

2024 Tier III Corrective Action Report 63rd Avenue SW Pump Station Overflow

DSN# 054 – 63rd Avenue SW Pump Station Overflow

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King County

Department of
Natural Resources and Parks
Wastewater Treatment Division

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1.0 Introduction

As of 2017, the 63rd Avenue Southwest Pump Station (63rd Ave SW PS) Overflow (DSN 054) does not meet the combined sewer overflow (CSO) control performance standard of no more than one untreated discharge per year on a 20-year moving average as specified in:

- Condition S11.C.b in the NPDES permit for the West Point Wastewater Treatment Plant (WWTP) (Permit No. WA0029181)
- The general requirement to comply with the NPDES permit in Section V.B (paragraph 19) of the Consent Decree (CD), Civil Action No. 2: 13-cv-677

King County Wastewater Treatment Division (WTD) is submitting this Tier III Corrective Action Report in accordance with the NPDES permit Section S11.C.d to provide information on actions it will take to bring 63rd Ave SW PS Overflow (DSN 054) into consistency with the performance standard.

This report also meets Supplemental Compliance Plan requirements per Section V of the CD and supersedes the Corrective Action Compliance Notification Letter submitted May 14, 2018 for the 63rd Ave SW Overflow, DSN 054.

2.0 Description of the 63rd Ave SW Pump Station and Vicinity

The 63rd Ave SW PS CSO basin includes approximately 1,160 acres of King County's Combined Sewer system that drain to the 63rd Ave SW PS. The 63rd Ave SW PS is a key component of the West Seattle conveyance infrastructure as shown in Figure 1.

