



# WELLS 2, 3, AND 4 WATER TREATMENT PLANT

Town of Sharon, Water Management Advisory Committee

August 17, 2023



# AGENDA

- Project Background and Need
- Project Overview
- Summary of Alternatives Analysis
  - Resource Impacts
  - Cost Considerations
- Questions

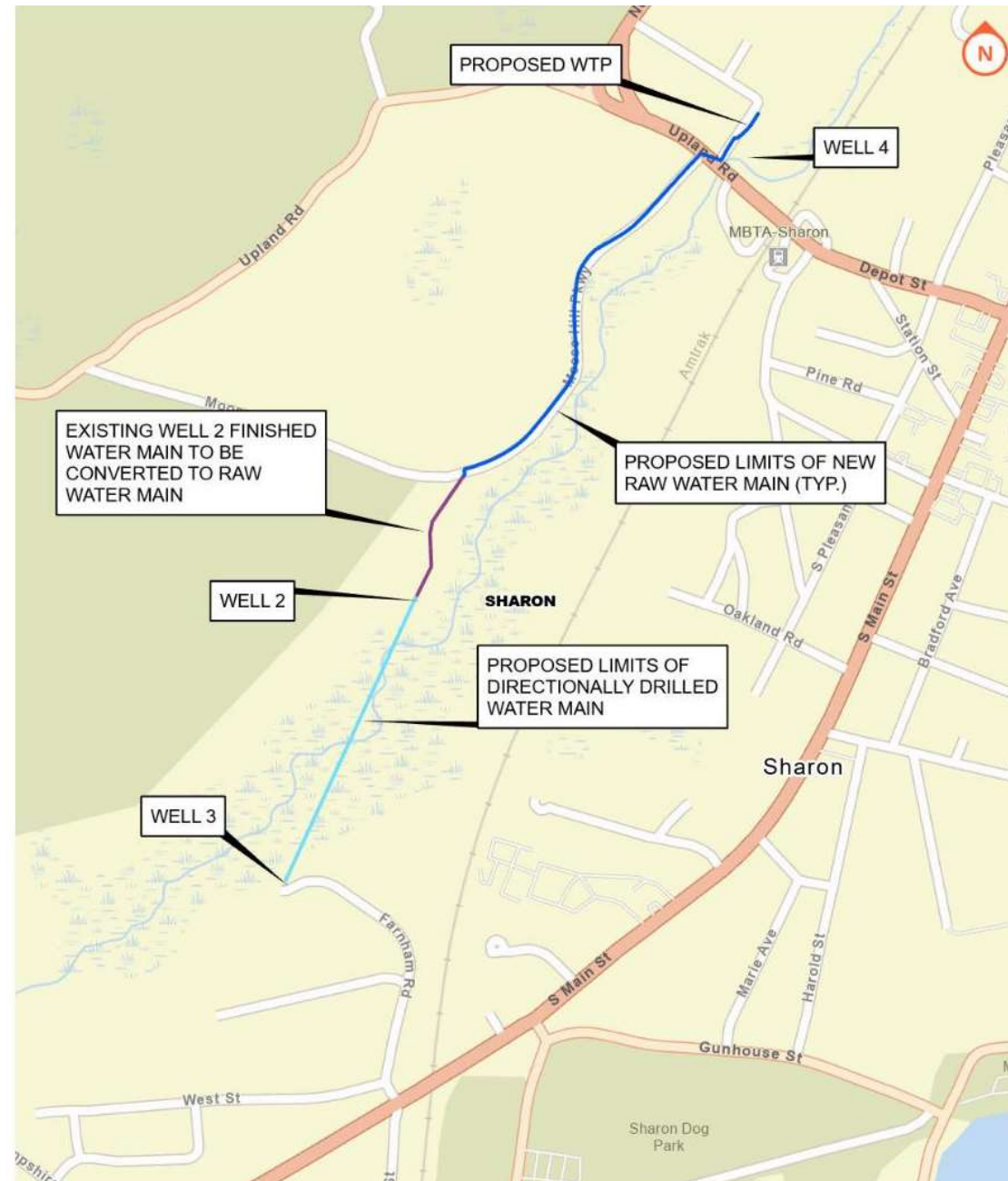


# PROJECT BACKGROUND AND NEED

- Water quality challenges at water supply Wells 2, 3, and 4
  - Well 2 raw water exceeds Secondary Maximum Contaminant Levels (SMCLs) for iron and manganese and recently began exceeding MCL for PFAS6
  - Well 3 raw water exceeds SMCLs for manganese and may exceed the proposed US EPA MCL for PFOA
  - Well 4, the Town's largest water supply, raw water exceeds MCL for PFAS6
- Limited operational flexibility for the Town's water system
  - Well 2 is currently off-line
  - Well 4 has temporary PFAS6 treatment
- Proposed WTP for the treatment of Wells 2, 3, and 4 will help the Town reliably meet water quality standards and water demands with their existing sources



