

The Turning Point: Sustainability Plan Milestones & Momentum

From Scarcity to Stewardship

Santa Felicia Dam since 1955

- 80,000 AF storage for water conservation
- SWP imports from Pyramid

Freeman Diversion since 1990

- Diversions at 375 cfs max.

Saticoy/El Rio Recharge Basins

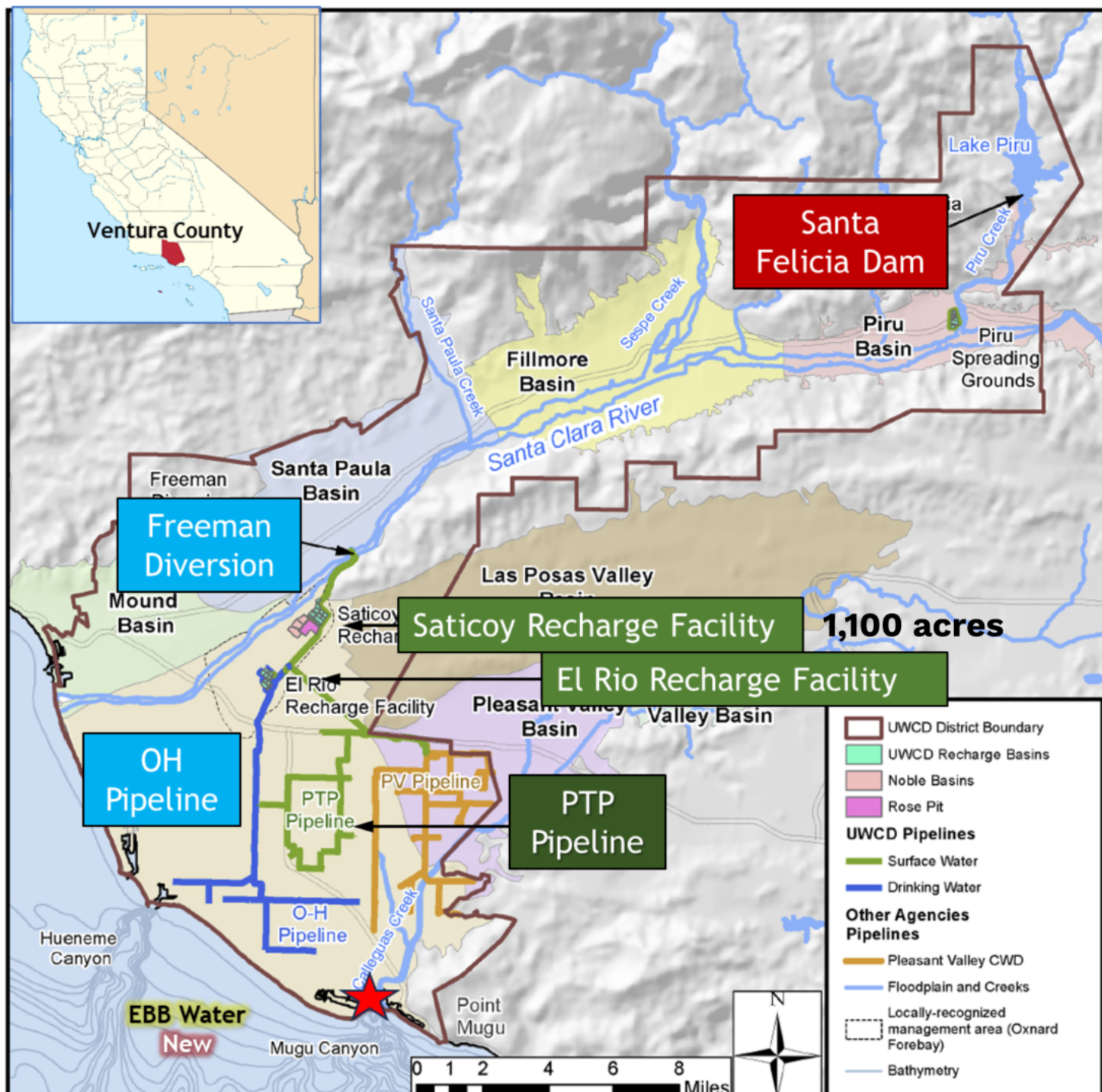
- Approx. 1,100 acres of land for groundwater recharge

PTP System Pipeline + Wells since 1984

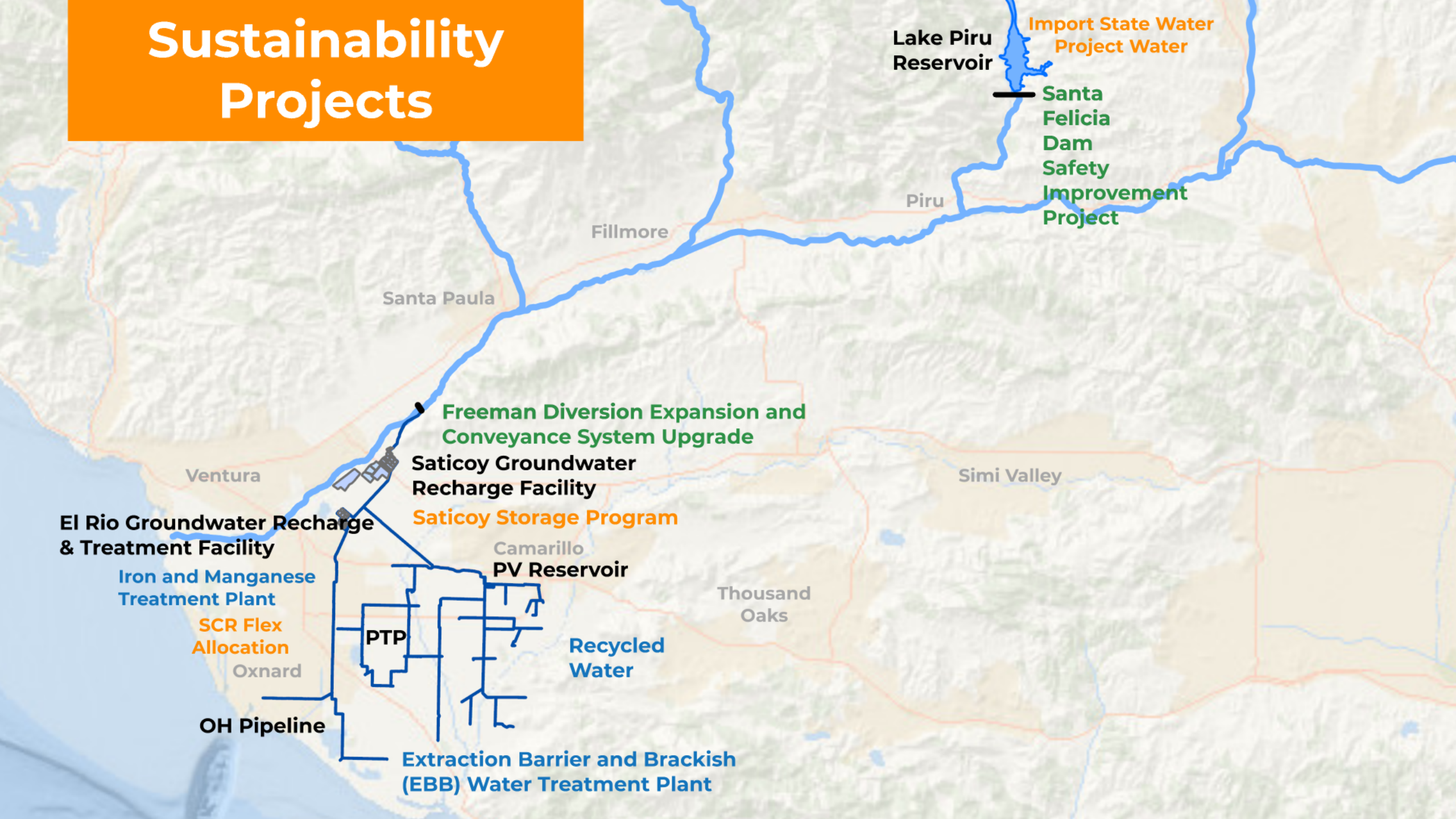
- Surface water deliveries to agriculture

El Rio Wellfield/OH Pipeline Since 1956

- Wholesale water deliveries to over 200,000 people on the Oxnard Plain



Sustainability Projects



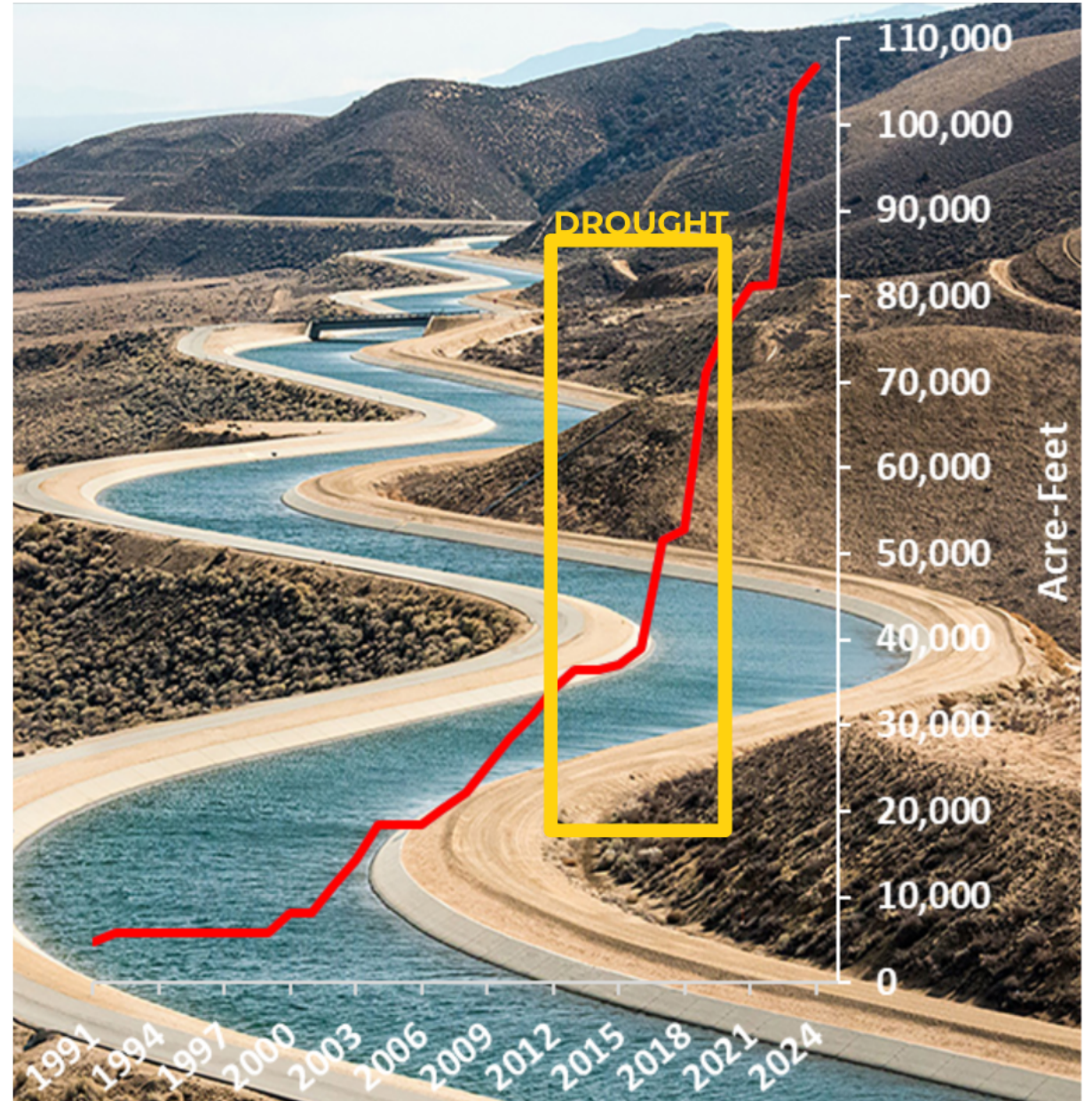
Santa Felicia Dam Safety Improvement Project

**First Reservoir in the State Dedicated to Groundwater
Recharge and Seawater Intrusion Abatement**



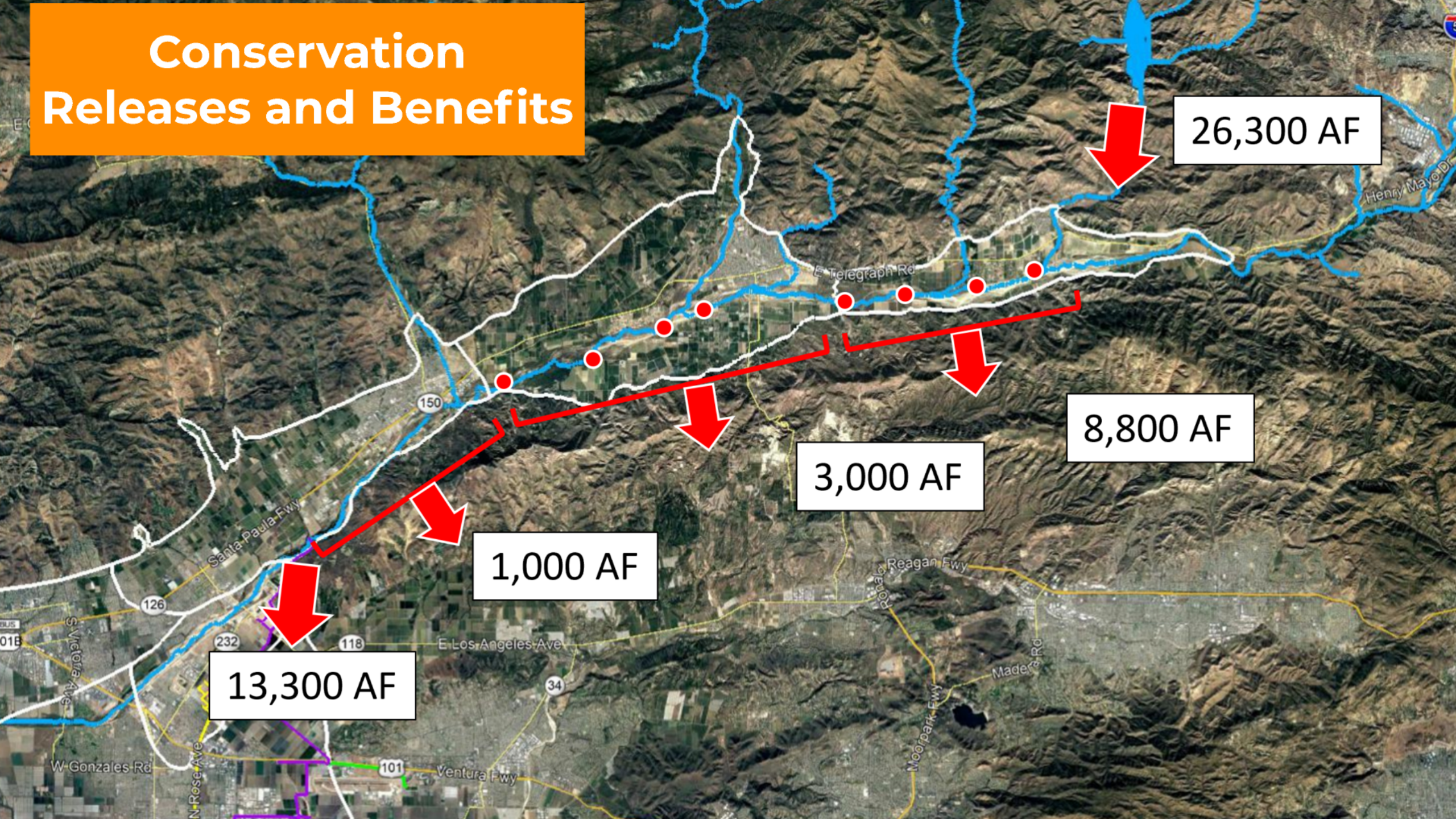
State Water Project

- Approx. 107,000 AF or 35 Billion Gallons Imported Water (since 1991)
- Additional 99,700 AF or 33 Billion Gallons Flood Flow releases from Castaic (2017-2025)



