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Cities of Hillsboro, Forest Grove, Beaverton, and Tualatin Valley Water District

Long Term Seismic Resilience Master Planning

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JWC Introduction

Infrastructure

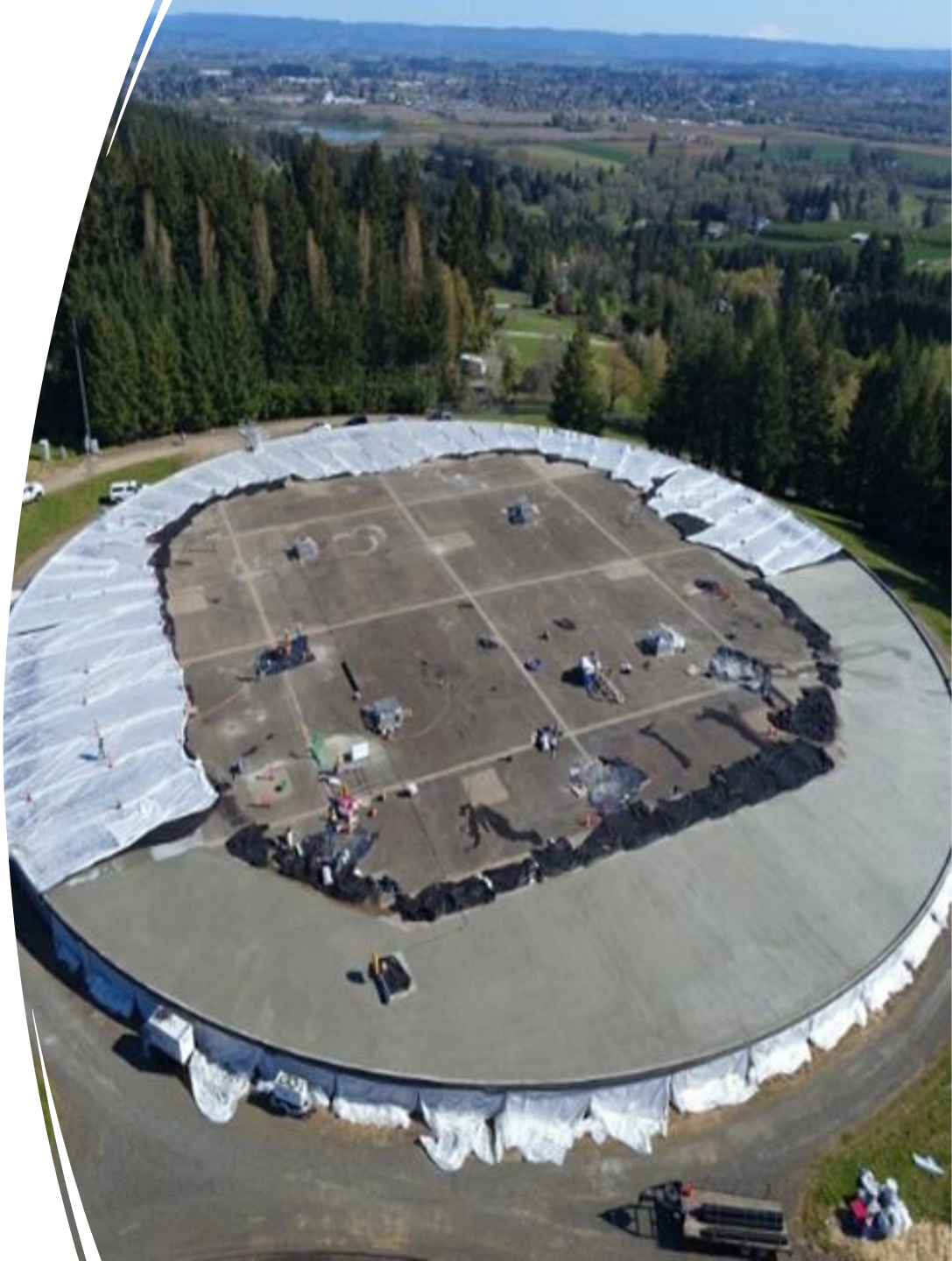
OHA Requirements

Level of Service Goals

CIP Development

Long Term Financial Planning

Grants and Funding



Introduction

- Commission partnership
- History

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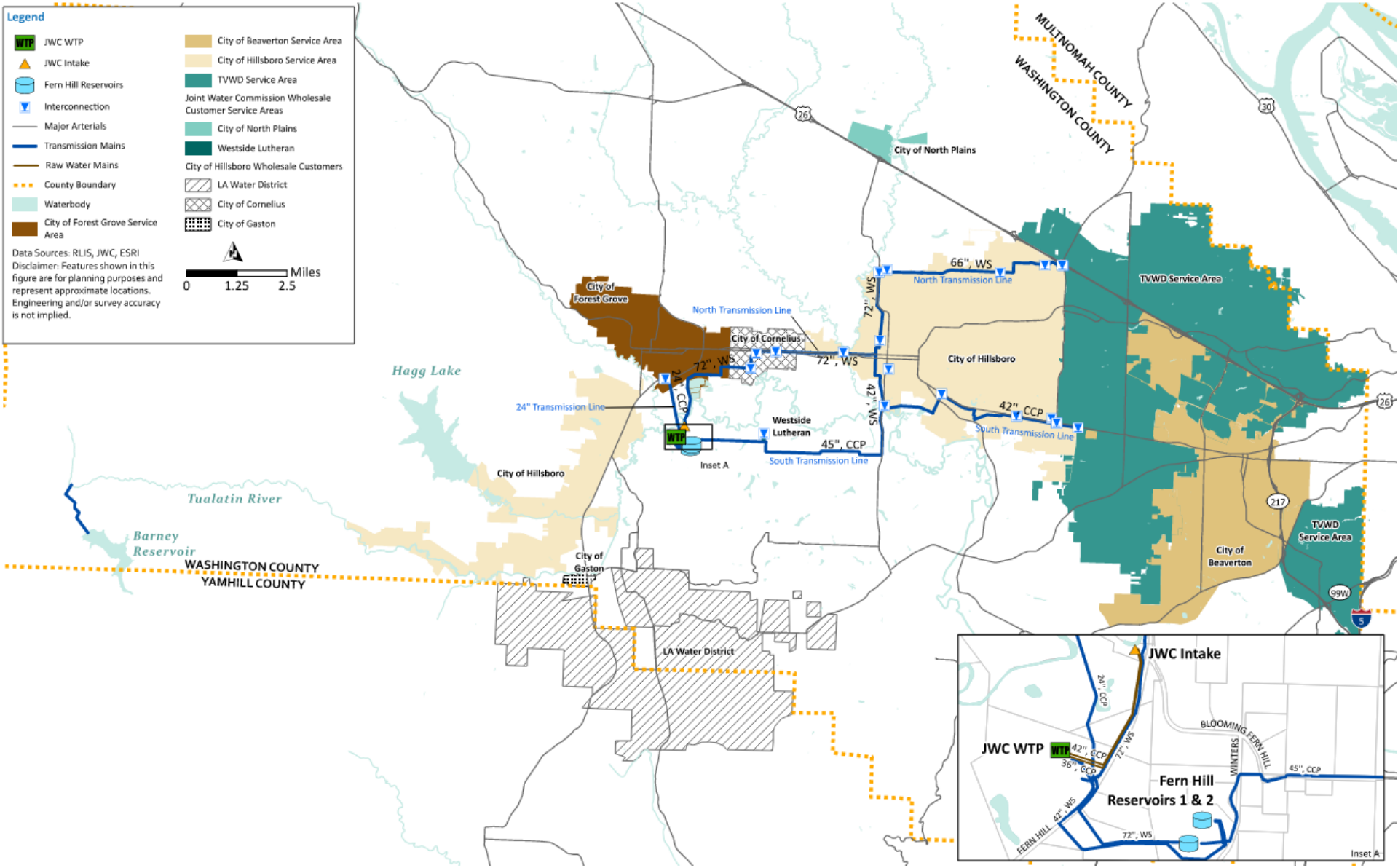
Infrastructure


Legend
JWC WTP
JWC Intake
Fern Hill Reservoirs
Interconnection
Major Arterials
Transmission Mains
Raw Water Mains
County Boundary
Waterbody
City of Forest Grove Service Area
City of Beaverton Service Area
City of Hillsboro Service Area
TVWD Service Area
Joint Water Commission Wholesale Customer Service Areas
City of North Plains
Westside Lutheran
City of Hillsboro Wholesale Customers
LA Water District
City of Cornelius
City of Gaston
Data Sources: RLIS, JWC, ESRI
Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.
0 1.25 2.5 Miles
MULTNOMAH COUNTY
WASHINGTON COUNTY
City of North Plains
66", WS
North Transmission Line
TVWD Service Area
City of Forest Grove
North Transmission Line
72", WS
City of Cornelius
72", WS
72", WS
City of Hillsboro
Hagg Lake
24", CCP
