Jacobs Challenging today. Reinventing tomorrow.

# Seismically Resilient Transformation of Medford Water

Joshua Kennedy and Andy Huffman

2023 PNWS-AWWA Conference, Kennewick, WA

Thursday, May 4, 2:45pm

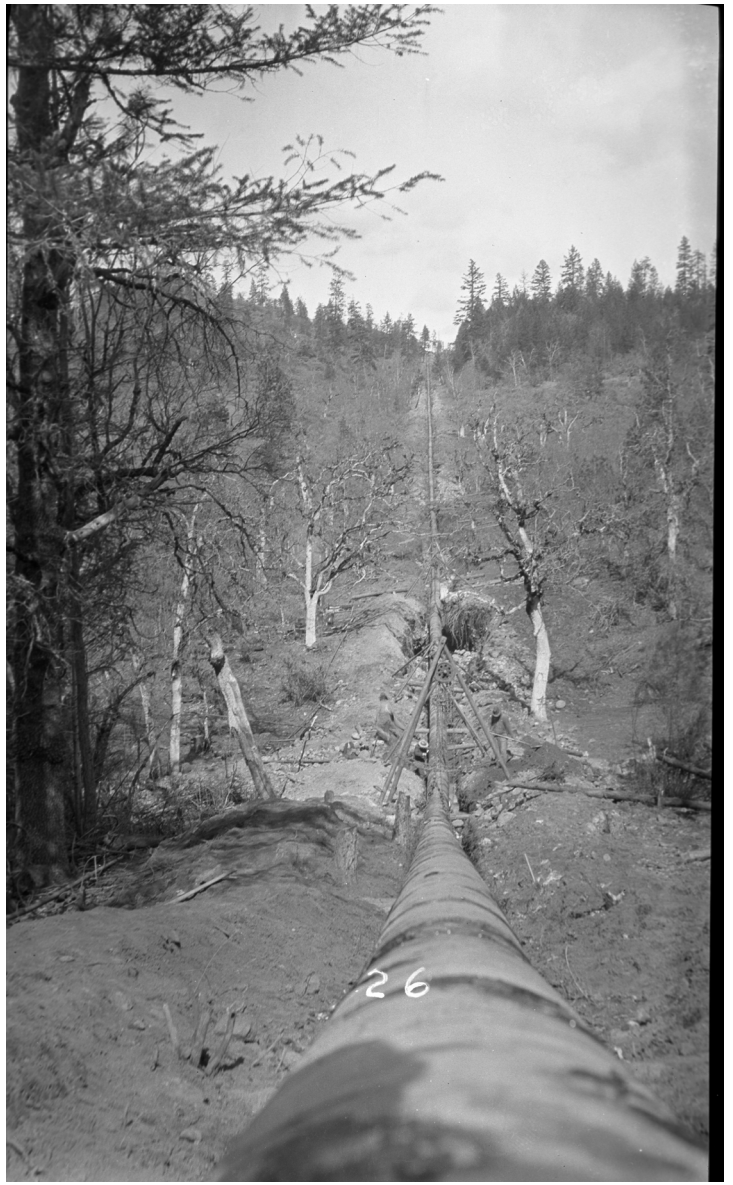
# Agenda

- Medford Water Background and History
- Program Drivers
- Program Definition, Summary of Work
- Funding Approach
- Program Highlights

# Background and History

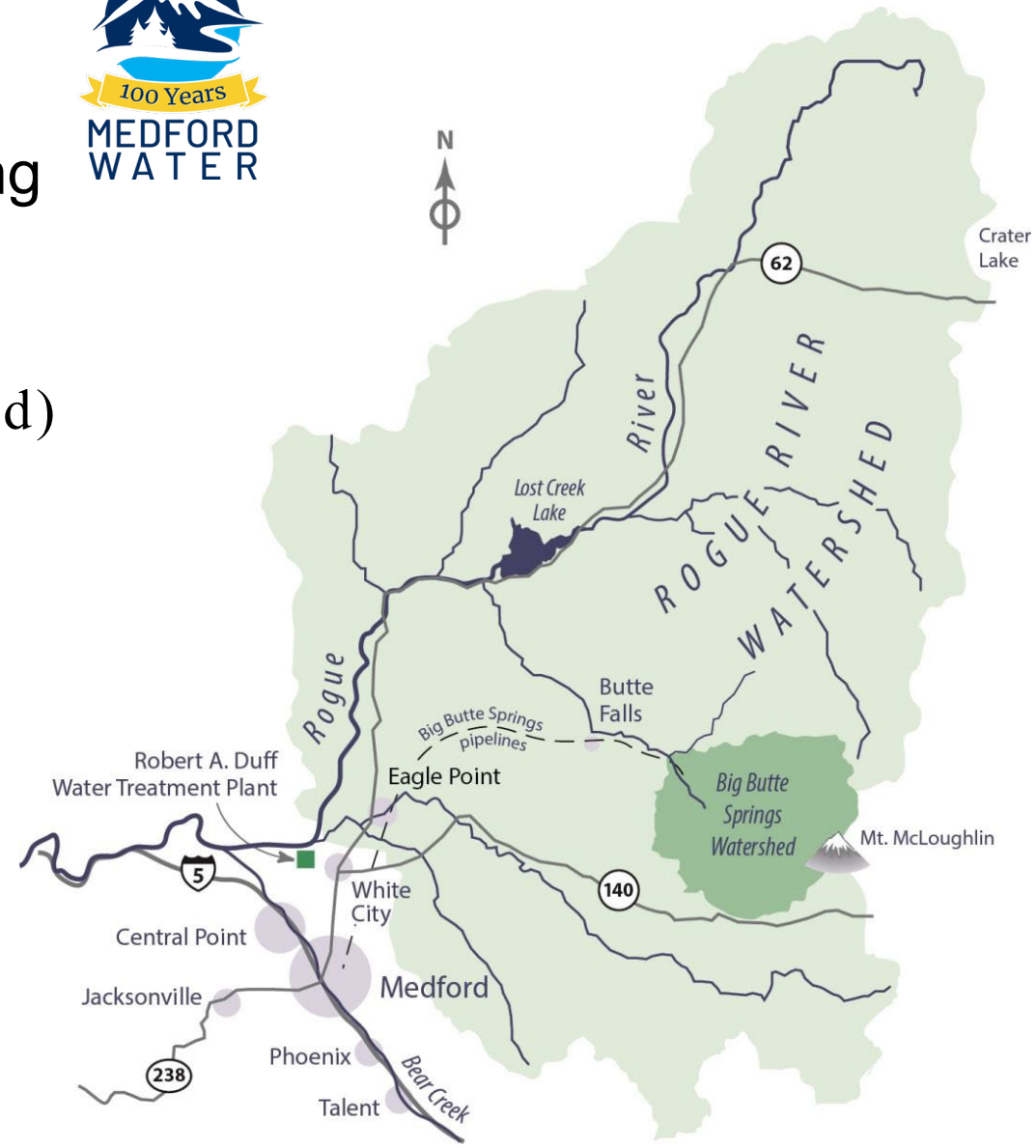
# Background - Medford Water

- Water Commission formed in 1922
- Formed by charter by and through the City of Medford
- Big Butte Springs source began conveying water 30 miles to the Capital Hill Reservoir complex
- BBS #2 Pipeline Completed 1955
- System demand still increasing
- Second water source at Rogue River in 1968

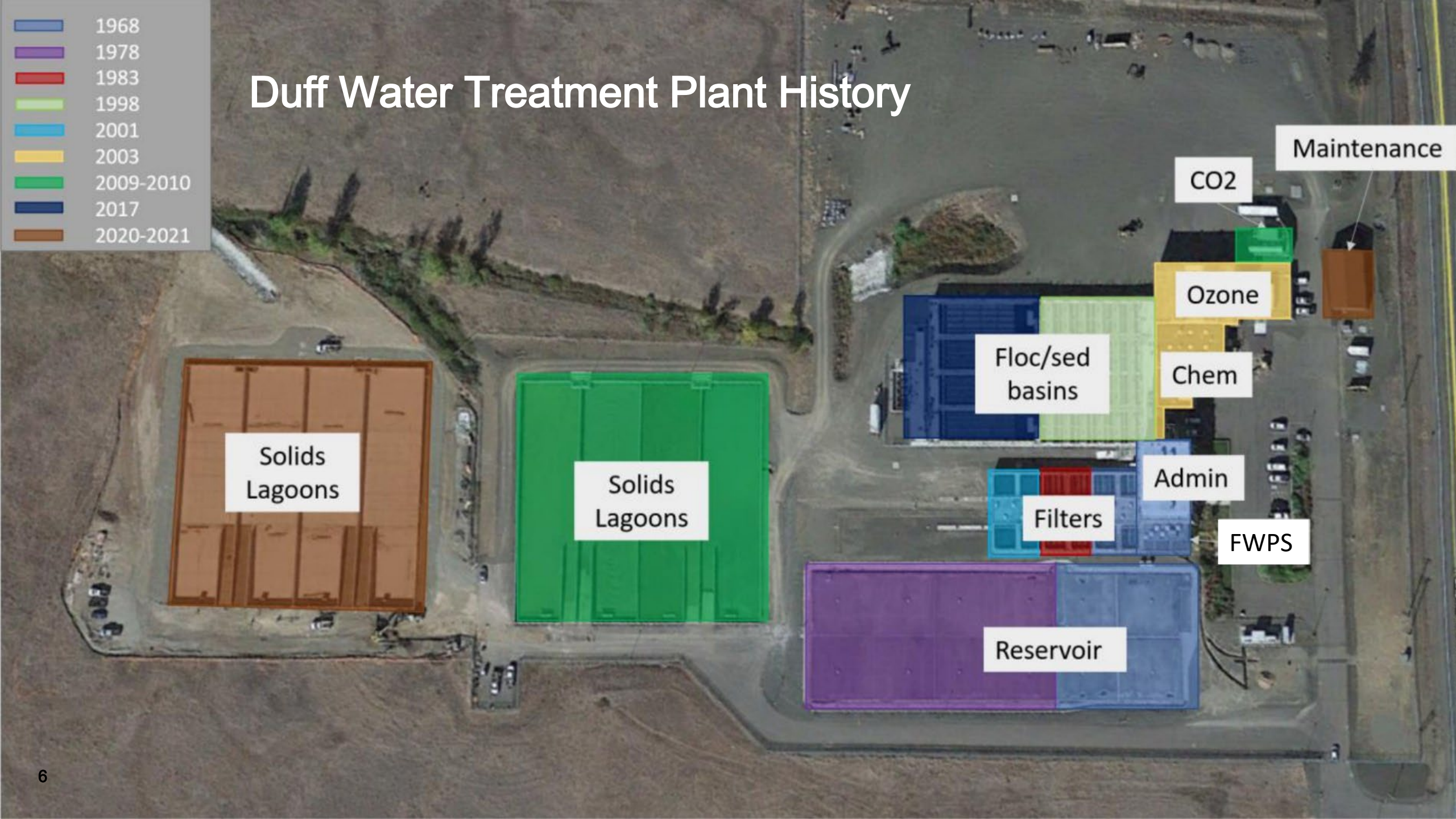


# Background - Medford Water

- 140,000 customers in Medford and surrounding communities
- Two sources:
  - Duff Water Treatment Plant, Rogue River (45 mgd)
  - Big Butte Springs (26.4 mgd)
- Capacity: 71.4 mgd nominal



