Planning, Design, and Interim Operation of New Tank, Booster, and Wholesale Intertie

for Fruitland Mutual Water Company

TED HARDIMAN, General Manager,
Fruitland Mutual Water Company

DAVID ROBERTS, PE, Parametrix

Parametrix

Presentation

- Background of Fruitland's system
- Major project elements
- Where we are today and interim operational strategies
- Future steps
- What we've learned along the way

Fruitland Mutual Water Company

- Member Owned
- Governed under RCW Title 24 – Corporations and Associations – Nonprofit

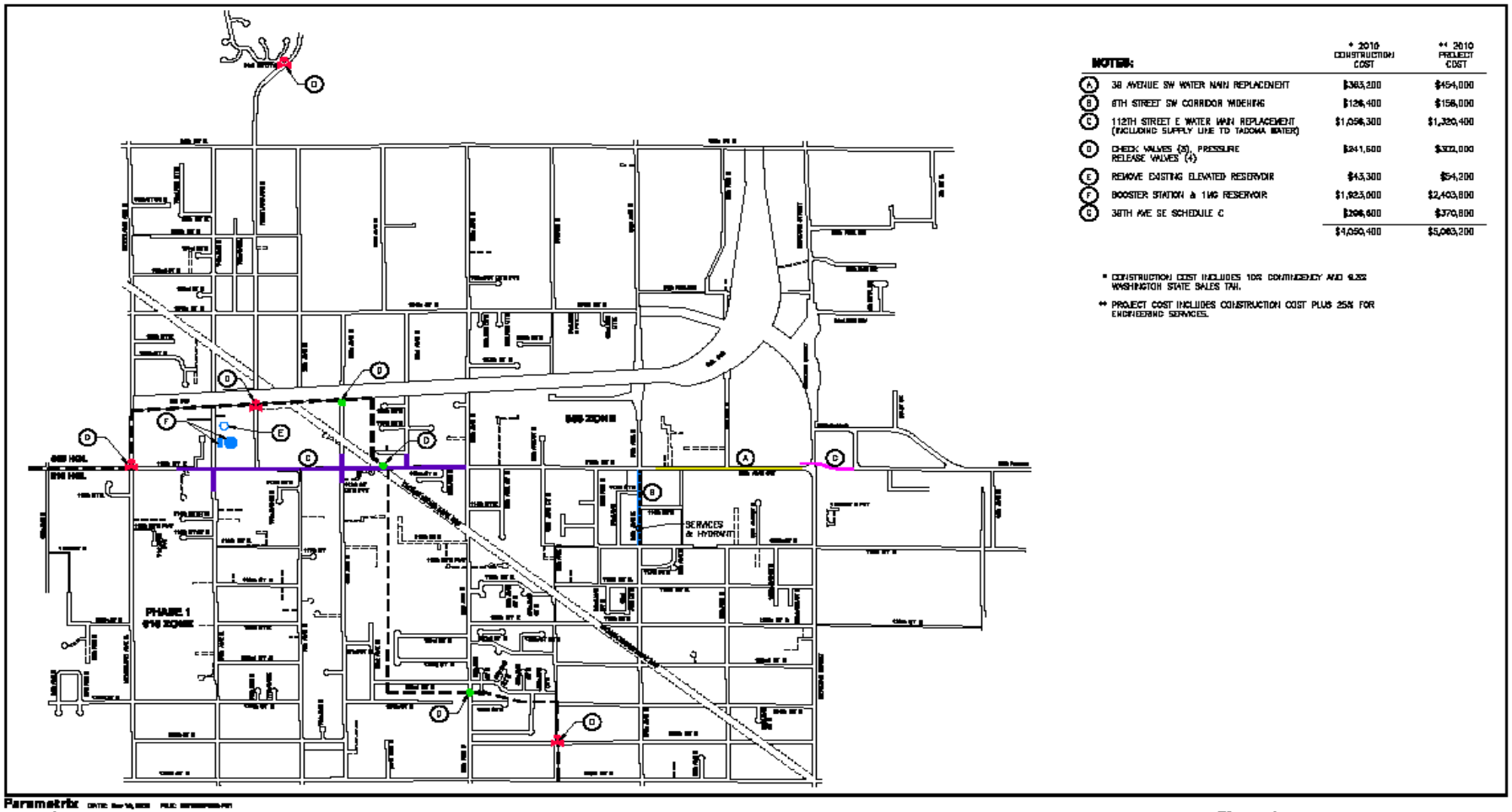
Fruitland Mutual Water Company – Today

- 3,600 connections / 12,000 Population Equivalents
- 5.2 Square Mile Service Area (City and County)
- Eight independent sources of supply totaling 3,905 gpm and 2,337 acre-feet Qa
- 3MG Storage

Fruitland Mutual Water Company – Future

- No planned change to limits of service area
- 6,000 connections / 20,000 PEs
- Two main pressure zones (556 and 610)
- Wholesale Intertie with Tacoma (1020 gpm and 840 acre-feet)
- 6 MG Storage

System Overview and Project Limits



NOTES:	* 2010 CONSTRUCTION COST	** 2010 PROJECT COST
(A) 38 AVENUE SW WATER MAIN REPLACEMENT	$363,200	$454,000
(B) 6TH STREET SW CORRIDOR WIDENING	$126,400	$158,000
(C) 112TH STREET E WATER MAIN REPLACEMENT (INCLUDING SUPPLY LINE TO TACOMA WATER)	$1,056,300	$1,320,400
(D) CHECK VALVES (3), PRESSURE RELEASE VALVES (4)	$241,600	$302,000
(E) REMOVE EXISTING ELEVATED RESERVOIR	$43,300	$54,200
(F) BOOSTER STATION & 1MG RESERVOIR	$1,923,000	$2,403,800
(G) 38TH AVE SE SCHEDULE C	$296,600	$370,800
	$4,050,400	$5,063,200

* CONSTRUCTION COST INCLUDES 10% CONTINGENCY AND 9.2% WASHINGTON STATE SALES TAX.

** PROJECT COST INCLUDES CONSTRUCTION COST PLUS 25% FOR ENGINEERING SERVICES.

Parametrix

N

NO SCALE

LEGEND

PRESSURE RELEASE VALVE

CHECK VALVE

RESERVOIR & BOOSTER STATION

ZONE BOUNDARY

Figure 1
Fruitland Mutual Water Company
6 Year Capital Improvement Program
With Anticipated Project Cost

Project Drivers

- Address localized low pressure
- Secure additional water
  - Water rights and physical source of supply
- Control Transmission and Blend wholesale water
- Improve fire flow
- Improve storage
  - Volume and geography
  - Replace aging elevated reservoir

Major Project Physical Components

- Tacoma Intertie:
  - Wholesale water intertie sufficient for buildout of Fruitland's service area
  - 5,190LF of 12-inch transmission main from intertie to storage and 1,835 LF of 8-inch
  - Connection completed for emergency purposes
- 1MG reservoir
- 3800 gpm booster pumping station
- Pressure reducing (3) and check valves (3) for pressure zone

Project Status

- Wholesale intertie completed
- Wholesale Dedicated Transmission 2012
- Old Elevated Reservoir demolished
- Design Plans for New Reservoir and Booster Station Complete
- Permits and State approval outstanding

Planning – Background

- Identifying improvements
- Interim and long term operation / controls
- Design and permitting
- Funding
- Implementation…

Planning, Design, and Implementation

- 2000 and 2008 water system plans – Phase 1
  - Estimated value of improvements - $9M (Including Water Purchase)
- Intertie
- Booster Station and Reservoir
- Service area pressure zone creation

Wholesale Intertie – Patience…

- 5 Years:
  - Water Purchase Evaluation
  - Water Demand Calculations
  - Water compatibility / blending (surface and subsurface source)
  - Hydraulic Modeling
  - Contract negations
  - Financing
- 1 Week:
  - Construction

Parametrix

Wholesale Intertie – Patience…

Wholesale Intertie – Patience…

- There will be additional sampling and reporting requirements if you combine surface water and groundwater sources

- In addition to sampling and reporting – blended water quality should be evaluated

Form 6: Standard Monitoring Plan

Page 1 of 6

I. GENERAL INFORMATION

A. PWS Information*

B. Date Submitted* 09/20/2007

PWSID: 26800F
PWS Name: Fruitland Mutual Water Co.
PWS Address: P.O. Box 73759
City: Puyallup State: WA Zip: 98373
Population Served: 10,000

System Type:	Source Water Type:	Buying / Selling Relationships:
☑ CWS	☑ Subpart H	☑ Consecutive System
☐ NTNCWS	☐ Ground	☐ Wholesale System
		☐ Neither

C. PWS Operations

Residual Disinfectant Type: ☑ Chlorine ☐ Chloramines ☐ Other:_____

Number of Disinfected Sources: ___ Surface ___GWUDI _6_ Ground _1_ Purchased

D. Contact Person*

Name: Gary (Ted) Hardiman
Title: General Manager
Phone #: 253-848-5519 Fax #: _____
E-mail: ted@fruitlandwater.com

