

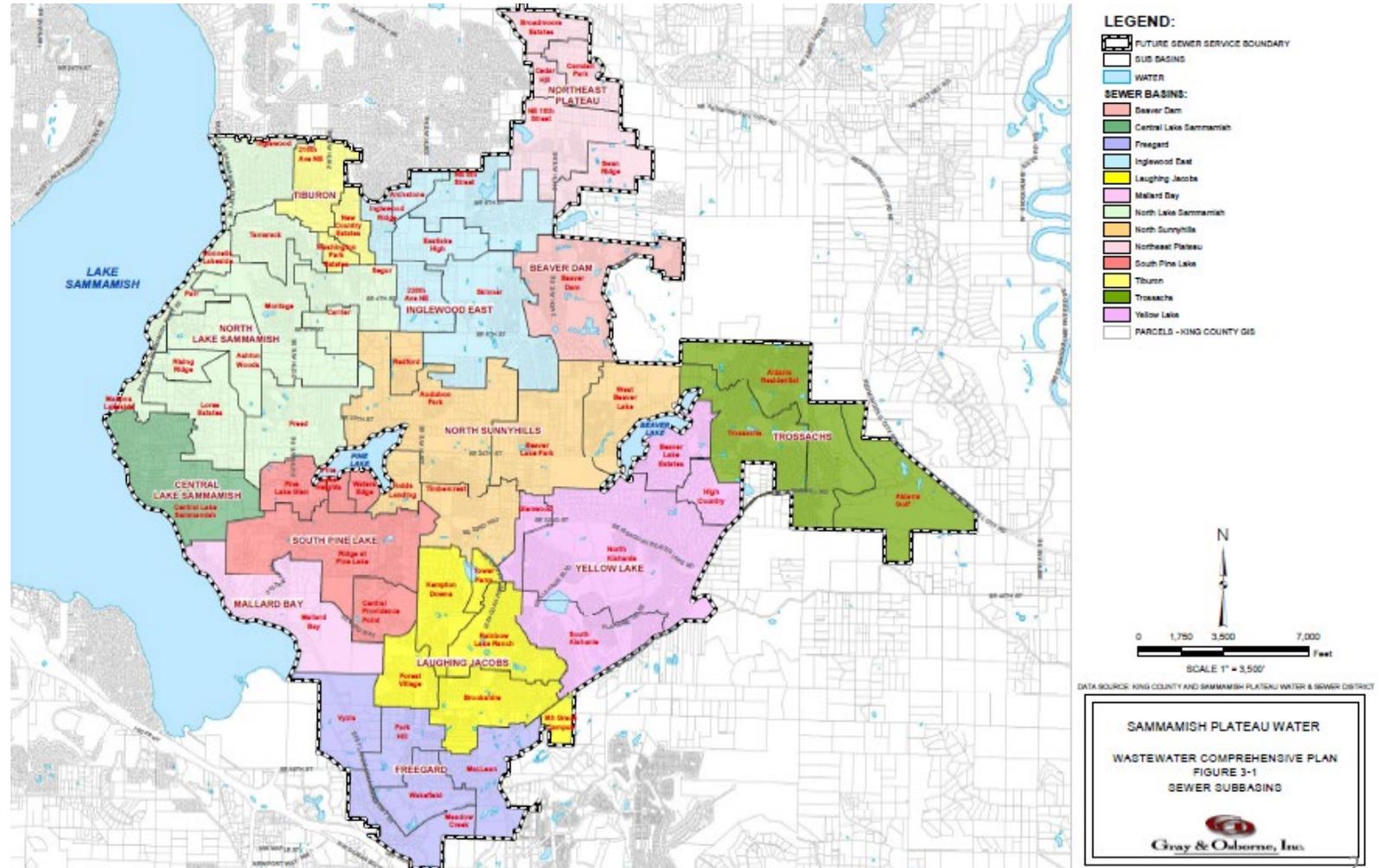


# North Sewer Service Area I&I Investigation

October 6, 2022

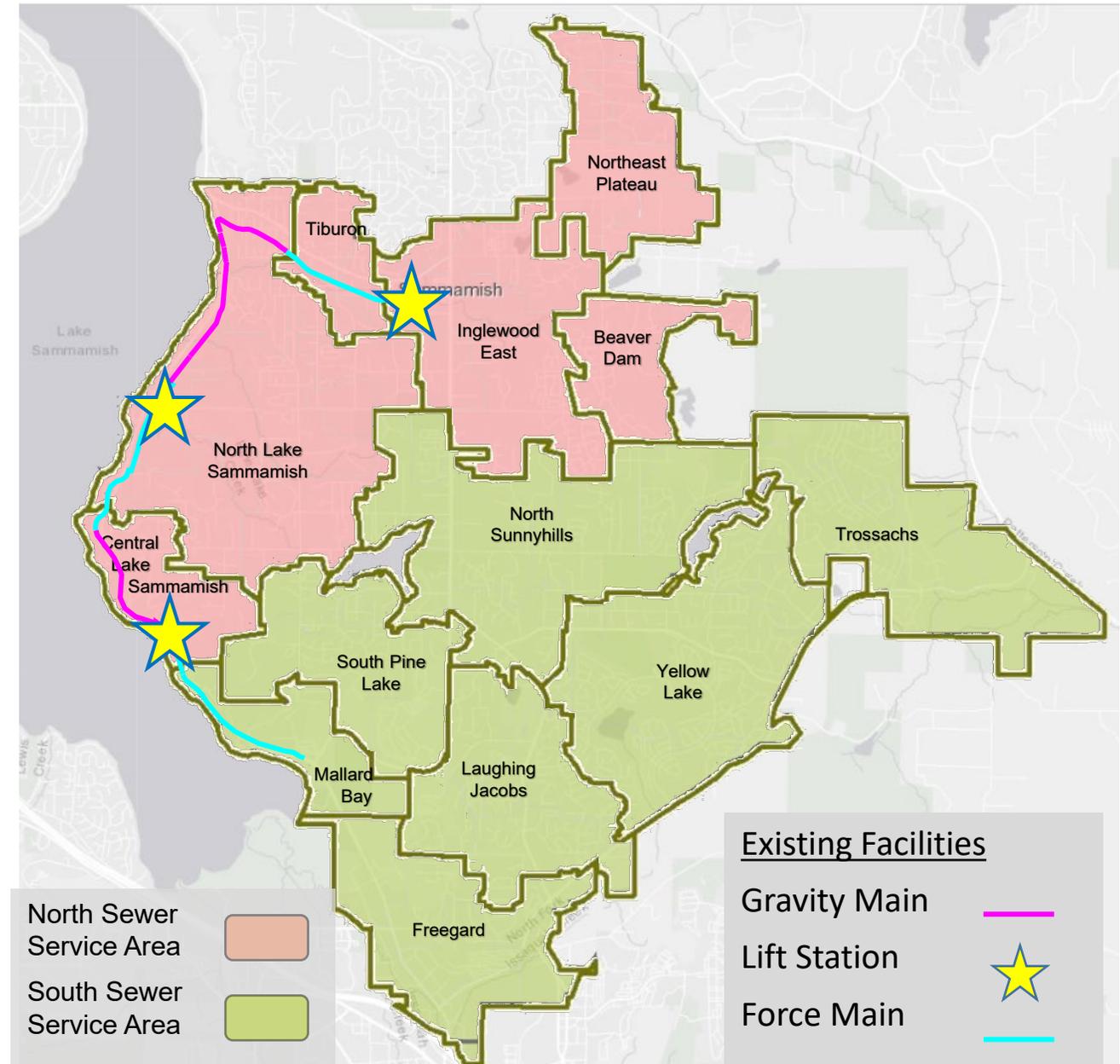
# Sammamish Plateau Water Sewer System

- 13,000+ Service Connections
- 170 Miles of Gravity Main
- 24 Miles of Pressure Mains
- 21 Lift Stations
- 13 Basins/59 Sub-basins
- 580 Grinder Pumps
- **3 Overflows in 5 Years**
  - **Zero Capacity Caused Overflows**



