

Sun Vista/Sunlight Beach Water Consolidation Study Task 1 – Evaluation of Existing Systems

Presented by:

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Sun Vista/Sunlight Beach HOA and Sunlight Beach Water Association Consolidation Feasibility Study

- Funding from Washington State Department of Health (DOH) Drinking Water State Revolving Funding Consolidation Feasibility Grant Program
- \$50,000 grant to complete study
- Grant does not require consolidation as an outcome of the study
- Purpose of study is to evaluate the water systems and provide enough information for the members of both water systems to make informed decisions about the future of their water systems

What will be done to complete the Water Consolidation Feasibility Study?

Task 1 – Evaluation of existing water systems

Task 2 – Evaluation of separate water systems with consideration for new supply and storage facilities at new location(s)

Task 3 – Evaluation of one consolidated water system

Task 4 – Coordination with water users

Task 5 – Preparation of consolidation study report



Why are we doing this?

- Assess improvements that will likely be needed over the next 20 years to maintain adequate operation and water supply quality, based on a range of potential alternatives
- Assess potential for groundwater contamination of water supplies for both system from anticipated upgradient development of septic systems and seawater intrusion due to flooding during high tide events
- Assess potential locations for new water supply and water storage facilities, if needed
- Provide enough information for the members of both water systems to make informed decisions about the future of their water systems

Task 1 Overview

Evaluation of Existing Water Systems

Task 1 – Evaluation of Existing Water Systems

- Collect and review of background information on each water system
- Kick-off meeting and site visit with Joint Water Planning Committee
- Inventory and mapping of existing water system facilities
- Evaluation of water supply, water use, and future water demands
- Evaluation of existing water systems
 - Capacity analysis
 - Hydraulic analysis
 - Assess water quality and potential for contamination
 - Identify deficiencies

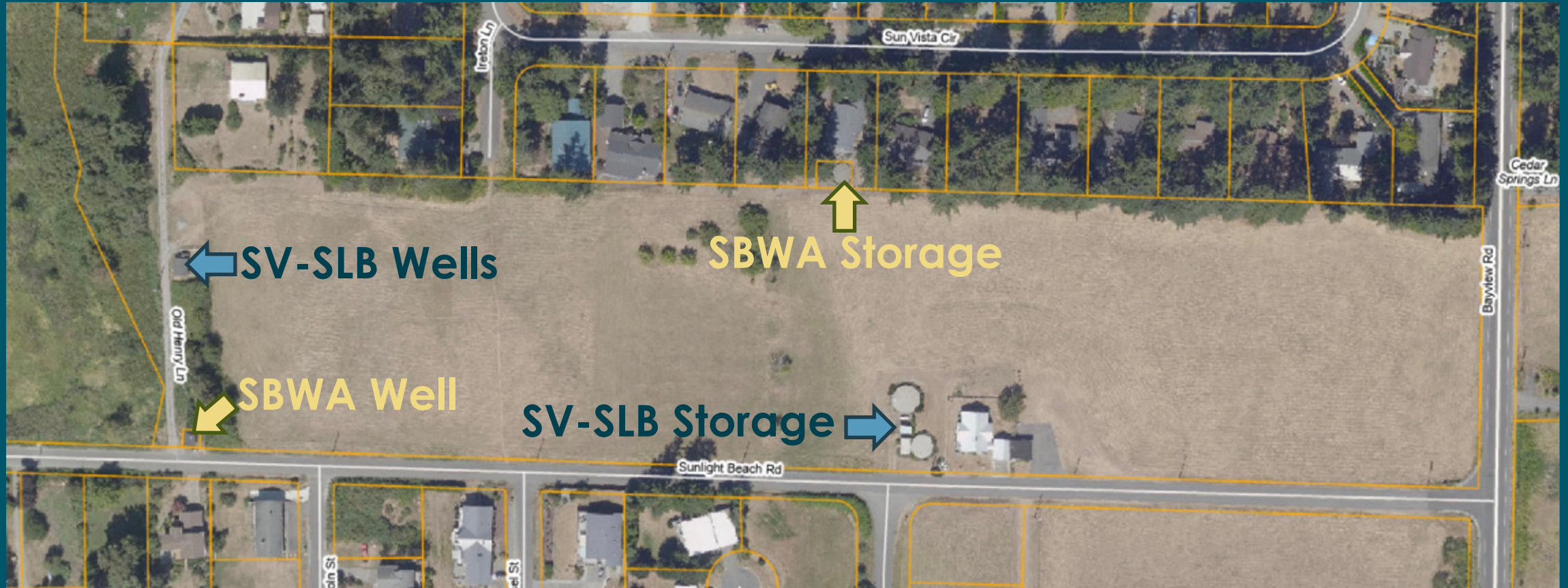
Task 1 – Evaluation of Existing Water Systems

- Recommend improvements for 6-year and 20-year planning horizons
- Complete cost analysis
- Prepare Task 1 Summary Memorandum for each water system