42", WS
24" Transmission Line
42", CCP
South Transmission Line
Westside Lutheran
45", CCP
South Transmission Line
Inset A
City of Hillsboro
Tualatin River
Barney Reservoir
WASHINGTON COUNTY
YAMHILL COUNTY
City of Gaston
City of Beaverton
TVWD Service Area
LA Water District
JWC Intake
29", CCP
JWC WTP
42", CCP
36", CCP
72", WS
BLOOMING
FERN HILL
WINTERS
45", CCP
Fern Hill Reservoirs 1 & 2
42", WS
FERN HILL
72", WS
Inset A


Maintenance Shed
Surge Basins
Ops Building
Chlorine Gas Facilities
Rapid Mix
FWPS 1
Floc/Sed Basins D - G
Floc/Sed Basins A - C
Filters 1 - 14
Clearwell
FWPS 2
Filters 15 - 16
Surge Basin
Solids Drying Bed 5
Solids Drying Bed 4
Solids Drying Bed 3
Solids Drying Bed 2
Solids Drying Bed 1

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OHA Requirements

OHA Requirement: OAR 333-061-0060-5(a) (J)

- The Oregon Resilience Plan was developed in 2013.
- Provides the state's road map for earthquake preparedness.
- Goals:

1. Identify critical infrastructure needed to supply water during an emergency
2. Identify projects to be completed in the next 50 years to ensure that piped water can be provided in the event of a strong earthquake

- Every community water system with more than 300 connections.
- For Master Plans submitted after January 10, 2018.
- Required to conduct a seismic risk assessment and mitigation plan.