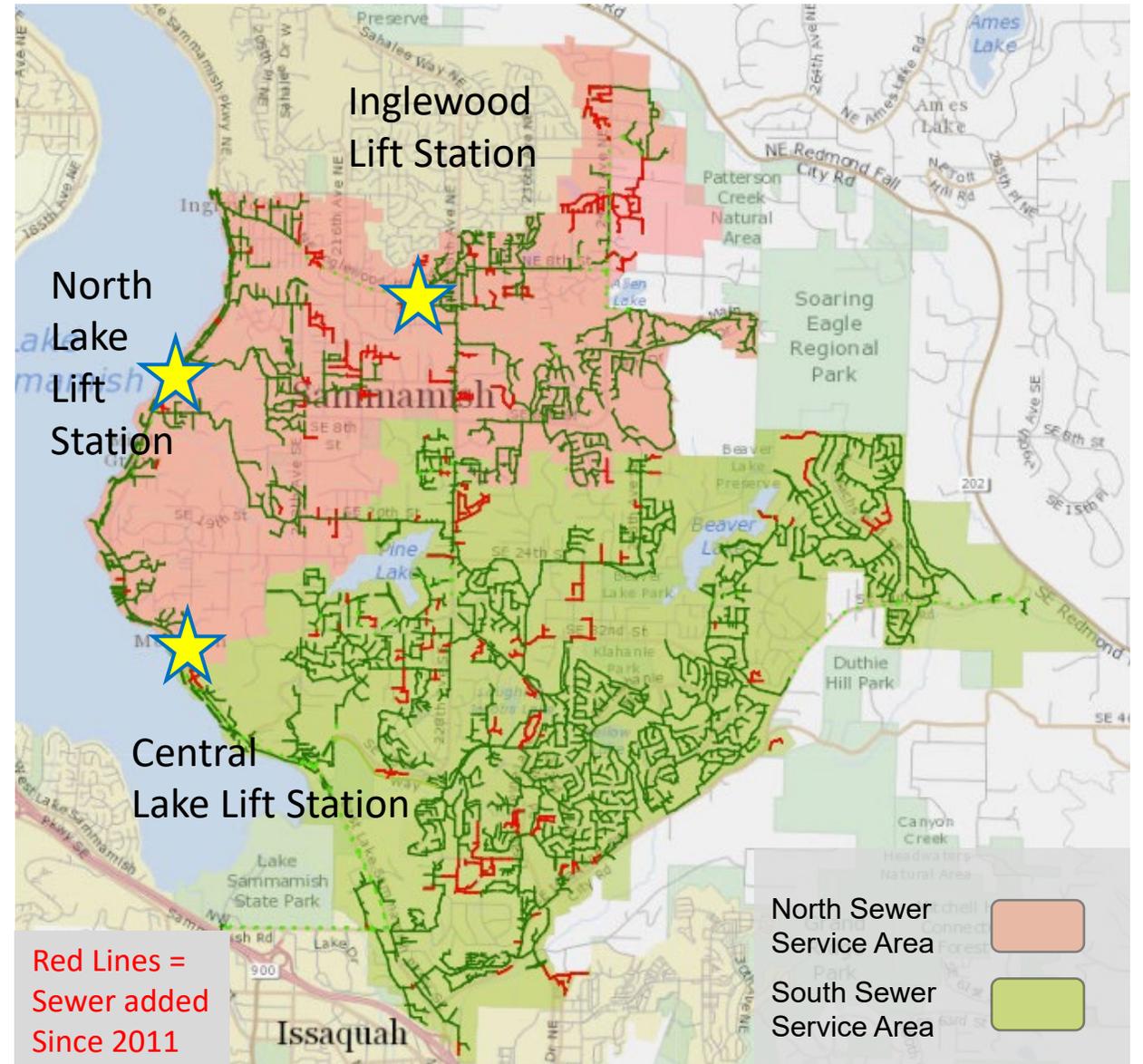
# Sammamish Plateau North Sewer Service Area

- System designed to take flows to the North.
- Capacity events at North Lake Pump Station
- 90 Day moratorium declared by the District Board of Commissioners (Feb 2021)
- District staff come up with immediate and short term capacity improvement plans
  - Immediate Improvements
  - Lift Station Improvement
  - Pipe upsizing
  - **I&I investigation and work**



# Sammamish Plateau North Sewer System

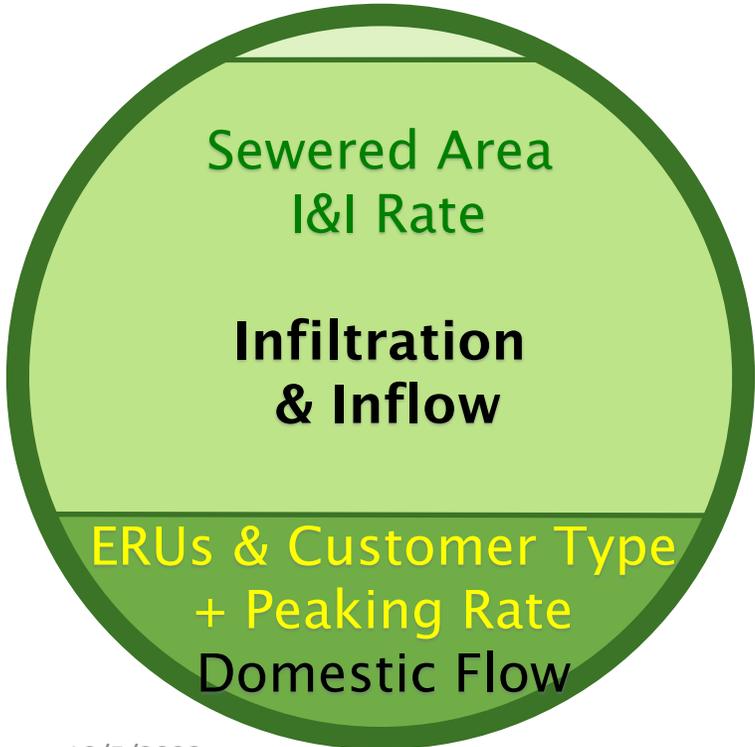
- 57 Miles Sewer Main
- 1,952 Manholes
- 8 Lift Stations
- 2,222 Acres of Service Area



