

JEFFERSON COUNTY PUD WATER SYSTEM PLAN BOARD BRIEFING #2

**PRESENTED BY: SAMANTHA HARPER, P.E., PUD
BILL GRAHAM, PUD
JEFF HANSEN, P.E., HDR**



SEPTEMBER 10, 2020

BRIEFING OUTLINE

- Acronyms/Definitions
- Water System Plan Policies/Service Objectives Discussion
- JPUD's Water System Plan – Recap of Plan Organization
- Volume 2 – System-Specific Information
 - Technical Analysis Required by DOH
 - Analysis Methodologies
 - Discussion of each JPUD Group A System
- Next Steps

ACRONYMS

- DOH – Washington State Department of Health
- WSP – Water System Plan
- ERU – Equivalent Residential Unit
- WAC – Washington Administrative Code
- WUE – Water Use Efficiency
- DSL – Distribution System Leakage
- CIP – Capital Improvement Program
- gpd – gallons per day
- gpm – gallons per minute

DEFINITIONS


- Equivalent Residential Unit (ERU) – A system-specific unit of measure used to express the amount of water utilized by a typical full-time single-family residence (WAC 246-290-010).
- Average Day Demand (ADD) – Average daily amount of water used throughout a system. Calculated as total annual demand / 365. Expressed in gpd.
- Maximum Day Demand (MDD) – Amount of water used throughout a system on the day of highest usage (i.e., in the peak of summer). Expressed in gpd.
- Distribution System Leakage (DSL) – Amount of water lost to leaks. Expressed as a percentage of the total volume of water pumped from wells.
- Peaking Factor – The ratio of MDD to ADD.

POLICIES – SERVICE OBJECTIVES

1. Provide safe and reliable drinking water for the residents of Jefferson County.
2. Provide water service in a manner that is consistent with the Safe Drinking Water Act, Jefferson County Comprehensive Plan, all applicable County Sub-area Plans, Coordinated Water System Plan (CWSP), and Growth Management policies of Jefferson County.
3. Manage all water systems owned, operated, or assisted by the PUD in such a way that water resources and facilities are efficiently and cost-effectively operated and maintained, while meeting or exceeding state and federal water quality standards.
4. Develop priorities and criteria for meeting the needs of existing and future customers.
5. Provide a regional perspective of coordinated utility services and resource management which is beneficial to the continued provision of high quality water service to the citizens of Jefferson County.

Action Item: Discussion from August 25th meeting.
How do these service objectives align with the
PUD's Mission and Vision Statements?

JPUD WSP ORGANIZATION

- Volume 1: District-Wide Information
 - General, programmatic elements
- Volume 2: System-Specific Information  **Focus for today**
 - Technical analysis related to each water system
 - Chapter dedicated to each of 9 Group A Water Systems
- Volume 3: Wellhead Protection Program
 - Management and protection of groundwater sources
- Volume 4: Appendices (2011 version)
 - In 2020 WSP, appendices will be included at the end of each volume; thus, there will be no longer be a Volume 4

VOLUME 2: KEY ELEMENTS (FOR EACH SYSTEM)

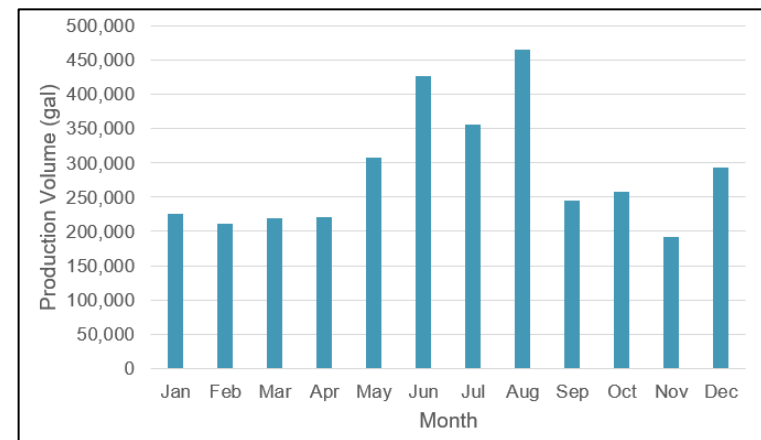
- System Description
- Population and Water Demand Forecast
- Water Use Efficiency (WUE) Goals (to be discussed at September 23, 2020 BOC Meeting)
- Capacity Analysis
 - Water Rights
 - Source Pumping Capacity
 - Storage Capacity
 - Distribution System (Piping)
- Vulnerability Assessment
- Water Quality Assessment
- Capital Improvement Program

DEMAND FORECASTING - APPROACH

- Planning Horizon (20 Years)
 - 2018 = Base Year
 - 2028 = 10-Year
 - 2038 = 20-Year
- Data
 - Historical Use: Well Pumping Data (Production) and Customer Billing Records (Consumption)
 - Future Growth: County Comprehensive Plan Growth Projections and Recent Trends within Each System

DEMAND FORECASTING - APPROACH

- Historical Data
 - Annual/seasonal trends
 - Determine system-specific Equivalent Residential Unit (ERU) water use factor (how much water a single-family residence uses)
 - Average Day Demand (ADD)
 - Maximum Day Demand (MDD)
- Growth Projections
 - Average County-wide Growth Rate = 0.98% per year
 - Used for long-term projections