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Level of Service Goals

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JWC Seismic Resilience Level of Service Goals

Seismic Event	Proposed Immediate Capacity Goal (MGD)	Proposed Short Term Capacity Goal (MGD)	Short Term Restoration Time Goal (Days)
72-year Event (Local)	42 (ADD)	42 (ADD)	0
475-year Event (CSZ)	0	28 (WADD)	1
2,475-year event (MCE)	0	14 (1/2 WADD) 28 (WADD) 42 (ADD)	3 7 to 14 60 to 90

Notes:

- MGD – Million Gallons Per Day
- ADD – Average Daily Demand
- WADD – Winter Ave Daily Demand

- 72-year event: a local fault event (50% chance in 50 years)
- 475-year event: Cascadia Subduction Zone (CSZ) earthquake (10% chance in 50 years)
- 2,475-year event: Maximum Considered Event (MCE) (2% chance in 50 years)

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Expected Water Systems Conditions Following Seismic Events

JWC WTP Capacity following Seismic Events – Existing Conditions			
WTP Capacity	**72-year event (Local)**	**475-year event (CSZ)**	**2,475-year event (MCE)**
	0 MGD for 7 days	0 MGD for 3 weeks	0 MGD for 3 weeks
	20 MGD for 7 weeks	5 MGD for 6 months	5 MGD for 6 months
	40 MGD for 18 weeks	40 MGD for 6 months	40 MGD for 6 months

Notes:

- 72-year is based on a local fault event (50% chance in 50 years)
- 475-year event is based on a Cascadia Subduction Zone (CSZ) earthquake (10% chance in 50 years)
- 2,475-year (2% chance in 50 years) - Maximum Considered Event (MCE)

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CIP Development

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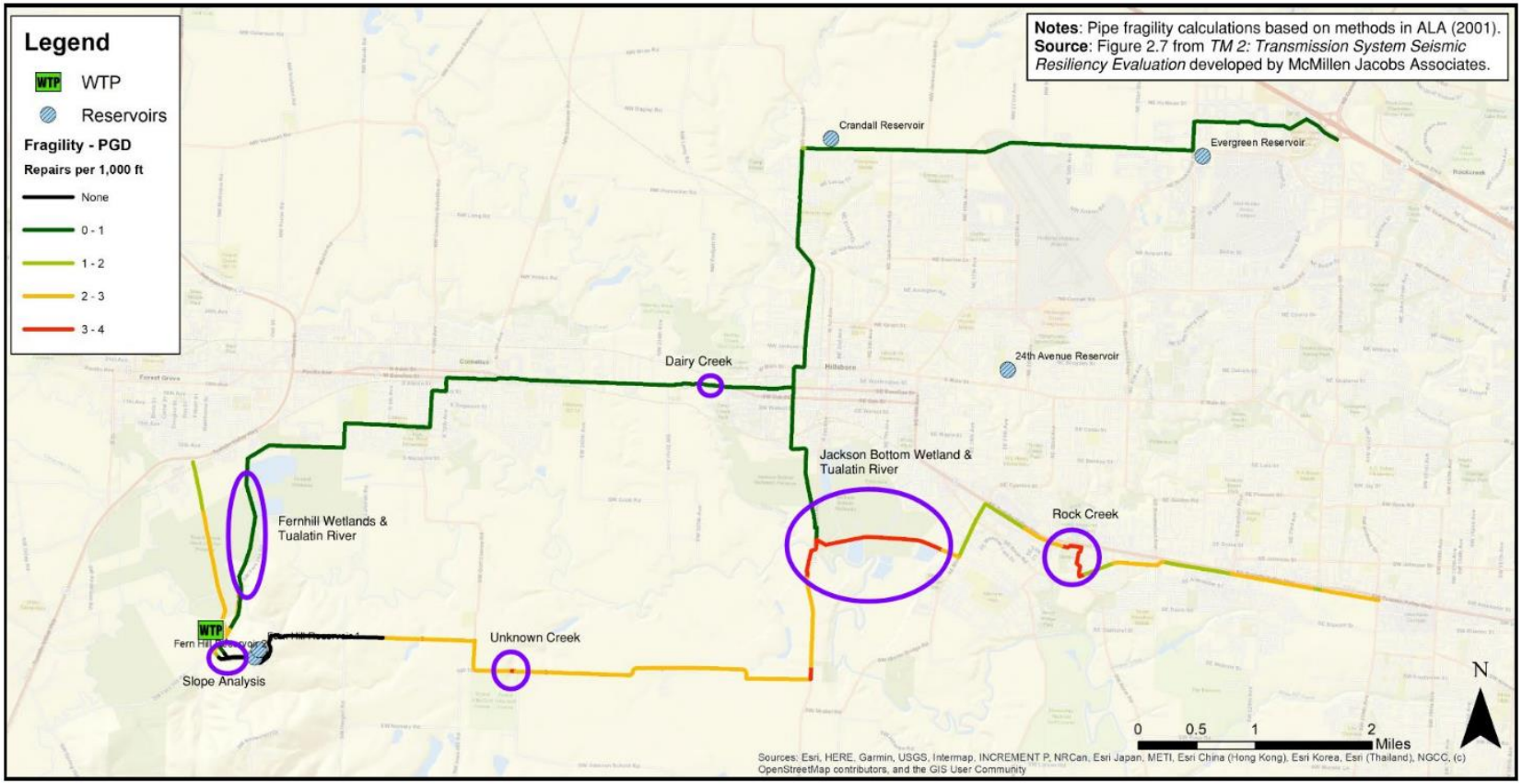
Transmission system seismic evaluation identified high-hazard areas for further evaluation



