

2024 AWWA-PNWS Spring Conference

Scope Creep for the Greater Good

Adding Replacement of a 90-Year-Old Reservoir to a Pump Station Project on a Highly Constrained Site

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Agenda

01 Background

02 Initial Scope

03 The Path to Expanding Scope

04 Final Scope and Project Status

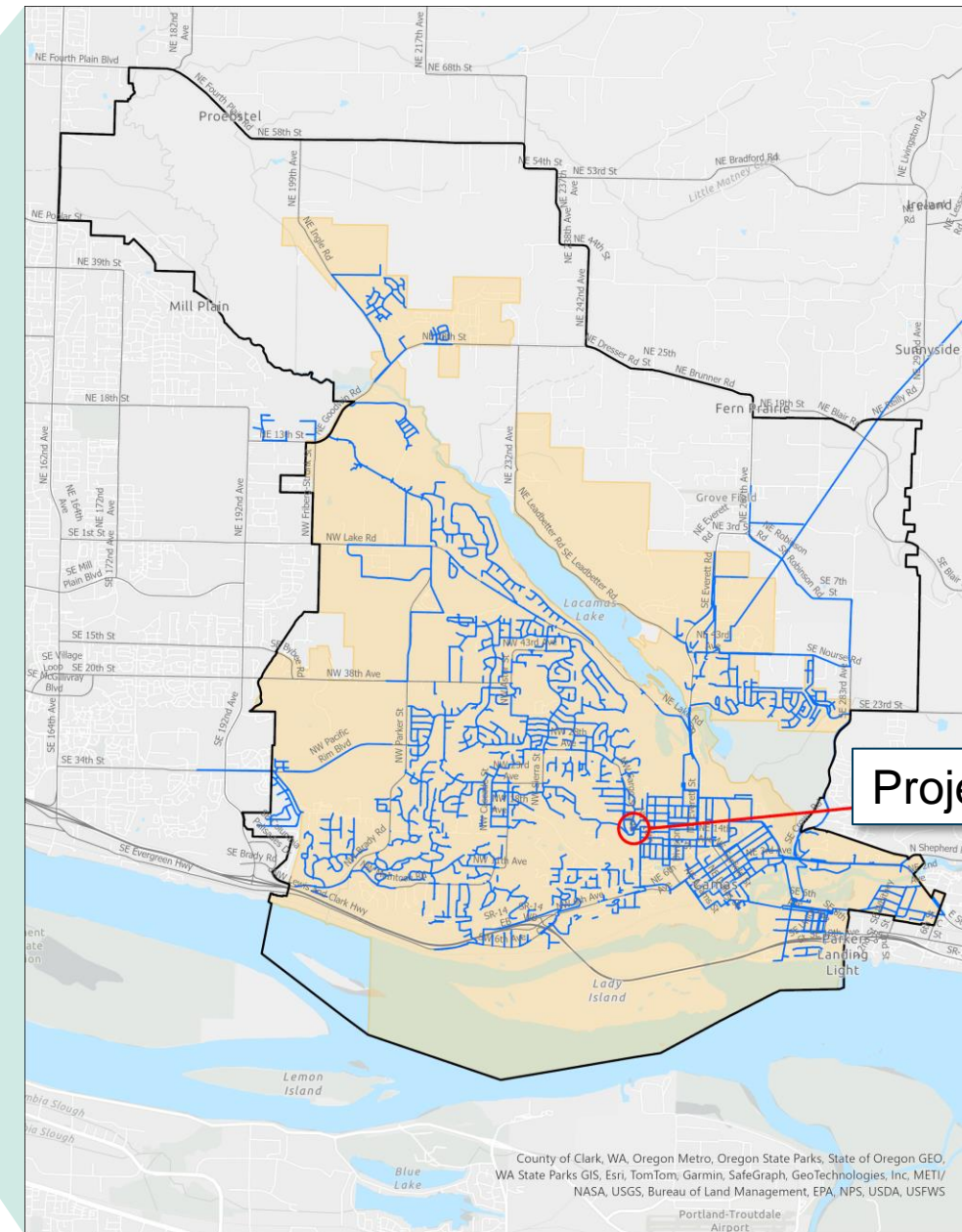
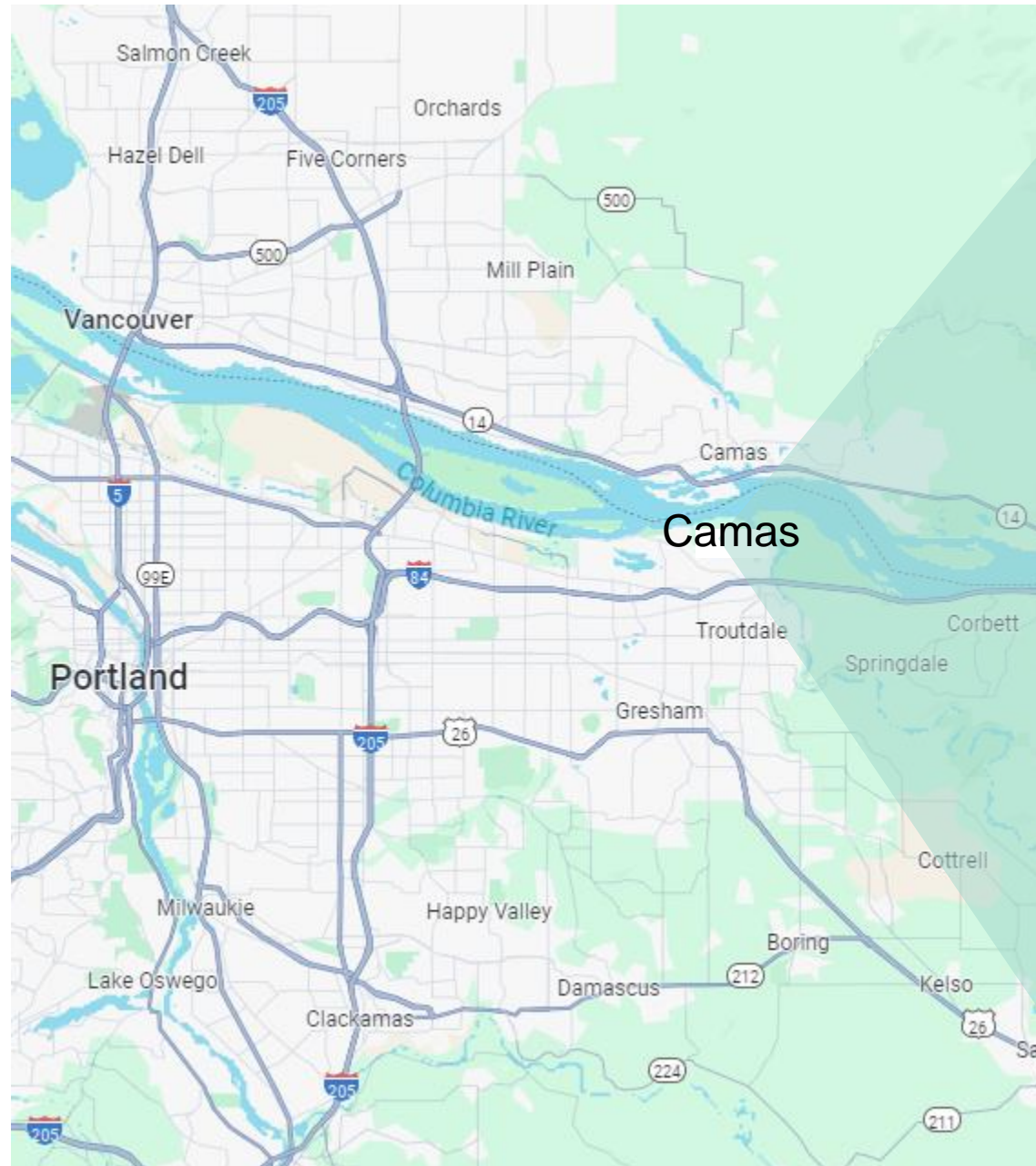
05 Q&A



