

Council Report on January 2021 Wastewater Bypass

Dirk Apgar, PE, PMP, Engineering Supervisor
John Conway, Senior Water Quality Planner
King County Wastewater Treatment Division

MWPAAC

August 25, 2021

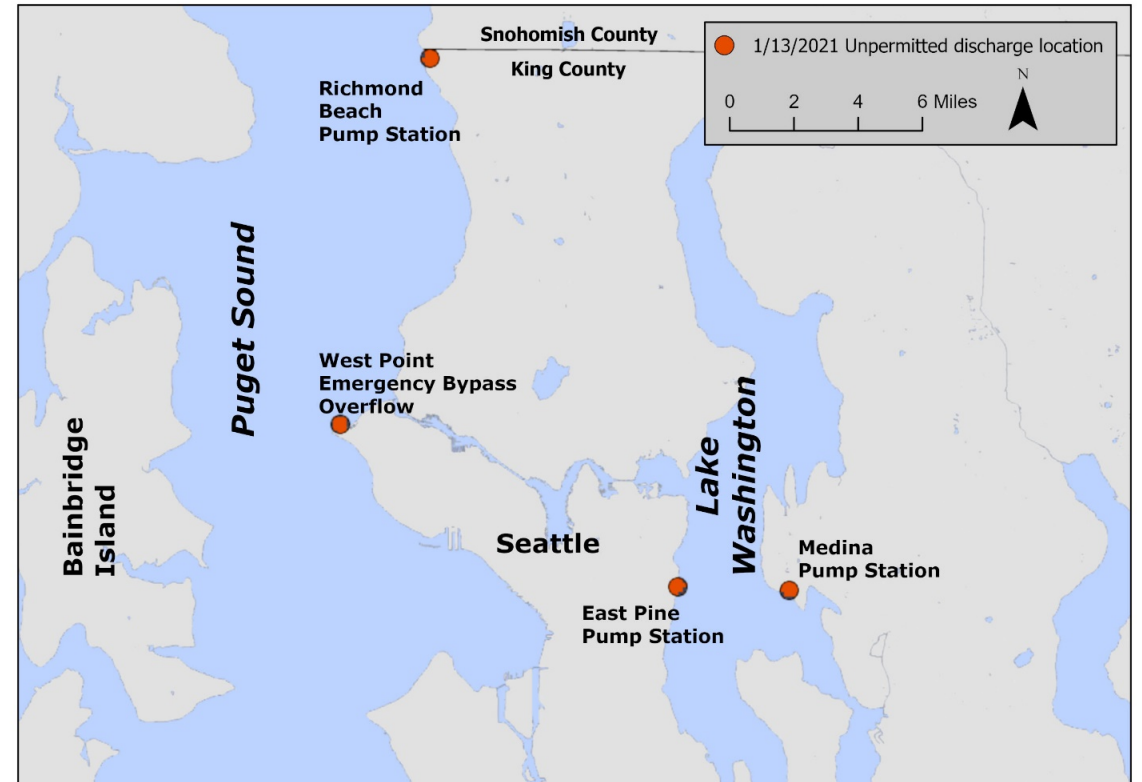


King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Background

- Overflow events on January 13, 2021, at 4 King County Wastewater Treatment Division (WTD) locations:
 - West Point Treatment Plant
 - Richmond Beach Pump Station
 - East Pine Pump Station
 - Medina Pump Station



Causes of 1/13/21 Overflows

- Winter storm January 12 and 13 causing power disruption throughout the region
 - 17 of the 21 pump stations in WTD's East Section impacted
- As a result of the power disruptions, wastewater could not be fully pumped out of 4 facilities