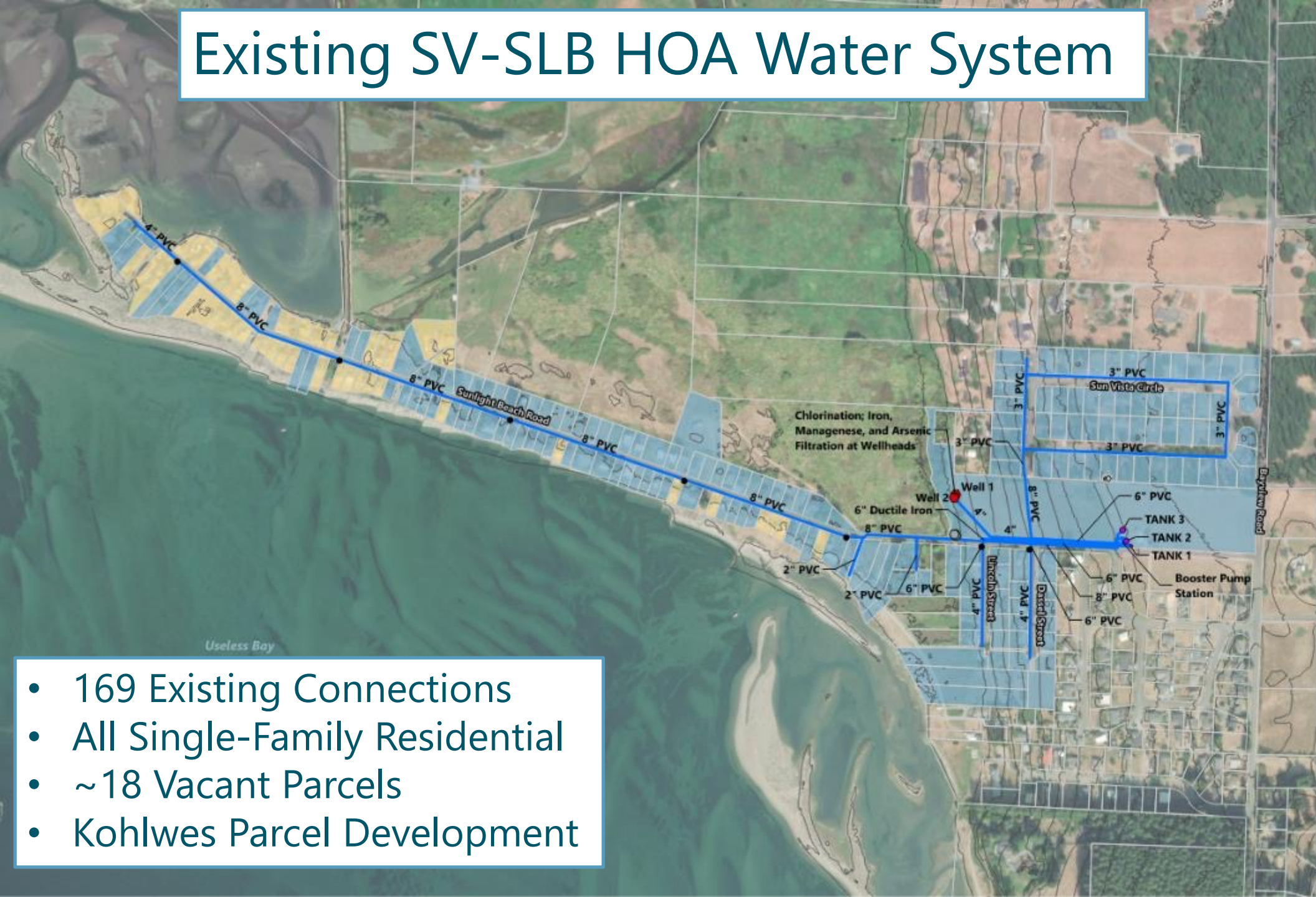
Background

Existing Water System Infrastructure

Water Supply and Water Storage Facilities

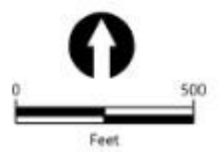


Existing SV-SLB HOA Water System



NOTES:
1. Aerial imagery: Esri (2023)
2. Contour: Island County NAVD88 (2014)
3. Parcel: Island County (2015)

- 169 Existing Connections
- All Single-Family Residential
- ~18 Vacant Parcels
- Kohlwes Parcel Development



Existing SV-SLB HOA Water Supply Facilities

- Two Groundwater Wells
 - Well 1 (S01, Active)
 - 8-inch Well
 - 30 feet deep
 - 35 gpm capacity
 - Well 2 (S02, Active)
 - 8-inch Well
 - 50 feet deep
 - 78 gpm capacity
 - Both located in well house on Old Henry Lane
 - Chlorinated and Iron, Manganese, and Arsenic Filtration System
- Intertie with SBWA Water System

SV-SLB HOA Water System Well House



SV-SLB HOA
Water System
Well 1



SV-SLB HOA
Water System
Well 2



SV-SLB HOA
Water System
Filtration System



SV-SLB HOA
Water System
Filter Backwash



Existing SV-SLB HOA Water Storage Facilities

- Three Water Storage Tanks
 - Tank 1
 - 7,200 gallons
 - Octagonal reinforced concrete tank
 - Tank 2
 - 55,000 gallons
 - Circular reinforced concrete tank
 - Tank 3
 - 52,800 gallons
 - Circular reinforced concrete tank
 - Total Capacity = 115,000 gallons
 - Located in easement on north side of Sunlight Beach Road

SV-SLB HOA
Water System
Tank 1



SV-SLB HOA
Water System
Tank 2



SV-SLB HOA
Water System
Tank 3



Existing SV-SLB HOA Pumping Facilities

- Booster Pump Station
 - Four 5-horsepower booster pumps
 - Pulls from water storage tanks
 - Delivers water to pressure system that serves the highest customer services, mostly along Sun Vista Circle and Dassel Street
 - Located adjacent to Tank 2