WTP evaluation focused on chlorine gas replacement

Replacement Options:

1. Bulk Hypochlorite
2. Full On-site Hypochlorite Generation (OSHG)
3. Bulk Hypochlorite with Backup OSHG
4. Bulk Hypochlorite with Future OSHG

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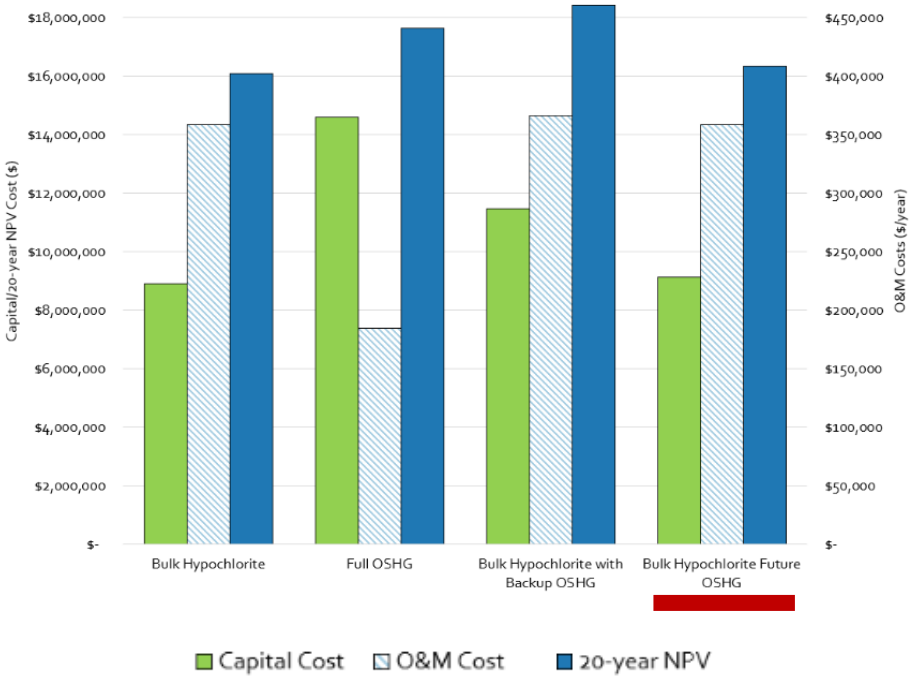
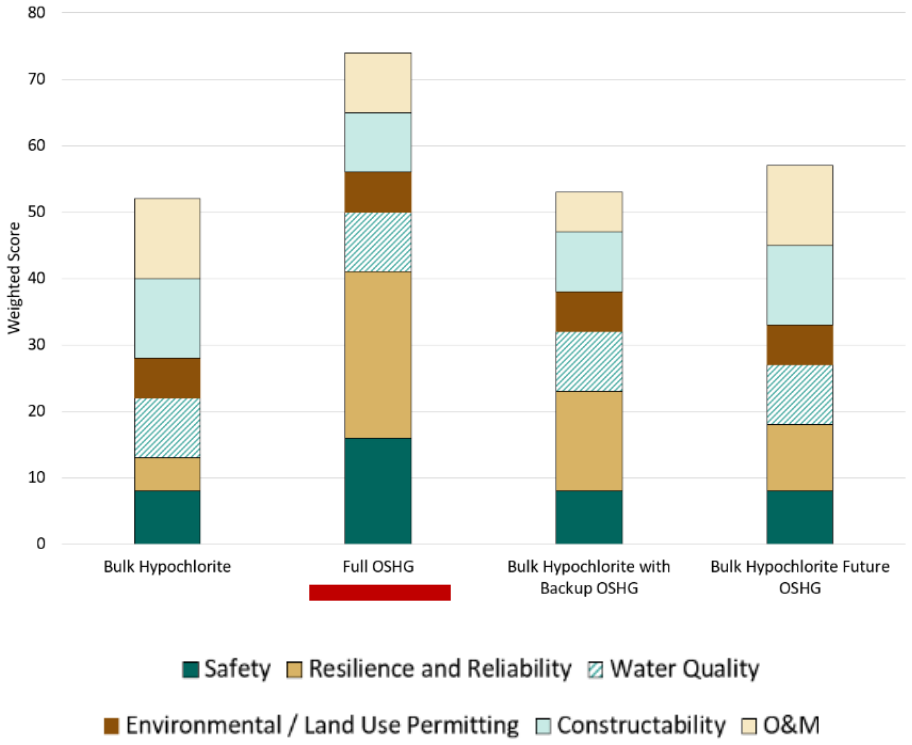
Affordable near-term solution is bulk hypochlorite, long-term goal is OSHG