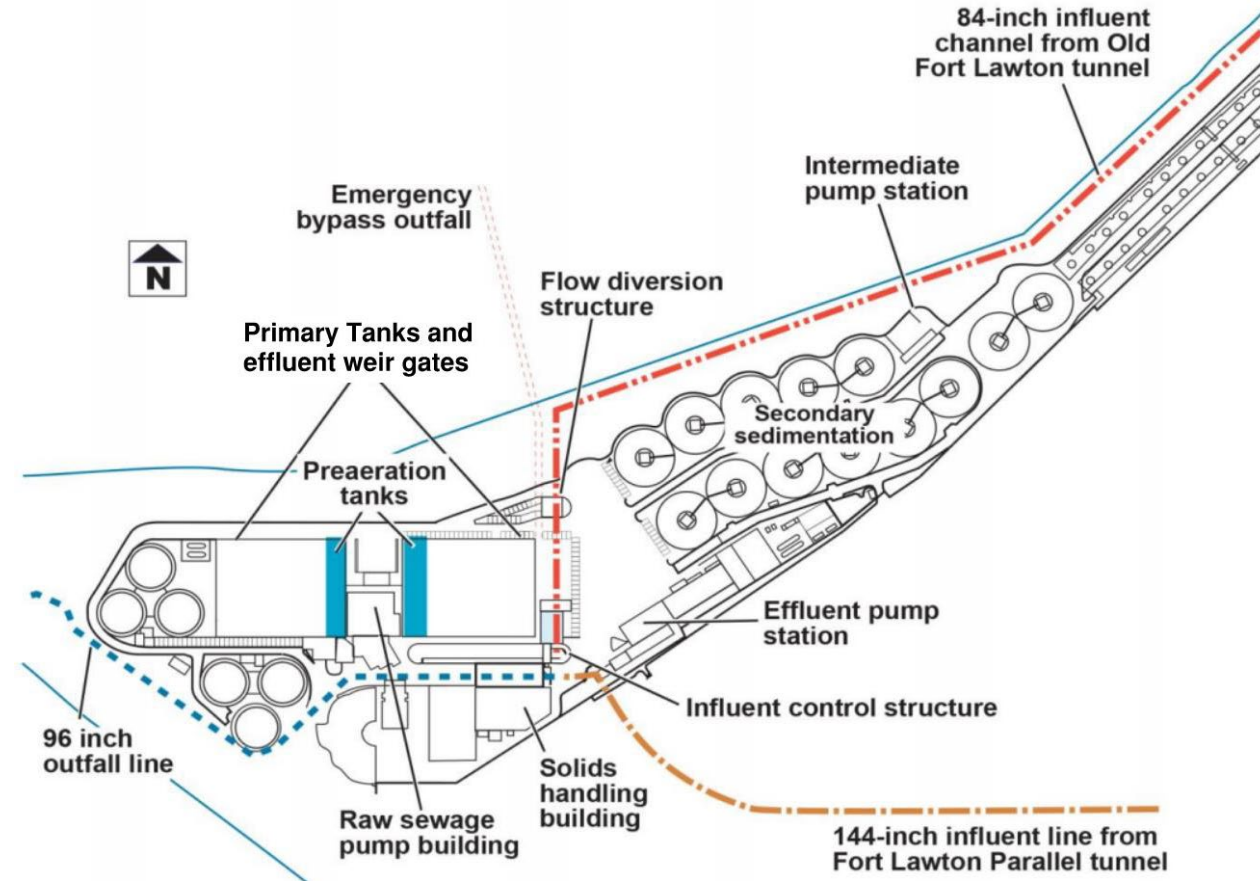


Image courtesy of Mike Siegel / The Seattle Times



West Point Treatment Plant Overflow

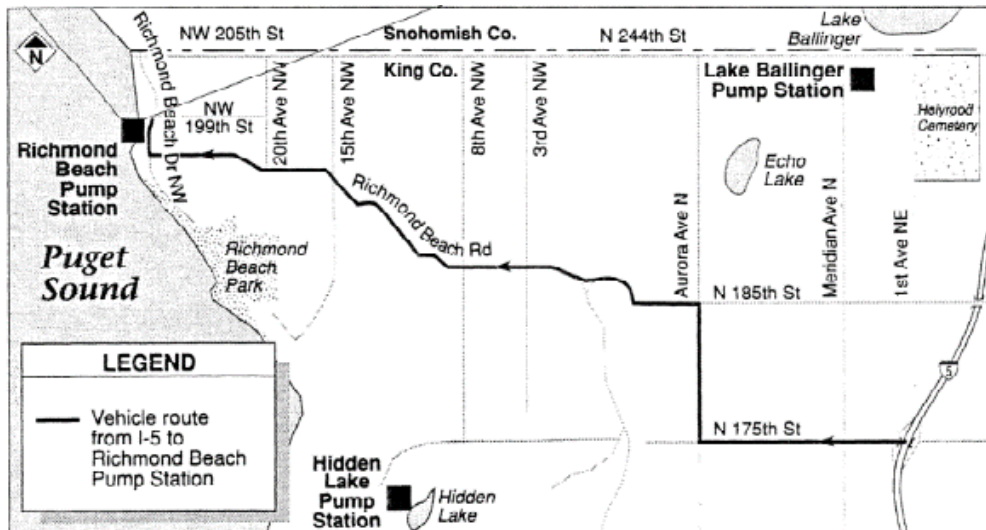
- Operating at its maximum capacity of 440 mgd
- Power disruptions to the plant caused pumps in the Intermediate Pump Station and the Effluent Pump Station to stop