SV-SLB HOA Water System Booster Pump Station



SV-SLB HOA
Water System
Pressure Tank
And Controls



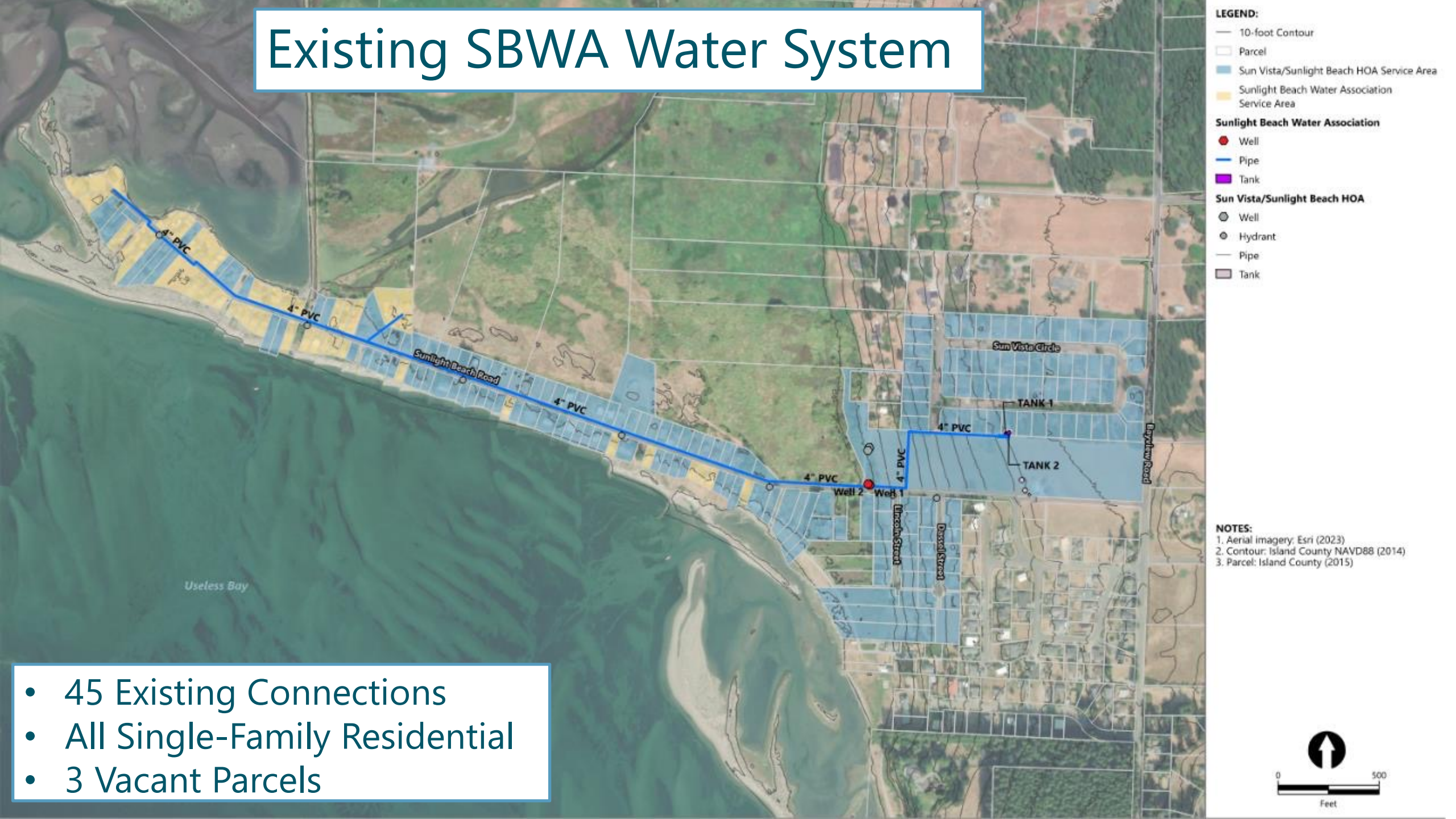
Existing SV-SLB HOA Distribution Facilities

- 4-inch pipeline from well house to storage tanks
- 6-inch pressure pipeline with connections to 3-inch loop in Sun Vista Circle and 4-inch pipeline in Dassel Street
- 8-inch gravity pipeline in Sunlight Beach Road with connection to 4-inch pipeline in Lincoln Street and a few smaller pipelines
- Hydrants
 - Low flow (red cap) hydrants at Dassel Street, Lincoln Street, and Sun Vista Circle
 - Fire flow (fully yellow) hydrants along Sunlight Beach Road
 - Provide fire protection for both systems

SV-SLB HOA
Water System
Hydrant

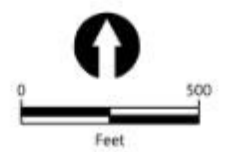


Existing SBWA Water System



- LEGEND:**
- 10-foot Contour
 - Parcel
 - Sun Vista/Sunlight Beach HOA Service Area
 - Sunlight Beach Water Association Service Area
 - Sunlight Beach Water Association**
 - Well
 - Pipe
 - Tank
 - Sun Vista/Sunlight Beach HOA**
 - Well
 - Hydrant
 - Pipe
 - Tank

- NOTES:**
1. Aerial imagery; Esri (2023)
 2. Contour; Island County NAVD88 (2014)
 3. Parcel; Island County (2015)



- 45 Existing Connections
- All Single-Family Residential
- 3 Vacant Parcels

Existing SBWA Water Supply Facilities

- Two Groundwater Wells
 - Well 1 (S01, Disconnected/No longer in use)
 - 10-inch Well
 - 25 feet deep
 - 35 gpm capacity
 - Well 2 (S02, Active)
 - 10-inch Well
 - 21 feet deep
 - 35 gpm capacity
 - Well house at corner of Old Henry Lane and Sunlight Beach Road
 - Does not require treatment
- Intertie with SBV-SLB HOA Water System