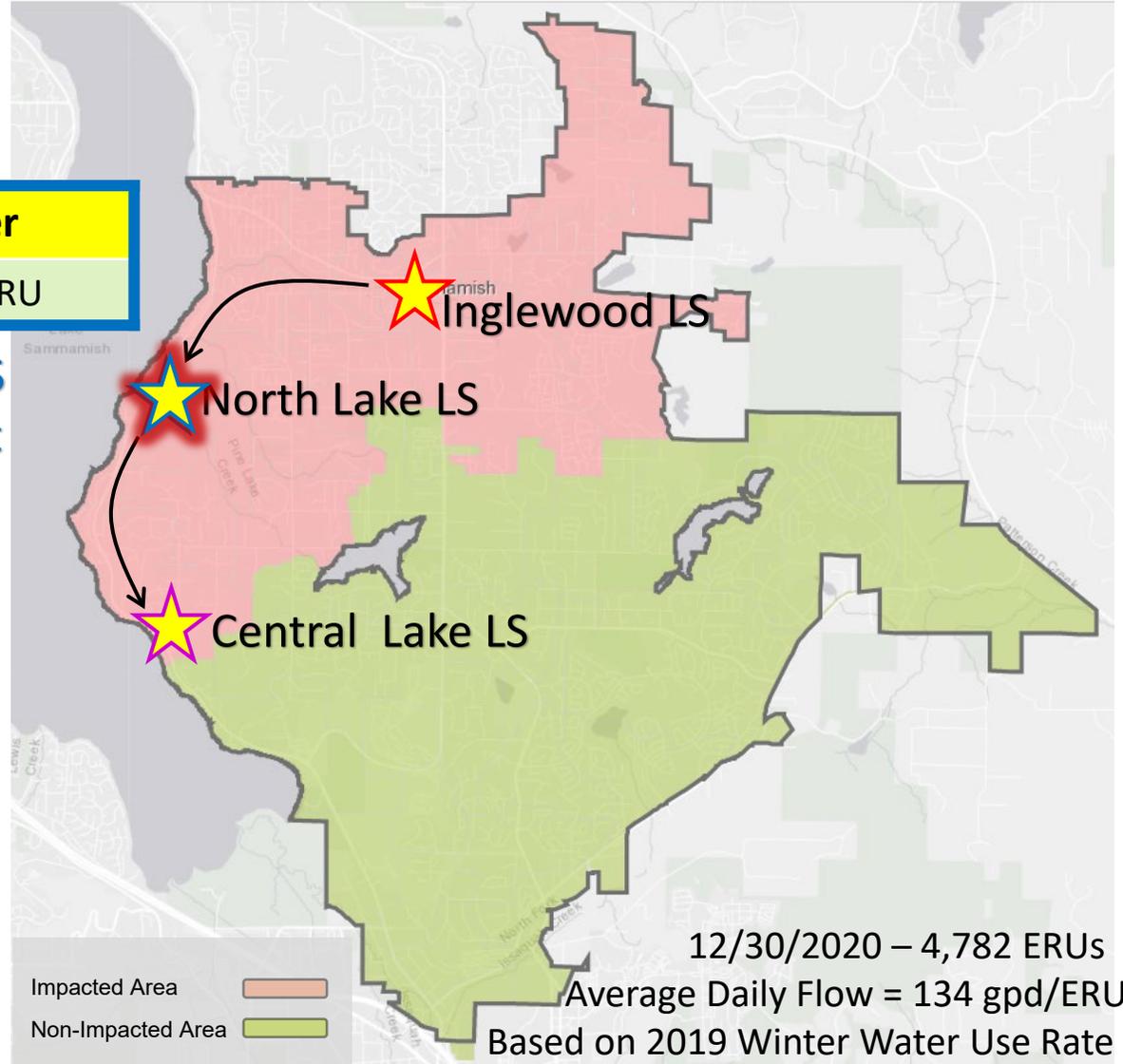
# Dry & Wet Weather Flow Rate Comparison

North Lake Lift Station - Dry Weather	
Dry Weather Total Flow	0.16 gpm/ERU

North Lake Lift Station – Wet Weather	
Wet Weather Total Flow	0.38 gpm/ERU



North Lake LS  
Is the current  
bottleneck



# District Conveyance System Immediate Improvements – Capacity Provided

## Inglewood Lift Station

• November, 2021

Operational Flow Reduction to 1,100 gpm  
Add 21,000 gallon Temporary Storage Tank