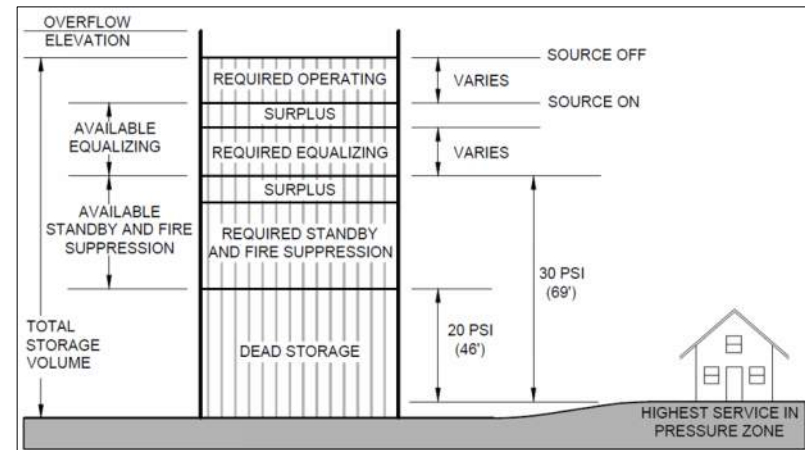
Example: Monthly Water Pumping Trends for Lazy C

SOURCE CAPACITY - APPROACH

- Water Rights
 - Two metrics that legally limit how much water can be used:
 - » Annual Quantity (Q_a), acre-feet per year
 - » Instantaneous Quantity (Q_i), gallons per minute
 - Compare current and future water demands to these limits
- Source Pumping Capacity
 - Pumping capacity must be able to meet Maximum Day Demand
 - DOH also recommends that sources be able to meet Average Day Demand with the largest source out of service (an element of redundancy)

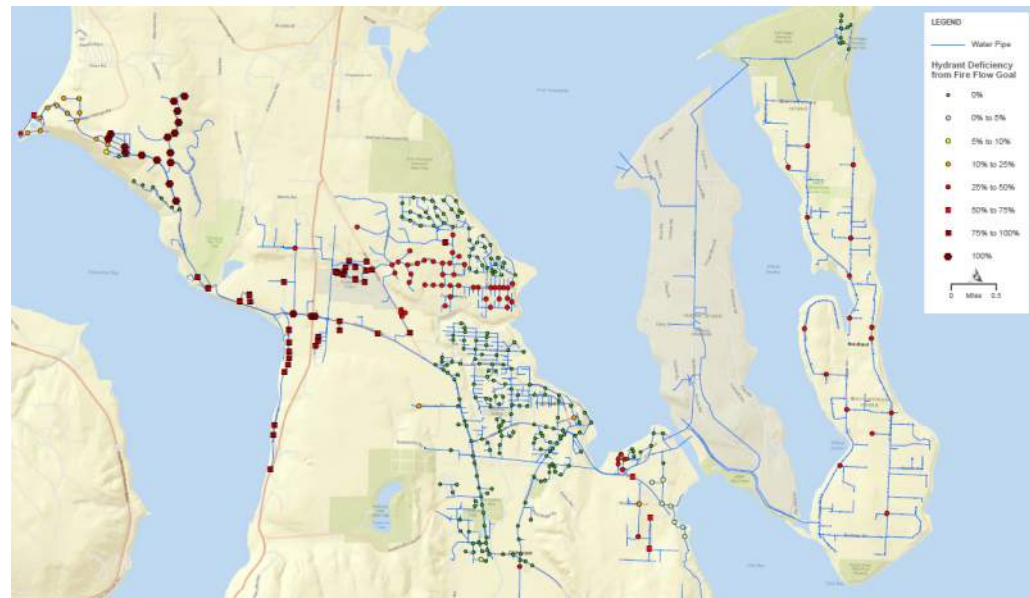
STORAGE CAPACITY - APPROACH

- Components of storage:
 - Operational – Accommodates typical fluctuations in demand
 - Equalizing – Helps system meet peak needs
 - Standby – Emergency storage (2 days of average demand)
 - Fire Suppression – For fighting fires
- Storage must be at elevations that provide required pressures throughout system:
 - Normal operation – 30 psi
 - During fires – 20 psi



DISTRIBUTION SYSTEM ANALYSIS

- Computer models used to evaluate capacity of water system piping
- Two conditions must be met at all service connections:
 - Normal operation, under peak hour demands – 30 psi
 - During fires, under maximum day demands – 20 psi



Example: Computer model results for fire flow analysis, Quimper

SYSTEM-SPECIFIC DETAILS

We will focus on these 5 systems:

- Quimper
- Bywater Bay
- Quilcene
- Gardiner
- Coyle

We will discuss the others if/as time allows

QUIMPER– DESCRIPTION

- Location: South of Port Townsend, inclusive of Marrowstone Island
- History:
 - 1940s – original infrastructure to Indian Island from Port Townsend
 - 1959 to 1997 – Sparling Well and further infrastructure development
 - 2001 – Water system transfer with Port Townsend (Tri-Area for Glen Cove and cash)
 - 2001 through present – system consolidations