# Duff Water Treatment Plant History



# Background – History of Proactive Projects

- Medford Water prides themselves on being a proactive and progressive organization. Long history includes:
  - Springs development
  - Tee Screens – replaced in 2010 ahead of regulatory requirements
  - Ozone Project – first large system in Oregon (around same time as SPU Tolt WTP)
  - Seismic Resiliency Studies

# Program Drivers

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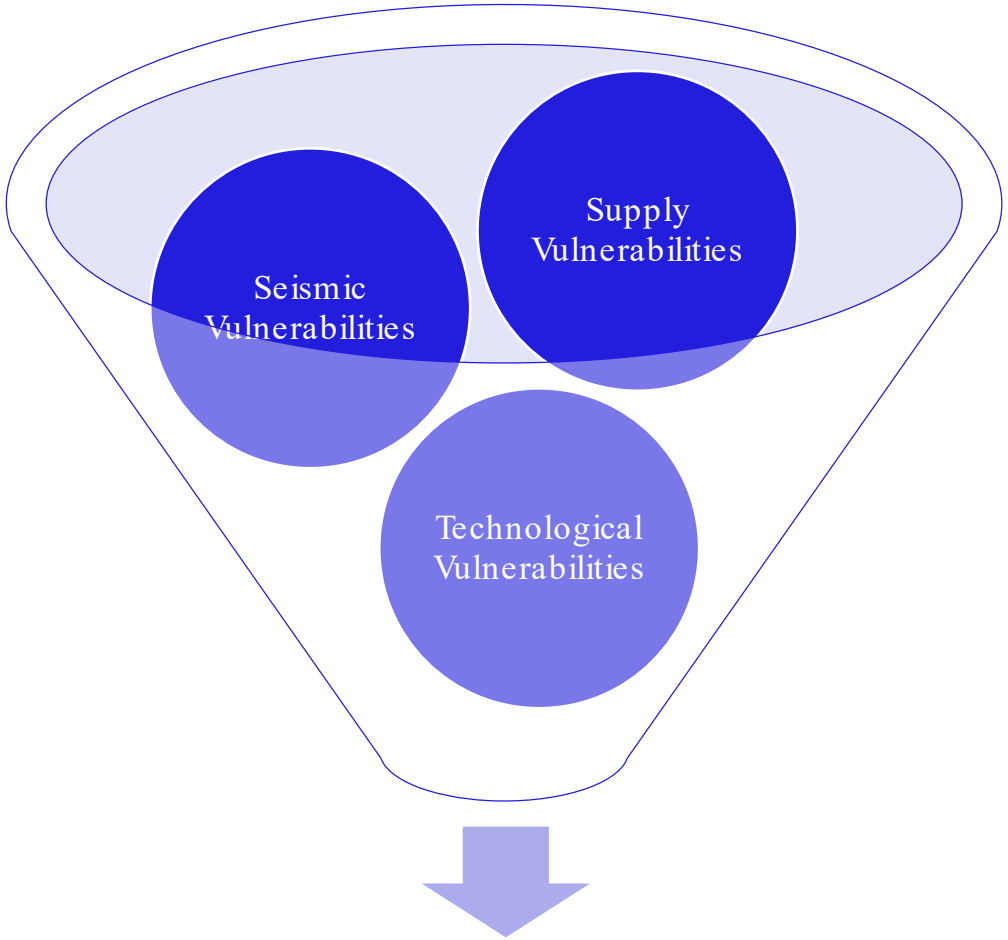
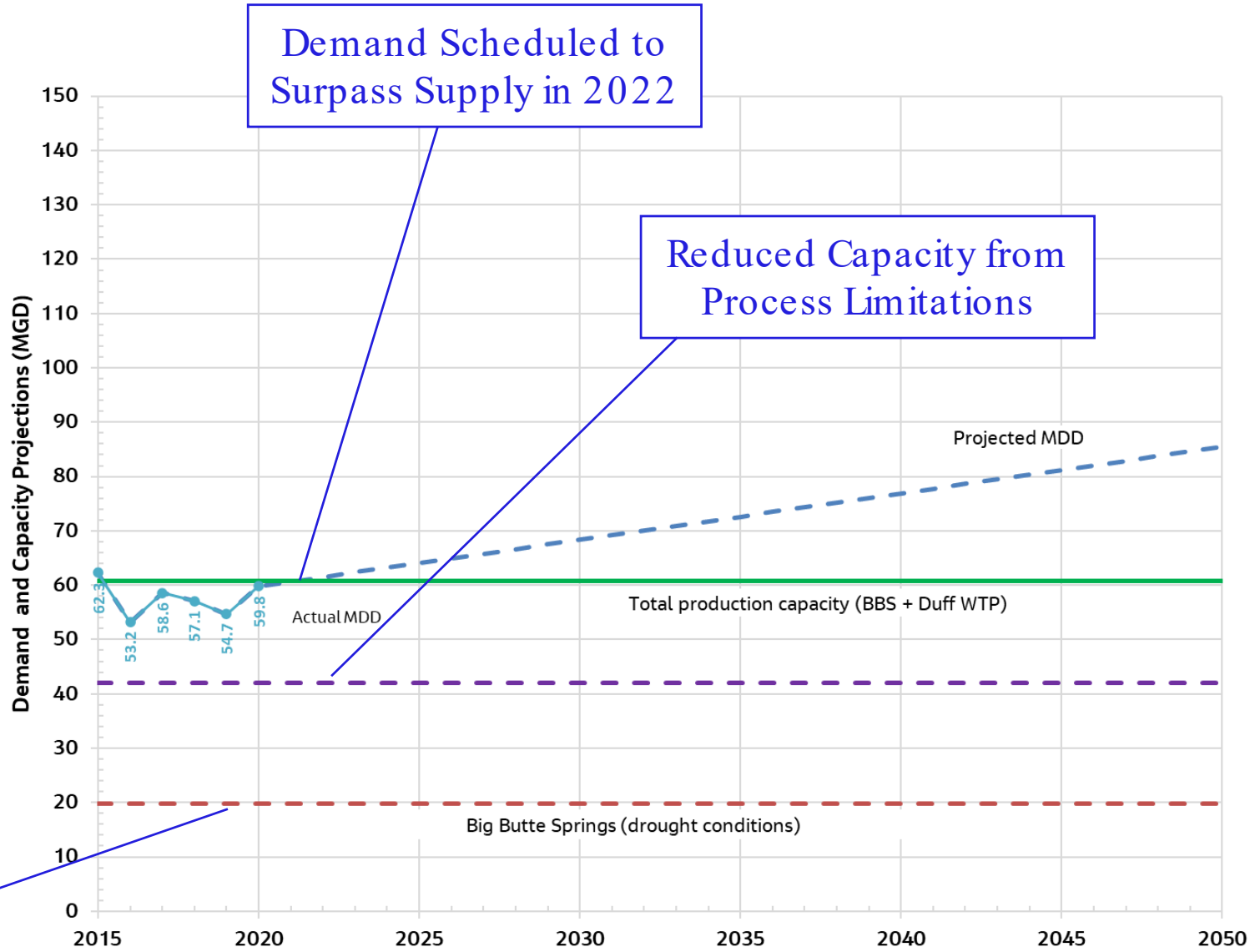


# Supply Vulnerabilities

- Demand outpacing supply
  - Big Butte Springs capacity is below 26.4 mgd due to drought
  - Duff WTP capacity is limited to less than nominal 45 mgd (for various reasons)