## North Lake Lift Station

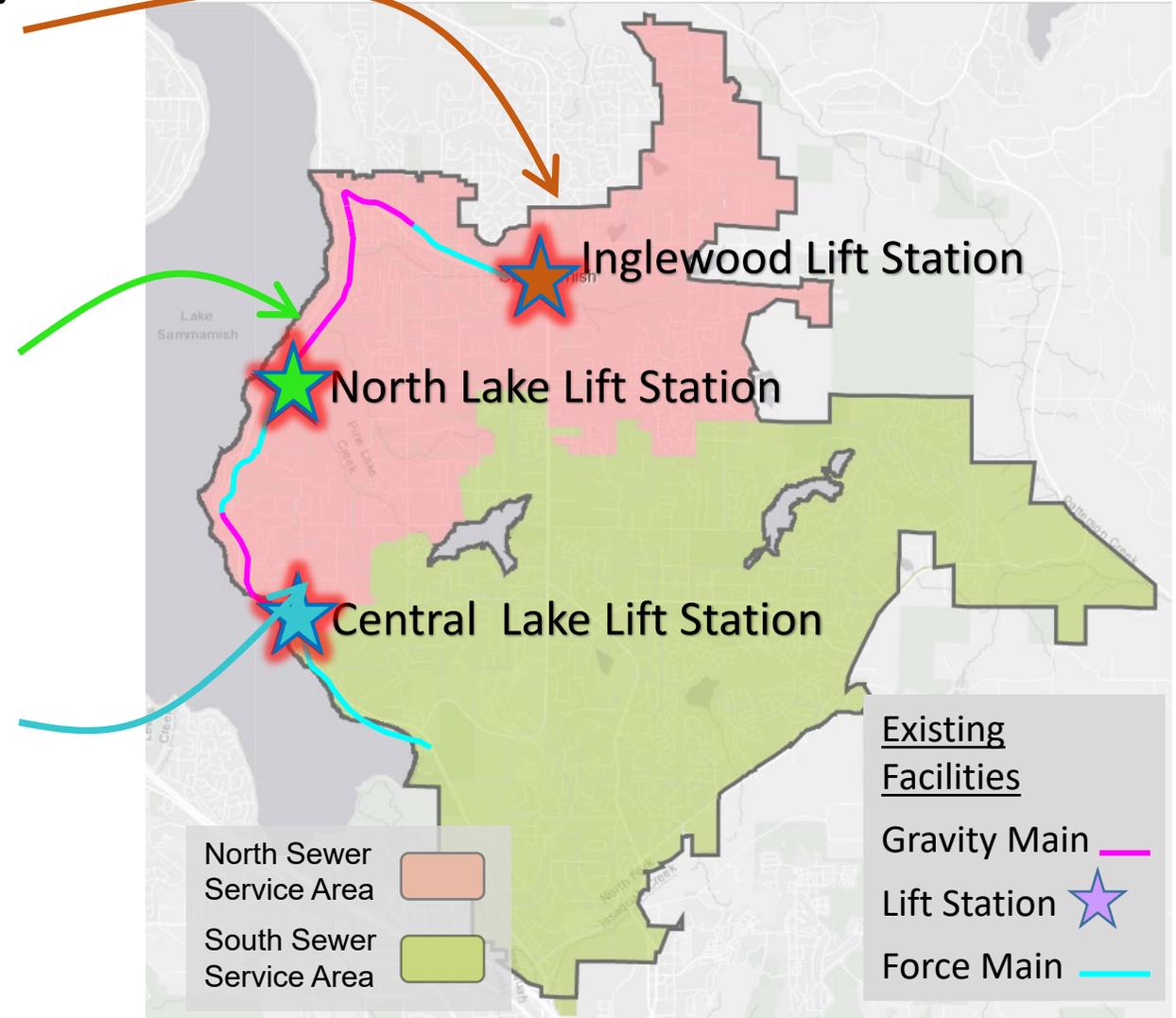
• November, 2021

Bypass Pump: 250 gpm Capacity Increase

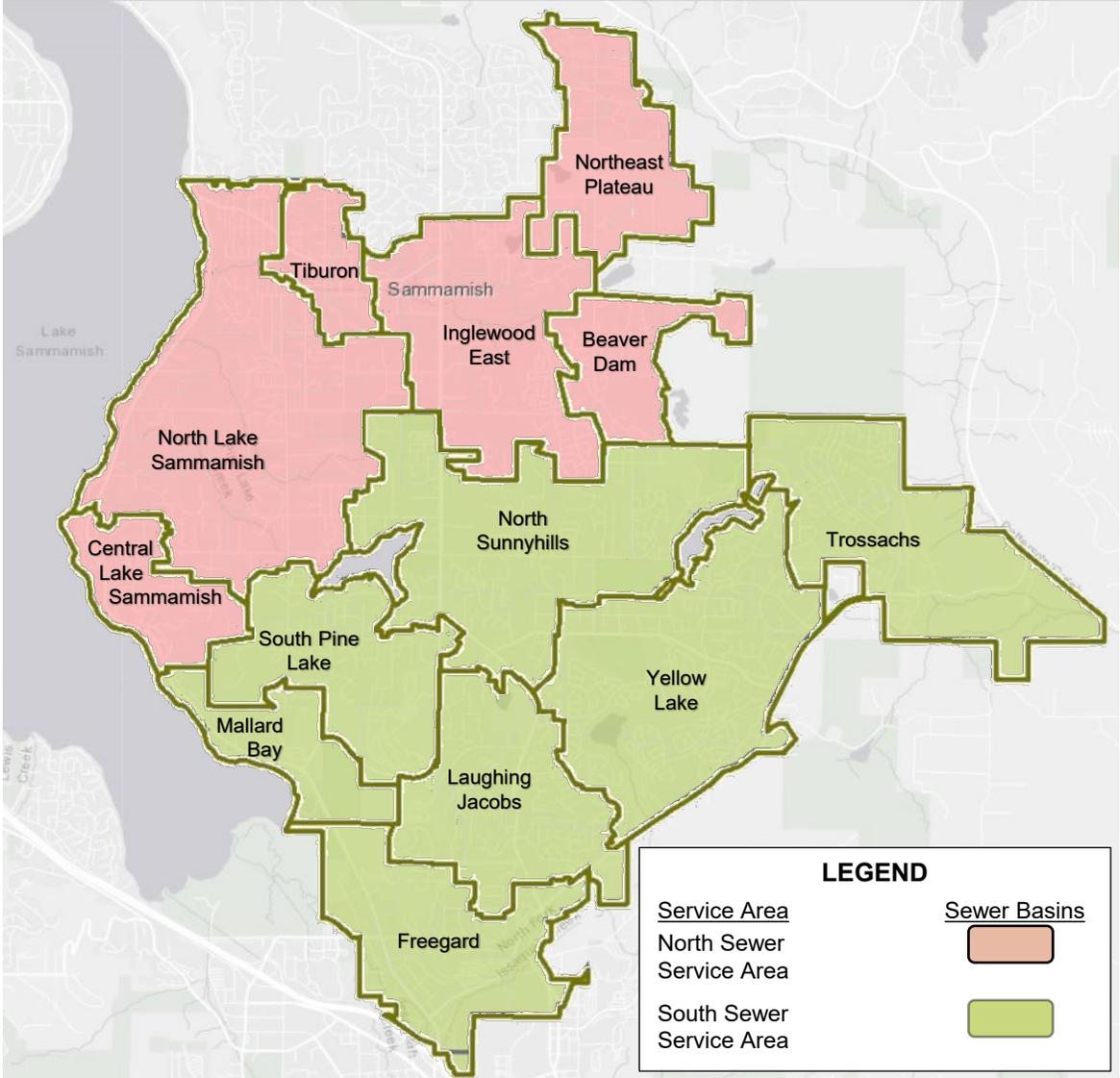
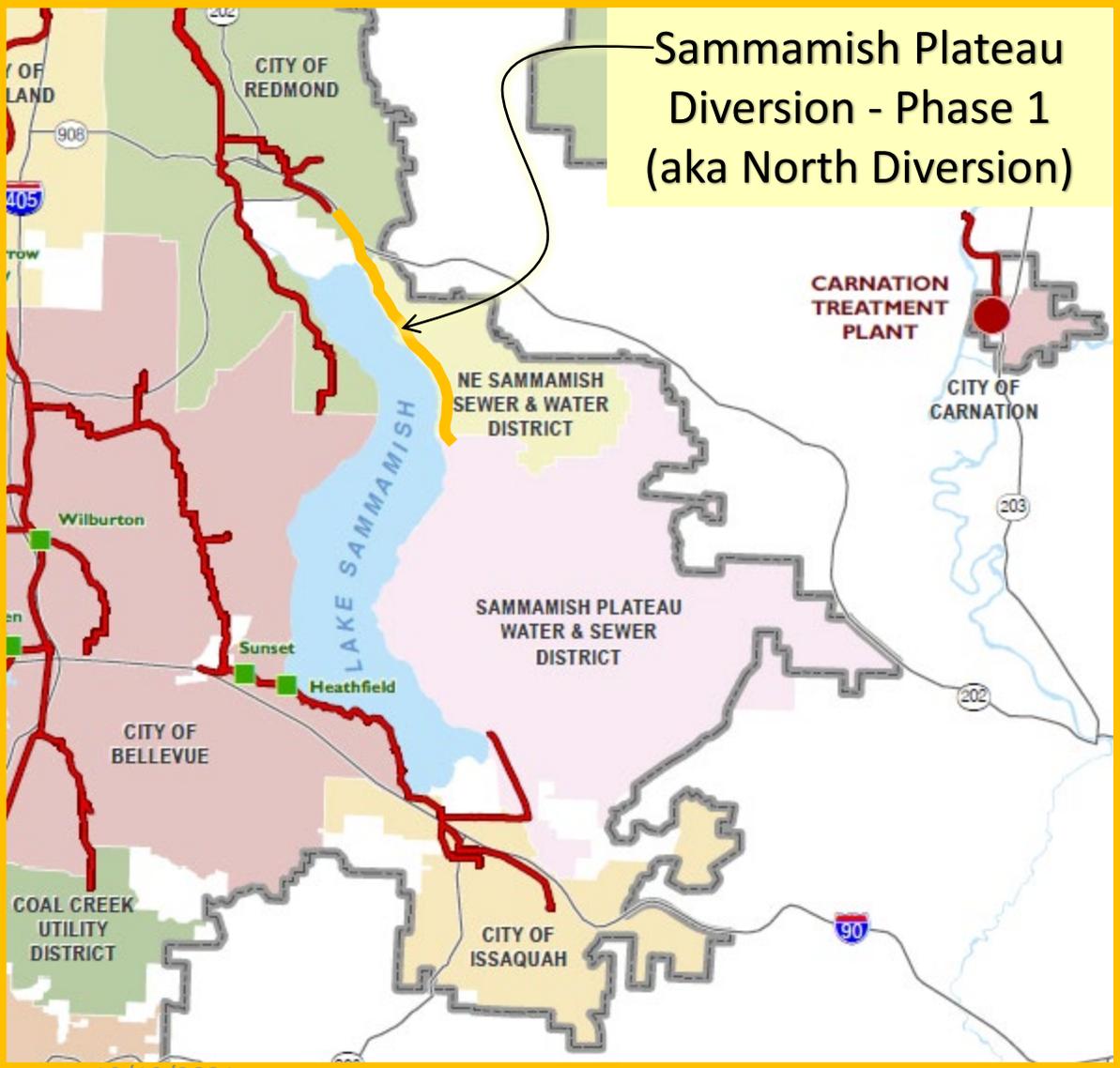
## Central Lake Lift Station

• November, 2021

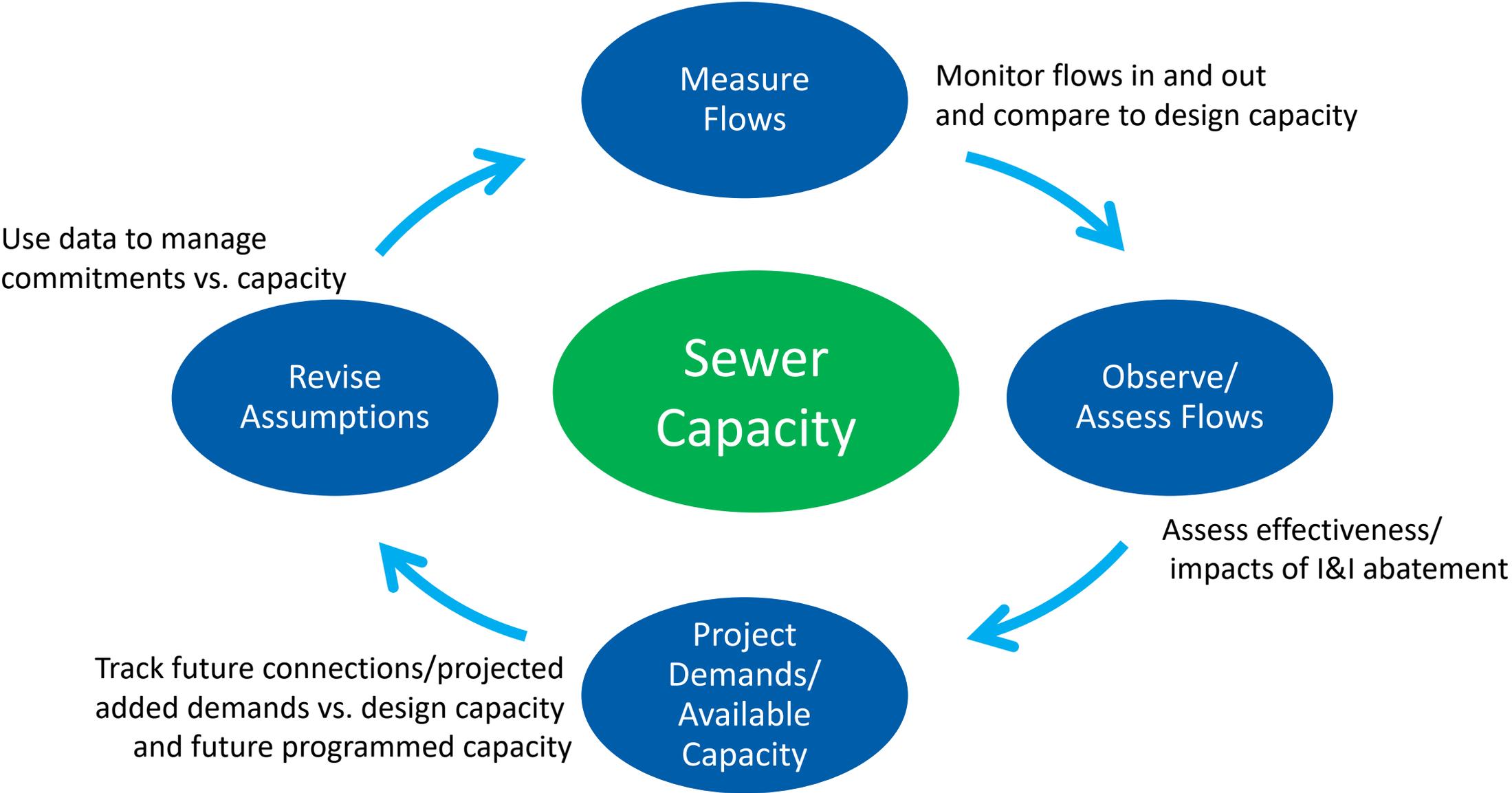
Add 21,000 gallon Temporary Storage Tank