# PROJECT OVERVIEW



# ALTERNATIVES ANALYSIS

# NO-BUILD ALTERNATIVE

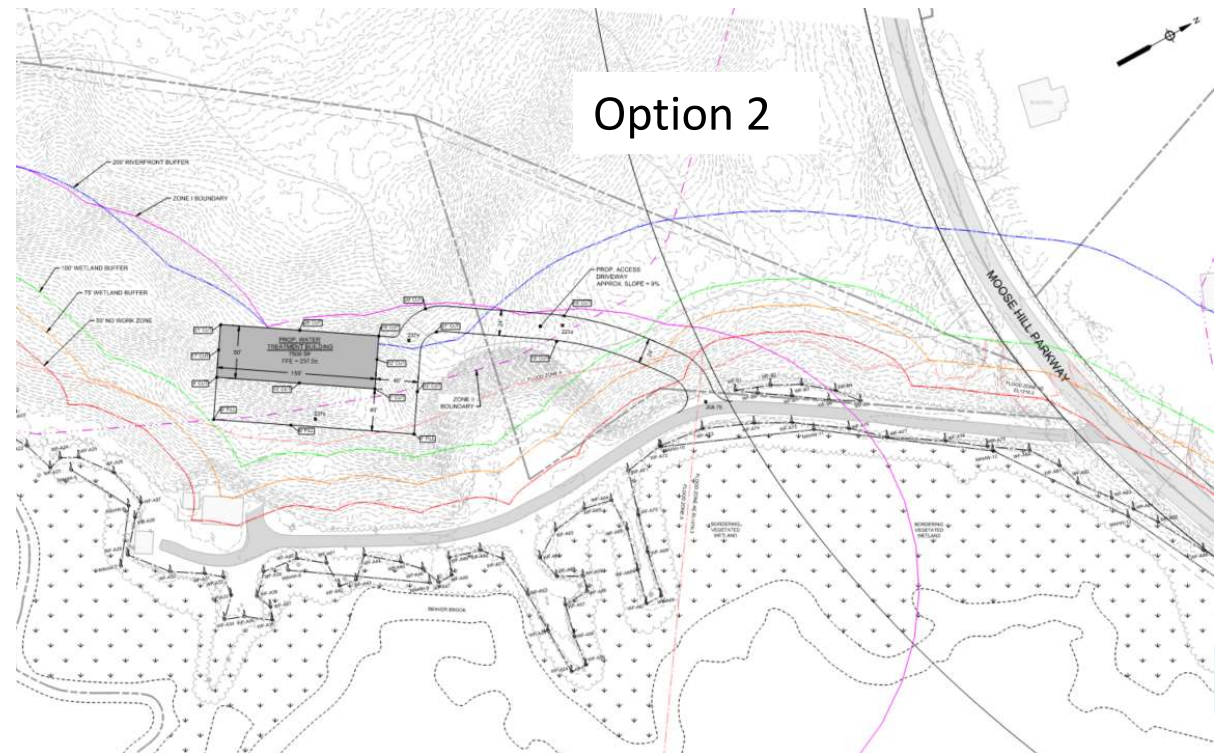
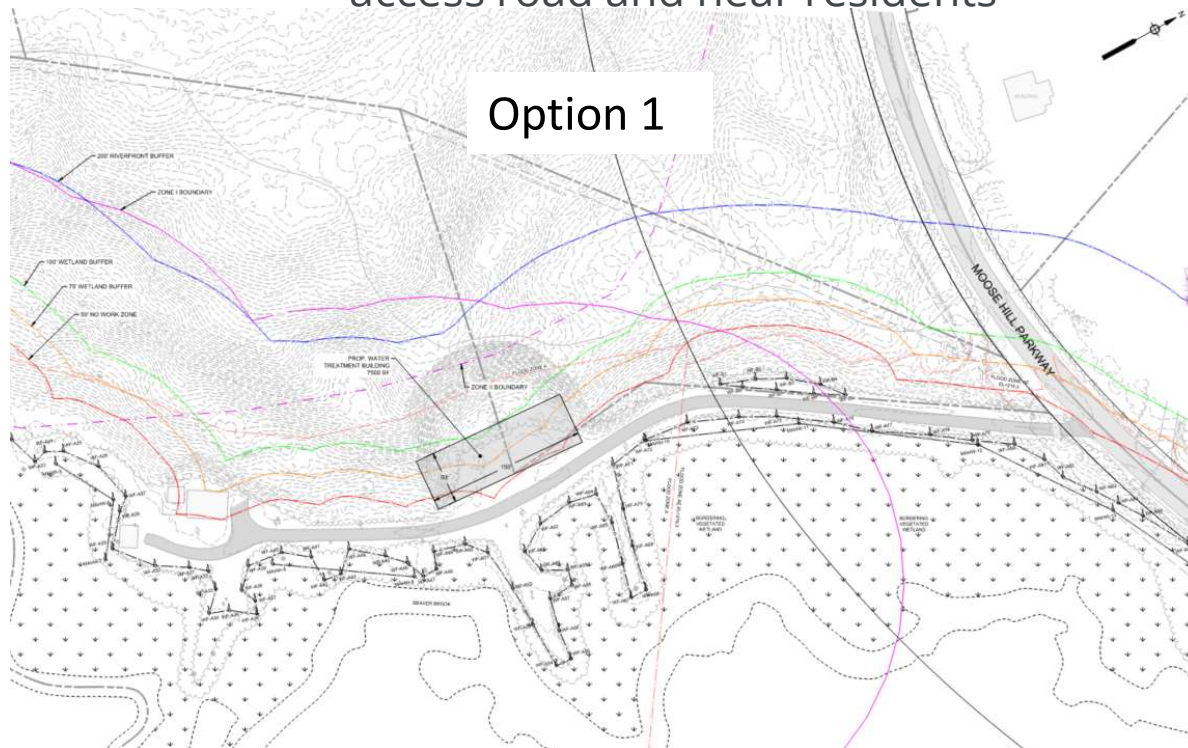
- Not a viable option
  - Maintains existing water supply system operations
  - No new treatment systems
  - Would not allow the Town to sufficiently supply water to their customers
  - Would not allow the Town to reliably meet drinking water quality standards
- Establishes the baseline conditions for the Alternatives Analysis





