North Sewer Service Area
Immediate Temporary Improvements

July 26, 2021
Path to NSSA Improvements

2013 Wastewater Comprehensive Plan

2016 Interim Improvement Evaluation
- 2025-2028 Sammamish Plateau Diversion Available

Implementing Initial 2016 Evaluation Recommendations

2018 – Sammamish Plateau Diversion Delayed Significantly
- 2050-2070 Sammamish Plateau Diversion Available

Refined Scope Report & Implementing 2021 Analysis Recommendations

2021 Interim Improvement Analysis

Immediate, Temporary Improvements Update in July 2021

Interim Improvements I-4 Phase 1 & 2 Construction
- 2022-2025

Permanent Solutions
- 2021 Analysis A-B: TRP OR
- Sammamish Plateau Diversion: 2030

7/26/2021
Sammamish Plateau Water – Measured Storm Flows

North Lake Lift Station
Peak Inflow Trigger = 1,200 gpm

- 12/20/2019: 4.2” rain, 1,305 gpm
- 2/5/2020 to 2/7/2020: 3.25” rain, 1,300 gpm
- 1/3/2021: 2.72” rain, 1,227 gpm
- 1/13/2021: 4.2” rain, 1,437 gpm

Existing Pipeline of 388 ERUs representing 140 gpm
Existing System Flow

- Inglewood Lift Station 2,880 gpm
- Inglewood Force Main
- North Lake Gravity
- North Lake Lift Station 1,250 gpm
- North Lake Force Main
- Central Lake Gravity
- Central Lake Lift Station 1,500 gpm
- Central Lake Force Main

Limitations

- Gravity Main Surcharges
- Lift Station Capacity Limits
- Gravity Main Capacity Limits
- Force Main Capacity Limits

Existing Facilities
- Gravity Main
- Lift Station
- Force Main

North Sewer Service Area
South Sewer Service Area

7/26/2021
Temporary Options

• Reduce Pumping At Inglewood Lift Station
• By-pass Pump at North Lake Lift Station to Increase Capacity
• Provide Temporary Storage at Inglewood Lift Station
• Provide Temporary Storage at Central Lake Lift Station
North Lake Lift Station By-pass Pump

• Diesel Powered Pump
• Requires construction of a by-pass connection to the force main
• Existing pumps will have to be turned off to operate
• Requires on-site monitoring
• Operations prefers purchase over rental options
Central and Inglewood Lift Station Temporary Storage

• Baker Tanks are common
• Holds 21,000 gallons
• Can reduce peak hourly flows by up to 350 gpm
• Provides approximately 1.5 hours of peak hourly storage
• Requires pumping out of a manhole or wet well to utilize.
• Requires on-site monitoring
• Needed at both Inglewood and Central Lake Lift Stations

7/26/2021
Central Lake Lift Station Temporary Storage
Inglewood Lift Station Temporary Storage
Recommendations

• Purchase a 1,750 gpm Portable By-pass Sewage Pump for North Lake Lift Station
  • Due to supply chain issues, purchase of pump will need to be soon to ensure arrival before wet peak season.
• Rental of two 21,000 gallon Baker Tanks, with submersible by-pass pumps.
• During peak events, reduce pumping at Inglewood Lift Station temporarily utilizing existing smaller pumps.
• Develop SOP for implementation of Temporary Improvements.
• Test and train recommended improvements prior to peak season.
Existing System & Interim Improvements

**Existing System Flow**

- Inglewood Lift Station 2,880 gpm
- Inglewood Force Main
- North Lake Gravity
- North Lake Lift Station 1,250 gpm
- North Lake Force Main
- Central Lake Gravity
- Central Lake Lift Station 1,500 gpm
- Central Lake Force Main

**Limitations**

- Gravity Main Surcharges
- Lift Station Capacity Limits
- Gravity Main Capacity Limits
- Force Main Capacity Limits

*7/26/2021*
Existing System & Interim Improvements

Existing System Flow

Temporary Improvements

<table>
<thead>
<tr>
<th>Facility</th>
<th>Flow Rate</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Inglewood Lift Station</td>
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<td>Inglewood Force Main</td>
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<td>North Lake Gravity</td>
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<tr>
<td>Inglewood Lift Station</td>
<td>1,100 gpm</td>
<td>21,000 Gallon Baker Tank</td>
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7/26/2021
Operational Considerations

• Proposed various readiness levels that will be triggered by specific events
• Examples of five levels of escalating readiness
  • Level 0 – Summer Flow Conditions
  • Level 1 – Normal Winter Flow Conditions
  • Level 2 – Winter Storm Anticipated
  • Level 3 – High Flow Conditions
  • Level 4 – High Flow Conditions Continues
# Temporary Improvement Costs

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<tr>
<th>Item</th>
<th>Cost</th>
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<tr>
<td>North Lake Lift Station By-pass Pump (Purchase)</td>
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<tr>
<td>North Lake Lift Station By-Pass Connection (Construct)</td>
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<tr>
<td>Central Lake Lift Station Emergency Storage (Rental)</td>
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<tr>
<td>Inglewood Lift Station Emergency Storage (Rental)</td>
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<td><strong>Total:</strong></td>
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Schedule

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<tr>
<th>Construction Project Board Touches</th>
<th>Phase 1 Central Lake Force Main</th>
<th>Phase 1 North Lake Lift Station</th>
<th>Phase 2 North Lake Force Main</th>
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<tr>
<td>Complete Construction</td>
<td>9/2022</td>
<td>2/2023</td>
<td>6/2023</td>
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Moratorium Assessment

• Immediate improvements will add a 1,750 gpm pump to North Lake Lift Station.
  • Reliability, redundancy and automation standards are not met by Immediate Improvements.
  • Central Lake Lift Station is still limited to 1,500 gpm due to the force main.

• Baker Tanks provide 1.5 hours of equalizing storage, but does not really improve capacity of the system.

• Running the lower flow pumps at Inglewood Lift Station can help mitigate flows to North Lake and Central Lake.

• Findings of smoke testing could improve I/I rates.
Moratorium Assessment

• Lifting moratorium is a policy decision regarding risk assessment of adding connections versus risk of overflow.

• Potential Risk Factors:
  • Storm intensities and frequencies have been increasing in recent years. This is out of our control.
  • Changing multiple operational schemes and procedures.
  • Manual operation of facilities during storms creates a burden on O&M staff.
  • Connections are already in the pipeline and will be coming online.

• Lifting the moratorium will increase the risk of overflow during winter storms.
Moratorium Assessment Summary

• Difference in pumping between North Lake and Central Lake Lift Stations after Immediate Improvements is 250 gpm.
  • 250 gpm = 694 ERU (at 0.36 gpm/ERU)
  • There are 388 ERUs in the pipeline, adding 140 gpm into the system
  • Anticipate 42 Septic Conversions over 2 years, adding 15 gpm into the system.

• If Immediate Temporary are successful and an acceptable risk there may be **264 ERUs** potentially available, adding 95 gpm into the system.