II. IDSE REQUIREMENTS*

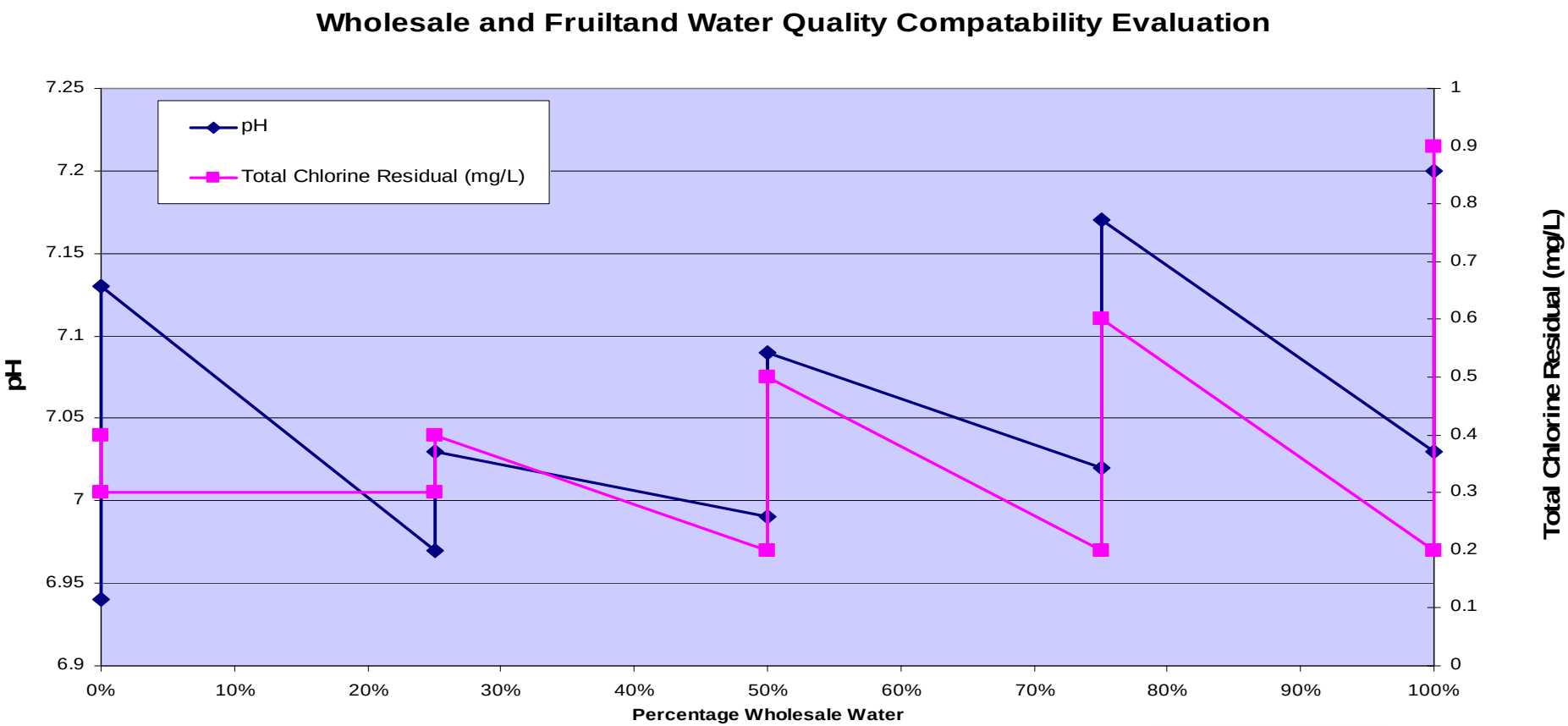
A. Number of Sites		B. Schedule	C. Standard Monitoring Frequency
Total:	8		
Near Entry Point:	1	☐ Schedule 1	☑ During peak historical month (1 monitoring period)
Avg Residence Time:	2	☐ Schedule 2	
High TTHM:	3	☑ Schedule 3	☐ Every 90 days (4 monitoring periods)
High HAA5:	2	☐ Schedule 4	☑ Every 60 days (6 monitoring periods)

IDSE Guidance Manual for the Final Stage 2 DBPR 7-29 January 2006

Parametrix

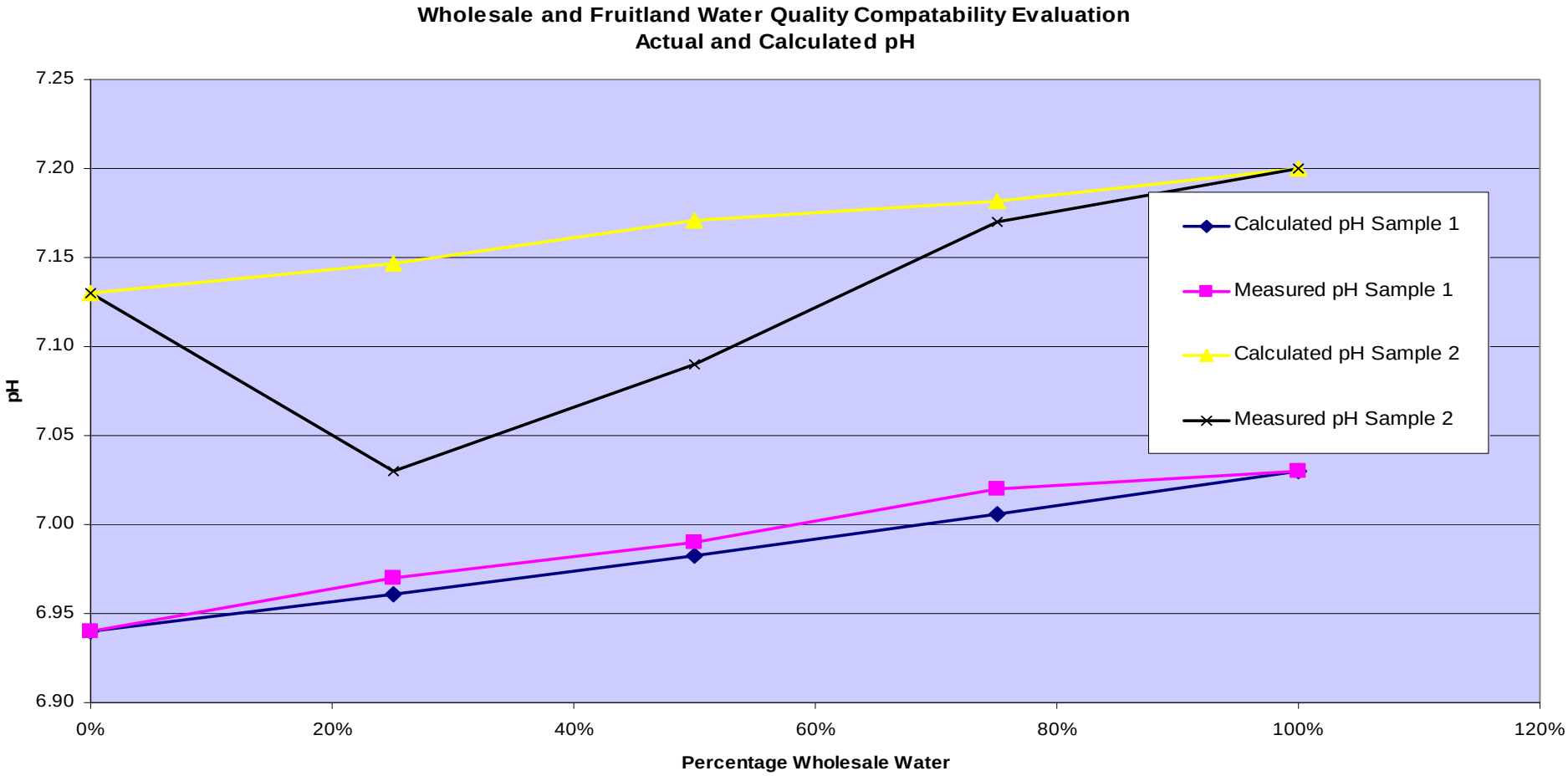
Wholesale Intertie – Patience…

- There is a perceived and real need to evaluate water quality when blending two sources from different supplies



