
32	2.4	3	32.27	286,718	Lake Washington	8.4	0.3	Below
33	N/A	N/A	N/A	N/A	Lake Washington	NA	NA	Removed from service 2016
34	1	1	1.00	4,552	Lake Washington	1.4	0.5	Below
35	0.2	0	0.00	0	Lake Washington	2	0.3	Below
36	0	0	0.00	0	Lake Washington	2.7	0.1	Below
38	1.8	4	34.80	1,008,881	Lake Washington	0.7	0.4	Above
40	1.8	3	53.52	1,838,620	Lake Washington	6	0.8	Frequency Below, Volume Above
41	1.8	3	53.52	1,838,620	Lake Washington	7.5	0.9	Frequency Below, Volume Above
42	1.8	3	32.50	347,470	Lake Washington	0.6	0.02	Above
43	3.2	3	79.00	1,475,969	Lake Washington	7	0.7	Frequency Below, Volume Above
44	1.8	3	81.23	8,944,053	Lake Washington	13	9.3	Below
45	1.2	2	2.07	55,260	Lake Washington	5.9	1.1	Below
46	0.4	0	0.00	0	Lake Washington	6.5	0.9	Below

Outfall Number	2018 - 2022 Average CSO Frequency (No./year)	2022 CSO Discharge Events			Receiving Water	2010 Baseline CSO		2022 CSOs Compared to 2010 Baseline CSOs
		Frequency (No./year)	Duration (hours)	Volume (gallons)		Frequency (No./year)	Volume (MG/year)	
47	3.8	8	82.83	3,140,221	Lake Washington	5.6	1.8	Above
48	0	0	0.00	0	Lake Washington	0	0	Equals
49	4.4	7	107.39	8,514,038	Lake Washington	1.6	0.8	Above
57	0.2	1	2.03	307,223	Puget Sound	0	0	Above
59	1.6	2	2.07	40,806	Salmon Bay	0.2	0.4	Above
60	0.6	1	0.07	15	Salmon Bay	1.7	0.8	Below
61	1.4	3	3.54	36,680	Elliott Bay	0	0	Above
62	0.6	1	0.07	133	Elliott Bay	0.7	0	Above
64	0	0	0.00	0	Elliott Bay	0.1	0	Frequency Below, Volume Equals
68	1.6	2	5.85	477,574	Elliott Bay	1.4	1.3	Frequency Above, Volume Below
69	1.6	4	5.68	432,472	Elliott Bay	4.4	1.4	Below
70	N/A	N/A	N/A	N/A	Elliott Bay	0.9	0.2	Removed from service 2020
71	1	0	0.00	0	Elliott Bay	4.3	1.3	Below
72	N/A	N/A	N/A	N/A	Elliott Bay	1.2	0.3	Removed from service 2020
78	0	0	0.00	0	Elliott Bay	0.3	0.2	Below
80	0	0	0.00	0	Elliott Bay	0	0	Equals
83	0	0	0.00	0	Puget Sound	0	0	Equals
85	0	0	0.00	0	Puget Sound	0	0	Equals
88	0.4	1	1.95	42,430	Puget Sound	0.3	0.2	Frequency Above, Volume Below
90	0	0	0.00	0	Puget Sound	0.2	0	Frequency Below, Volume Equals
91	0.4	2	2.08	18	Puget Sound	0	0	Above
94	0	0	0.00	0	Puget Sound	0.1	0	Frequency Below, Volume Equals
95	2	3	3.67	12,505	Puget Sound	3	0.4	Frequency Equals, Volume Below
99	1.8	3	26.55	1,087,950	W Waterway - Duwamish River	0.5	2.8	Frequency Above, Volume Below
107	2.8	9	60.56	186,131	E Waterway - Duwamish River	3.8	1.9	Frequency Above, Volume Below
111	1.8	4	11.38	444,498	Duwamish River	3	7.9	Frequency Above, Volume Below
120	0	0	0.00	0	Lake Union	0	0	Equals
121	0.2	0	0.00	0	Lake Union	0.1	0	Frequency Below, Volume Equals
124	0	0	0.00	0	Lake Union	0	0	Equals

Outfall Number	2018 - 2022 Average CSO Frequency (No./year)	2022 CSO Discharge Events			Receiving Water	2010 Baseline CSO		2022 CSOs Compared to 2010 Baseline CSOs
		Frequency (No./year)	Duration (hours)	Volume (gallons)		Frequency (No./year)	Volume (MG/year)	
127	0	0	0.00	0	Lake Union	0.7	0.1	Below
129	0	0	0.00	0	Lake Union	0.1	0	Frequency Below, Volume Equals
130	0.4	1	0.20	36,864	Lake Union	0	0	Above
131	0	0	0.00	0	Lake Union	0.1	0	Frequency Below, Volume Equals
132	1	1	0.43	165,695	Lake Union	0.7	0	Above
134	0	0	0.00	0	Lake Union	0	0	Equals
135	1	1	0.43	6,225	Lake Union	0.3	0	Above
136	0	0	0.00	0	Lake Union	0	0	Equals
138	2	4	10.53	634,607	Portage Bay	2.3	2	Frequency Above, Volume Below
139	3.2	5	10.92	399,154	Portage Bay	0.7	1.4	Frequency Above, Volume Below
140	4	6	32.50	850,854	Portage Bay	4.1	0.3	Above
141	0	0	0.00	0	Portage Bay	0.1	0	Frequency Below, Volume Equals
144	0	0	0.00	0	Lake Union	0.1	0.2	Below
145	0	0	0.00	0	Lake Union	0	0	Equals
146	0	0	0.00	0	Lake Union	0	0	Equals
147	40	42	372.67	9,849,427	Lake Union	33	19	Frequency Above, Volume Below
148	0.6	2	2.87	137,907	Lake Washington Ship Canal	0	0	Above
150/151	23.6	35	272.30	2,672,440	Salmon Bay	15	2	Above
152	42.4	44	554.73	42,006,279	Salmon Bay	15	9.7	Above
161	0	0	0.00	0	Lake Washington	0	0	Equals
165	1.2	1	1.75	446	Lake Washington	1.1	0.02	Below
168	1.8	3	52.55	7,576,097	Longfellow Creek	3.9	1.6	Frequency Below, Volume Above
169	1.8	4	66.93	7,159,239	Longfellow Creek	2.2	49	Frequency Above, Volume Below
170	0.4	0	0.00	0	Longfellow Creek	0.4	0.1	Below
171	3.8	8	83.26	6,115,060	Lake Washington	4.1	0.75	Above
174	6.4	7	56.59	8,651,075	Lake Washington Ship Canal	11	5.9	Frequency Below, Volume Above
175	0.6	1	0.40	78,276	Lake Union	0.7	0	Above
Total	**203**	**279**	**2469.75**	**131,570,761**		**251**	**140**	