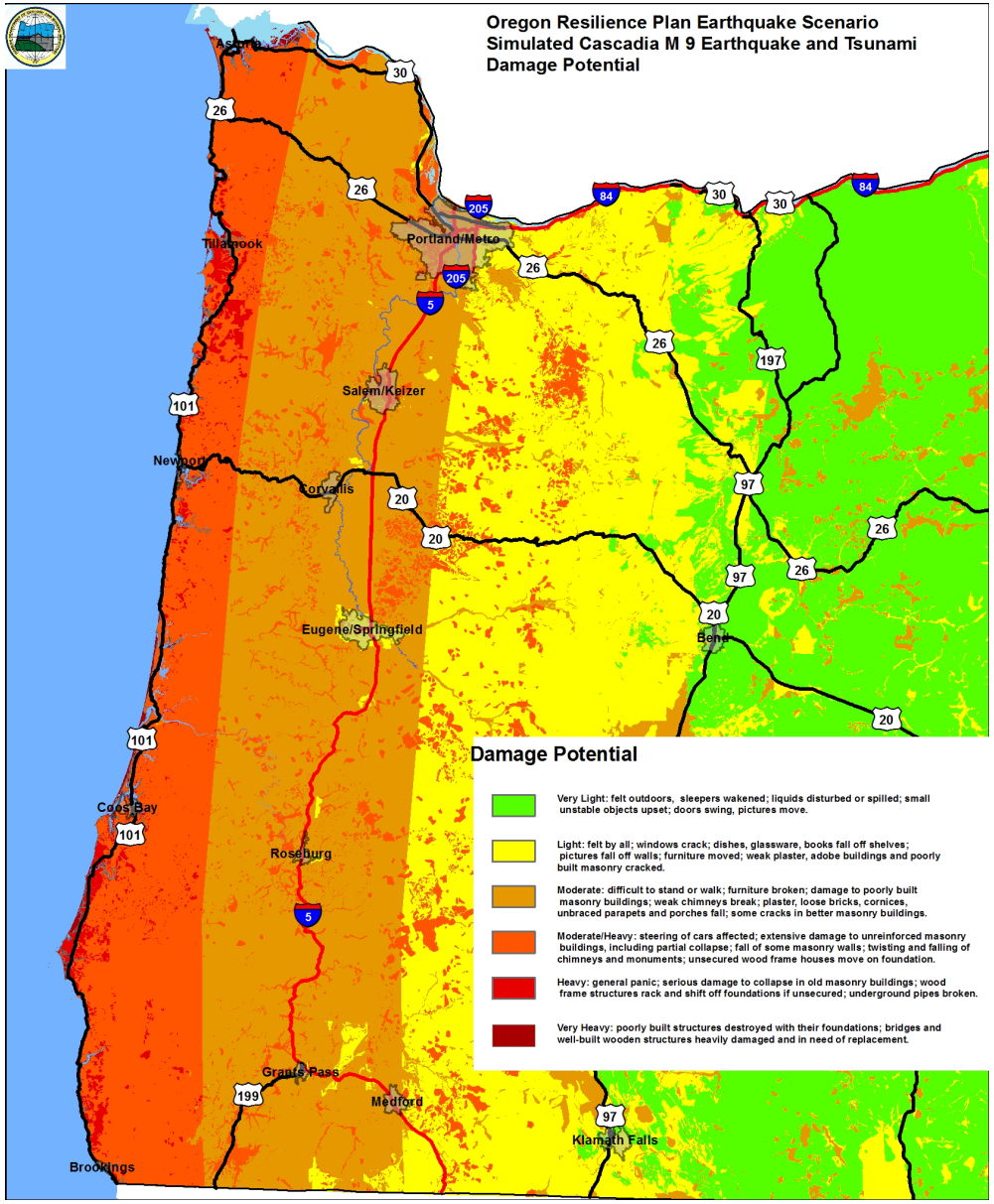
*Goal to provide 65 mgd firm capacity from WTP*



# Seismic Vulnerabilities

- Duff WTP is the resilient supply but includes many 50+ year old facilities
- Review of WTP elements as part of Seismic Risk Assessment
- Lack of resilient transmission and storage to weather a large seismic event

*Goal to provide 23 mgd flow to customers following Cascadia earthquake event*



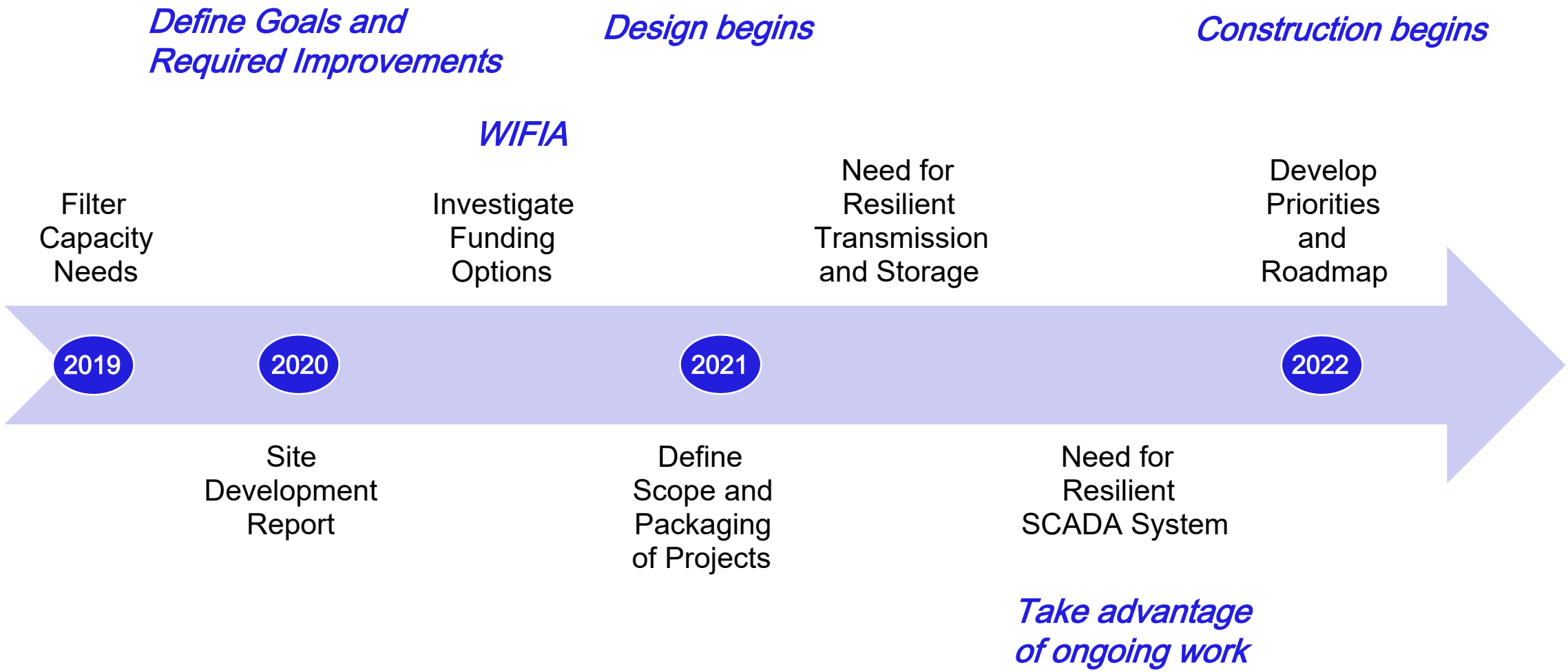
# Technological Vulnerabilities

- Communication network was slow with single points of failure
- Old software and hardware with known security vulnerabilities
- Separated WTP and Distribution SCADA systems made visibility and troubleshooting difficult
- Aging system was more “reactive” than “proactive”

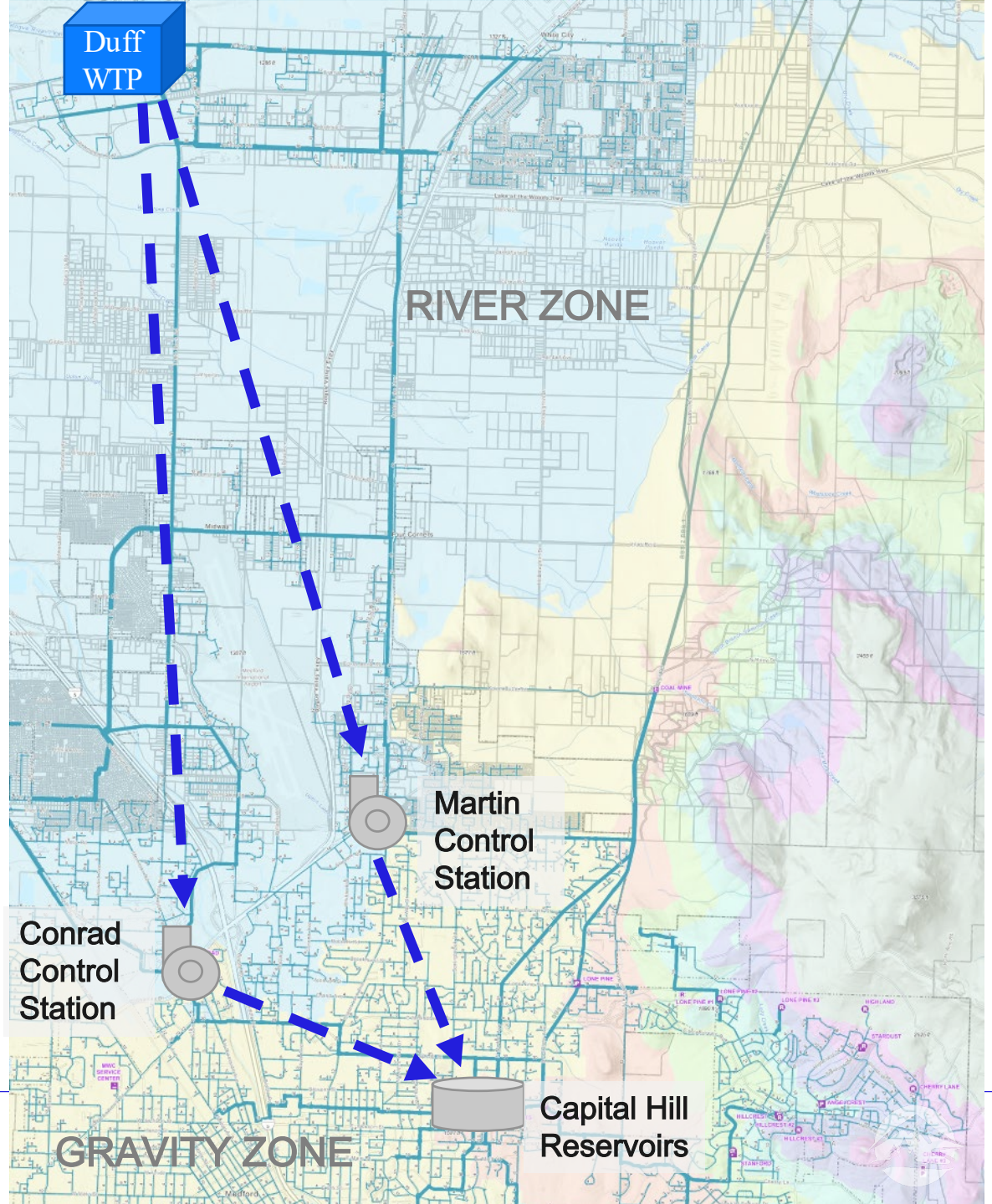
★ *Goal to provide a secure and resilient system for operations*

