LAKE WHATCOM WATER AND SEWER DISTRICT

Division 7 Reservoir Seismic Upgrade and Shake Alert Implementation Project

Project Overview and Update

May 25, 2022

WILSON ENGINEERING

Div 7 Reservoir - Presentation Overview

- Project Background
- Design Background and Criteria
- Distribution System Operation
- Distribution System Changes
- Proposed Tanks Simulation Analyses
- Field Testing and SVWTP Operational Changes
- Proposed Reservoir Sizing
- Project Timeline
- Construction Costs

Div 7 Reservoir - Project Background

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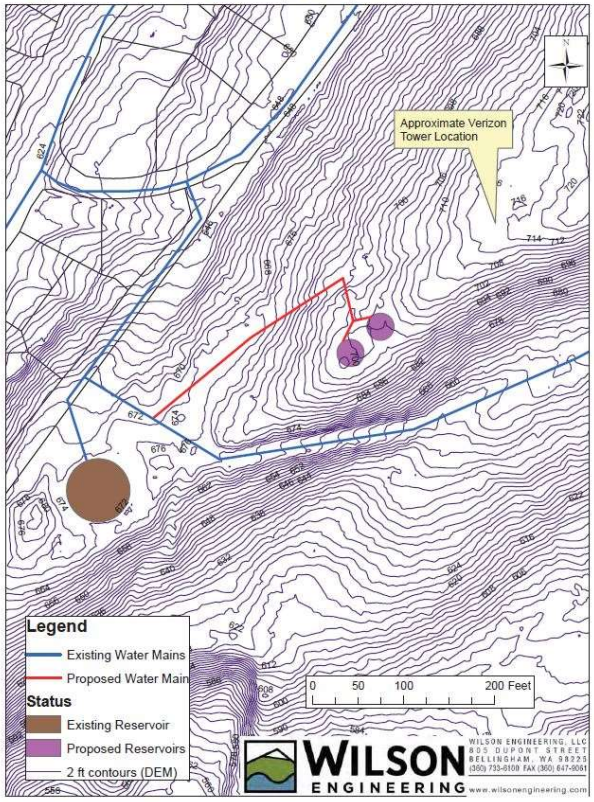
- December 2016 structural analysis report (BHC Consultants) – Division 7 Water Reservoir identified as structurally and seismically deficient, HIGH PRIORITY for replacement.