Table 5-6. 2018-2022 Summary Comparison of CSOs by Outfall

Outfall No.	Frequency (Number per Year)					Duration (Hours per Year)					Volume (Gallons per Year)					Receiving Water
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	
12	1	1	3	0	2	6.23	8.70	5.57	0.00	3.37	60,517	164,728	73,378	0	9,543	Lake Washington
13	1	2	5	4	6	4.17	30.87	36.11	25.35	86.98	360,187	10,525,382	7,707,124	4,068,045	7,979,211	Lake Washington
14	0	0	1	0	0	0.00	0.00	1.00	0.00	0.00	0	0	5,005	0	0	Lake Washington
15	2	1	1	2	4	1.97	20.17	3.73	24.37	12.83	19,287	162,483	372,636	47,778	284,941	Lake Washington
16	0	1	1	0	0	0.00	0.18	0.33	0.00	0.00	0	1,269	575	0	0	Lake Washington
18	1	1	2	2	3	4.97	26.10	25.75	4.08	20.83	392,952	3,225,836	2,421,116	986,572	3,397,459	Union Bay
19	0	0	1	0	0	0.00	0.00	0.16	0.00	0.00	0	0	215	0	0	Union Bay
20	3	1	3	1	2	14.80	39.00	30.56	1.33	4.50	530,191	1,595,375	834,150	27,907	142,943	Union Bay
22	0	0	1	0	0	0.00	0.00	0.95	0.00	0.00	0	0	461	0	0	Union Bay
24	0	1	1	0	2	0.00	2.13	2.33	0.00	13.00	0	41,198	540,526	0	100,808	Lake Washington
25	0	1	1	0	2	0.00	2.33	2.30	0.00	12.86	0	116,115	812,813	0	105,746	Lake Washington
27	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Washington
28	1	5	4	7	5	1.87	14.02	2.52	9.15	5.16	6,611	21,771	55,823	214,831	34,487	Lake Washington
29	1	2	2	2	4	3.40	7.72	3.70	26.86	25.70	53,616	157,589	105,678	199,900	291,733	Lake Washington
30	1	1	3	2	3	3.12	7.30	4.51	26.73	23.00	14,492	39,810	89,469	69,534	83,495	Lake Washington
31	3	1	6	3	5	3.00	28.67	42.16	47.67	56.83	213,963	547,576	864,078	918,527	2,277,912	Lake Washington
32	3	1	3	2	3	3.80	11.23	12.63	29.50	32.27	54,332	232,294	279,919	191,926	286,718	Lake Washington
33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Lake Washington
34	1	1	1	1	1	6.90	3.23	2.75	1.25	1.00	347,045	27,359	139,256	15,606	4,552	Lake Washington
35	0	0	1	0	0	0.00	0.00	0.27	0.00	0.00	0	0	2,972	0	0	Lake Washington
36	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Washington
38	1	1	1	2	4	6.43	9.60	3.75	5.48	34.80	113,752	409,725	355,975	256,102	1,008,881	Lake Washington
40	1	1	2	2	3	15.42	38.23	52.97	48.05	53.52	232,494	915,369	327,145	684,204	1,838,620	Lake Washington
41	1	1	2	2	3	15.42	38.23	52.97	48.05	53.52	232,494	915,369	327,145	684,204	1,838,620	Lake Washington
42	1	1	1	3	3	9.10	14.00	7.40	33.61	32.50	199,773	258,181	176,049	335,339	347,470	Lake Washington
43	3	3	4	3	3	26.25	67.42	81.42	96.92	79.00	173,312	1,217,192	785,242	1,018,332	1,475,969	Lake Washington
44	1	1	1	3	3	13.75	57.67	0.40	90.12	81.23	566,412	5,435,510	3,068	5,115,155	8,944,053	Lake Washington

Outfall No.	Frequency (Number per Year)					Duration (Hours per Year)					Volume (Gallons per Year)					Receiving Water
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	
45	0	1	1	2	2	0.00	9.70	2.43	22.63	2.07	0	52,700	113,592	68,754	55,260	Lake Washington
46	0	0	2	0	0	0.00	0.00	13.15	0.00	0.00	0	0	220,085	0	0	Lake Washington
47	1	3	2	5	8	7.77	19.42	8.56	54.61	82.83	520,612	2,477,342	1,144,837	1,532,159	3,140,221	Lake Washington
48	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Washington
49	3	2	4	6	7	17.70	40.70	27.19	60.43	107.39	1,391,210	6,930,074	2,877,370	5,315,419	8,514,038	Lake Washington
57	0	0	0	0	1	0.00	0.00	0.00	0.00	2.03	0	0	0	0	307,223	Puget Sound
59	4	1	1	0	2	21.42	0.75	0.92	0.00	2.07	591,114	195,533	119,284	0	40,806	Salmon Bay
60	0	2	0	0	1	0.00	3.37	0.00	0.00	0.07	0	25,117	0	0	15	Salmon Bay
61	0	1	2	1	3	0.00	0.67	1.21	0.17	3.54	0	37,629	71,812	2,113	36,680	Elliott Bay
62	0	0	2	0	1	0.00	0.00	0.50	0.00	0.07	0	0	8,674	0	133	Elliott Bay
64	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Elliott Bay
68	1	2	2	1	2	0.13	26.94	8.51	1.43	5.85	766	983,018	660,538	24,184	477,574	Elliott Bay
69	0	1	2	1	4	0.00	13.43	2.12	0.08	5.68	0	47,509	717,160	2,345	432,472	Elliott Bay
70	0	0	0	NA	NA	0.00	0.00	0.00	NA	NA	0	0	0	NA	NA	Elliott Bay
71	2	2	1	0	0	3.40	20.03	1.40	0.00	0.00	84,372	620,074	309,386	0	0	Elliott Bay
72	0	0	0	NA	NA	0.00	0.00	0.00	NA	NA	0	0	0	NA	NA	Elliott Bay
78	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Elliott Bay
80	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Elliott Bay
83	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Puget Sound
85	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Puget Sound
88	0	0	1	0	1	0.00	0.00	1.03	0.00	1.95	0	0	1,047,258	0	42,430	Puget Sound
90	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Puget Sound
91	0	0	0	0	2	0.00	0.00	0.00	0.00	2.08	0	0	0	0	18	Puget Sound
94	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Puget Sound
95	0	2	2	3	3	0.00	6.73	3.07	29.99	3.67	0	6,673	28,802	42,394	12,505	Puget Sound
99	3	1	2	0	3	13.30	10.20	12.02	0.00	26.55	1,083,831	740,333	1,144,773	0	1,087,950	W Waterway - Duwamish River
107	2	1	1	1	9	3.77	39.03	4.57	1.60	60.56	29,605	176,732	90,815	14,358	186,131	E Waterway - Duwamish River
111	1	1	1	2	4	2.77	7.97	4.47	4.91	11.38	56,370	1,401,251	292,182	309,788	444,498	Duwamish River

