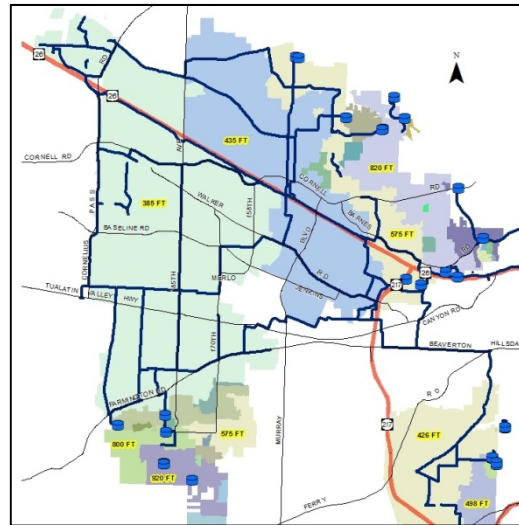


Selection and Design of an Irregular Shaped Reservoir to Satisfy Challenging Project Constraints



2014 PNWS Conference



Outline

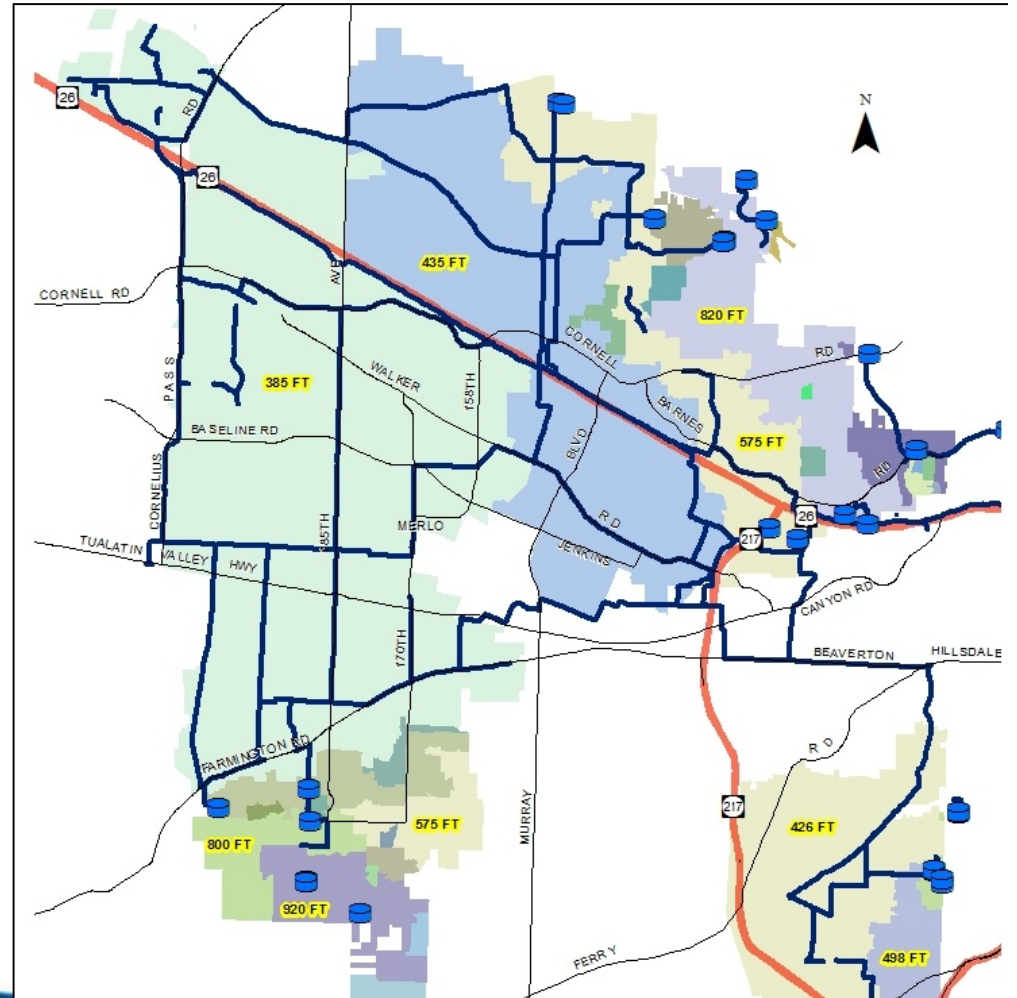
- Background
- Project History
- Preliminary Design
- Final Design



Background

- 28 pressure zones (PZ)
- 12 pump stations
- Nearly 800 miles of pipe
- 65 million gallons (MG) storage

That's not enough storage for the future & finding places for reservoirs is difficult