# Program Definition, Summary of Work

# Program Scope Development



# System Diagram



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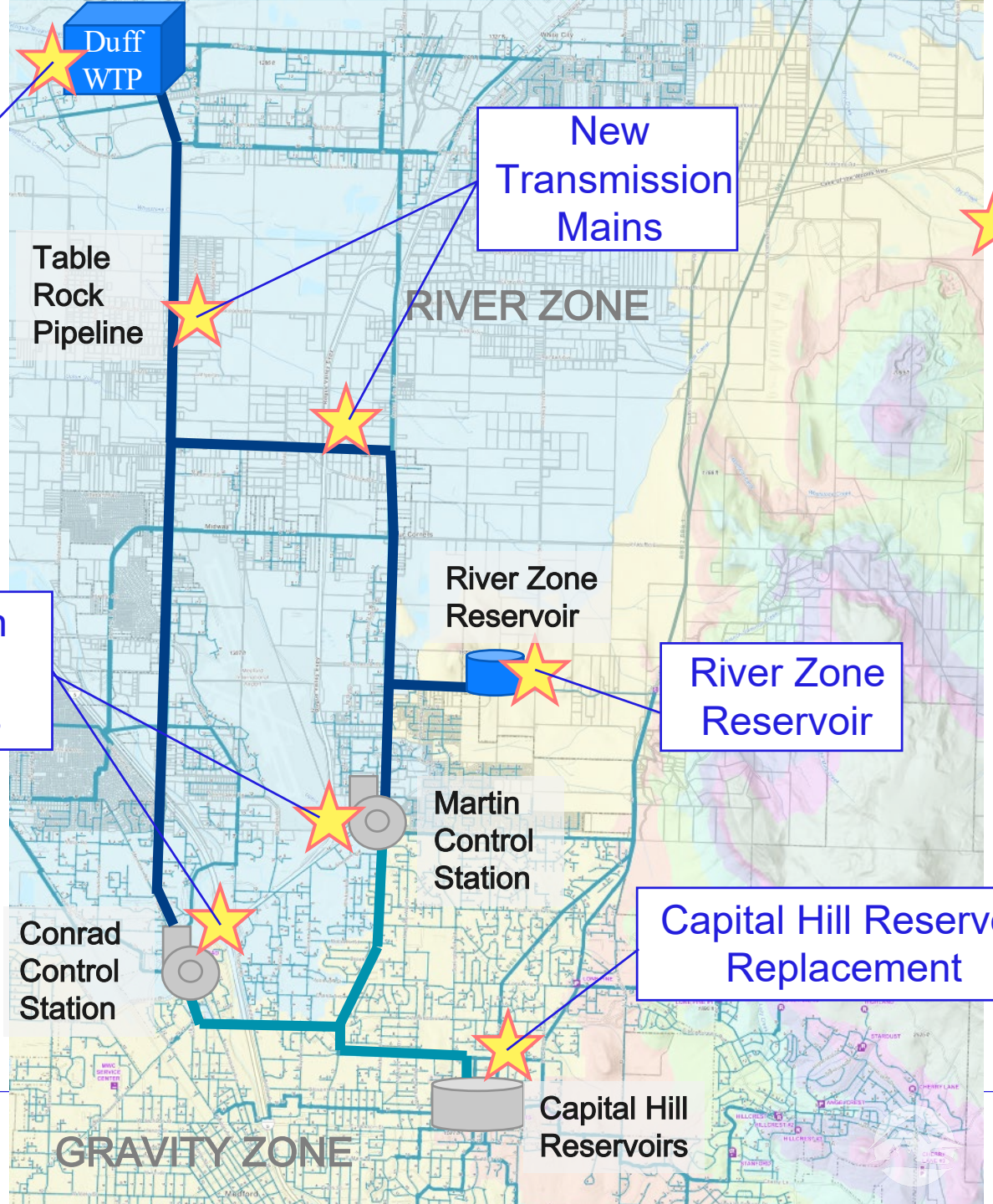



Duff WTP Expansion (23 mgd resilient, 65 mgd peak day)

New Transmission Mains

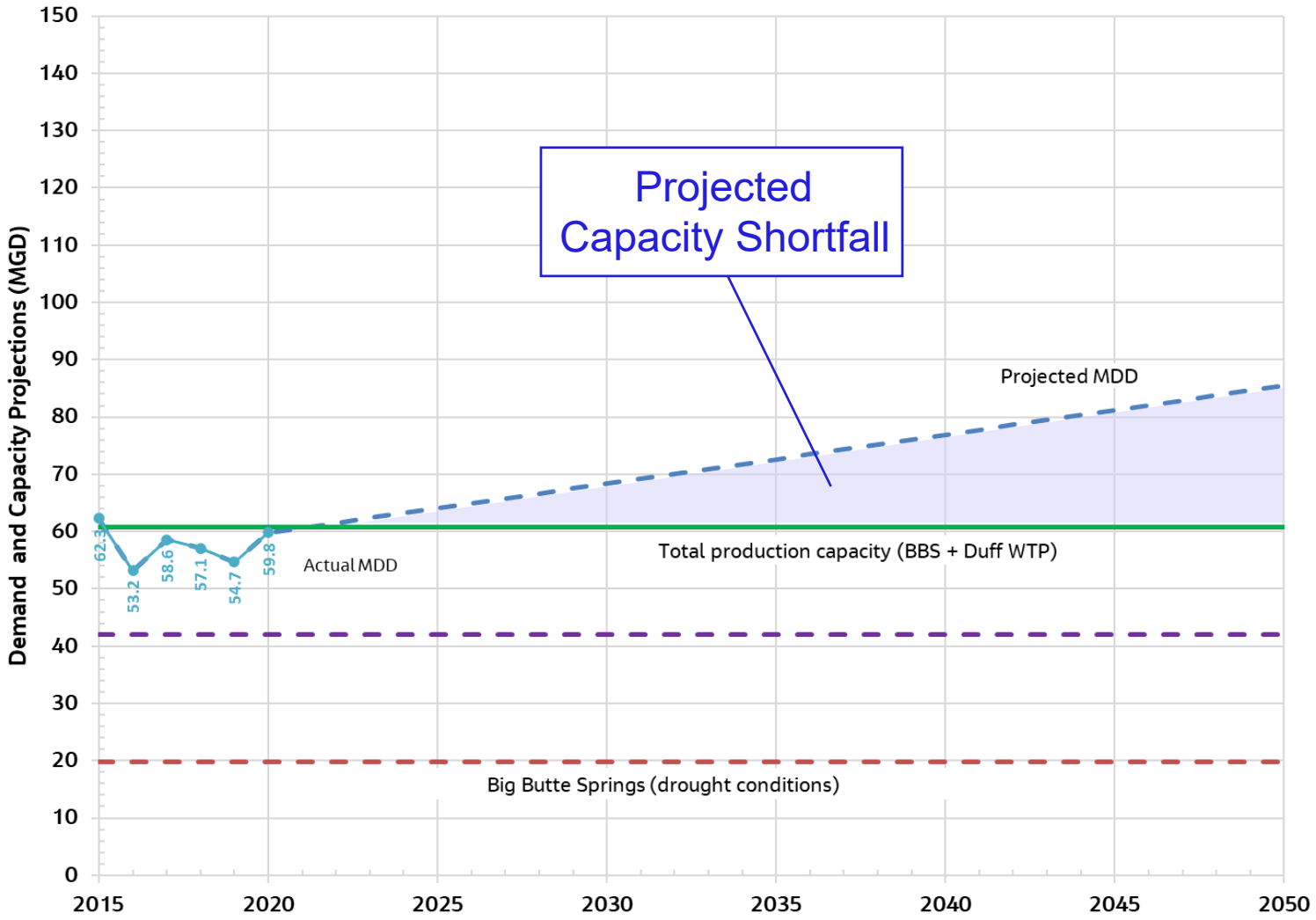
SCADA Upgrades (system wide)