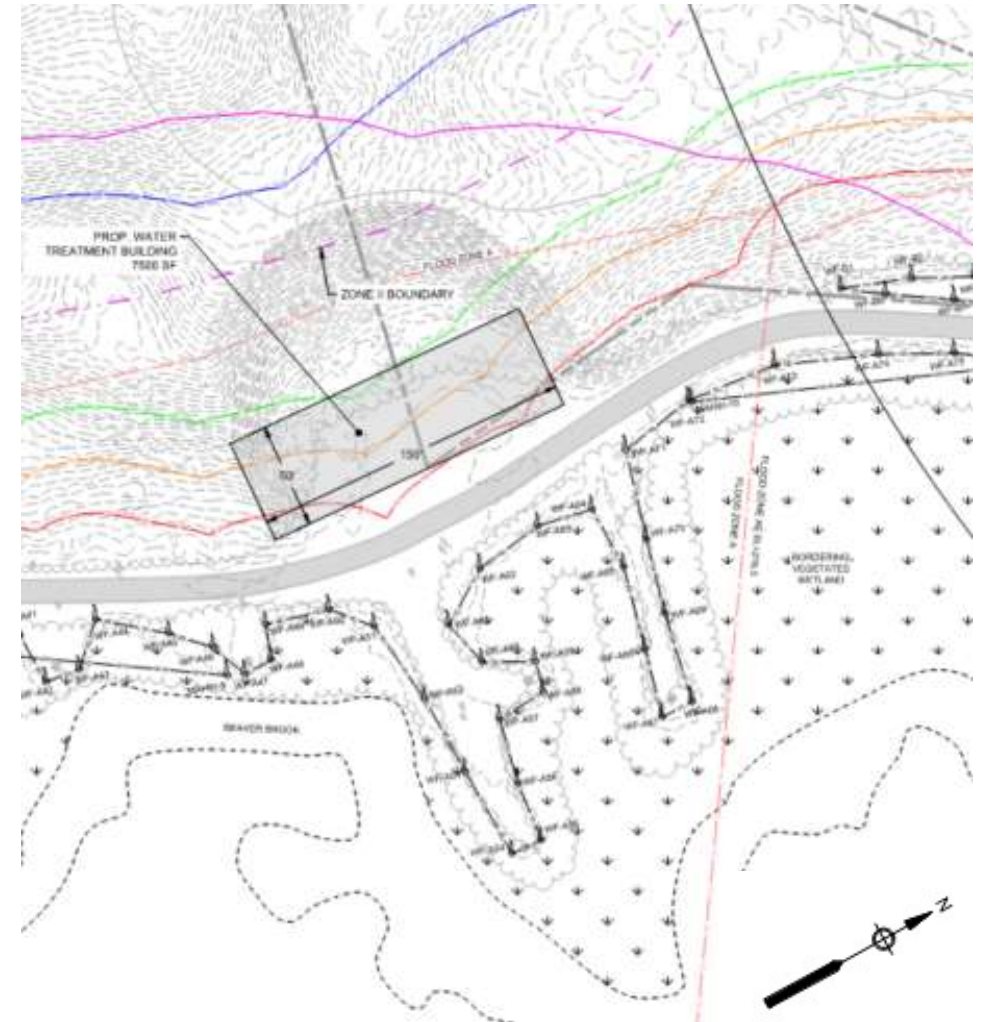
# BUILD ALTERNATIVE A – WELL 2 SITE

- Located along Moose Hill Parkway at Well 2
- Three locations were evaluated:
  - Option 1 – A clearing west of the existing Well 2 access Road
  - Option 2 – A wooded hill west of the existing Well 2 access Road
  - Option 3 – Adjacent to Moose Hill Parkway.
    - Discarded immediately: WTP and access road fully within wetland resource areas with a very steep access road and near residents



# BUILD ALTERNATIVE A – WELL 2 SITE

- Option 1 – Well 2 Site Clearing
  - Away from abutters
  - Approximately 4,000 feet of new water main
  - The proposed footprint (7,500 sf) is too large for the existing clearing
  - Impacts to wetland resource areas (50-ft and 75-ft no disturb areas)
  - WTP and Access Road located in the FEMA 100-year flood zone
    - MassDEP requires all water supply facilities and water treatment plant access roads shall be elevated and/or protected to a minimum of two feet (3 feet recommended) above the 100-year flood elevation
    - FEMA floodzone elevation of 216.3 ft; access road at 208 ft near the clearing