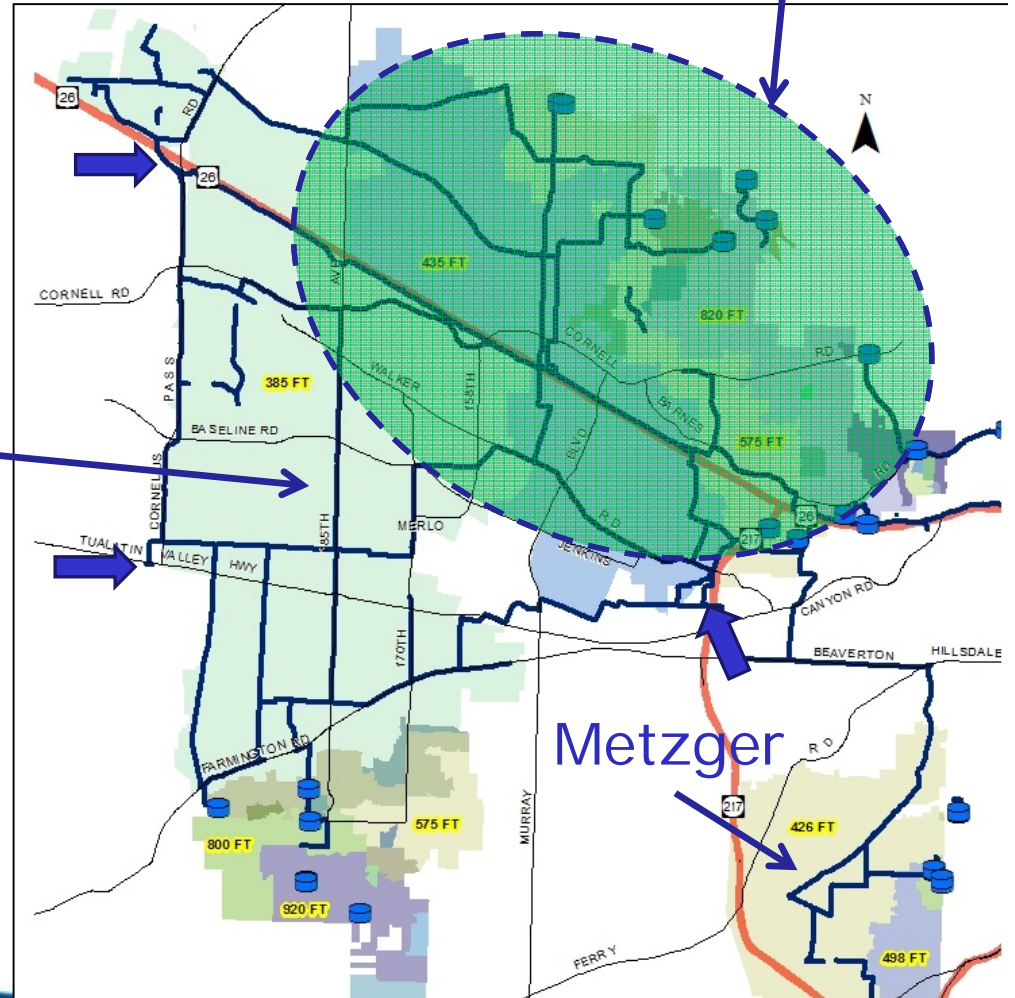
Background

- 45 square mile service area
- Three points where flow enters the District

West Hills Study Area

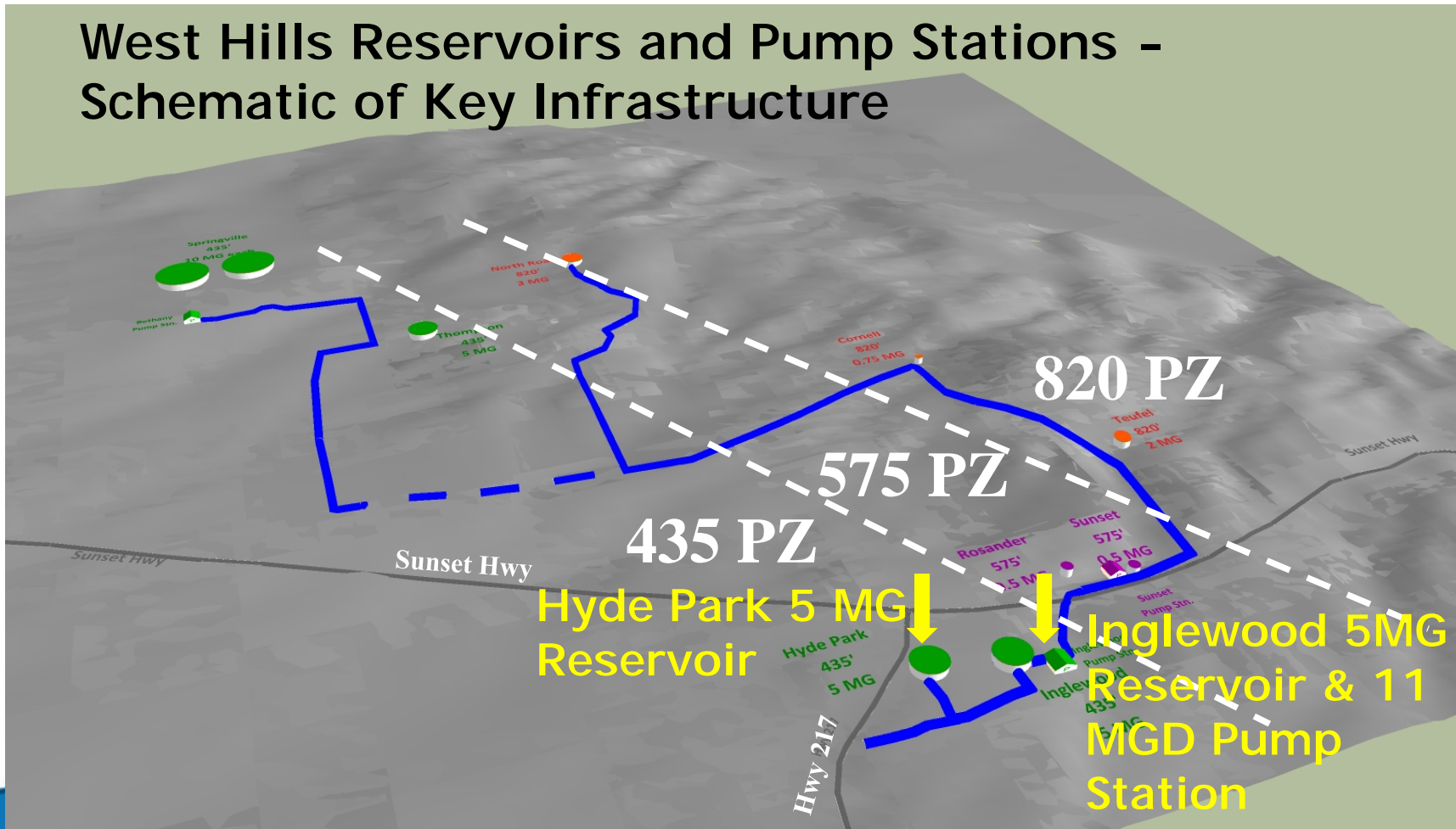
Wolf Creek

Metzger



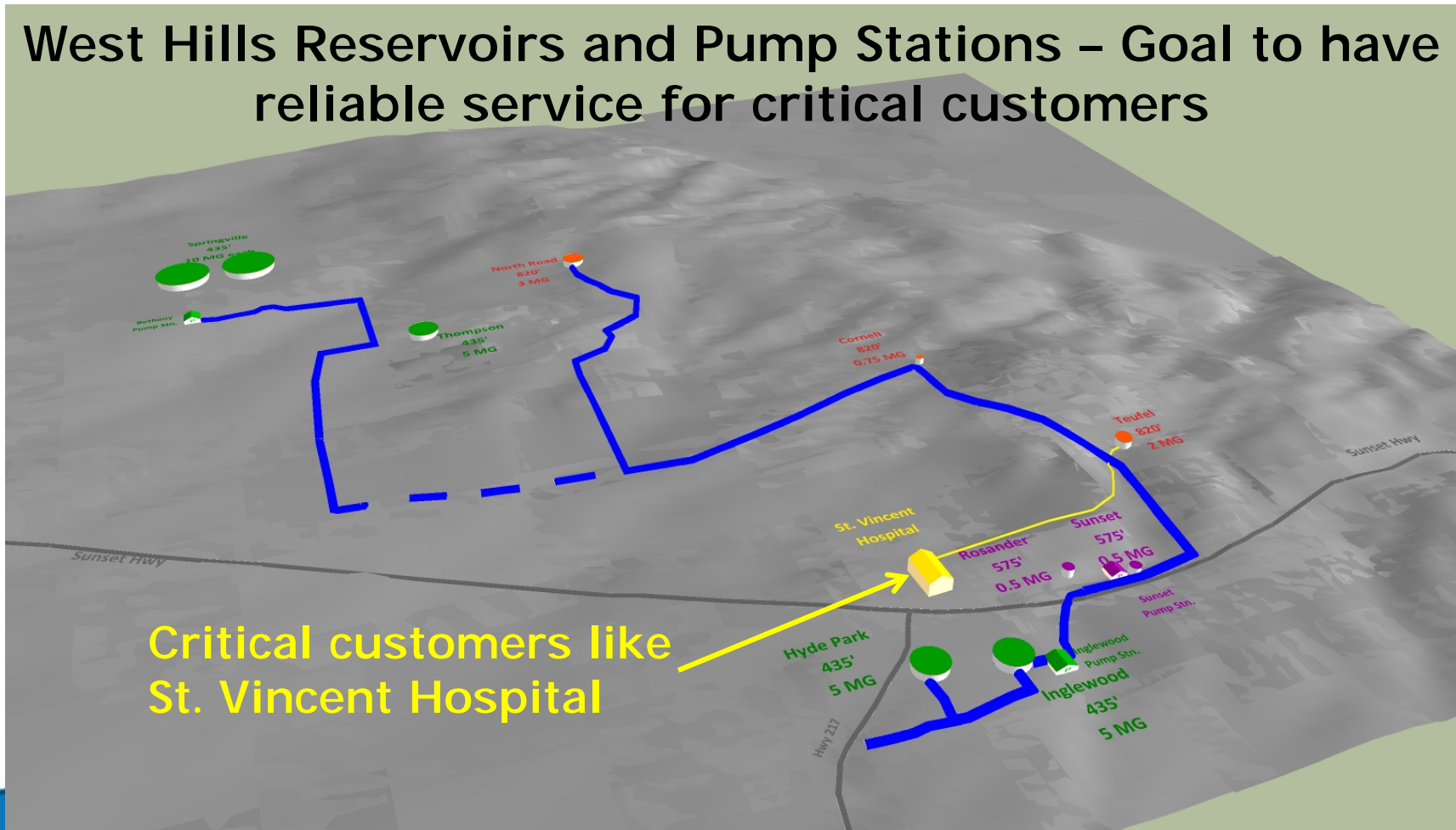
Background

West Hills Reservoirs and Pump Stations - Schematic of Key Infrastructure



Background

West Hills Reservoirs and Pump Stations – Goal to have reliable service for critical customers



Project History

West Hills Reservoirs and Pump Stations - Recent Studies Related to the Area:

- TVWD Water Master Plan Update (Carollo, 2007)
- Reservoir Inspections and Structural Evaluations (OBEC, 2009)
 - Hyde Park Reservoir
 - Inglewood Reservoir
 - Sunset Reservoir
 - Cornell Reservoir
- West Hills Reservoirs and Pump Stations Hydraulic and Economic Analysis (Black & Veatch, 2010)



Background

Site Map



Conditions & Findings

- Prestressed Concrete Tank (partially buried)
- Constructed in 1970
- Structurally:
 - Fair condition
 - Seismic upgrades needed
 - 25 psf roof load rating
 - Tennis courts closed
- Piping improvements needed



Background



5 MG Hyde
Park Reservoir

Background

Site Map



Conditions & Findings

- Prestressed Concrete Tank (partially buried)
- Constructed in 1961
- Structurally:
 - Fair condition
 - Seismic upgrades needed
 - 25 psf roof load rating
 - Tennis courts closed



Project History

West Hills Reservoirs and Pump Stations Goals:

- Determine preferred long-term improvements
- Address concerns from condition assessment inspections
- Improve system reliability
- Improve system redundancy
- Consider emergency preparedness in long-term planning for improvements