SBWA Water System Well House



SBWA Water System Well 1



SBWA Water System Well 2



Existing SBWA Water Storage Facilities

- Two Water Storage Tanks
 - Tank 1
 - 9,000 gallons
 - Rectangular reinforced concrete tank
 - Tank 2
 - 25,000 gallons
 - Hexagonal reinforced concrete tank
 - Total Storage Capacity = 34,000 gallons
 - Located on property between Sun Vista Circle and Kohlwes property

SBWA Water System Storage Tanks



Existing SBWA Distribution Facilities

- 4-inch pipeline from well house to storage tanks
- 4-inch distribution pipeline in Sunlight Beach Road
- No hydrants
- Rely on SV-SLB HOA hydrants for fire protection

Capacity Analysis and Hydraulic Analysis

Existing Water Systems

SV-SLB HOA Storage Capacity Required

Year	Operating Storage (gallons)	Equalizing Storage (gallons)	SB (gallons)	Fire Suppression Storage (gallons)	Total Storage Required (gallons)
2023	19,900	1,883	63,375	15,000	85,158
2029	19,900	5,044	76,860	15,000	101,804
2043	19,900	6,269	82,740	15,000	108,909

Notes:

Operating Storage (OS): Used for normal daily operation.

Equalizing Storage (ES): Used to make up the difference between the well capacity and peak demand.

Standby Storage (SB): Reserved for times when wells are out of service or other emergency occurs.

Fire Suppression Storage (FSS): Used to meet fire flow requirements.

Current Storage Capacity = 115,000 gallons

SV-SLB Capacity and Hydraulic Analyses

- The SV-SLB HOA Water System has adequate source and storage capacity to meet existing and projected water demand conditions.
- The SV-SLB HOA Water System has capacity to supply a minimum fire flow of 500 gpm for a duration of 30 minutes at all hydrants except the highest hydrants located on Sun Vista Circle and on the corner of Sunlight Beach Road and Dassel Street.
- Pressures on Lincoln Street are marginal (30 to 40 psi during PHD). The SV-SLB has indicated that they have observed pressures on Lincoln Street below 30 psi.

SBWA Storage Capacity Required

Year	Operating Storage (OS) (gallons)	Equalizing Storage (ES) (gallons)	Standby Storage (SB) (gallons)	Fire Suppression Storage (FSS) (gallons)	Total Storage Required (gallons)
2023	6,200	2,723	16,875	0	25,798
2029	6,200	2,958	17,625	0	26,783
2043	6,200	3,075	18,000	0	27,275

Notes:

Operating Storage (OS): Used for normal daily operation.

Equalizing Storage (ES): Used to make up the difference between the well capacity and peak demand.

Standby Storage (SB): Reserved for times when wells are out of service or other emergency occurs.

Fire Suppression Storage (FSS): Used to meet fire flow requirements.

Existing Storage Capacity = 34,000 gallons

SBWA Capacity and Hydraulic Analyses

- The SBWA Water System has adequate source and storage capacity to meet existing and projected water demand conditions
- The SBWA Water System does not currently have a redundant source of supply
- The SBWA Water System has capacity to meet minimum pressure and delivery criteria under peak demand conditions
- The SBWA Water System will continue to need to rely on the SV-SLB Water System for fire protection

Water Quality, Potential for Contamination

Existing Water Systems

SV-SLB HOA Existing Water Quality

- Well water is chlorinated and filtered through an iron and manganese removal system
- Treatment has proven effective at not only removing iron and manganese from the system, but also treating for arsenic
- No exceedances of DOH maximum contaminant levels (MCLs) were reported in 2022 or 2023
- One exceedance for arsenic reported in July 2021 appears to be an anomaly, because prior and subsequent samples showed no exceedance
- No other exceedances have been reported in the last 10 years

SBWA HOA Existing Water Quality

- No exceedances of DOH water quality MCLs for 20 years, with one exception
- One exceedance for manganese reported in 2016 appears to be an anomaly, because prior and subsequent samples showed no exceedance