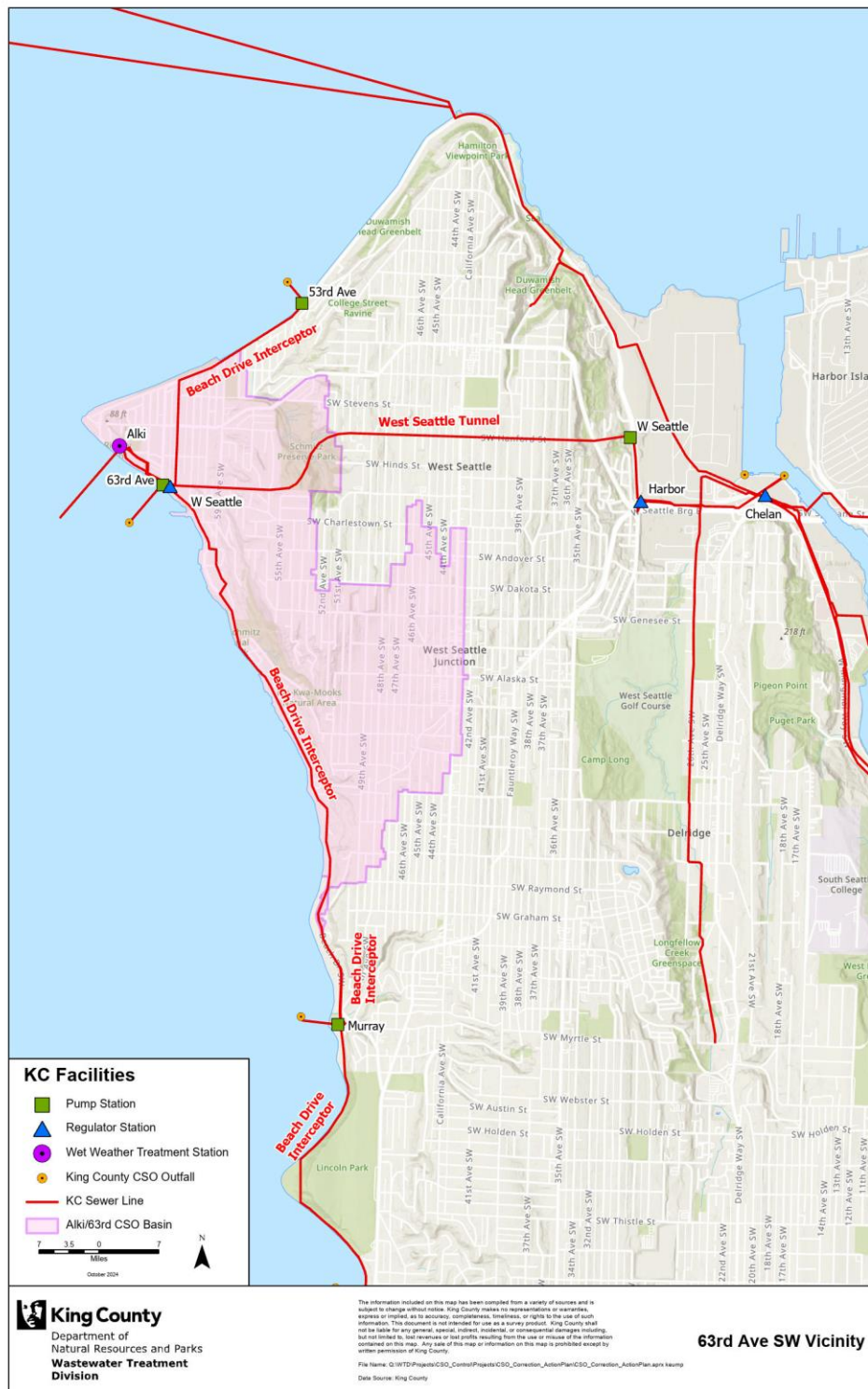


Figure 1. 63rd Ave PS SW Vicinity

Figure 2 shows a schematic of the West Seattle conveyance system. The 63rd Ave SW PS receives flows from Barton St PS and Murray PS through the Alaska St Weir. During dry-weather conditions, flow is typically diverted past the 63rd Ave PS downstream through the West Seattle Regulator Station (RS) to the West Seattle Tunnel, then through the West Seattle Pump Station (West Seattle PS) to the Elliott Bay Interceptor (EBI), where flow then makes its way to West Point WWTP. The West Seattle regulator gate is set to allow a maximum flow of 25 MGD to the West Seattle Tunnel that allows a balanced use of tunnel volume by Harbor Ave RS (downstream of the West Seattle Tunnel) and 63rd Ave SW PS to control overflows.

During wet weather conditions, excess flow from the upstream West Seattle Tunnel and Beach Drive Interceptor overflows weirs at the influent structures into the 63rd Ave SW PS (Figure 3). The 63rd Ave SW PS begins to operate once the wet well's water surface rises to a defined set point level and pumps flow to the Alki Wet Weather Treatment Station (Alki WWTS) through two force mains, one 24-inch-diameter and one 42-inch-diameter force main.

63rd Ave SW PS's capacity with three pumps in service is approximately 60 MGD (20 MGD per pump). Alki WWTS was originally designed for 60 MGD, however, is only able to achieve about 40 MGD during high-tide events. During these events, the 63rd Ave SW PS is throttled to 40 MGD to maintain water surface elevation set points in the Alki WWTS and only two of the three pumps operate in this scenario. In this scenario, excess flow is diverted from the 63rd Ave SW PS's wet well to an overflow over three passive weirs to Puget Sound.