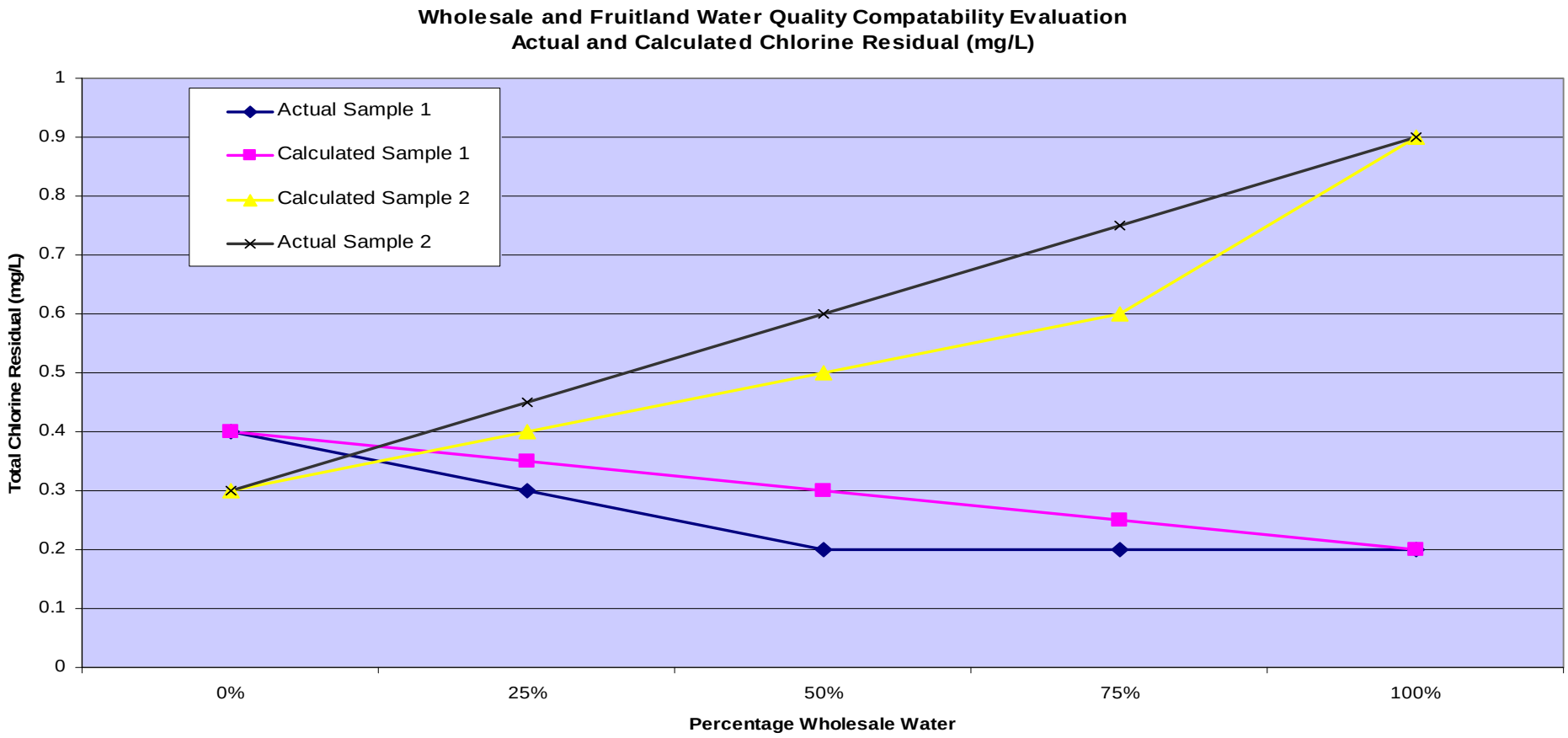
Wholesale Intertie – Patience…

- Blended water quality may differ from expected - pH



Wholesale Intertie – Patience…

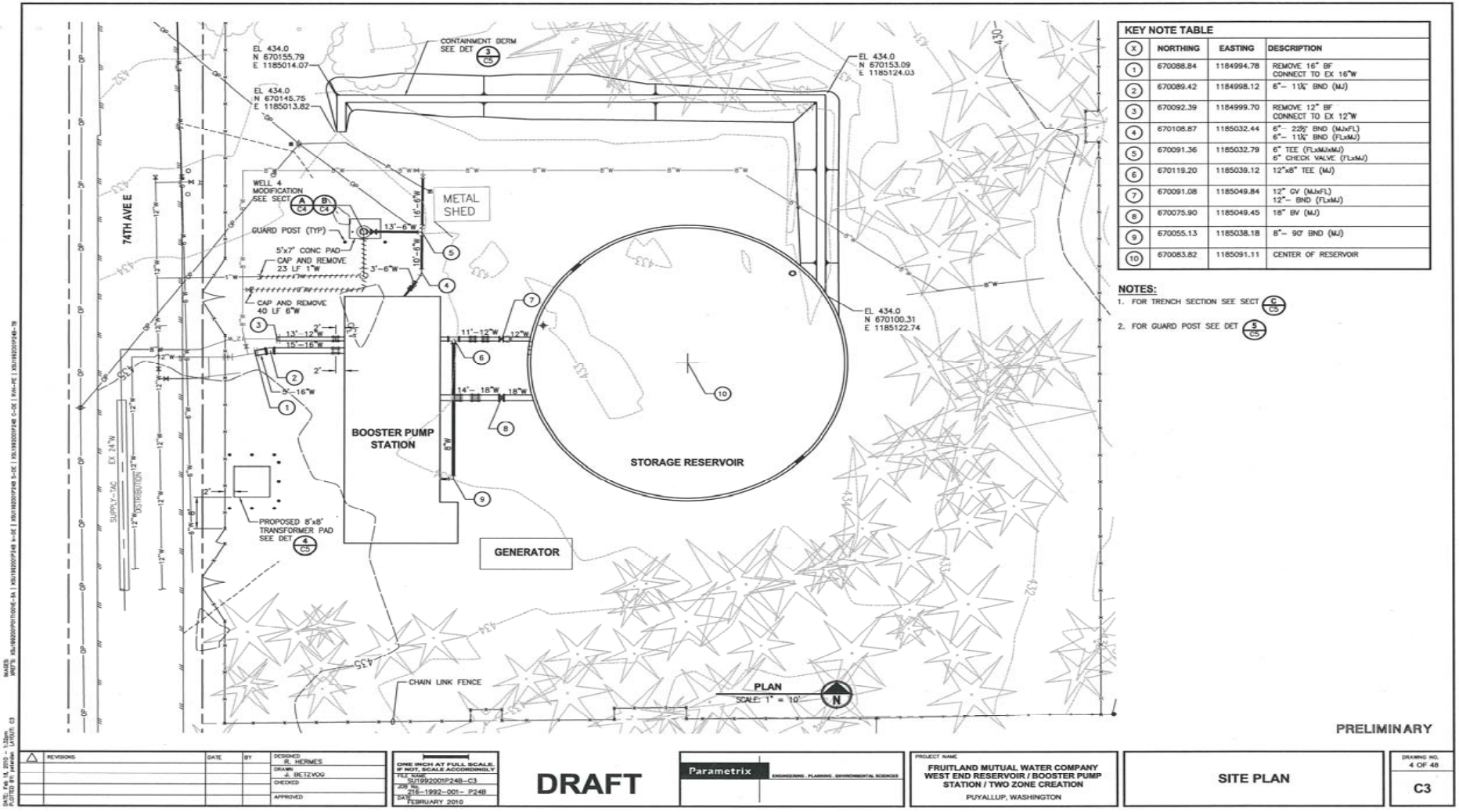
- Blended water quality may differ from expected – available chlorine



Reservoir and Booster Station

- Challenges:
  - Design delivery with multiple stakeholders (Tacoma, Puyallup, Pierce County, DOH, Fruitland members, and USDA-RD)
  - Phased demolition/construction
  - Interim operations
  - Funding limitations
- Opportunities:
  - Three dimensional design
  - ARRA Funding / Timing
  - System Operational Flexibility with new SCADA system allows phased construction
  - Flexible schedule allows for phased construction / crew installation