Figure 1 - Division 7 Reservoir - Proposed Replacement with 2 Reservoirs

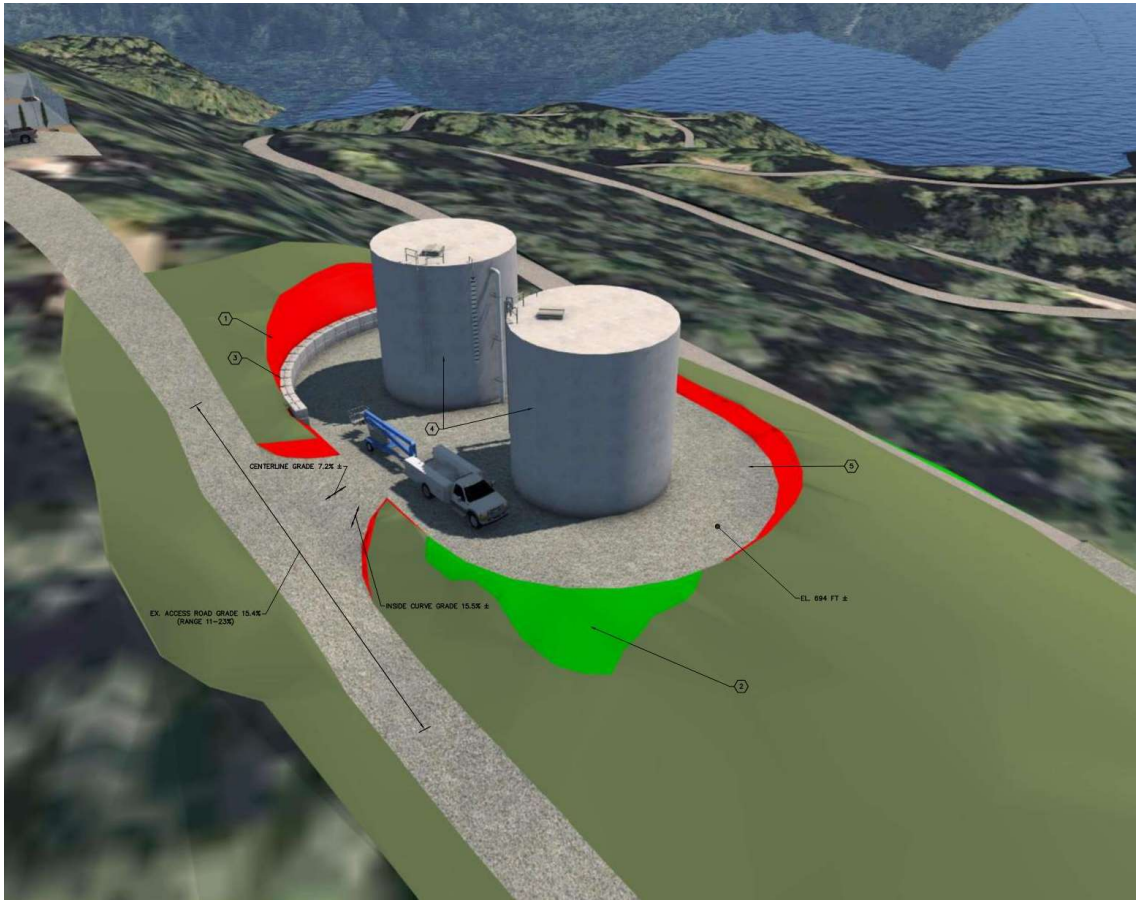


- 2016 Water System Plan Update (Wilson Eng.) – Capacity Analysis shows Division 7 Reservoir oversized. Recommended alternatives analysis for upgrades and repair of existing tank vs. replacing with more appropriate size.

- Feb 2018 Alternatives Analysis Tech Memo (Wilson Eng) – Recommended alternative to replace with two appropriate sized concrete tanks.

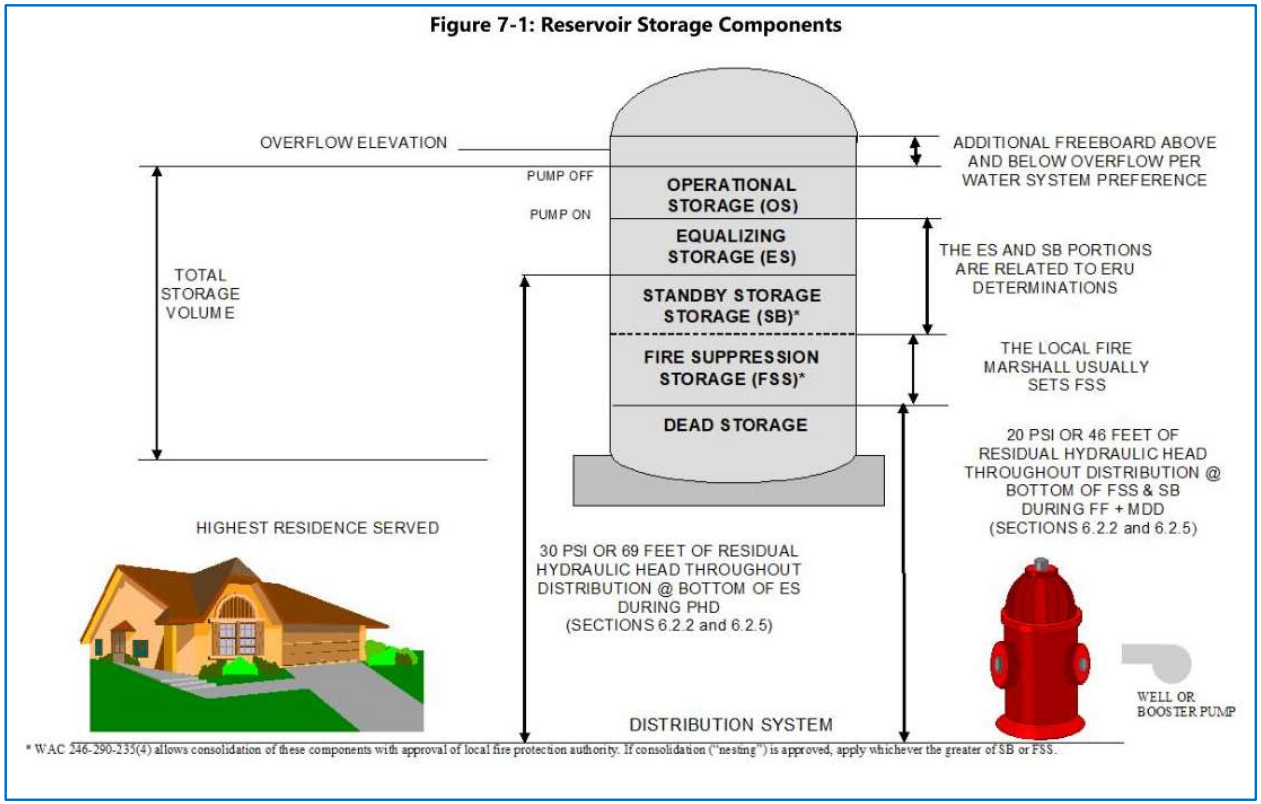
Div 7 Reservoir - Project Background

- 2018 District applied for FEMA Hazard Mitigation Grant to fund the reservoir replacement project, and implement ShakeAlert (earthquake early warning system) on these reservoirs and elsewhere.
- December 2020 Grant Application Supplement Tech Memo (Wilson Eng). – confirmed long-term preferred approach was two concrete reservoirs.
- Fall 2021 District selection of consultant team.
- Currently in progress – Funding Phase 1 Design and Permitting.