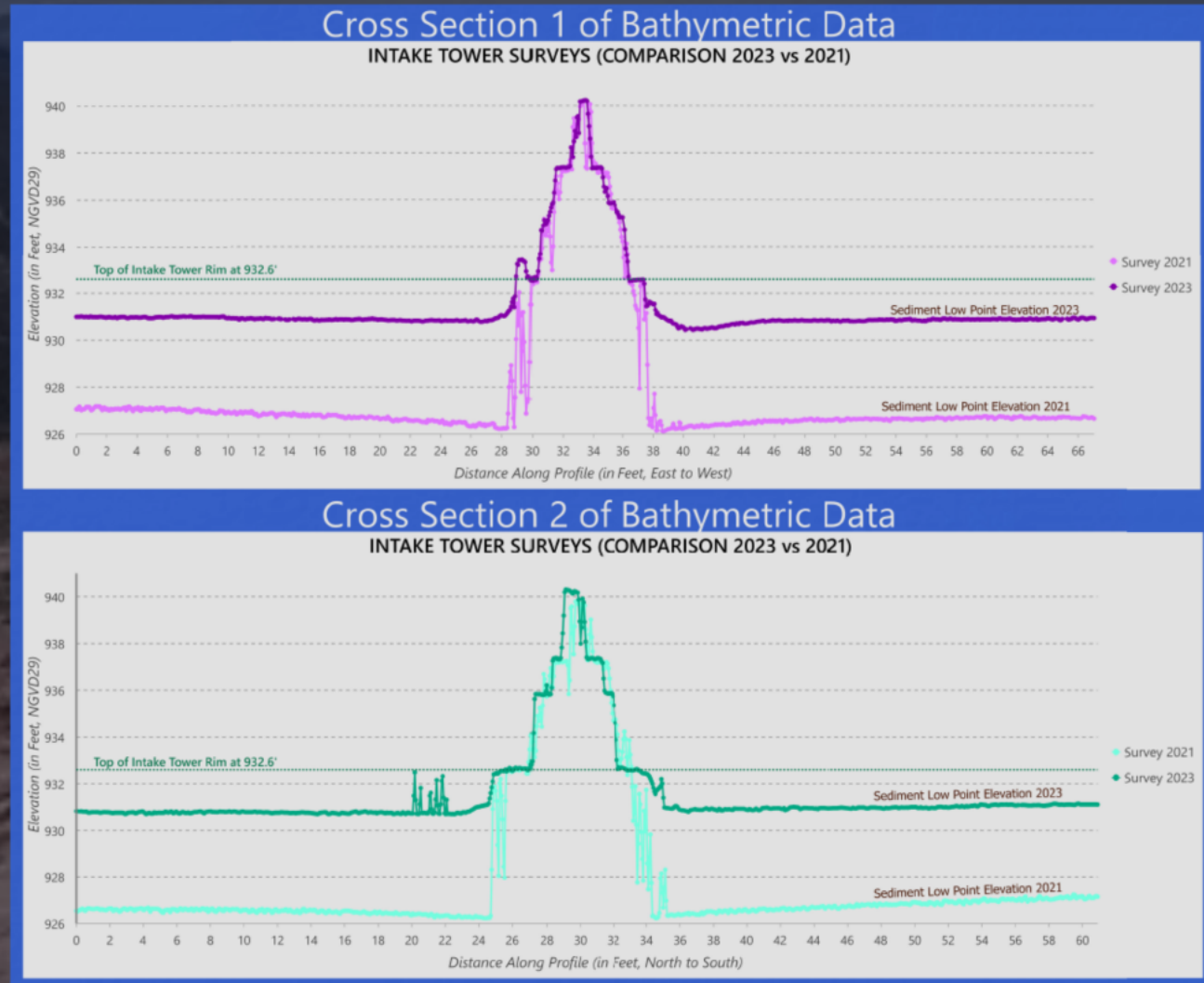


Conservation Releases and Benefits



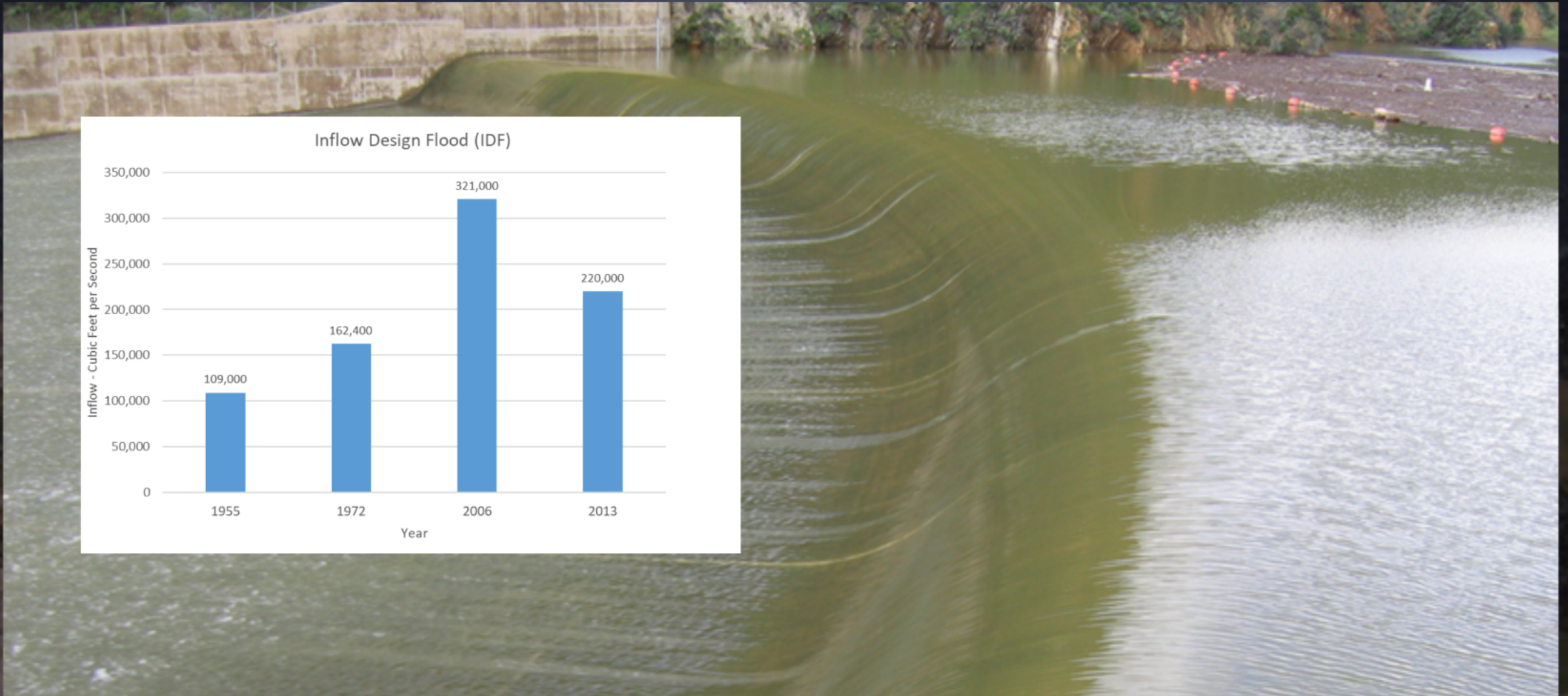
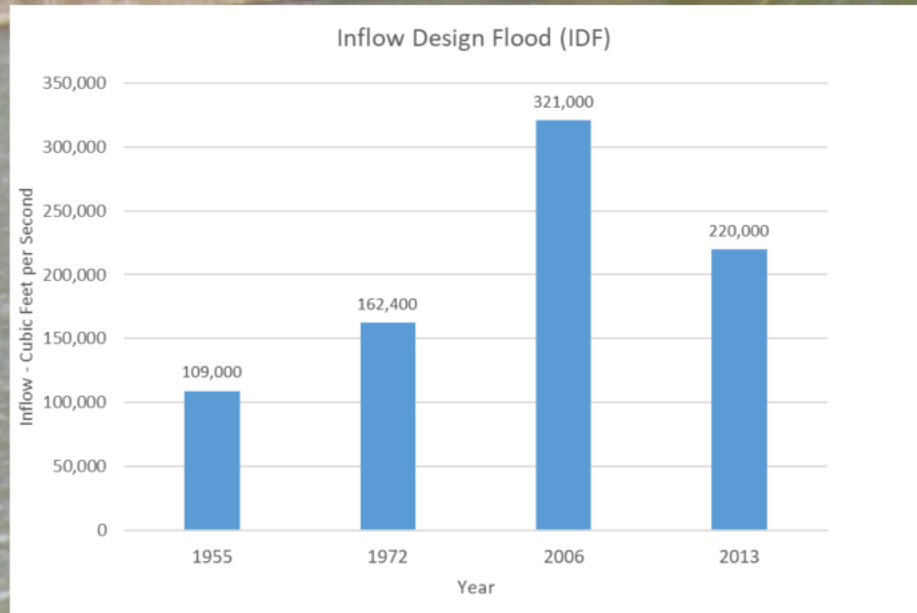
Santa Felicia Dam Current Risks

Ongoing Siltation in the Reservoir

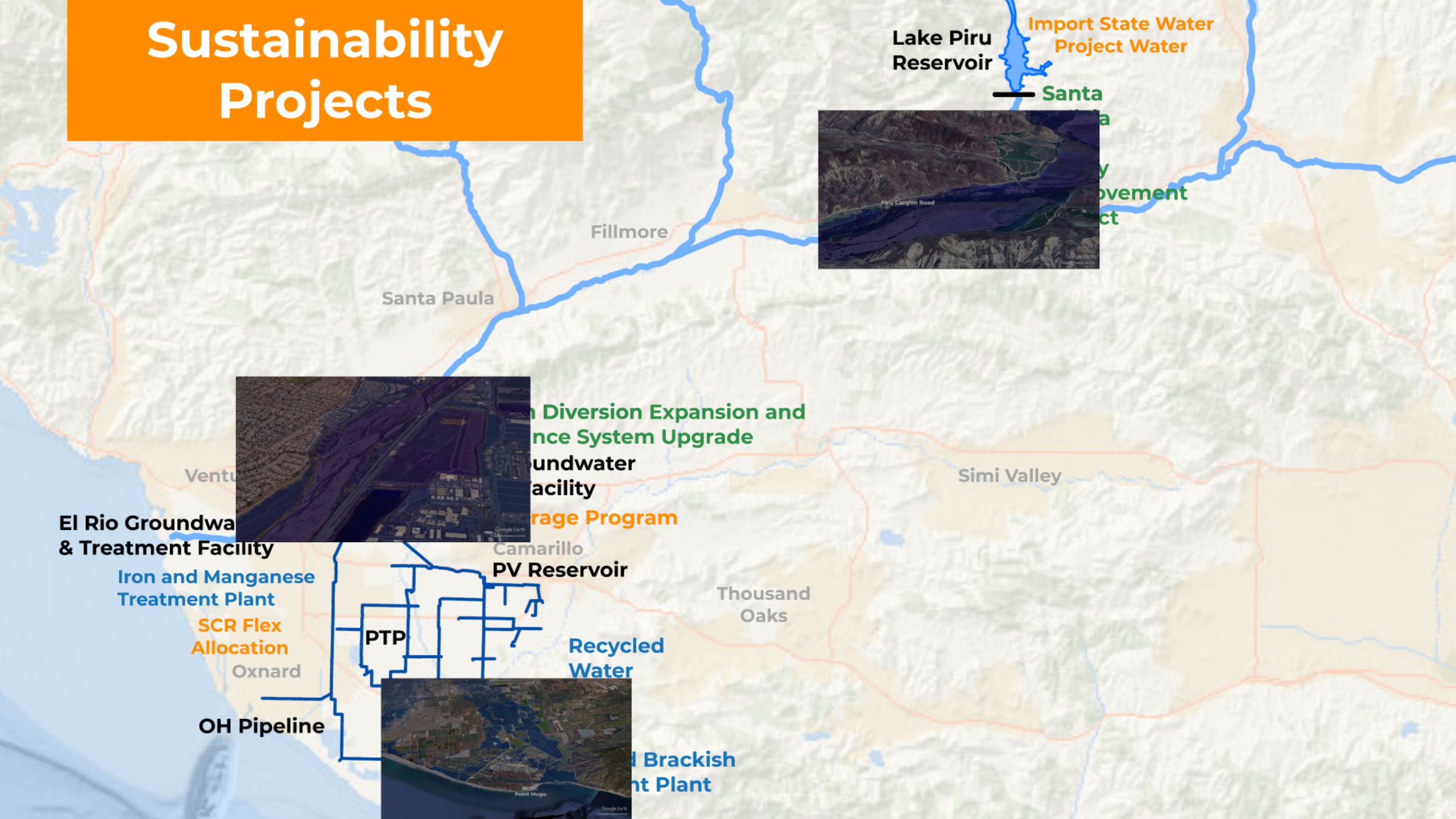


Santa Felicia Dam Current Risks

Insufficient Spillway Capacity



Sustainability Projects



Lake Piru Reservoir

Import State Water Project Water

Santa

Improvement Project

Fillmore

Santa Paula

Ventura

El Rio Groundwater & Treatment Facility

Iron and Manganese Treatment Plant

SCR Flex Allocation

Oxnard

OH Pipeline

Diversion Expansion and Inflow System Upgrade

Groundwater Facility

Program

Camarillo


PV Reservoir

Thousand Oaks

Simi Valley

Recycled Water

Brackish Water Treatment Plant

An aerial photograph of a valley. A road, labeled 'Piru Canyon Road', runs horizontally across the middle of the image. Below the road, there are large, rectangular agricultural fields, some of which appear to be covered in a dark material, possibly solar panels or a type of crop. The surrounding hills are rugged and brownish, indicating a dry or semi-arid environment. The overall scene is a mix of natural terrain and human-made agricultural infrastructure.

Piru Canyon Road

Google Earth

[Copyright imagery sources]



Google Earth

[Copyright imagery sources]



NVBC
Point Mugu

Google Earth

[Copyright imagery sources]

New Outlet Works



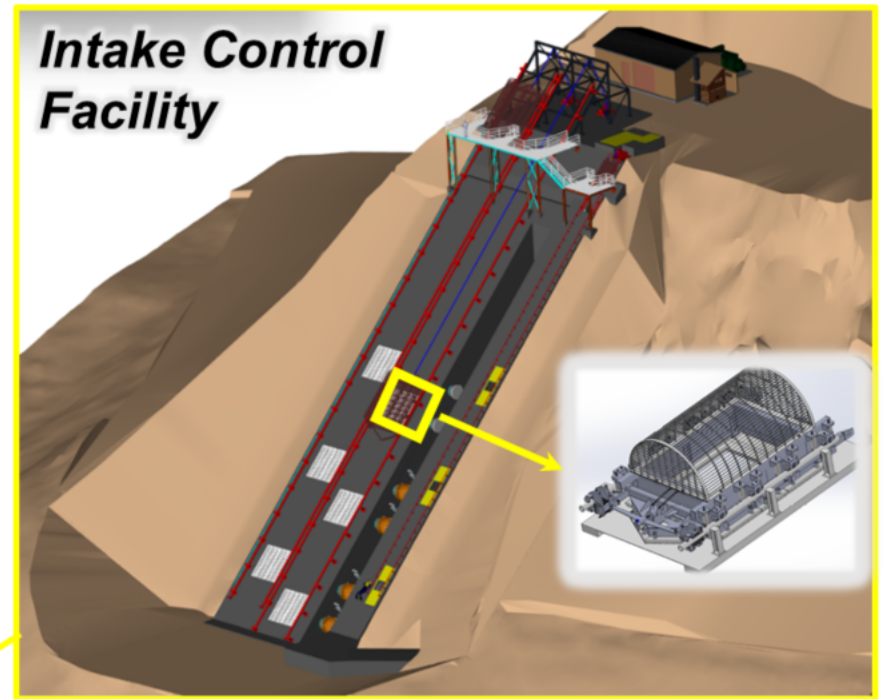
Santa Felicia Dam Safety Improvement Project

DESIGN & CONSTRUCTION

Regulatory Mandated
New Conveyance (Outlet Works) System



Intake Control Facility



Downstream Control Facility



Spillway Improvements

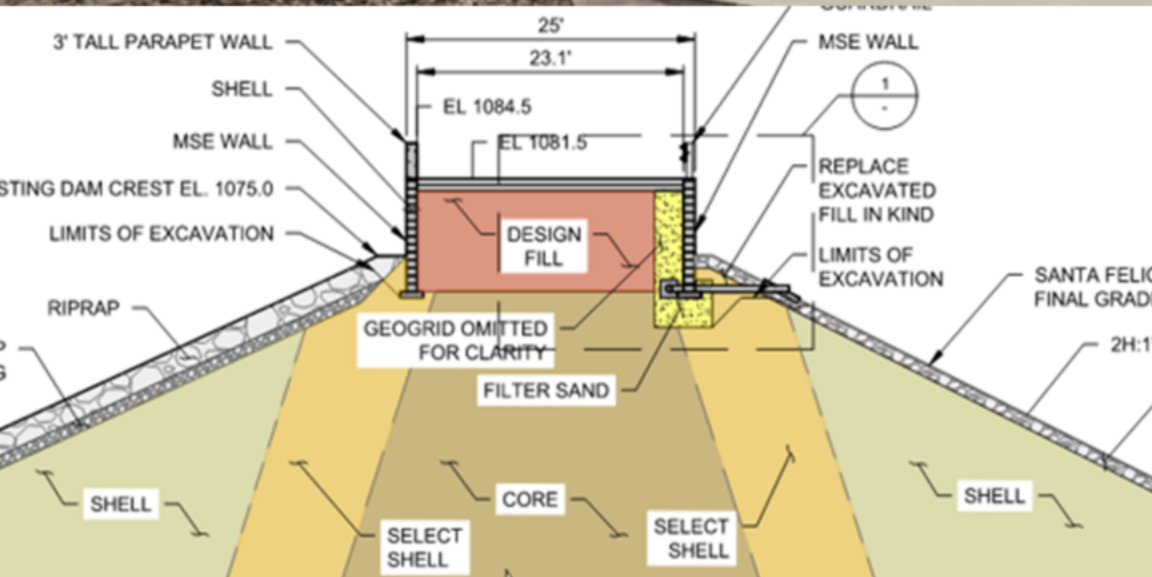
Raising Dam Crest by 6.5 ft using MSE Wall

Preserving Existing Bridge

Preserving Existing Spillway Walls

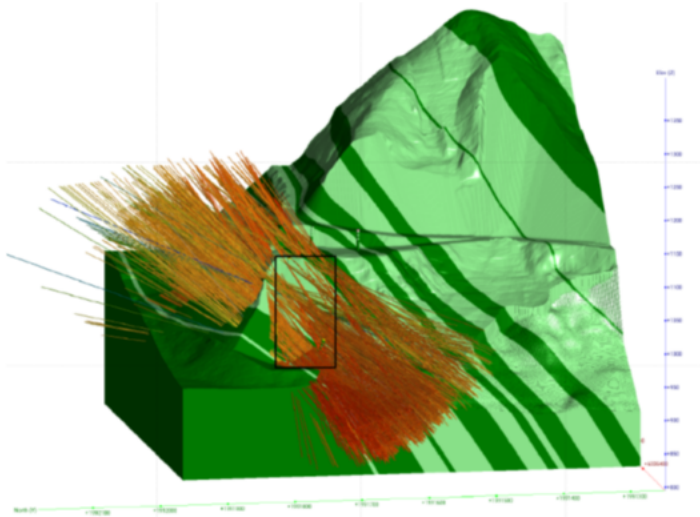
Lowering Spillway Chute

Preserving Existing Spillway Ogee Crest

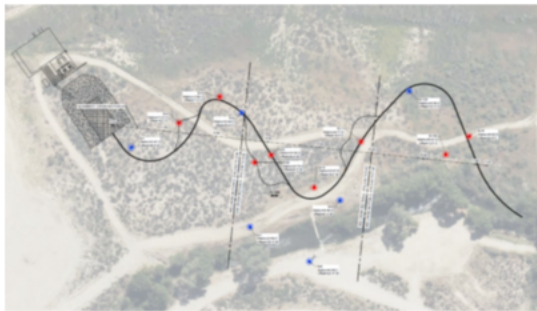




Accomplishments



Kinematic Analysis of Sloping Intake



2025 Drilling Program Plan

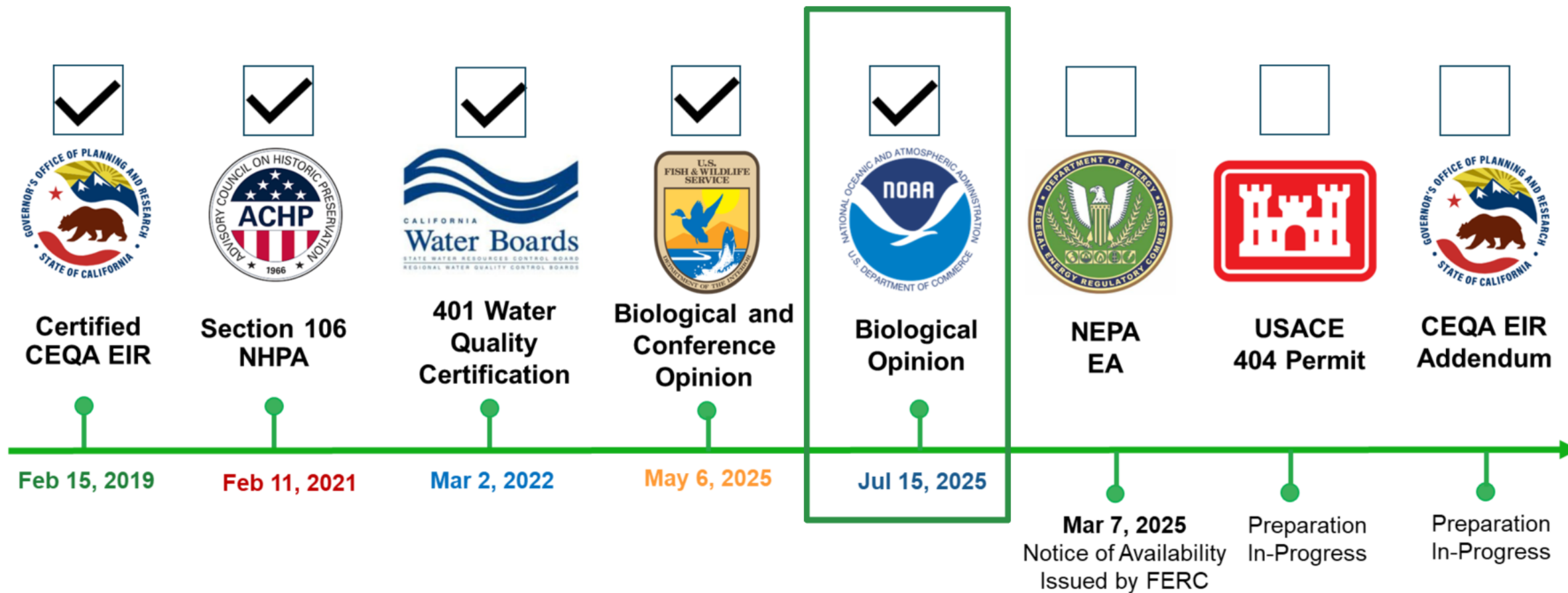
2024 Summit



2025 Summit

- ✓ **New Outlet Works Final Design**
- ✓ **Spillway Improvements 90% Design**
- ✓ **Final Drilling Program Plan (2017 - 2025)**
- ✓ **Adopted Best Value Selection**
- ✓ **Site Development Plan for Construction**
- ✓ **Design Potential Failure Mode Analysis Workshop and SME Review**
- ✓ **Completion of ESA Consultation with U.S. Fish and Wildlife Service (USFWS)**
- ✓ **Completion of ESA Consultation with National Marine Fisheries Service (NMFS)**