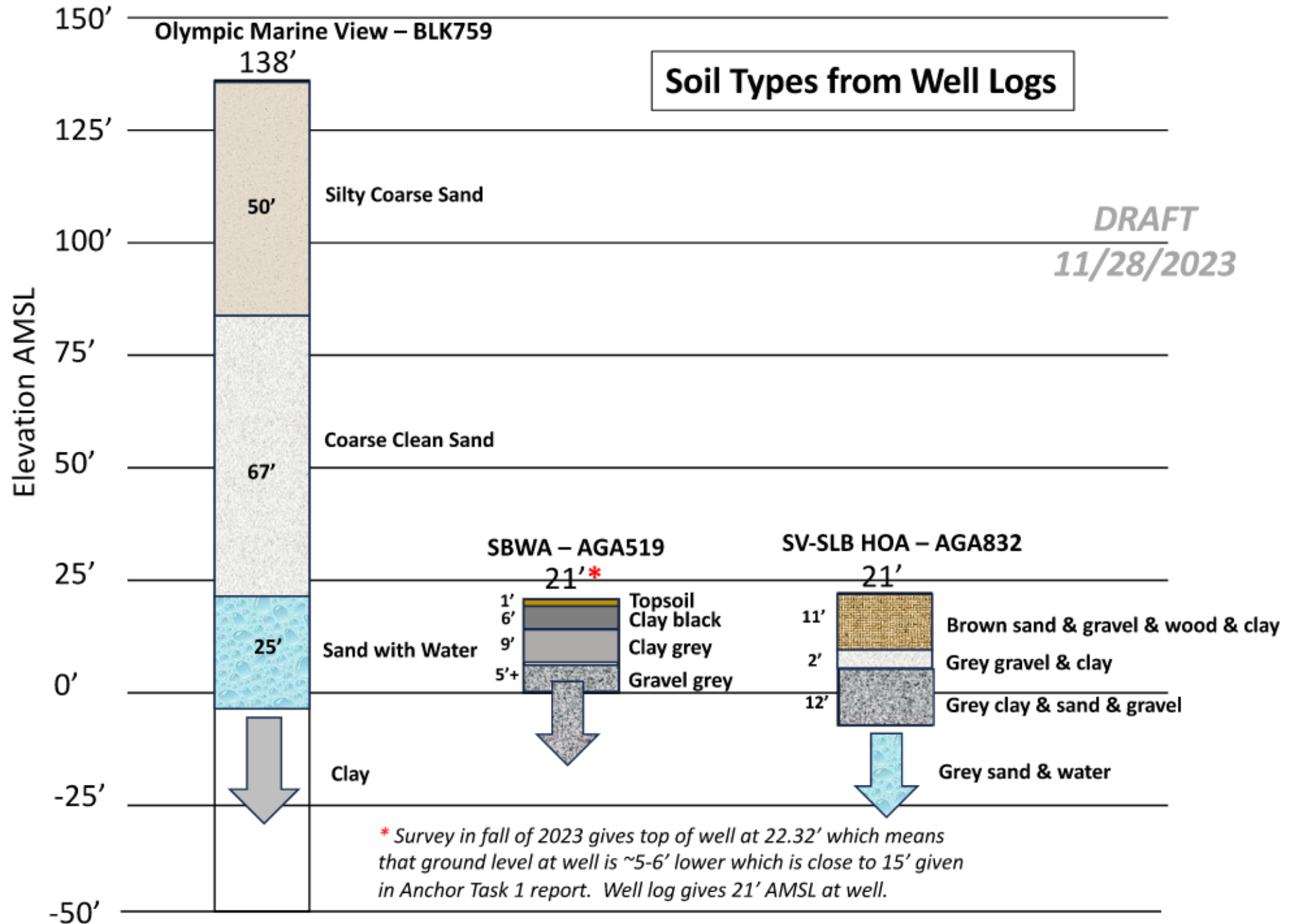
Nitrate Contamination Risk (Both Systems)

- Risk of nitrate contamination from upgradient septic systems within the wellhead protection area was reviewed
- Risk is sufficiently credible to recommend that affirmative actions be taken to protect water supplies for both systems in the future
- A prudent alternative would be to pursue construction of a well or wells at a new location that is upslope of these potential contamination risks
- DOH spreadsheet model used by Joint Water Planning Committee to evaluate the potential for nitrate contamination that would result from development of septic systems upgradient of the existing wells
- An independent review of model inputs and methodology was completed by Anchor QEA

Nitrate Contamination Risk (Both Systems)

- Anchor QEA identified and recommended some adjustments to input values and assumptions
- Anchor QEA believes that these modifications do not appear to warrant a change in the conclusion made by the Joint Water Planning Committee that the potential development of 10 to 15 additional septic systems upslope of the existing wells could increase nitrate levels above allowable levels
- Findings are subject to the potential impact of other factors, such as the presence (or consistency) of a semi-confining soil layer, groundwater flow direction, and hydraulic gradient, where current information available is not adequate to make more definitive assessments

Well Logs, Subsurface Soil Types



Saltwater Contamination Risk (Both Systems)

- Seawater intrusion from long-term increases in seawater levels as well as the potential for upconing appear to be low risks
- Wells are at risk of being flooded during extreme high tides (king tides plus low atmospheric pressure plus storm surges)
- Flooding can damage facilities and would likely require flushing and sanitizing the water system, which would result in disruption of the water supply
- A “do-nothing” approach is not advisable