Outfall No.	Frequency (Number per Year)					Duration (Hours per Year)					Volume (Gallons per Year)					Receiving Water
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	
120	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
121	0	0	1	0	0	0.00	0.00	0.70	0.00	0.00	0	0	0	0	0	Lake Union
124	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
127	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
129	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
130	0	0	1	0	1	0.00	0.00	0.92	0.00	0.20	0	0	86,940	0	36,864	Lake Union
131	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
132	0	0	2	2	1	0.00	0.00	1.50	0.34	0.43	0	0	441,749	64,169	165,695	Lake Union
134	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
135	0	0	3	1	1	0.00	0.00	2.16	0.42	0.43	0	0	11,528	5,065	6,225	Lake Union
136	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
138	1	0	3	2	4	6.83	0.00	28.00	25.70	10.53	65,996	0	429,730	329,070	634,607	Portage Bay
139	3	3	2	3	5	12.53	37.11	5.75	6.92	10.92	443,323	1,849,563	334,584	265,003	399,154	Portage Bay
140	4	5	3	2	6	9.28	26.67	8.91	27.00	32.50	103,400	569,810	267,340	401,757	850,854	Portage Bay
141	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Portage Bay
144	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
145	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
146	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Union
147	37	34	47	40	42	520.08	179.12	358.40	573.00	372.67	15,031,921	21,385,295	21,102,048	6,380,778	9,849,427	Lake Union
148	0	1	0	0	2	0.00	1.25	0.00	0.00	2.87	0	23,649	0	0	137,907	Lake Washington Ship Canal
150/ 151	22	9	21	31	35	152.14	22.17	111.01	236.11	272.30	2,916,004	2,349,832	2,056,525	1,422,363	2,672,440	Salmon Bay
152	45	33	49	41	44	777.04	291.33	589.37	733.78	554.73	22,660,613	19,992,281	27,157,824	33,277,406	42,006,279	Salmon Bay
161	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	Lake Washington
165	1	1	1	2	1	0.73	0.17	13.42	1.33	1.75	732	1,754	127,525	1,806	446	Lake Washington
168	1	1	2	2	3	3.92	24.82	11.84	19.12	52.55	52,250	1,477,082	528,881	1,798,523	7,576,097	Longfellow Creek
169	0	1	2	2	4	0.00	27.38	20.70	35.18	66.93	0	1,335,434	1,253,119	2,416,798	7,159,239	Longfellow Creek
170	0	1	1	0	0	0.00	2.32	1.33	0.00	0.00	0	13,333	13,634	0	0	Longfellow Creek
171	1	3	2	5	8	3.77	18.90	8.73	55.00	83.26	266,958	1,759,209	844,280	2,673,547	6,115,060	Lake Washington

Outfall No.	Frequency (Number per Year)					Duration (Hours per Year)					Volume (Gallons per Year)					Receiving Water
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	
174	6	2	6	11	7	27.17	43.50	53.25	81.46	56.59	3,845,179	5,368,115	5,599,153	7,401,924	8,651,075	Lake Washington Ship Canal
175	1	0	1	0	1	3.08	0.00	1.55	0.00	0.40	366,058	0	327,474	0	78,276	Lake Union
Total	165	142	224	207	279	1,727	1,300	1,685	2,490	2,470	53,081,743	95,829,473	85,708,718	78,583,685	131,570,761	

Table 5-7. 2018-2022 Summary Comparison of CSOs by Receiving Water															
Receiving Water	Frequency (Number per Year)					Duration (Hours per Year)					Volume (Gallons per Year)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Duwamish River	1	1	1	2	4	3	8	5	5	11	56,370	1,401,251	292,182	309,788	444,498
East Waterway	2	1	1	1	9	4	39	5	2	61	29,605	176,732	90,815	14,358	186,131
Elliott Bay	3	6	9	3	10	4	61	14	2	15	85,138	1,688,230	1,767,570	28,642	946,859
Lake Union	39	34	54	43	46	523	179	364	574	374	15,397,980	21,385,295	21,969,739	6,450,012	10,136,487
Lake Washington	28	36	56	58	82	161	451	393	707	885	4,827,798	32,409,998	18,351,564	23,411,168	44,737,784
Lake Washington Ship Canal	6	3	6	11	9	27	45	53	81	59	3,845,179	5,391,764	5,599,153	7,401,924	8,788,982
Longfellow Creek	1	3	5	4	7	4	55	34	54	119	52,250	2,825,850	1,795,633	4,215,321	14,735,336
Portage Bay	8	8	8	7	15	29	64	43	60	54	612,719	2,419,373	1,031,654	995,830	1,884,615
Puget Sound	0	2	3	3	7	0	7	4	30	10	0	6,673	1,076,060	42,394	362,176
Salmon Bay	64	45	71	72	82	950	318	701	970	829	26,167,731	22,562,763	29,333,633	34,699,769	44,719,540
Union Bay	4	2	7	3	5	20	65	57	5	25	923,143	4,821,211	3,255,942	1,014,479	3,540,402
West Waterway	3	1	2	0	3	13	10	12	0	27	1,083,831	740,333	1,144,773	0	1,087,950
TOTAL:	159	142	223	207	279	1,738	1,300	1,685	2,490	2,470	53,081,743	95,829,473	85,708,718	78,583,685	131,570,761

Table 5-8. Outfalls Meeting Performance Standard for Controlled CSOs Based on Flow Monitoring Results and Modeling

Outfall Number	Number of Combined Sewer Overflows Per Year [1]																				Average Annual Overflow Frequency	Meets Performance Standard (2022) [2]	Long-Term Simulation Source	Notes
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022				
12	0	0	0	0	0	0	0	1	0	1	1	2	1	0	1	1	1	3	0	2	0.7	Yes	N/A	3
13	2	2	1	2	1	0	2	1	0	1	1	4	5	2	4	1	2	5	4	6	2.3	No	Mike URBAN results, March 2017	4
14					1	0	1	0	0	0	0	0	1	1	1	0	0	1	0	0	0.4	Yes	N/A	5
15	2	1	1	3	1	0	2	1	1	1	2	6	7	3	4	2	1	1	2	4	2.3	No	Mike URBAN results, March 2017	4
16	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	Yes	N/A	3
18	0	2	1	0	3	1	0	0	1	0	1	0	1	1	0	1	1	2	2	3	1.0	Yes	Mike URBAN results, October 2019	6
19	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0.2	Yes	N/A	3
20	1	1	0	1	1	0	0	1	0	1	1	0	3	0	0	0	1	1	0	2	0.7	Yes	SWMM5 results, December 2022	7
22	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0.2	Yes	EPA-SWMM results, February 2019	8
24	0	2	2	0	4	1	0	1	1	0	1	1	0	0	1	1	0	1	1	2	1.0	Yes	LTCP Long Term Simulation Results February 2013	7
25	0	2	1	0	3	1	1	2	1	0	1	1	0	0	1	1	0	1	1	2	1.0	Yes	LTCP Long Term Simulation Results February 2013	9
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	Mike URBAN results, January 2019	10
28	1	2	0	1	1	1	0	0	0	0	2	2	2	2	3	1	5	4	7	5	2.0	No	Mike URBAN results, January 2019	10
29	0	1	0	1	0	0	0	0	0	0	0	0	1	1	2	1	2	2	2	4	0.9	Yes	Mike URBAN results, January 2019	10
30	2	2	1	4	1	1	2	1	1	3	3	5	5	3	4	1	1	3	2	3	2.4	No	Mike URBAN results, January 2019	10
31	2	3	2	4	1	1	5	2	2	4	3	9	9	6	7	3	1	6	3	5	3.9	No	Mike URBAN results, January 2019	10
32	1	1	0	1	1	1	0	0	0	1	2	2	2	2	1	3	1	3	2	3	1.4	No	Mike URBAN results, January 2019	10
33																		0	0	0	0.0	NA	NA	11
34	2	1	0	2	1	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1.1	No	Mike URBAN results, January 2019	10
35	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	Yes	Mike URBAN results, January 2019	10