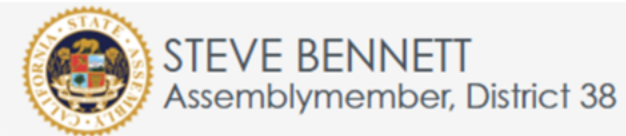
Agency Consultation Summary



NMFS ESA: Challenges and Success



Pleasant Valley County Water District



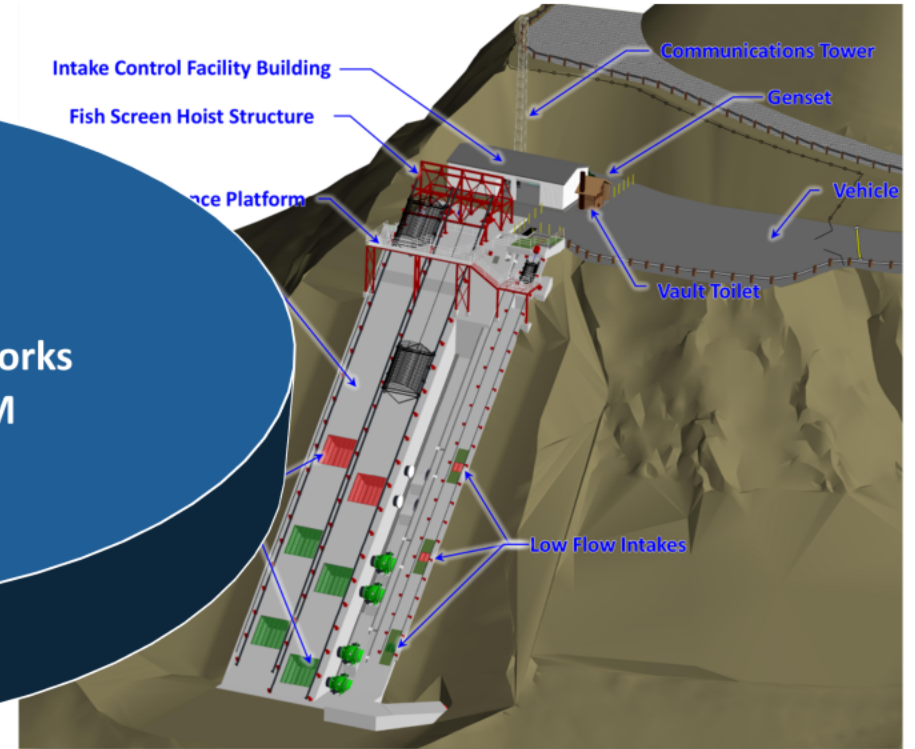
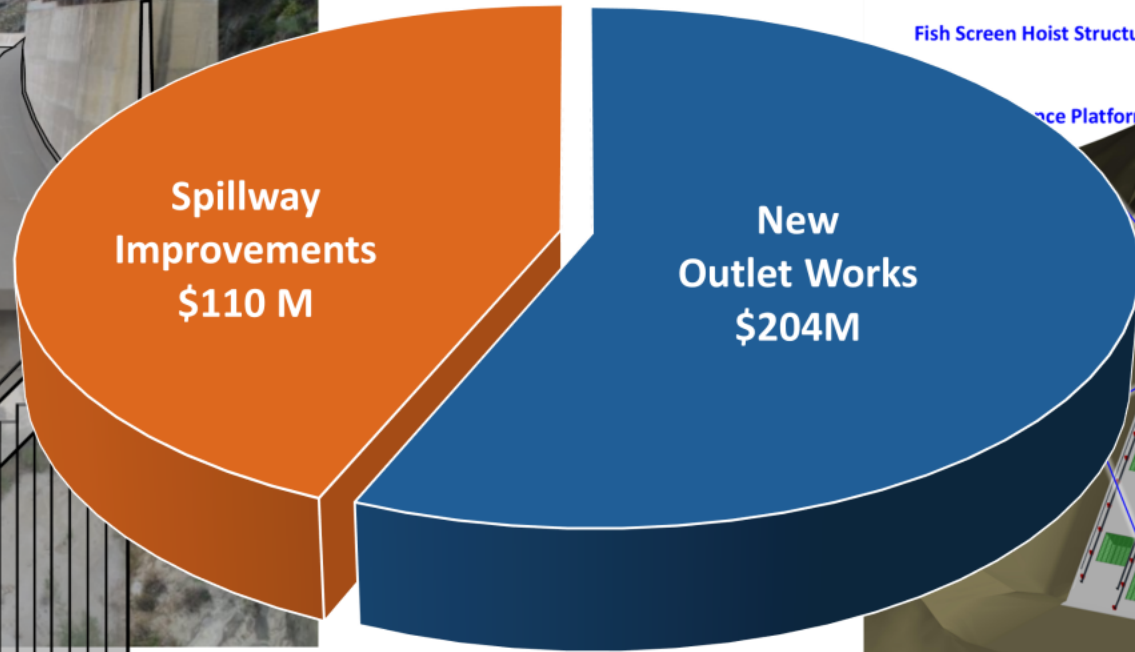
KEN CALVERT
41st DISTRICT, CALIFORNIA

Piru Neighborhood Council
Serving the Piru community since 1977



VENTURA LOCAL AGENCY FORMATION COMMISSION

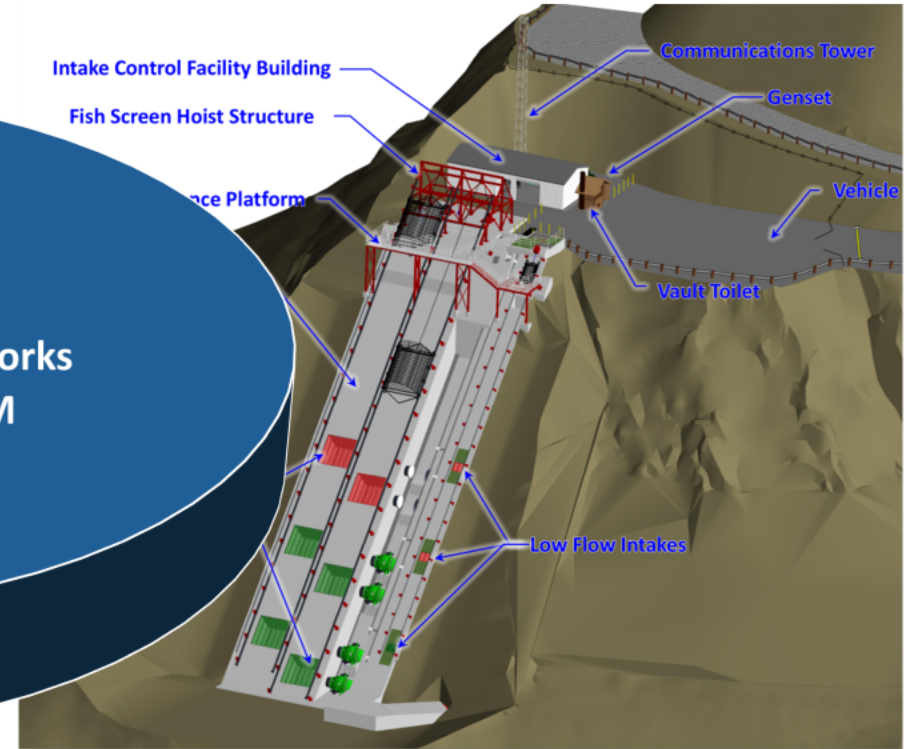
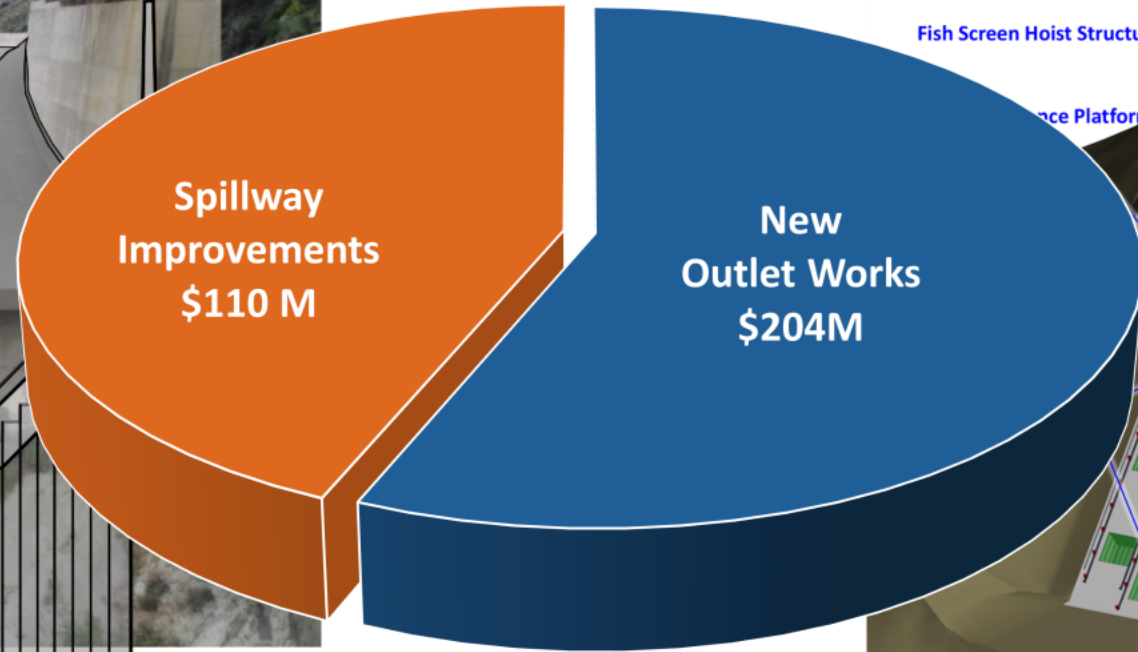
Santa Felicia Dam SIP: Costs Breakdown



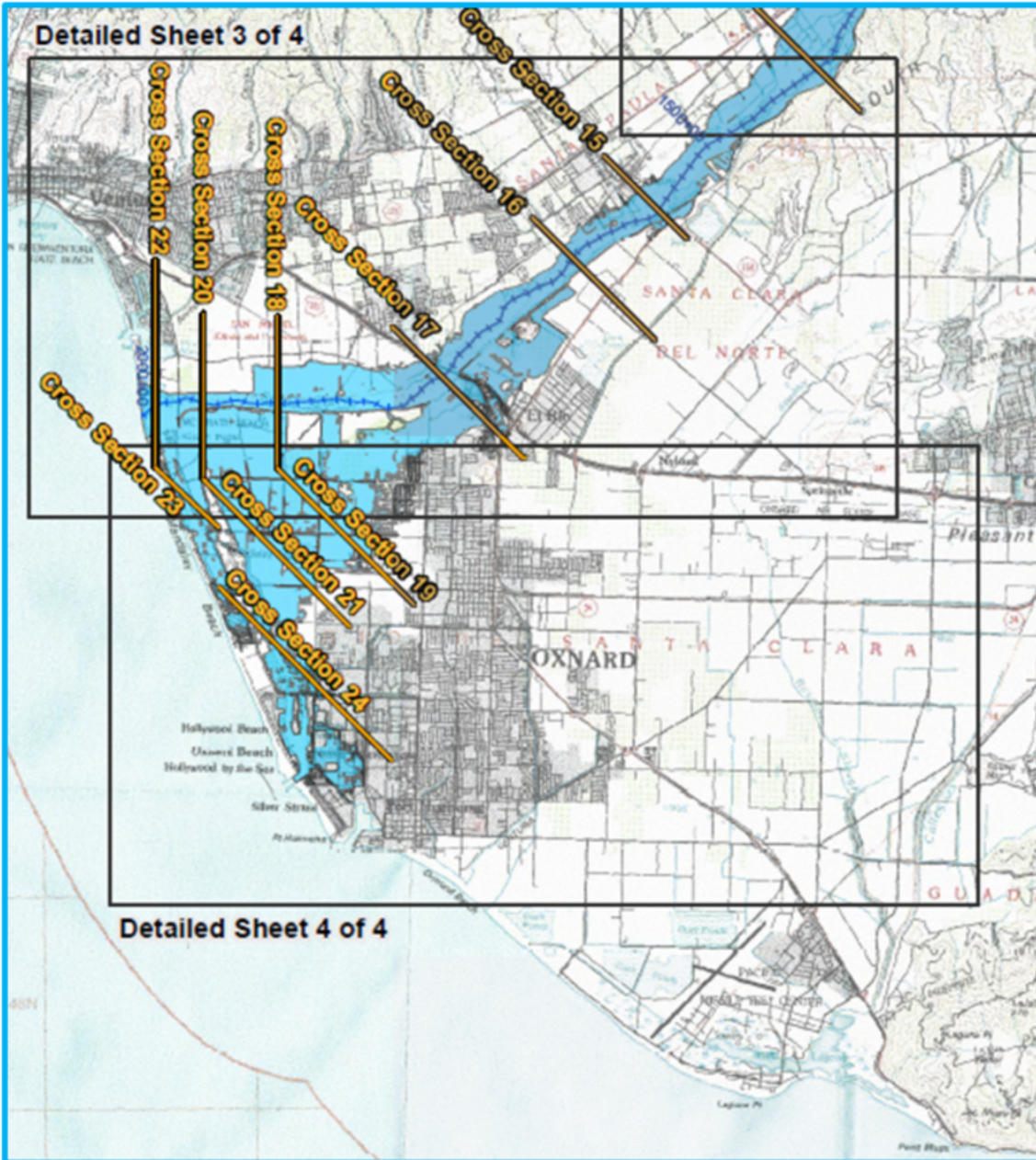
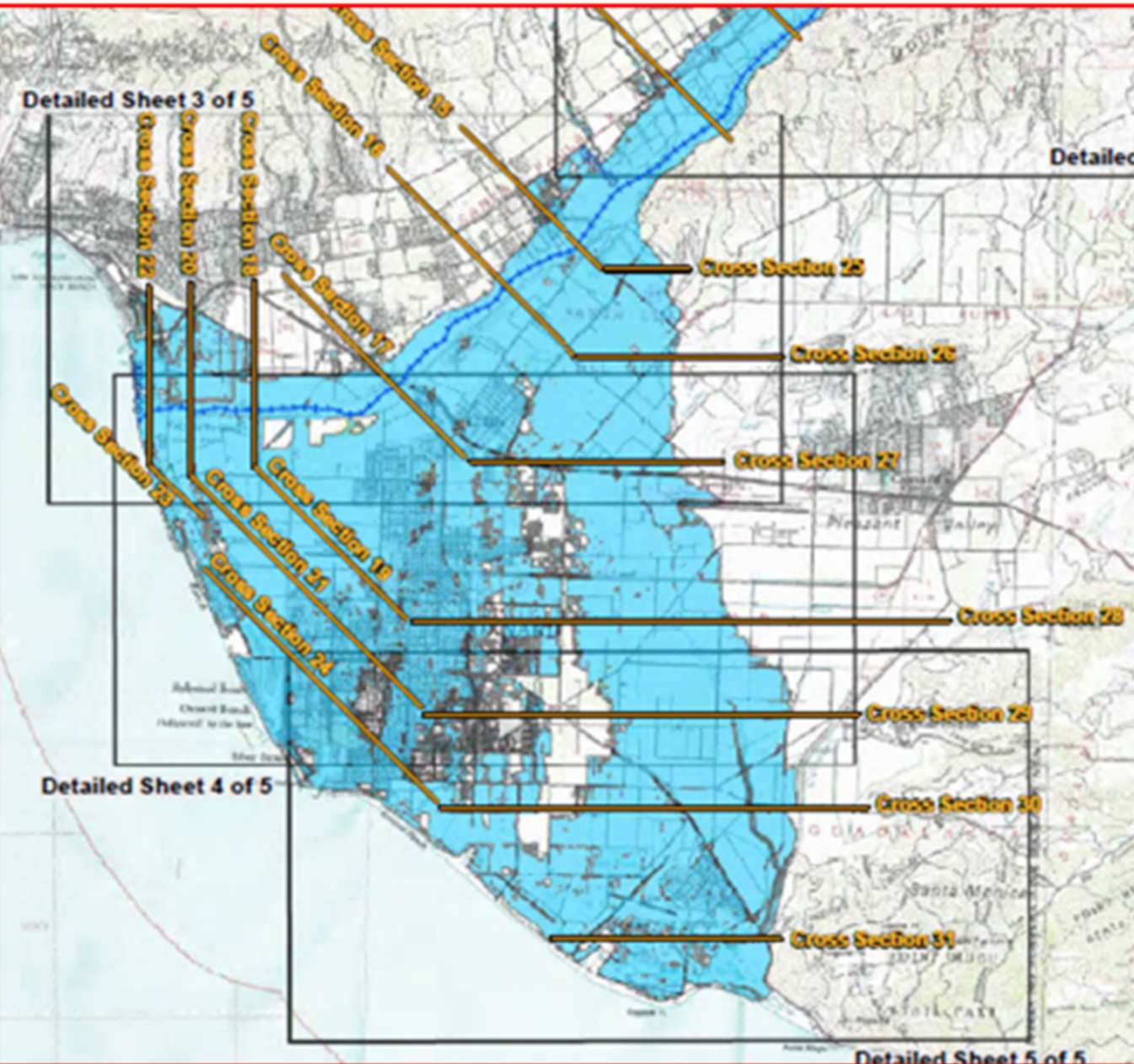
Total All-In Construction Cost: \$314M*

*Including Construction, Construction Management, Design Services During Construction, Cost Escalation, Contingency