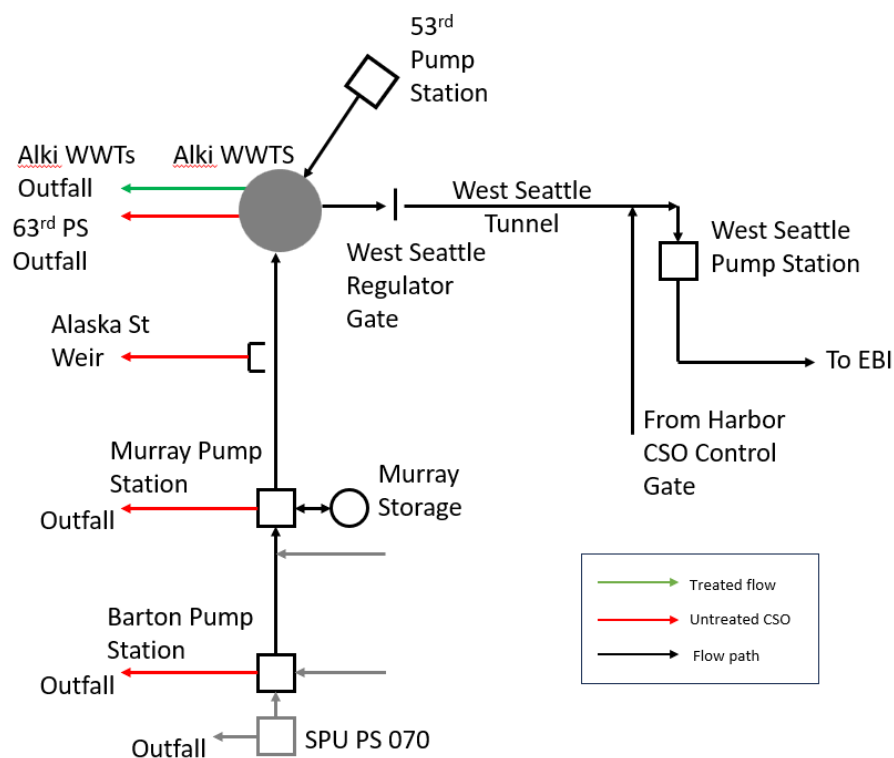


Figure 2. West Seattle Schematic

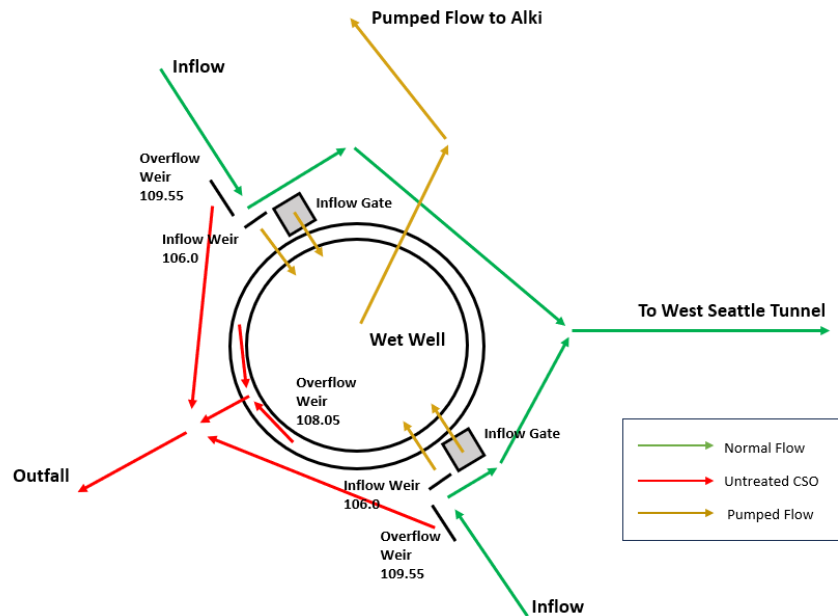


Figure 3. 63rd Pump Station Flow Paths

3.0 63rd Ave SW System Performance and Corrective Actions Completed

The 63rd Ave SW PS was constructed in 1953. A flow meter was installed on the West Seattle regulator gate in 1999, downstream of the 63rd Ave SW PS to ensure the flow rate of 25 MGD to the West Seattle tunnel from 63rd Ave SW PS is not exceeded. However, this flow meter was never operable, so instead, two bubblers were installed at both sides of the West Seattle regulator gate in 2015 and programmed to allow the gate to operate based on the 25 MGD setpoint. This setpoint is the determined setpoint to balance flows between the 63rd Ave SW PS and Harbor Ave RS overflows. If the West Seattle regulator gate malfunctions, the gate will be set to remain 50 percent open as a backup measure.

Table 1 shows the overflows from 2019 through 2023. A total of nine overflows have occurred, with one overflow in 2019, two overflows in 2020 and 2021, three overflows in 2022 and one overflow in 2023. The table also incorporates the tide levels during the overflow events. Six of the nine events since 2019 started when the tide was above the mean sea level and eight of the nine events had a maximum tide level above the mean sea level. This is likely due to the limited capacity that Alki WWTS has during high-tide events.