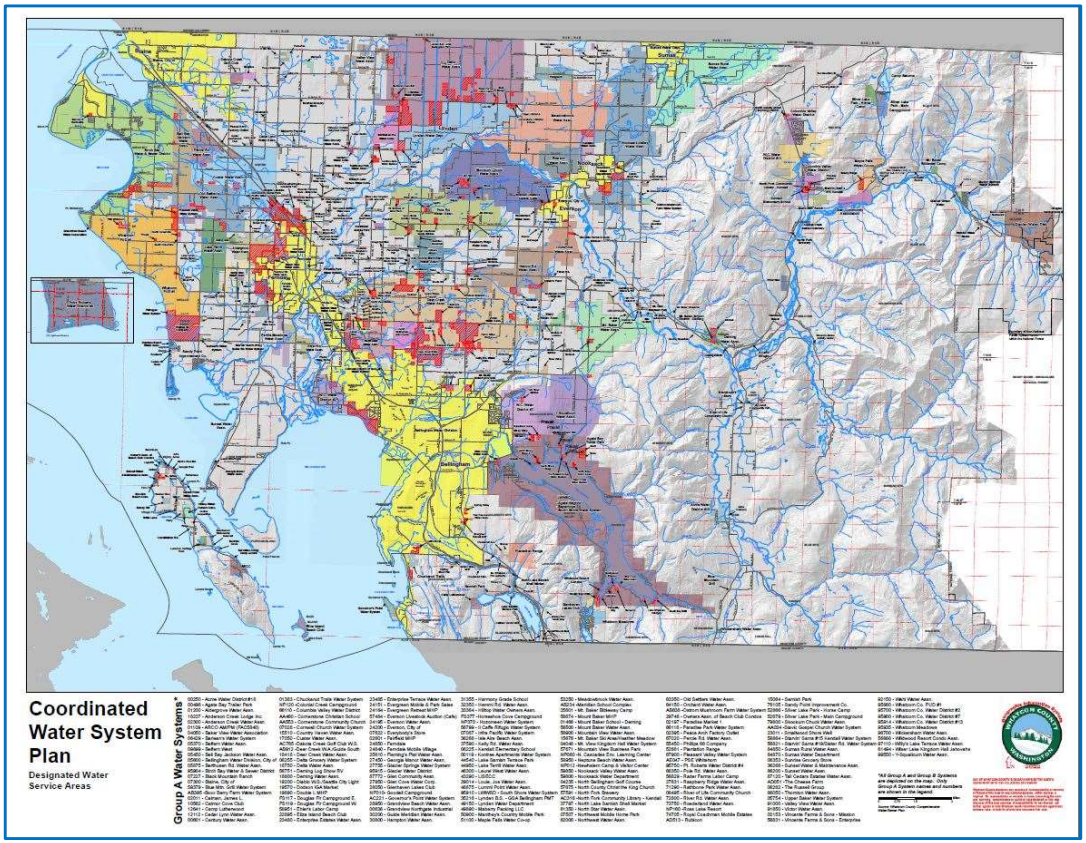
Div 7 Reservoir – Design Background/Criteria

- WA State Department of Health – Water System Design Manual
  - Framework for consistent water system designs for safe and reliable drinking water.
  - Regularly reviewed and updated, latest edition June, 2020.
  - Collaborated contributions from experienced experts in the industry; government regulators (engineers and planners), consulting engineers, municipalities, and operators.



Div 7 Reservoir – Design Background/Criteria

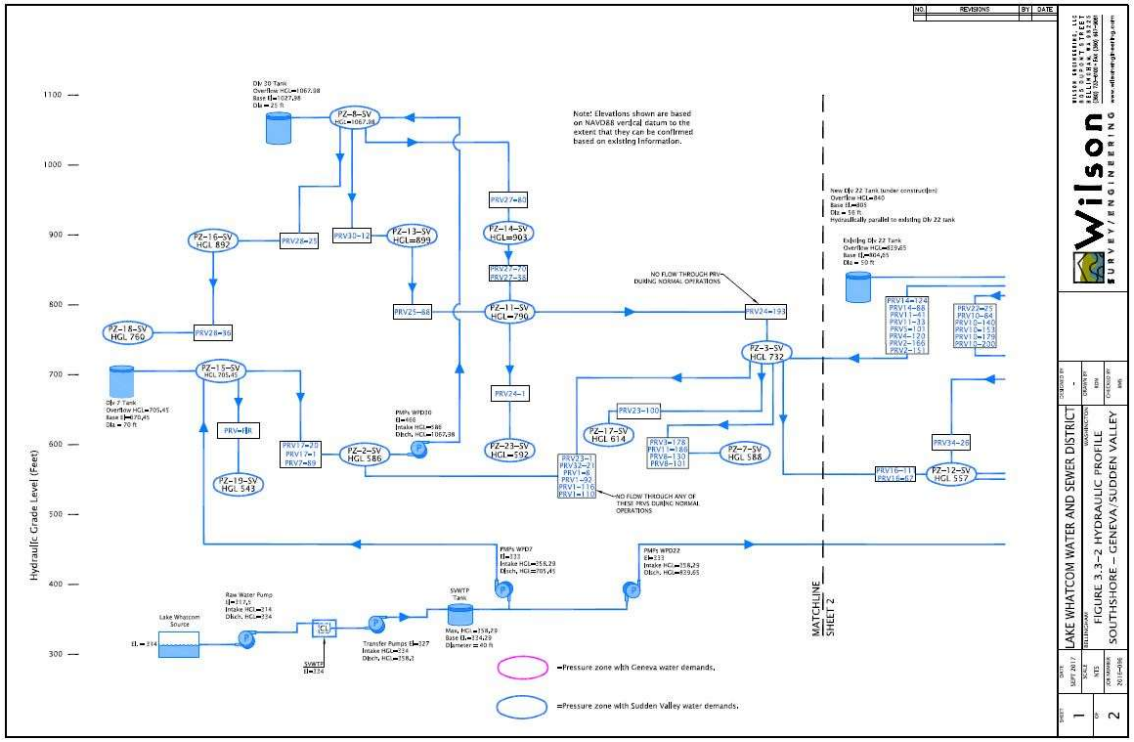
- Whatcom County Coordinated Water System Plan