Traditional Design Delivery – Plan View



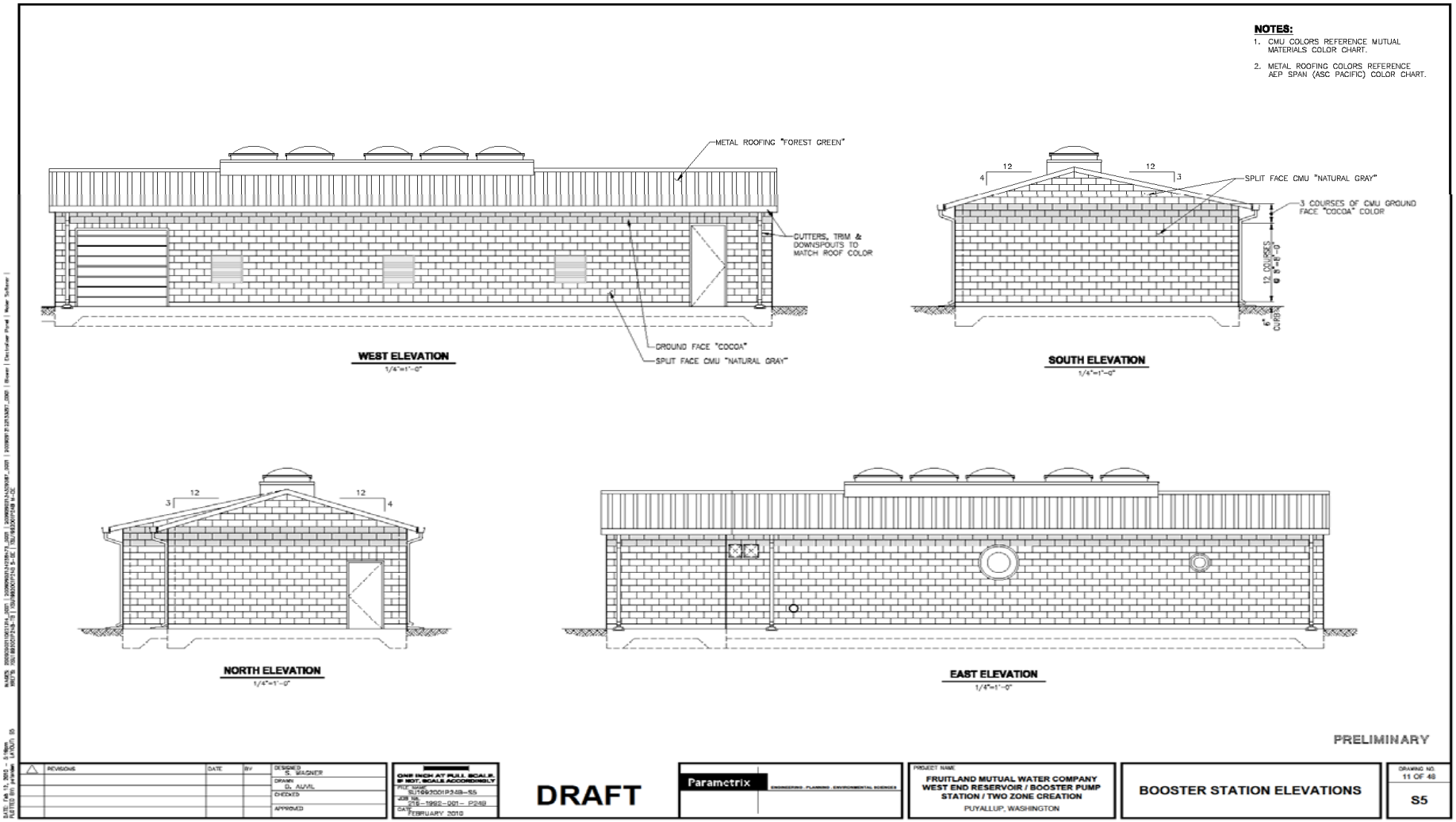
KEY NOTE TABLE

X	NORTHING	EASTING	DESCRIPTION
1	670088.84	1184994.78	REMOVE 16" BF CONNECT TO EX 16"W
2	670089.42	1184998.12	6"– 11¼° BND (MJ)
3	670092.39	1184999.70	REMOVE 12" BF CONNECT TO EX 12"W
4	670106.87	1185032.44	6"– 22½° BND (MJxFL) 6"– 11¼° BND (FLxMJ)
5	670091.36	1185032.79	6" TEE (FLxMJxMJ) 6" CHECK VALVE (FLxMJ)
6	670119.20	1185039.12	12"x8" TEE (MJ)
7	670091.08	1185049.84	12" GV (MJxFL) 12"– BND (FLxMJ)
8	670075.90	1185049.45	18" BV (MJ)
9	670055.13	1185038.18	8"– 90° BND (MJ)
10	670083.82	1185091.11	CENTER OF RESERVOIR

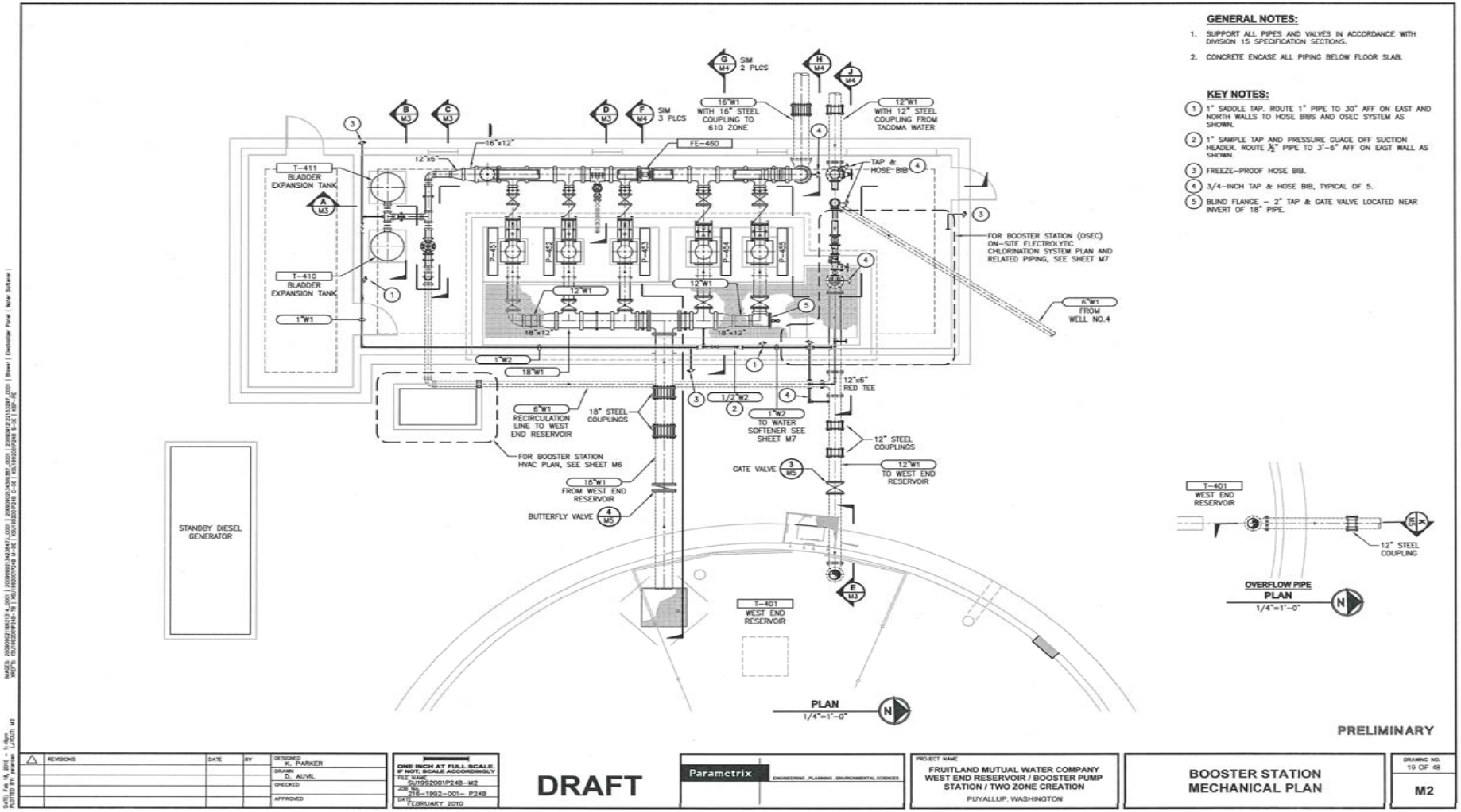
NOTES:

1. FOR TRENCH SECTION SEE SECT C/C5
2. FOR GUARD POST SEE DET 5/C5

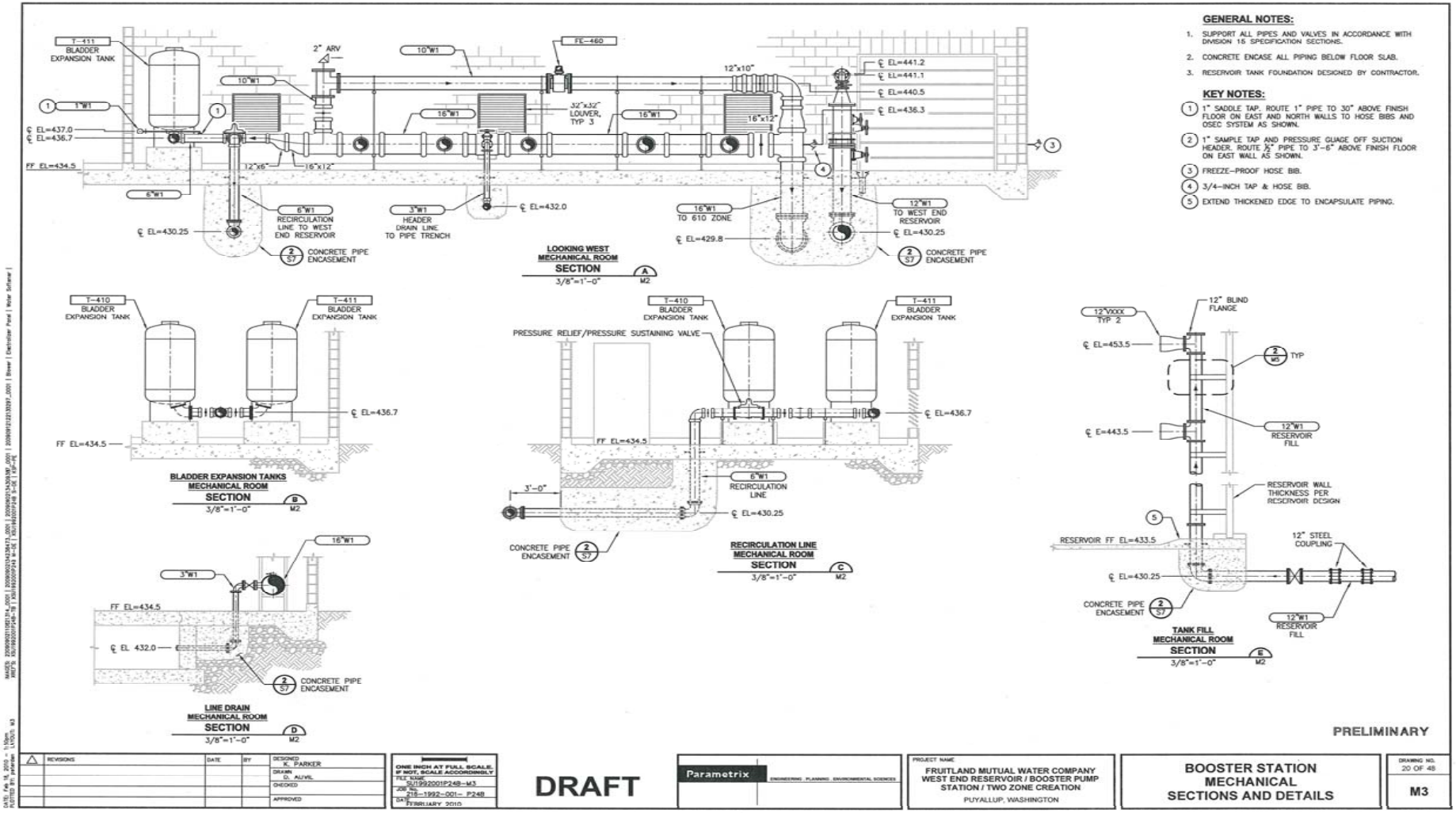
Traditional Design Delivery – Elevations