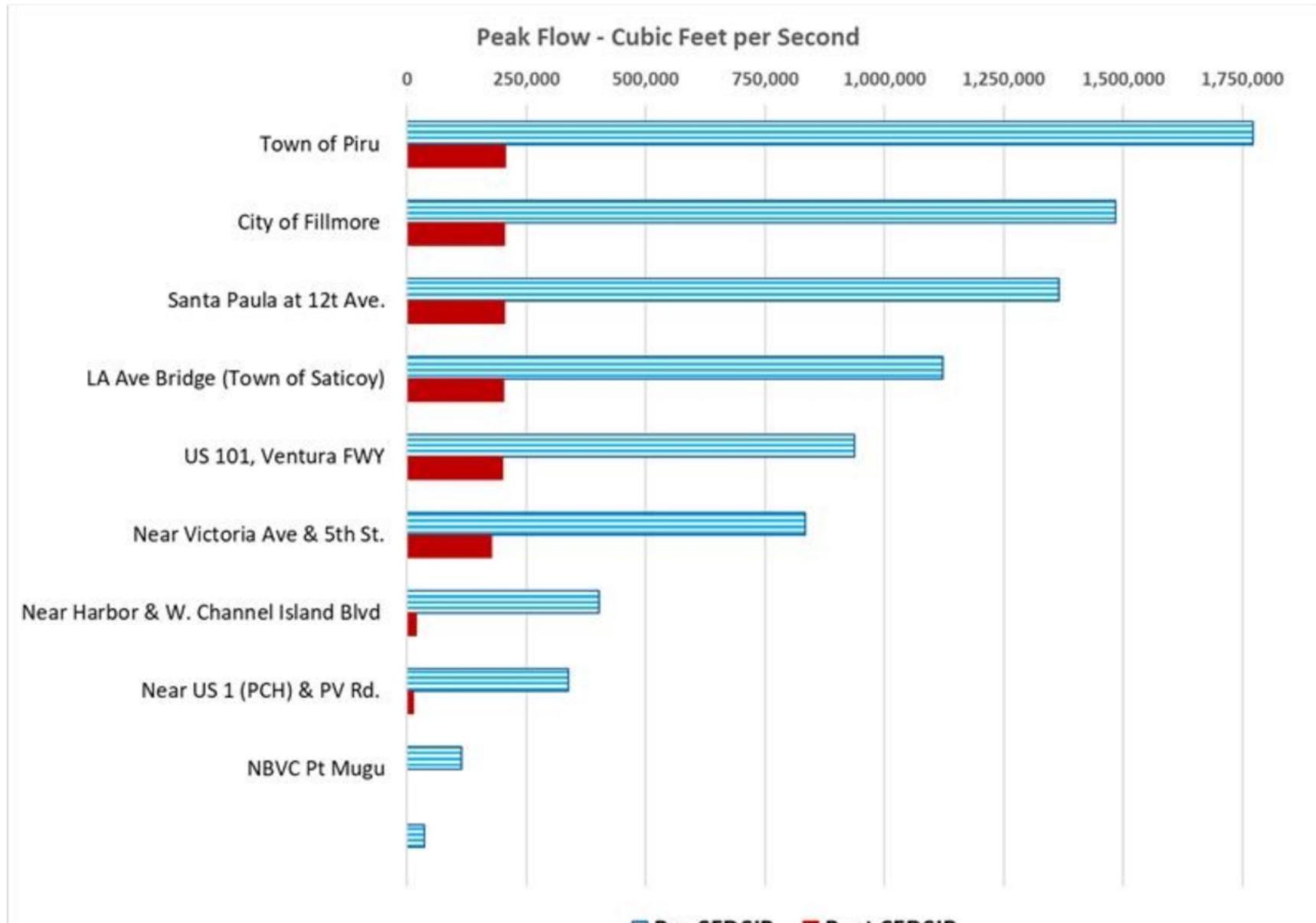
Santa Felicia Dam SIP: Costs Breakdown



FEMA Grant Application Requesting
\$17.4 million for Outlet Works
Construction



Peak Flood Flow (cfs) Pre and Post SFDSIP



Flood Zone Impact Reductions

Population



186,521

18%
Impact



32,657

Homes



61,558

18%
Impact



10,778

Agricultural Lands



25,654 Acres

36%
Impact



9,162 Acres

Industrial and Commercial Buildings



10,778

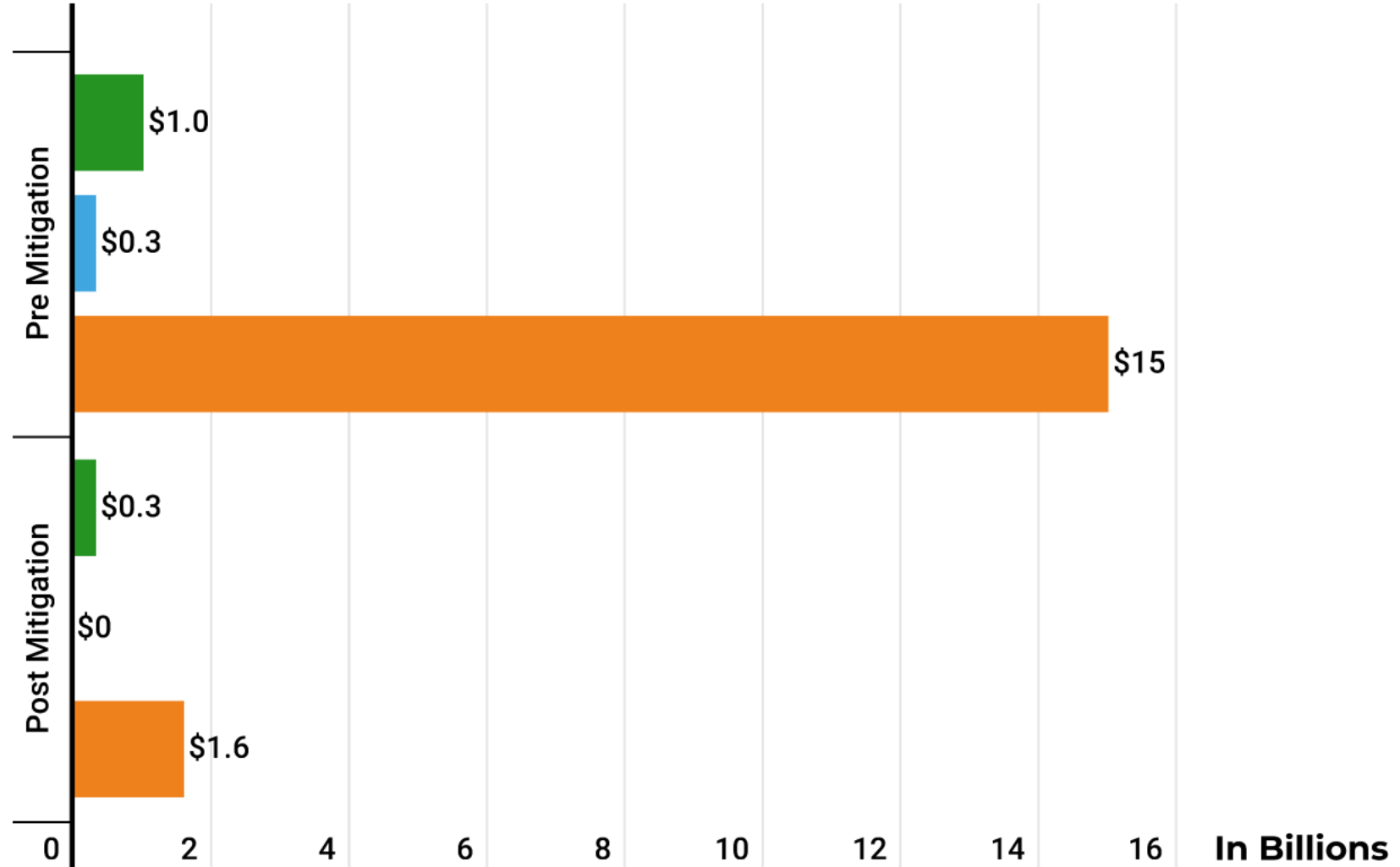
12%
Impact



747

Financial Damages: Pre and Post SFDSIP

● Crop Production Losses ● UWCD Losses ● Building Damages



Timeline

Once Project Funding is Secured



Outlet Works

Construction
Years 1-4

Completion
Year 5

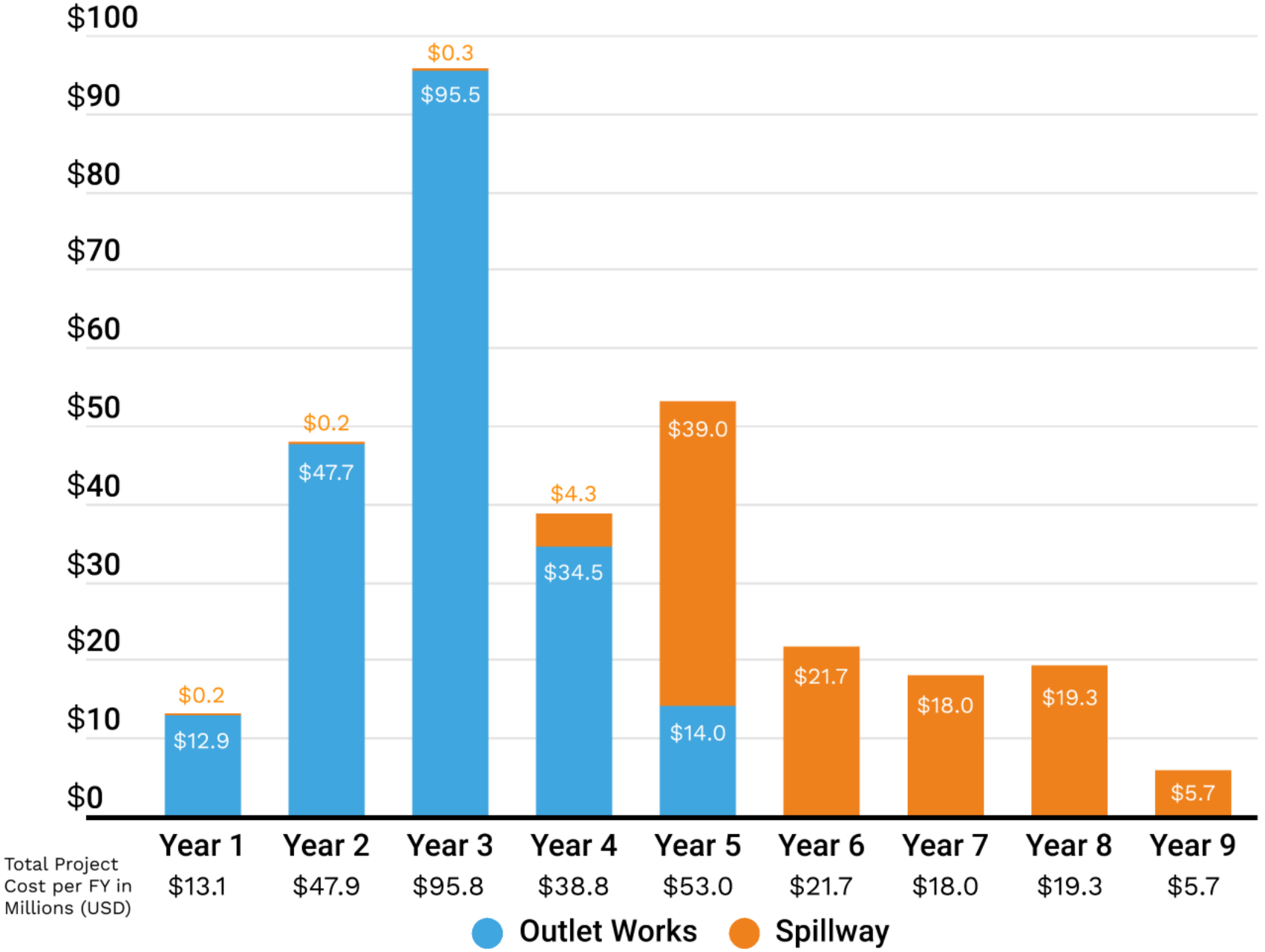
Spillway

Bid Phase
Year 4

Construction
Years 5-8

Completion
Year 9

Building Safety: Costs Across Time



Freeman Diversion Expansion

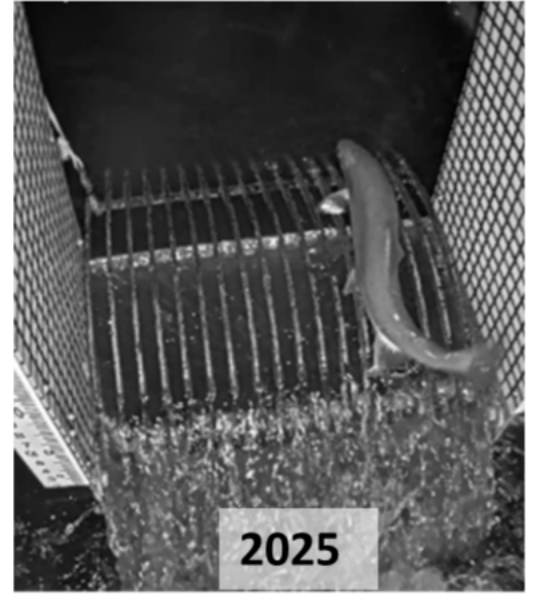




Existing Facility



Ongoing Fish Passage

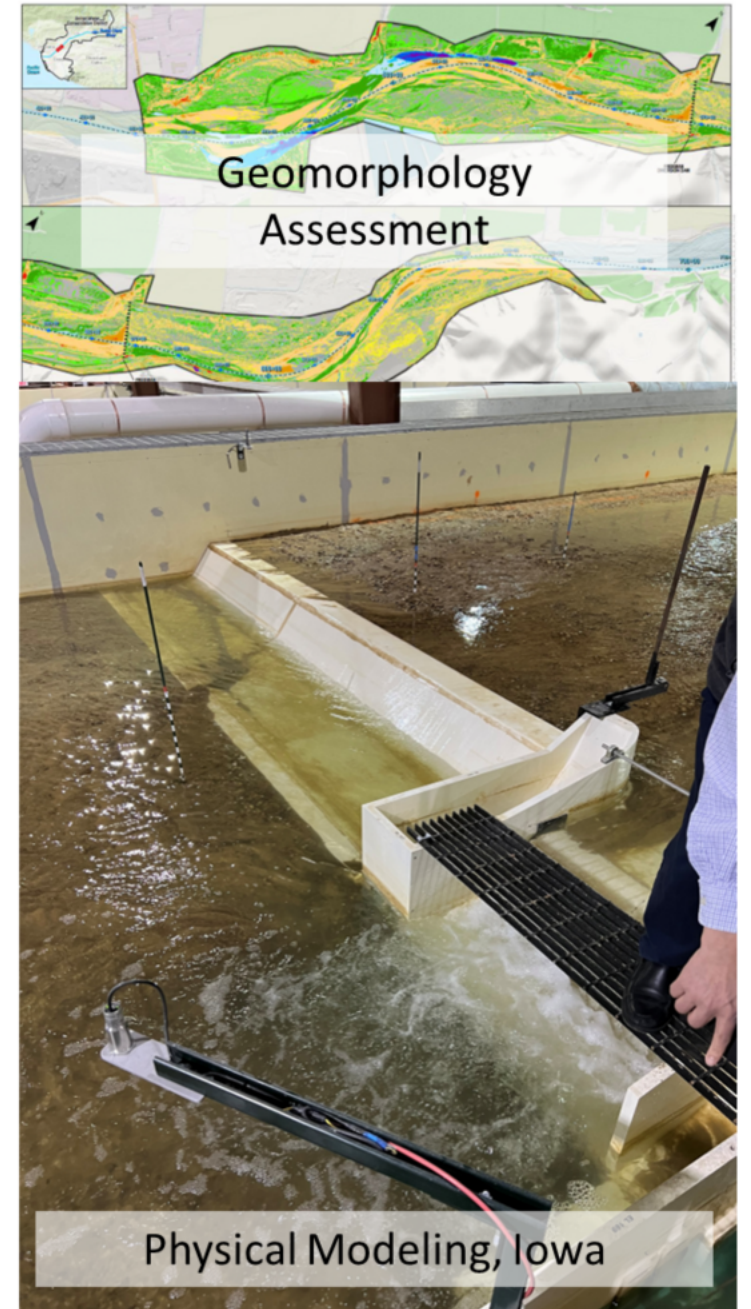
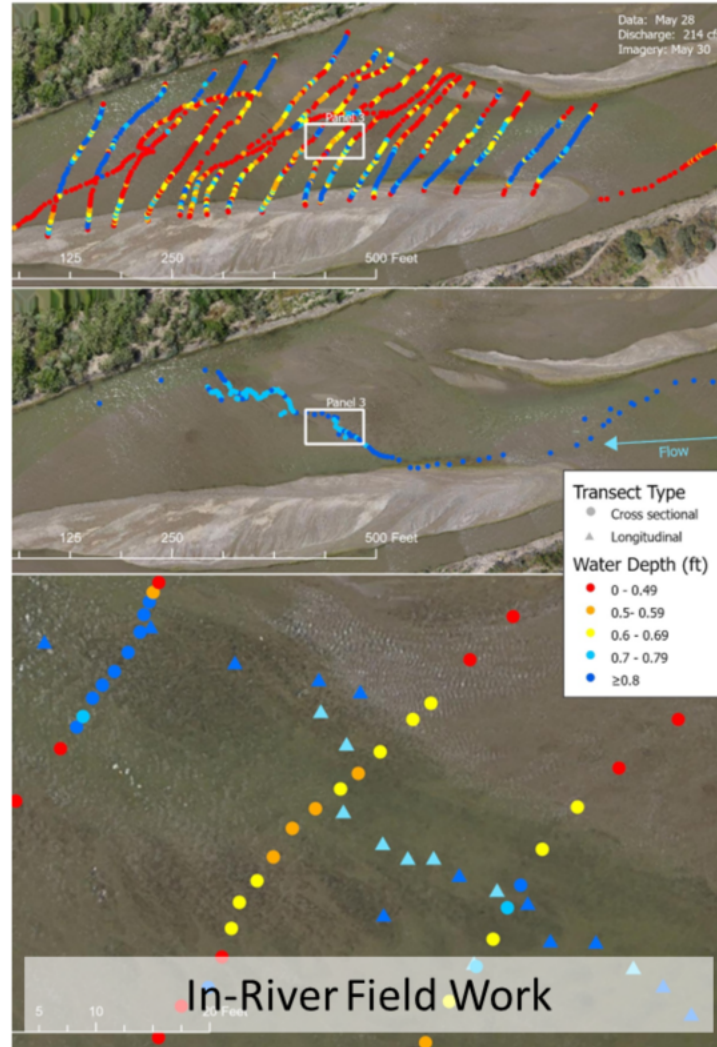


How We Got Here

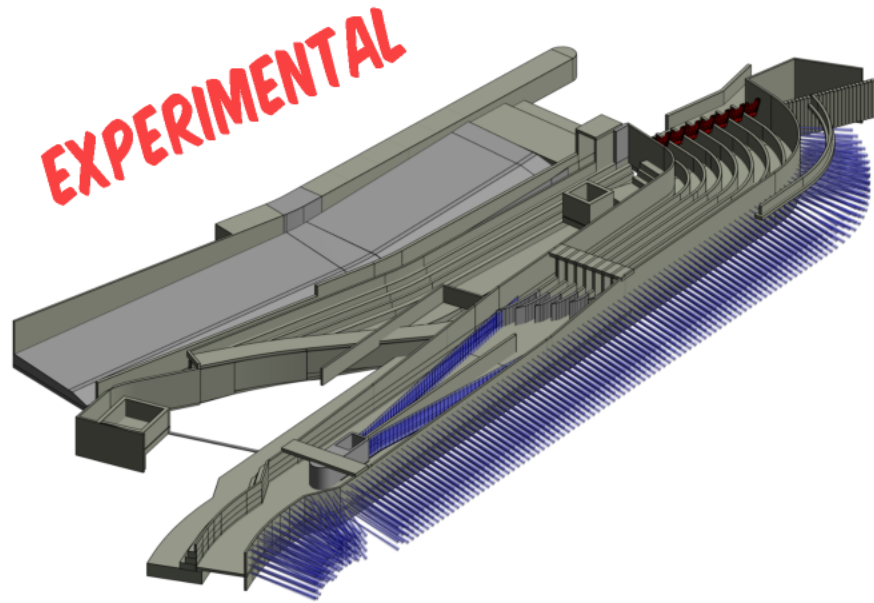
- 25+ years of consultation
- Changed operations from the Water Rights multiple times per NMFS requirements
- Significant cost escalations (\$260 million hardened ramp)
- Designed several fish passage alternatives per NMFS elevated criteria (15+ years and \$20 million+ spent to date)



Cutting Edge Science & Investigation



New Facility: Improved Denil



Hardened Ramp

Construction Costs: \$260 Million



**87% COST
SAVINGS**



Improved Denil

Construction Costs: \$35 Million





Flushing Channel

Intake and Debris Screen

Expand Screen bay and New Diversion Fish Screens (\$3M Grant from USBR)