- "Regional Supplement" to individual approved WSPs throughout Whatcom County.
- Prepared and submitted by the Whatcom County Water Utility Coordinated Committee (WUCC), representing dozens (>60) of water systems in Whatcom County; large and small, urban and rural, Associations and Districts and municipalities.
- Fire flow rate and duration requirements and recommendations were developed in coordination with the County Fire Marshal and the WUCC.
- Adopted by Whatcom County Council August 9, 2016.
- Approved by WA State DOH September 15, 2016.

Div 7 Reservoir – Design Background/Criteria

- LWWSD Comprehensive Water System Plan
  - Adopted by LWWSD Board June 27, 2018
  - Approved by WA State DOH October 3, 2018
  - Establish Design Standards
    - Water Use - past, current, trends
    - Design parameter ADD, MDD, PHD
    - Fire Flow rate and duration



- Other Design Considerations:
  - Build-Out Conditions
  - Water age, negative water quality effects
  - Operational inefficiencies
  - Two tanks vs. One tank
  - New Site

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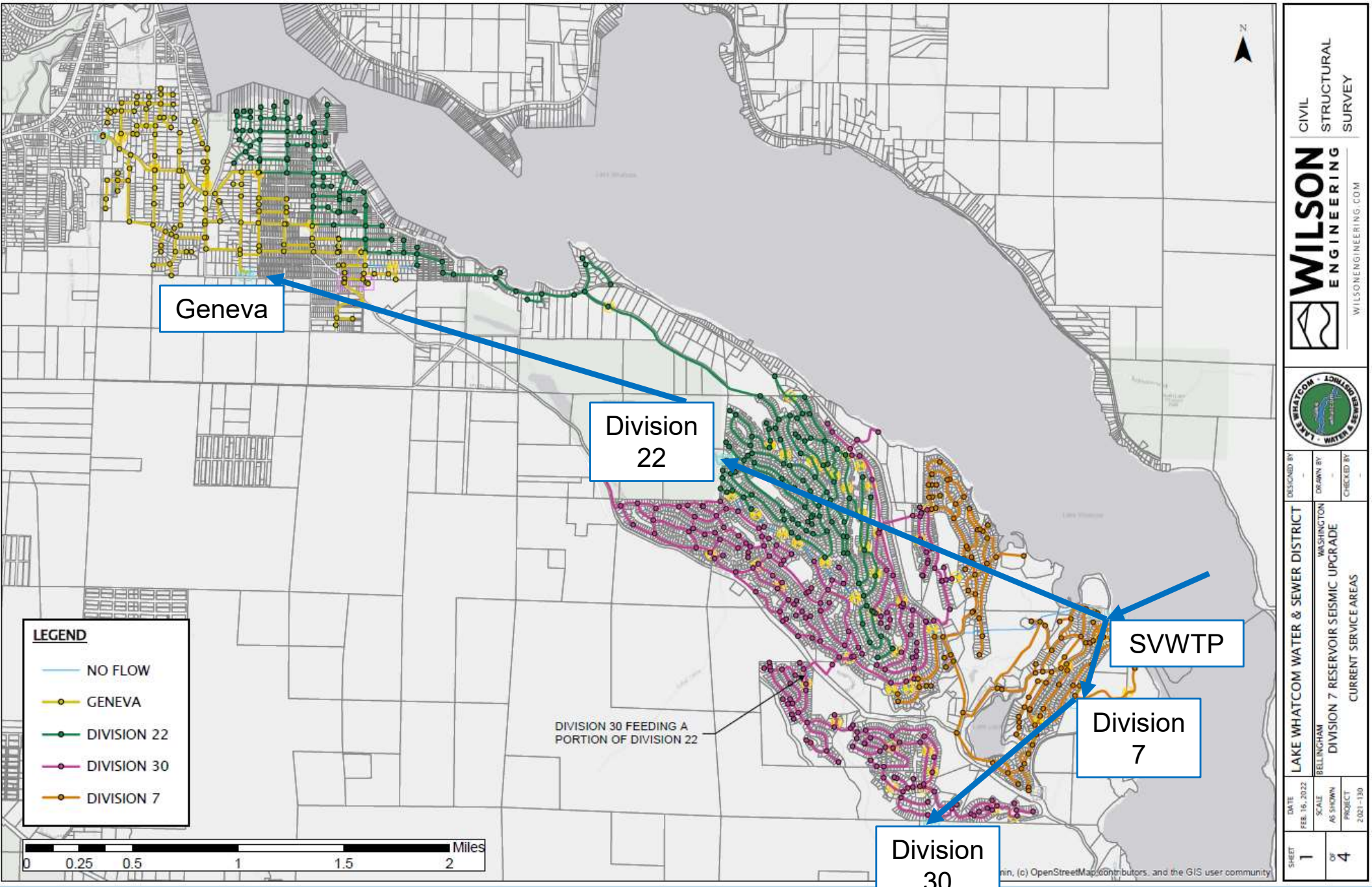
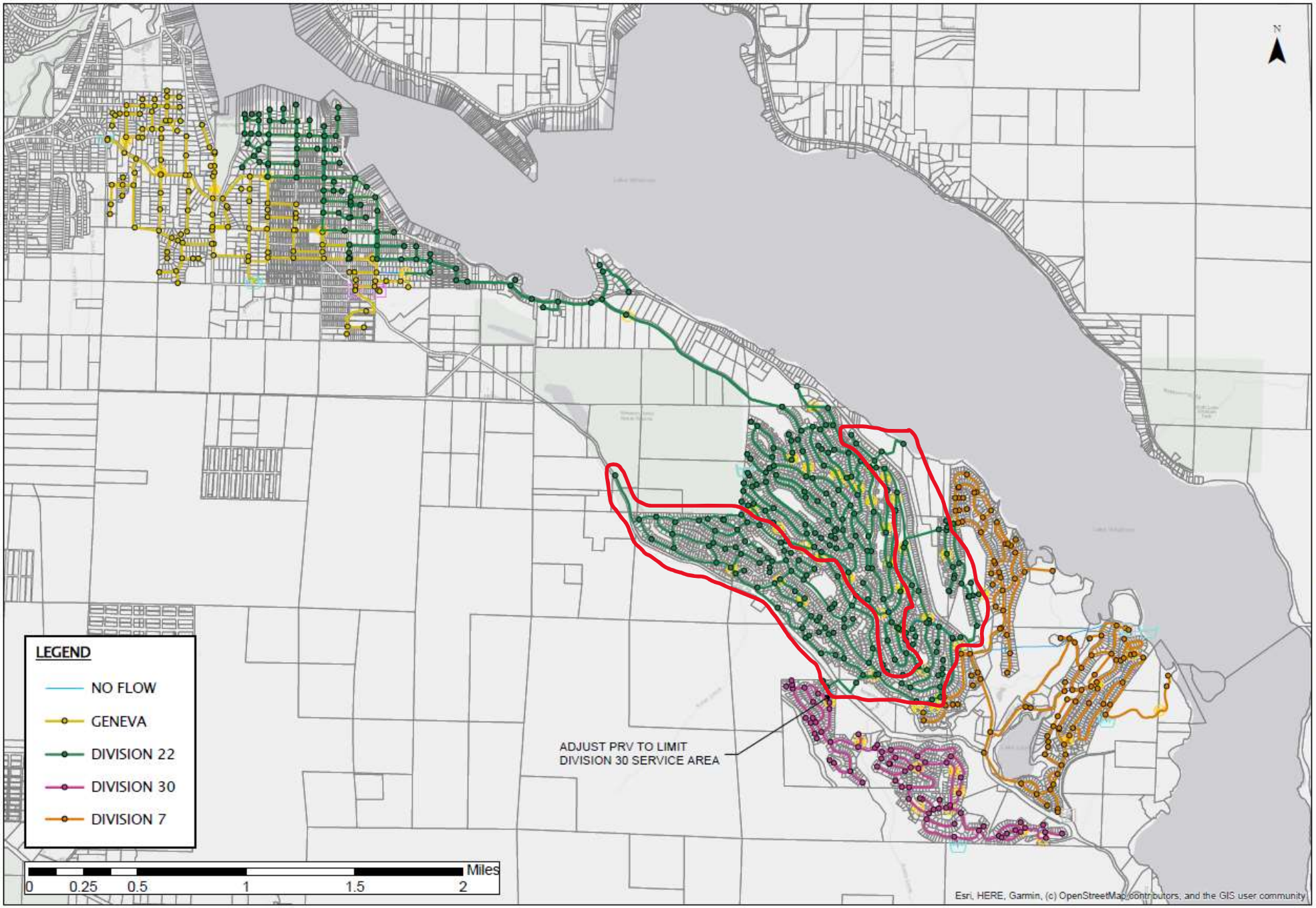
Div 7 Reservoir – Distribution System Operation