Traditional Design Delivery – Mechanical



Traditional Design Delivery – Mechanical

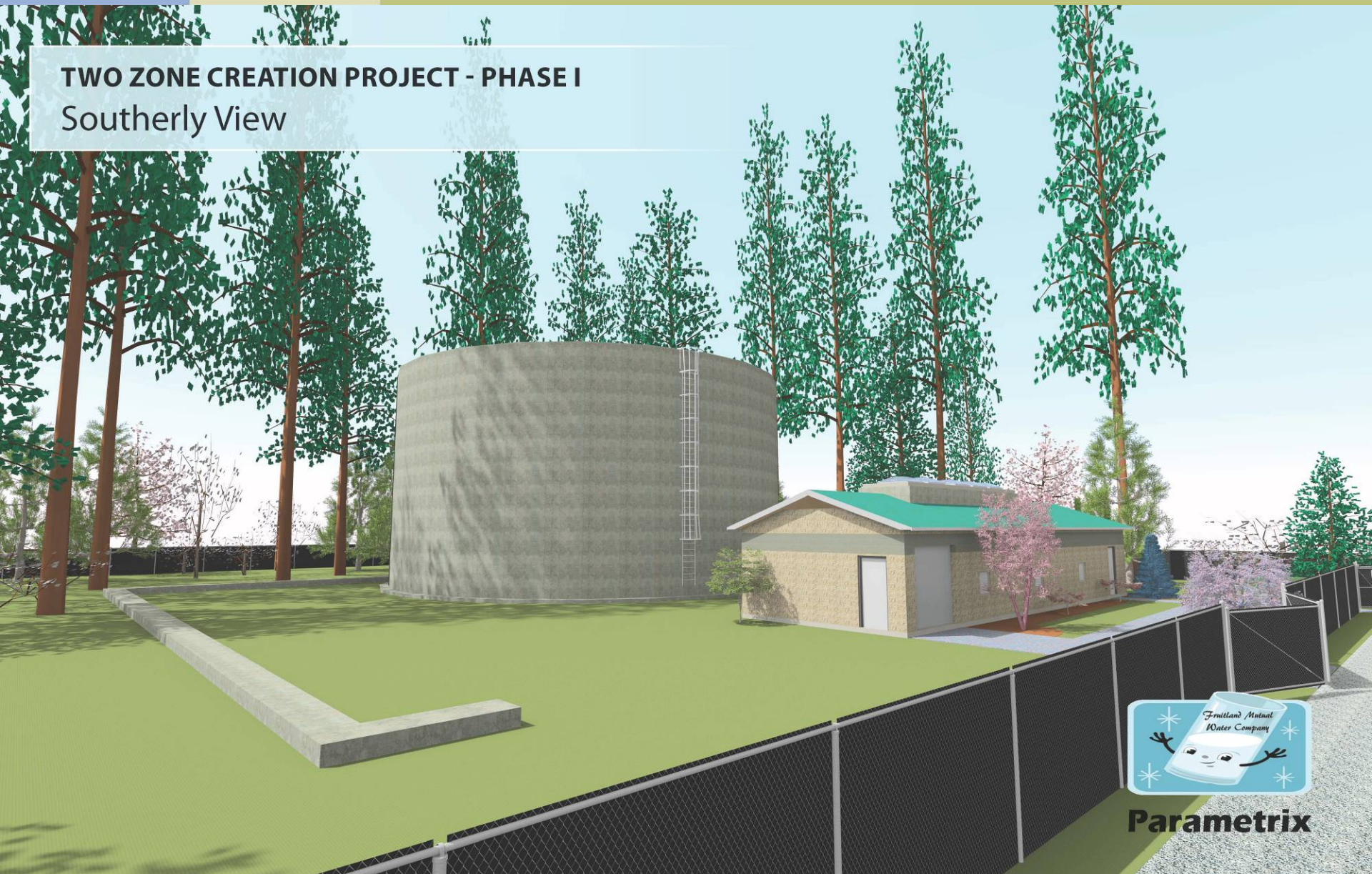


The Power of 3D Rendering and Design

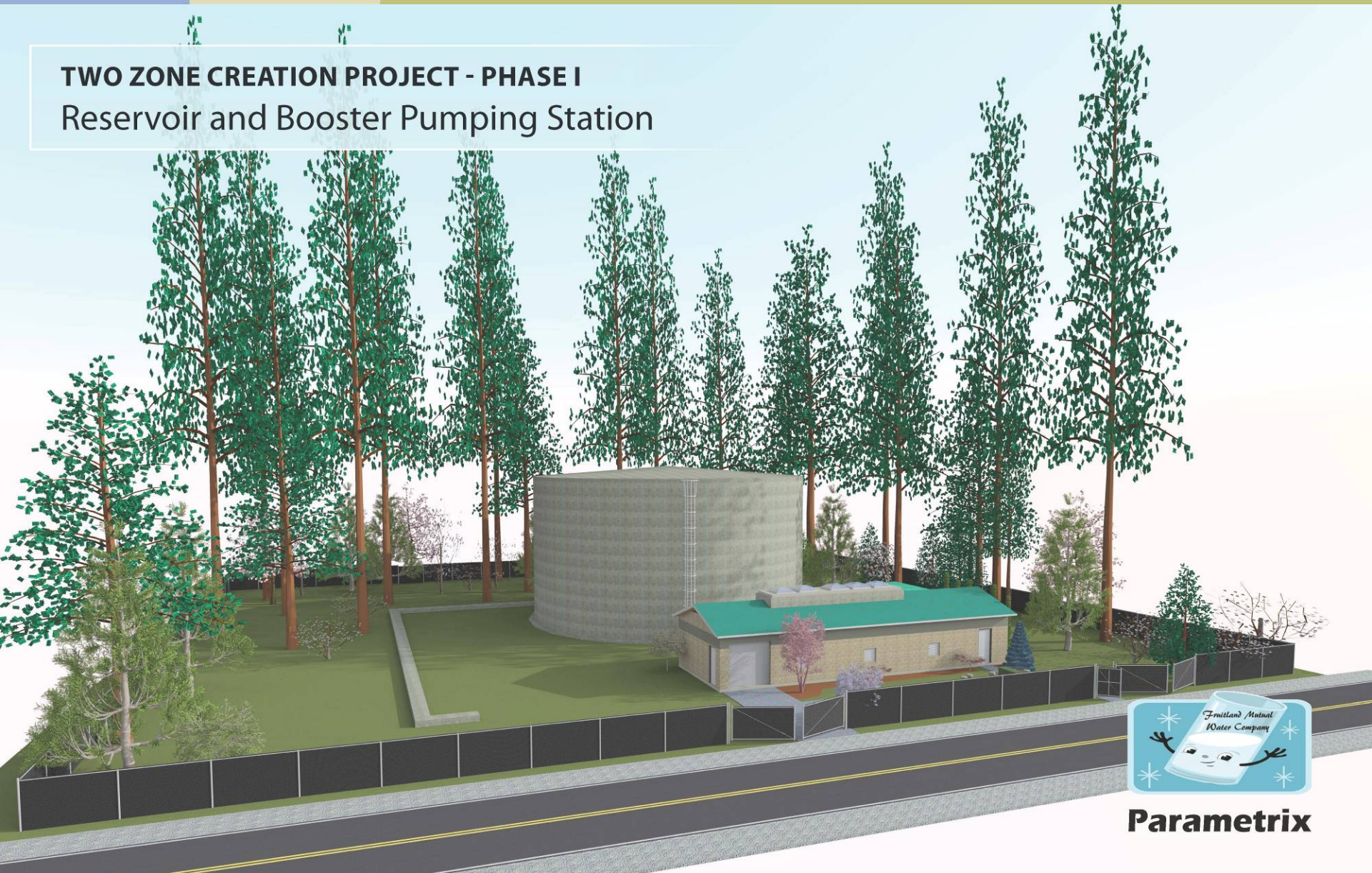
- Stakeholder communication / vision
- Estimating operation and maintenance
- Color selection (aesthetic and functional)
- Vandalism evaluation
- Prevailing winds / venting
- How it fits with the neighborhood
- Funding / bonding
- Ergonomics – walkways / equipment layout etc.