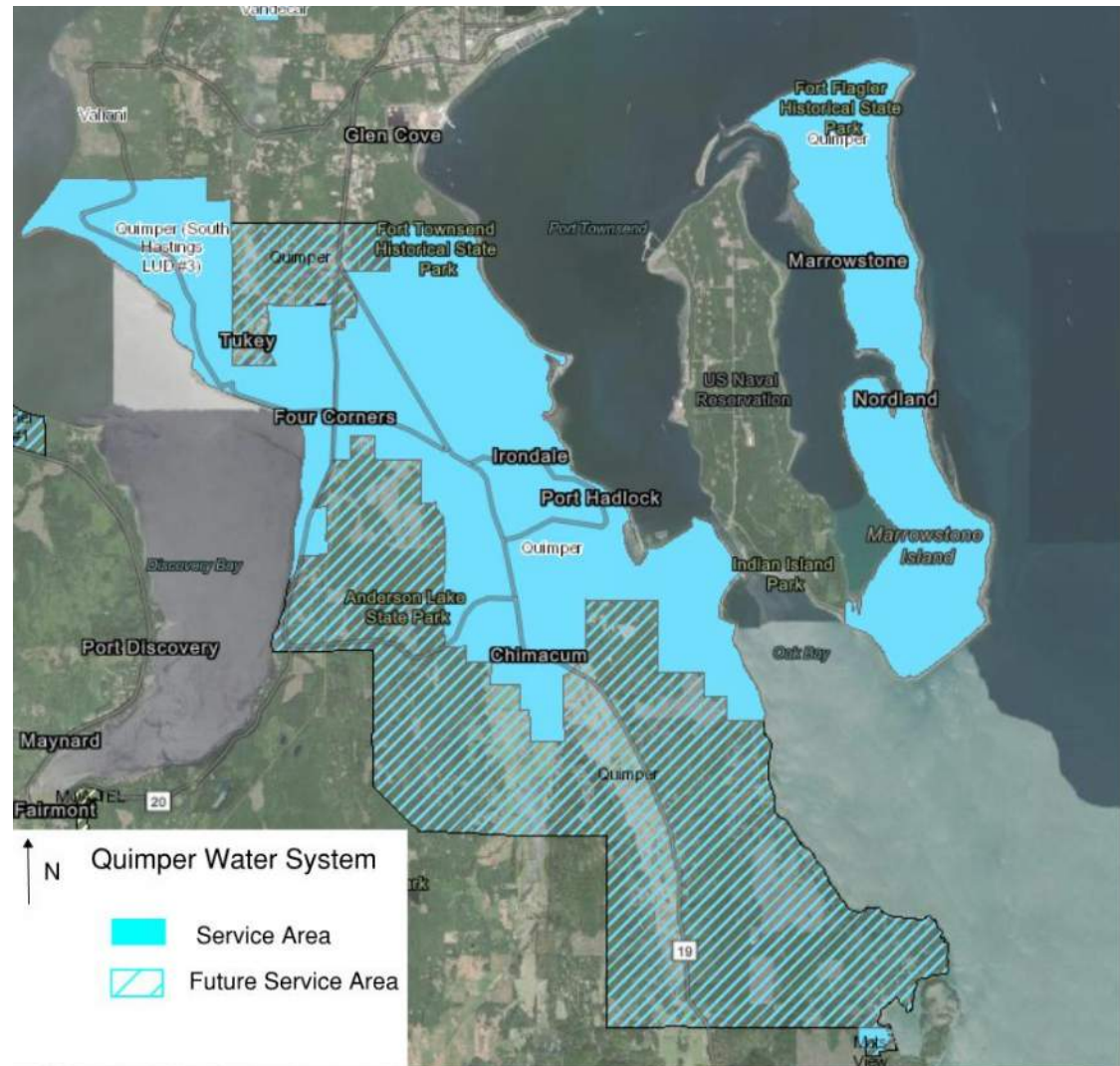
Quimper consists of:

- Tri-Area
- Glen Cove South
- Olympic Mobile Village
- Marrowstone Island (LUD#14)
- Kala Point
- South Hastings Loop (LUD#3)

Facilities:

- 8 active wells (2 are emergency)
- 6 booster pump stations
- 17 pressure zones
- 10 reservoirs
- 706,000 feet of piping

QUIMPER— SERVICE AREA



QUIMPER – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	3,646
ERU Water Use Factor (gpd)	123 -182
Peaking Factor	2.24
DSL %	5.17%

- Projections

Metric	2018	2028	2038
ERUs	4,854	6,605	7,649
Average Day Demand (gpd)	769,457	1,048,951	1,214,908
Maximum Day Demand (gpd)	1,724,265	2,350,578	2,722,470

QUIMPER – CAPACITY ANALYSIS SUMMARY

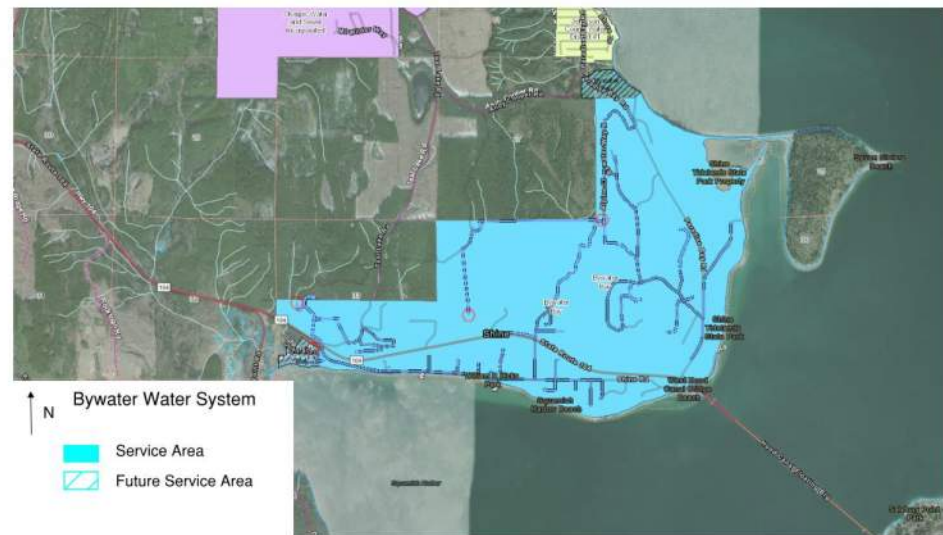
Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Insufficient	Ocean Grove BPS deficiencies with MDD + fire flow for entire planning period.
Storage	Sufficient	
Distribution System Piping	Insufficient	Several minor fire flow deficiencies across system related to pipe sizing and insufficient pressure through storage and booster stations.