Project History

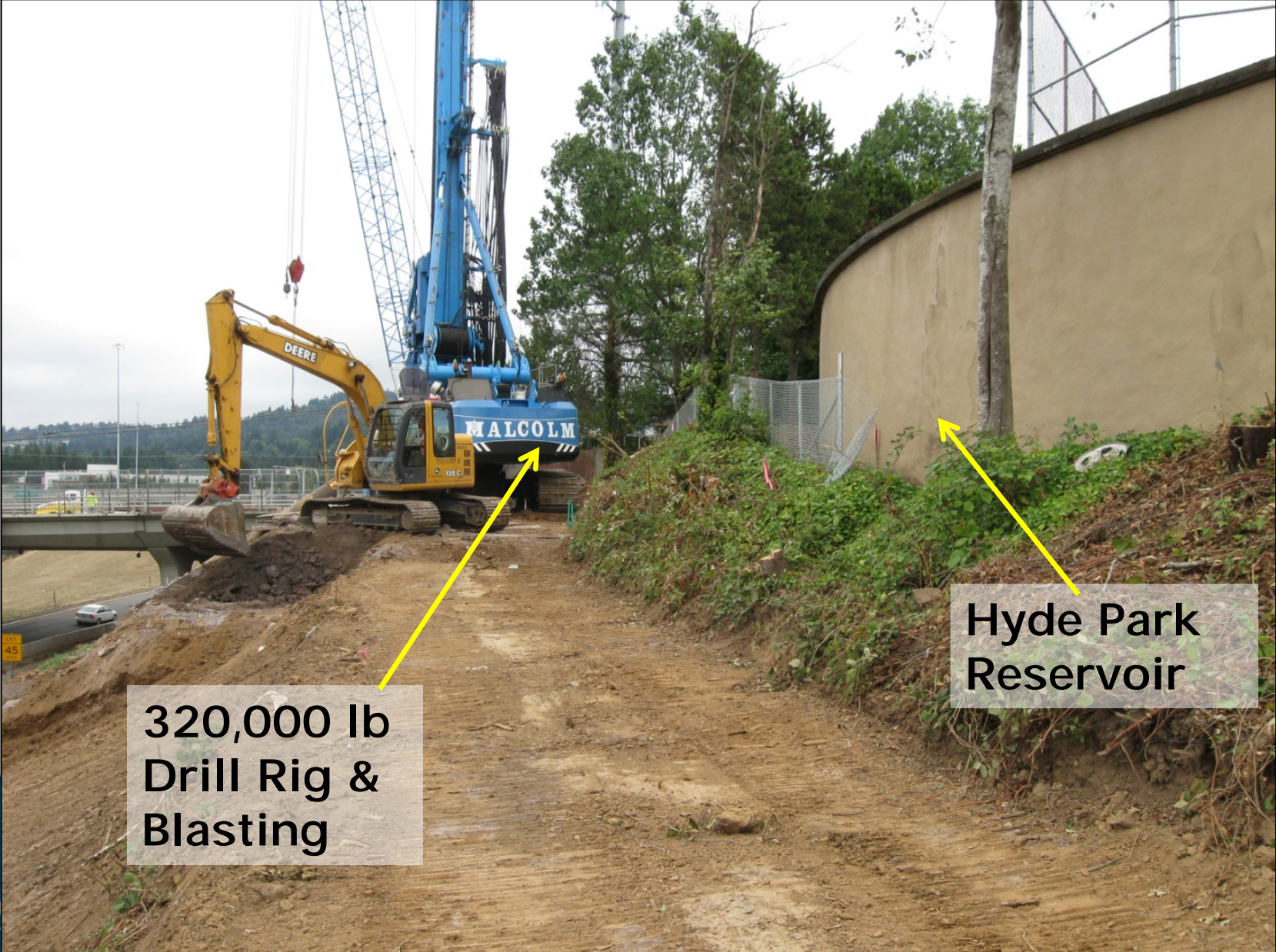
New Secant
Pile Wall
Along Hwy
217



Hyde Park
Reservoir



Project History

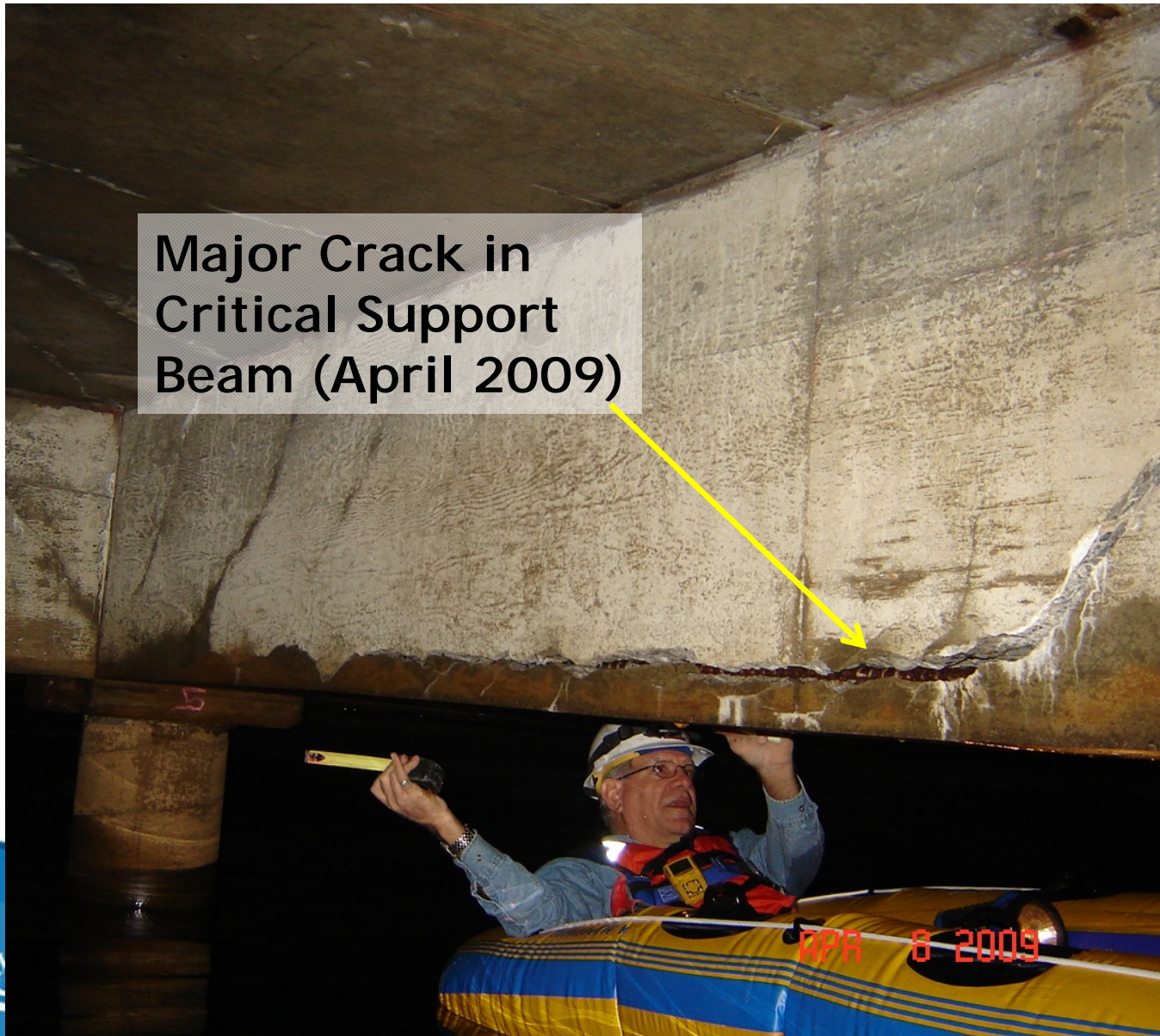


320,000 lb
Drill Rig &
Blasting

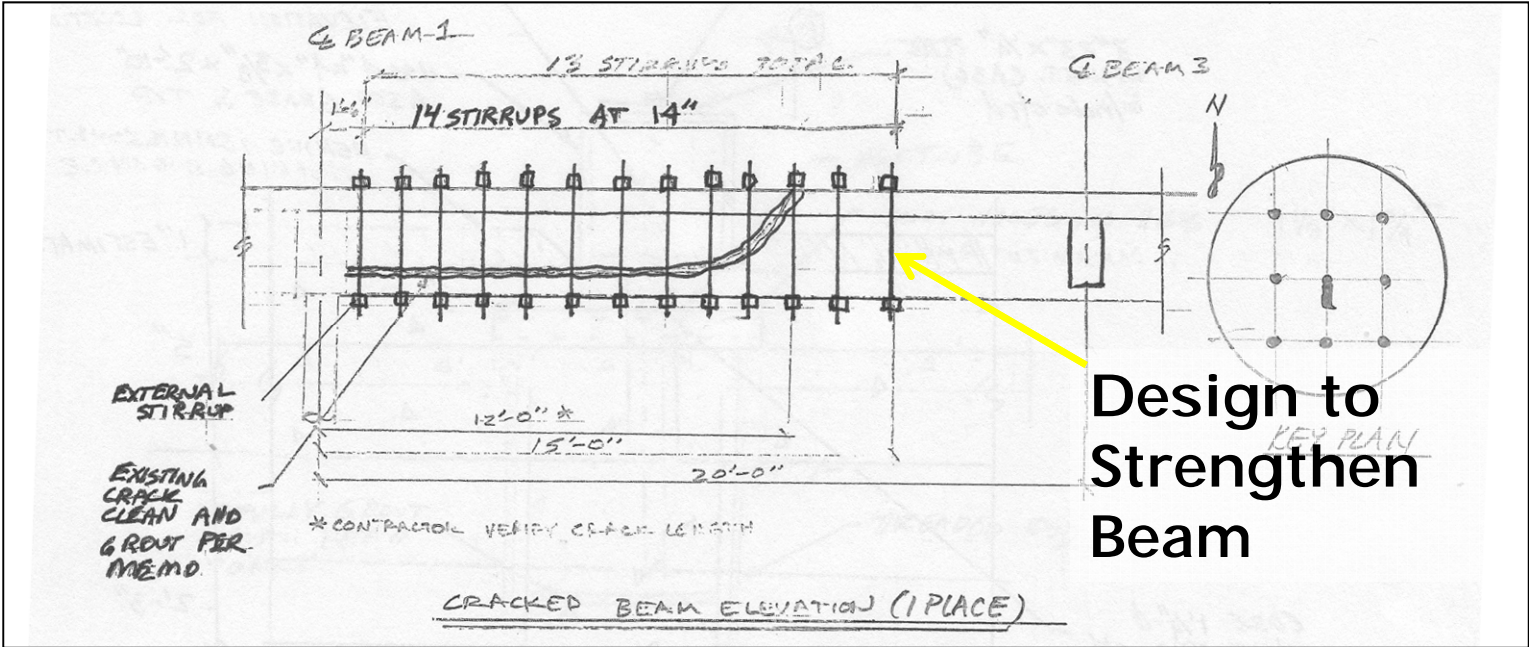
Hyde Park
Reservoir

Project History

Major Crack in
Critical Support
Beam (April 2009)