The Power of 3D Rendering

The Power of 3D Rendering

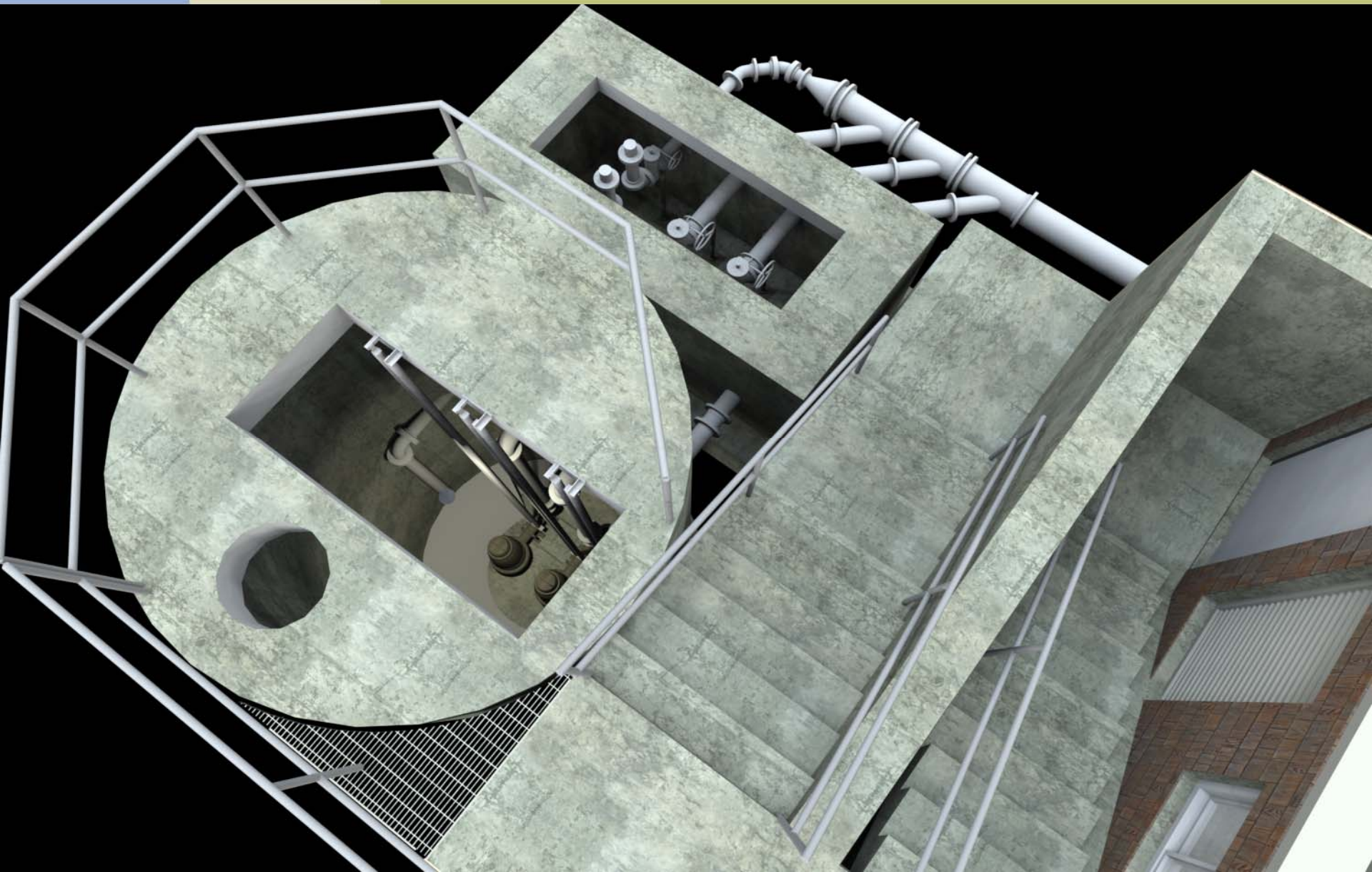


The Power of 3D Rendering



The Power of 3D Rendering

The Power of 3D Rendering



Booster Station and Reservoir – Almost

Parametrix

Booster Station and Reservoir – Almost

Parametrix

Two Zone Creation

- Locations identified throughout distribution system
- Detailed design and ROW permits / Easements on-going
- Fruitland crew anticipated construction summer 2010 and 2011
- Phased construction acceptable given bypass is required until booster and reservoir complete

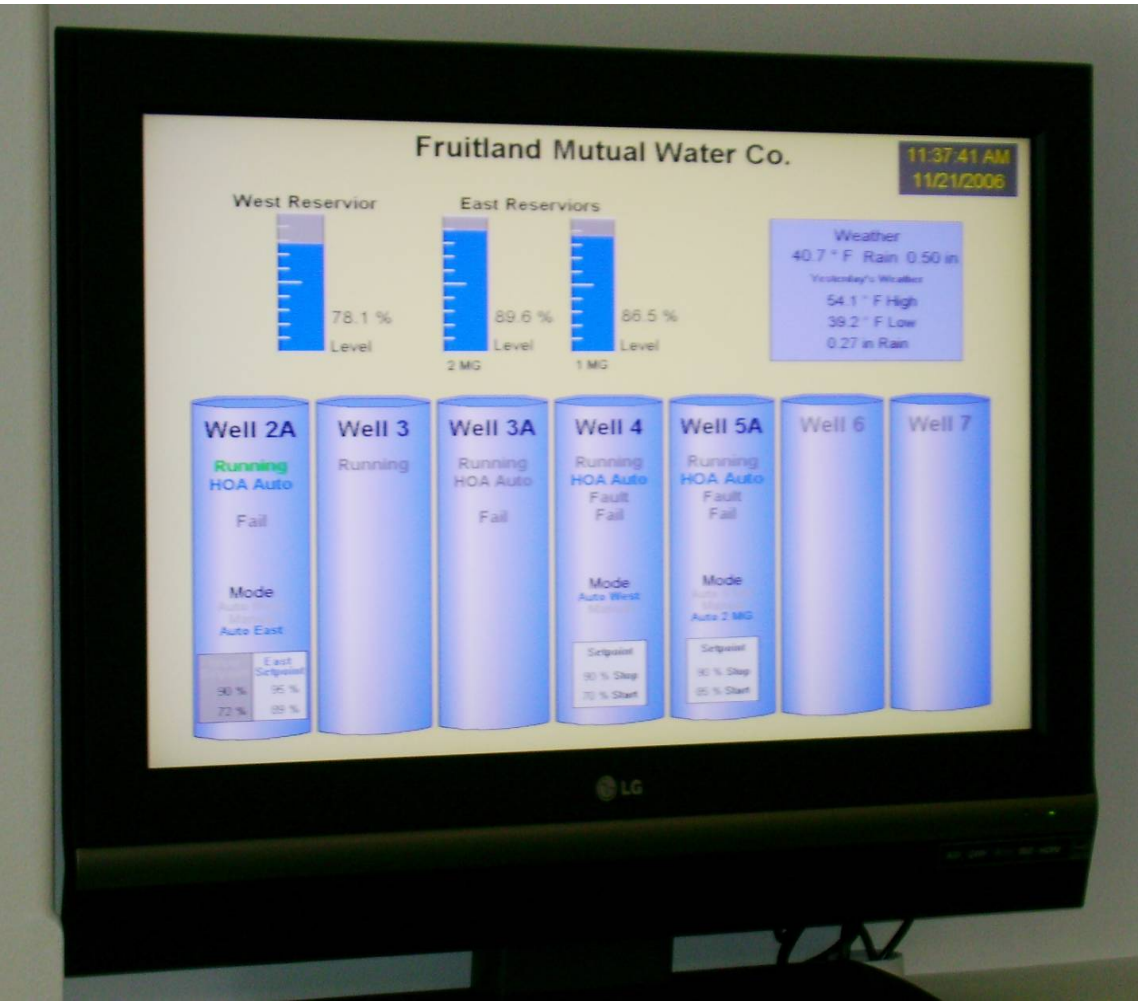
Interim Operation and Construction

- Phased construction required detailed analysis and SCADA modifications/operational changes
- Old system – elevated reservoir maintained pressure
- Interim system – well 4 used as virtual reservoir to maintain system pressure
- Interconnected to six sources of supply