QUIMPER – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
QR-3 Sparling II Building Air Compressor	\$5,000	2022	Replacement of the existing air compressor at Sparling Treatment Plant
D-2 Pressure zones at Beckett Point	\$2,000	2022	Reconfiguring pressure zone using existing piping and valves
D-3 Marrowstone	\$16,000	2022	Upsizing 4-inch to 8-inch (200LF)
D-6 Pressure zones along Cape George Rd. and Huntingford St.	\$2,000	2022	Reconfiguring pressure zone using existing piping and valves
D-7 Center Rd. near Beaver Valley Rd.	\$28,000	2022	Upsizing 4-inch to 8-inch (200LF)

BYWATER BAY – DESCRIPTION

- Location: Western terminus of Hood Canal Bridge
- History:
 - 1991 – original system established by Pope Resources
 - 1995 – ownership transferred to JPUD
 - 1999 through present day – system expansions through LUDs.
- Facilities:
 - 3 wells
 - 1 booster pump station
 - 2 reservoirs
 - 74,500 feet of piping
 - 3 pressure zones



Service Area

BYWATER BAY – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	240
ERU Water Use Factor (gpd)	216
Peaking Factor	2.74
DSL %	5.4%

- Projections

Metric	2018	2028	2038
ERUs	270	344	379
Average Day Demand (gpd)	58,395	74,334	81,949
Maximum Day Demand (gpd)	160,002	203,676	224,539

BYWATER BAY – CAPACITY ANALYSIS SUMMARY

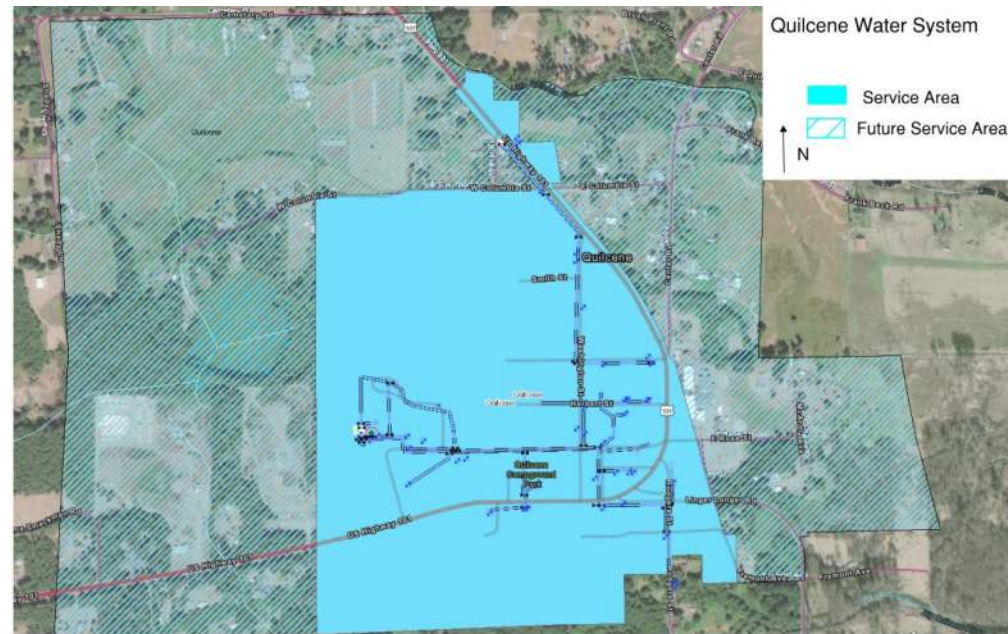
Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Insufficient	MDD with fire flow is insufficient in the upper zone for the entire planning period.
Storage	Insufficient	Lower zone will be deficient in 2028 and beyond.
Distribution System Piping	Sufficient	

BYWATER BAY – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
B-1 Pump Replacement (Shine Well)	\$35,000	2021	Replacement of aging well pump.
B-2. Booster Pump Station Installation	\$31,000	2021	Provide required pressures at Shine Road between Longmire Ln and Harbor View Pl.