Project History



Design to Strengthen Beam

Project History

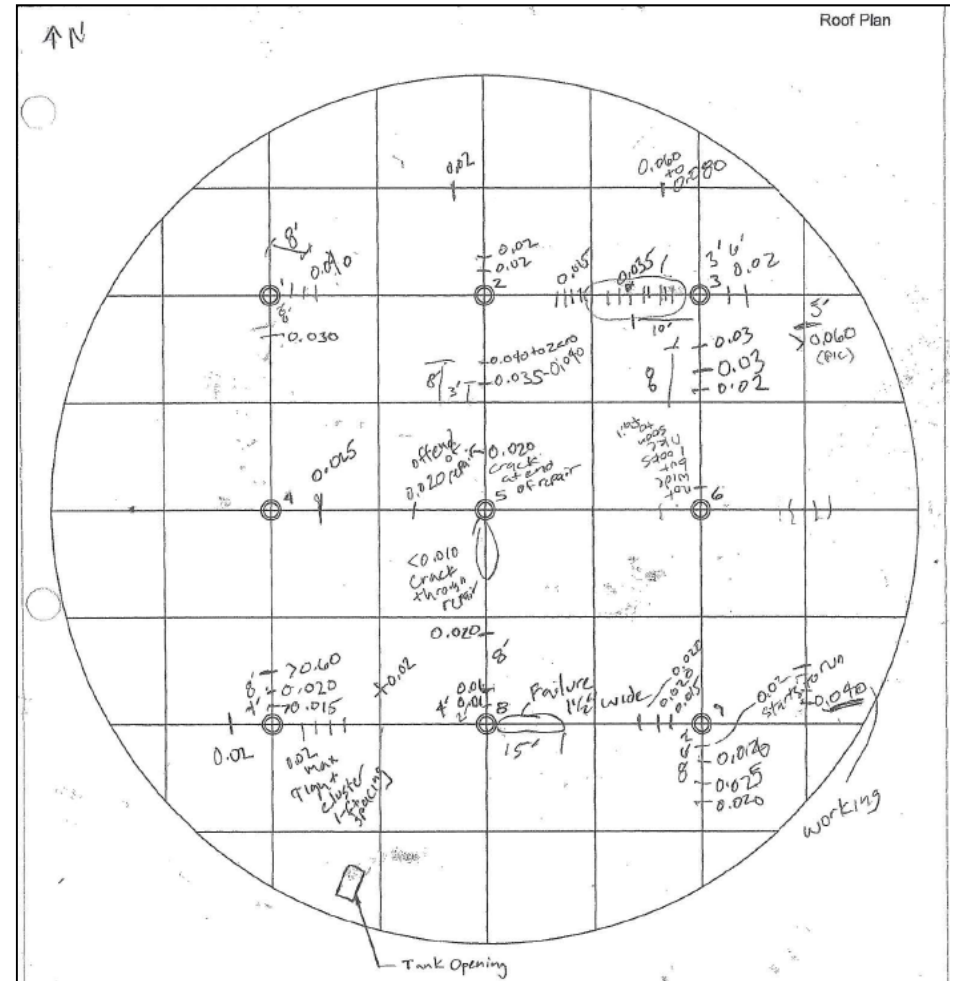


Project History

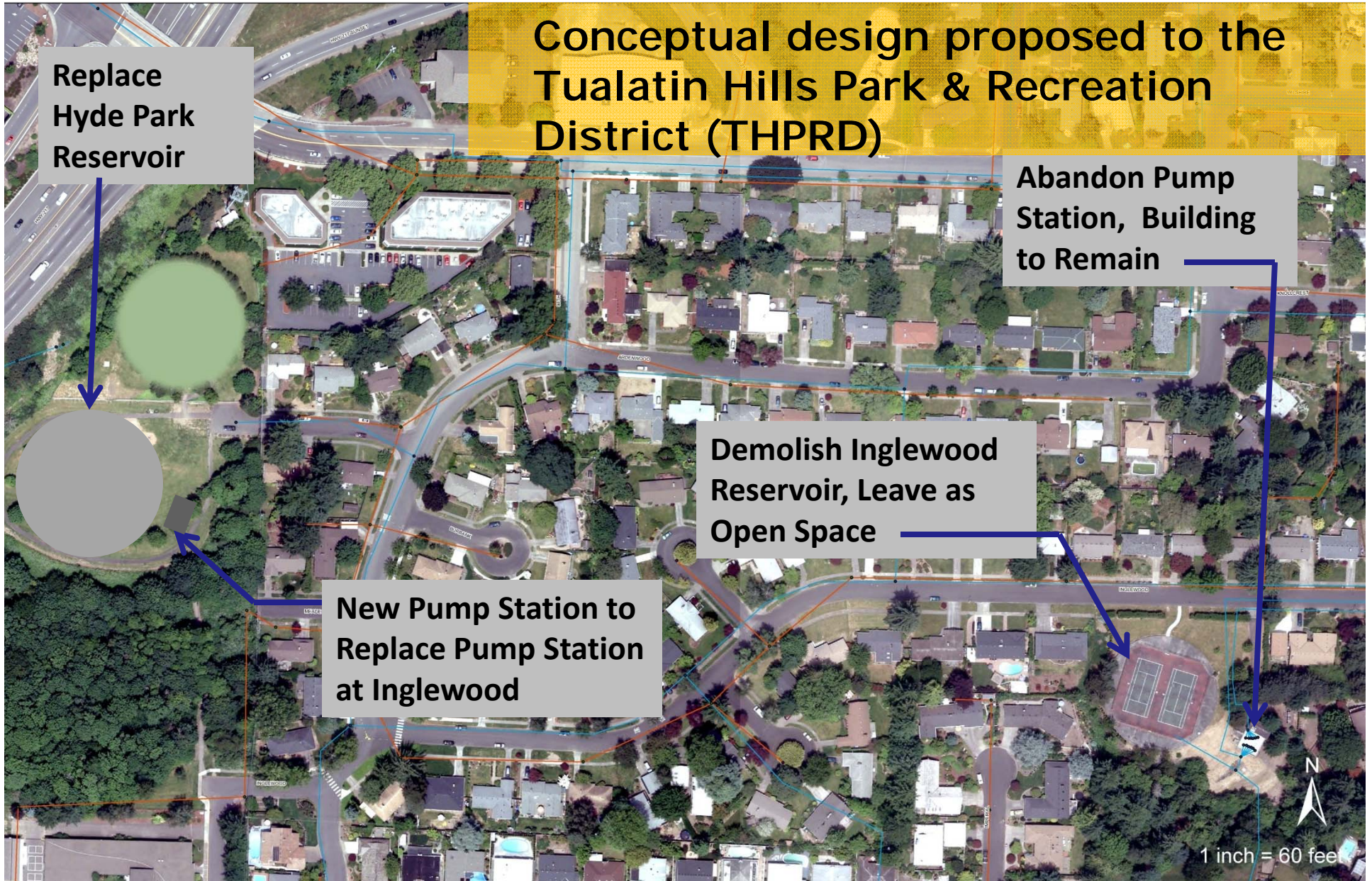
Major Crack in
Critical Support
Beam (Oct. 2011)



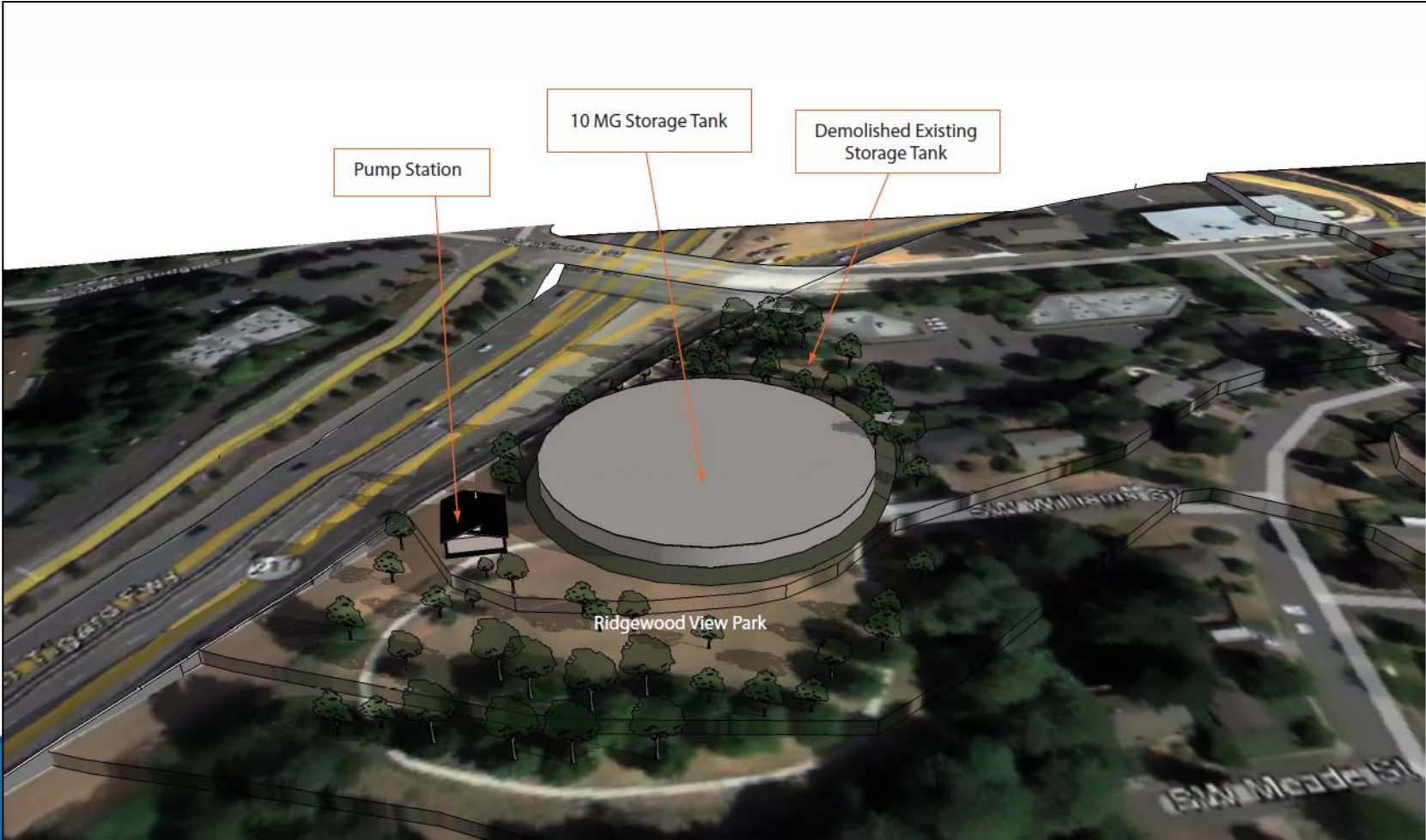
Photo 1: New beam failure east of south-central column