# Sammamish Plateau Water – Impacted Sewer Basins

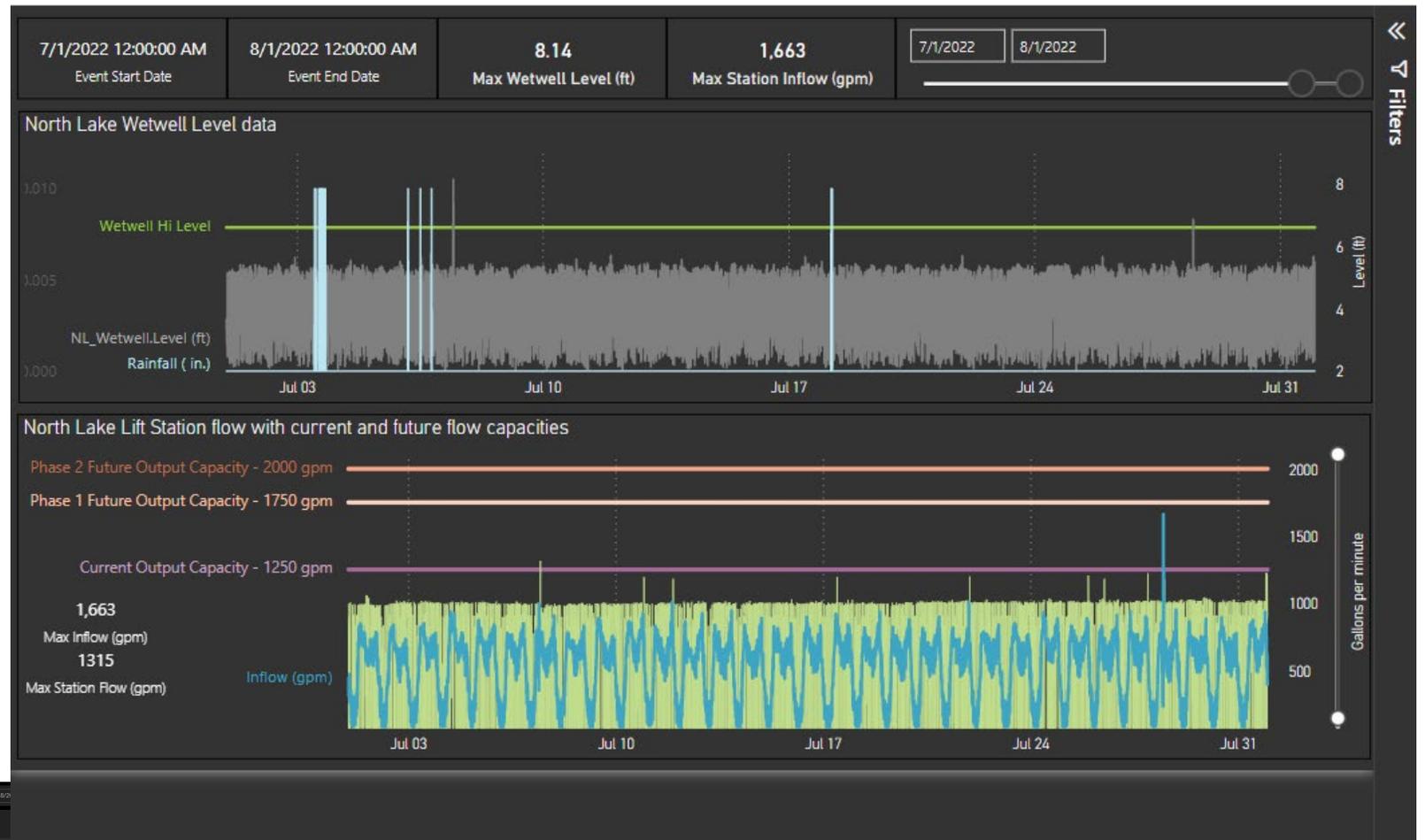


# Sewer Metrics



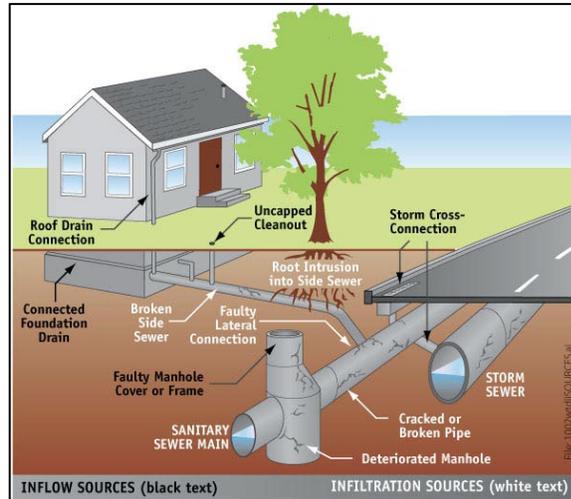
# Dashboards

- AMI Metering in the North Sewer Sewer Service Area
- Calculated Station inflow
- Actual inflow using flow monitors
- Wet well levels
- Pumped flow data
- Rainfall



10/3/2022

# Infiltration & Inflow (I&I)



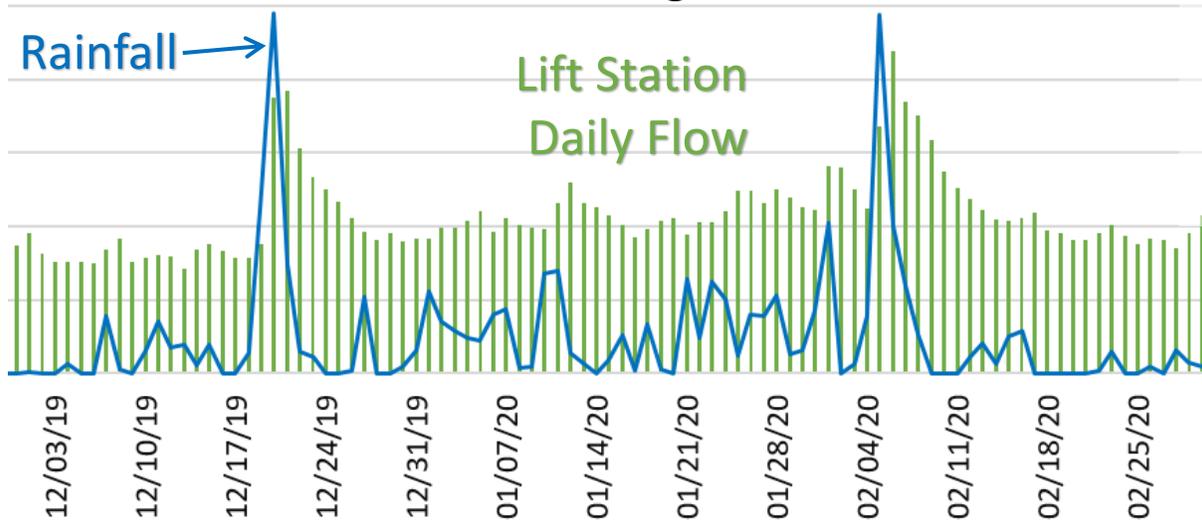
## Infiltration

- Groundwater seeps into sewer pipes through holes, cracks, joint failures, and faulty connections.