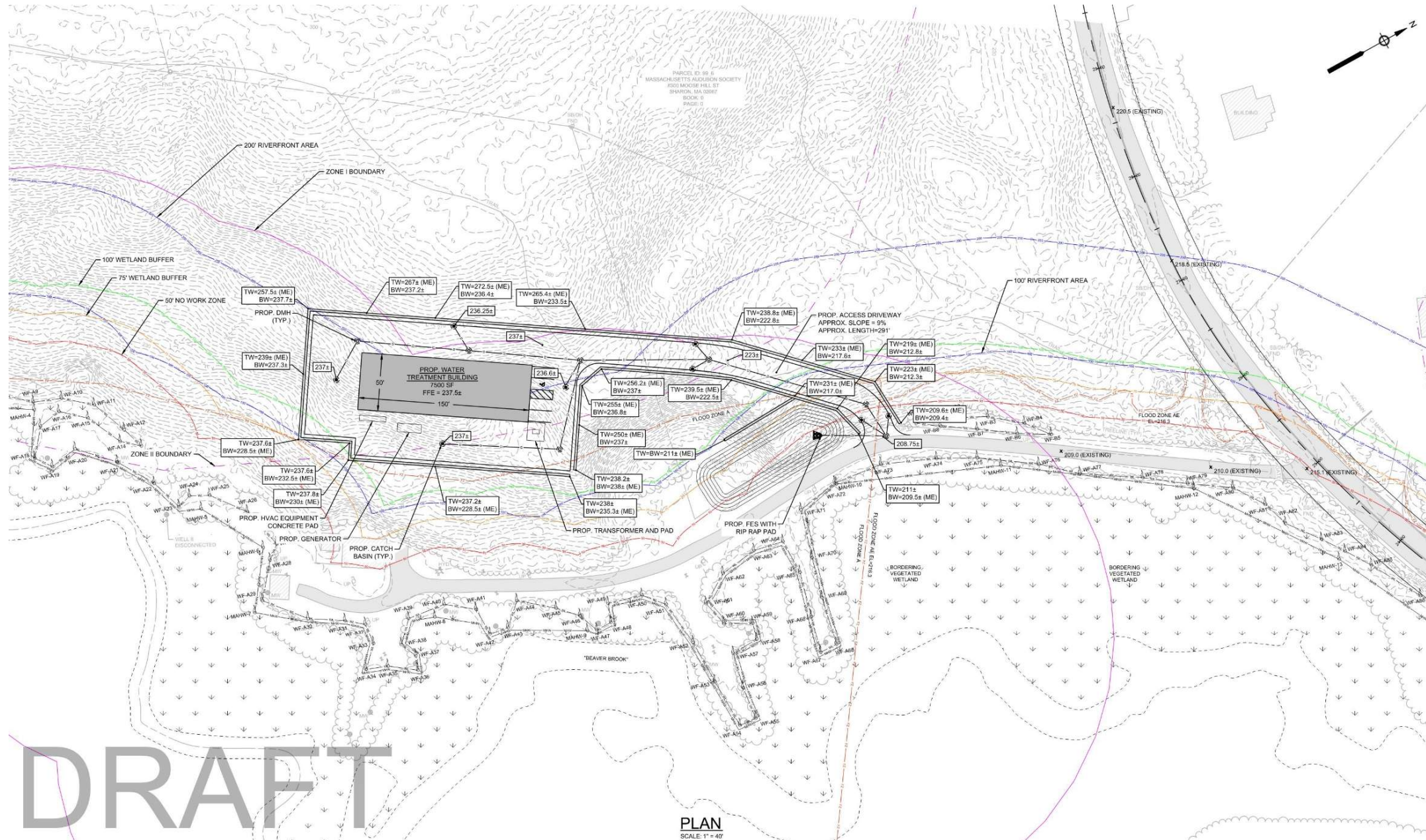
# BUILD ALTERNATIVE A – WELL 2 SITE

- Option 2 – Well 2 Site Hill
  - Away from abutters
  - Outside of 75-ft no build wetland buffer zone
  - Over 6,000 feet of new water main
  - Steep slope and dense woods requiring significant clearing and earthwork, tall retaining walls
    - Requires over 1,300 linear feet of retaining walls of varying size and up to 35 feet in height
  - Long, steep access road
  - Access road located in the FEMA 100-year flood zone
    - MassDEP requires all water supply facilities and water treatment plant access roads shall be elevated and/or protected to a minimum of two feet (3 feet recommended) above the 100-year flood elevation





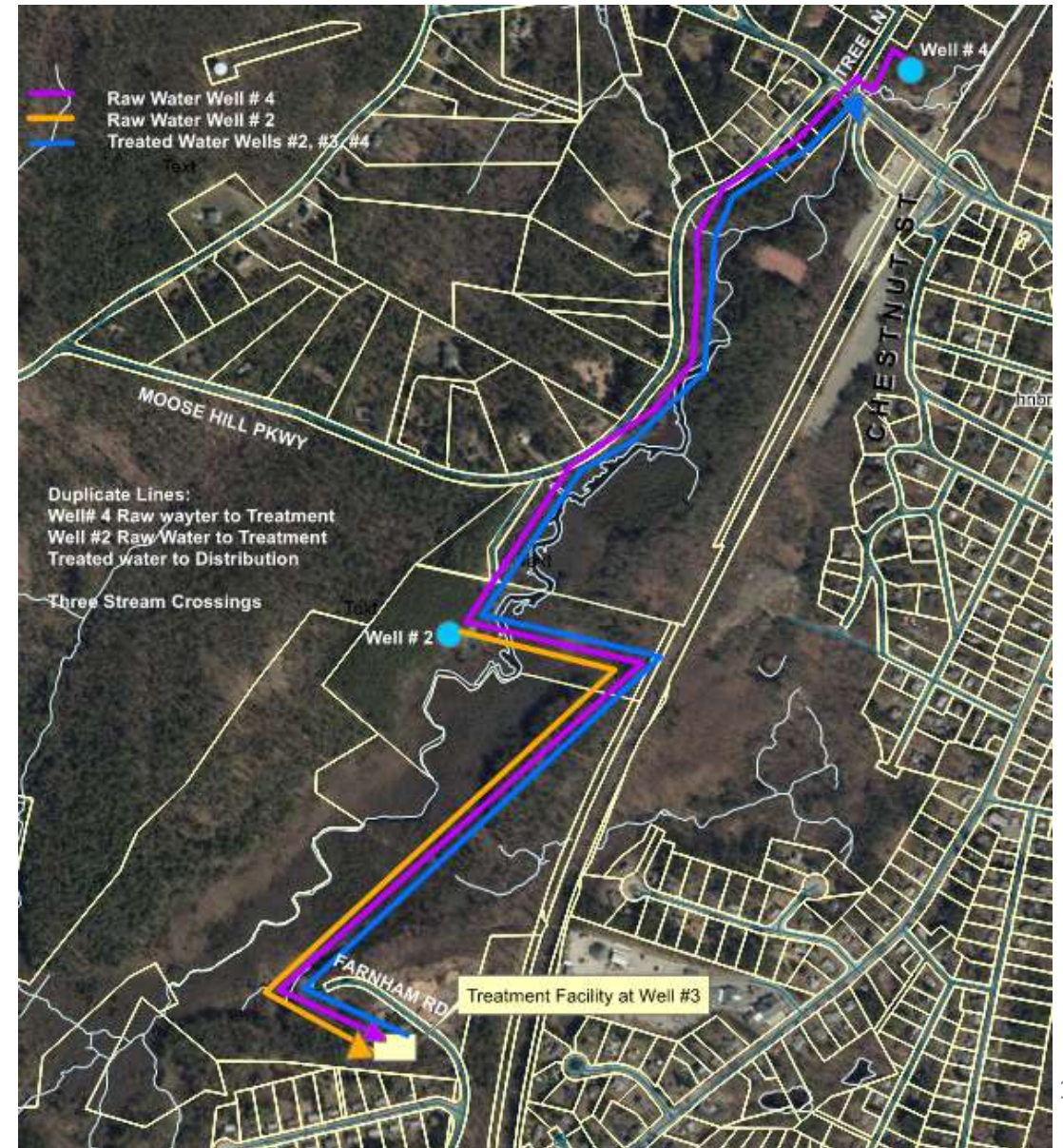
# BUILD ALTERNATIVE A – DRAFT WELL 2 SITE PLAN