Expand Auxiliary Water Screens

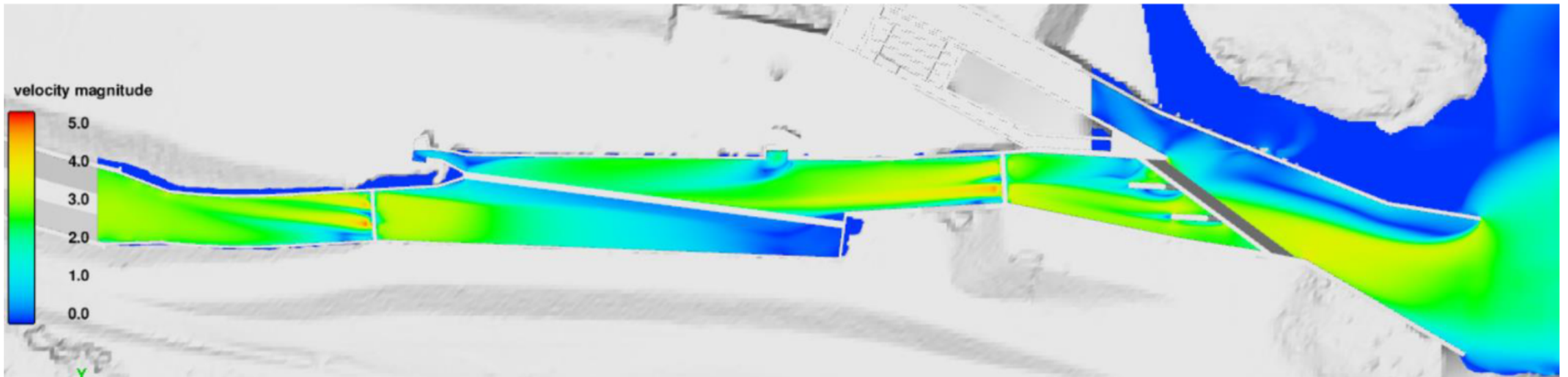
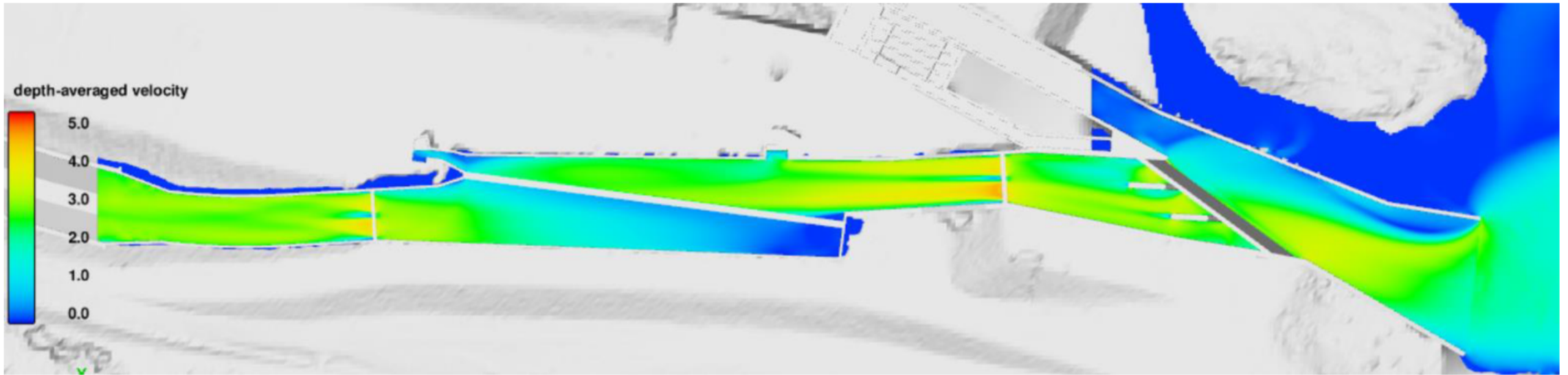


**Intake and
Debris
Screen**

**Expand
Fish Capture
Facility**

**Improve Fish
Passage
Facility(\$20M
Grant, USBR)**

Flow Velocity



Improved Denil



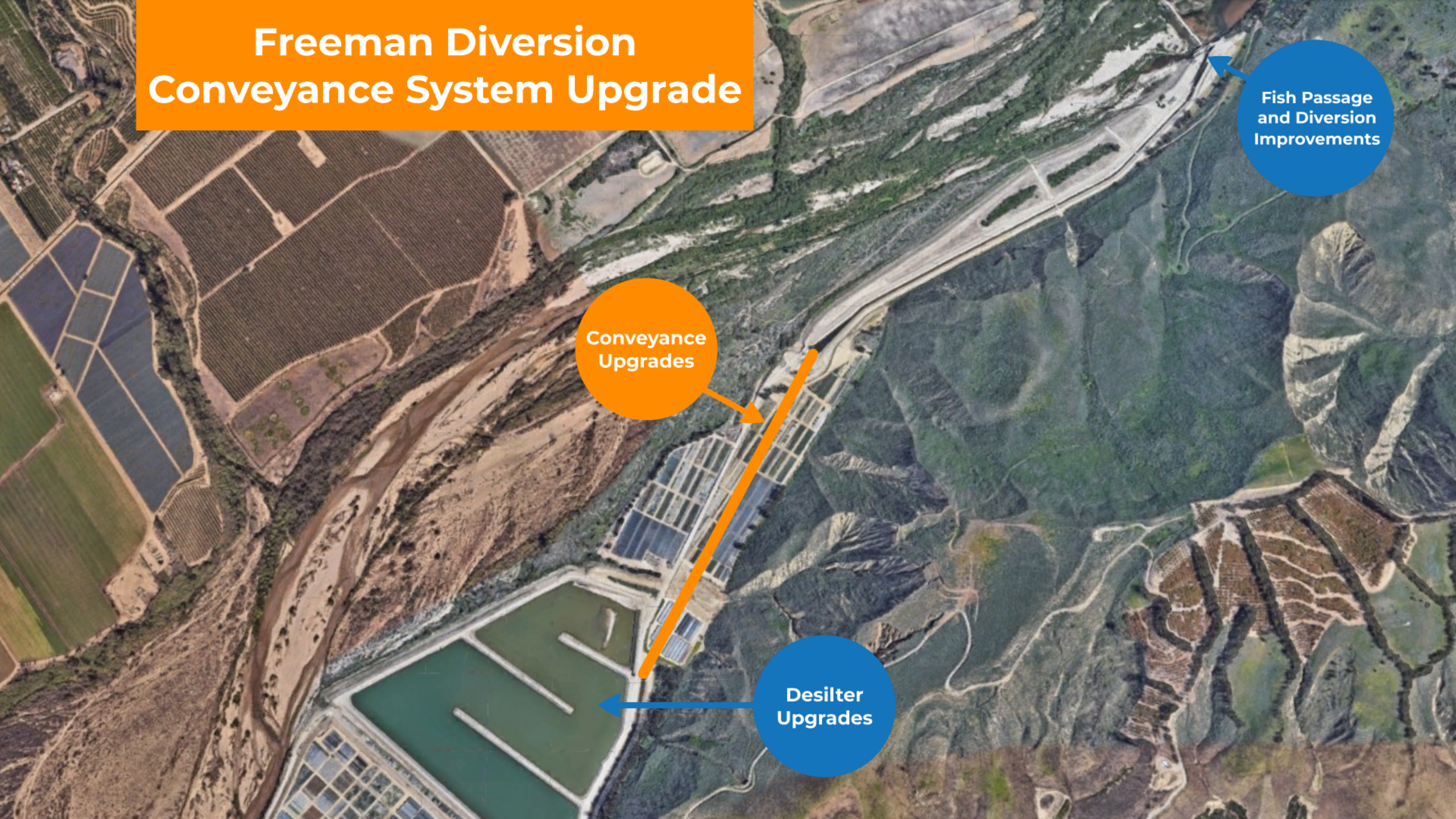
- **87% Cost Decrease**
- **Protects current diversions and adds 5,000 to 8,000 AFY**
- **Shorter construction window and smaller footprint**
- **Maintains Fish Passage and Diversions during construction**
- **Maintains proven off-river system with storm resilience**

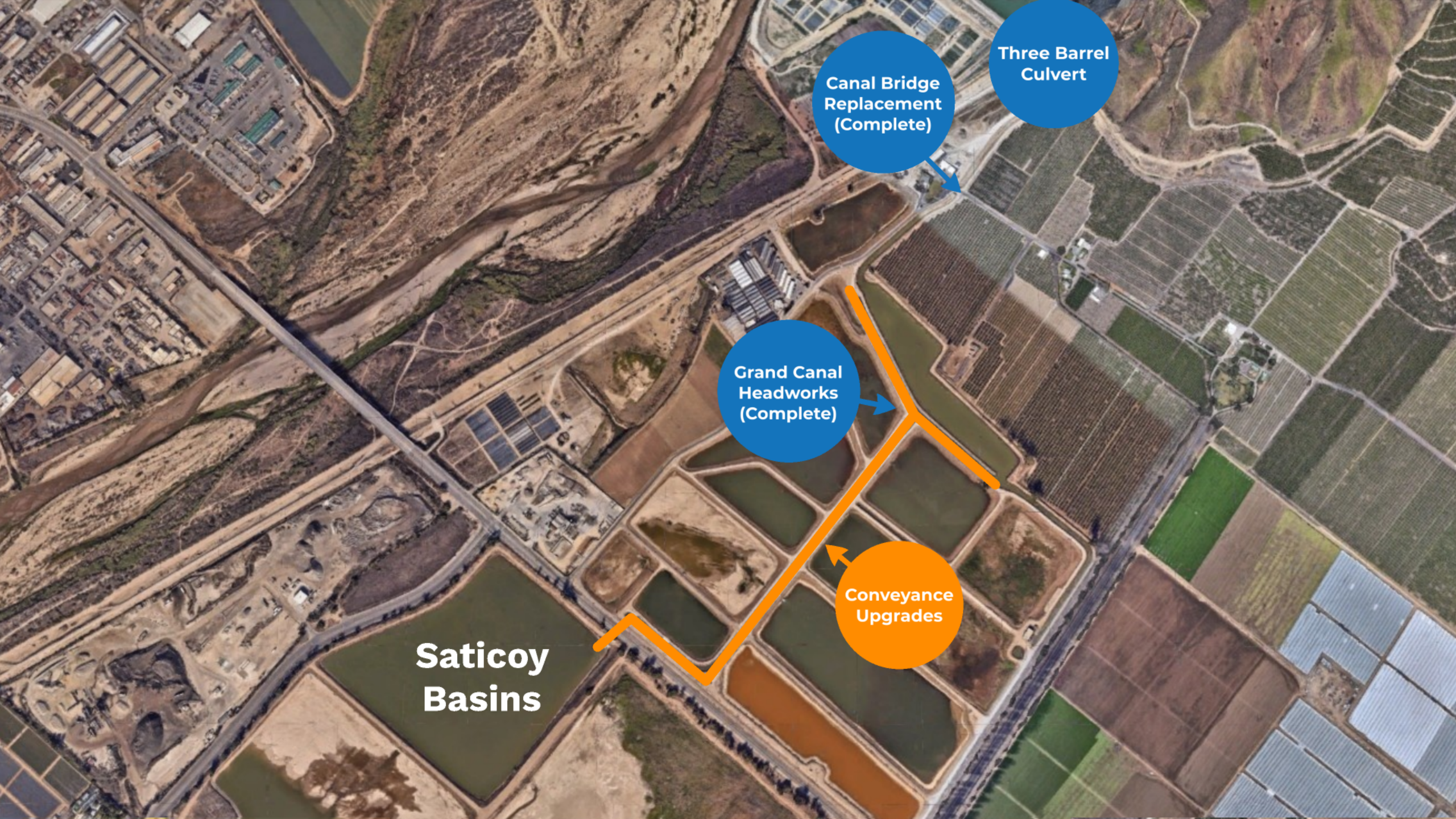
Freeman Diversion Conveyance System Upgrade

Fish Passage
and Diversion
Improvements

Conveyance
Upgrades

Desilter
Upgrades





Three Barrel
Culvert

Canal Bridge
Replacement
(Complete)

Grand Canal
Headworks
(Complete)

Conveyance
Upgrades

Saticoy
Basins

Canal Bridge Replacement

Desilter
Upgrades

Three Barrel
Culvert

Canal Bridge
Replacement

- Completed November 4, 2024
- \$1.2M Project Cost (Fully Funded)
- Completed Ahead of Schedule
- Completed with no Change Orders

Grand Canal Headworks



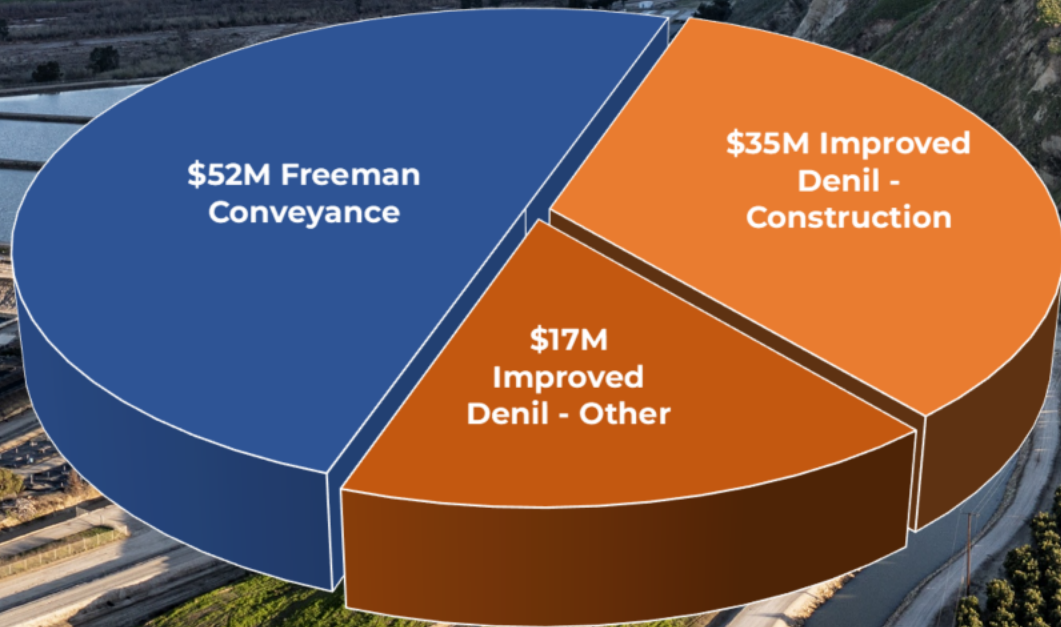


**Ferro
Basin**

**Saticoy
Basins**

**Vineyard
Crossing**

Freeman Diversion Expansion and Conveyance System Upgrade



- Freeman Fish Passage and Diversion Improvement
- Conveyance Upgrades (Main Canal)
- Desilter Upgrades
- Three Barrel Culvert Replacement
- Conveyance Upgrades (Grand Canal)
- Vineyard Crossing

**TOTAL PROJECT COST
\$104 Million**

Water System Upgrade

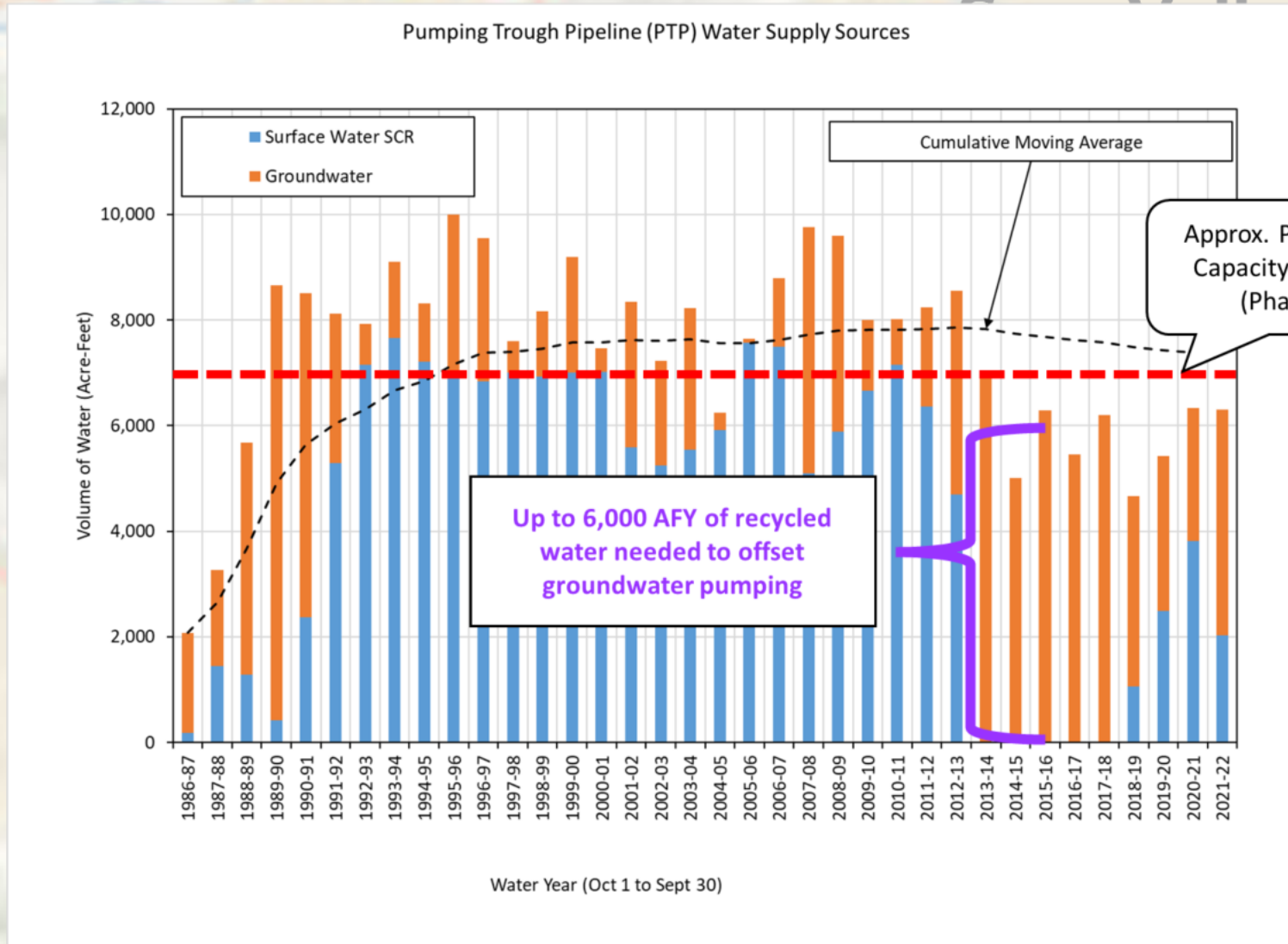
Groundwater
Facility

Recharge Program

Marillo
Reservoir

Recycled
Water

Carrier and Brackish



Recycled Water






Laguna Road Interconnection

- *Completed in 2025*
- *Phase 1: Capable of moving up to 1,500 AFY (489 million gallons) into UWCD systems*

97% Grant Support

Total Project Budget

Total Project Budget **\$6,808,038**

Funding Source		Amount
PT Pipeline (CIP 8043)		\$1,901,050
USDA NRCS		\$347,231
DWR SGMA (original)		\$2,651,500
DWR SGMA (reallocation)		\$1,964,356
Total Funding		\$6,864,137

Total Grant Funding: \$4,963,087
 Approximately 73% of Total Project Costs
 Approximately 97% of Construction Costs