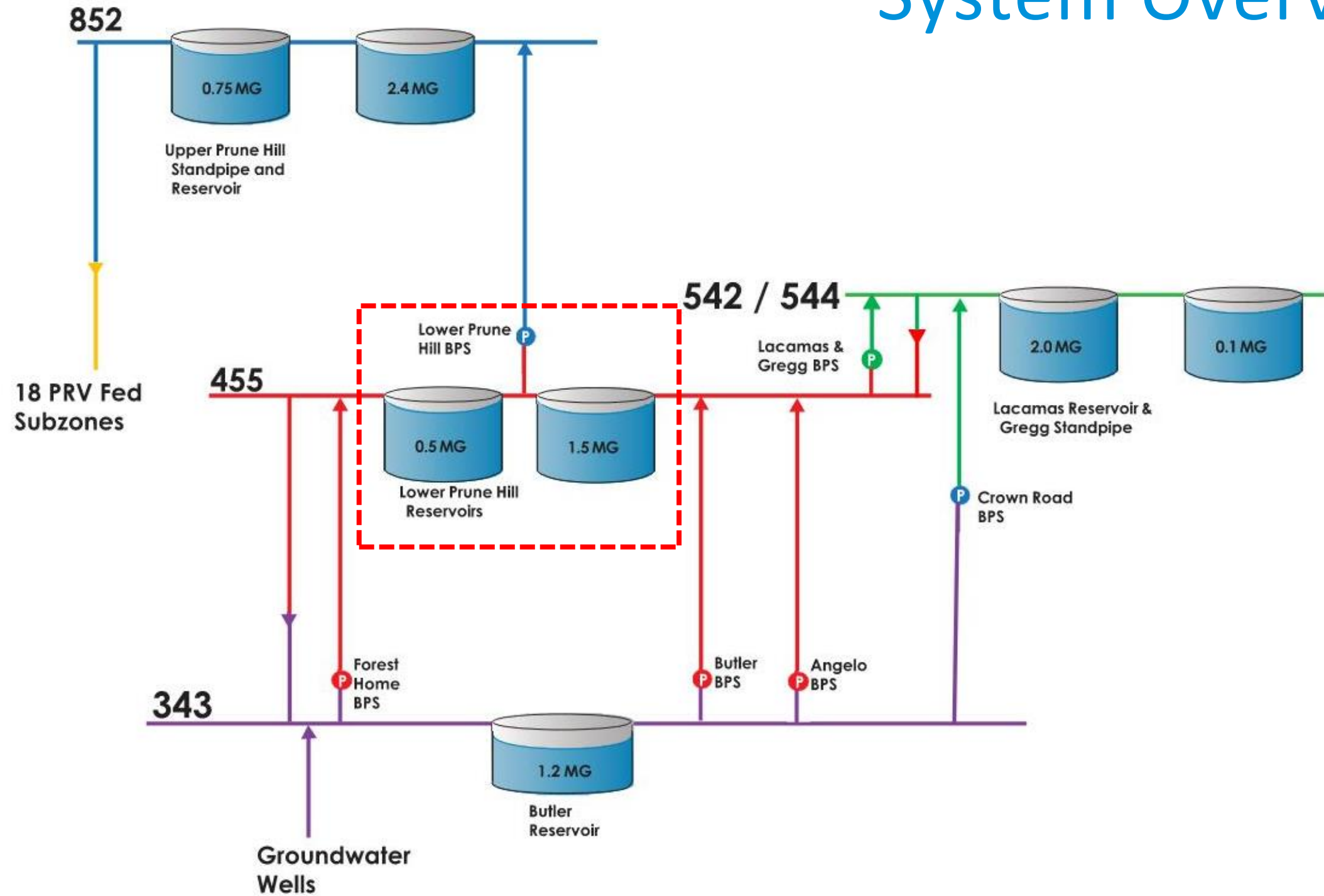
01

Background

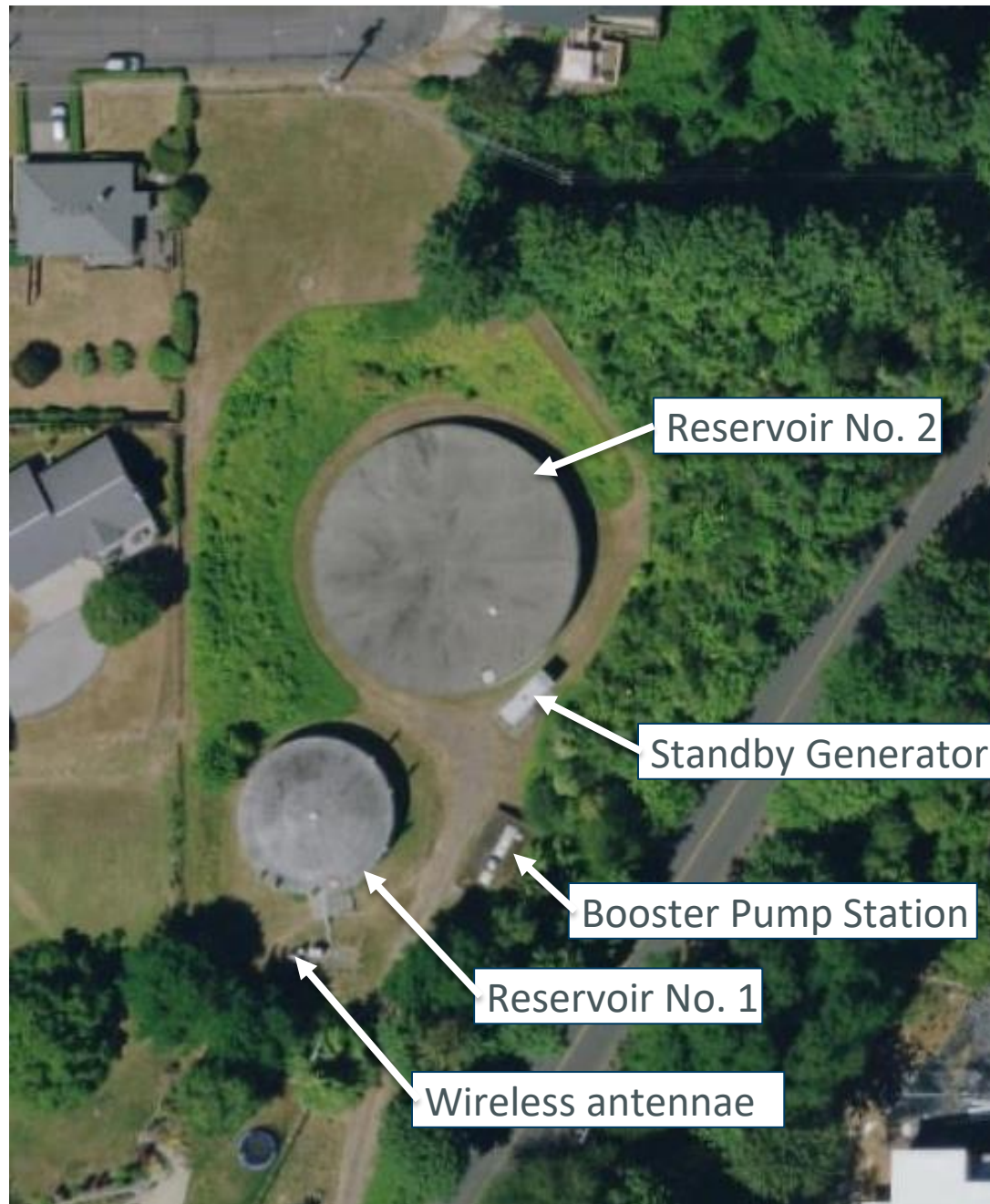
City Overview



System Overview



Site Overview/Existing Facilities



Site Facilities

- 0.5 MG concrete Reservoir No. 1
- 1.5 MG concrete Reservoir No. 2
- Booster Pump Station
- Standby Generator
- Sprint/T-Mobile wireless antenna facility, to be relocated prior to construction

Site Topography

- Steep slopes (2H:1V) in the north and west dropping towards the existing reservoirs