Outfall Number	Number of Combined Sewer Overflows Per Year [1]																			Average Annual Overflow Frequency	Meets Performance Standard (2022) [2]	Long-Term Simulation Source	Notes
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022			
36	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	Mike URBAN results, January 2019	10
38	0	0	0	2	1	0	1	1	1	1	1	0	0	0	3	1	1	1	2	4	1.0	Yes	Mike URBAN results, June 2018	12
40	2	1	1	5	1	0	3	1	2	2	1	2	3	1	3	1	1	2	2	3	1.9	No	Mike URBAN results, June 2018	12
41	2	1	1	5	1	0	3	1	2	2	1	2	3	1	3	1	1	2	2	3	1.9	No	Mike URBAN results, June 2018	12
42	2	0	0	3	1	1	1	1	1	1	1	0	3	0	2	1	1	1	3	3	1.3	No	Mike URBAN results, June 2018	12
43	2	1	2	6	1	1	5	3	2	5	2	4	5	4	5	3	3	4	3	3	3.2	No	Mike URBAN results, June 2018	12
44	2	0	0	2	1	0	0	1	1	3	0	0	3	0	2	1	1	1	3	3	1.2	No	Mike URBAN results, July 2018	13
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0.3	Yes	Mike URBAN results, July 2018	13
46	3	1	0	1	1	0	3	1	1	2	0	1	2	0	0	0	0	2	0	0	0.9	Yes	InfoWorks results, December 2016	14
47	3	0	4	5	3	2	6	4	2	5	3	4	6	4	2	1	3	2	5	8	3.6	No	Mike URBAN results, December 2018	15
48						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	7
49	3	1	3	8	3	1	4	5	4	7	3	6	5	4	5	3	2	4	6	7	4.2	No	Mike URBAN results, February 2018	7
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	Yes	N/A	3
59	1	0	0	0	1	0	0	0	1	2	1	0	0	1	8	4	1	1	0	2	1.2	No	N/A	3, 16
60	2	1	4	4	3	0	3	4	2	6	1	2	4	2	3	0	2	0	0	1	2.2	No	LTCP Long Term Simulation Results February 2013	7
61	0	0	1	1	1	0	0	0	1	2	1	0	2	0	0	0	1	2	1	3	0.8	Yes	N/A	7
62	0	0	1	1	1	0	0	0	0	1	1	0	2	0	0	0	0	2	0	1	0.5	Yes	EPA-SWMM results, February 2021	17
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	7
68	2	0	1	1	1	0	1	1	0	1	1	2	4	1	2	1	2	2	1	2	1.3	No	LTCP Long Term Simulation Results February 2013	7, 18
69	2	1	1	2	1	1	3	1	2	2	3	3	4	4	2	0	1	2	1	4	2.0	No	LTCP Long Term Simulation Results February 2013	7
70	0	1	0	1	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0.3	Yes	AWVSRP Modeling Support Alternative	7

Outfall Number	Number of Combined Sewer Overflows Per Year [1]																			Average Annual Overflow Frequency	Meets Performance Standard (2022) [2]	Long-Term Simulation Source	Notes
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022				
																						Modeling Report May 2012, Appendix D	
71	3	1	1	2	1	2	9	7	3	5	3	2	5	2	5	2	2	1	0	0	2.8	No	AWVSRP Modeling Support Alternative Modeling Report May 2012, Appendix D	7
72	2	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	Yes	AWVSRP Modeling Support Alternative Modeling Report May 2012, Appendix D	7
78	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	Yes	N/A	3
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
88	0	1	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0.4	Yes	N/A	3
90	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	N/A	3
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	Yes	N/A	3
94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	N/A	3
95	1	0	0	2	1	1	2	1	0	1	1	0	0	0	2	0	2	2	3	3	1.1	No	EPA-SWMM results, February 2019	19
99	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	0	2	1	0	0.4	Yes	SWMM5 results, December 2022	7
107				9	3	1	9	11	4	4	2	4	5	5	5	2	1	1	1	9	4.5	No	EPA-SWMM results, February 2019	20
111	3	0	2	2	1	0	1	1	0	1	3	2	3	0	2	1	1	1	2	4	1.5	No	EPA-SWMM results, February 2019	21
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
121	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	Yes	N/A	3
124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
127	0	1	0	3	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	Yes	N/A	3
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	Yes	N/A	3
130						0	0	0	0	0	0	0	3	0	0	0	0	1	0	1	0.3	Yes	N/A	5
131	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	N/A	3
132						0	0	0	1	0	2	0	3	0	0	0	0	2	2	1	0.7	Yes	N/A	5
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
135						0	1	0	0	0	0	0	2	0	0	0	0	3	1	1	0.5	Yes	N/A	5
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3

Outfall Number	Number of Combined Sewer Overflows Per Year [1]																			Average Annual Overflow Frequency	Meets Performance Standard (2022) [2]	Long-Term Simulation Source	Notes
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022				
138	1	2	0	1	1	0	1	1	0	1	1	0	3	0	0	0	1	1	0	4	0.9	Yes	SWMM5 results, December 2022	7
139	1	3	1	1	1	0	1	1	0	1	4	0	3	0	3	3	3	2	3	5	1.8	No	EPA-SWMM results, February 2019	22
140	6	5	6	5	1	1	7	8	2	4	5	13	10	10	7	4	5	3	2	6	5.5	No	LTCP Long Term Simulation Results February 2013	7
141	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	N/A	3
144	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	Yes	N/A	3
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
147	31	29	37	45	35	50	45	63	40	47	27	49	32	58	42	37	34	47	40	42	41.5	No	LTCP Long Term Simulation Results February 2013	7
148	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	1	0	0	2	0.4	Yes	N/A	3
150/151	14	6	15	23	11	2	22	29	25	31	14	34	28	31	29	22	9	21	31	35	21.6	No	LTCP Long Term Simulation Results February 2013	7, 23
152	53	44	46	42	43	11	29	63	48	57	44	53	34	63	50	45	33	49	41	44	44.6	No	LTCP Long Term Simulation Results February 2013	7
161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Yes	N/A	3
165	2	0	0	1	2	0	0	2	1	2	2	0	2	0	2	1	1	1	2	1	1.1	No	Mike URBAN results, June 2018	12
168	2	1	2	5	2	0	1	1	0	2	0	2	2	0	2	1	1	2	2	3	1.6	No	EPA-SWMM results, February 2019	24
169	3	1	3	5	2	1	1	2	2	3	0	2	3	1	3	0	1	2	2	4	2.1	No	EPA-SWMM results, February 2019	24
170						0	2	1	0	1	0	0	0	0	1	0	1	1	0	0	0.5	Yes	N/A	6
171	2	0	3	5	2	1	6	4	2	4	2	4	6	3	1	1	3	2	5	8	3.2	No	Mike URBAN results, December 2018	15
174	5	6	10	21	6	6	14	13	10	17	7	20	15	12	7	6	2	6	11	7	10.1	No	LTCP Long Term Simulation Results February 2013	7
175						0	1	0	0	0	2	0	4	0	0	1	0	1	0	1	0.7	Yes	N/A	7