- Flows diverted through the emergency bypass gate and outfall into Puget Sound



Richmond Beach Pump Station (PS) Overflow

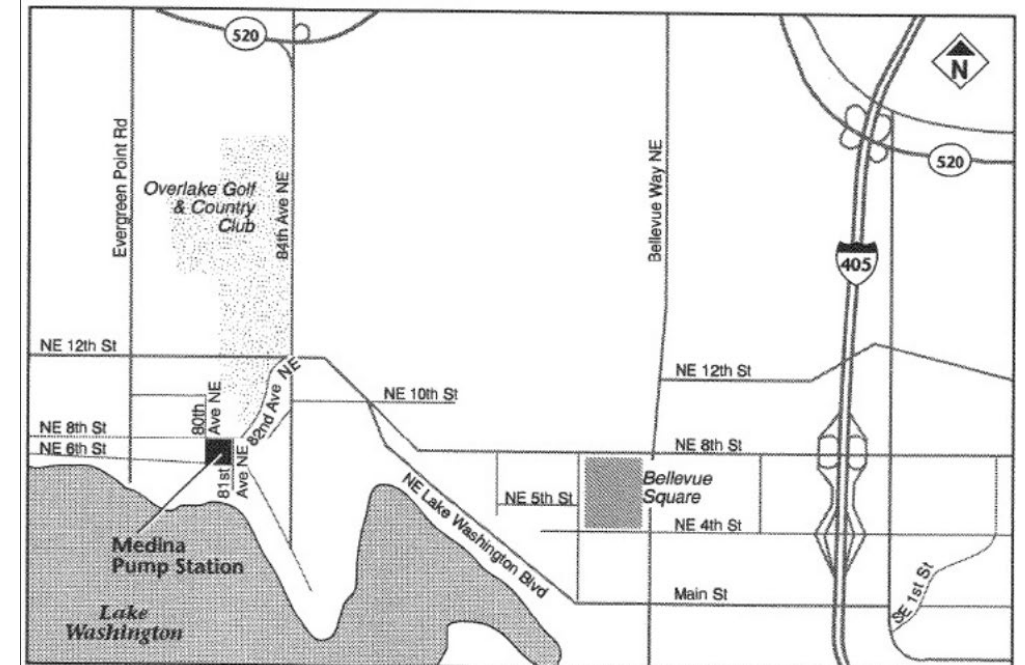


- Power disruptions shut down variable frequency drive (VFD) controlled pumps
- 2 of 3 operating pumps shut down
- Operator dispatched and successfully restarted pumps