- Extremely steep slopes (3/4H:1V) in the east dropping towards NW 18th Loop

02

Initial Scope

Existing Booster Pump Station



Existing Structure and Equipment

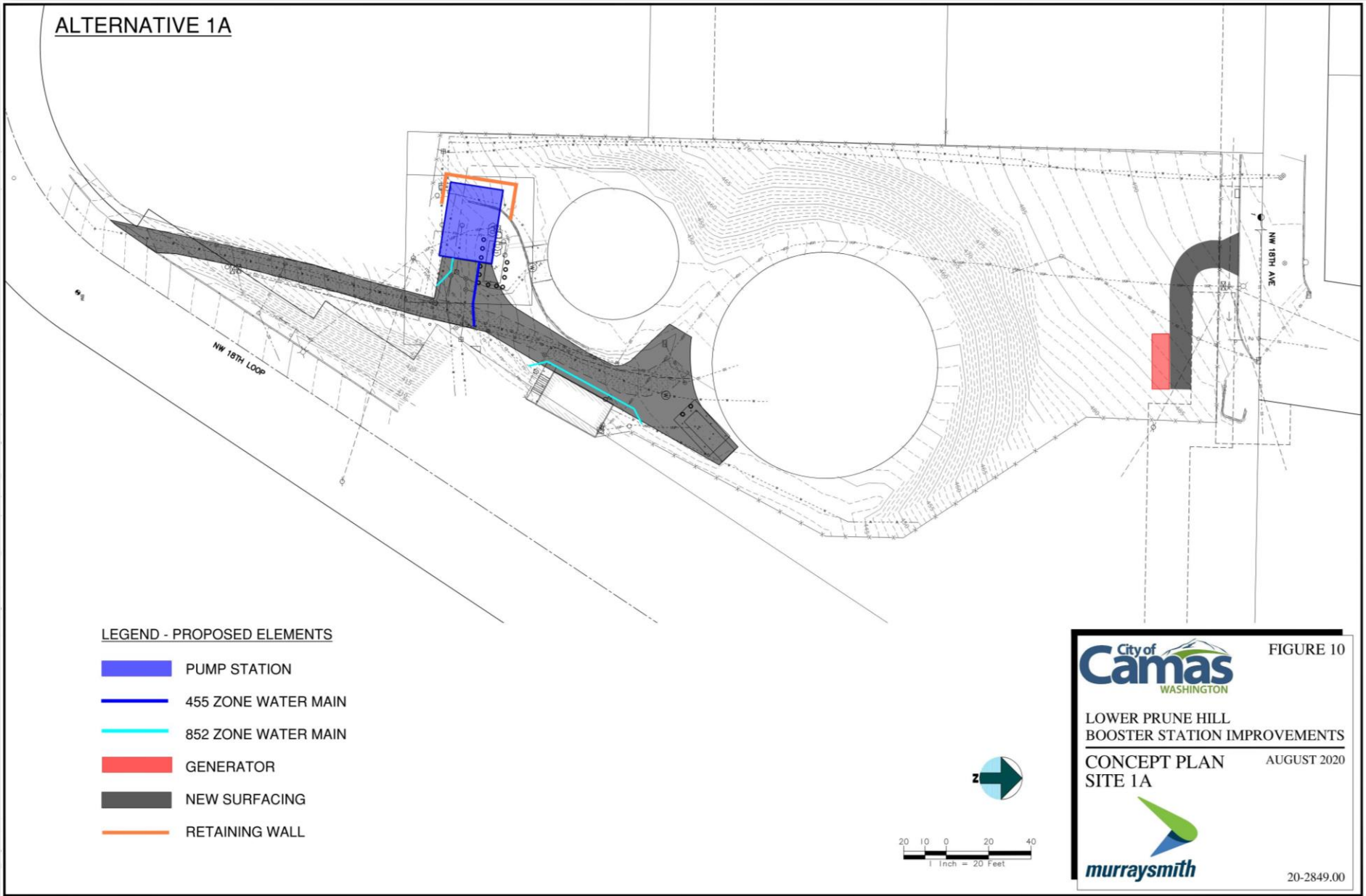
- Building was constructed in 1971 and consists of reinforced concrete
- Partially buried in the steep slope on eastern portion of the site
- Houses three pumps
 - Two vertically mounted split case pumps each with maximum flow of 1,000 gpm
 - One vertical turbine pump with maximum flow of 750 gpm