Notes:

1. Per Section S4.B of the NPDES Permit, the determination of whether an outfall is meeting the performance standard for controlled outfalls has been made based on up to 20 years of data and modeling. Numbers in the colorless cells were obtained from flow monitoring. Numbers in blue-shaded cells were obtained using precipitation data and basin-specific models and are used in the long-term average annual overflow calculation for years when flow monitoring data either is not available or the accuracy of the flow monitoring data cannot be confirmed.
2. Responses in this column are “Yes” if the calculated Average Annual Overflow Frequency is no more than 1 per year and “No” if the calculated Average Annual Overflow Frequency is more than 1 per year.
3. The flow monitoring configuration prior to 2001 cannot be confirmed and the pre-2001 data accuracy is questionable, so the calculated Average Annual Overflow Frequency uses data from flow monitoring conducted between 2001 and 2022.
4. The Basin 13 storage tank was operationally complete on July 21, 2015. Due to the hydraulic connectivity between Basin 13 and Basin 15 via the Lake Line, flow modeling data is used to estimate overflow events from both basins prior to this date.
5. The flow monitoring configuration prior to 2007 cannot be confirmed and the pre-2007 data accuracy is questionable, so the calculated Average Annual Overflow Frequency uses data from flow monitoring conducted between 2007 and 2022.
6. In October 2012, SPU completed sewer system improvements in Sub-Basin 18A. Flow modeling is used to predict Sub-Basin 18A overflows prior to this date. In April 2017, SPU completed sewer system improvements in Sub-Basin 18B. Flow modeling is used to predict Sub-Basin 18B overflows prior to this date.
7. The flow monitoring configuration prior to 2008 cannot be confirmed and the pre-2008 data accuracy is questionable, so the calculated Average Annual Overflow Frequency uses data from flow monitoring conducted between 2008 and 2022.
8. Several exacerbated CSOs occurred at Outfall 22 in recent years because of the deteriorating performance of WWPS 50. The pump station was rehabilitated, and existing air-lift style pumps replaced with submersible pumps. WWPS 50 began pumping at its design rate on December 20, 2016. Flow modeling data is used prior to this date.
9. SPU raised the weir at Outfall 25 in early 2008, so the calculated Average Annual Overflow Frequency uses flow modeling through 2008 and flow monitoring for subsequent years.
10. The weir at Outfall 34 was lowered on February 15, 2017 to protect WWPS 2 from an elevated grade line. Due to the hydraulic connectivity of the Leschi basins along the Lake Line, flow modeling data is used for all Leschi outfalls prior to this date.
11. The CSO overflow pipe to Outfall 33 was sealed and the outfall was removed from CSO service on July 22, 2016.
12. The Lake Line connecting the Genesee CSO basins was jet cleaned on March 17, 2016, allowing for maximum hydraulic conveyance capacity. Due to the connectivity of the Genesee CSO basins along the Lake Line, flow modeling data is used for all Genesee outfalls prior to this date.
13. The hydraulic model for Basins 44 and 45 was updated in Dec 2021 to reflect the most current operations of the North Henderson CSO Reduction facilities and associated pump stations.
14. SPU completed the Pump Station 9 Rehabilitation Project in 2016 and subsequently updated the hydraulic model for Basin 46 to reflect the constructed facilities.
15. On July 19, 2013, SPU replaced a HydroBrake in South Henderson Basin 49 with an orifice plate. Flow modeling is used to predict Basin 49 CSOs prior to this date. SPU completed the South Henderson CSO Reduction Projects (weir retrofits and 52nd Ave Conveyance Project) in August 2015 and, on November 9, 2017, removed the orifice in the 52nd Avenue South flow control structure that was restricting flows. Flow modeling is used to predict Basin 47 and 171 flows prior to this date.
16. During repair of the WWPS 43 force main, flows were temporarily bypassed around WWPS 43. Because of unavoidable bypass system constraints, there were six exacerbated CSOs at Outfall 59 in 2017, four exacerbated CSOs at Outfall 59 in 2018, and one exacerbated CSO at Outfall 59 in 2019. The bypass was removed in September 2019.
17. The Basin 62 overflow weir was raised on August 27, 2018, optimizing use of the existing sewer system. Hydraulic modeling data is used for January 1, 2001 through August 27, 2018, with flow monitoring data used thereafter.
18. In 2015 and 2016, Basin 68 CSOs were likely exacerbated by a partially clogged HydroBrake.
19. The Basin 95 retrofit project was substantially complete on April 4, 2013. Flow modeling is used prior to this date.
20. Basin 107 overflows are induced by an elevated hydraulic grade line (HGL) in the Elliot Bay Interceptor. Reliable HGL data, necessary for flow modeling, is available from 2006 to present. The backwater valve retrofit was installed on August 19, 2017. Therefore, flow modeling data is used for January 1, 2006 through August 19, 2017, with flow monitoring data used thereafter.
21. The last hydraulic modification in Basin 111 was performed on December 1, 2014. Flow modeling data is used prior to this date.
22. The Basin 139 sewer system improvement project was completed in July 2016. Hydraulic modeling data is used prior to that date and flow monitoring data is used thereafter.
23. SPU removed Outfall 150 from service on February 27, 2019. Any Basin 150/151 CSOs now discharge from Outfall 151.
24. SPU completed the valve retrofit on November 5, 2015. Flow modeling data is used prior to this date.

Table 5-9. Integrated Plan Performance Targets and Results to Date								
Status	**Project Name**	**Average volume treated or removed (MG/year)**	**Fecal coliform (billion CFU/year)[1]**	**PCB (g/year)[1]**	**Total phosphorus (kg/year)[1]**	**Total copper (kg/year)[1]**	**TSS (kg/year)[1]**	**Total zinc (kg/year)[1]**
Target	NDS Partnering	32[1]	10,649	1.3	11	1.1	6,478	9.2
	South Park Water Quality Facility	67[1]	31,000	5.2	38	3.8	20,935	25
	Expanded Arterial Street Sweeping	1,477[1,2]	1,380	2.0	14	3.3	20,700	6.3
	Total	1,576	43,029	9	63	8.2	48,113	41
2017 Interim Results	Expanded Arterial Street Sweeping[3]	1,900	1,464	4.0	44	9.1	59,000	20
2018 Interim Results	Expanded Arterial Street Sweeping[3]	1,700	801	2.6	41	8.4	53,000	18

Notes:

1. These values represent the 95% lower confidence limits (LCL) from the Integrated Plan pollutant load model (PLM) results.
2. Volume of runoff from swept streets.
3. Data is only available for the Expanded Arterial Street Sweeping Program. NDS Partnering and South Park Water Quality Facility monitoring has not begun. Post-construction monitoring results will not be compared to the total performance monitoring targets until monitoring has been completed for all three stormwater projects because the goals are based on the total load reductions for the three projects combined.