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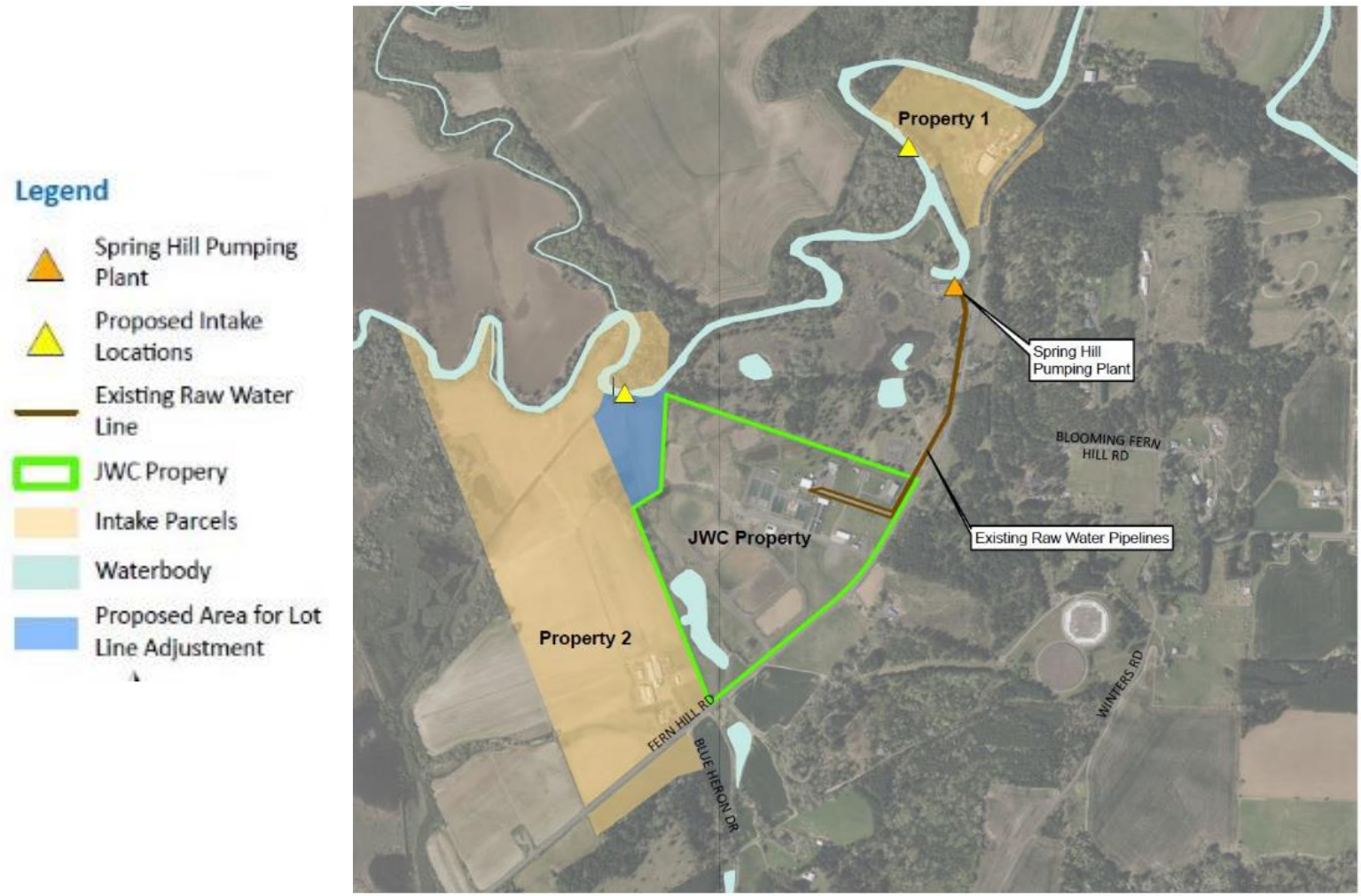
To address supply resilience, compared 3 possible intake sites