Control Station Resiliency Improvements

River Zone Reservoir

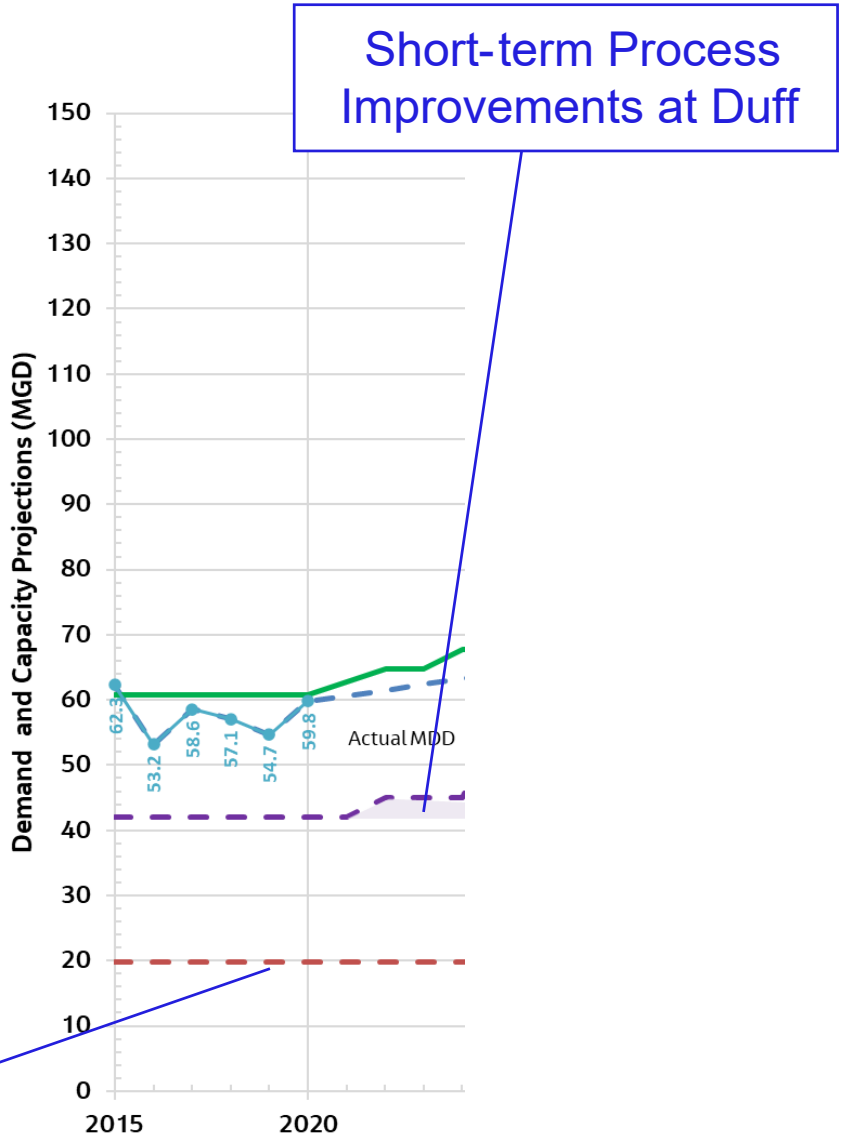
Capital Hill Reservoir Replacement

# Address Demand Issues



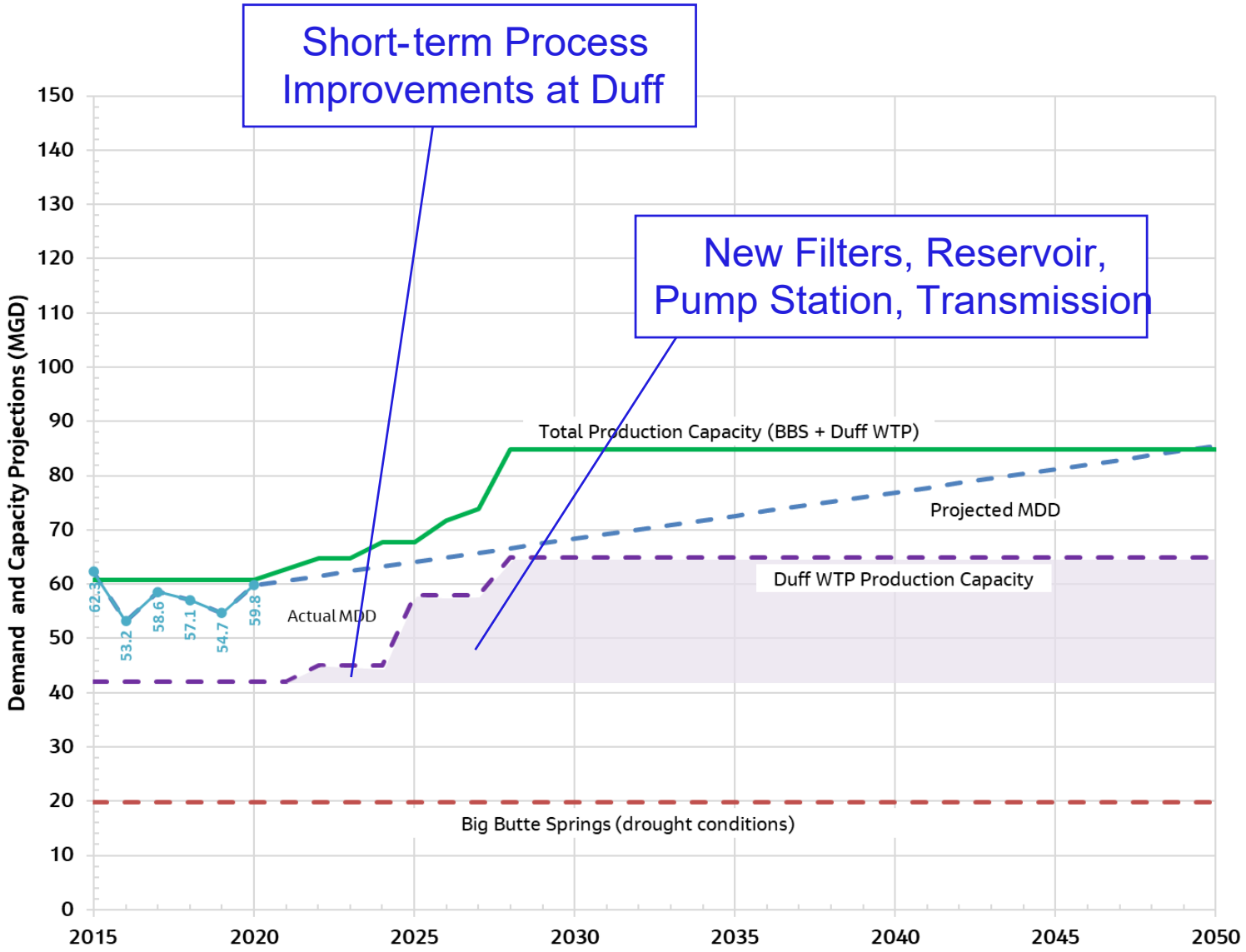
# Address Demand Issues

- Implement short-term capacity improvements
  - Reservoir baffles
  - Filter media re-rate
  - Pump hydraulic analysis



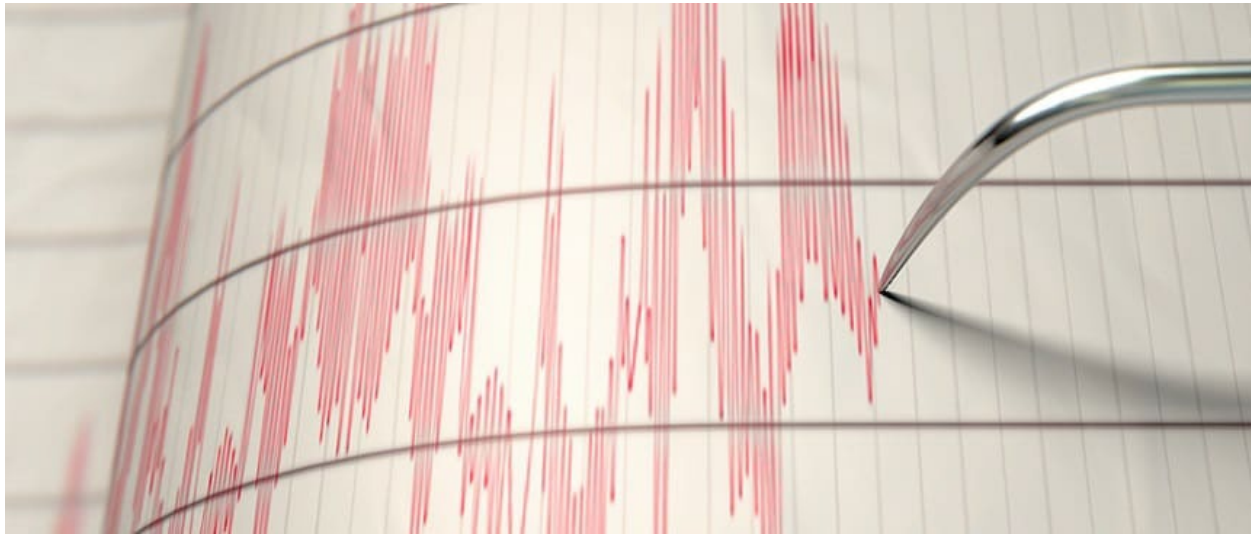
# Address Demand Issues

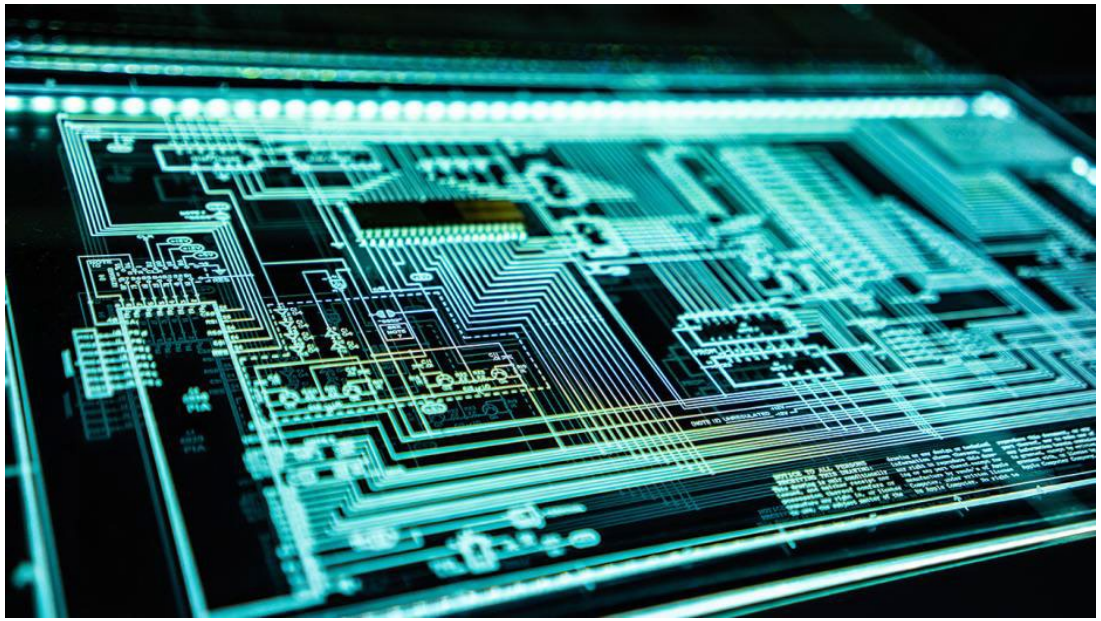
- Implement short-term capacity improvements
  - Reservoir baffles
  - Filter media re-rate
  - Pump hydraulic analysis
- Implement long-term capacity improvements
  - New filter facility
  - New reservoir
  - New finished water pump station
  - New Transmission Main