Table 1. Untreated Combined Sewer Overflow Discharge Events at 63rd Ave SW PS

Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (gallons)	Precipitation (inches)	Storm Duration (hours)	Starting Tide Level (NAV D88)	Max Tide Level (NAV D88)
12/19/19 10:45PM	12/20/19 7:46 PM	21.02	91,883,606	2.75	113.25	10.92	10.92
2/1/20 3:01 AM	2/1/20 8:56 AM	5.92	37,116,883	2.37	38.72	3.63	9.78
12/21/20 3:16 PM	12/22/20 12:20 AM	9.07	46,060,447	3.02	21.42	4.92	10.34
1/2/21 6:38 PM	1/3/21 1:03 AM	6.42	19,109,545	2.61	51.17	8.71	8.74
1/12/21 1:51 AM	1/13/21 1:42 AM	23.85	58,933,204	2.66	40.65	5.7	11.04
1/2/22 9:48 PM	1/3/22 12:00 AM	2.20	38,695,188	2.02	16.72	-4.36	-2.97
1/6/22 5:45 PM	1/7/22 3:46 AM	10.02	49,854,845	2.97	111.6	7.72	8.39
2/28/22 6:07 AM	2/28/22 5:44 PM	11.62	28,226,790	3.68	50.12	8.73	8.73
12/5/23 0:12	12/5/23 16:48	16.60	71,340,930	3.64	59.1	4.07	10.18

The overflow frequency currently averages 1.7 events per year based on the last 20 years of monitored data, as can be seen below in Table 2.

Table 2. 63rd Ave SW CSO Events

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	20-year Average
CSO Events	0	1	0	0	0	0	1	1	3	2	2	4	5	5	1	1	2	2	3	1	1.7

The 63rd Ave SW PS experienced more frequent overflow events beginning in 2010 and went out of control in 2017. WTD initiated an investigation of the system, consistent with the Corrective Action Compliance Notification Letter submitted May 14, 2018. Since 63rd Ave SW PS is hydraulically linked to and a key component of the West Seattle conveyance infrastructure, WTD began looking at optimization opportunities in the West Seattle portion of its CSO System. WTD has completed several actions to better understand the facility and to

improve its CSO control performance since submittal of this Corrective Action Report. The actions completed and in progress to date are listed in Table 3.

Table 3. Summary of Completed Corrective Actions and Schedule

Action	Schedule
Operating Alki WWTS More Frequently	Ongoing
Replacing the two constant speed pumps to variable speed pumps as well as electrical and control upgrades	Control modifications completed 2018
Installed flap gate on the 63rd Ave SW PS overflow	Completed 2018
Updated the West Seattle model	Completed 2020 with continued upgrades and modifications ongoing
Assessing and implementing measures to improve data collection at Alki WWTS and 63rd Ave SW PS	2021 – Ongoing
Report Compliance in Annual Reports	Completed July 2019, 2020, 2021, 2022, 2023, 2024

Since the 63rd Ave NW PS is closely linked to Alki WWTS, operating the Alki WWTS more frequently was seen as an opportunity to not only be able to control 63rd Ave SW PS but also reduce the amount of flow being sent to West Point WWTP through the West Seattle Tunnel. This would also further reduce volumes in overflows from trunks draining to the EBI, including the Harbor, Lander, Kingdome, King and Hanford #2 overflows. This is an ongoing effort in which Alki WWTS is operated as frequently as necessary with flow only limited by pump capacity and tidal conditions during wet weather events. Additionally, in 2018, WTD completed electrical and control upgrades during the upgrade of the two constant speed pumps to variable speed pumps at 63rd Ave SW to allow more operating flexibility and improve performance of the 63rd Ave SW PS and the Alki WWTS.