Reasons for Replacement

- Water system plan identified need for addition 1,000 gpm capacity

Initial Siting Alternatives

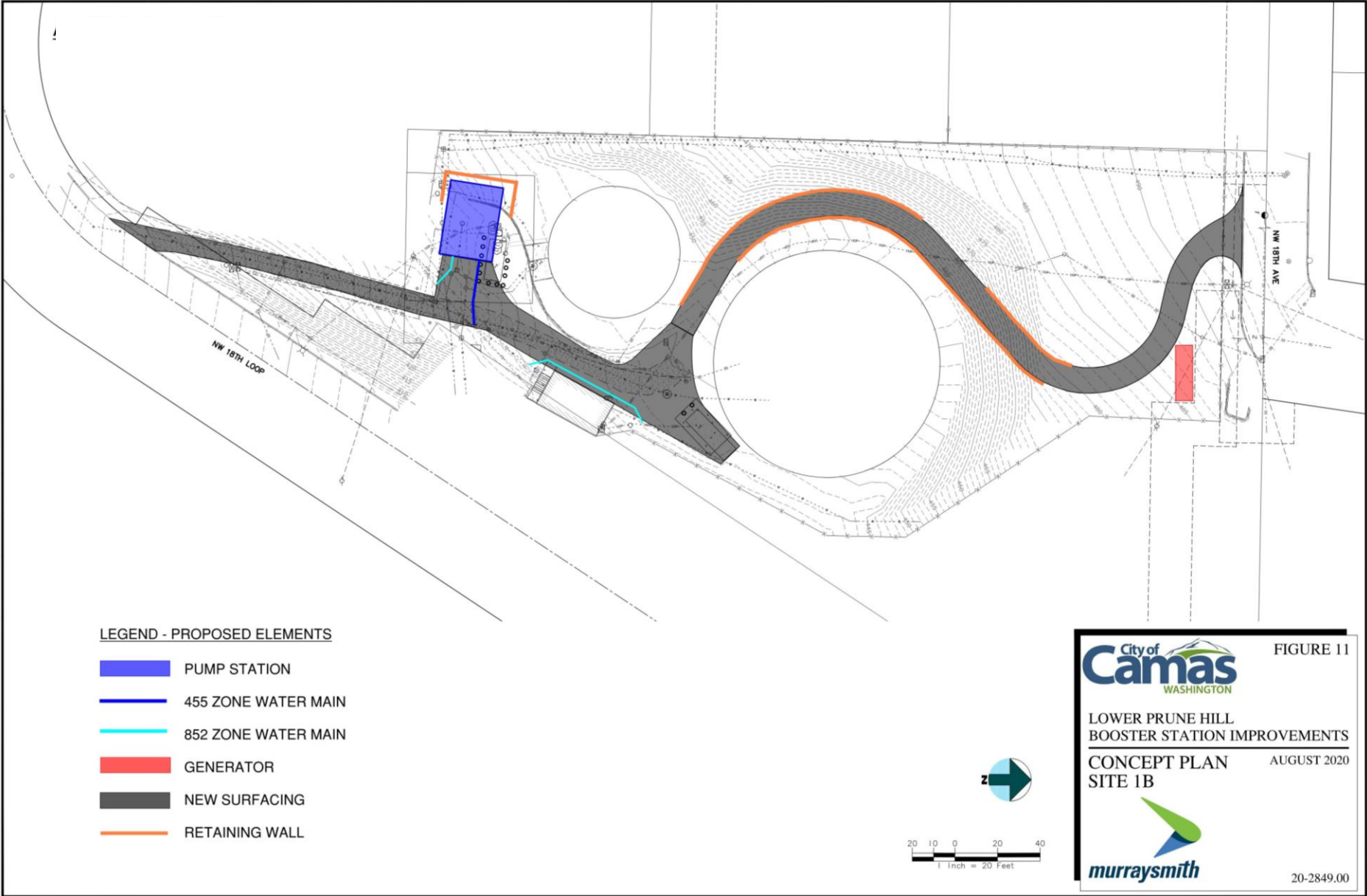
Alternative 1A



- Maintains existing Reservoir 1
- Requires a variance for building setbacks
- Retaining wall around the proposed pump station

Initial Siting Alternatives

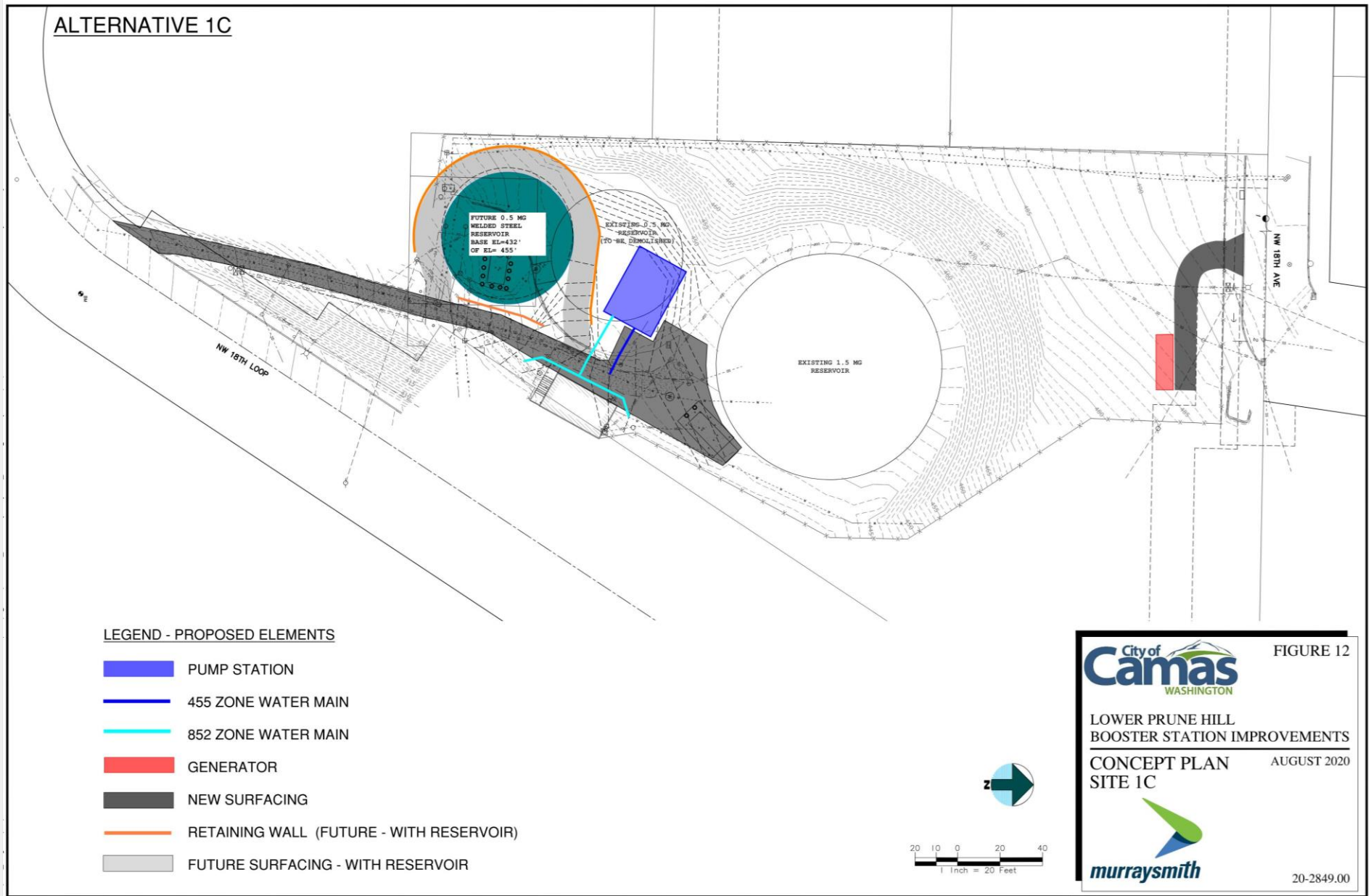
Alternative 1B



- Similar to Alternative 1A
- Access road will require significant retaining walls