## Inflow

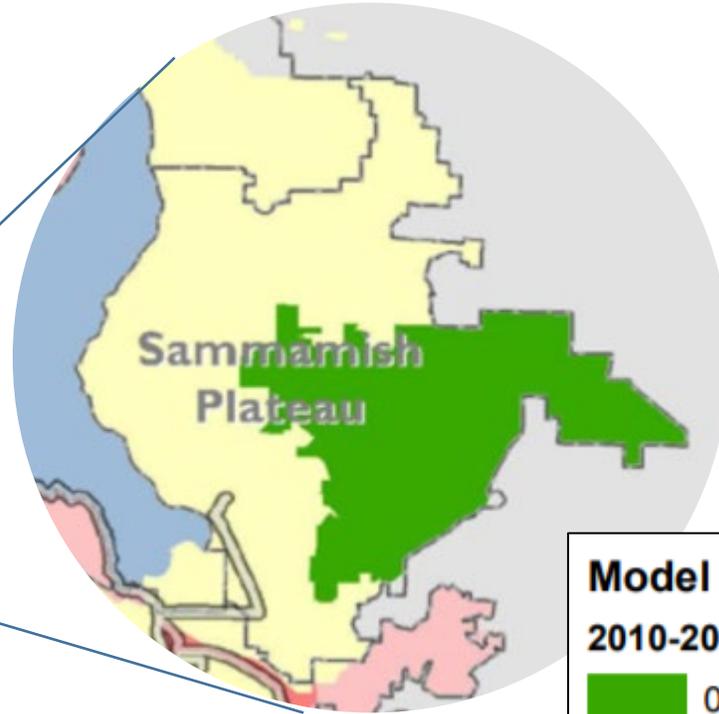
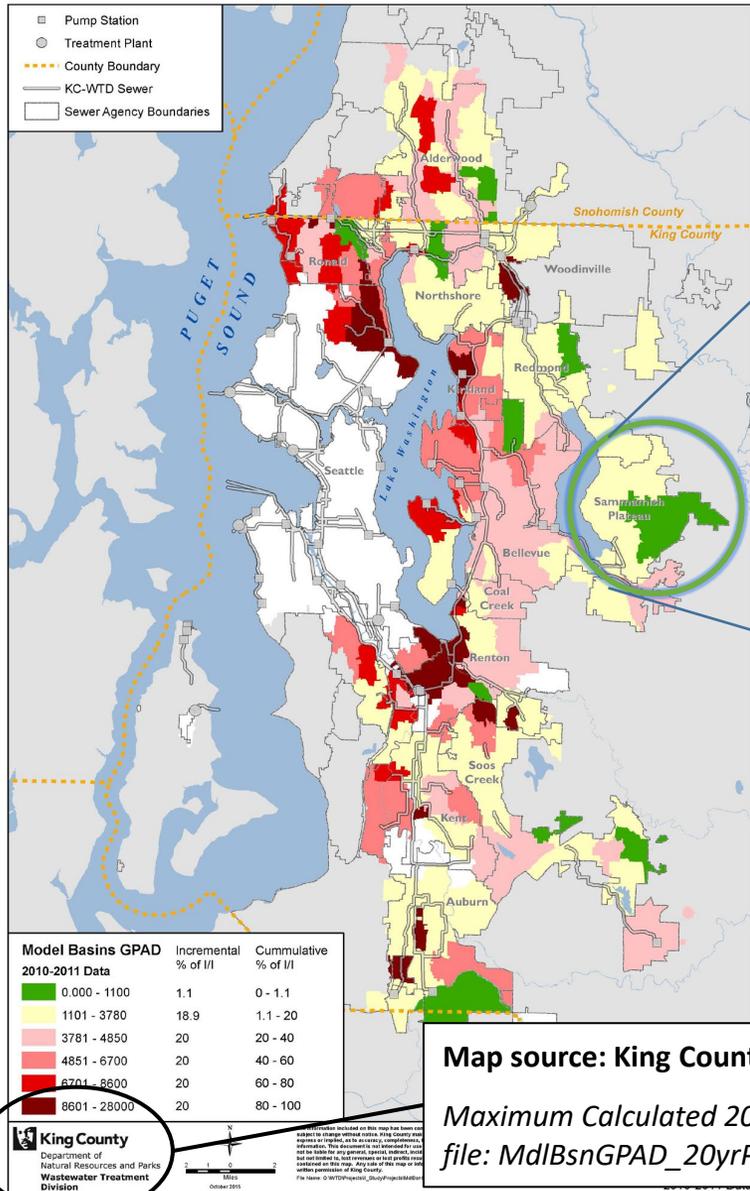
- Stormwater flows into sewers via roof drain downspouts, foundation drains, storm drain connections, and holes in manhole covers.

Lift Station Flow During Storm Events



**The District's capacity constraints occur during wet weather events.**

# Regional Infiltration & Inflow (I&I)



When compared with the region, the District's amounts of Infiltration & Inflow are **low**.

Model Basins GPAD	Incremental % of I/I	Cummulative % of I/I
0.000 - 1100	1.1	0 - 1.1
1101 - 3780	18.9	1.1 - 20
3781 - 4850	20	20 - 40
4851 - 6700	20	40 - 60
6701 - 8600	20	60 - 80
8601 - 28000	20	80 - 100

Map source: King County Wastewater Treatment Division

Maximum Calculated 20-Year Peak I/I Hourly Flow Rates  
file: MdlBsnGPAD\_20yrPeak\_20150522.mxd

GPAD = Gallons per acre per day.

# Sammamish Plateau Water – Infiltration & Inflow (I&I)

## Internal I&I Work

- Internal Work
  - Manhole plugs
    - Most outside of high traffic lanes remain from previous placement.
    - High traffic areas require multiple visits to ensure continued protection from I&I.
  - Video Inspection of Sewer Mainlines
    - If done when ground is saturated it can pinpoint areas of intrusion.
  - Jetting or cleaning sewer pipes. This is done to support the ability to effectively perform video inspection.



# Smoke Testing

- Use smoke fluid blown through the sewer to identify illicit connections
- Smoke travels about 500 LF in any direction
- Advantage: Quick and inexpensive way to identify inflow in the system
- Disadvantages:
  - Smoke can get into homes and businesses if pea traps are dry
  - Is not effective for customers on grinders or with basement sump pumps



# Sammamish Plateau Water – Infiltration & Inflow (I&I) Consultant Engagement

- Smoke Testing of the Entire North Sewer System – G&O Consultant Proposal
  - July 2021 - Develop the plan specific for our system.
  - August 2021 - Smoke testing in the North Sewer Service Area.
  - Smoke testing to be completed by the end of September.
  - Technical Memorandum would be completed by October.
  - Estimated Cost of \$73,000



# Research

- Examples of projects done at other agencies
  - Smoke Test flyers
  - Illicit connection notifications
- Northshore Utility District phone call – Great resource
- Consultant engagement

# Public Outreach – Before Smoke Testing

- Internal meetings weekly prior to and during field work to update progress on tasks.
- Postcard Mailers
- Door hangers were hung on every residence affected.
- Web Site front page link to smoke testing FAQ
- Contact with local Fire and Police agencies and the City of Sammamish.