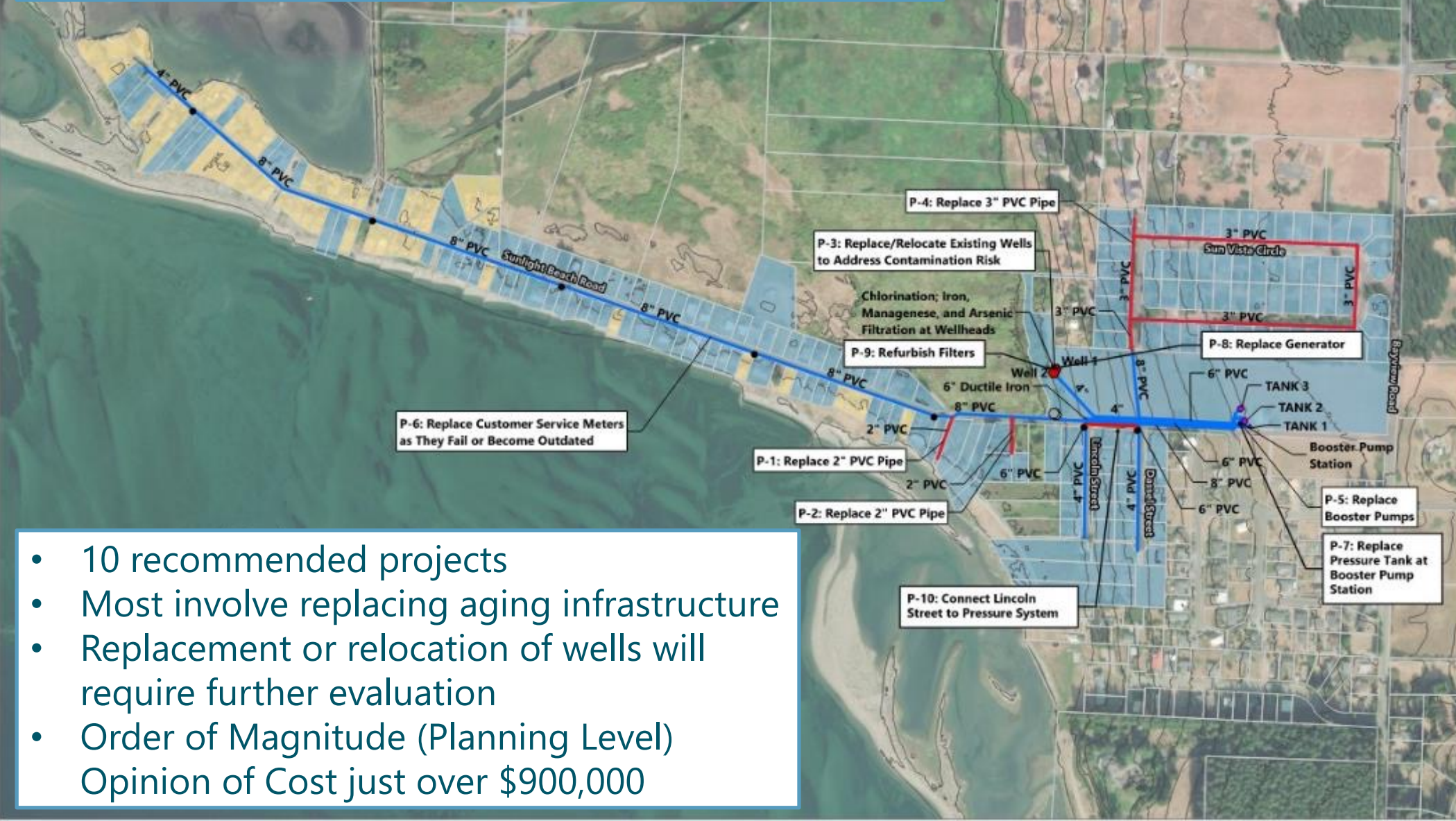
Recommended Improvements

Existing Water Systems

SV-SLB HOA Identified Deficiencies

- No capacity-related deficiencies were identified through the capacity analyses and hydraulic analysis, with the exception of the following:
 - Adequate fire flow is not available at the highest hydrants on the SV-SLB HOA Water System, including the hydrants on Sun Vista Circle and the hydrant at the corner of Dassel Street and Sunlight Beach Road
 - Pressures at customer services along Lincoln Street are marginal
- Some of the water system infrastructure is aging and will likely require replacement or upgrade during the next 20 years
- While the system currently provides water that generally meets water quality standards, the system is at risk of contamination in the future from nitrates, bacteria, and seawater intrusion

Recommended Improvements - SV-SLB HOA Water System



LEGEND:

- 10-foot Contour
- Parcel
- Sun Vista/Sunlight Beach HOA Service Area
- Sunlight Beach Water Association Service Area

Sun Vista/Sunlight Beach HOA

- Well
- Hydrant
- Pipe
- Tank

Sunlight Beach Water Association

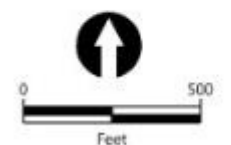
- Well
- Pipe
- Tank

Proposed Improvements

- New or Replaced Pipe

NOTES:

1. Aerial imagery: Esri (2023)
2. Contour: Island County NAVD88 (2014)
3. Parcel: Island County (2015)

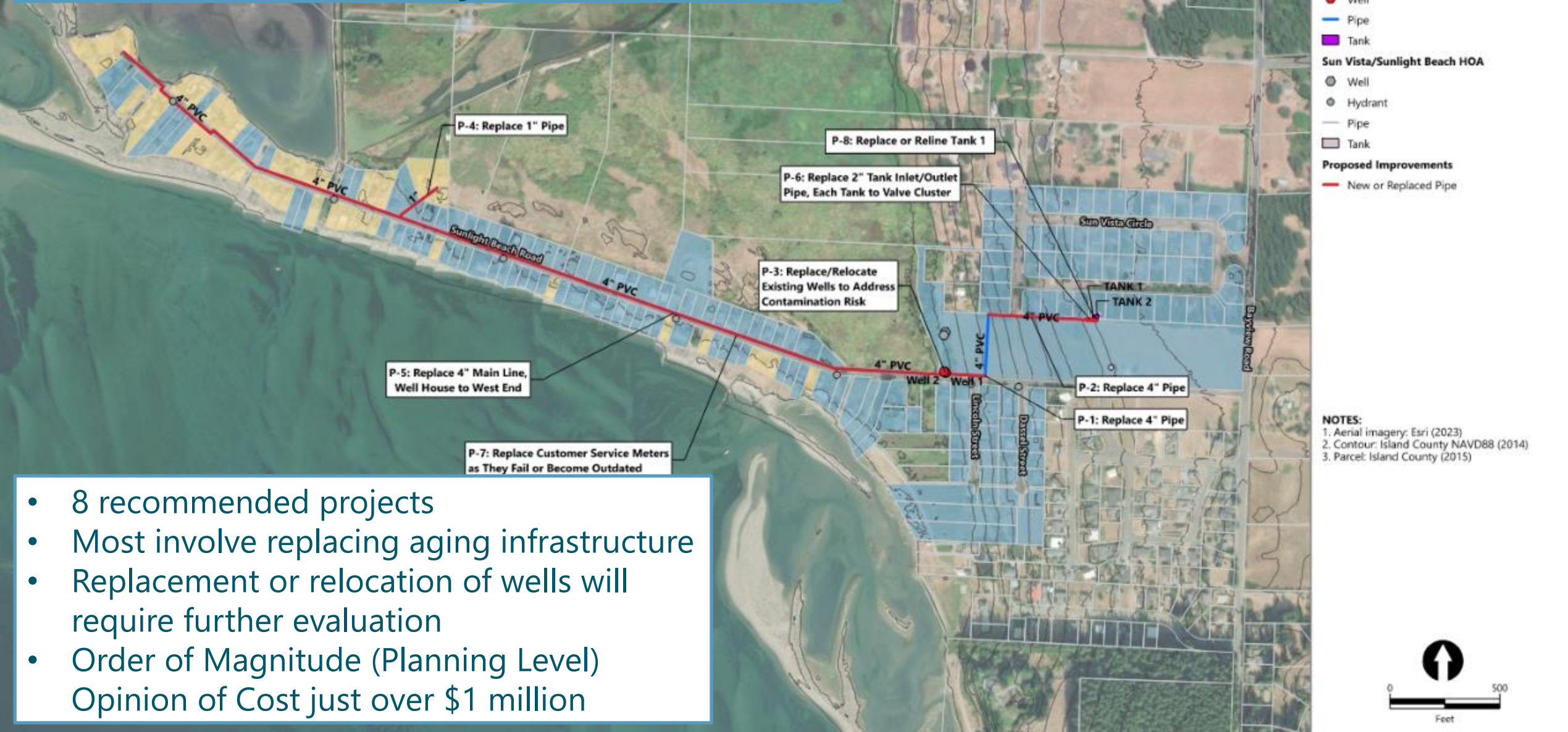


- 10 recommended projects
- Most involve replacing aging infrastructure
- Replacement or relocation of wells will require further evaluation
- Order of Magnitude (Planning Level)
Opinion of Cost just over \$900,000

SBWA Identified Deficiencies

- No capacity-related deficiencies were identified through the capacity analyses and hydraulic analysis.
- Some of the water system infrastructure is aging and will likely require replacement or upgrade during the next 20 years
- While the system currently provides water that generally meets water quality standards, the system is at risk of contamination in the future from nitrates, bacteria, and seawater intrusion

Recommended Improvements - SBWA Water System

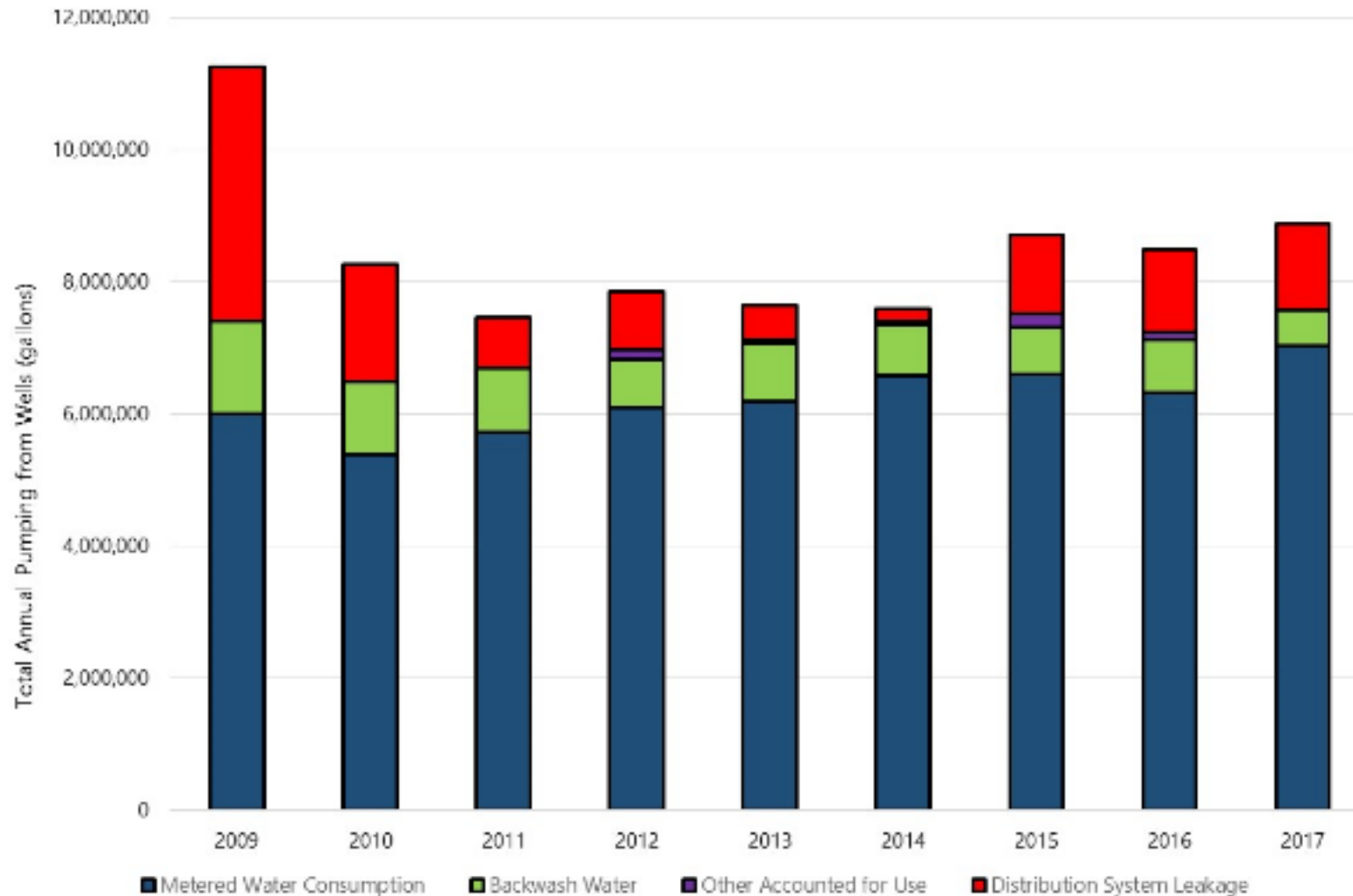


- 8 recommended projects
- Most involve replacing aging infrastructure
- Replacement or relocation of wells will require further evaluation
- Order of Magnitude (Planning Level)
Opinion of Cost just over \$1 million