# Address Seismic and Technological Vulnerabilities

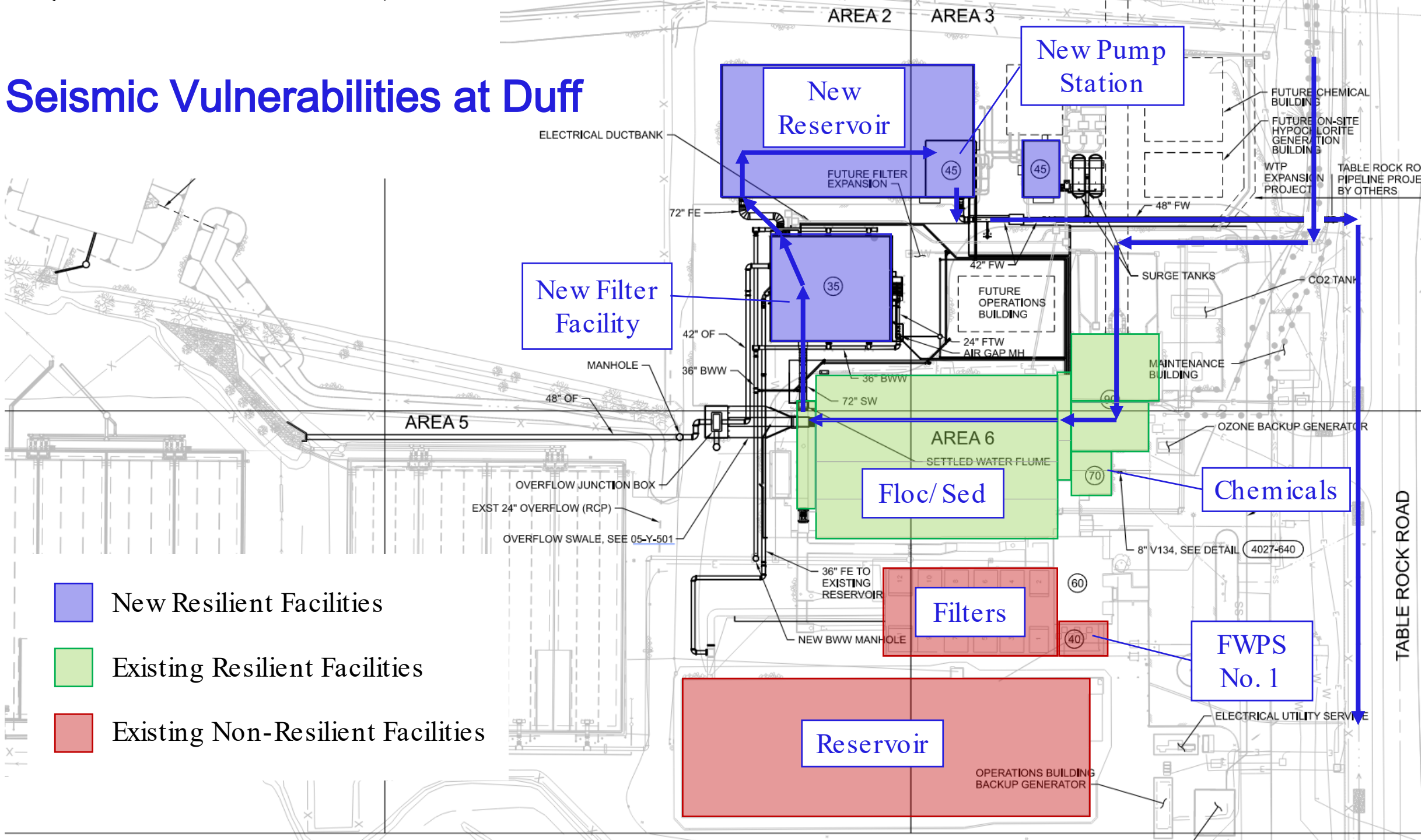
- New, seismically resilient facilities
- Seismically resilient reservoir and transmission





- Redundant communications
- New integrated SCADA platform
- Upgrade cybersecurity standards

# Seismic Vulnerabilities at Duff




- New Resilient Facilities
- Existing Resilient Facilities
- Existing Non-Resilient Facilities

# Funding Approach

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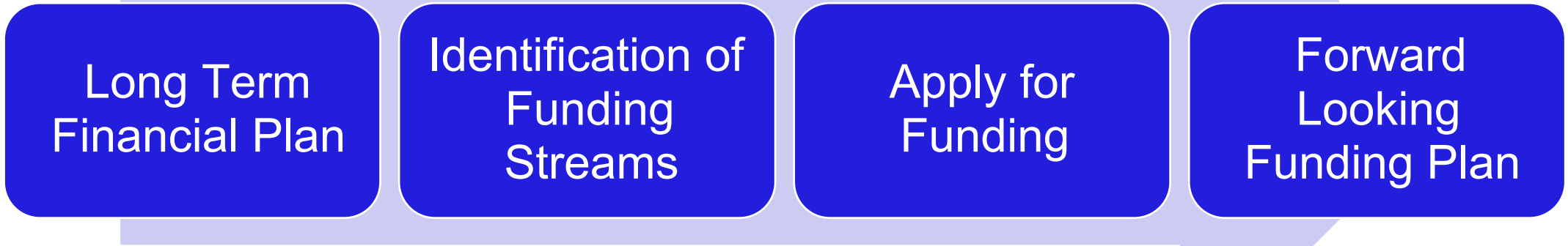
- *SRF*
- *WIFIA*
- *FEMA BRIC*
- *USACE*
- *DHS Cyber Grant*

- *FEMA BRIC Grants*
- *WIFIA Round 3*



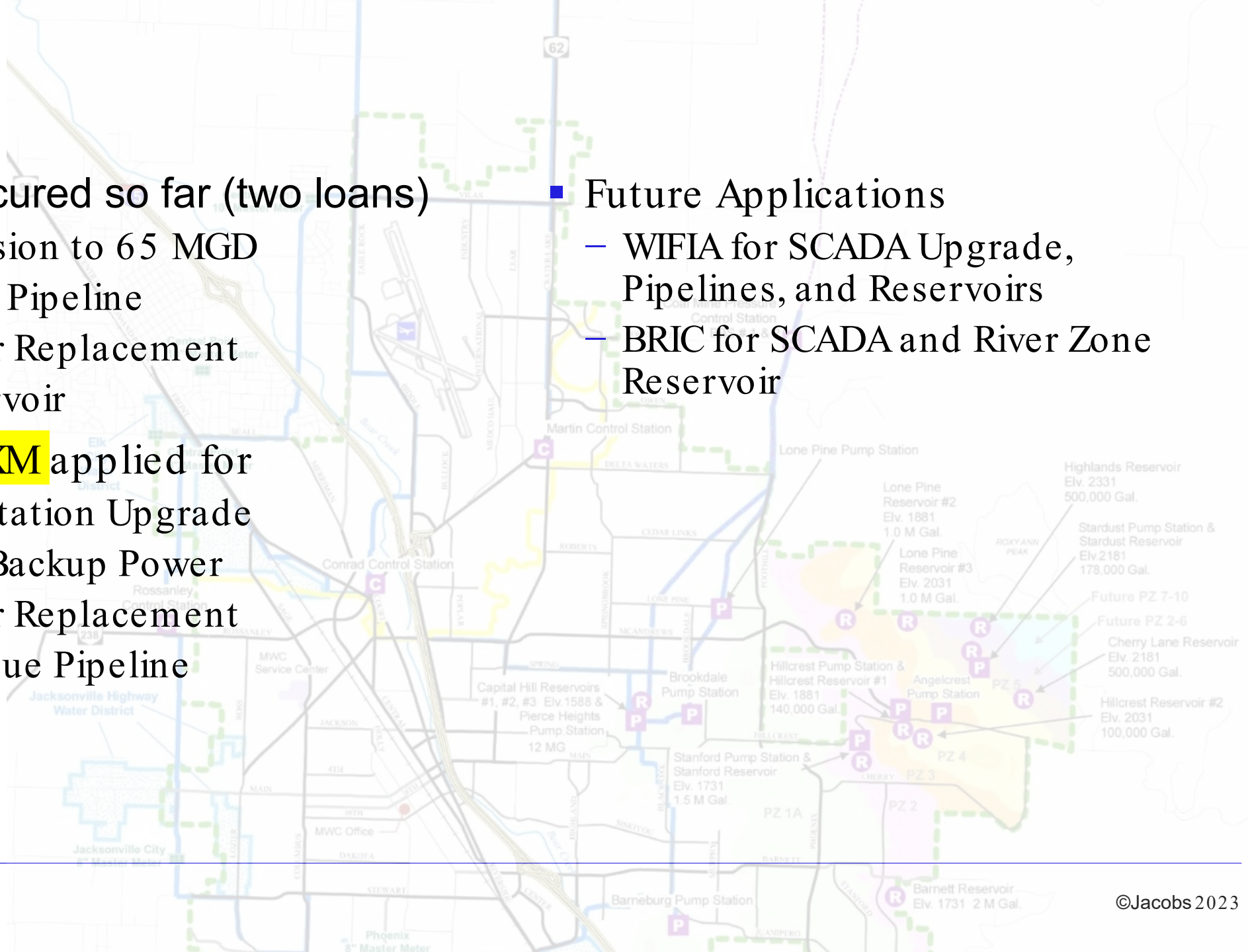

- *What are the shortfalls?*
- *What rate structure do we need?*
- *Chart path from now→ end goal*

- *WIFIA*
- *BRIC Grants*

*Leverage Jacobs' Grant Funding Team*

# Funding to Date

- WIFIA- $95M secured so far (two loans)
  - Duff WTP Expansion to 65 MGD
  - Table Rock Road Pipeline
  - Capital Reservoir Replacement
  - River Zone Reservoir
- FEMA BRIC – $XXM applied for
  - Martin Control Station Upgrade
  - Control Station Backup Power
  - Capital Reservoir Replacement
  - Crater Lake Avenue Pipeline
- Future Applications
  - WIFIA for SCADA Upgrade, Pipelines, and Reservoirs
  - BRIC for SCADA and River Zone Reservoir