Appendix A: Additional CMOM Information

Table A-1. 2022 Sewer Overflow (SSO) Details								
Event Number	**ERTS Number**	**Location**	**Event Date and Time**	**Estimated Total Overflow Volume (gallons)**	**Estimated Volume to Receiving Water (gallons)**	**Receiving Water, if applicable**	**Primary Cause**	**Secondary Cause, if any**
22001	711654	730 HARVARD AVE E	01/02/2022 9:09 PM	UNKNOWN	0		ROOTS	
22002	711658	10337 BEDFORD CT NW (WWPS 056)	01/02/2022 10:19 PM	1,600	0	PUGET SOUND	PUMP STATION - CAPACITY	
22003	711634	7609 PERIMETER RD S	01/02/2022 11:33 PM	100,000	100,000	DUWAMISH RIVER	PUMP STATION - CAPACITY	
22004	711651	731 BROADWAY AVE E	01/03/2022 4:11 AM	UNKNOWN	0		ROOTS	
22005	711690	1402 32ND AVE S	01/04/2022 9:14 AM	5	0		ROOTS	
22006	711714	37TH PL NW/NW 61ST ST	01/04/2022 5:43 PM	5,000	5,000	PUGET SOUND	PRIVATE CONSTRUCTION	
22007	711791	53RD AVE S/ LAKE WASHINGTON BLVD S	01/06/2022 10:57 AM	100,000	100,000	LAKE WASHINGTON	MAINTENANCE ERROR	
22008	711809	7609 PERIMETER RD S PS45	01/06/2022 2:10 PM	161,441	0		PUMP STATION - CAPACITY	
22009	711846	736 S KENYON ST	01/06/2022 7:57 PM	UNKNOWN	0		CAPACITY - KING COUNTY	
22010	711846	728 S KENYON ST	01/07/2022 12:19 AM	UNKNOWN	0		CAPACITY - KING COUNTY	
22011	711884	5021 SW 97TH ST	01/07/2022 9:09 AM	UNKNOWN	0		CAPACITY - KING COUNTY	
22012	711881	4001 16TH AVE SW	01/07/2022 9:26 AM	500	0		CAPACITY - KING COUNTY	
22013	711916	9722 8TH AVE NW	01/07/2022 2:40 PM	UKNOWN	0		DEBRIS	

Event Number	ERTS Number	Location	Event Date and Time	Estimated Total Overflow Volume (gallons)	Estimated Volume to Receiving Water (gallons)	Receiving Water, if applicable	Primary Cause	Secondary Cause, if any
22014	712653	8734 20TH AVE NW	02/09/2022 8:11 AM	10	0		FOG	
22015	712964	SW CAMBRIDGE ST/44TH AVE SW	02/24/2022 10:48 AM	1,000	1,000	PUGET SOUND	DEBRIS	
22016	713108	4339 SW BEVERIDGE ST	02/28/2022 2:03 AM	400	0		DEBRIS	
22017	713015	7609 PERIMETER RD S	02/28/2022 6:16 AM	125,200	0		PUMP STATION - CAPACITY	
22018	713054	644 NW 82ND ST	02/28/2022 8:06 AM	10	0		ROOTS	
22019	713072	2623 SW YANCY ST	02/28/2022 12:22 PM	48,000	48,000	LONGFELLOW CREEK	STRUCTURAL FAILURE - GRAVITY	
22020	713776	3212 CLAREMONT AVE S	03/27/2022 5:20 PM	5,400	5,400	DUWAMISH RIVER	ROOTS	
22021	714003	9543 46TH AVE NE	04/05/2022 2:02 PM	20	0		PRIVATE SIDE SEWER ISSUE	
22022	714035	5411 48TH AVE SW	04/06/2022 7:19 AM	25	0		STRUCTURAL FAILURE - GRAVITY	
22023	714151	7575 PERIMETER RD S	04/12/2022 3:18 PM	11,142	0		PRIVATE CONSTRUCTION	
22024	714269	4540 8TH AVE NE	04/18/2022 5:09 PM	1,000	0		ROOTS	
22025	714700	3115 SW ROXBURY ST	05/07/2022 2:38 PM	25	0		ROOTS	
22026	714775	7TH AVE/MADISON ST	05/10/2022 3:08 PM	10,000	10,000	LAKE UNION	CITY CONSTRUCTION	
22027	714900	928 W EMERSON ST	05/11/2022 2:09 PM	UNKNOWN	0		PRIVATE CONSTRUCTION	
22028	715086	1600 PIKE PL	05/22/2022 10:48 AM	3,000	0		STRUCTURAL FAILURE - GRAVITY	
22029	715321	6818 21ST AVE NE	06/05/2022 9:05 AM	10	0		CAPACITY- GRAVITY	

Event Number	ERTS Number	Location	Event Date and Time	Estimated Total Overflow Volume (gallons)	Estimated Volume to Receiving Water (gallons)	Receiving Water, if applicable	Primary Cause	Secondary Cause, if any
22030	715320	5228 21ST AVE NE	06/05/2022 9:07 AM	40	0		CAPACITY- GRAVITY	
22031	715439	3214 SW SPOKANE ST	06/08/2022 6:59 PM	8	0		CITY CONSTRUCTION	
22032	715787	7502 E GREEN LAKE DR N	06/14/2022 11:09 AM	5	0		STRUCTURAL FAILURE - GRAVITY	
22033	715947	WESTERN AVE/VIRGINIA ST	06/15/2022 3:49 PM	4,000	0		STRUCTURAL FAILURE - GRAVITY	
22034	715925	14300 GREENWOOD AVE N	06/29/2022 1:03 PM	200	0		FOG	
22035	715962	8700 20TH AVE NW	06/30/2022 12:23 PM	10	0		PRIVATE SIDE SEWER ISSUE	
22036	715941	SW SPOKANE ST/33RD AVE SW	06/30/2022 1:52 PM	200	0		CITY CONSTRUCTION	
22037	716528	9503 48TH AVE NE	07/26/2022 3:15 PM	30	0		ROOTS	
22038	716891	NE 89TH ST/ROOSEVELT WAY NE	08/10/2022 10:34 PM	10	0		STRUCTURAL FAILURE - GRAVITY	
22039	717358	7300 PERIMETER RD S	08/31/2022 11:57 AM	75	0		STRUCTURAL FAILURE - GRAVITY	
22040	718034	8TH AVE/SPRING ST	10/01/2022 10:51 AM	700	0		CITY CONSTRUCTION	
22041	718228	5754 24TH AVE NE	10/12/2022 6:58 PM	10	0		ROOTS	
22042	718581	2ND AVE NW/ NW 36TH ST	10/28/2022 8:01 AM	212,000	212,000	SHIP CANAL_LAKE UNION	PUMP STATION - MECHANICAL	
22043	718641	HUBBELL PL/UNIVERSITY ST	10/31/2022 11:55 PM	121,650	16,000	LAKE UNION	VANDALISM	
22044	718705	5TH AVE/COLUMBIA ST	11/02/2022 6:16 PM	200	0		STRUCTURAL FAILURE - GRAVITY	
22045	719077	5TH AVE/COLUMBIA ST	11/16/2022 11:42 AM	15	0		VANDALISM	