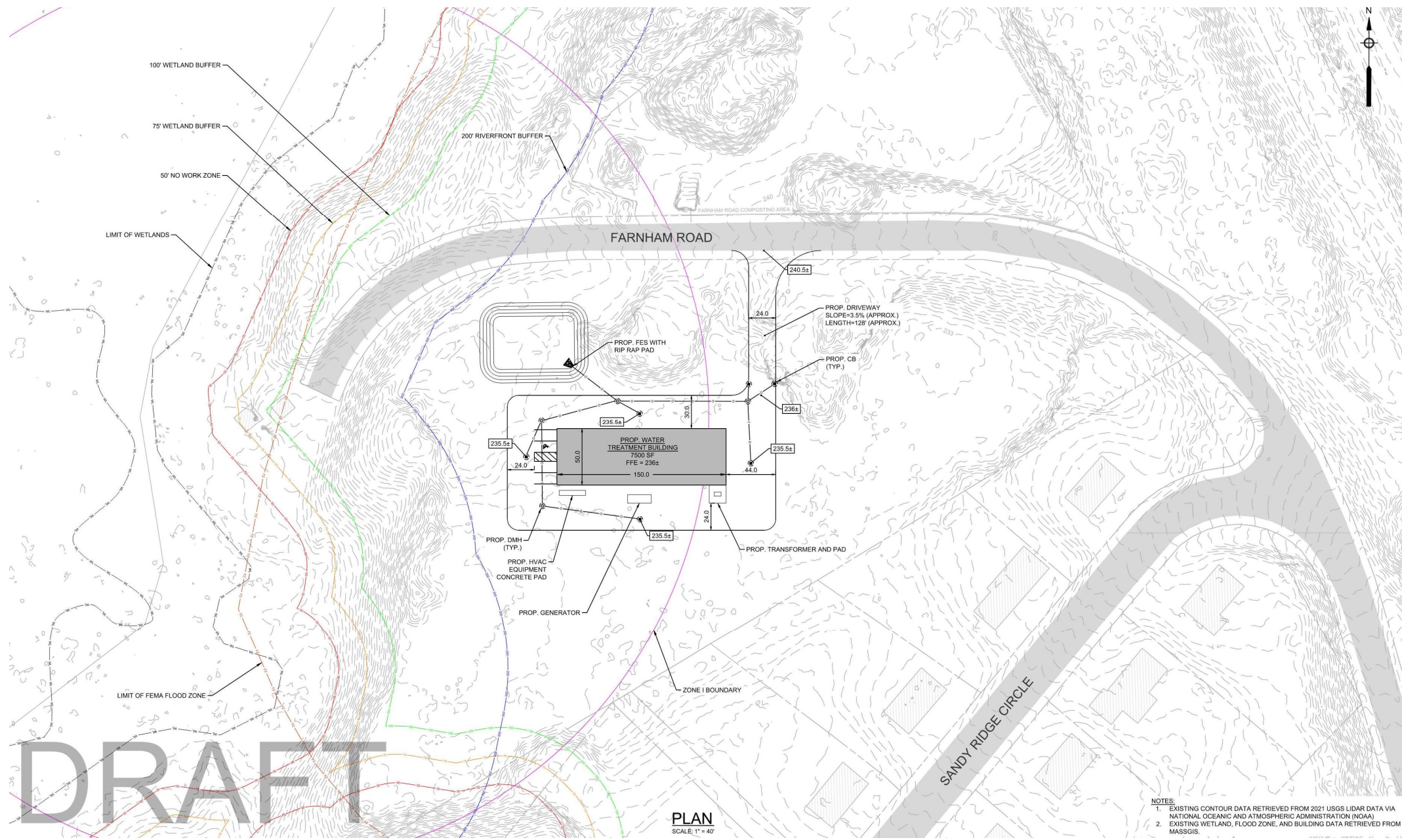
# BUILD ALTERNATIVE B – WELL 3 SITE

- Located along Farnham Road at the Well 3 site
- Borders a residential area
- Relatively flat wooded area
- WTP outside of wetland resource areas (50-ft, 75-ft, 100-ft buffer zones); utility work within resource areas
- Requires about 12,000 feet of new water main
  - ~7,000 feet of raw water mains
  - ~5,000 feet of new finished water main
  - Significant directional drilling operation required to cross Beaver Brook with three new water mains.