Natural Resources Conservation Service
 U.S. DEPARTMENT OF AGRICULTURE

Engineer:



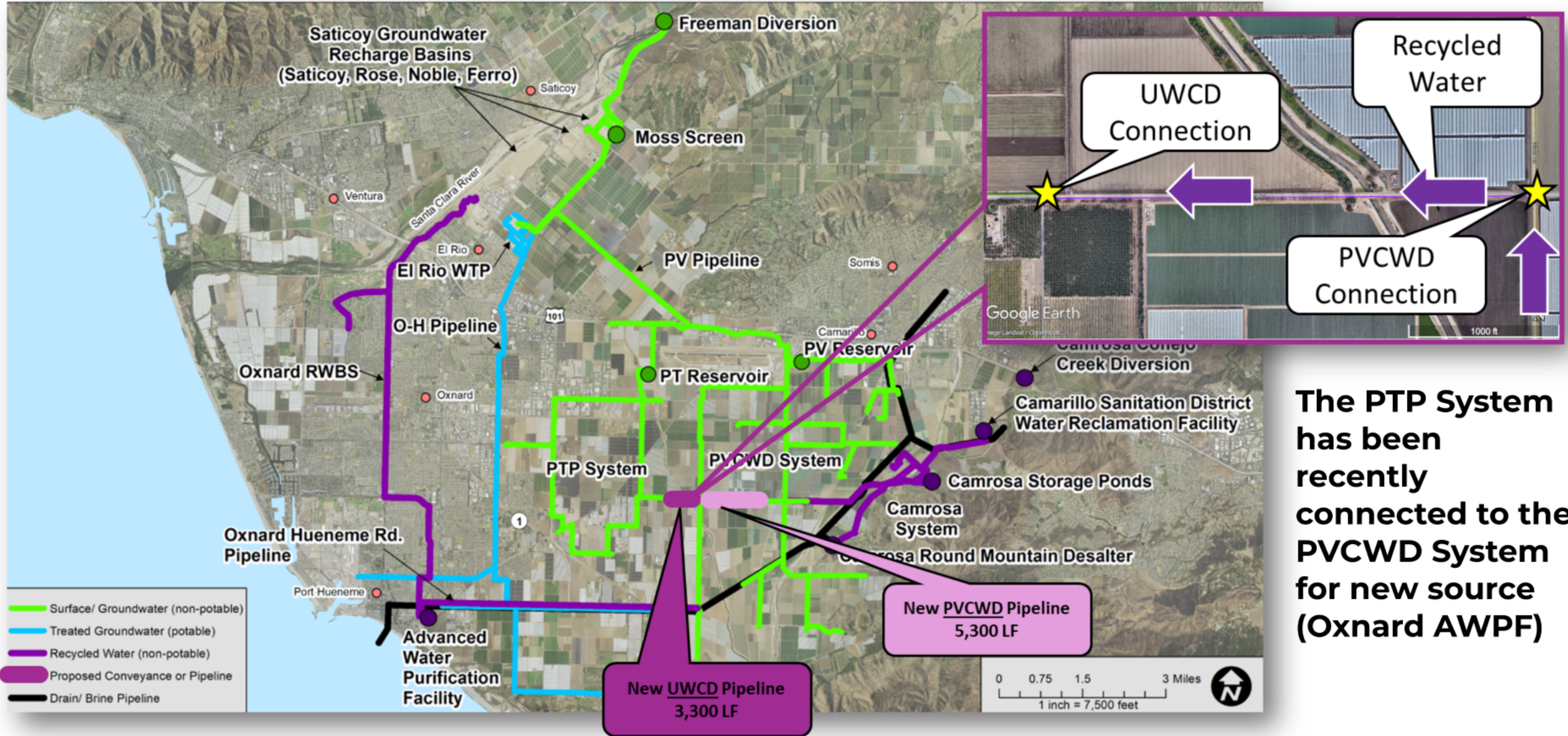
Construction Management
 & Inspection:



Contractor:

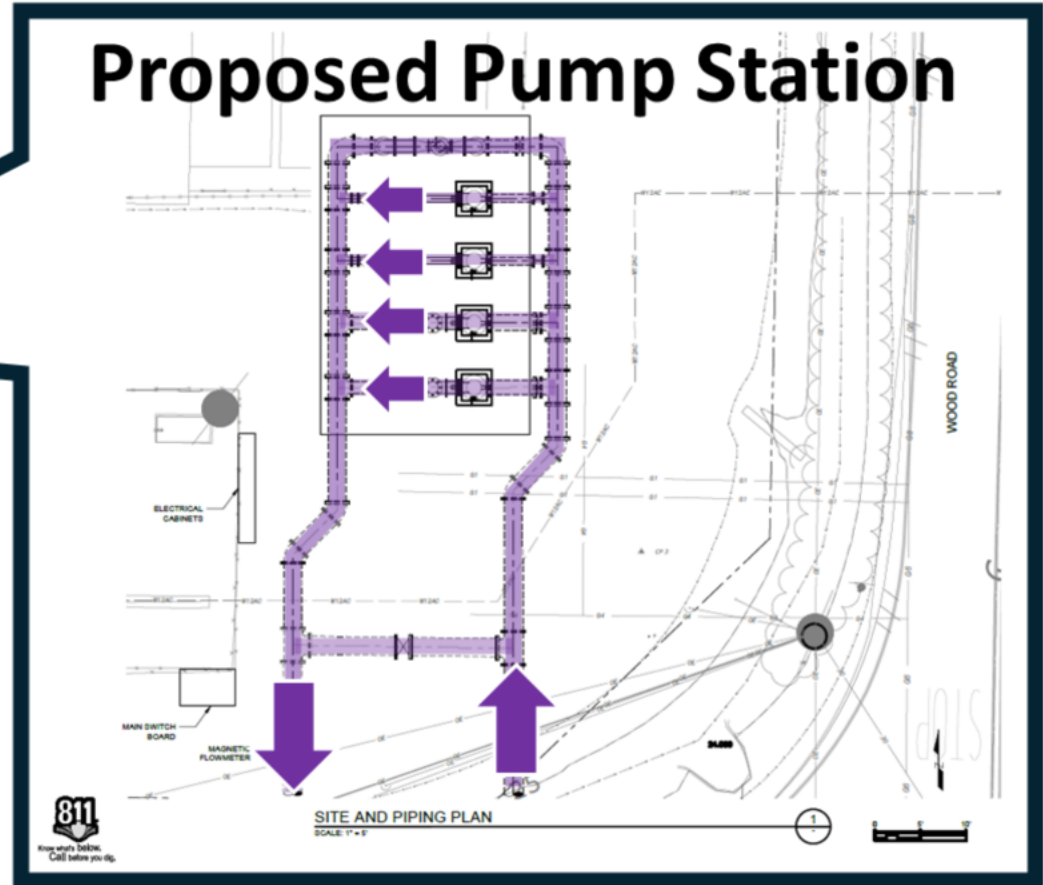
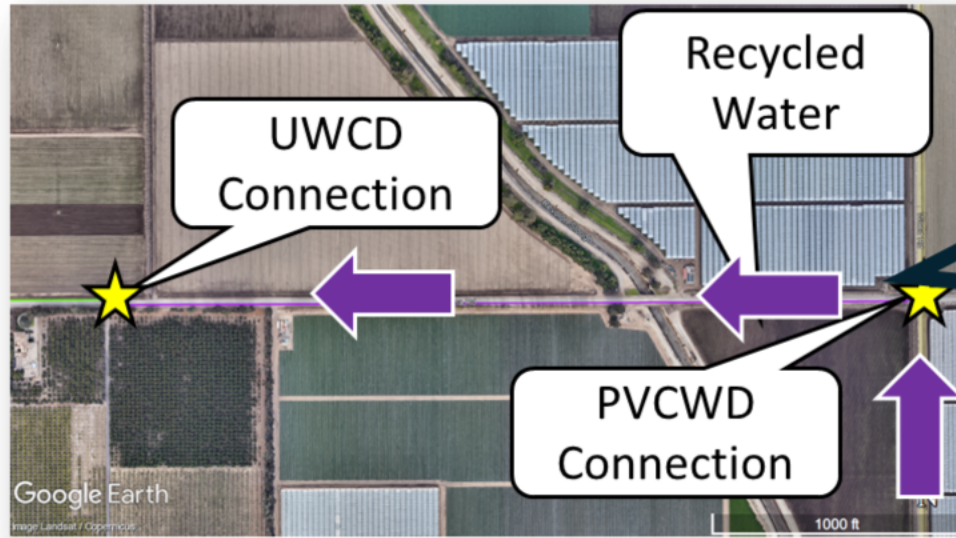


Laguna Road Interconnection



The PTP System has been recently connected to the PVCWD System for new source (Oxnard AWPF)

Laguna Road Interconnection



Criteria	RW Flow	Total Dynamic Head	
		RW + All Wells	RW + Surface Water
Minimum	1,000 gpm	8.36	80.62 ft
Design	4,340 gpm	41.02	126.77 ft

Recycled Water



Laguna Road Recycled Water Interconnection Project
IMPLEMENTED BY
United Water CONSERVATION DISTRICT & **Fox Canyon Groundwater Management Agency**
FUNDED UNDER
THE BUDGET ACT OF 2021 and 2022
ADMINISTERED BY
Sustainable Groundwater Management Grant Program
California Department of Water Resources

Engineer: **mkn**
Construction Management & Inspection: **M MOTT MACDONALD**
Contractor: **Toto**

With Additional Funding from: **USDA** Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

SUSTAINABLE GROUNDWATER MANAGEMENT (SGM) GRANT PROGRAM

Future Benefits



Reduces Groundwater Pumping



Increases Operational Flexibility on the Oxnard Plain



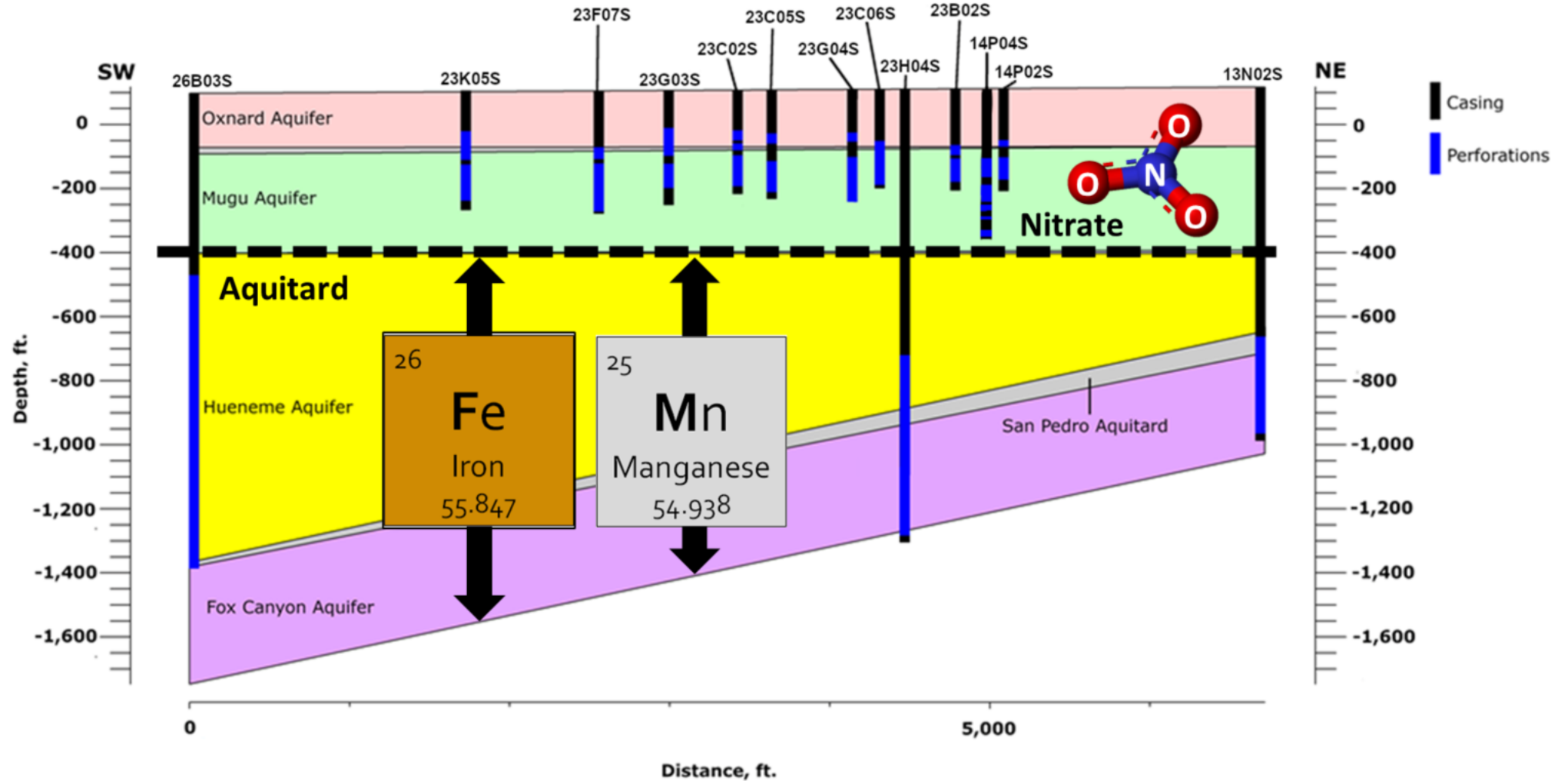
Provides Additional Conveyance for EBB

Iron and Manganese Treatment Plant

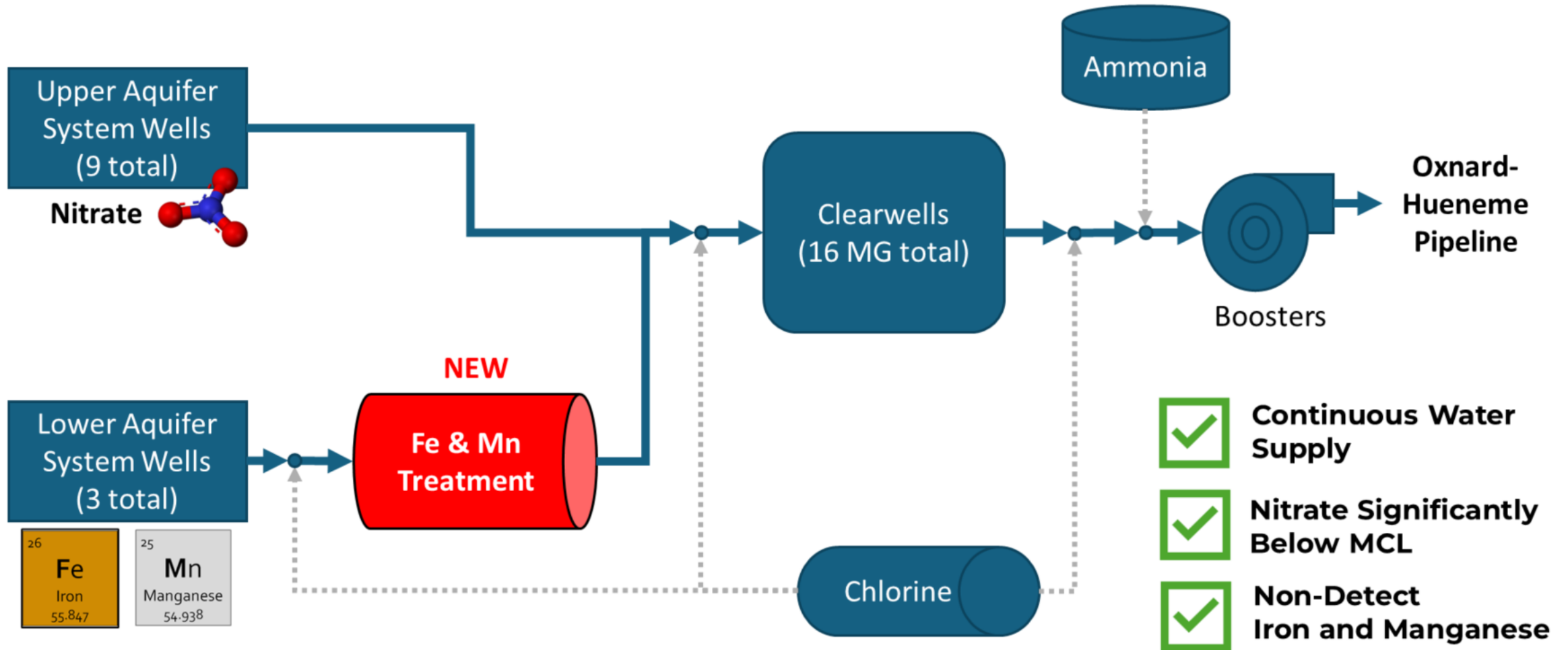


- *Operational since April 2024*
- *Phase 1: 3,500 gallons per minute capacity (5,645 AFY)*

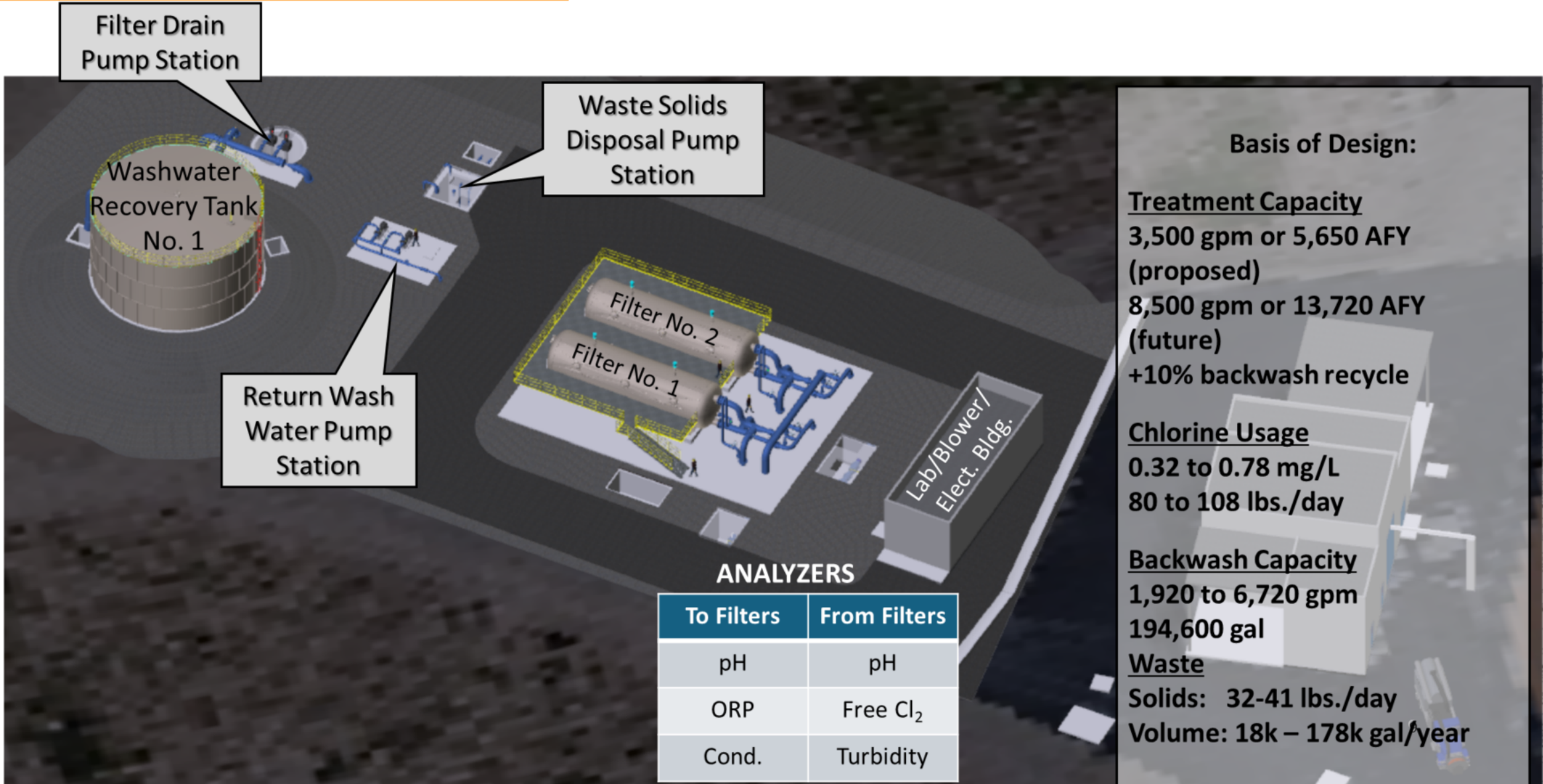
Hydrogeological Setting



Process Diagram



Project Site Layout



Basis of Design:

Treatment Capacity
 3,500 gpm or 5,650 AFY (proposed)
 8,500 gpm or 13,720 AFY (future)
 +10% backwash recycle

Chlorine Usage
 0.32 to 0.78 mg/L
 80 to 108 lbs./day

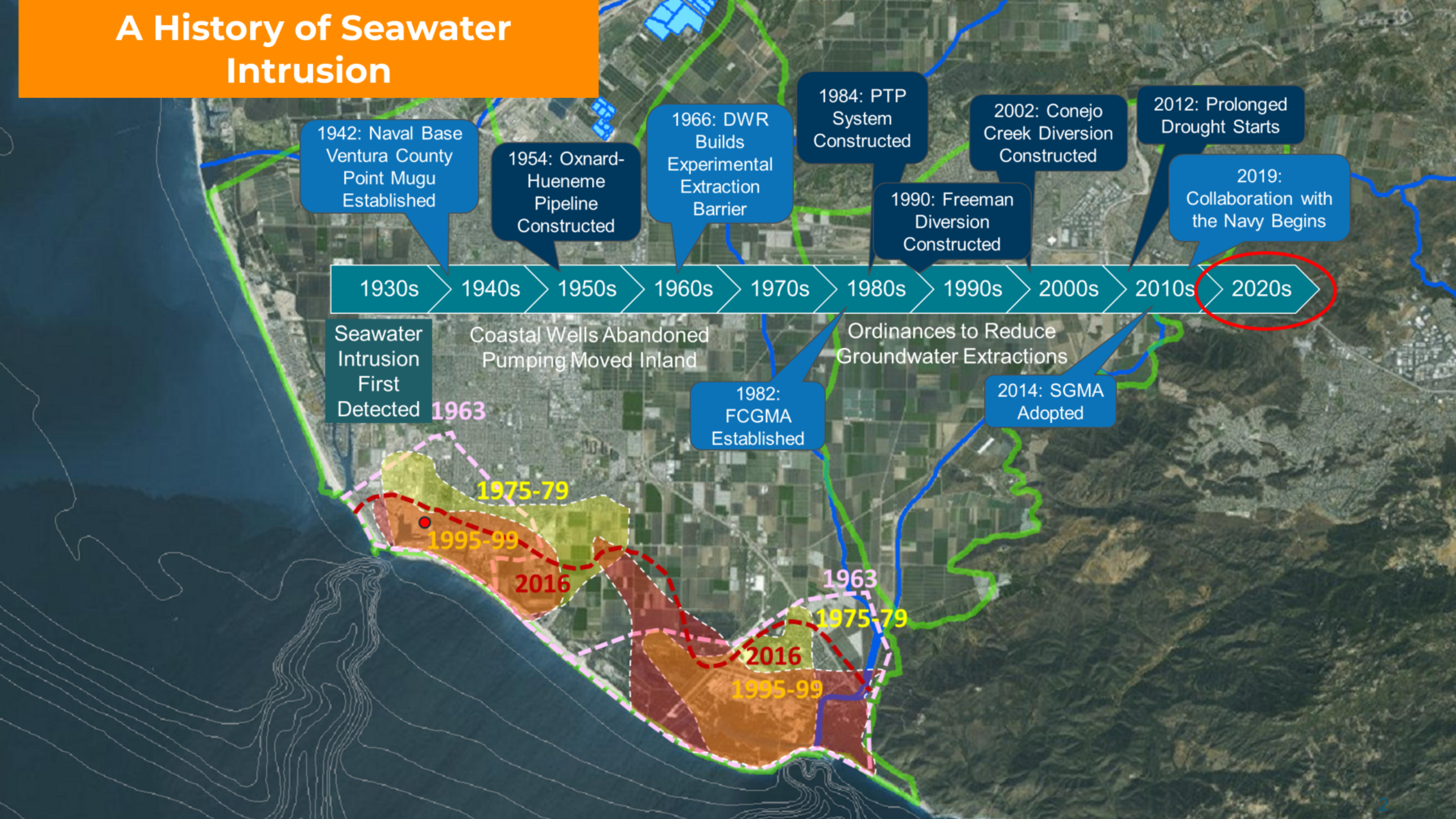
Backwash Capacity
 1,920 to 6,720 gpm
 194,600 gal

Waste
 Solids: 32-41 lbs./day
 Volume: 18k – 178k gal/year

ANALYZERS

To Filters	From Filters
pH	pH
ORP	Free Cl ₂
Cond.	Turbidity

A History of Seawater Intrusion



1942: Naval Base Ventura County Point Mugu Established

1954: Oxnard-Hueneme Pipeline Constructed

1966: DWR Builds Experimental Extraction Barrier

1984: PTP System Constructed

2002: Conejo Creek Diversion Constructed

2012: Prolonged Drought Starts

2019: Collaboration with the Navy Begins

1930s 1940s 1950s 1960s 1970s 1980s 1990s 2000s 2010s 2020s

Seawater Intrusion First Detected

Coastal Wells Abandoned Pumping Moved Inland

Ordinances to Reduce Groundwater Extractions

1982: FCGMA Established

2014: SGMA Adopted

1963

1975-79

1995-99

2016

1963

1975-79

2016

1995-99

Challenges

✓ Stop Seawater Intrusion



Build Extraction Barrier

✓ Extraction Barrier Location



- **At the Source of Seawater Intrusion**
 - **Regional Project**
 - **Collaboration with the U.S. Navy**
-

✓ Project Implementation

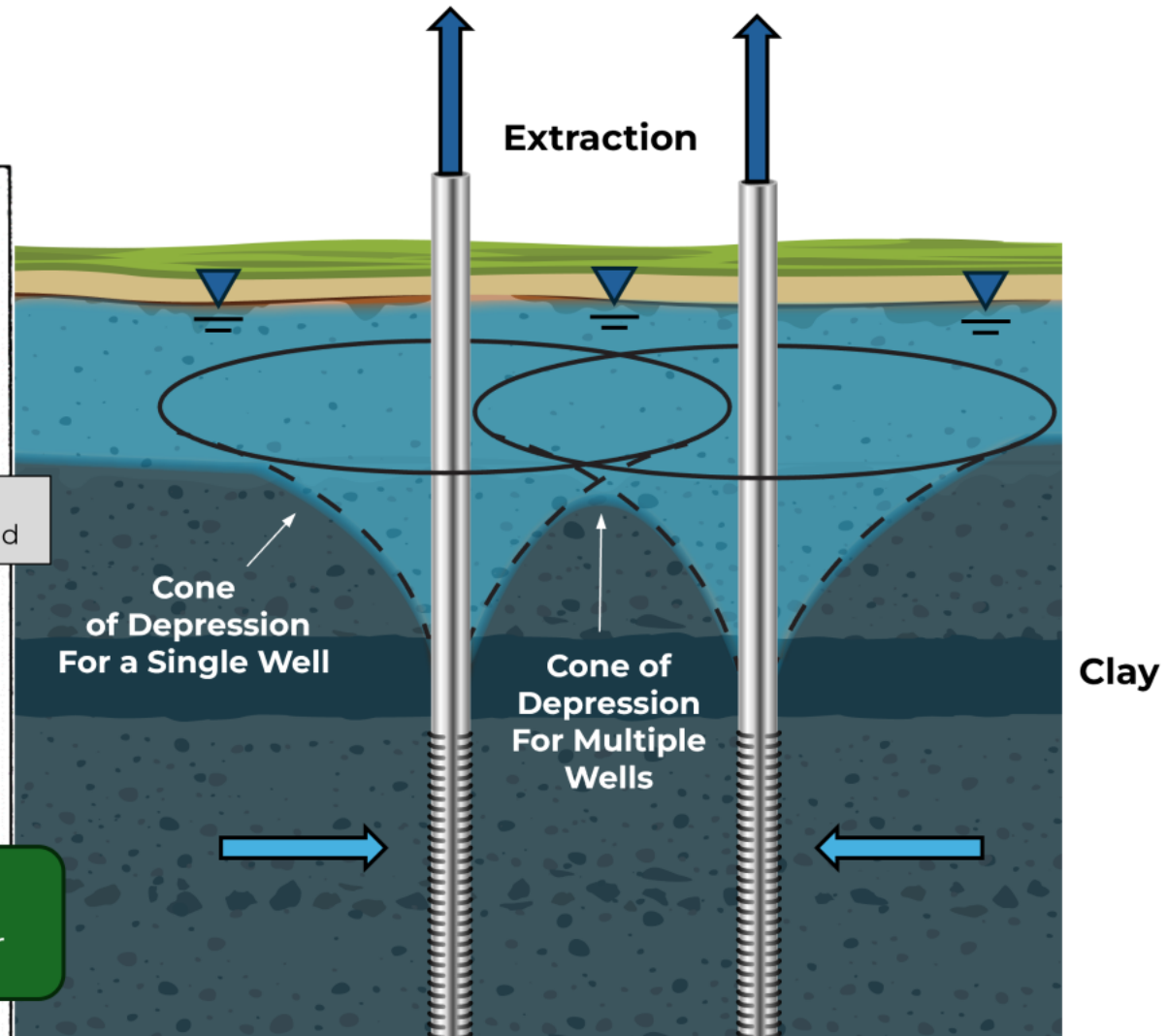
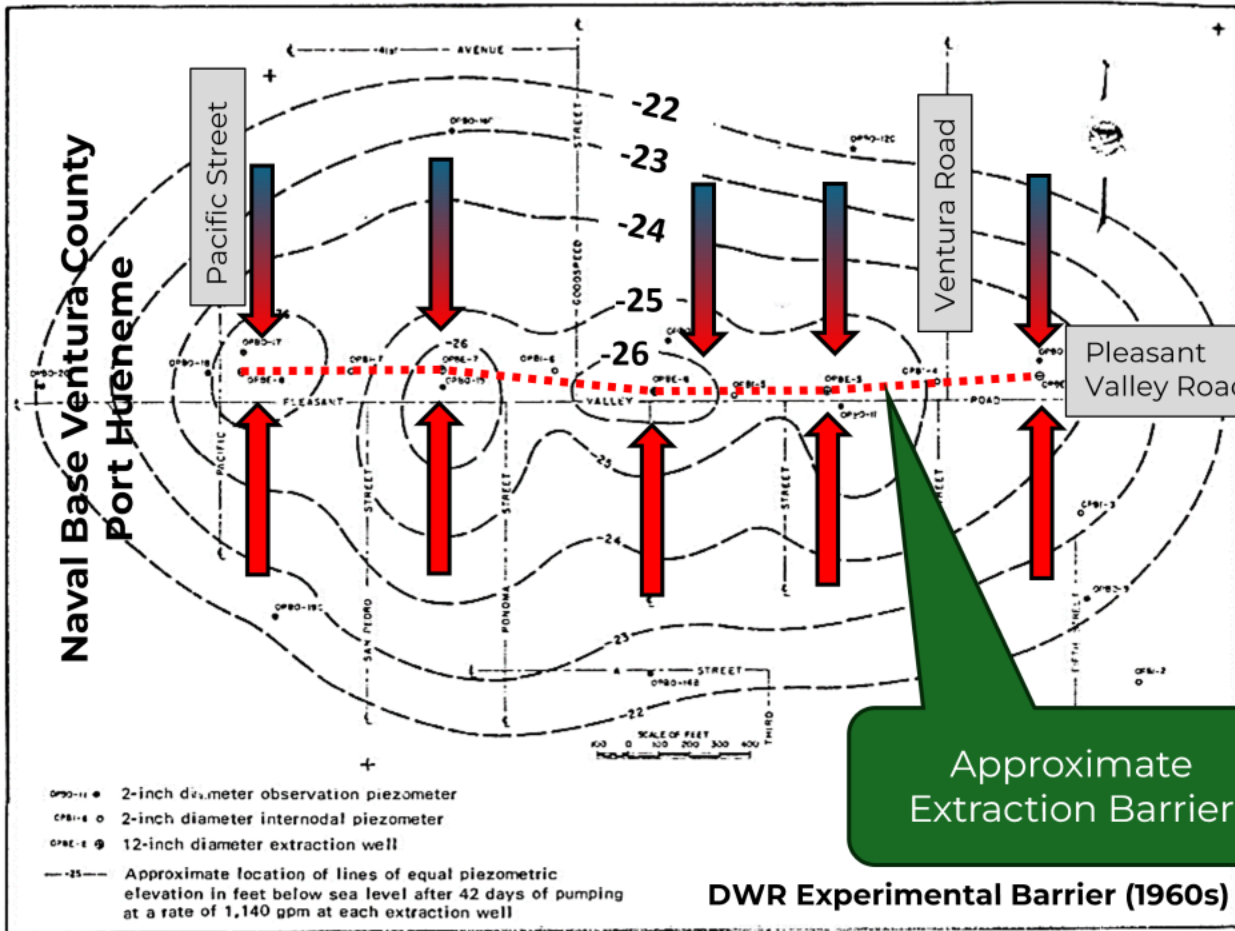


- **Multiphase**
 - **Phase 1 - Extraction Barrier**
 - **Phase 2 - Treatment, Distribution, and Concentrate Disposal**
-

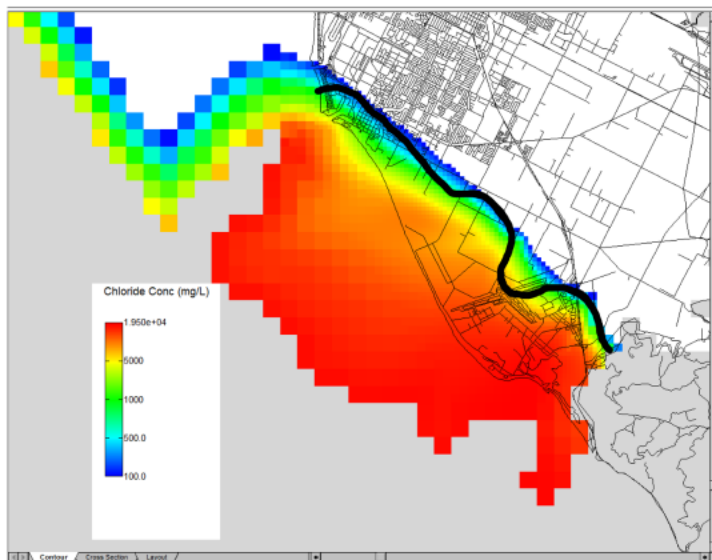
■ Funding

Solution: Extraction Barrier

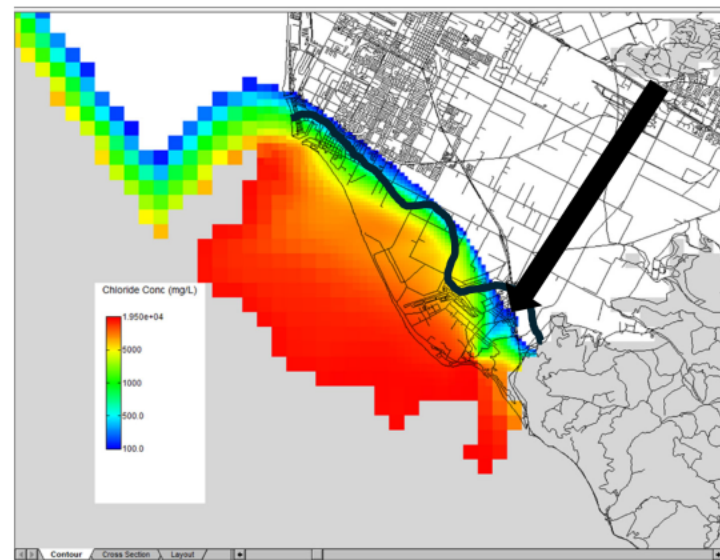
How an extraction barrier works



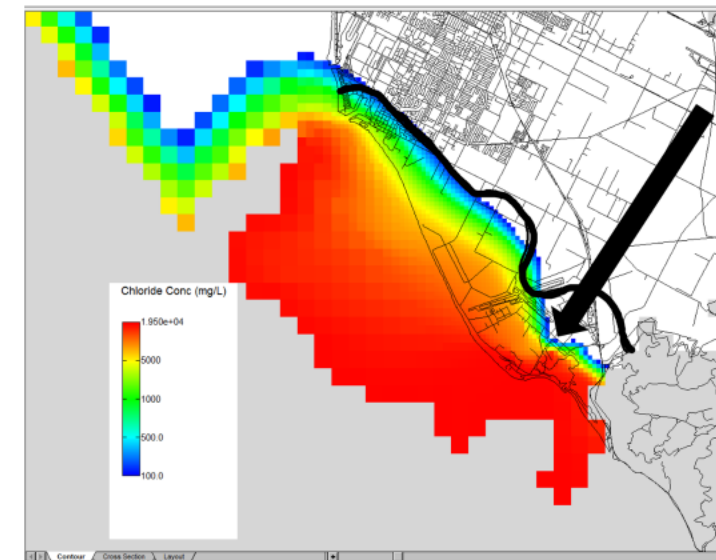
2019 Prop 1 Grant Funded Feasibility Study Included Groundwater Modeling