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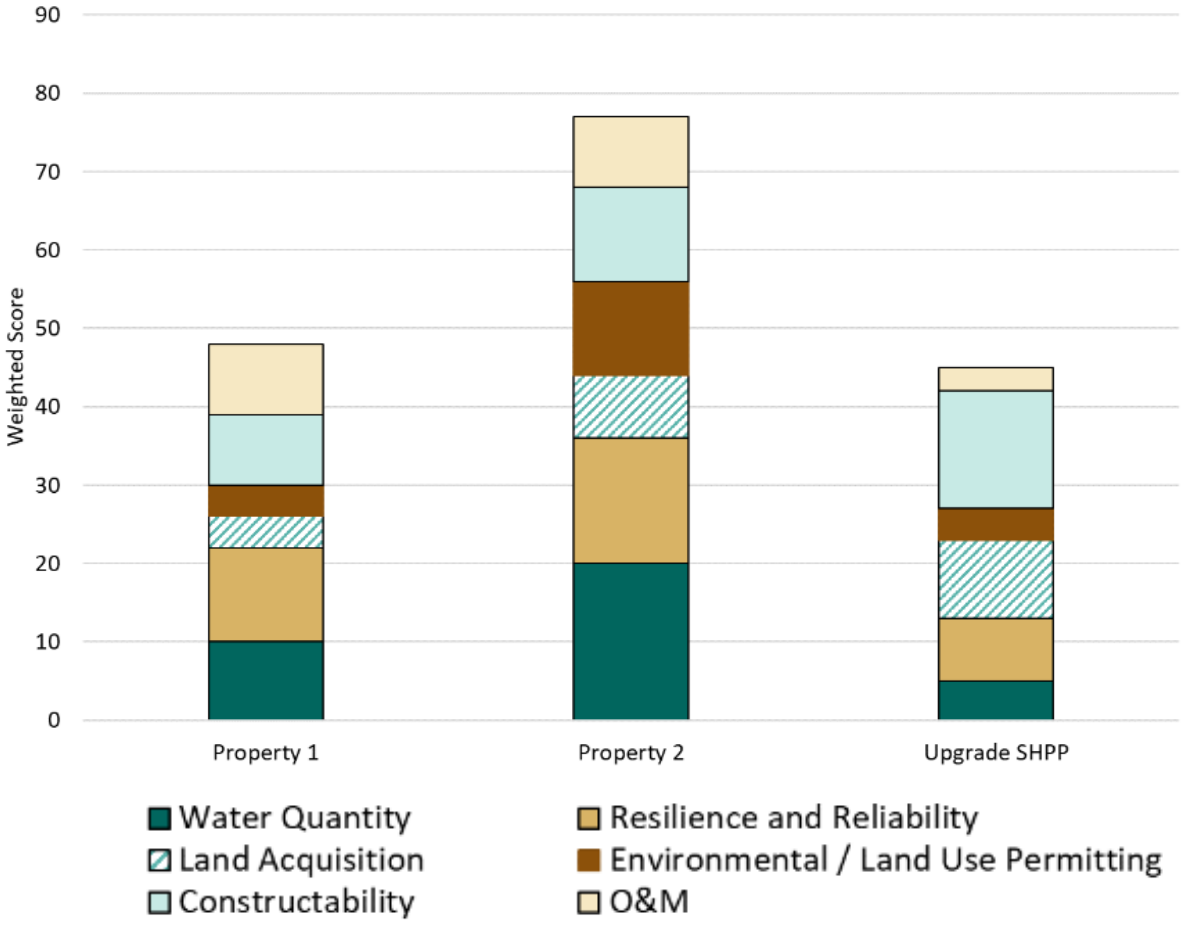
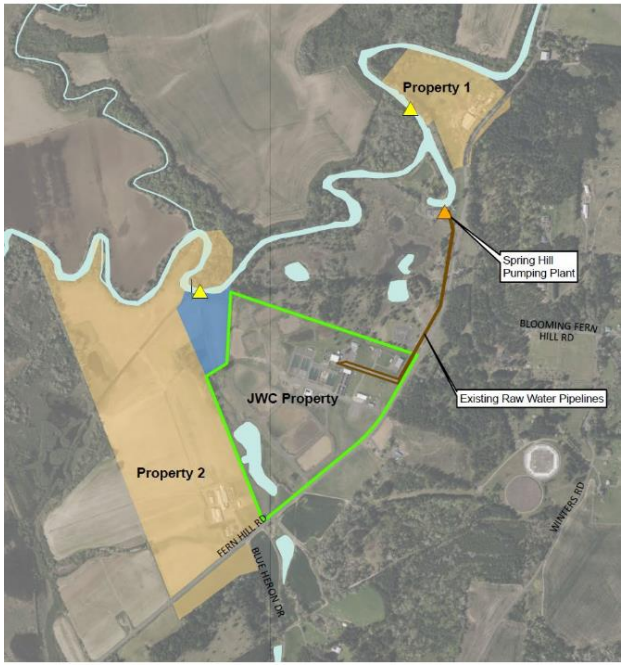
Property 2 found to be most advantageous for JWC