Initial Siting Alternatives

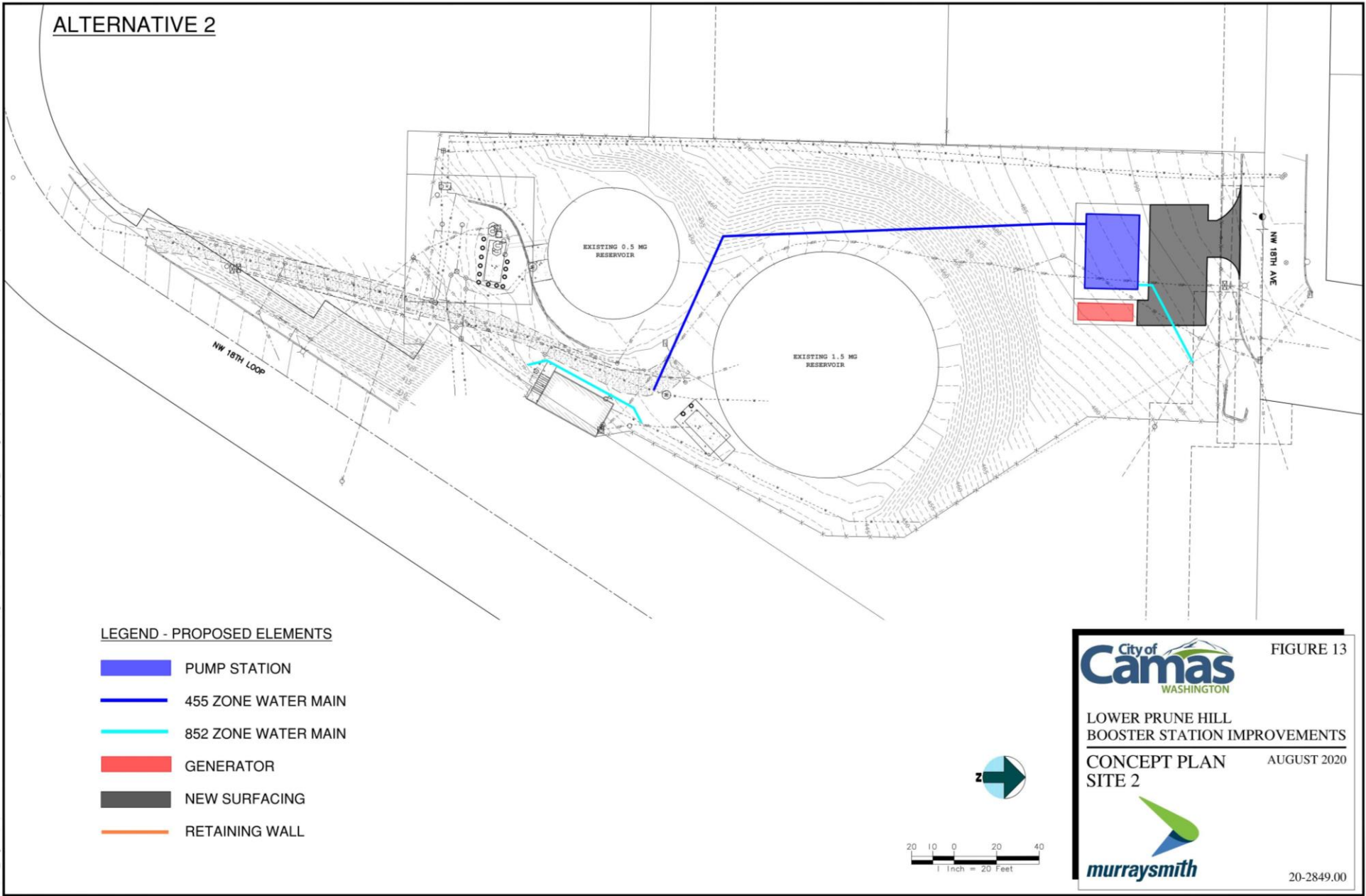
Alternative 1C



- Pump station location requires existing Reservoir 1 to be removed
- Future reservoir installation may impact pump station operation

Initial Siting Alternatives

Alternative 2



- Pump station would be approximately 50 feet above the existing reservoir floor
- Pump station location would impact residents' view



03

The Path to Expanding Scope

LPH Reservoir No. 1 Condition



Reservoir 1 nearing the end of useful life

- Constructed of reinforced concrete in 1935, making it almost 90 years old
- Active and historic leaking through walls.
- Capital Improvement Program scheduled to replace in the 2027-2036 timeframe

Reservoir No. 2 Condition

Reservoir 2 to remain

- Constructed of reinforced concrete in 1971
- Reservoir is in good condition and not currently scheduled for replacement
- Telecom equipment currently mounted on Reservoir 1 to be relocated to Reservoir 2



Cost/Benefit of Adding Reservoir Replacement

	Alternative 1A - Reservoir Now	Alternative 1A - Future Reservoir	Alternative 1 C – Reservoir Now	Alternative 1 C - Future Reservoir
Mobilization	\$400,000	\$435,000	\$395,000	\$415,000
Demolition	\$170,000	\$170,000	\$270,000	\$320,000
Pump Station	\$1,960,000	\$1,960,000	\$1,960,000	\$1,960,000
Reservoir	\$1,860,000	\$2,210,000	\$1,650,000	\$1,870,000
Sub-Total	\$4,390,000	\$4,775,000	\$4,275,000	\$4,465,000
Sales Tax (8.40%)	\$369,000	\$401,000	\$359,000	\$383,000
Subtotal	\$4,759,000	\$5,176,000	\$4,630,000	\$4,950,000
Contingency (30%)	\$1,430,000	\$1,550,000	\$1,390,000	\$1,490,000
Total Cost	\$6,189,000	\$6,726,000	\$6,020,000	\$6,440,000