QUILCENE – DESCRIPTION

- Location: near Brinnon
- History:
 - 1980s – original system built by USFS
 - 2005 – system purchased by JPUD
 - 2006 – extensions and local small system consolidations
- Facilities:
 - 1 active well
 - no booster pump stations (single pressure zone)
 - 1 reservoir
 - 15,000 feet of piping



Service Area

QUILCENE – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	36
ERU Water Use Factor (gpd)	200
Peaking Factor	3.68
DSL %	10.8%

- Projections

Metric	2018	2028	2038
ERUs	35	47	54
Average Day Demand (gpd)	7,054	9,455	10,759
Maximum Day Demand (gpd)	25,960	34,794	39,591

QUILCENE – CAPACITY ANALYSIS SUMMARY

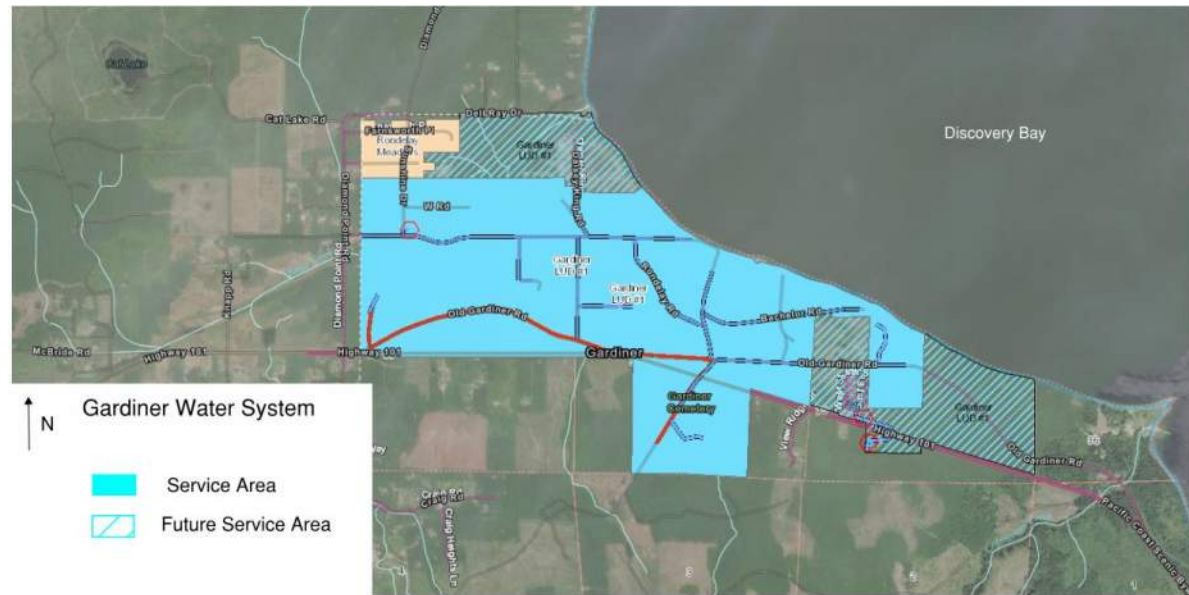
Metric	Status	Notes
Water Rights	Insufficient	Instantaneous rights insufficient in 10- and 20-year forecast horizons. Application pending.
Source Pumping	Sufficient	
Storage	Insufficient	Storage for 20-psi fire suppression is insufficient throughout the entire planning period.
Distribution System Piping	Sufficient	

QUILCENE – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
QE-1. Source 2 Development	\$5,000	2020-2021	Process and use a pending water right application.
QE-2. New Quilcene Water Tank	\$2,460,000	2020-2022	Final design into early 2021 (funded through PIF and PUD funds). Construction funding not secure.
QE-3. Quilcene Pump replacement	\$15,000	2021	Upsize the existing pump.
QE-4. SCADA Control Replacement	\$15,000	2021	Total includes SCADA for Triton Cove, Lazy C and Quilcene.

GARDINER – DESCRIPTION

- Location: Southwest shore of Discovery Bay
- History:
 - 1981 – established by JPUD as LUD #1
 - 1981 – current – gradual increase in service connections
- Facilities:
 - 1 active well
 - 1 booster pump station
 - 2 pressure zones, 2 reservoirs
 - 45,000 feet of piping



Service Area

GARDINER – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	141
ERU Water Use Factor (gpd)	184
Peaking Factor	2.82
DSL %	14.6%

- Projections

Metric	2018	2028	2038
ERUs	166	197	218
Average Day Demand (gpd)	30,462	36,311	40,030
Maximum Day Demand (gpd)	85,903	102,396	112,886

GARDINER – CAPACITY ANALYSIS SUMMARY

Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Sufficient	
Storage	Sufficient	
Distribution System Piping	Sufficient	Recommend looping dead-end mains.

GARDINER – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
G-3. Replacement Pump	\$80,000	2022	Replace aging pump and upgrade controls in well house

COYLE – DESCRIPTION

- Location: Southern tip of Toandos peninsula
- History:
 - 1970s – original system established as Jefferson County Water District #3
 - 2012 – taken over by JPUD
- Facilities:
 - 1 active well
 - 1 booster pump station (3 pumps)
 - 2 pressure zones
 - 1 reservoir
 - 14,000 feet of piping



Service Area

COYLE – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	85
ERU Water Use Factor (gpd)	112
Peaking Factor	3.15
DSL %	58.0%

- Projections

Metric	2018	2028	2038
ERUs	104	124	137
Average Day Demand (gpd)	11,646	13,901	15,325
Maximum Day Demand (gpd)	36,686	43,789	48,274