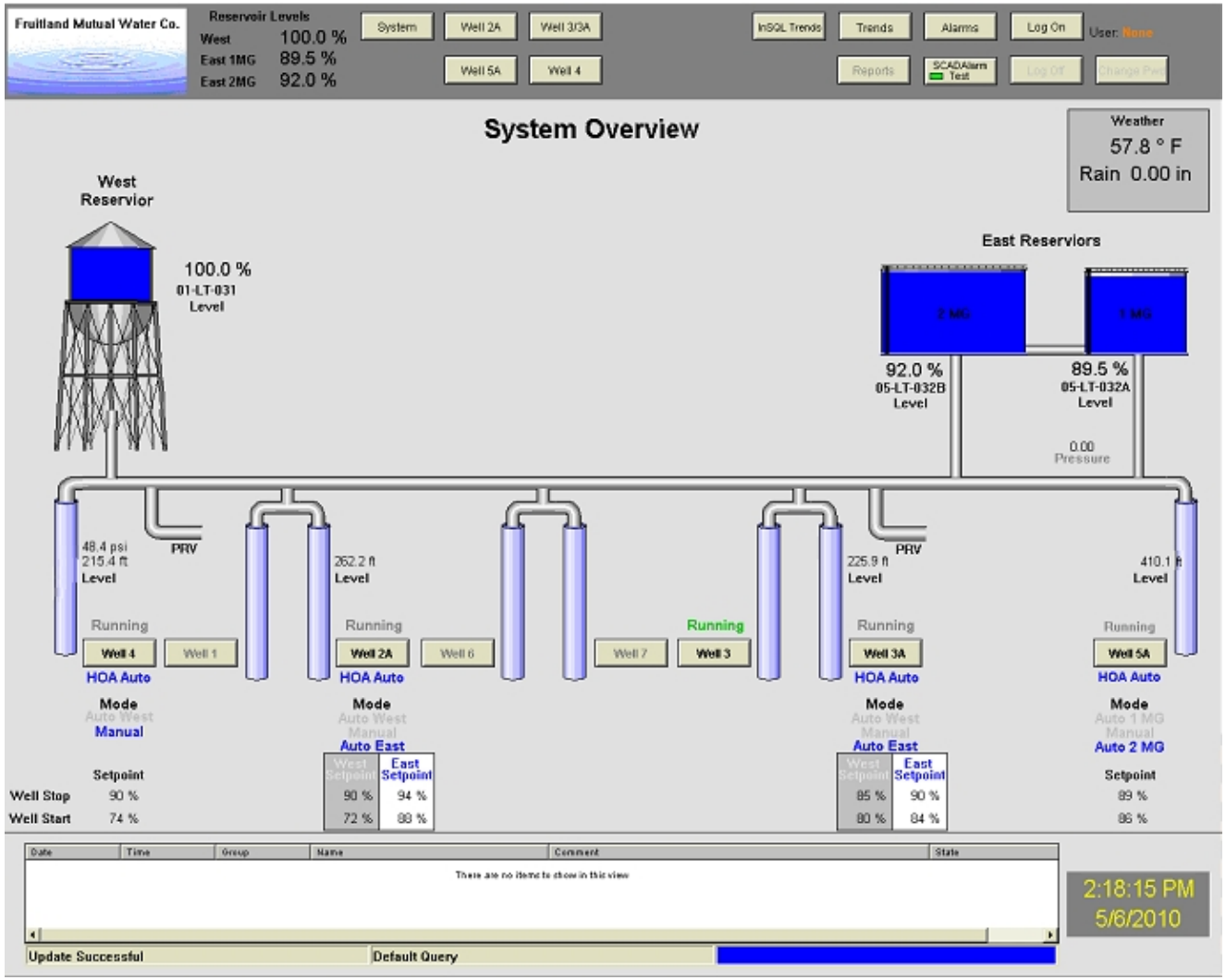
Phased Demolition/Construction

- Phase I – Demo elevated tank (winter 2009)
- Phase II – On-site improvements (estimated 2011)
- Phase III – Complete intertie (estimated 2012)
- Fruitland Construction:
  - On-site utilities and grade
  - Off-site two zone creation / check valve installation