# BUILD ALTERNATIVE B – DRAFT WELL 3 SITE PLAN

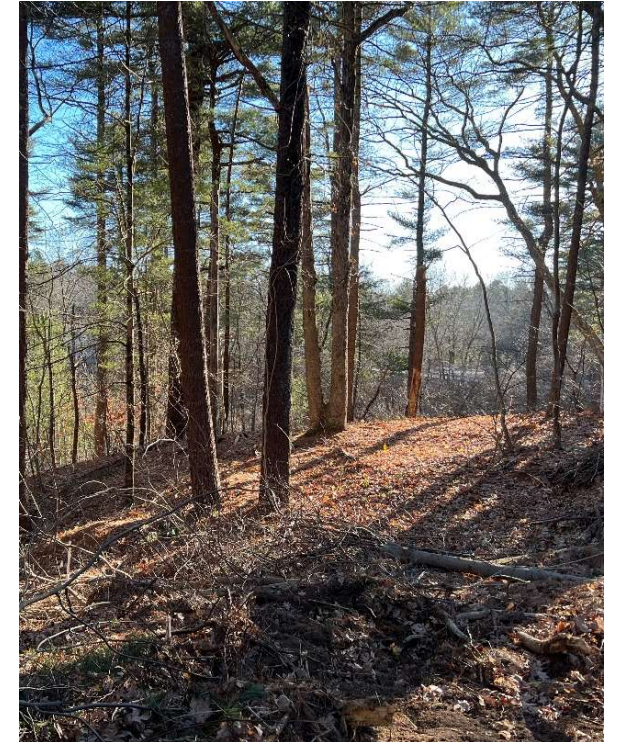


NOTES:  
1. EXISTING CONTOUR DATA RETRIEVED FROM 2021 USGS LIDAR DATA VIA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)  
2. EXISTING WETLAND, FLOOD ZONE, AND BUILDING DATA RETRIEVED FROM MASSGIS.



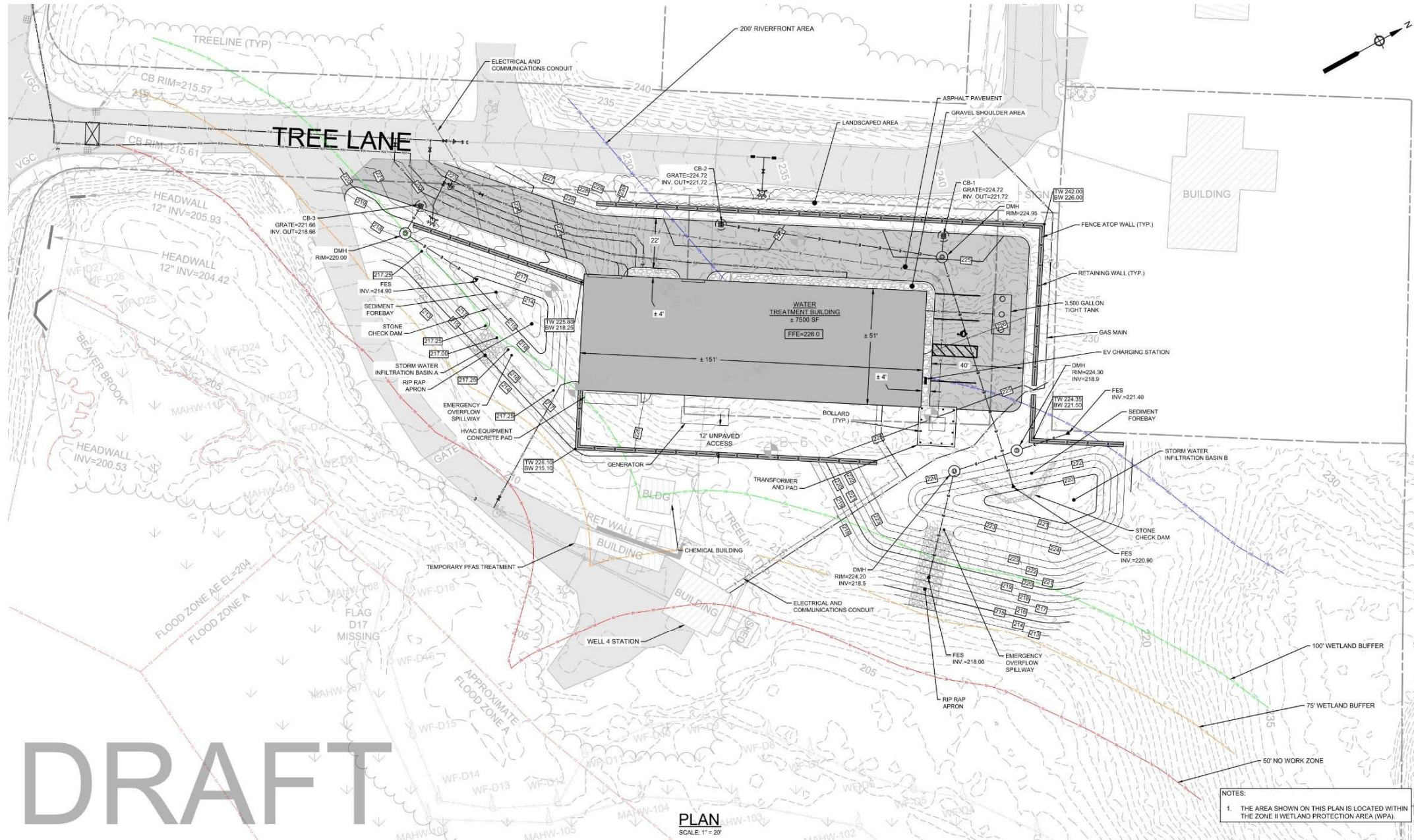
# BUILD ALTERNATIVE C - WELL 4 SITE

- Located along Tree Lane next to Well 4
- Borders a residential area
- Minimizes wetland resource area impacts
  - Within riverfront area but outside of the 75-foot no-disturb wetland buffer zone and the 100-year FEMA flood zone
- Short access road
- ~5,000 feet of new water main required
- Minimizes tree clearing compared to alternatives as hill slope will be benched