Div 7 Reservoir – Distribution System Changes



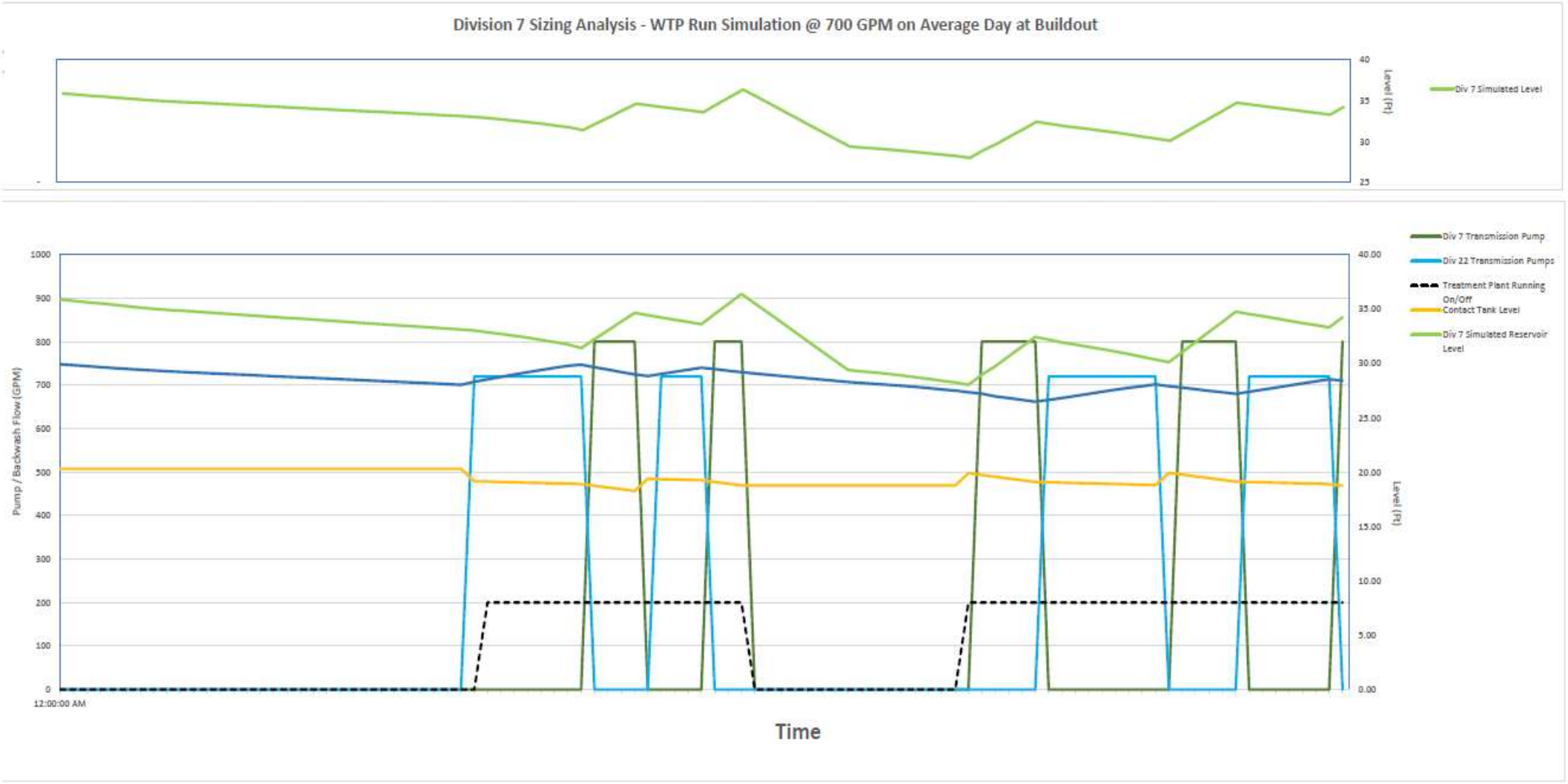
Div 7 Reservoir – Simulation Analyses, Proposed

Option C Summary:

		Build-out ERUs				
Reservoir	Capacity (gallons)	Geneva	Sudden Valley	Sum of required storage (gallons)	Surplus of storage (gallons)	Surplus of storage (%)
Proposed Division 7A	422,800		1078	419,384	3,416	0.8%
Proposed Division 7B						
Division 22	1,158,859	178	2333	976,340	182,519	15.7%
Division 22 New						
Division 30	146,869		369	112,445	34,425	23.4%
Geneva	508,333	692		266,606	241,726	47.6%

Note: Fire Suppression Storage is nested within Standby Storage for all reservoirs

Div 7 Reservoir – Simulation Analyses, Proposed



Div 7 Reservoir – SVWTP Operational Changes

- Proposed distribution system changes result in:
  - More demand on Div 22 reservoirs
  - Less demand on Div 7