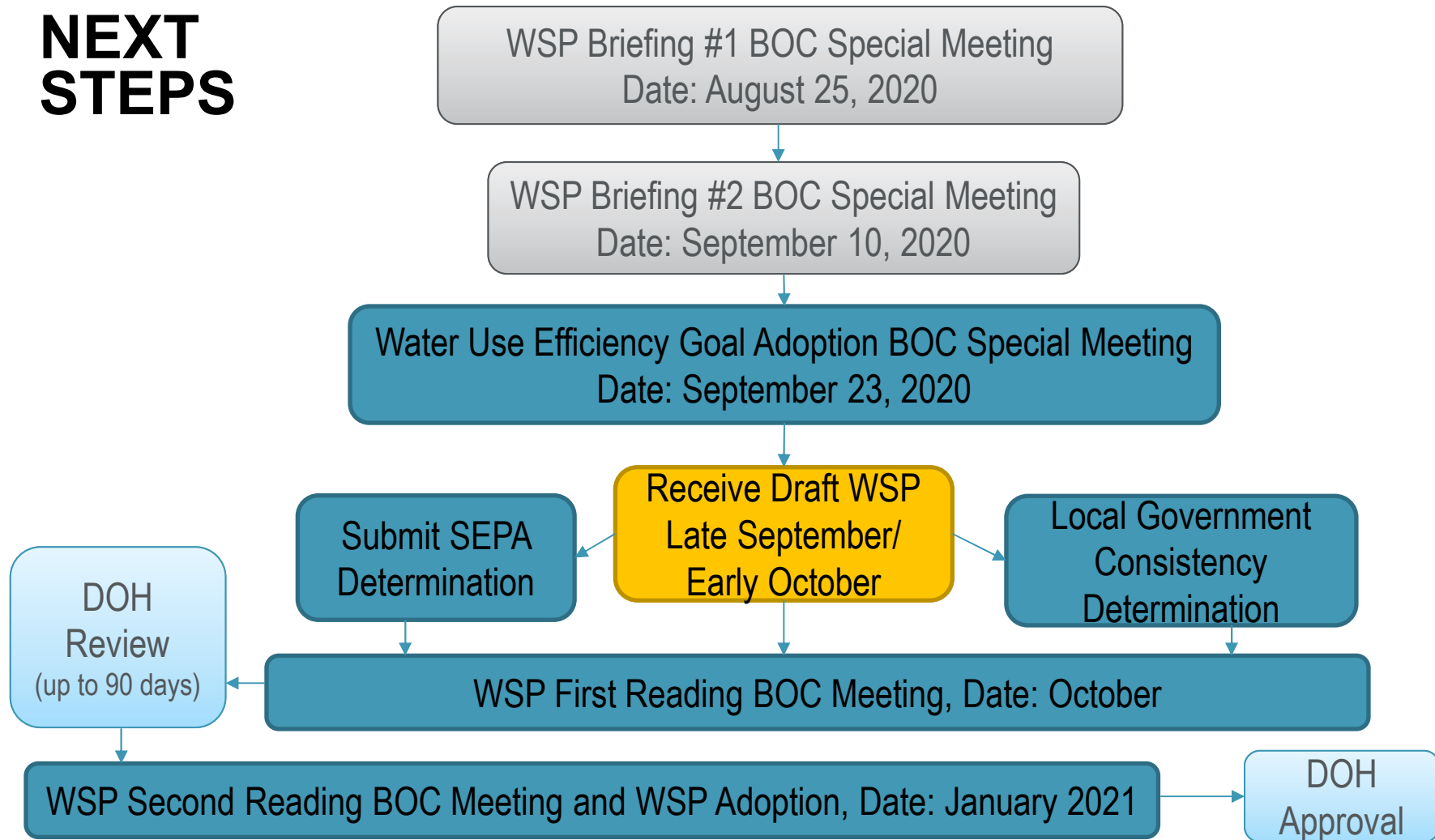
COYLE – CAPACITY ANALYSIS SUMMARY

Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Insufficient	Cannot meet MDD with fire flow through entire planning period.
Storage	Sufficient	
Distribution System Piping	Insufficient	Cannot meet fire flow at hydrants in upper zone.

COYLE – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
C-2. Transmission Line Replacement	\$55,000	2021	Replace main with 8-inch pipe. This amount may be split with other water systems, however, will be spent for pipeline replacement.
C-1. Fire Pump	\$50,000	2023	Install fire pump at BPS.