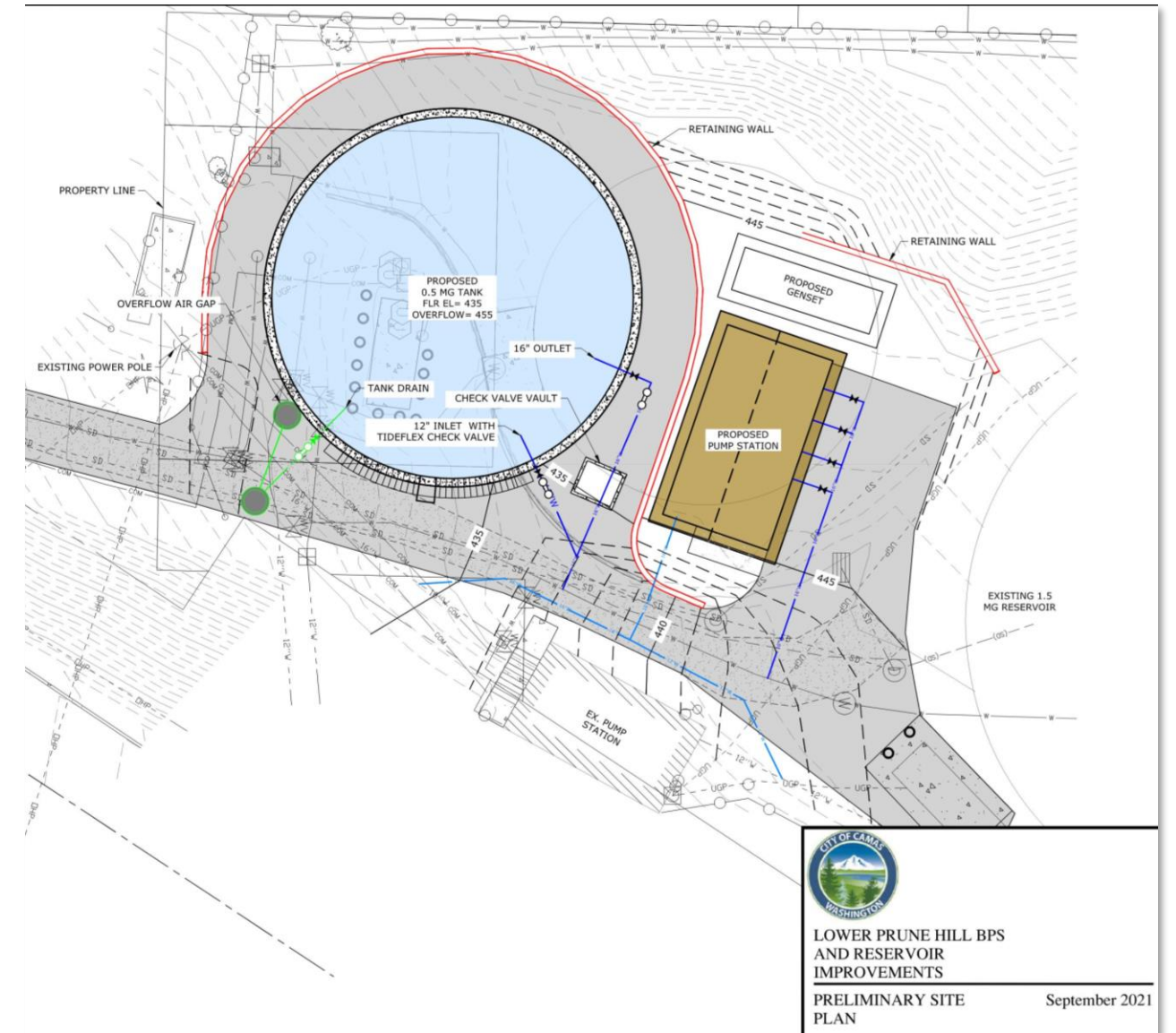
Quantifying Cost Impacts of Waiting to Replace Reservoir

- Building reservoir on a more constrained site would increase reservoir construction cost.
- Decreased cost efficiency to conduct two construction projects instead of combining
- Increased initial investment now for long term savings.

Expanded Siting Alternatives

“Original” Alternative From Initial Siting Study

- Pump station sits at top of retaining wall around new tank.
- Minimum amount of retaining wall.
- Potential challenges when working on 1.5 MG reservoir in the future – pump station “on an island”