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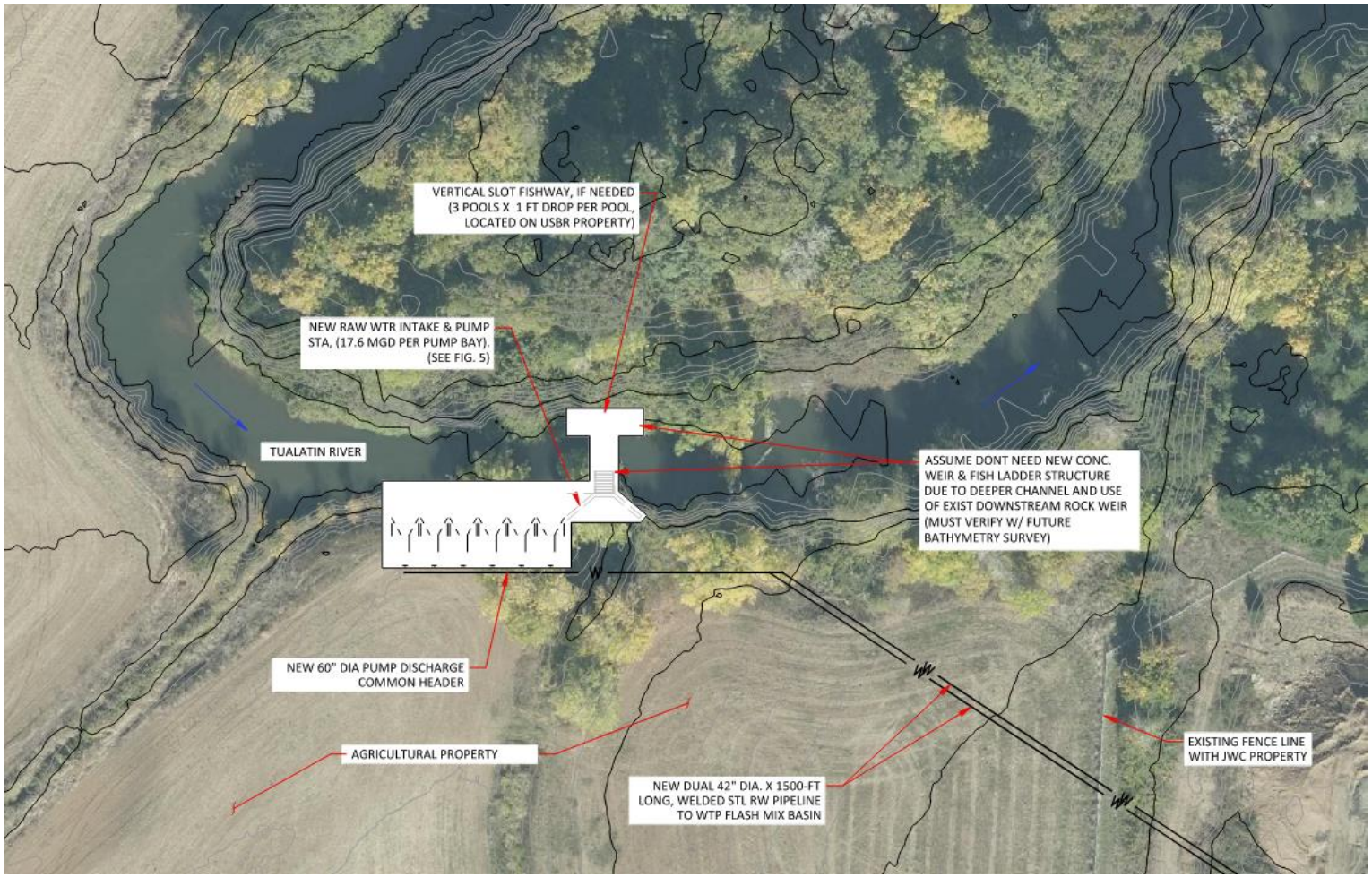
Long-term project due to estimated cost of $25M to $35M



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WTP Seismic Upgrades

- Replacing WTP facilities with seismic resilient facilities:
  - Rapid Mix
  - Ops Building
  - Clearwell
  - Floc/Sed Basins
  - Filters 1-14
- Finished Water Pump Station 2 Seismic Improvements.

Hazard mitigation study recommended

- Consider regional resilient supplies and needs.
- Develop emergency water supply strategy to be implemented before long-term resilience investments are made.
- Assess seismic resilience of Fern Hill Reservoirs.