Medina PS Overflow

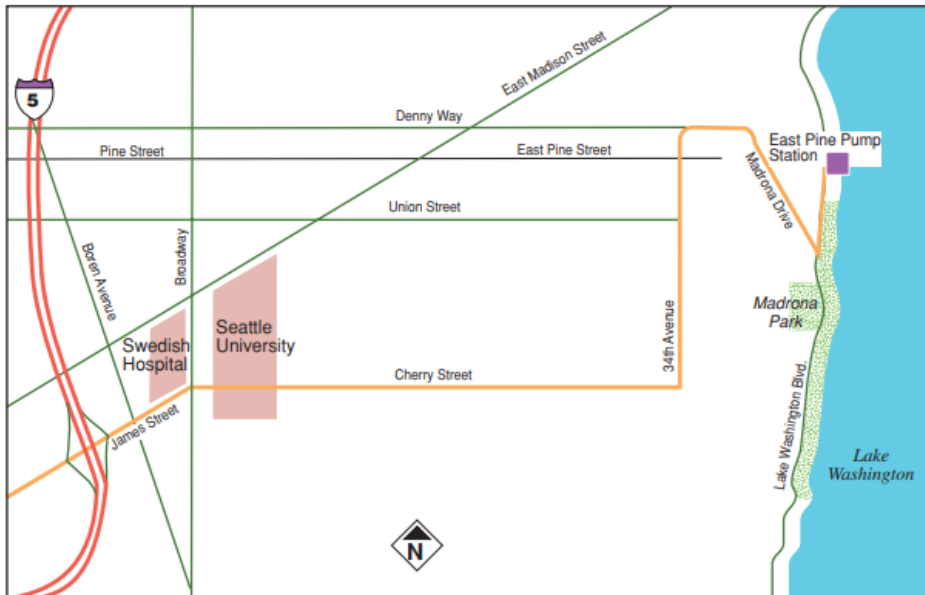
- Power disruptions shut down VFD controlled pumps
- 2 large pumps did not restart
- 2 small pumps successfully started automatically
- When power quality improved, large pumps restarted ending the event



East Pine PS Overflow



- Power disruption shut off pumps
- Valves in level control system had been positioned incorrectly
- Primary communication lines out of service
- Backup communication issued alarm to secondary panel in main control
- Operator arrived at PS to reset control logic and started pumps



January 13, 2021 Bypass and Overflow Volumes

Facility	Bypass/Overflow Quantity (gallons)	Receiving Water
West Point Treatment Plant	11,000,000	Puget Sound
Richmond Beach Pump Station	160,000	Puget Sound
East Pine Pump Station	2,200,000	Lake Washington
Medina Pump Station	86,000	Lake Washington



Effects of January 13 Overflows

- Closed Beaches immediately following event
 - Posted signs
 - Notified users
- Sampled beaches until WQ standard achieved
- Shellfish harvesting in Kitsap County closed 1/13/21-2/3/21



Analysis of the Impacts

- Partnered with King County Water and Land Resource Division (WLRD) Science Group
 - Evaluated water samples collected and analyzed by King County's Environmental Laboratory following event
- Concluded:
 - Bacteria counts were elevated but returned to standard within 2-4 days
 - No lasting impacts to Puget Sound or Lake Washington waters
 - Minimal impacts to water-adjacent property owners or facilities
 - Minimal impacts to those using fishery or shellfish harvesting resources