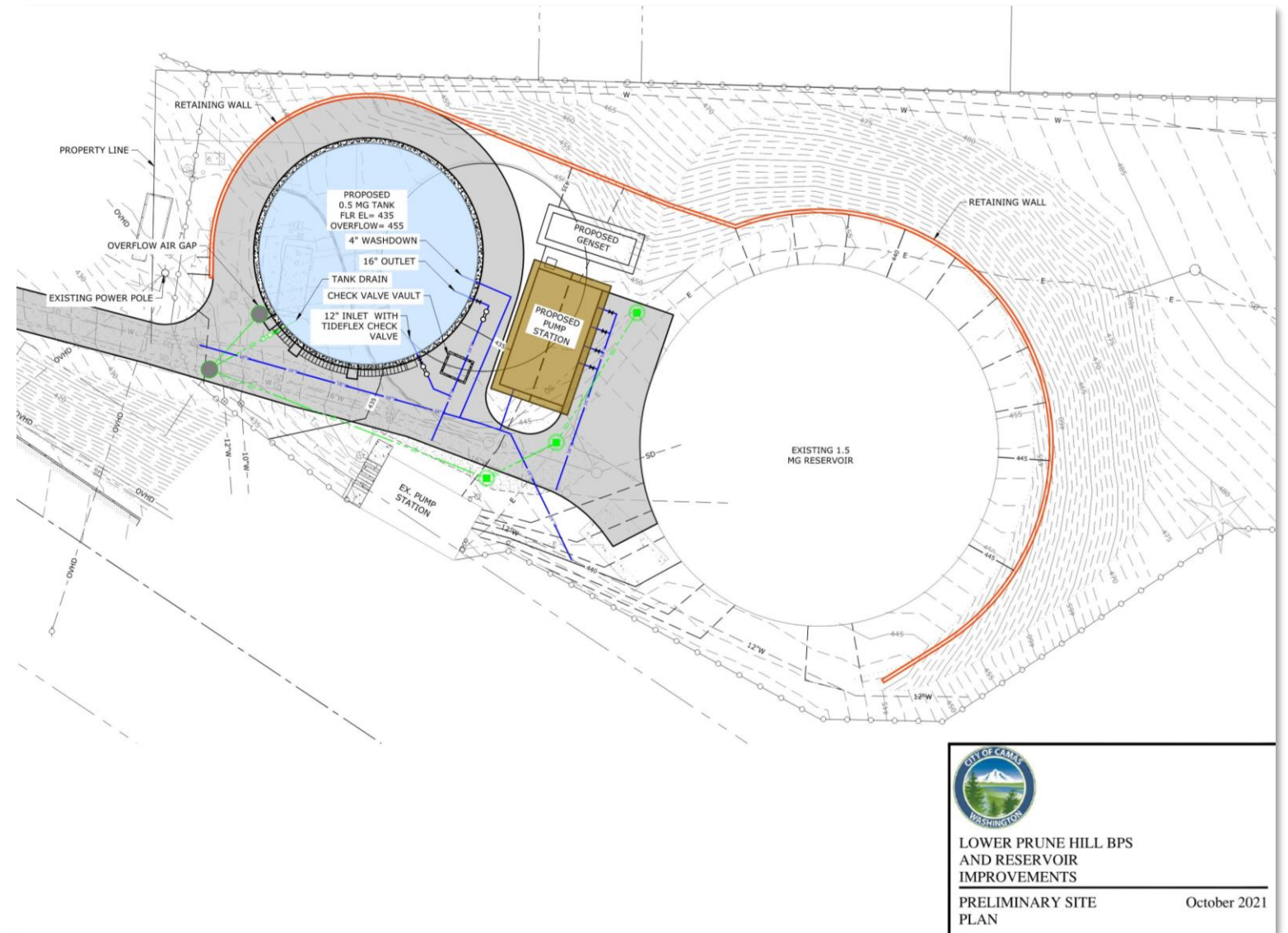
Expanded Siting Analysis



Expanded Siting Alternatives

Alternative 2

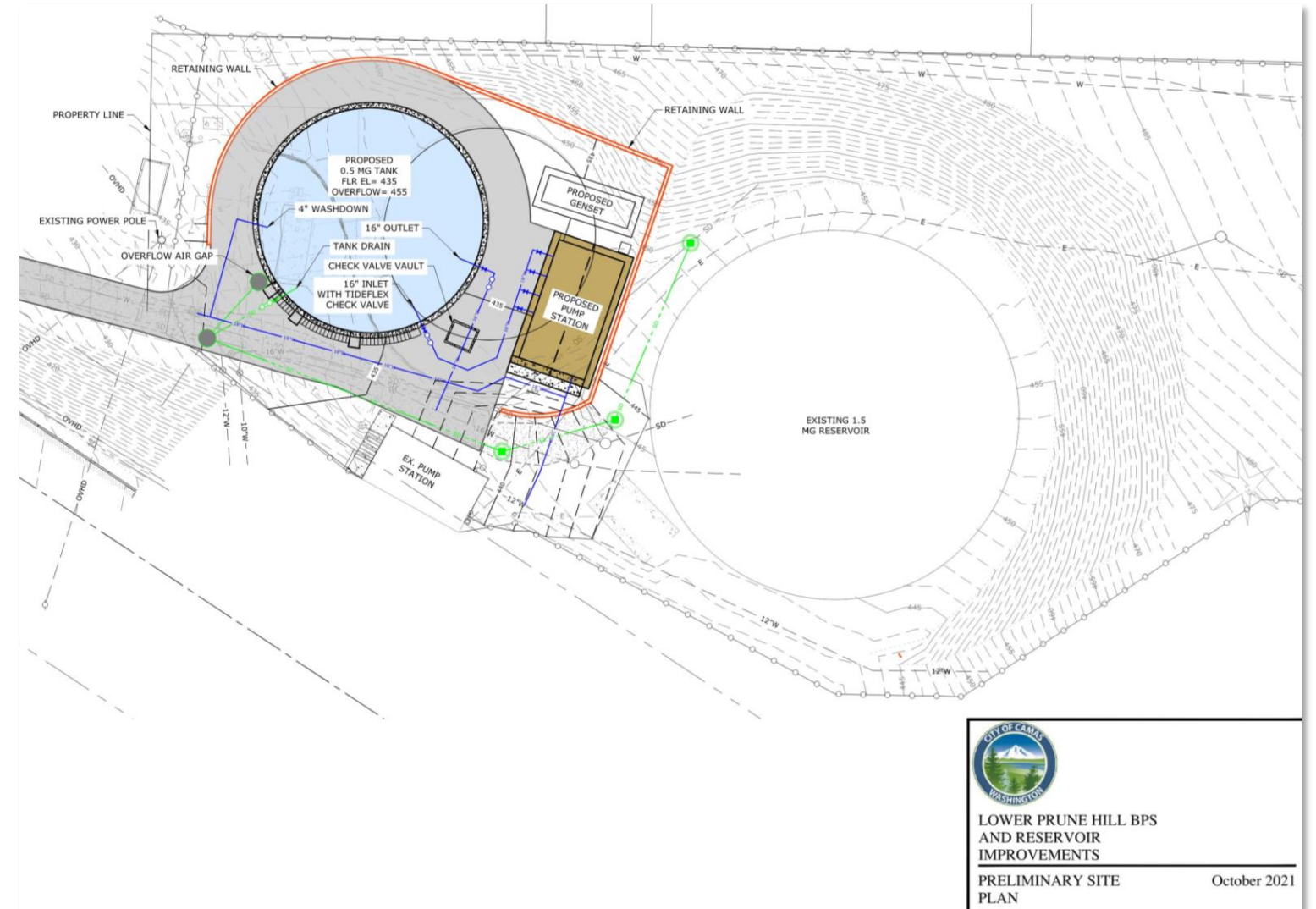
- Expanded retaining wall around 1.5 MG reservoir plans for future work on 1.5 MG reservoir.
- Pump station sits at tank floor level.
- Highest cost due to expanded wall and increased earthwork