Event Number	ERTS Number	Location	Event Date and Time	Estimated Total Overflow Volume (gallons)	Estimated Volume to Receiving Water (gallons)	Receiving Water, if applicable	Primary Cause	Secondary Cause, if any
22046	719303	1215 E FIR ST	12/01/2022 4:18 PM	53,400	0		PRIVATE CONSTRUCTION	
22047	719732	7609 PERIMETER RD S	12/24/2022 1:54 PM	55,676	43,000	DUWAMISH RIVER	PUMP STATION - CAPACITY	
SPREV-1	N/A	703 S KENYON ST	12/27/2023 12:00 AM	UNKNOWN	UNKNOWN		EXTREME WEATHER EVENT (>25 YEAR)	
22048	719839	10423 42ND AVE NE	12/28/2022 8:45 AM	60	0		STRUCTURAL FAILURE - GRAVITY	

Table A-2. Pump Station Location and Capacity										
Number	Name	Address	Type [1]	Basin Area (acres)	Average Annual Inflow (gpm)	Average Wet Weather Inflow (gpm)	Number of Pumps and Rating	Static Head (feet)	Average Annual Storage Time (hours)	Average Wet Weather Storage Time (hours)
1	Lawton Wood	5645 45th Ave West	WW/DW	31.8	10	27	2 at 350 gpm each	60.5	25.7	9.5
2	Charles Street	901 Lakeside Dr	WW/DW	108.1	180	303	2 at 450 gpm each	20	7.6	4.5
4	South Director Street	5135 South Director St	Air Lift	3.1	33	48	2 at 150 gpm each	28.5	2.1	1.4
5	46th Avenue South	3800 Lake Washington Blvd	WW/DW	198.2	250	715	2 at 1000 gpm each	13.9	4.7	1.7
6	South Alaska Street	4645 Lake Washington Blvd	WW/DW	10.2	24	88	2 at 300 gpm each	14	3.0	0.82
7	East Lee Street	4214 East Lee St	WW/DW	227	373	961	2 at 2800 gpm each	50	11.8	4.6
9	South Grattan Street	8400 55th Ave South	WW/DW	422.2	372	1074	2 at 2700 gpm each	13.9	2.8	1.1
10	South Holly Street	5711 South Holly St	WW/DW	188.4	201	494	2 at 1000 gpm each	13.5	1.7	0.70
11	North Sand Point	63rd Ave NE and NE 78th St	Submersible	32.8	45	80	2 at 180 gpm each	23	6.9	3.9
13	Montlake	2160 East Shelby St	WW/DW	64.9	49	154	2 at 600 gpm each	29.7	44.2	14.0
17	Empire Way	42nd Ave South and South Norfolk St	WW/DW	395	546	804	2 at 2000 gpm each	27.7	4.5	3.0
18	South 116th Place	6700 South 116th Pl	Submersible	2.5	2.8	3.7	2 at 150 gpm each	45	21.7	16.4
19	Leroy Place South	9400 Leroy Pl South	Submersible	6.84	4.3	5.5	2 at 150 gpm each	45	14.9	11.6
20	East Shelby Street	1205 East Shelby St	WW/DW	48.6	94	278	2 at 600 gpm each	45	20.5	6.9
21	21st Avenue West	2557 21st Ave West	Submersible	3.55	6.7	7.2	2 at 150 gpm each	45	9.8	9.2
22	West Cramer Street	5400 38th Ave West	WW/DW	26.9	44	224	2 at 750 gpm each	62	6.0	1.2
25	Calhoun Street	1812 East Calhoun St	WW/DW	52.2	123	328	2 at 850 gpm each	36	2.9	1.1
28	North Beach	9001 View Ave NW	Submersible	4.8	2.7	6.0	2 at 150 gpm each	40.7	17.5	7.9
30	Esplanade	3206 NW Esplanade St	Submersible	5.7	8.7	19	2 at 150 gpm each	63	14.0	6.6
31	11th Avenue NW	12007 11th Ave NW	Submersible	2	0.81	1.1	2 at 150 gpm each	20	41.0	30.8
35	25th Avenue NE	2734 NE 45th St	WW/DW	71	170	202	2 at 600 gpm each 1 at 900 gpm	39.8	1.2	0.98

Number	Name	Address	Type [1]	Basin Area (acres)	Average Annual Inflow (gpm)	Average Wet Weather Inflow (gpm)	Number of Pumps and Rating	Static Head (feet)	Average Annual Storage Time (hours)	Average Wet Weather Storage Time (hours)
36	Maryland	1122 Harbor Ave SW	Air Lift	12.2	60	83	2 at 150 gpm each	10	5.0	3.6
37	Fairmont	1751 Harbor Ave SW	WW/DW	281.5	275	744	2 at 3000 gpm each	12.8	5.1	1.9
38	Arkansas	1411 Alki Ave SW	Air Lift	46.5	108	164	2 at 300 gpm each	10	5.4	3.6
39	Dawson	5080 Beach Dr SW	WW/DW	55	114	340	2 at 850 gpm each	36.7	5.4	1.8
42	Lincoln Park	8617 Fauntleroy Way SW	WW/DW	6.5	18	35	2 at 200 gpm each	55.5	6.3	3.2
43	Seaview No. 1	5635 Seaview Ave NW	WW/DW	177.4	82	211	2 at 2750 gpm each	40.4	19.7	7.7
44	Boeing No. 1	6820 Perimeter Rd S	WW/DW	168.5	196	361	2 at 800 gpm each	19	2.4	1.3
45	Boeing No. 2	7609 Perimeter Rd S	WW/DW	133.5	92	167	2 at 350 gpm each	16.5	3.8	2.1
46	Seaview No. 2	6541 Seaview Ave NW	Air Lift	52.6	64	96	2 at 150 gpm each	14.6	1.9	1.2
47	Seaview No. 3	7242 Seaview Ave NW	Air Lift	11	14	17	2 at 150 gpm each	9.5	6.8	5.6
48	Brooklyn	3701 Brooklyn Ave NE	WW/DW	31.4	91	108	2 at 1000 gpm each	53.3	3.8	3.2
49	Latona	3750 Latona Ave NE	WW/DW	22.4	20	40	2 at 250 gpm each	33.3	19.0	9.6
50	39th Avenue East	2534 39th Ave East	Submersible	10.6	5.3	14	2 at 120 gpm each	17	19.6	7.3
51	NE 60th Street	6670 NE 60th St	WW/DW	44.5	38	94	2 at 325 gpm each	126.3	3.5	1.4
53	SW Hinds Street	4951 SW Hinds St	WW/DW	10.6	7.1	22	2 at 150 gpm each	66	10.9	3.5
54	NW 41st Street	647 NW 41st St	WW/DW	24.5	50	149	2 at 350 gpm each	27	5.1	1.7
55	Webster Street	3021 West Laurelhurst NE	Air Lift	2.4	5.6	8.8	2 at 150 gpm each	31	1.1	0.7
56	Bedford Court	10334 Bedford Ct NW	Air Lift	1.6	4.8	12	2 at 150 gpm each	30.3	0.62	0.26
57	Sunnyside	3600 Sunnyside Ave North	WW/DW	16.3	12	17	2 at 300 gpm each	31.5	14.3	10.0
58	Woodlawn	1350 North Northlake Way	WW/DW	33.4	34	41	2 at 685 gpm each	30	8.0	6.7
59	Halliday	2590 Westlake Ave North	WW/DW	21.2	8.5	8.0	2 at 325 gpm each	17.7	25.7	27.4
60	Newton	2010 Westlake Ave North	WW/DW	57.6	65	94	2 at 250 gpm each	67.4	4.4	3.1
61	Aloha	912 Westlake Ave North	WW/DW	26.3	13	11	2 at 450 gpm each	19.1	15.8	19.4
62	Yale	1103 Fairview Ave North	WW/DW	12.2	27	27	2 at 300 gpm each	18.4	6.0	6.0
63	East Blaine	140 East Blaine St	WW/DW	33.1	103	136	2 at 600 gpm each	31	2.4	1.8