Project History






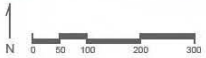
Project History



Project History

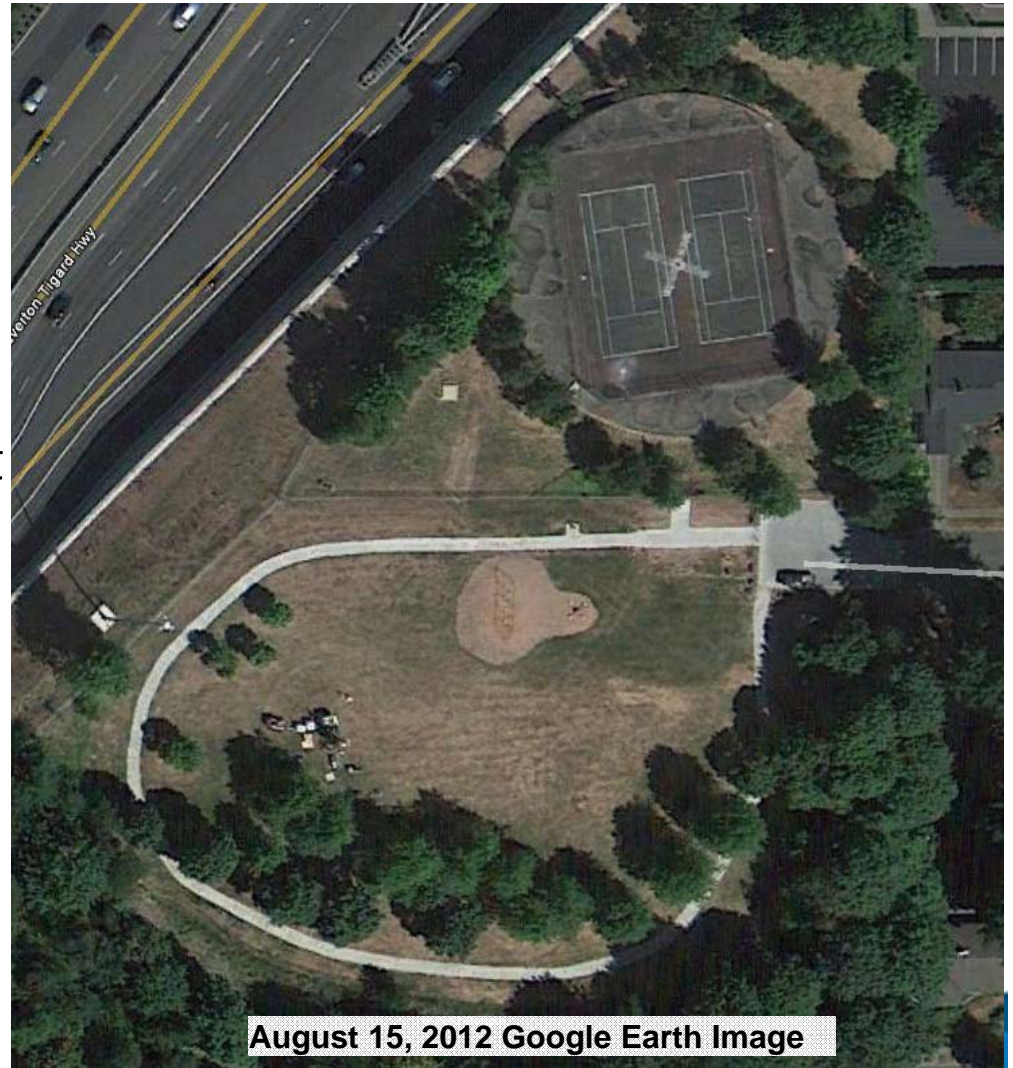


-  TVWD property
-  THPRD property
-  Beaverton right-of-way



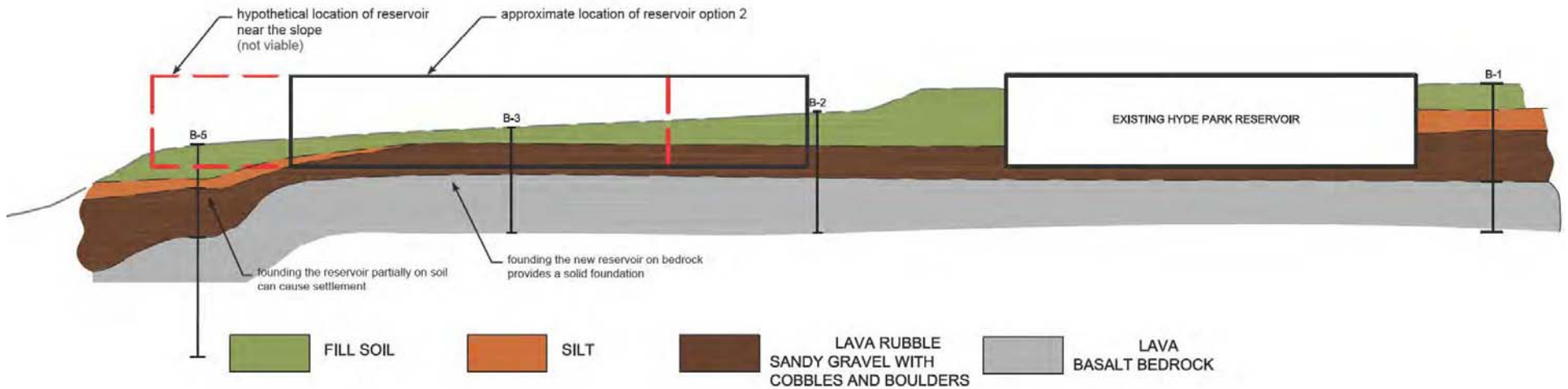
Preliminary Design

- Site survey work
- Conducted geotechnical investigation
- Nature resources review
- Developed public involvement & outreach plan
- Started street right-of-way vacation process
- Develop of initial project replacement options



Preliminary Design

- Geologic Profile – Ridgewood View Park

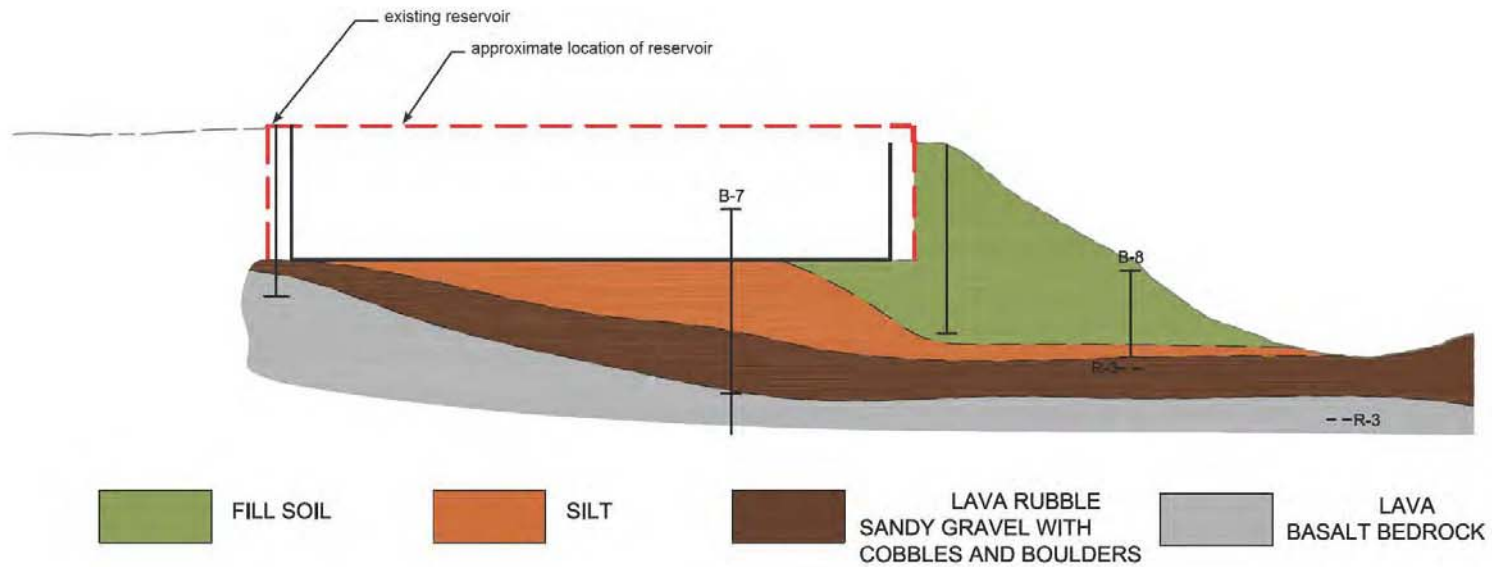


key notes

_foundation conditions are key considerations in reservoir placement

Preliminary Design

- Geologic Profile – Reservoir Park (Inglewood Reservoir)



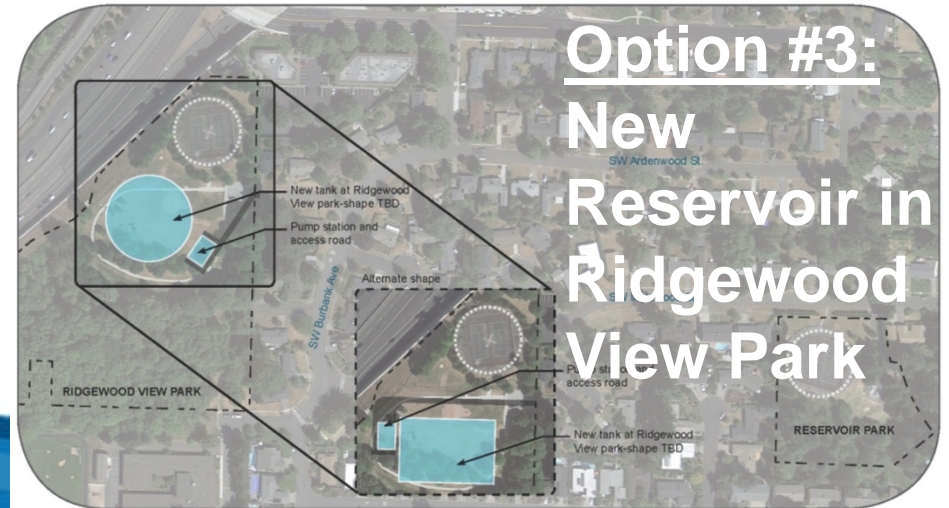
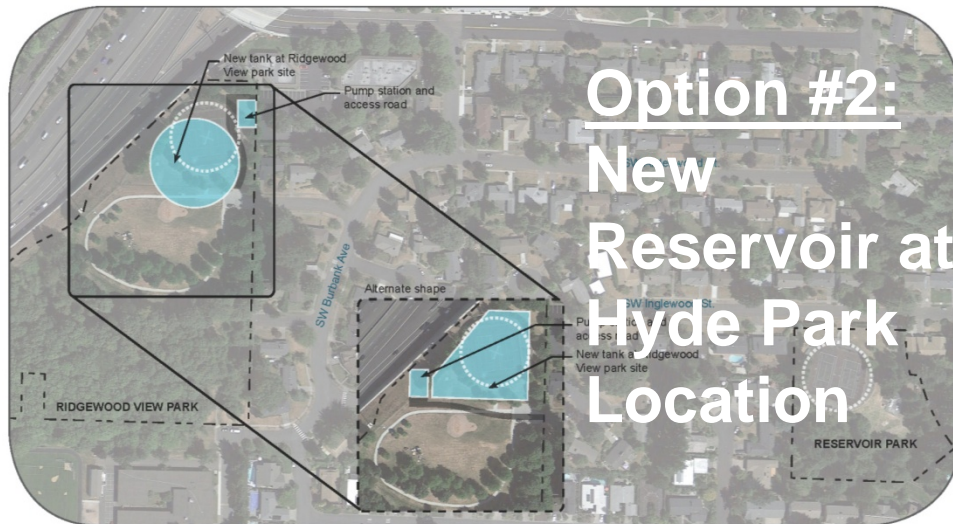
key notes

_foundation conditions are key considerations in reservoir placement

Preliminary Design

Reservoir Replacement Options:

- Circular AWWA D110 Prestressed Concrete Tank
- Cast-in-Place Concrete
- Post-Tensioned Concrete Tank



Preliminary Design

Key Comments from Public Meetings:

- Keep new facilities close to where they are now – least intrusive possible
- Minimize impact on current park sites
- Provide new reliable water storage capacity
- Minimize construction disruption