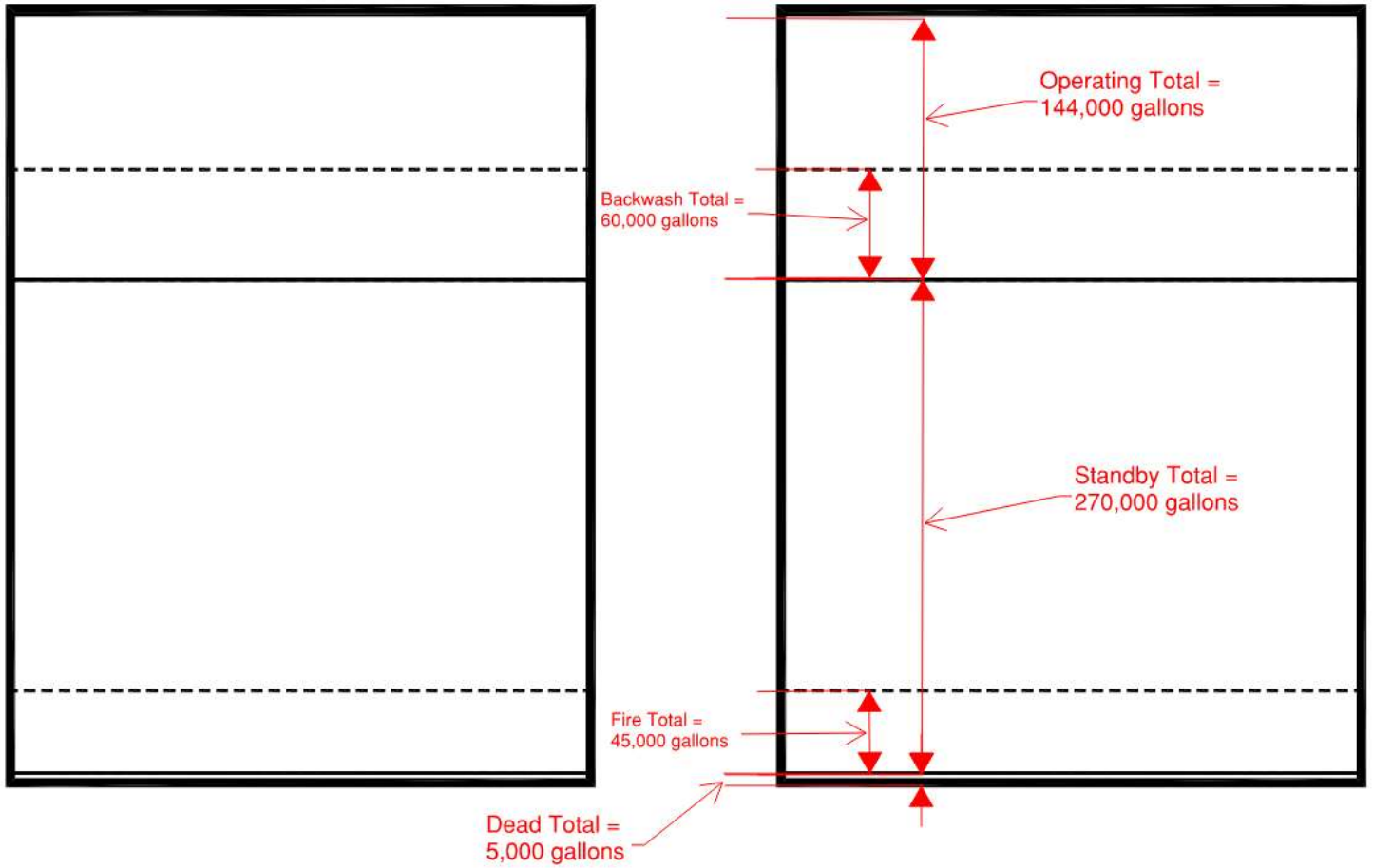
- Implementing lead/lag control scheme for Div 7 / Div 22 transmission pumps

Div 7 Reservoir – Progression of Field Testing and SVWTP Operational Changes

- New control scheme to work under all conditions:
  - Existing distribution system operation or proposed distribution system operation
- Step 1: Implementing new transmission pump control strategy
  - Currently underway
- Step 2: Implement distribution system operation modification
  - Had tested previously, but now with new pump control strategy
- Step 3: Planning to test SVWTP production at 1,000 gpm with the above two changes
  - 1,000 gpm production not required for proposed Div 7 tanks, but dovetails nicely with project and is almost necessary
    - To meet peak summer demands
    - To keep tanks from draining during a significant leak

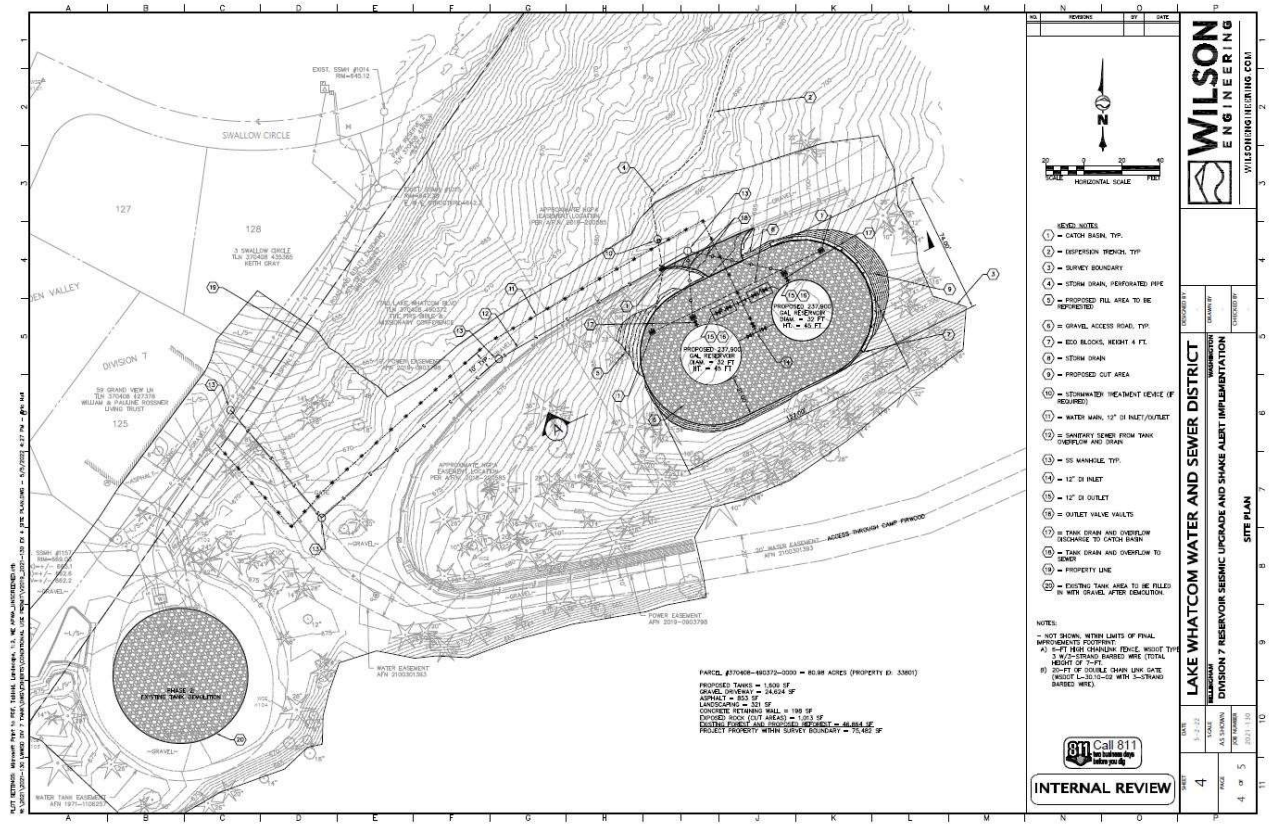
Div 7 Reservoir – Proposed Reservoir Sizing