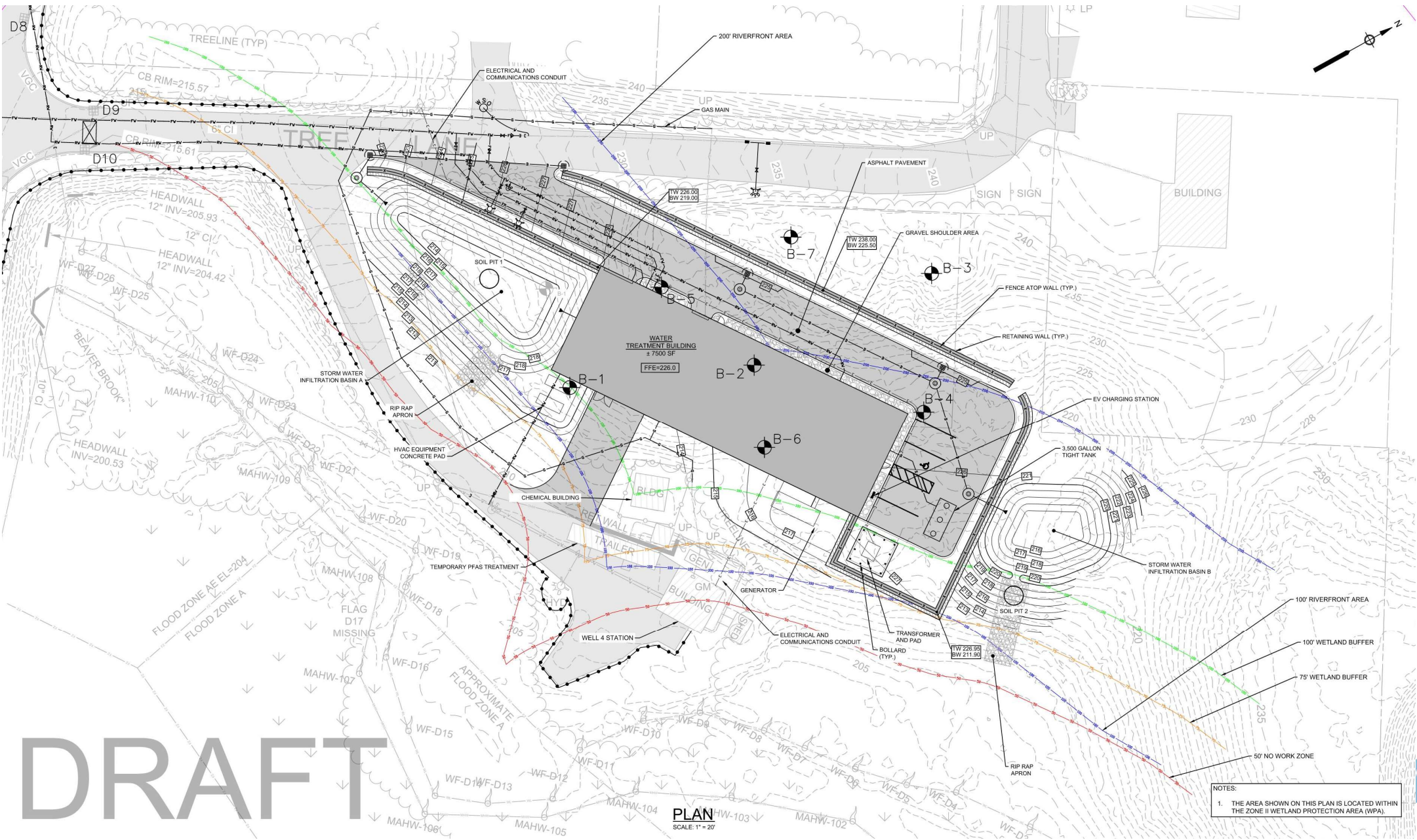


# BUILD ALTERNATIVE C – INITIAL DRAFT WELL 4 SITE PLAN





# BUILD ALTERNATIVE C – DRAFT WELL 4 SITE PLAN REVISED



DRAFT

PLAN  
SCALE: 1" = 20'