  
1610 228th Ave SE, Sammamish, WA 98075

PHOTO BY:  
LISE POSTAGE PAID  
BENTLEY FOR  
PERMIT 218

During the month of August, field crews will be conducting sanitary sewer smoke testing in selected areas of the District. Pushing non-toxic smoke into the sewer pipes is helpful in detecting connection points where outside surface water can enter into the sewer pipes. During the testing, you may see non-toxic smoke coming from vent stacks on buildings or from holes in the ground. Don't be alarmed. This simulated "smoke" is safe and non-toxic, has no odor, is non-staining, does not create a fire hazard, and should dissipate quickly.

The smoke is similar to what you might see at a live concert or theater show. For a single city block, smoke testing lasts approximately 30 minutes. Avoid unnecessary exposure to the smoke if possible, as extended exposure may cause some skin irritation. If there is a concern during testing, please locate the field crew outside on the street, or call the District office at 425.392.6256 for assistance.

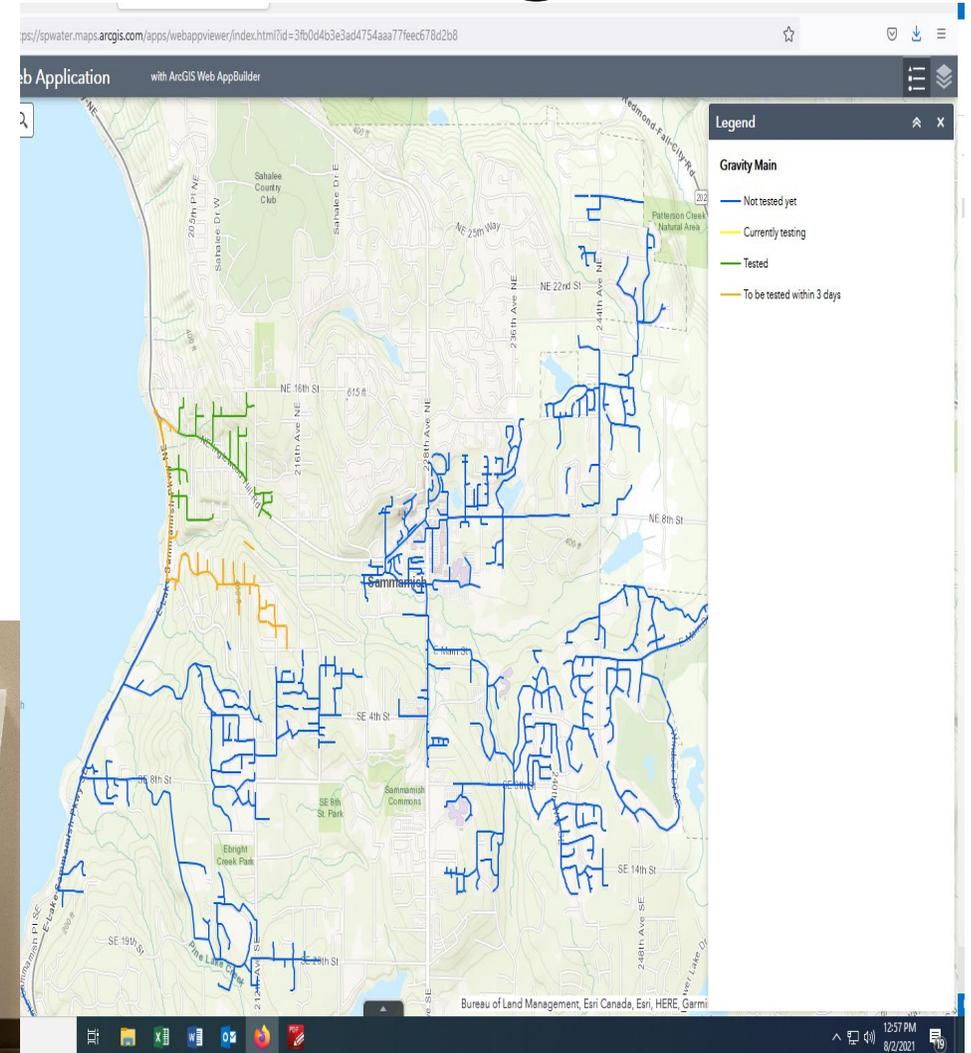
Please visit [www.sppwater.org/smoketesting](http://www.sppwater.org/smoketesting) for answers to Frequently Asked Questions, a map of the smoke testing zone, specific

**Here's what you can expect during the smoke testing**

- Field crews in safety gear will be working outside around manholes. A Sammamish Plateau Water vehicle will follow the field crews.
- Non-toxic, simulated "smoke" may become visible during the testing.
- Smoke should not enter your home or building unless the building has defective plumbing or your drain traps are dry or leaking.
- Eastside Fire & Rescue will be notified of the smoke testing and will be updated as needed regarding the neighborhood testing schedules.

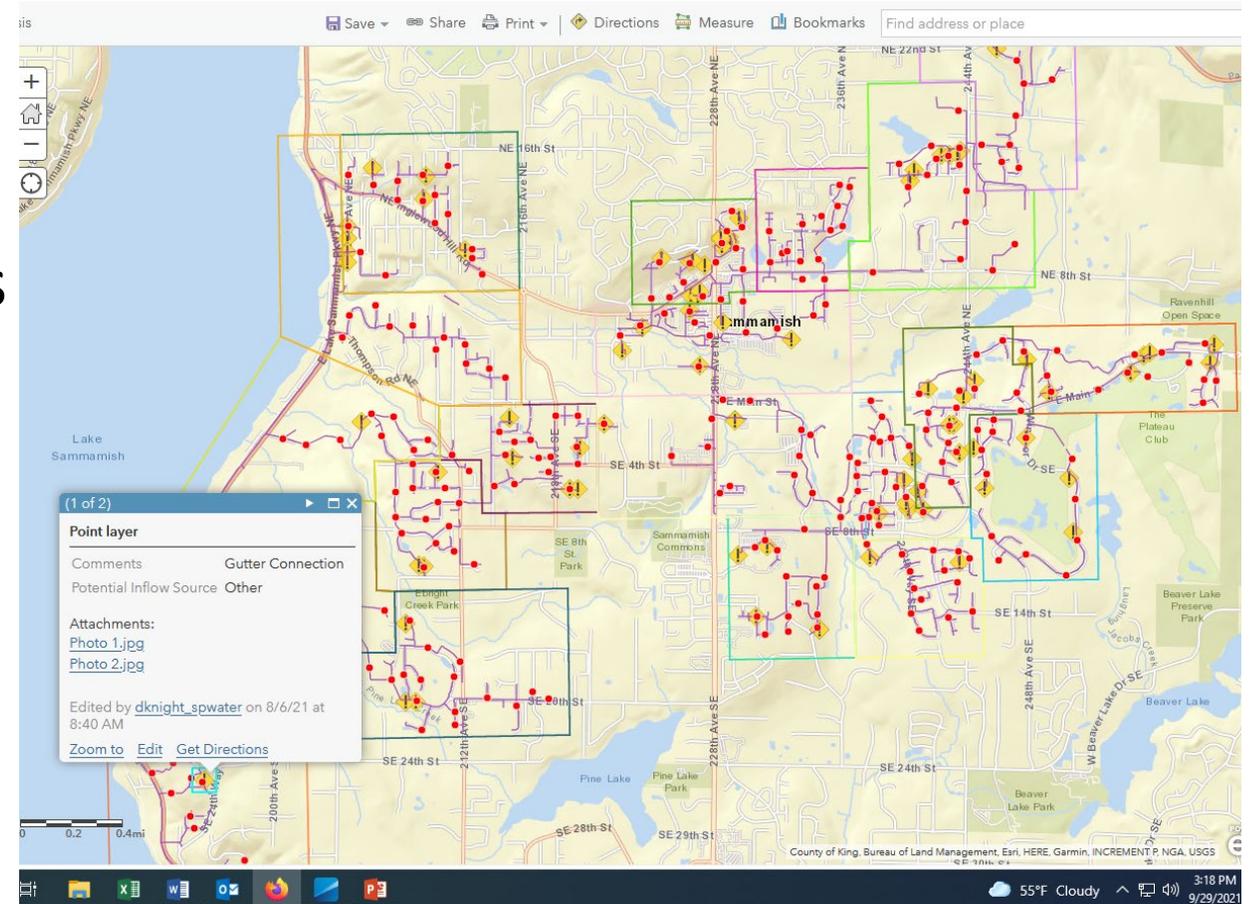
# Public Outreach – During Smoke Testing