- Div 7 reservoir volumes:
  - Operating is nearly identical to current
  - Equalizing is not needed
  - Standby is less than current standby
    - Driven by number of connections being served, which is going down significantly
  - Existing Div 7 had excessive storage capacity
    - Removing the excessive volume will improve system efficiency and improve water age



Div 7 Reservoir – Project Timeline

- Completed:
  - Survey
  - Geotechnical investigation
  - Telemetry testing
- In-Progress:
  - Operational optimization
  - Final Sizing
  - Preparing Permitting Applications/Documents
  - Preliminary Design
  - Easement negotiations

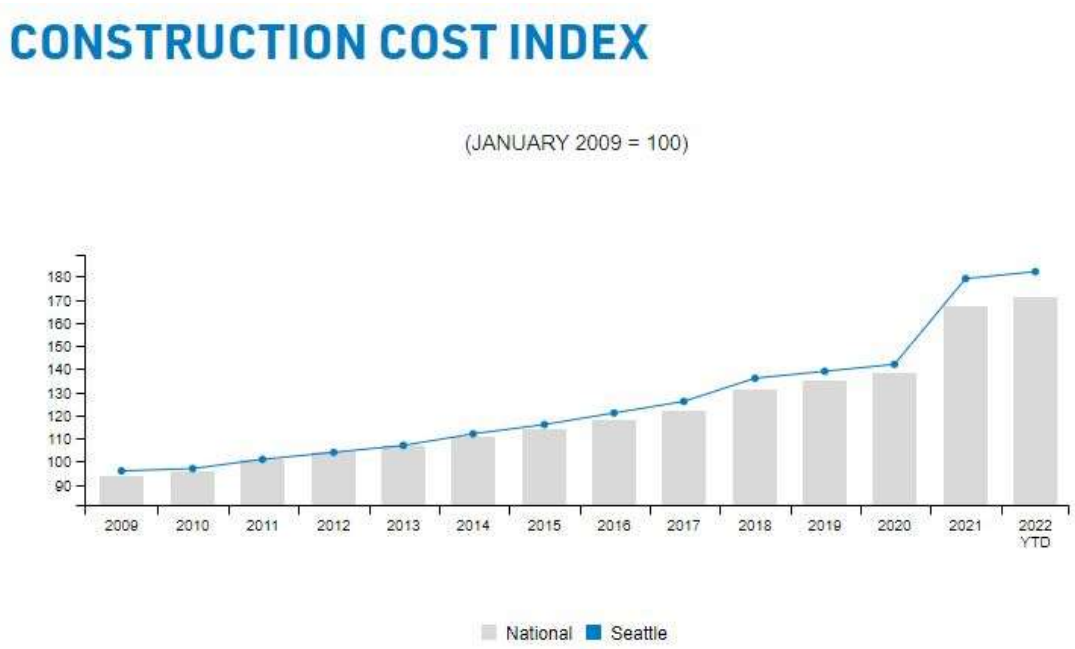


Div 7 Reservoir – Project Timeline

- Future Target Dates:
  - County Pre-Application Meeting; mid-June
  - DOH Project Report; July 2022
  - Conditional Use Permit and Variance; submit early August 2022
  - Design and Public Outreach; Aug-Dec 2022
  - Bidding; January 2023
  - Construction; June 2023

Div 7 Reservoir – Project Construction Cost Estimate

- Construction Cost Estimate (ROM, Pre-Design):
  - New Facilities = $2.1 M (incl. 20% contingency, sales tax)
  - Demo Existing = $225,000
  - TOTAL = $2.4 M
- Industry Wide Cost Escalation



The *Mortenson Cost Index* is showing a single quarter increase of 2.3% nationally and 1.6% in Seattle. Over the last twelve months, costs increased 18.3% nationally and 21.8% in Seattle.

Source: Mortenson, Cost Index, Seattle: https://www.mortenson.com/cost-index/seattle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