Expanded Siting Alternatives

Alternative 3

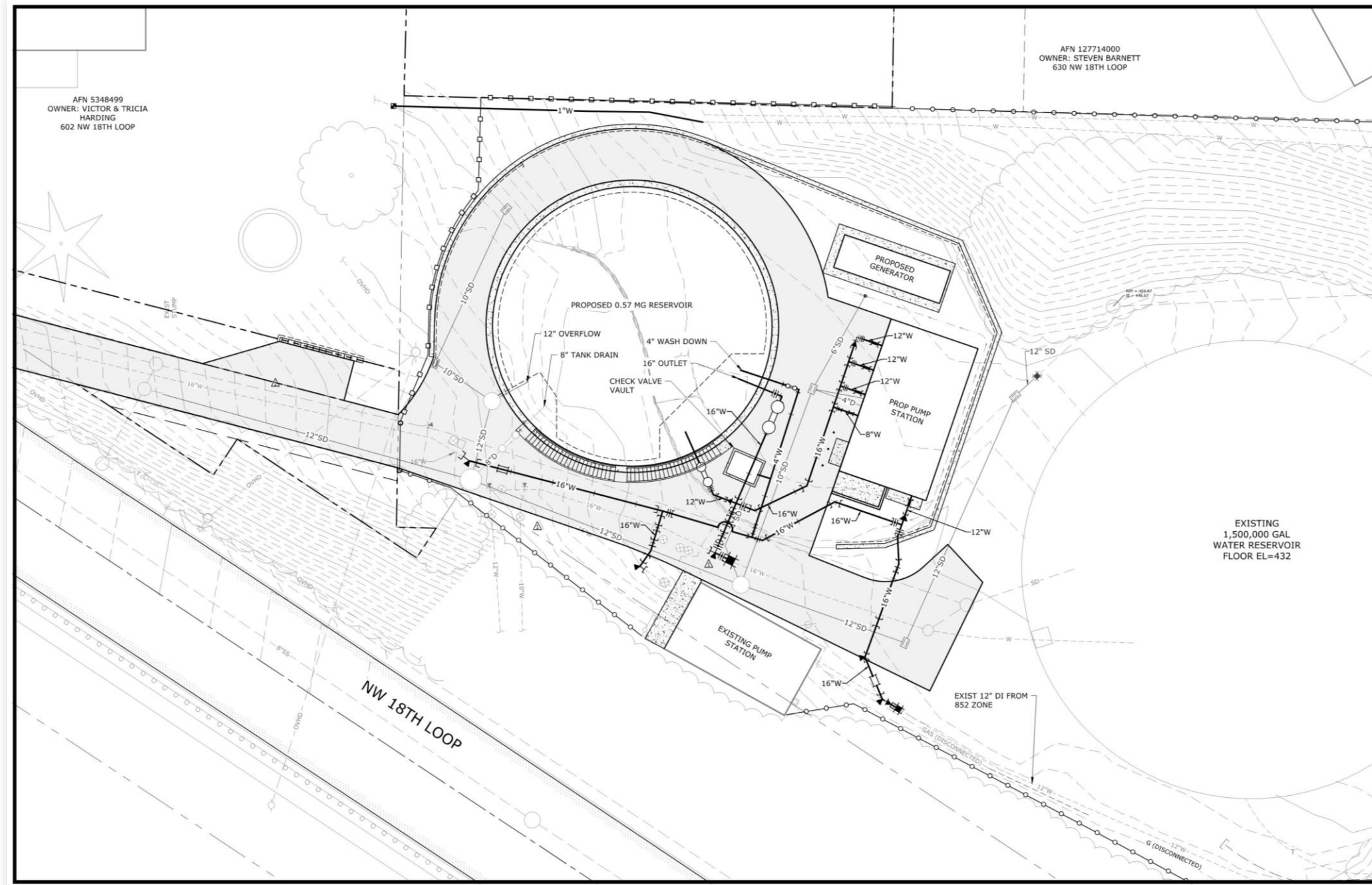
- Wall around new reservoir and pump station only.
- Pump station sits at tank floor level.
- Wall demolition and expansion needed if 1.5 MG reservoir replaced in the future.
- Balances initial cost with future site needs.



04

Final Scope and Project Status

Final Site Plan

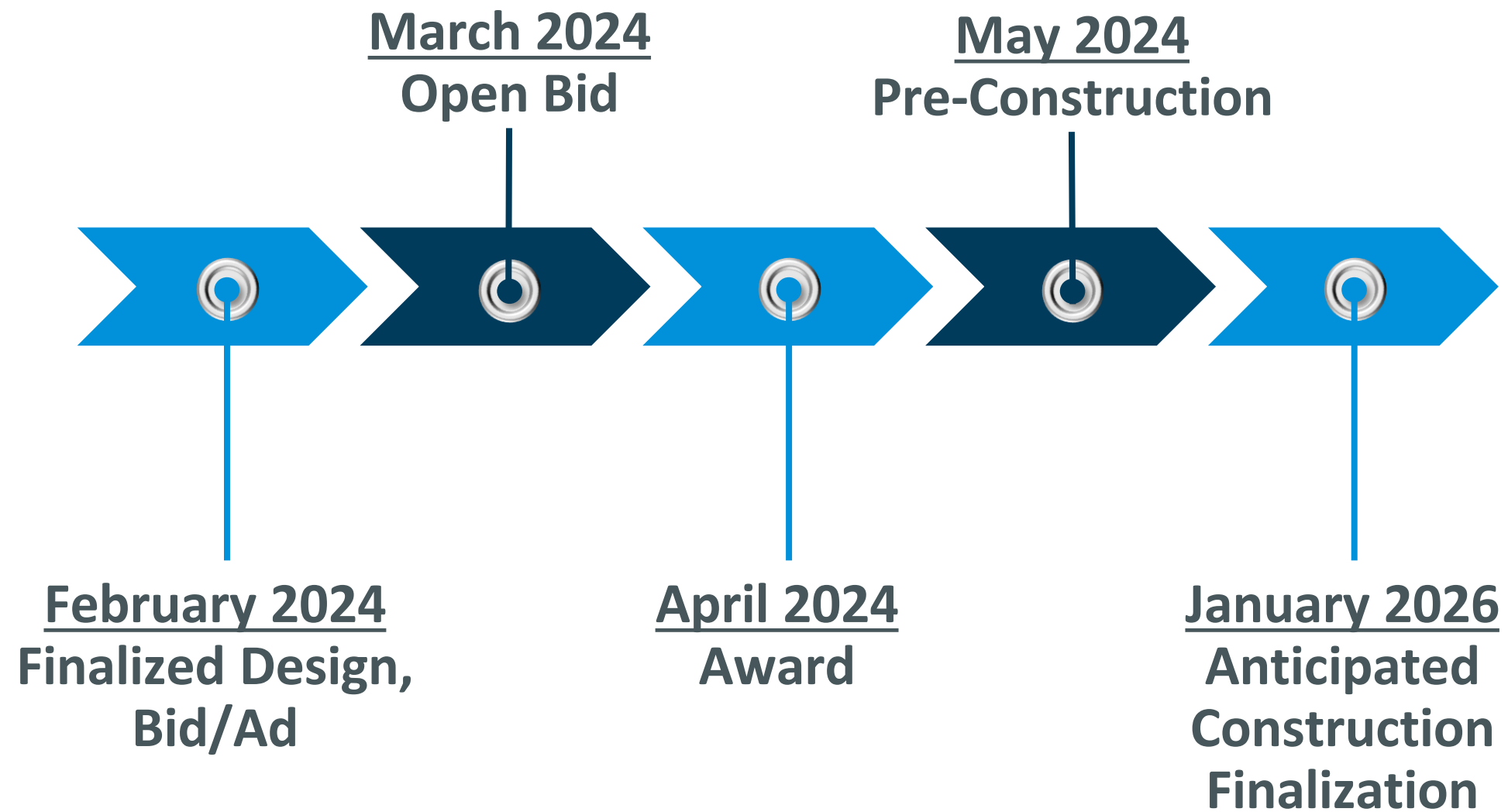




Final Site Layout



Status/Next Steps



Project Team

Owner	City of Camas
Prime Consultant	Conсор, Inc
Structural Engineer	Peterson Structural Engineers, Inc.
Electrical Engineer	Industrial Systems
Instrumentation & Controls	S&B, Inc.
Geotechnical Engineer	GRI
Land Use Permitting Support	WSP



05

Q&A