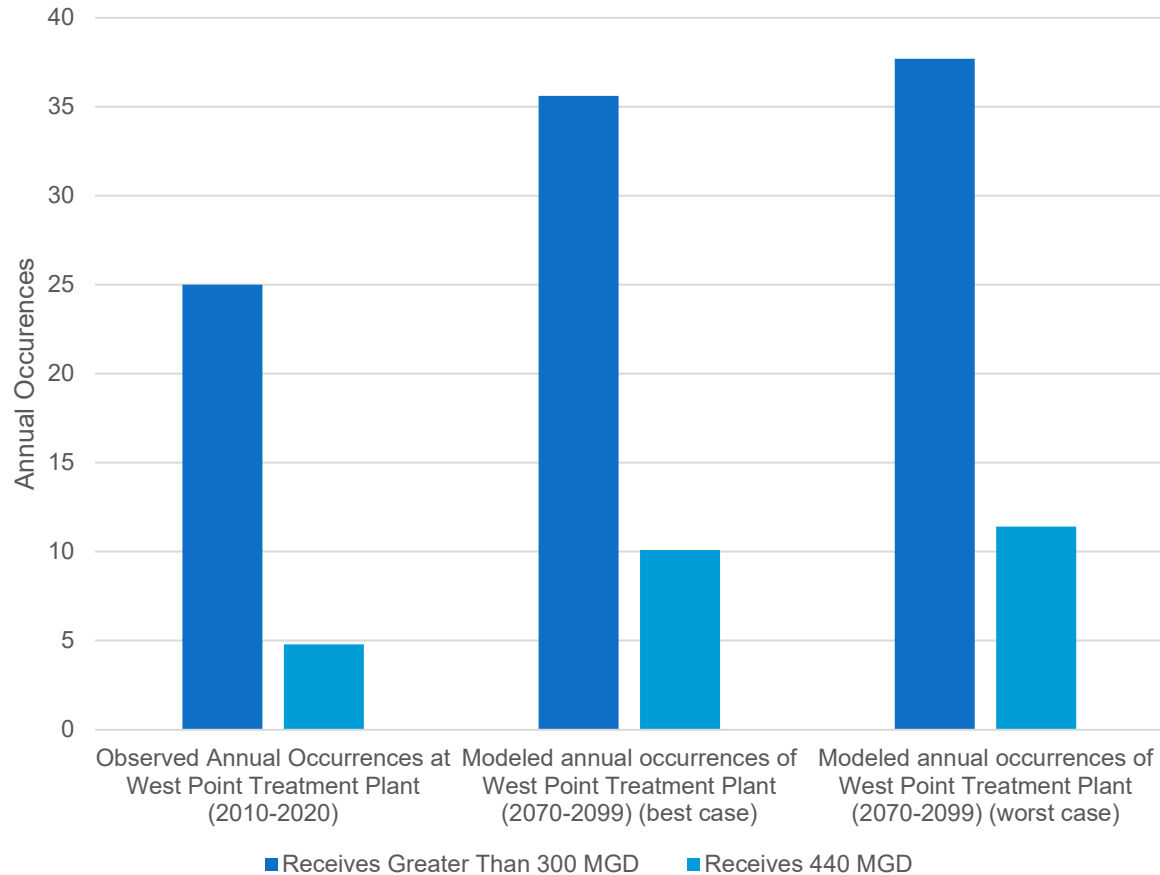


History of Overflows and Bypasses: 2017-2021

- West Point: 4 emergency Bypasses since February 2017
 - July 19, 2019
 - December 2, 2020
 - January 13, 2021
 - April 29, 2021
- Richmond Beach: 3 overflows prior to 1/13/21
- Medina Pump Station: 2 overflows prior to 1/13/21
- East Pine: no overflows since 1997



Impacts of Climate Change



- Climate Change will likely result in higher intensity rainfall events
- Larger rain events will increase frequency of exceeding 300 mgd capacity at West Point
- Increased frequency of high flows will increase the potential for unpermitted bypasses and discharges at West Point
- WTD is incorporating potential climate impacts into planning and design



Working to Eliminate Recurrence

- Implement requirements in Ecology Administrative Order for West Point
- Example strategies
 - Improve standby power and controls
 - Review/adjust maintenance schedules
 - Improve information for operators
 - Upgrade equipment
 - Improve telecommunications



Conclusions/Next Steps



- Implement strategies to eliminate recurrence
- Fulfill requirements of Ecology Administrative Order and County Emergency Declaration
- Continue to plan and design future projects for climate change



Questions?

Dirk Apgar

Engineering Supervisor

King County Wastewater Treatment Division

Dirk.apgar@kingcounty.gov