Preliminary Design

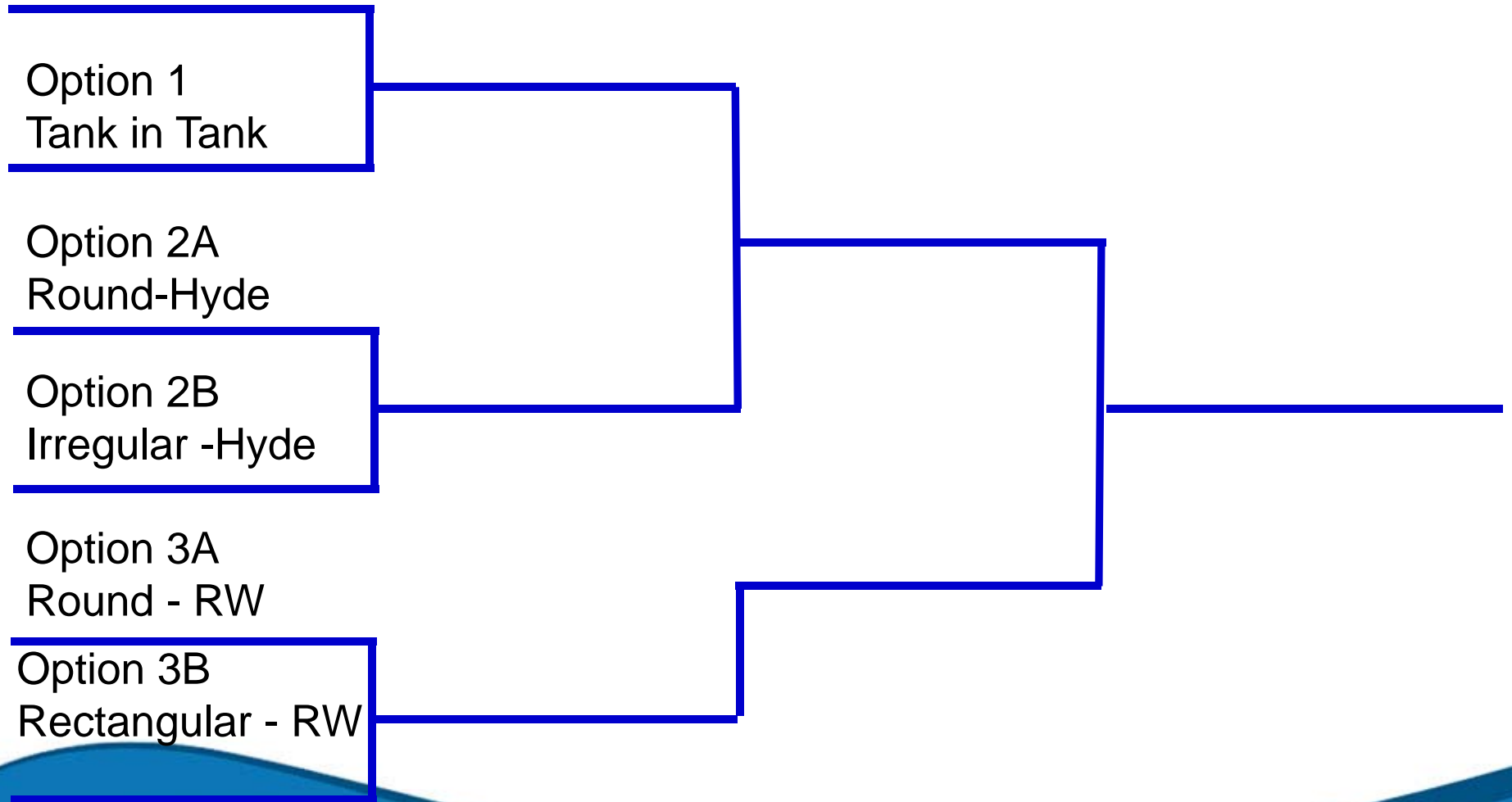
Developed and Applied Evaluation Criteria:

- Provides 7 MG of seismically resilient storage
- Construction cost
- Permitting impacts
- Long term community impacts
- Short term community impacts (including construction)
- Constructability
- Sustainability
- Operations and maintenance considerations
- Property impacts
- Compatibility with potential parks uses and amenities



Preliminary Design

Comparison by Pairs Evaluation Process Used



Preliminary Design

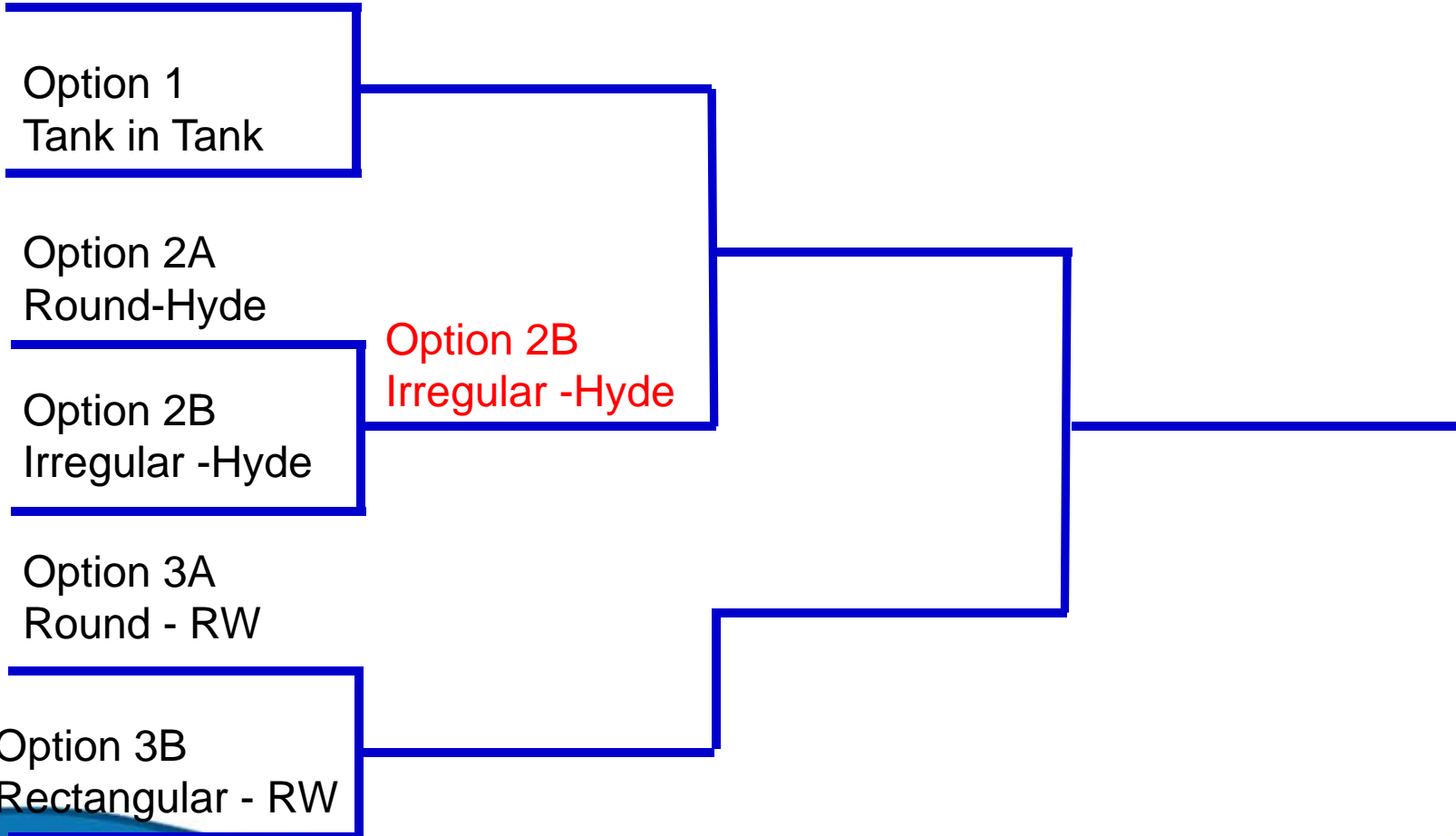
Alternative Evaluation – Option 2A vs. Option 2B



Preliminary Design

Criteria	2A - Round Reservoir at Hyde Park	2B – Irregular Res. at Hyde Park
7 MG Resilient Storage		
Overall Project Cost	✓	
Permitting Impacts		✓
Long Term Impacts		✓
Short Term Impacts		
Constructability		✓
Sustainability		
Operations & Maintenance		
Property Impacts		✓
Compatibility w/ Parks		✓