A flap gate was installed on the 63rd Ave SW PS overflow to prevent saltwater intrusion. The majority of the flap gate installation work was completed in 2018. The flap gate helps to prevent backflow of salt water into the system, that would cause the 63rd Ave SW PS to begin pumping flows to Alki WWTS, creating unnecessary events at Alki WWTS. Prior to the flap gate installation, WTD would have to disable the 63rd Ave SW PS at high tides to prevent intrusion. This was problematic in that if a storm event took place during a high tide, the 63rd Ave SW PS would not operate.

WTD also completed flow monitoring and modeling efforts to better understand the flow entering the West Seattle system. Monitoring activities and evaluation of pumping options during high-tide events are ongoing. WTD is assessing and implementing measures to improve data collection at Alki WWTS and 63rd Ave SW PS as needed to inform potential future capital projects. In 2020, modeling improvements were completed, including the creation of the West Core model with updates to the West Seattle system area. This model is undergoing continued updates and being modified as additional overall system changes are made including facility improvements and control adjustments.

The improvements made to date have not yet brought the 63rd Ave SW PS in compliance with the CSO performance standard.

4.0 Proposed Corrective Actions and Schedule

WTD plans to complete further monitoring activities and improve data collection measures to support evaluation of pumping options. By staging planning-level options analysis activities with this ongoing monitoring and evaluation for 63rd Ave SW PS and other facilities in the West Seattle system, more effective future capital investments to address control requirements will be evaluated and developed.

WTD plans to complete a planning-level options analysis to identify a capital project to control 63rd Ave SW PS. The planning-level options analysis will give WTD the opportunity to consider control options that incorporate other CSO infrastructure in the West Seattle portion of WTD's system, as well as integrate projected impacts of climate change when sizing the capital solution. The planning-level study will look at the following CSO control measures:

- Update communication between Alki and 63rd Ave SW PS to allow more flow to be pumped to Alki WWTS
- Increase capacity of Alki WWTS to handle more flow from 63rd Ave SW PS
- Construct additional storage for 63rd Ave SW PS
- Additional CSO control measures, which may include combinations of the above three control measures or strategies to reduce stormwater flows entering the system.

WTD will proceed to design and construct the capital solution by the deadlines included in Table 4. The schedule for delivery proposed below is informed by WTD's capital project planning and delivery processes. The schedule factors in time to complete necessary steps in the capital process that include but are not limited to, CSO control options analysis, property acquisition, community engagement, permit approvals, design, and construction. The schedule notes the annual budgeting schedule to ensure the capital solution is funded and seeks to expedite project delivery by advancing the project for budget authorization as early as possible based on planning-level analysis.

This capital project will be delivered as part of a robust capital portfolio including several substantial CSO projects, including:

- Ship Canal Water Quality Project
- Mouth of Duwamish Wet Weather Facilities

- Elliott West WWTS Reconstruction
- West Duwamish Wet Weather Storage Project
- University and Montlake CSO Control
- Supplemental Compliance Projects for Barton Pump Station, South Magnolia CSO and Hanford #1 CSO
- Belvoir PS CSO Control Project

Timely delivery of these projects, in addition to the capital solution to control 63rd Ave SW PS require substantial staff time, funding, and consultant resources, which may be constrained by other large infrastructure projects occurring in the region. The implementation schedule below reflects a schedule for delivery effort in which recommended corrective action measures are not yet known.

WTD will provide updates on this project to Ecology and EPA during quarterly regulatory meetings and as part of the CSO/CD Annual Report.

The proposed corrective actions and their implementation schedule include the following:

Table 4. Summary of Proposed Corrective Actions and Schedule

Action	Schedule
Assess and implement measures to improve data collection at Alki WWTS or 63rd Ave SW PS as needed to inform potential future capital projects	April 31, 2025
Complete a planning-level options analysis to develop and evaluate capital projects to control 63rd Ave SW PS CSO, to be presented on during a quarterly regulatory briefing	August 31, 2027
Request and secure capital funding to complete the 63rd Ave SW PS CSO capital project	December 31, 2027
Develop and submit an engineering report for the 63rd Ave SW PS CSO capital project	December 31, 2031
Achieve construction substantial completion of the 63rd Ave SW PS CSO capital project	August 31, 2037
Monitor and report compliance in future CSO/CD annual reports	Annually by July 31