NEXT STEPS

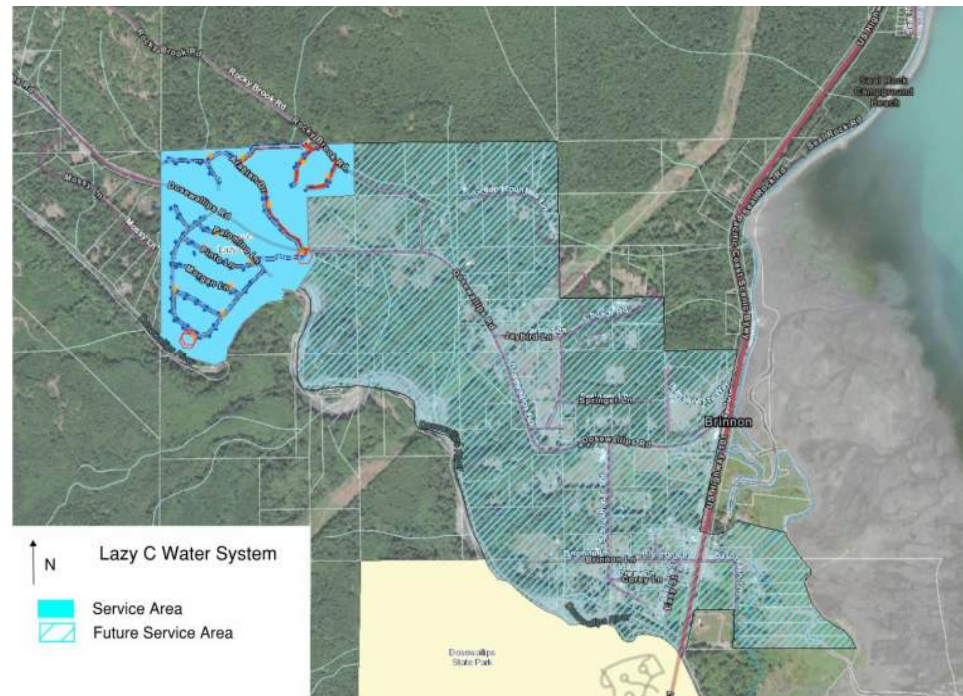


QUESTIONS/DISCUSSION



LAZY C – DESCRIPTION

- Location: near Brinnon
- History:
 - 1960s – original system
 - 1990 – ownership transferred to JPUD
 - 1997 – major improvements
- Facilities:
 - 1 active well (2 emergency)
 - 1 booster pump station
 - 3 reservoirs
 - 19,000 feet of piping



Service Area

LAZY C – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	114
ERU Water Use Factor (gpd)	86
Peaking Factor	2.11
DSL %	2.8%

- Projections

Metric	2018	2028	2038
ERUs	120	153	169
Average Day Demand (gpd)	10,346	13,170	14,519
Maximum Day Demand (gpd)	21,830	27,788	30,635

LAZY C – CAPACITY ANALYSIS SUMMARY

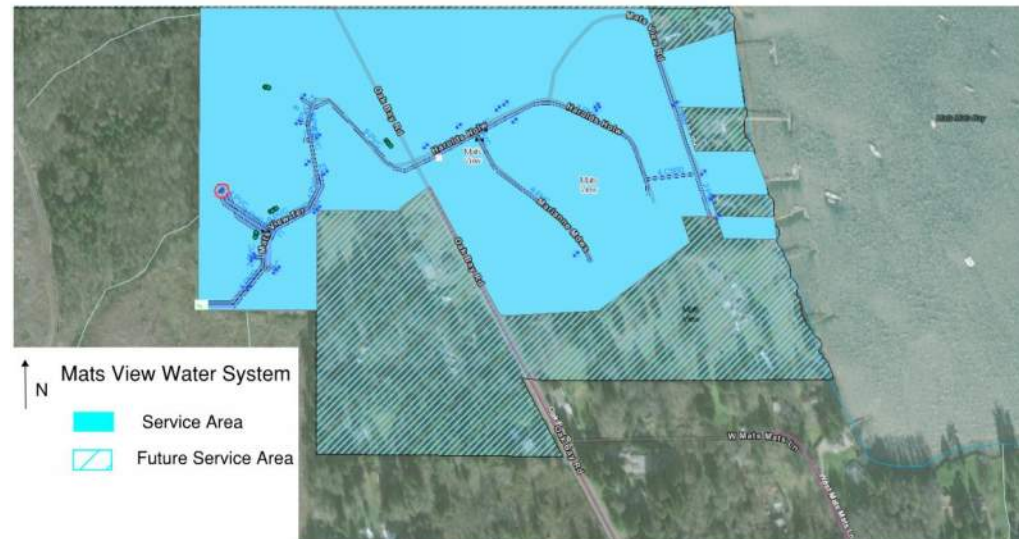
Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Sufficient	
Storage	Sufficient	
Distribution System Piping	Sufficient	

LAZY C – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
L-1: Emergency Well Upgrades	\$22,000	2021	Upgrade well, plumb to chlorination, new shed.
L-2: SCADA Control Replacement	\$15,000	2021	Total includes SCADA for Triton Cove, Lazy C and Quilcene

MATS VIEW – DESCRIPTION

- Location: Mats Mats Bay
- History:
 - 2000 – phase 1 constructed by private developer and transferred to PUD
 - 2002 – phase 2 constructed and transferred to PUD
- Facilities:
 - 1 active well
 - 1 booster pump station; 2 pressure zones
 - 1 reservoir
 - 5,500 feet of piping



Service Area

MATS VIEW – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	23
ERU Water Use Factor (gpd)	195
Peaking Factor	3.76
DSL %	8.0%

- Projections

Metric	2018	2028	2038
ERUs	24	35	41
Average Day Demand (gpd)	4,663	6,782	8,054
Maximum Day Demand (gpd)	17,531	25,500	30,281

MATS VIEW – CAPACITY ANALYSIS SUMMARY

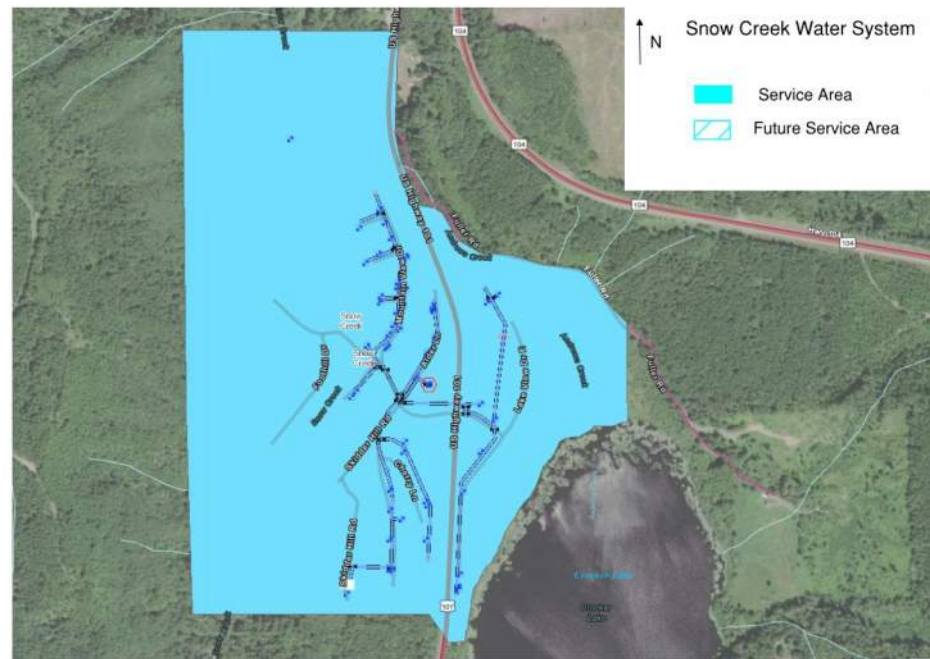
Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Sufficient	
Storage	Sufficient	
Distribution System Piping	Sufficient	