Preliminary Design

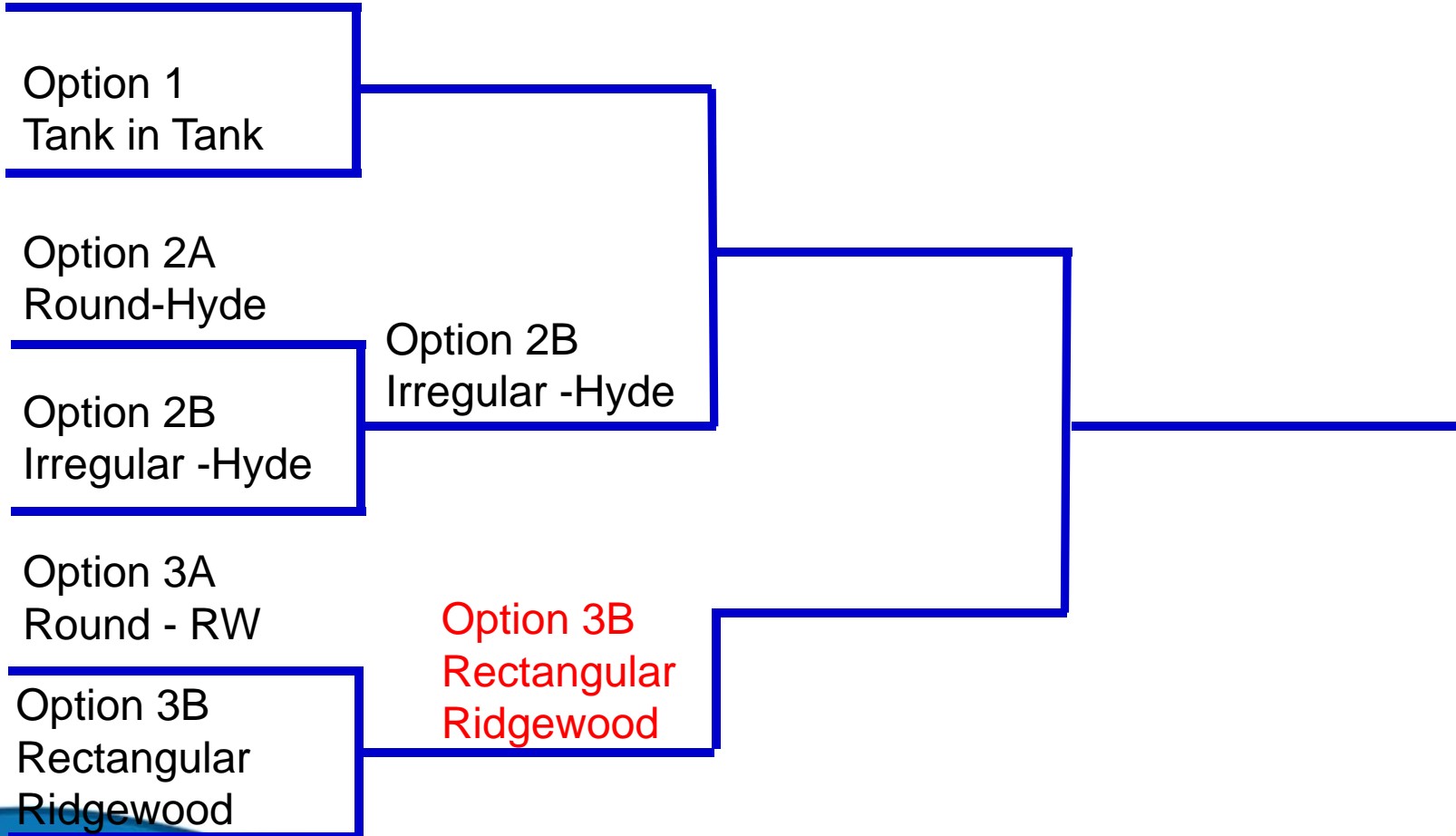


Preliminary Design

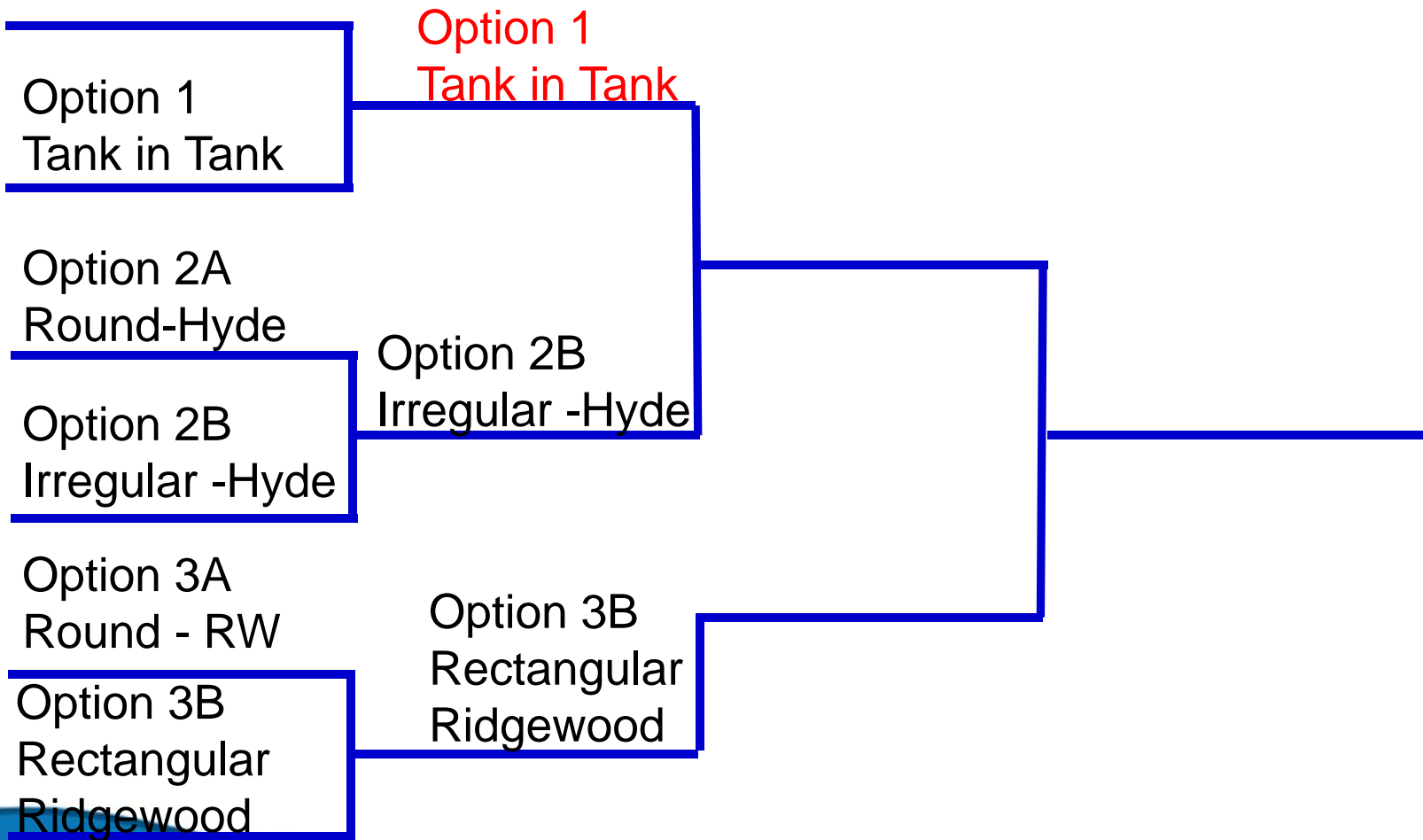
Alternative Evaluation – Option 3A vs. Option 3B