SCADA Modifications

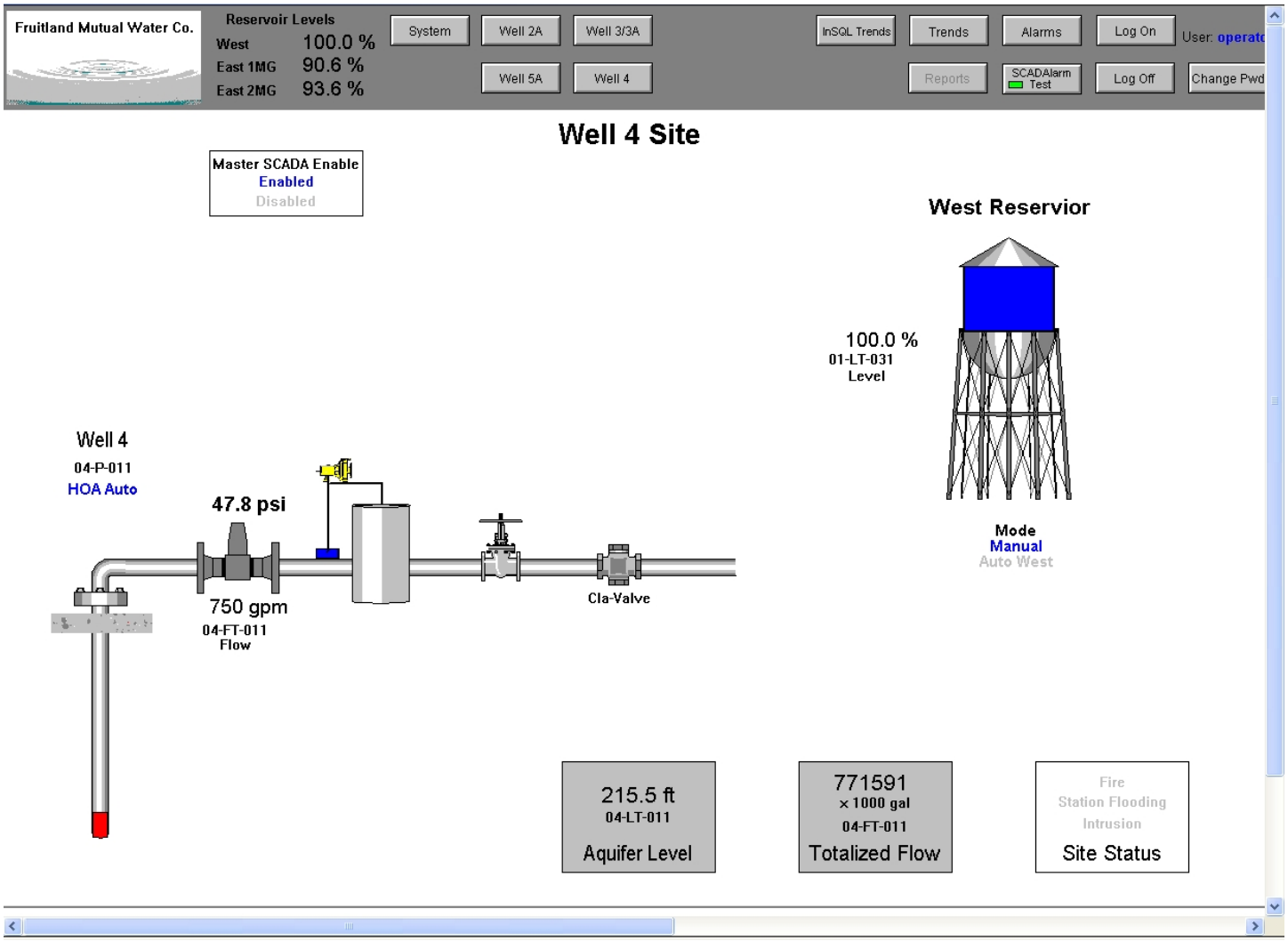


SCADA Modifications



Parametrix

SCADA Modifications

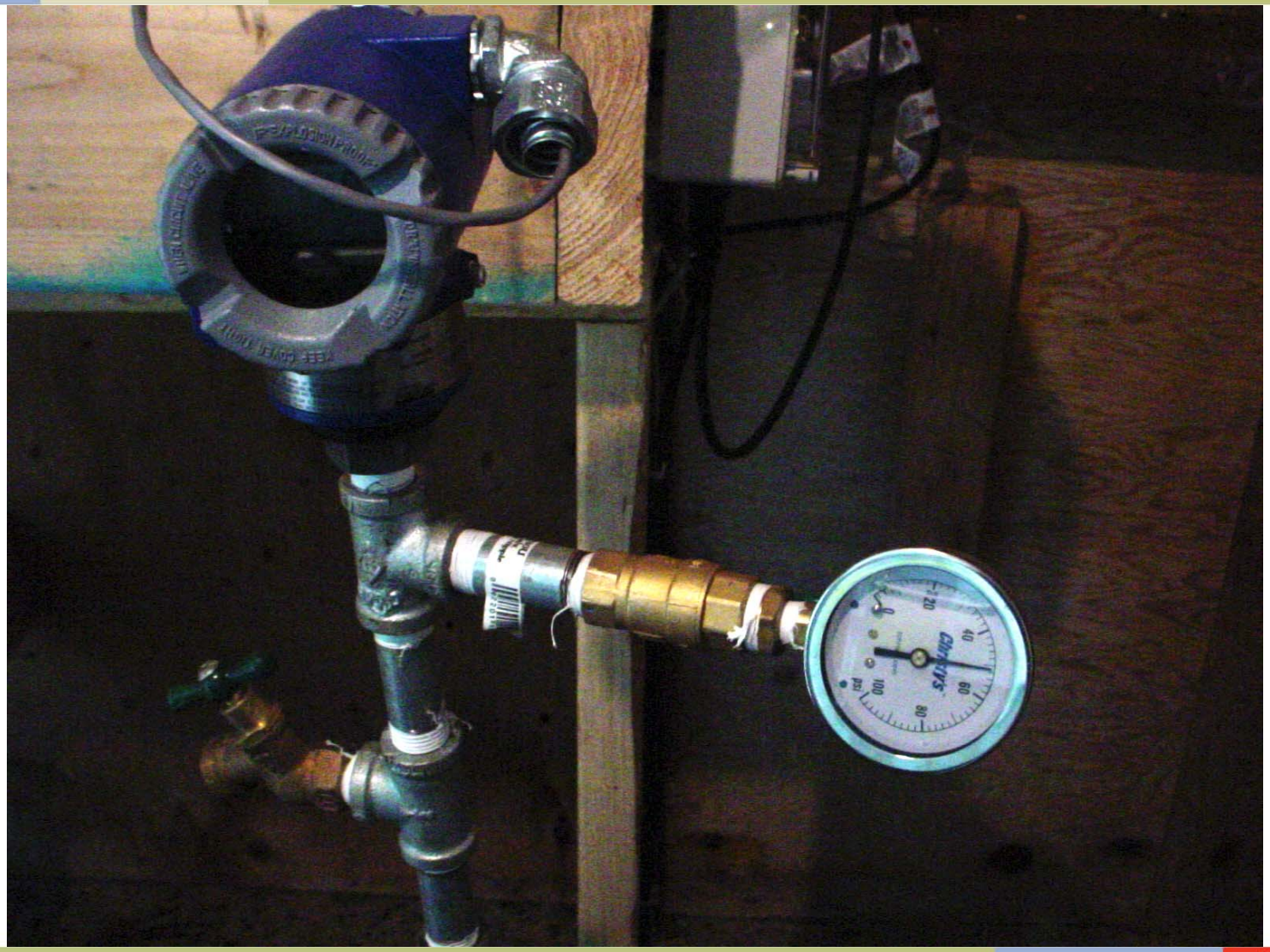


Phased Demolition/Construction

Parametrix

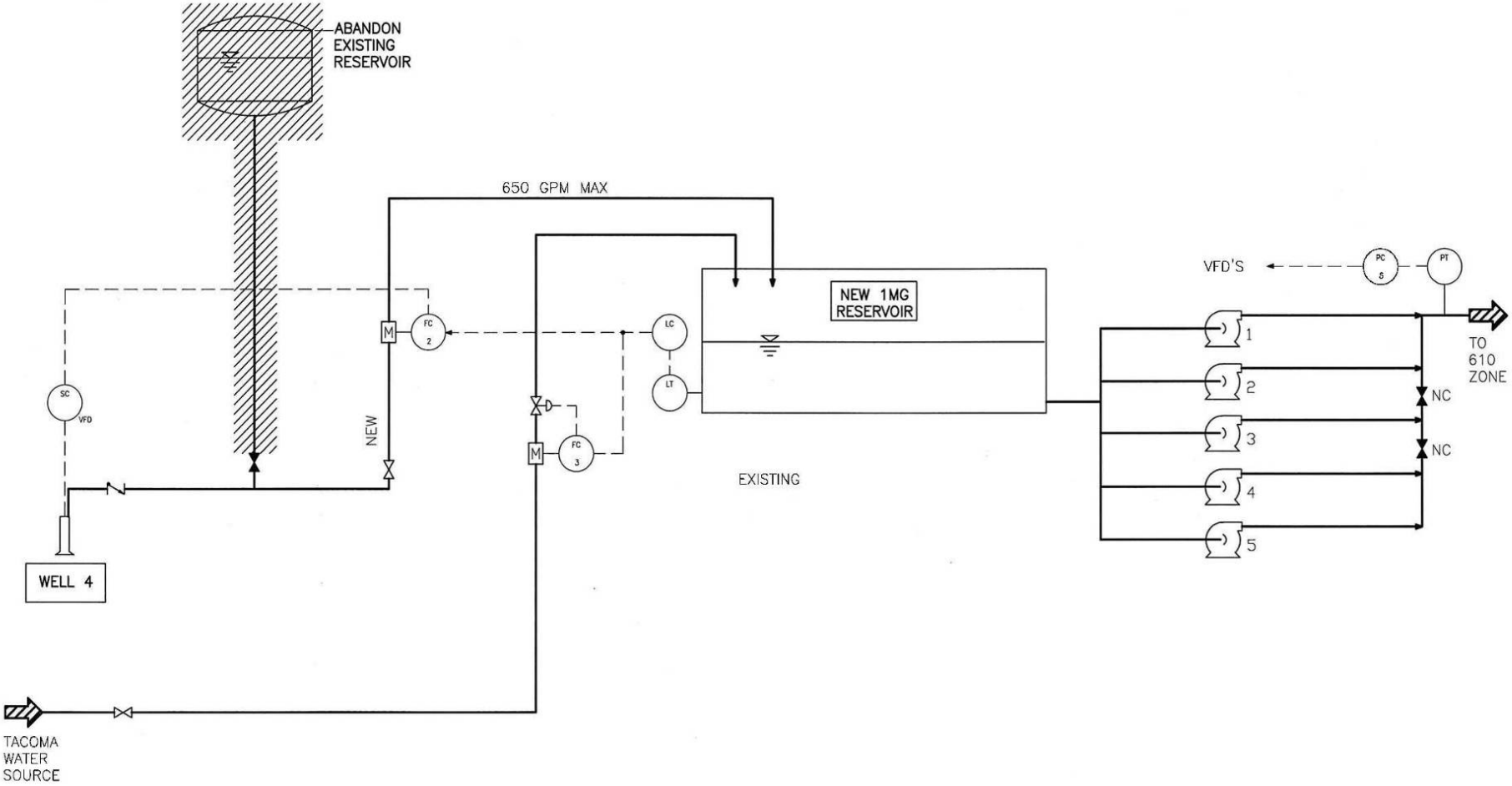
Phased Demolition/Construction

Phased Demolition/Construction

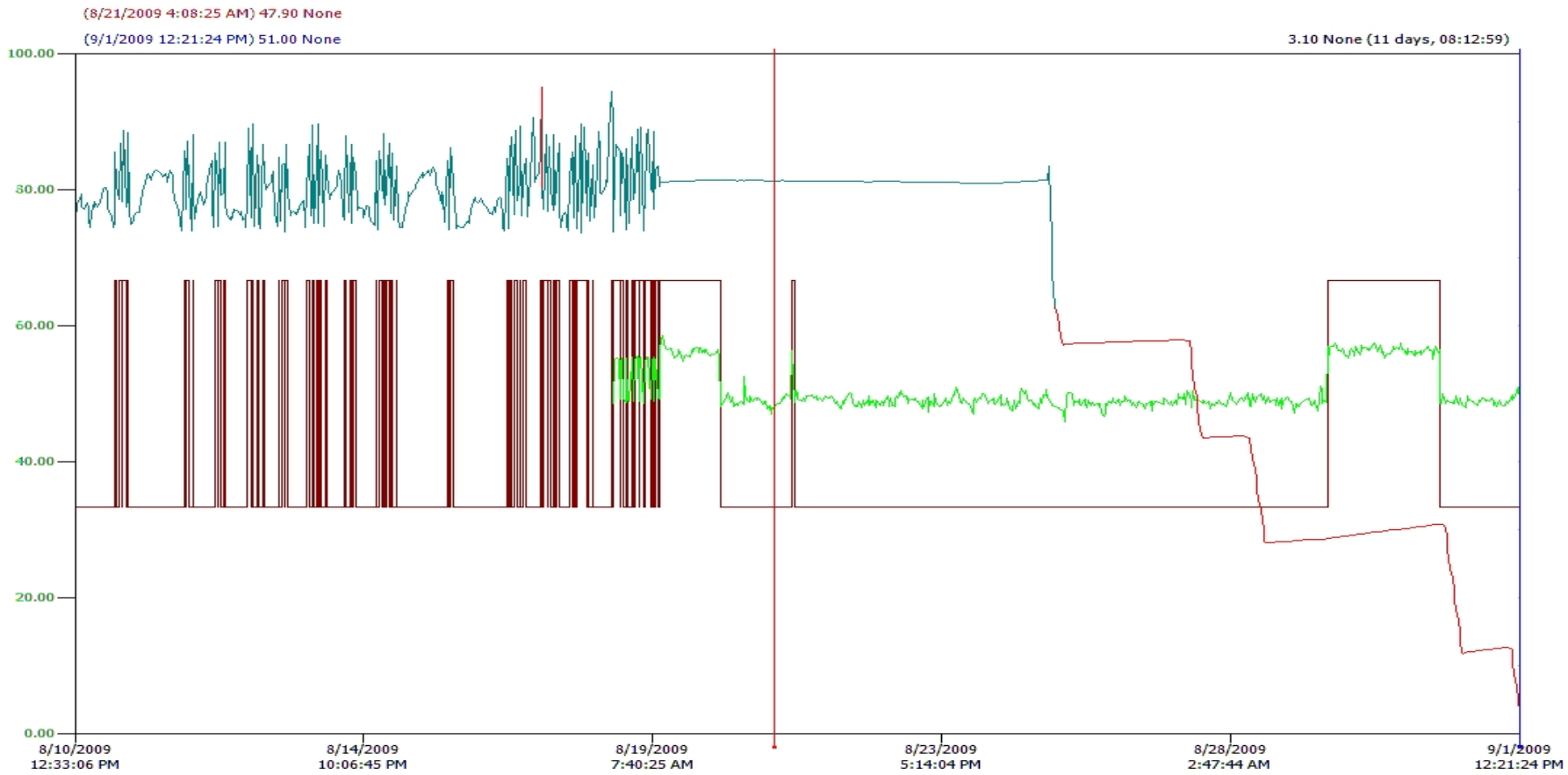


Parametrix

Interim Operation



SCADA Modifications – Interim Operation Well 4



Tag Name	Description	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset
01_LT_031_Level	Telemetry West Res Lvl	FRUITLAND		%	0.00	100.00	\\FRUITLAND\Serverm...	00:00:00
04_P_011_Run	Well 4 Pump Running	FRUITLAND		0|1	-1.00	2.00	\\FRUITLAND\Serverm...	00:00:00
S4PT01PSI	Well 4 Pressure	FRUITLAND		None	0.00	100.00	\\FRUITLAND\Serverm...	00:00:00

Parametrix

Next Steps

- Financing: USDA-RD
- Permitting: Pierce County comp plan revisions are related to water facilities
- Construction – pending financing

What We've Learned

- Patience
- Plan for variables outside the norm – <u>interim may be a while</u>
- Proof is in the pudding – field verification is always better than the best model
  - pressure zone verification
  - fire flow
  - water quality
  - Reservoir removal / testing – August 2009