Questions and Discussion

SV-SLB HOA Water Production and Water Use



SV-SLB HOA Projected Water Demand

Year	ERUs	ADD			MDD			PHD
		gpd/ERU	gpd	gpm	gpd/ERU	gpd	gpm	gpm
2023	169	150	25,350	17.6	375	63,375	44.0	125.6
2029	183	150	27,450	19.1	420	76,860	53.4	146.6
2043	197	150	29,550	20.5	420	82,740	57.5	154.8

Notes:

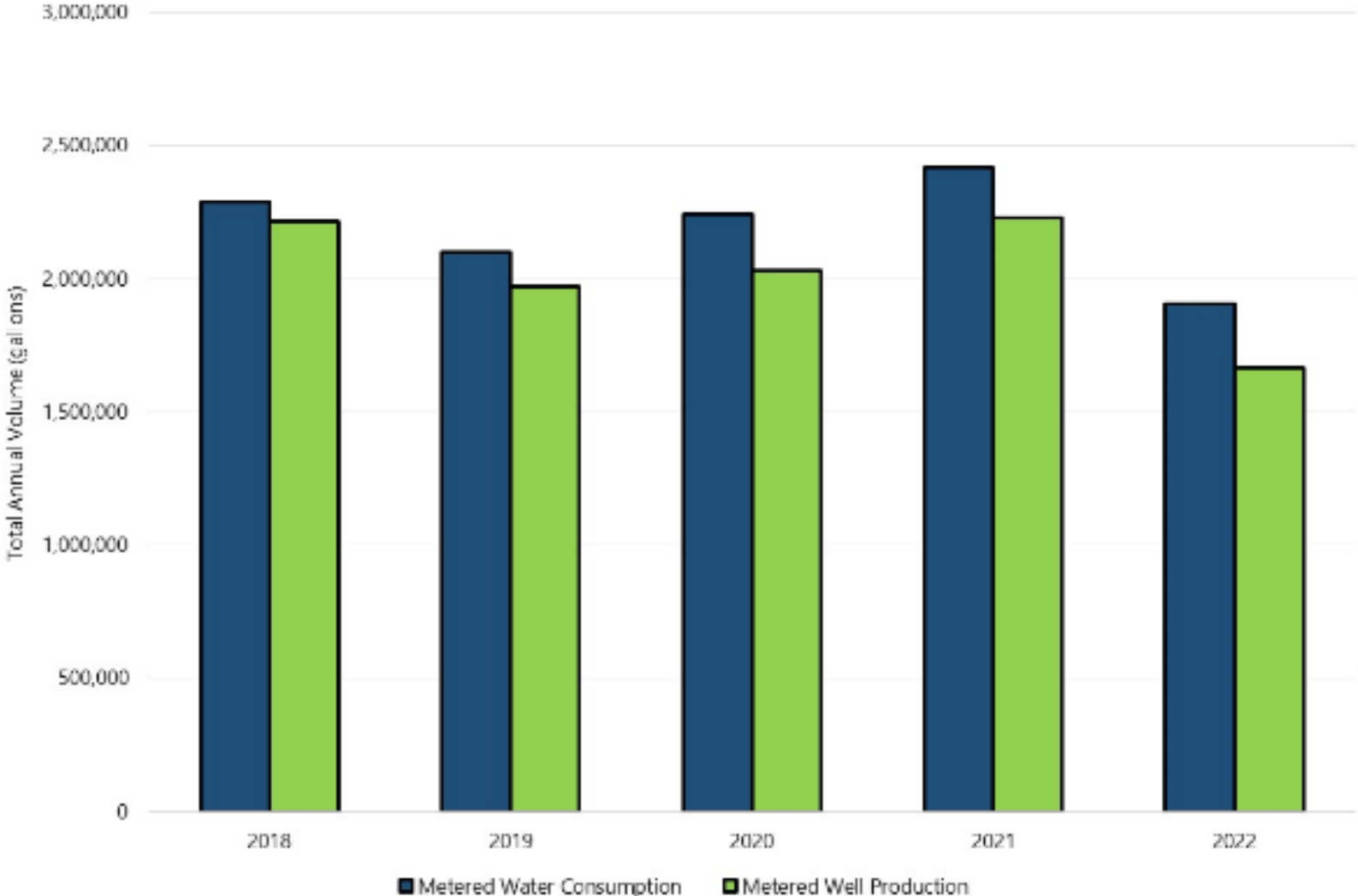
ERU: Equivalent Residential Unit

ADD: Average Daily Demand

MDD: Maximum Daily Demand

PHD: Peak Hourly Demand

SBWA Water Production and Water Use



SBWA Projected Water Demand

Year	ERUs	ADD			MDD			PHD
		gpd/ERU	gpd	gpm	gpd/ERU	gpd	gpm	gpm
2023	45	150	6,750	4.7	375	16,875	11.7	53.2
2029	47	150	7,050	4.9	375	17,625	12.2	54.7
2043	48	150	7,200	5.0	375	18,000	12.5	55.5

Notes:

ERU: Equivalent Residential Unit

ADD: Average Daily Demand

MDD: Maximum Daily Demand

PHD: Peak Hourly Demand