- Sandwich boards used in the field.
- Real-Time Public Facing Map
- Daily emails to Police, Fire, and the City of Sammamish
- Fielding of calls when issues arose



# Smoke Testing Field Work

- Smoke tested approximately 300,000 LF of sewer in the NSSA
- Tested for approximately 20 days in August
- Team of 3 G&O and 1 District Staff
- Used App on the District public facing website to document “smoke incidents”



# Preliminary Results

- Identified 88 potential sources of I/I.
  - Further research reduced the actionable locations to 76.
- Approximately 16 locations had easily measureable I/I totaling approximately 62 gpm.
- Repair of these 16 locations equates to 173 Single Family ERU.
- 41 instances of smoke from clean out caps.
- 19 District manholes identified for rehabilitation/sealing.



# Smoke Testing Findings



**Roof Gutter and Downspout Connected to Sewer**



**Roof Gutter and Downspout Connected to Sewer**

# Smoke Testing Findings



Yard Drain Connected to Sewer



Patio Drain Connected to Sewer

# Smoke Testing Findings



Wall Foundation Drain Connected to Sewer

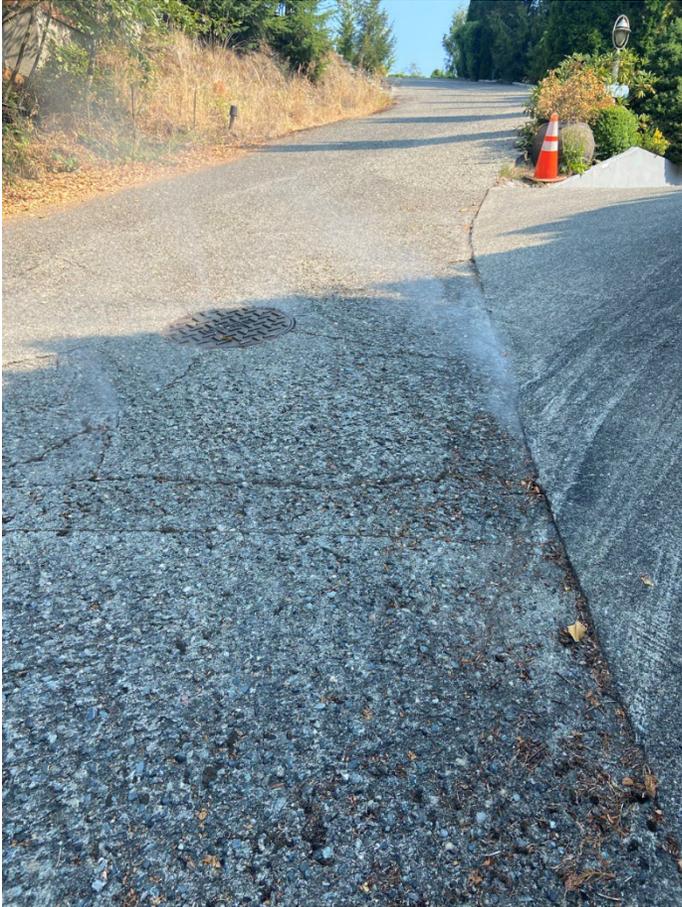


Clean Out Cap Removed

# Smoke Testing Findings



Koi Pond Connected to Sewer



Manhole Degradation

# Follow up Work

- Addressed 16 high I/I locations. All were single family homes.
- Rehabilitation of 19 identified manholes.
- Addressed identified I/I at District clean outs within public right-of-way.
- Notified customers with cracked cleanout covers.
- Investigate homes with no smoke at all.
- Developed an audit program for customers on grinder pumps.
- Installed District flow monitors to evaluate and identify potential infiltration locations.

# Interaction with Customers

- “Soft” notices of illicit connection sent out.
  - Contact information provided for follow up assistance.
- Formal violation notices sent out two weeks later.
  - Certified letters sent – 15 of 16 recipients responded within two weeks
- 13 of 16 Illicit connections were eliminated by the deadline.
  - 2 others were in process.
  - 1 customer had interaction with the District’s legal team.

VIA REGULAR AND CERTIFIED MAIL

[REDACTED]  
[REDACTED]

Re: Formal Notice of Prohibited Connection - Violation Notice: 3023 198th Ave SE

Dear [REDACTED]

The District previously provided you with an initial notification by letter dated 9/28/2021 advising you of a plumbing/side sewer violation and requesting corrective action. This letter is now following up with a formal violation notice pursuant to District Code Section 4.05.030 and Section 14.02 of the District’s Side Sewer Regulations.

On 8/6/2021, Sammamish Plateau Water conducted smoke testing inspections of its sanitary sewer system to identify prohibited connections to our sewer system which are discharging clear water (rainwater of groundwater) to the District’s sewer system. The discharge of clear water is a violation of the District’s policies and the Uniform Plumbing Code (UPC). Unfortunately, your property located at [REDACTED] was found to have a prohibited connection in violation of the District’s policies, code and/or the UPC. A photo documenting the prohibited connection is attached. Also attached is a copy the District’s policies, code and/or UPC provisions which prohibit the connection which are incorporated herein by this reference.

Please take notice that the District is requesting that you abate this prohibited connection by December 1, 2021. Compliance will require the disconnection and abandonment of any and all prohibited connections discharging to the District’s sewer system, including confirmation of disconnection by a District staff inspector. Failure to disconnect the prohibited connection may result in other enforcement actions being initiated, including fines or service termination. Pursuant to District Code Section 4.05.030 and Section 14.02 of the District’s Side Sewer Regulations, you are required to respond to this violation notice within ten (10) working days.

The District regrets having to issue this formal violation notice and to initiate actions to obtain your compliance. We will be happy to assist you moving forward and answer any questions you may have to ensure the work is completed properly. Please contact me if you have questions or require further assistance, or to schedule an inspection. You can reach me at (425) 295-3207 or by email at [andy.tuchscherer@spwater.org](mailto:andy.tuchscherer@spwater.org).

Sincerely,



Andy Tuchscherer  
Operations Manager

Attachment A: Photo and Observation Documentation  
Attachment B: Policies and Provisions which Prohibit the Connection

# Tracking Smoke Test Triggered Repairs

## Manhole Smoke Test Repair

Date	Total Manholes	Total repaired
11/30/2021	19	19

## Cleanout Smoke Test Issues

Date	Total Cleanouts	Total repaired	Notes
3/31/2022	41	38	Three cleanout issues remain, two are customer plumbing issues (inside or below the house), one is a cleanout pipe (not cap) that is in disrepair and is not contributing significantly to I&I. All customers have been notified of their (potential) issues. Left District contact information with customers. As the remaining concerns are internal plumbing issues as of 3/31/2022 no further follow-up is planned by the District.

## Illicit Connection Issues

Date	Total issues	Total repaired	Customers who made contact with District	Notes
3/10/2022	16	16	16	Completed 3/10/2022

# Moving Forward

## Entire System

- Continuing to track data for the sewer system

## North System

- Keep immediate capacity improvements in place until pipe and station capacity increase.
- Improvements on the North Sewer Service area will continue and are anticipated to be completed by June of 2023.
- Sammamish Diversion is scheduled to be completed in 2030

## South System

- South system Smoke Testing will begin in 2024.
  - It will be done in smaller segments.

# Thank You

Andy Tuchscherer

Operations Manager

direct 425.295.3207 mobile 425.495.6528

e-mail [andy.Tuchscherer@spwater.org](mailto:andy.Tuchscherer@spwater.org)