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Used a risk framework to prioritize the CIP

Project Drivers (Benefits):

- Capacity
- O&M
- Life Safety
- Water quality
- Condition
- Resilience

Project benefit may be ranked by calculating risk

RISK = Likelihood x Consequence

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Priority of resilience Projects

1. Emergency Supply Planning
2. Chlorine Gas Replacement
3. Geotechnical and Pipeline Analyses
4. WTP Seismic Upgrades
5. Transmission System Upgrades
6. New Intake

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Long Term Financial Planning

Feedback Received

- Seismic improvements are expensive, and improvements need to be timed to meet financial planning needs.
- Risks associated with the liquifiable soils.
- A long-term (40-year) seismic resilient CIP.
- Mitigation plan in short-term.

CIP Summary

Capital Improvement Plan Summary by Project Category					
Project Category	Total CIP Cost Estimate	CIP Phasing			
		Phase 1 (FY2024-2028)	Phase 2 (FY2029-2033)	Phase 3 (FY2034-2043)	Phase 4 (FY2044-2063)
Total Cost	$ 275,419,000	$ 23,490,000	$ 18,141,000	$ 92,805,000	$ 140,983,000
Land	$ 1,000,000	$ 1,000,000	$ -	$ -	$ -
Treatment Facilities	$ 201,697,000	$ 15,019,000	$ 3,190,000	$ 72,505,000	$ 110,983,000
Transmission Lines	$ 67,770,000	$ 4,376,000	$ 13,094,000	$ 20,300,000	$ 30,000,000
SCADA	$ 4,952,000	$ 3,095,000	$ 1,857,000	$ -	$ -
Annual Cost	$ -	$ 4,698,000	$ 3,628,000	$ 9,281,000	$ 7,049,000

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Grants and Funding

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Identified likely funding opportunities

- Low-interest Loan: WIFIA
- Low-interest Loan: Oregon IFA SDWRLF
- Legislative Community Project Funding
- FEMA: BRIC
- FEMA: FMA
- FEMA: HMGP
- USBOR: Water & Energy Efficiency Grants
- USBOR: Small-scale Water Efficiency Projects
- DOE: Energy Efficiency and Conservation Block Grant Program
- OWRD: Water Project Grants & Loans
- OEM: SPIRE

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Matched eligible projects to funding opportunities

CIP Projects and Funding Opportunities

CIP Project											
SCADA Program	✓	✓	✓				✓		✓	✓	
15,000-Gallon Diesel Fuel Tank[1]	✓	✓	✓								✓
Hazard Mitigation Study	✓	✓	✓	✓		✓					
Replace Chlorine Gas System	✓	✓	✓			✓					
Initiate Study with BOR for SHPP[2]	✓	✓									
Beaverton and TVWD Billing Meters	✓	✓						✓	✓		
Seismic Valves on N-S Intertie and Fern Hill Force Mains/ Replace/Improve Transmission Lines in Critical High-Hazard Areas (20-year CIP)[3]	✓	✓	✓	✓		✓					
Hazard Mitigation Implementation	✓	✓	✓			✓					
Replace Rapid Mix Facility/ Replace O&M Building[4]	✓	✓	✓			✓			✓		
Install OSHG Equipment into Hypo Facility[5]	✓	✓	✓	✓		✓					
Construct New Chemical Building[6]	✓	✓	✓	✓		✓			✓		
New Intake or SHPP Upgrade	✓	✓	✓	✓	✓	✓					

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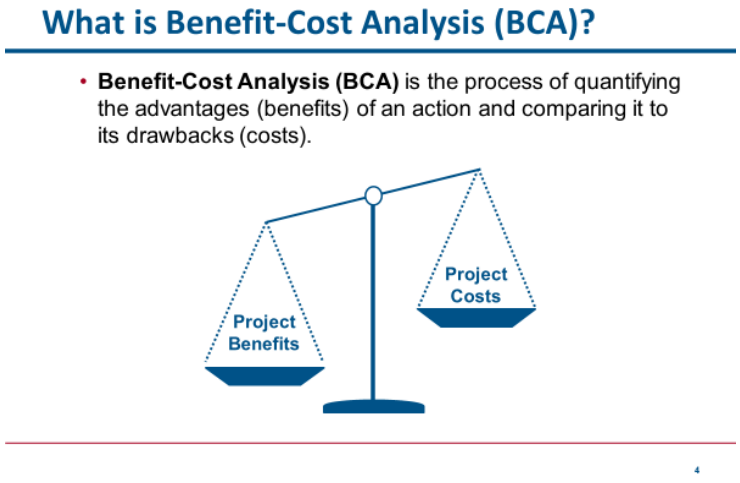
Applied for FEMA Hazard Mitigation Grant for Chlorine Gas System Replacement Project

- FEMA HMGP funds natural hazard mitigation projects.
  - Must mitigate existing structure.
- Application Process:
  - Submitted preapplication Feb-2022.
  - Submitted full application in June-2022.
    - Supported by Carollo and Stantec.
  - Requirements:
    - Mitigation need, schedule, budget.
    - 2 alternatives & no action alternative.
    - FEMA Benefit-Cost Analysis (BCA) tool.
- Currently responding to RFIs and awaiting final decision.



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Questions?

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Adjourn Meeting