MATS VIEW – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
M-1. Well/BPS Emergency Power Connections	\$6,000	2022	Modifications to the electrical panel at the well and booster pump station. Will be designed for the Triton Cove portable generator.

SNOW CREEK – DESCRIPTION

- Location: near Crocker Lake
- History:
 - 1974 – original system
 - 2001 – ownership transferred to JPUD
 - 2001 through 2003 – major improvements
- Facilities:
 - 1 active well
 - no booster pump stations (single pressure zone)
 - 1 reservoir
 - 9,500 feet of piping



Service Area

SNOW CREEK – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	50
ERU Water Use Factor (gpd)	126
Peaking Factor	3.46
DSL %	16.0%

- Projections

Metric	2018	2028	2038
ERUs	28	36	40
Average Day Demand (gpd)	3,581	4,569	5,037
Maximum Day Demand (gpd)	12,389	15,809	17,429

SNOW CREEK – CAPACITY ANALYSIS SUMMARY

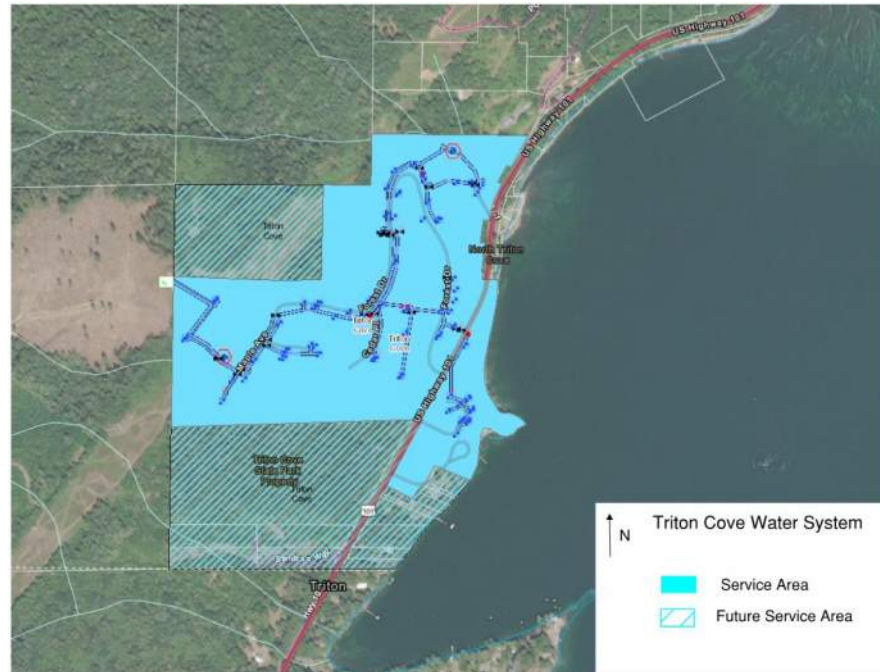
Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Sufficient	
Storage	Sufficient	
Distribution System Piping	Sufficient	

SNOW CREEK – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
SC-2. Wellhouse Replacement	\$179,500	2021	Construct the new well house. Design and DOH approval completed in 2020.

TRITON COVE – DESCRIPTION

- Location: Mason/Jefferson County border along highway 101
- History:
 - 1960s – original system
 - 1984 – ownership transferred to JPUD
 - 1995 – improvements
 - 1998 – incorporation of Williams Addition
- Facilities:
 - 2 active wells
 - No booster pumps
 - 1 reservoir
 - 5 pressure zones
 - 12,000 feet of piping



Service Area

TRITON COVE – WATER DEMAND

- Historical Data

Metric	Value
Active Connections (Nov. 2019)	63
ERU Water Use Factor (gpd)	87
Peaking Factor	3.07
DSL %	24.0%

- Projections

Metric	2018	2028	2038
ERUs	61	76	84
Average Day Demand (gpd)	5,289	6,593	7,269
Maximum Day Demand (gpd)	16,237	20,241	22,315

TRITON COVE – CAPACITY ANALYSIS SUMMARY

Metric	Status	Notes
Water Rights	Sufficient	
Source Pumping	Sufficient	
Storage	Sufficient	
Distribution System Piping	Sufficient	

TRITON COVE – CAPITAL IMPROVEMENT PROGRAM

Project	Cost	Year	Notes
T-2: SCADA Control Replacement	\$15,000	2021	Total includes SCADA for Triton Cove, Lazy C and Quilcene
T-3: Williams Addition Wellhouse	\$10,00	2021	Demo existing wellhouse and install new pitless adapter