# Program Highlights

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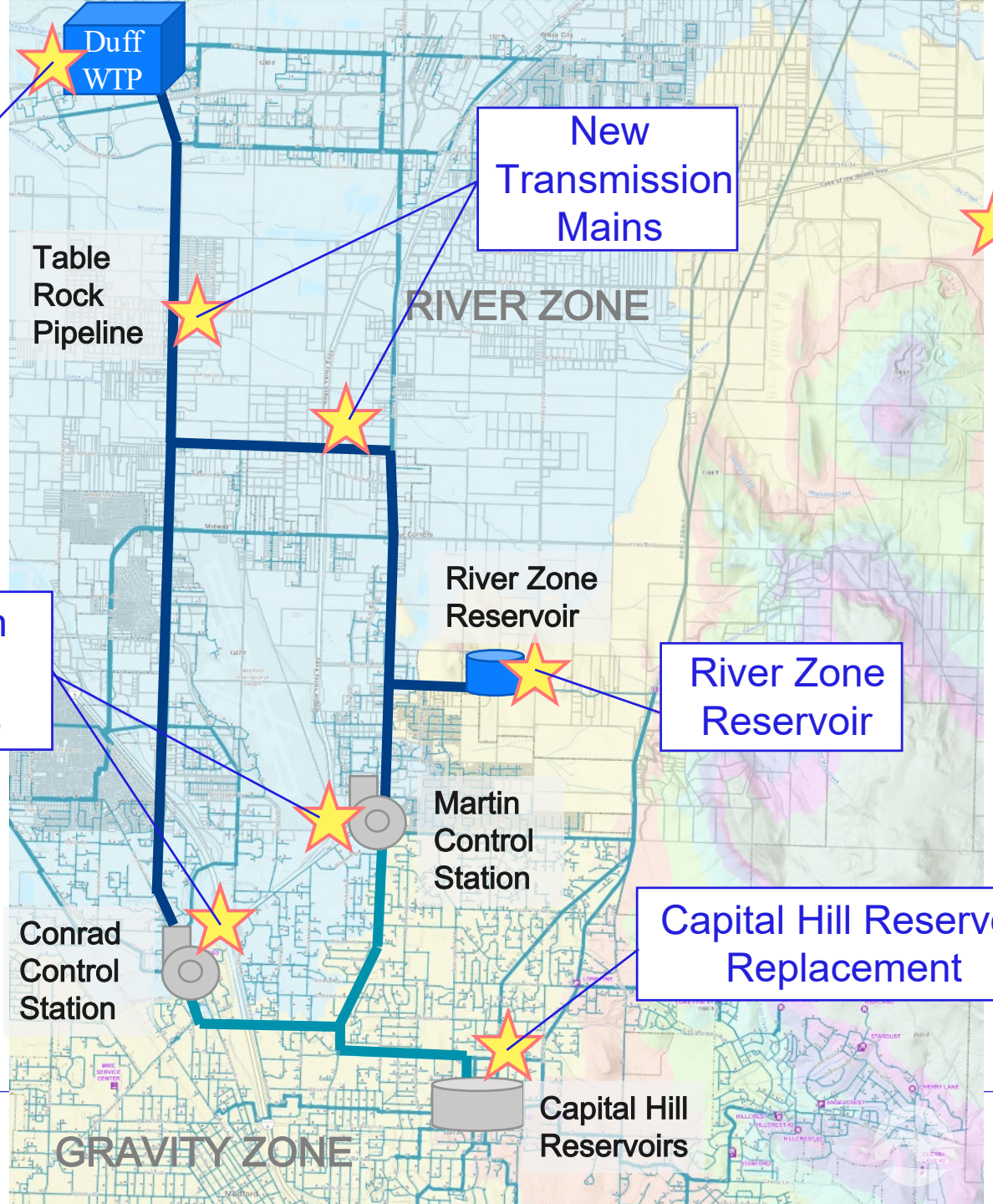


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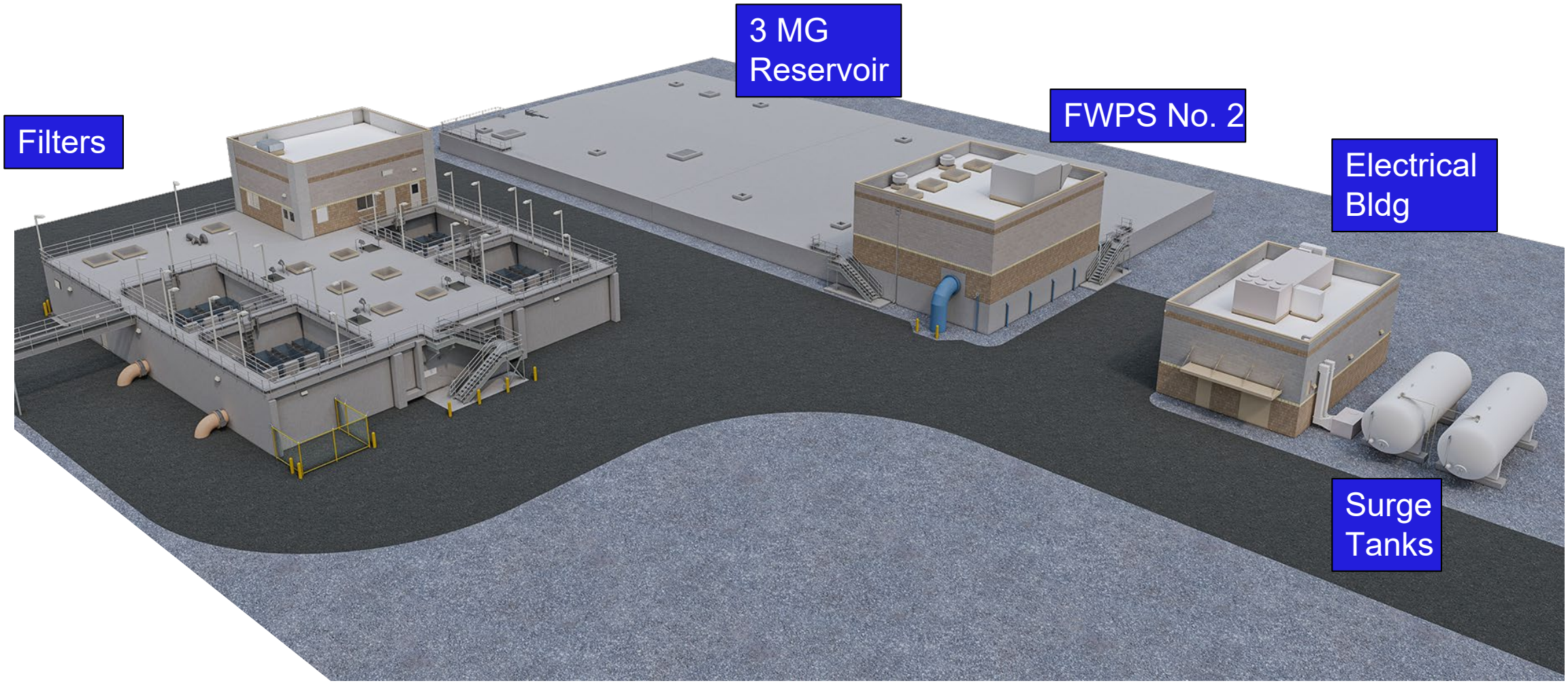
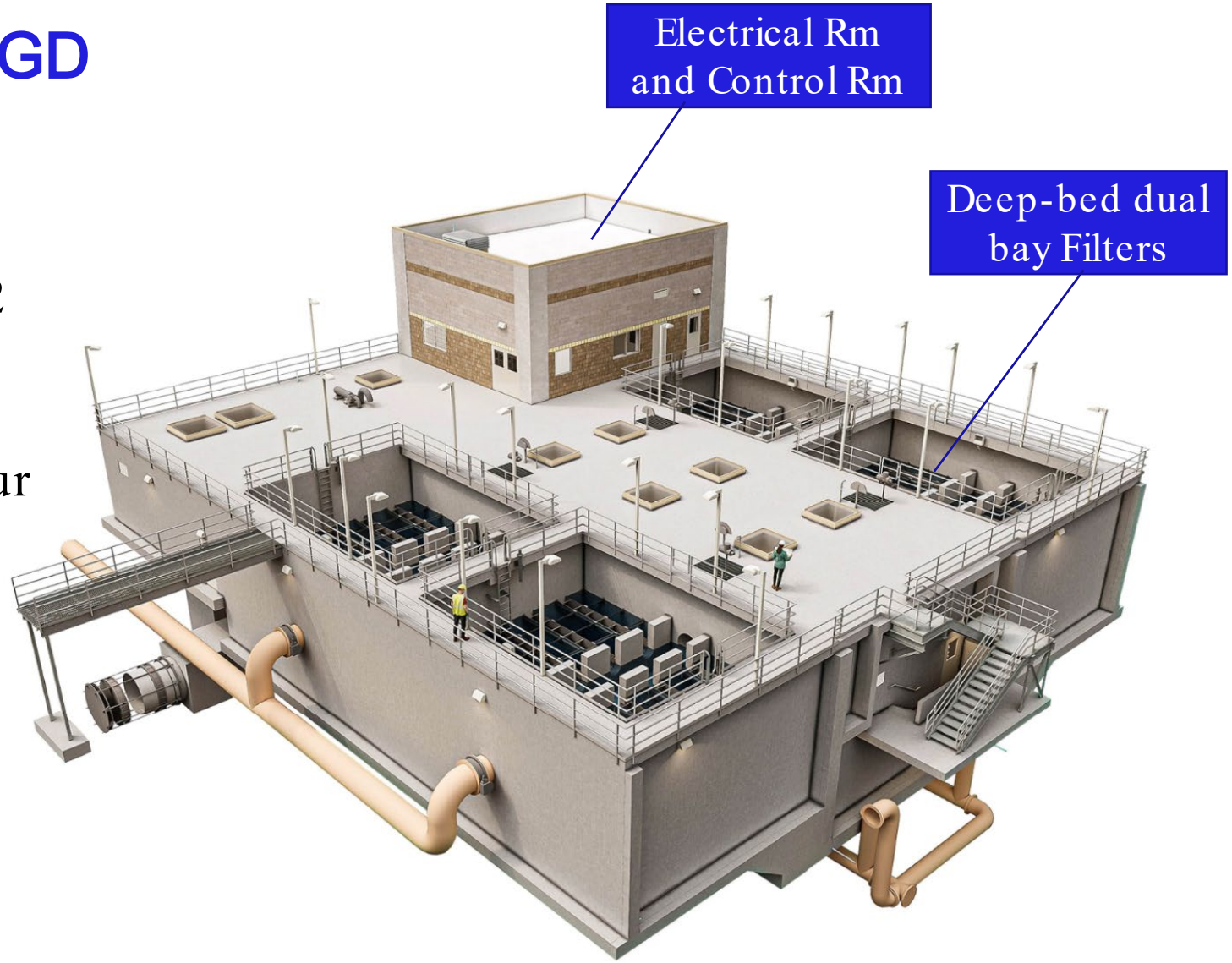
# Duff WTP Expansion to 65 MGD