Preliminary Design



Preliminary Design

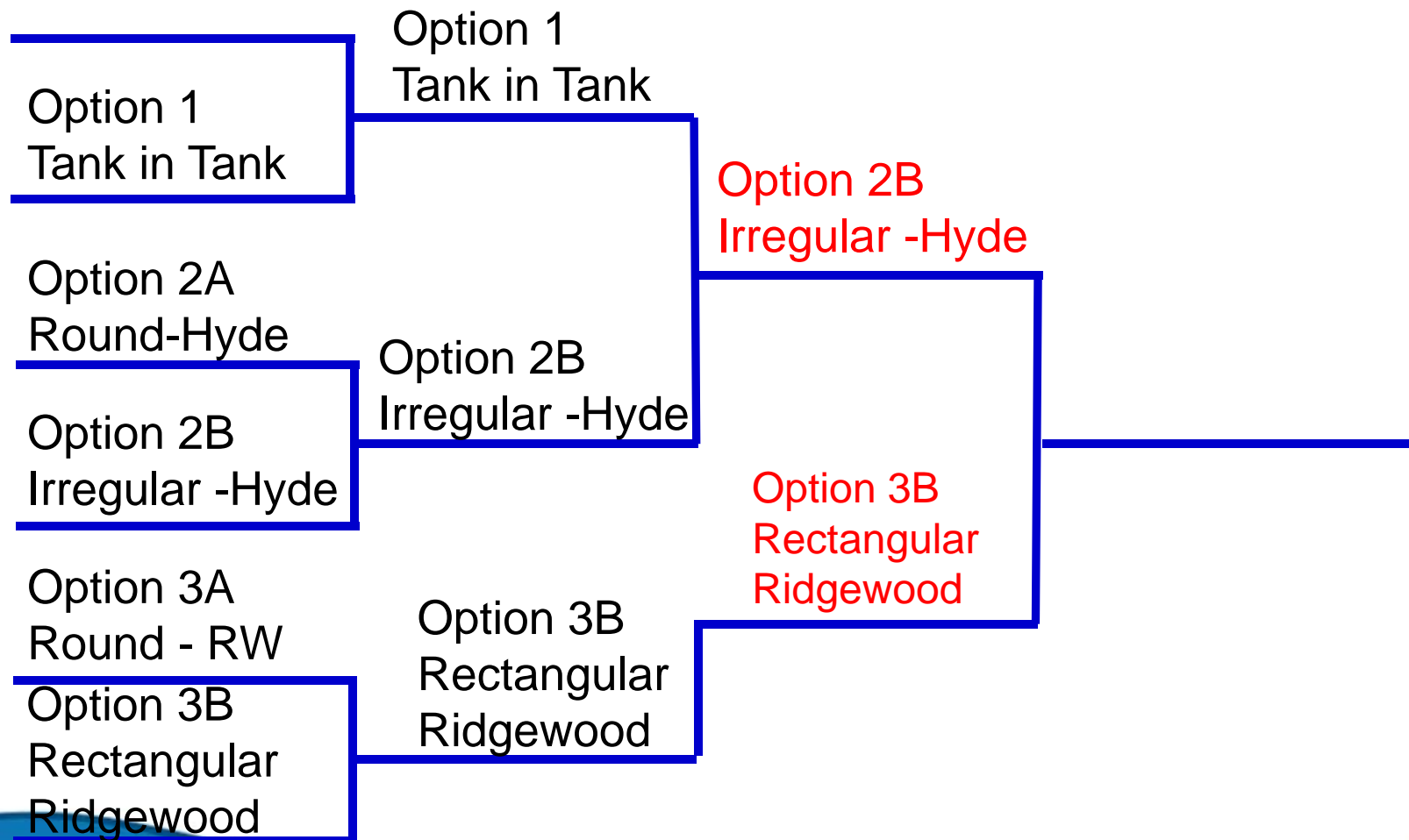


Preliminary Design

Alternative Evaluation – Option 1 vs. Option 2B



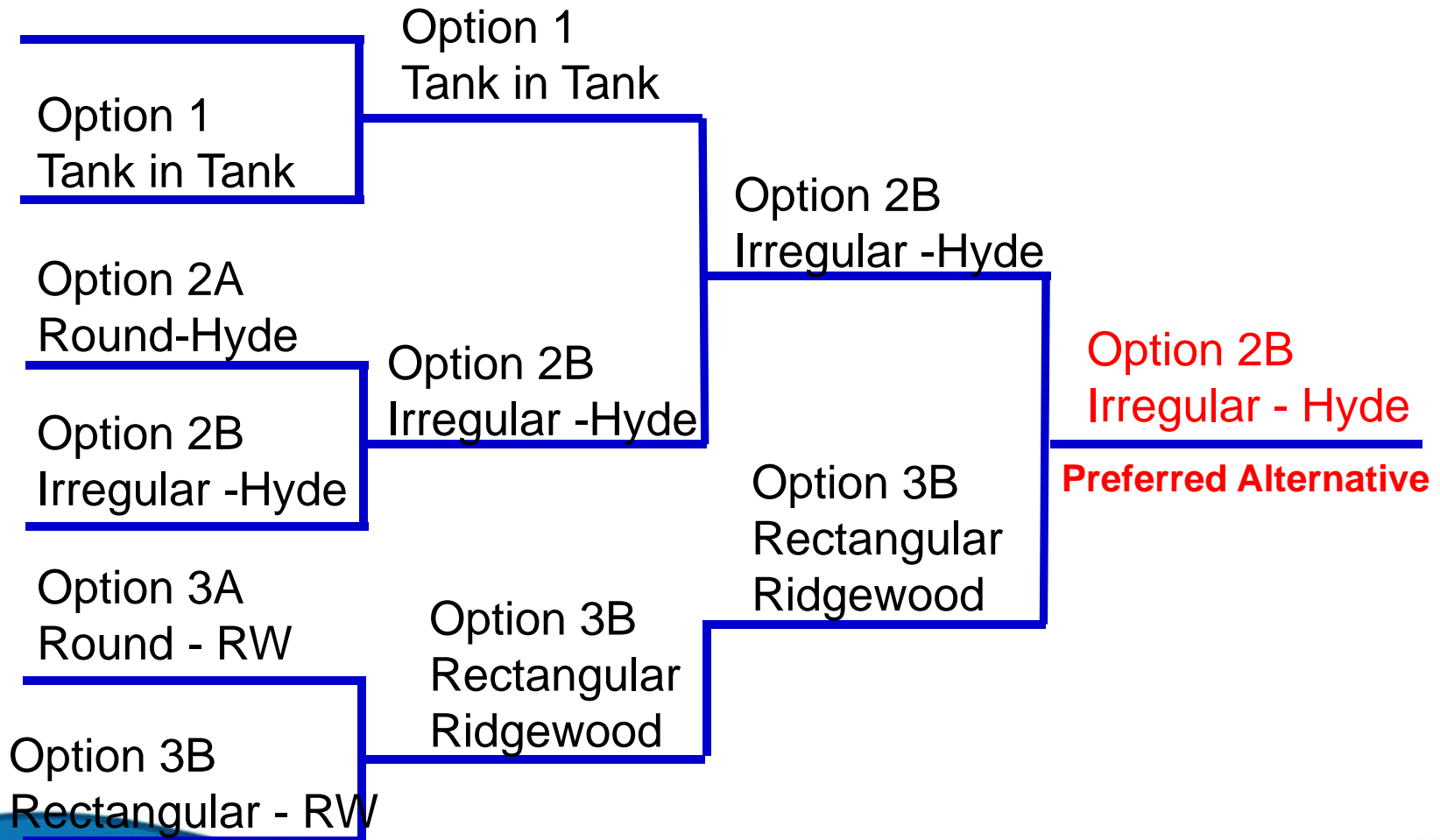
Preliminary Design



Preliminary Design

Criteria	3B – Rectangular at Ridgewood View Park	2B - Irregular Res. at Hyde Park
7 MG Resilient Storage		
Overall Project Cost		
Permitting Impacts		✓
Long Term Impacts		✓
Short Term Impacts		
Constructability		✓
Sustainability	✓	
Operations & Maintenance		
Property Impacts		✓
Compatibility w/ Parks		✓

Preliminary Design



Final Design



Water Facilities Planning through January 2013

Parks Restoration Planning continues through May 2013

★ *Public Open Houses: October 2012, December 2012, March 2013, May 2013*

Final Design

Open House Input & Park Facility Ideas:

- Tennis/Sport Courts
- Picnic/Benches
- Play Structure
- Bocce Ball
- Dog Run
- More Trees
- Landscaping –
remove non-natives



Final Design

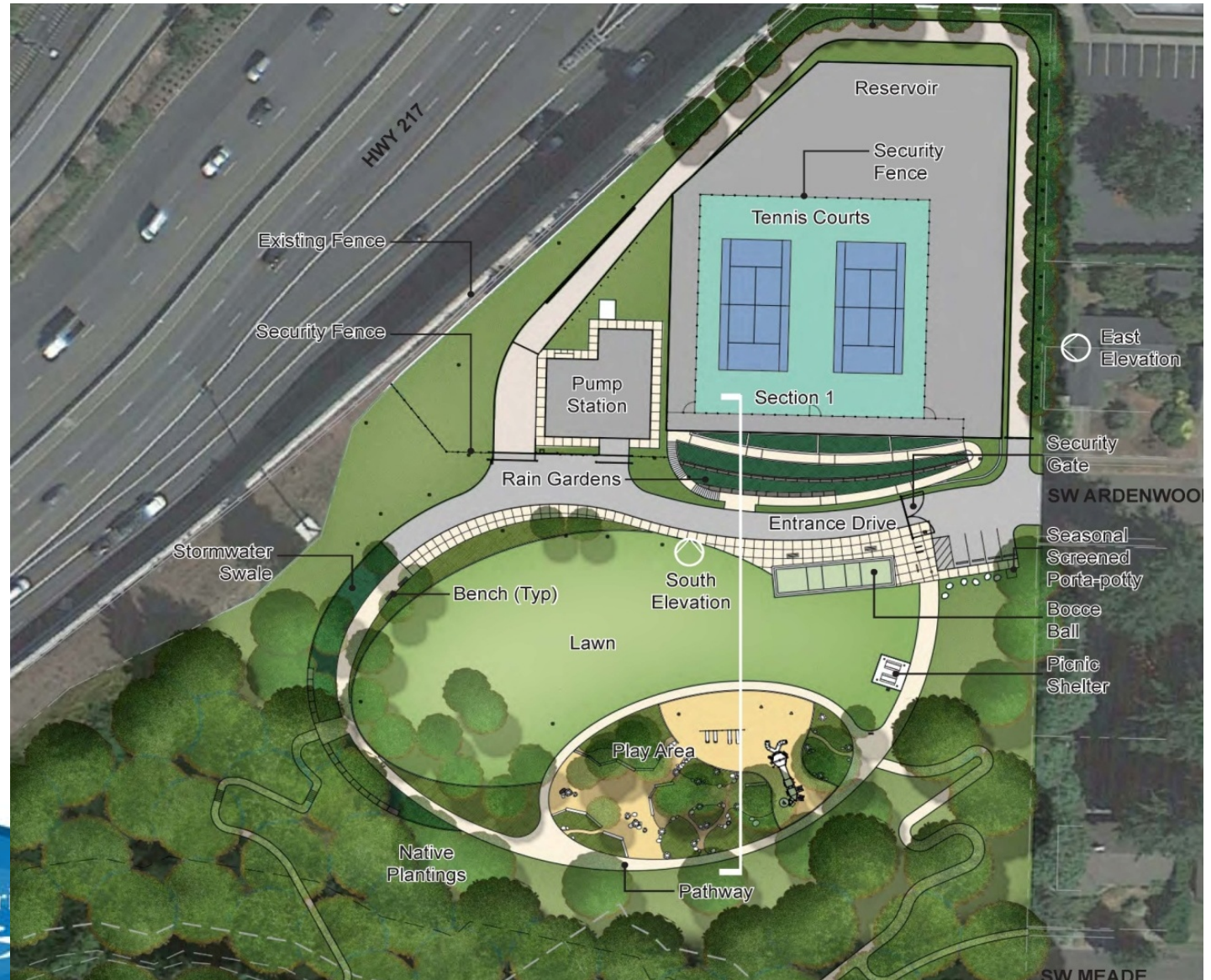
Project Status & Schedule:

- Held 90% review meeting
 - 8 MG reservoir
 - Resilient facility
- Working towards 100% design
- Working on Land Use Approval & other permits
- Prequalification of contractors
- Advertisement for bid
- Anticipated Notice to Proceed: 7/29/14



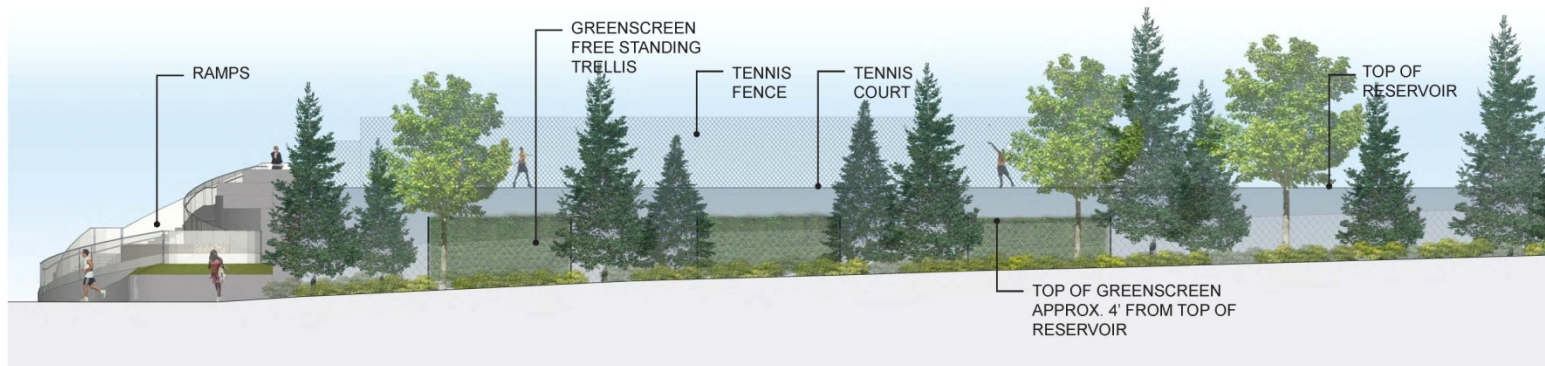
Final Design

- Site Plan



Final Design

- East Elevation



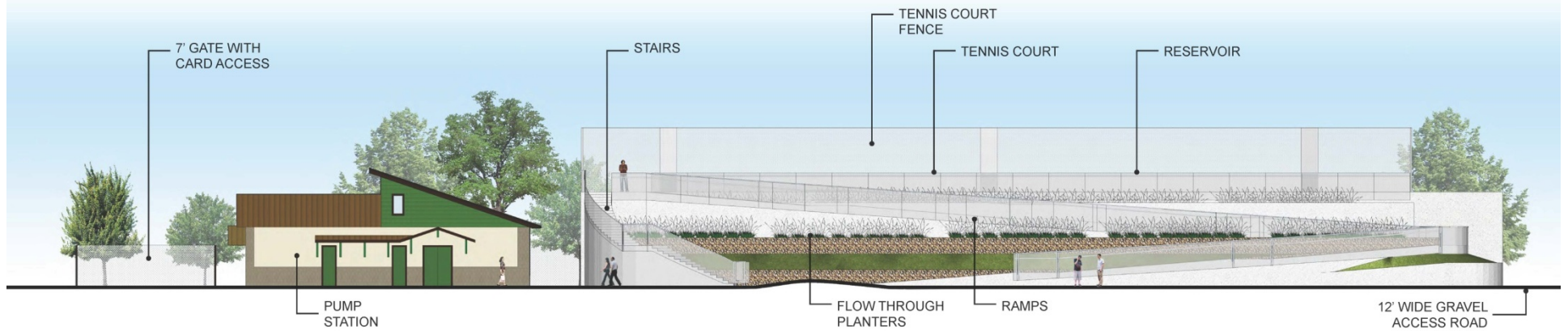
elevation



green screen precedents

Final Design

- South Elevation



Final Design

- Section



Questions?

- Contact information:
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Chief Engineer
Tualatin Valley Water District
503-848-3045
mikeb@tvwd.org