Number	Name	Address	Type [1]	Basin Area (acres)	Average Annual Inflow (gpm)	Average Wet Weather Inflow (gpm)	Number of Pumps and Rating	Static Head (feet)	Average Annual Storage Time (hours)	Average Wet Weather Storage Time (hours)
64	East Lynn Street No. 2	2390 Fairview Ave East	WW/DW	9.4	63	103	2 at 300 gpm each	16.2	2.4	1.4
65	East Allison Street	2955 Fairview Ave East	WW/DW	19.2	23	31	2 at 200 gpm each	47.2	10.4	7.8
66	Portage Bay No. 1	3190 Portage Bay Pl East	WW/DW	6.5	20	20	2 at 200 gpm each	12.2	7.2	7.2
67	Portage Bay No. 2	1209 East Shelby St	WW/DW	14.7	30	30	2 at 250 gpm each	17	5.0	5.0
69	Sand Point	6451 65th Ave NE	WW/DW	15.5	44	58	2 at 300 gpm each	79	2.0	1.5
70	Barton No. 2	4890 SW Barton St	WW/DW	73	37	76	2 at 290 gpm each	29	12.5	6.1
71	SW 98th Street	5190 SW 98th St	WW/DW	36.3	26	46	2 at 450 gpm each	16	6.2	3.5
72	SW Lander Street	2600 13th Ave SW	WW/DW	203.5	98	272	3 at 2100 gpm each	22.8	12.2	4.4
73	SW Spokane St	1190 SW Spokane St	WW/DW	336.5	96	258	3 at 2400 gpm each	16.3	9.5	3.5
74	26th Avenue SW	2799 26th Ave SW	Submersible	144	26	38	2 at 300 gpm each	30	12.3	8.4
75	Point Place SW	3200 Point Pl SW	Air Lift	4.9	n/a	n/a	2 at 150 gpm each	12.2	n/a	n/a
76	Lowman Park	7025 Beach Dr SW	WW/DW	20.4	15	22	2 at 100 gpm each	34	18.8	13.0
77	32nd Avenue West	1499 32nd Ave West	WW/DW	206.5	84	256	2 at 1400 gpm each	48	21.0	6.9
78	Airport Way South	8415 Airport Way South	Air Lift	18.4	11	12	2 at 150 gpm each	14.5	4.5	4.1
80	South Perry Street	9724 Rainier Ave South	Air Lift	4.6	4.8	5.2	2 at 150 gpm each	22	14.1	13.1
81	72nd Avenue South	10199 Rainier Avenue South	WW/DW	11	10	13	2 at 200 gpm each	53.3	19.0	14.7
82	Arroyo Beach Place	11013 Arroyo Beach Pl SW	Air Lift	6	4.5	4.8	2 at 150 gpm each	19.8	16.2	15.2
83	West Ewing Street	390 West Ewing St	Air Lift	6.1	44	29	2 at 150 gpm each	19	1.4	2.1
84	28th Avenue NW	5390 28th Ave NW	WW/DW	691.4	81	191	2 at 500 gpm each	24.4	3.9	1.6
114	35th Avenue NE	10701 36th Ave NE	Submersible	3.2	11	24	2 at 150 gpm each	5.6	19.4	9.1
118	Midvale Avenue North	1200 North 107th St	WW/DW	22.4	7.6	13	2 at 300 gpm each	11.5	48.4	28.1

1. WW/DW = Wet Well/Dry Well

Table A-3. 2022 Pump Station Work Order Summary			
WWPS Number	**Inspection**	**Maintenance**	**Total Work Orders**
WWPS001	7	30	37
WWPS002	24	20	44
WWPS004	9	19	28
WWPS005	15	27	42
WWPS006	4	13	17
WWPS007	13	46	59
WWPS009	9	19	28
WWPS010	15	18	33
WWPS011	17	14	31
WWPS013	40	59	99
WWPS017	33	34	67
WWPS018	14	19	33
WWPS019	40	27	67
WWPS020	19	19	38
WWPS021	16	23	39
WWPS022	6	20	26
WWPS025	12	23	35
WWPS028	5	24	29
WWPS030	14	24	29
WWPS031	19	18	37
WWPS035	9	20	29
WWPS036	4	22	26
WWPS037	8	21	29
WWPS038	7	24	31
WWPS039	6	29	35
WWPS042	10	25	35
WWPS043	28	20	48
WWPS044	3	27	30
WWPS045	12	35	47
WWPS046	11	36	47
WWPS047	12	29	41
WWPS048	18	22	40
WWPS049	30	17	47
WWPS050	6	16	22
WWPS051	19	24	43
WWPS053	6	8	14
WWPS054	6	48	54
WWPS055	11	46	57

WWPS Number	Inspection	Maintenance	Total Work Orders
WWPS056	14	61	75
WWPS057	20	15	35
WWPS058	9	18	27
WWPS059	7	14	21
WWPS060	7	16	23
WWPS061	3	20	23
WWPS062	62	18	80
WWPS063	6	15	21
WWPS064	2	11	13
WWPS065	3	18	21
WWPS066	1	11	12
WWPS067	4	14	18
WWPS069	9	28	37
WWPS070	6	20	26
WWPS071	5	17	22
WWPS072	1	26	27
WWPS073	2	20	22
WWPS074	15	16	31
WWPS075	6	17	31
WWPS076	30	21	51
WWPS077	10	20	30
WWPS078	7	24	31
WWPS080	14	14	28
WWPS081	5	24	29
WWPS082	5	18	23
WWPS083	5	20	25
WWPS084	1	15	17
WWPS114	9	15	24
WWPS118	13	12	25
Grand Total	**818**	**1,523**	**2,341**