# Duff WTP Expansion to 65 MGD

- New Filters details:
  - Dual-bay
  - 784 sq ft size, operate at up to 12 gpm/sf
  - 72” anthracite over 12” sand
  - AWI SST underdrains with air scour



# Duff WTP Expansion to 65 MGD- Construction

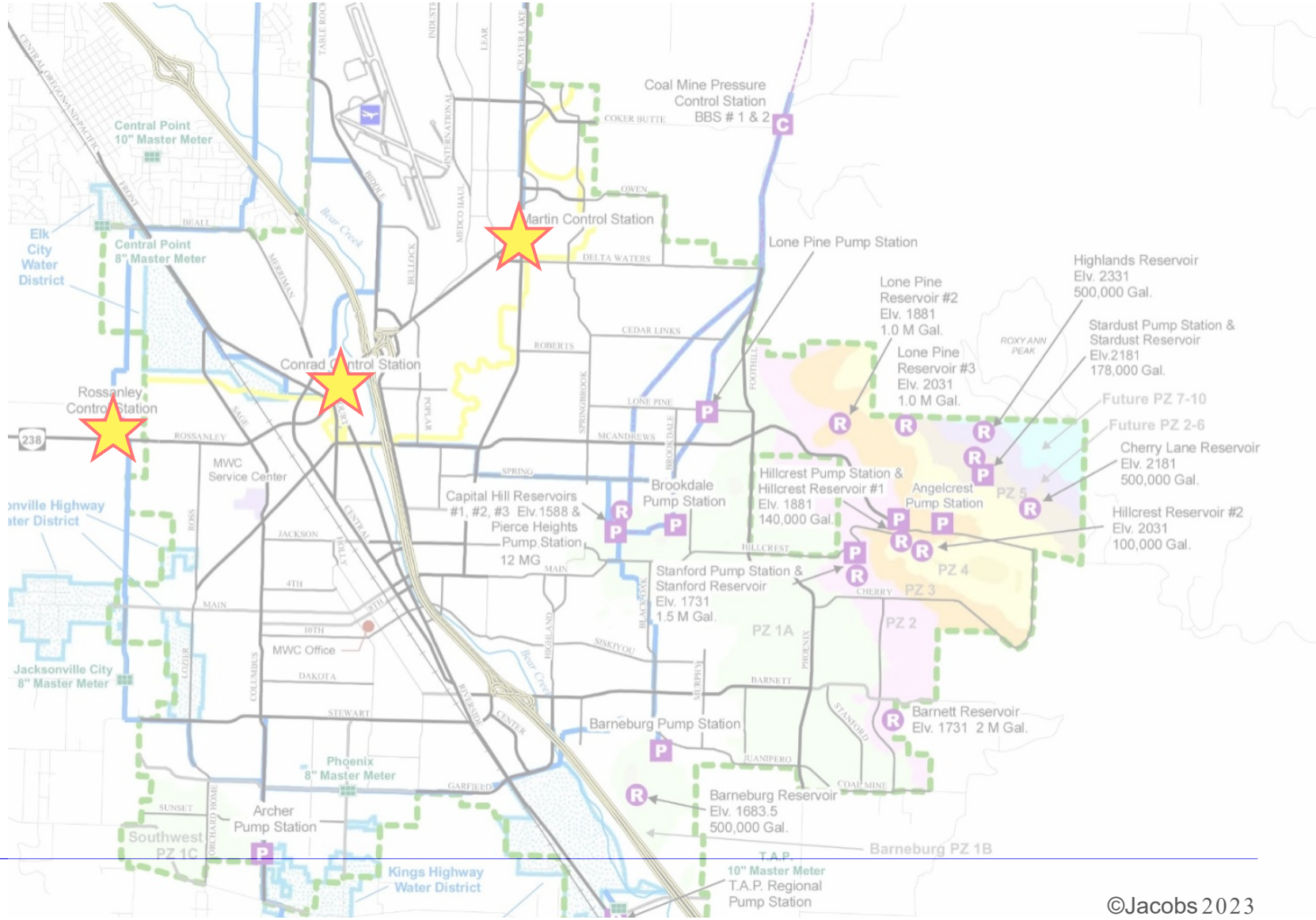
- CM/GC Contract with Slayden
- $80 M value

# Table Rock Road Resilient Pipeline Project

- 18,000 feet of 42” fully restrained ductile iron pipe
- 4 trenchless crossings
- Mostly within Jackson County right of way with 1 rail and 3 creek crossings (trenchless)
- Engineers Construction Estimate $26M

# Control Station Resiliency Improvements

- Install backup generators
- Upgrade communications and SCADA system
- Increase capacity
- Structural hardening

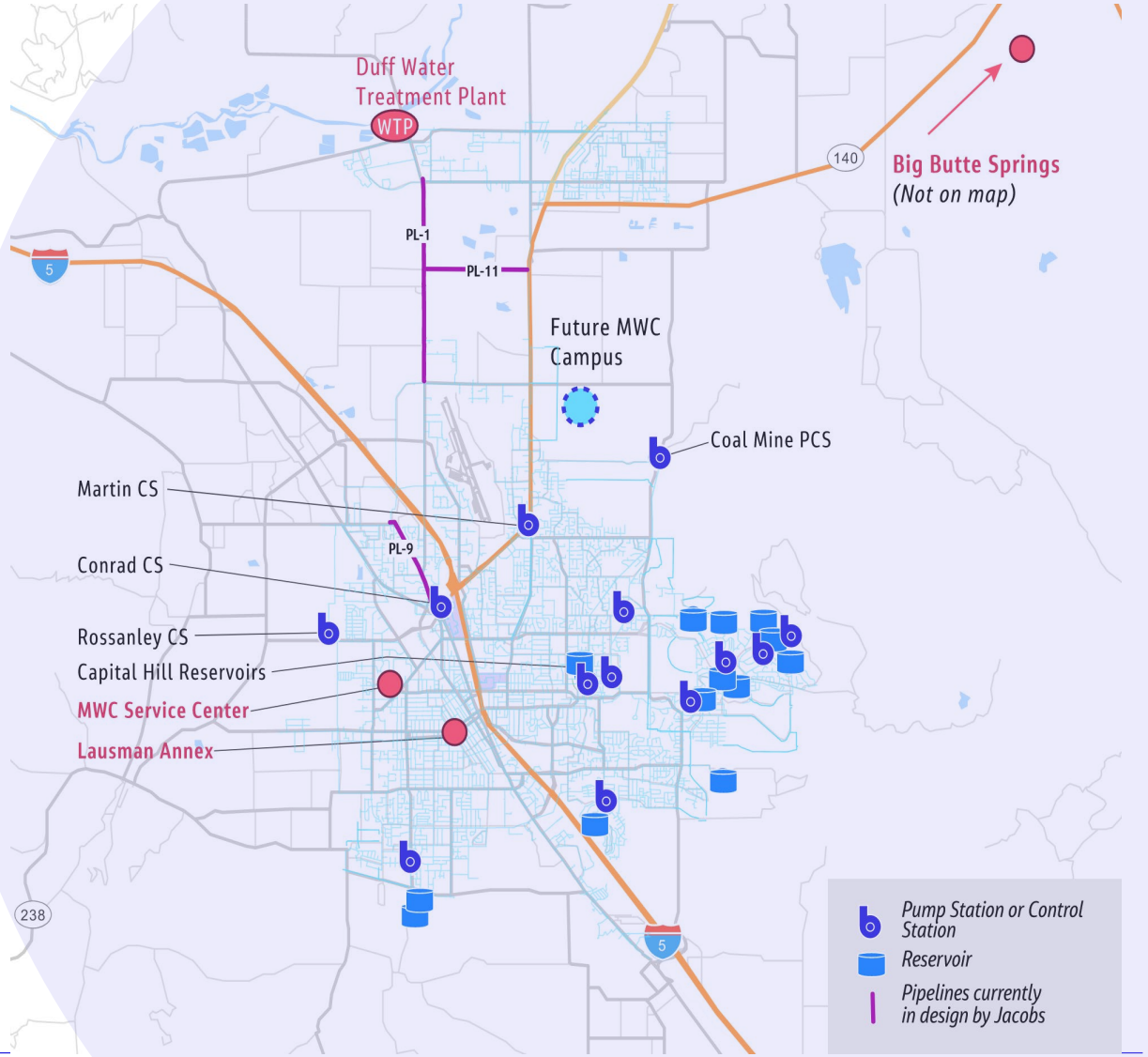


# Capital Hill Reservoir Replacement

- Replace two aging reservoirs with 12 MG capacity
- Construct new reservoirs with 14 MG of resilient capacity

# SCADA Upgrades

- New SCADA platform (Rockwell FactoryTalk) to come online February 2023
- Phased implementation at Duff WTP, BBS, and distribution system
- Plan to implement FluidMesh radio to cover remote sites



# Thank You

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