# COMPARISON OF ALTERNATIVES

| Alternative            | Construction Period Land Alteration (sf) | New Impervious Area (sf) | Approximate Wetland Resource Area Buffer Zone Impacts at the Treatment Plant Sites                            |   | Approximate Riverfront Area Impacts at the Treatment Plant Sites                |  | Estimated Opinion of Probable Program Costs |
|------------------------|--|--------------------------|---|---|---|--|---|
|                        |  |                          | Permanent (sf)  | Temporary (sf)  | New Permanent (sf)  | Temporary (sf)   |   |
| Well #2                | 54,980                                   | 34,790                   | 1,460 within 50' buffer zone;<br>1,470 within the 50-75' buffer zone;<br>3,470 within the 75-100' buffer zone | 4,630 within 50' buffer zone;<br>5,020 within the 50-75' buffer zone;<br>4,750 within the 75-100' buffer zone | 5,260 within 100' Riverfront Area<br>28,140 within the 100-200' Riverfront Area | 13,360 within 100' Riverfront Area<br>28,140 within the 100-200' Riverfront Area | \$42.95M                                    |
| Well #3                | 63,160                                   | 32,010                   | 0 within 50' buffer zone;<br>0 within the 50-75' buffer zone;<br>3,750 within the 75-100' buffer zone         | 0 within 50' buffer zone;<br>0 within the 50-75' buffer zone;<br>3,750 within the 75-100' buffer zone         | 1,875 within 100' Riverfront Area<br>1,875 within the 100-200' Riverfront Area  | 1,875 within 100' Riverfront Area<br>4,125 within the 100-200' Riverfront Area   | \$42.04M                                    |
| Well #4 - Initial Site | 48,570                                   | 18,630                   | 0 within 50' buffer zone;<br>0 within the 50-75' buffer zone;<br>310 within the 75-100' buffer zone           | 2,420 within 50' buffer zone;<br>3,520 within the 50-75' buffer zone;<br>6,800 within the 75-100' buffer zone | 0 within 100' Riverfront Area<br>14,735 within the 100-200' Riverfront Area     | 7,920 within 100' Riverfront Area<br>29,980 within the 100-200' Riverfront Area  | \$36.34M                                    |
| Well #4 - Rotated Site | 47,620                                   | 18,420                   | 0 within 50' buffer zone;<br>345 within the 50-75' buffer zone;<br>3,945 within the 75-100' buffer zone       | 2,385 within 50' buffer zone;<br>6,085 within the 50-75' buffer zone;<br>9,675 within the 75-100' buffer zone | 620 within 100' Riverfront Area<br>20,670 within the 100-200' Riverfront Area   | 11,220 within 100' Riverfront Area<br>32,770 within the 100-200' Riverfront Area |   |

Notes:

1) Resource area impacts for the Well 3 Site are based on MassGIS mapping information

2) Opinion of Probable Program Costs includes construction costs, construction contingency, Engineering fees (design, permitting, construction phase services), Owner's Project Manager fees, and escalation of construction costs to the mid-point of construction.





# COMPARISON OF ALTERNATIVES - COSTS

| Estimated Opinion of Probable Project Cost |   |                         |                         |                         |
|--|---|-------------------------|-------------------------|-------------------------|
| Item #                                     | Description   | Well 2 Site Estimate    | Well 3 Site Estimate    | Well 4 Site Estimate    |
| 1  | Offsite Water Mains   | \$ 3,585,800.00         | \$ 5,758,100.00         | \$ 2,332,200.00         |
| 2  | WTP Site Work   | \$ 5,742,600.00         | \$ 2,433,900.00         | \$ 2,791,200.00         |
| 3  | PFAS System Pre-Procurement   | \$ 2,463,100.00         | \$ 2,463,100.00         | \$ 2,463,100.00         |
| 4  | Iron and Manganese System Pre-Procurement                                   | \$ 1,129,800.00         | \$ 1,129,800.00         | \$ 1,129,800.00         |
| 5  | WTP Building Construction   | \$ 11,585,900.00        | \$ 11,585,900.00        | \$ 11,585,900.00        |
|  | Project Subtotal  | \$ 24,507,200.00        | \$ 23,370,800.00        | \$ 20,302,200.00        |
|  | General Conditions, Requirements, & GL Insurance (14%; 25% for Water Mains) | \$ 3,021,482.00         | \$ 3,564,557.00         | \$ 2,781,700.00         |
|  | Bonds (2%)  | \$ 490,144.00           | \$ 467,416.00           | \$ 364,500.00           |
|  | Overhead and Profit (10%)   | \$ 2,199,900.00         | \$ 2,097,900.00         | \$ 1,822,500.00         |
|  | <b>Construction Subtotal</b>  | <b>\$ 30,218,726.00</b> | <b>\$ 29,500,673.00</b> | <b>\$ 25,270,900.00</b> |
|  | 12 Months Escalation/Market Conditions (8%)                                 | \$ 2,417,500.00         | \$ 2,360,100.00         | \$ 2,021,700.00         |
|  | <b>Opinion of Probable Construction Cost</b>                                | <b>\$ 32,636,226.00</b> | <b>\$ 31,860,773.00</b> | <b>\$ 27,292,600.00</b> |
|  | Construction Contingency (10%)  | \$ 3,264,000.00         | \$ 3,187,000.00         | \$ 2,730,000.00         |
|  | Engineering Design, Permitting, and Bidding Assistance                      | \$ 1,653,110.00         | \$ 1,653,110.00         | \$ 1,653,110.00         |
|  | Construction Administration Costs (10%)                                     | \$ 3,264,000.00         | \$ 3,187,000.00         | \$ 2,730,000.00         |
|  | Owner's Project Manager (OPM) Services (5%)                                 | \$ 1,154,000.00         | \$ 1,173,000.00         | \$ 958,000.00           |
|  | Upland Road Tank Altitude Valve   | \$ 500,000.00           | \$ 500,000.00           | \$ 500,000.00           |
|  | <b>Total DWSRF Request Amount</b>   | <b>\$ 42,471,336.00</b> | <b>\$ 41,560,883.00</b> | <b>\$ 35,863,710.00</b> |
|  | Engineering Permitting (UNDER CONTRACT)                                     | \$ 167,000.00           | \$ 167,000.00           | \$ 167,000.00           |
|  | Ductile Iron Water Main Pre-Procurement (AWARDED)                           | \$ 307,000.00           | \$ 307,000.00           | \$ 307,000.00           |
|  | <b>Opinion of Probable Program Cost</b>                                     | <b>\$ 42,945,336.00</b> | <b>\$ 42,034,883.00</b> | <b>\$ 36,337,710.00</b> |

## OPCC Notes:

1. OPCC assumes Bid Date in May 2024 and a Midpoint of Construction in August 2025.
2. Construction Contingency is 10% per DWSRF Requirements.
3. Construction Administration Costs assumed to be 10% of OPCC.



# Q&A





# THANK YOU