No Action



3.5K



10K

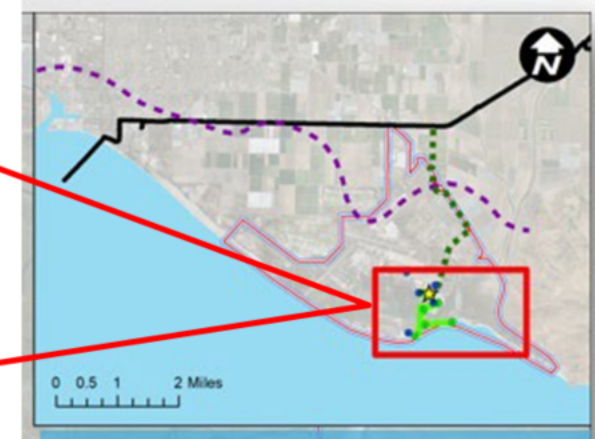
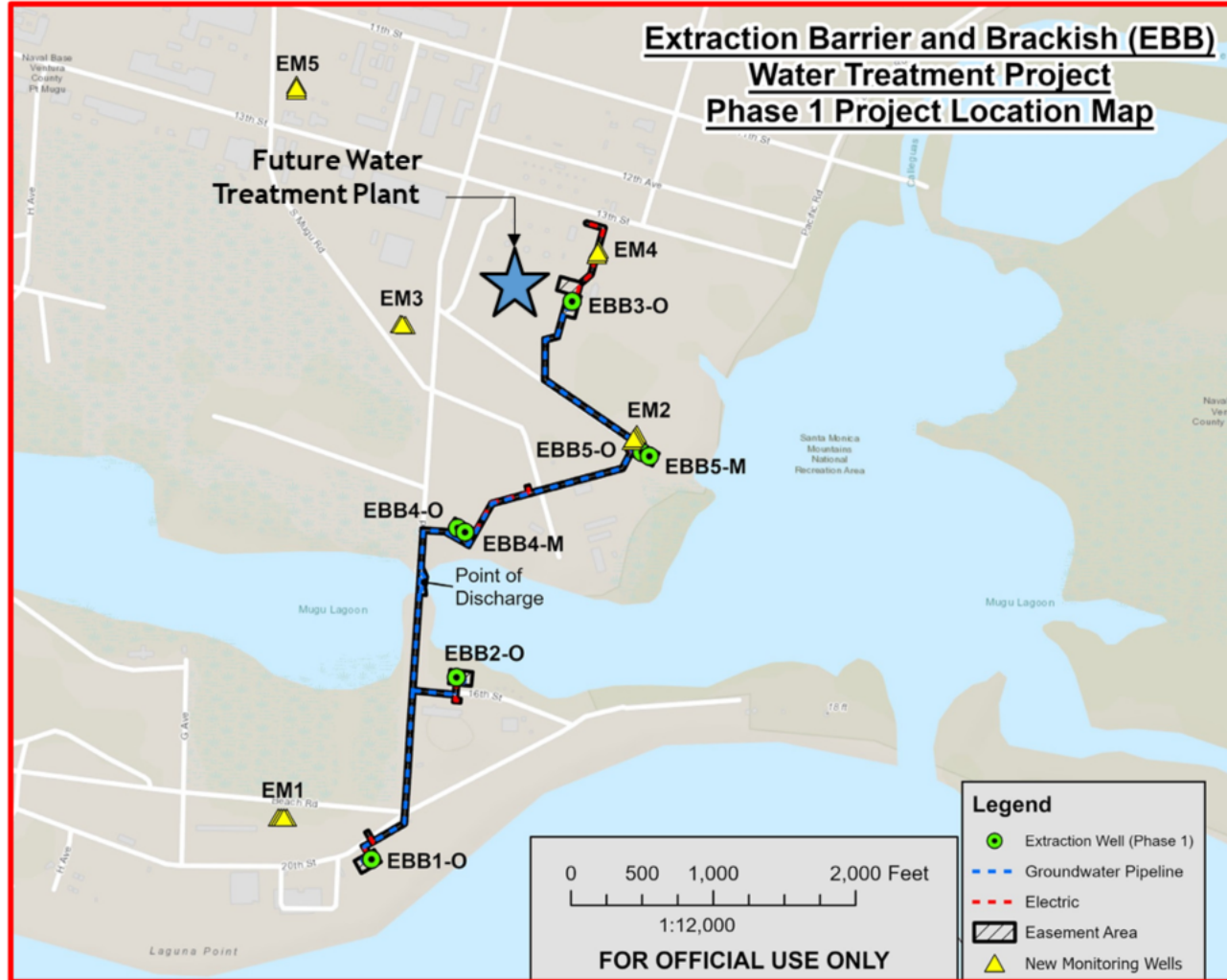
***5K, 15K and 20K scenarios not shown**
****50 year simulation period**

Collaborative Approach

- Signed MOA (Phase 1) with U.S. Navy (Nov 9, 2023)
- Secured two license agreements for Phase 1 design, documentation & wells
- Received \$8.45M SWRCB Groundwater Grant
- Conducted first TAC meeting as part of SWRCB Funding
- Highlighted by DWR in California Water Plan
- Included in FCGMA's GSP Annual Updates

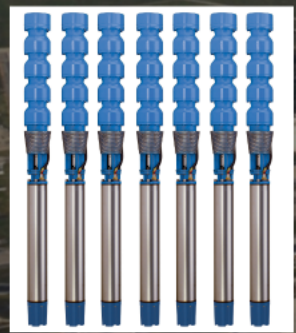


Collaborative Approach



EBB Water Treatment Project Implementation

Phase 1

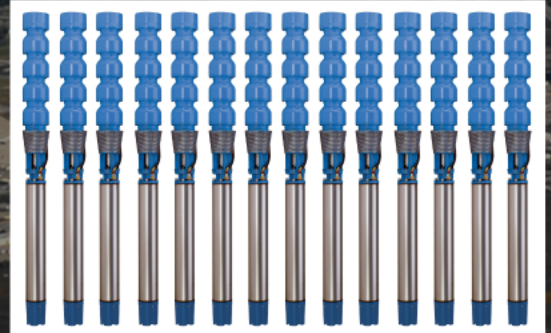


Extraction Wellfield
3,500 AFY or 3.1 MGD



Discharge to
Mugu Lagoon

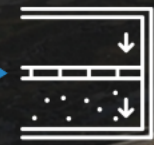
Phase 2 (Pre-Decisional)



Extraction Wellfield
Capacity TBD



Treatment



Concentrate

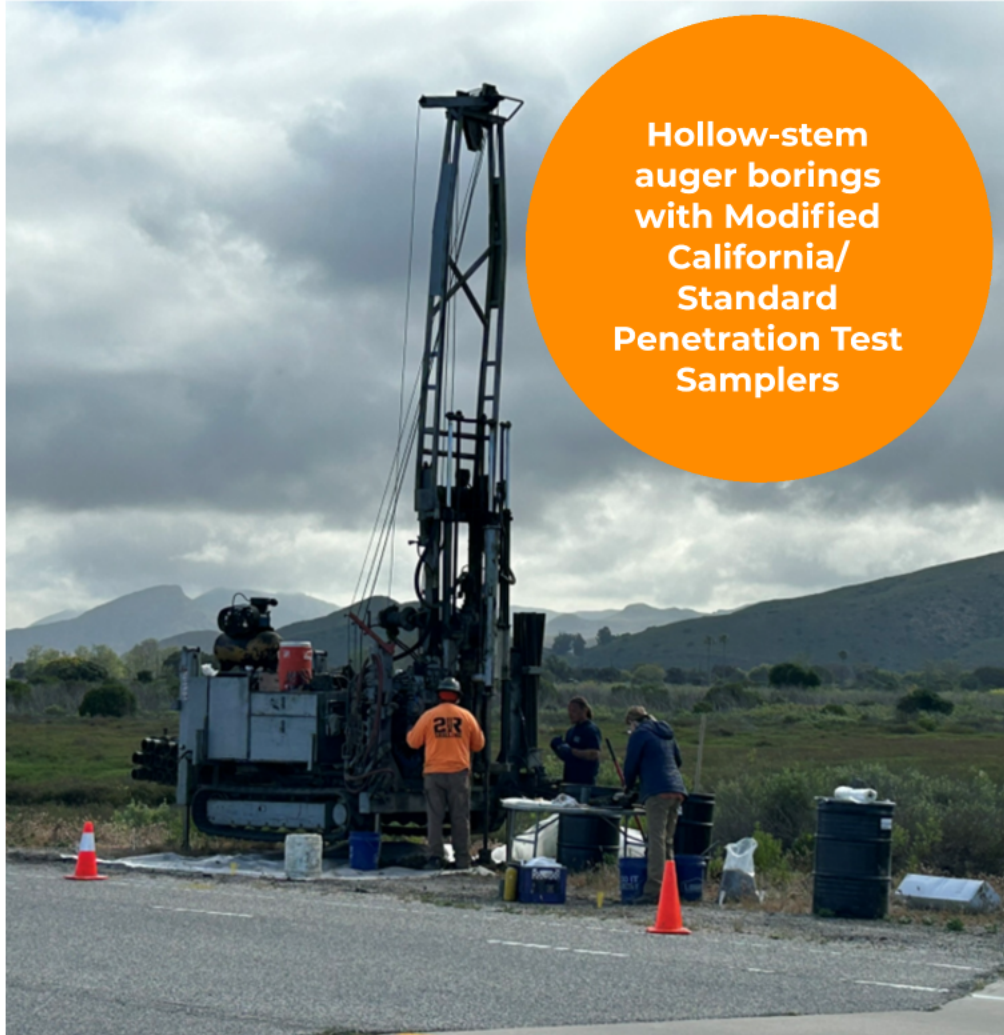
Salinity
Management
Pipeline



Distribution

NBVC Point
Mugu and
Oxnard Plain
Users

Geotechnical Field Investigation

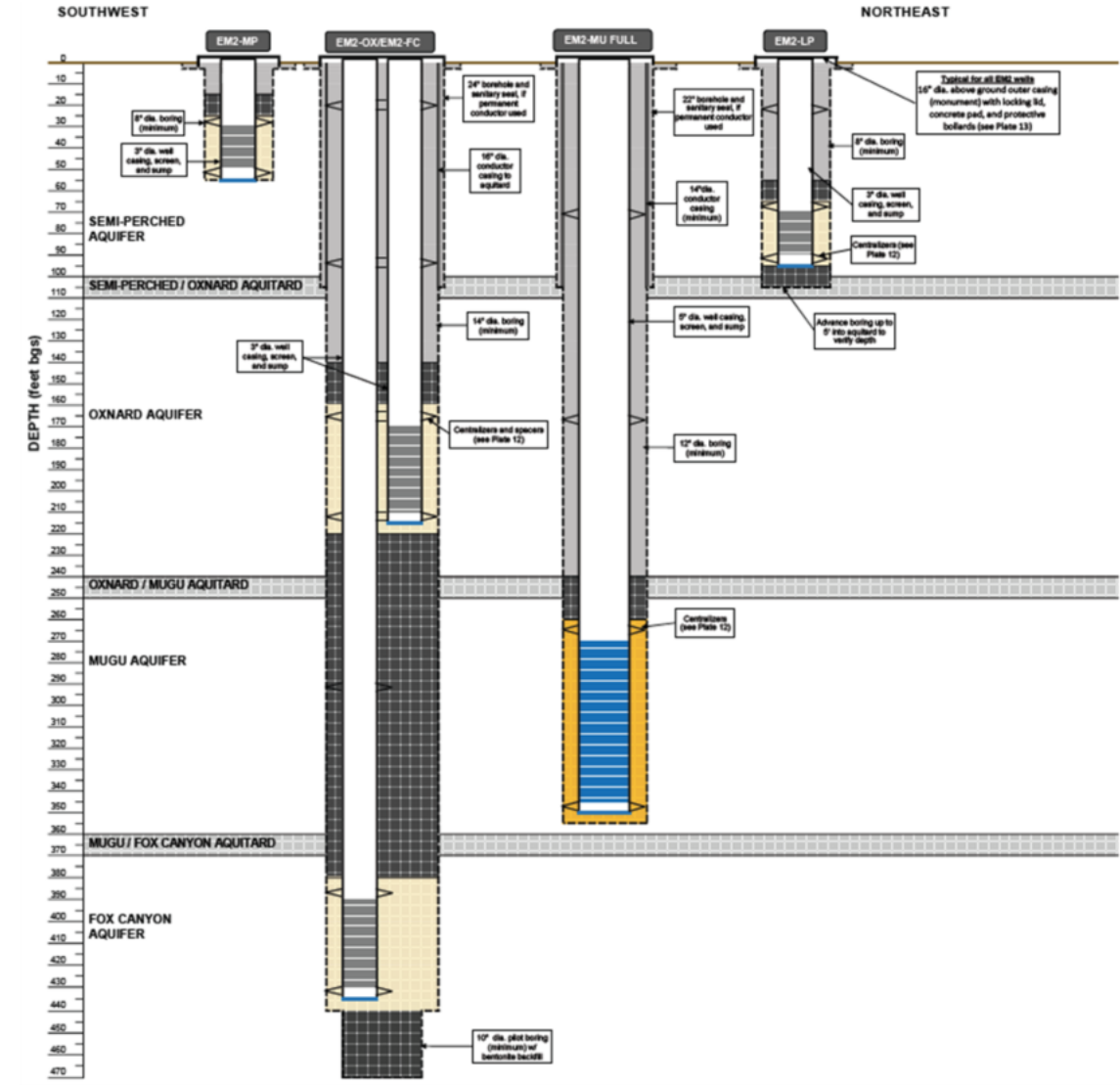


Hollow-stem
auger borings
with Modified
California/
Standard
Penetration Test
Samplers



Cone
Penetrometer
Testing

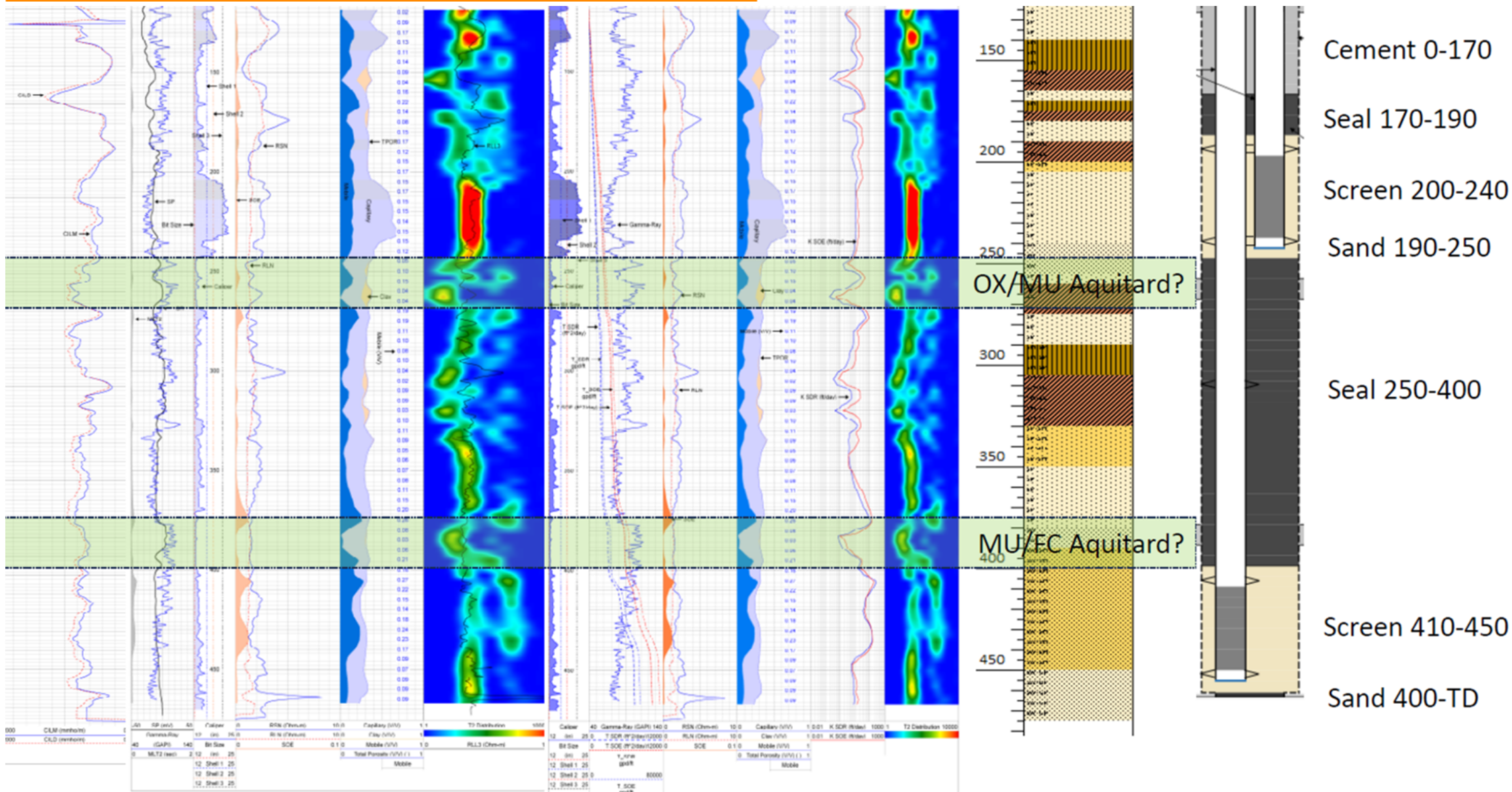
State and Local Collaboration: Monitoring Well Construction



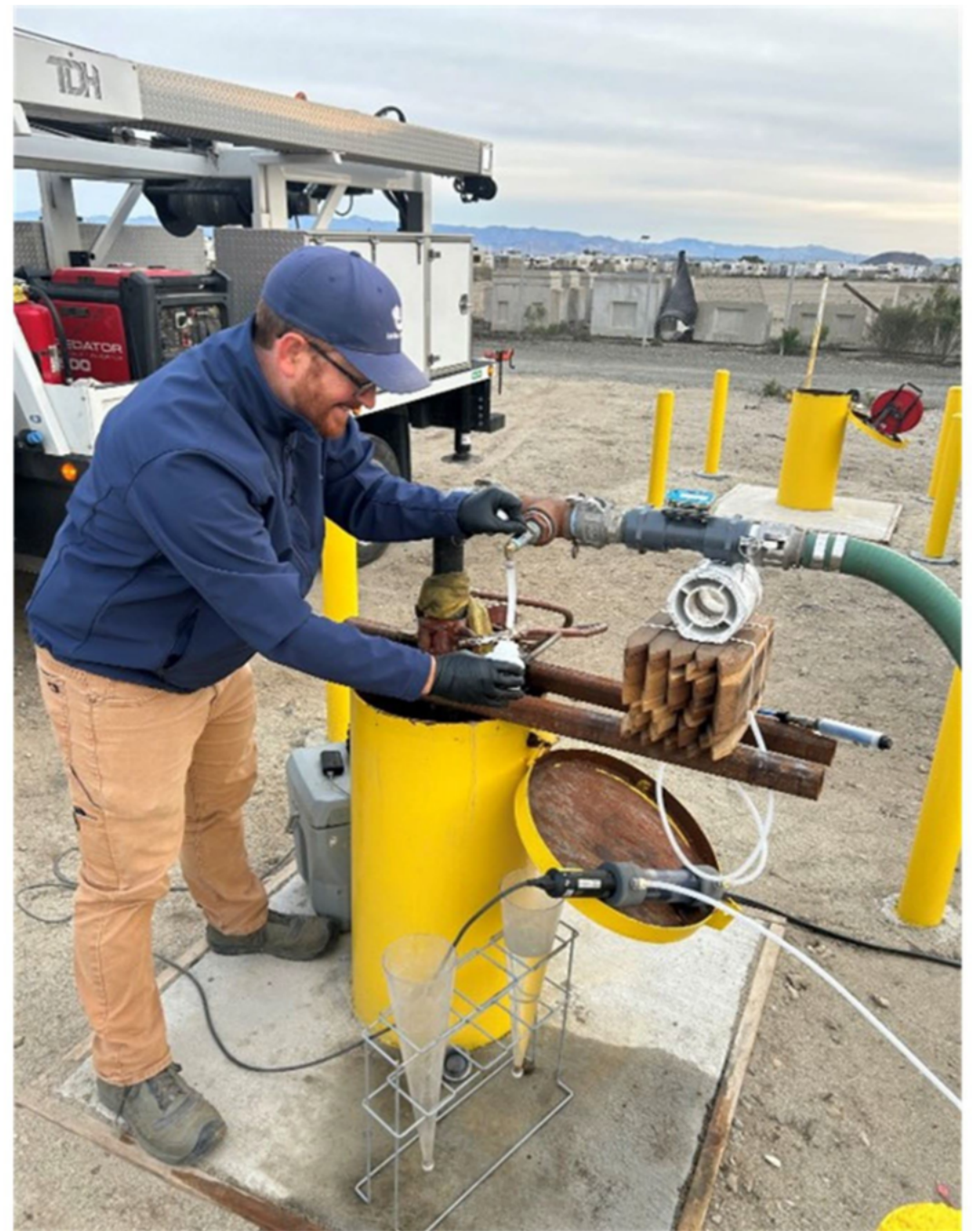
Boreholes provide data for extraction well design



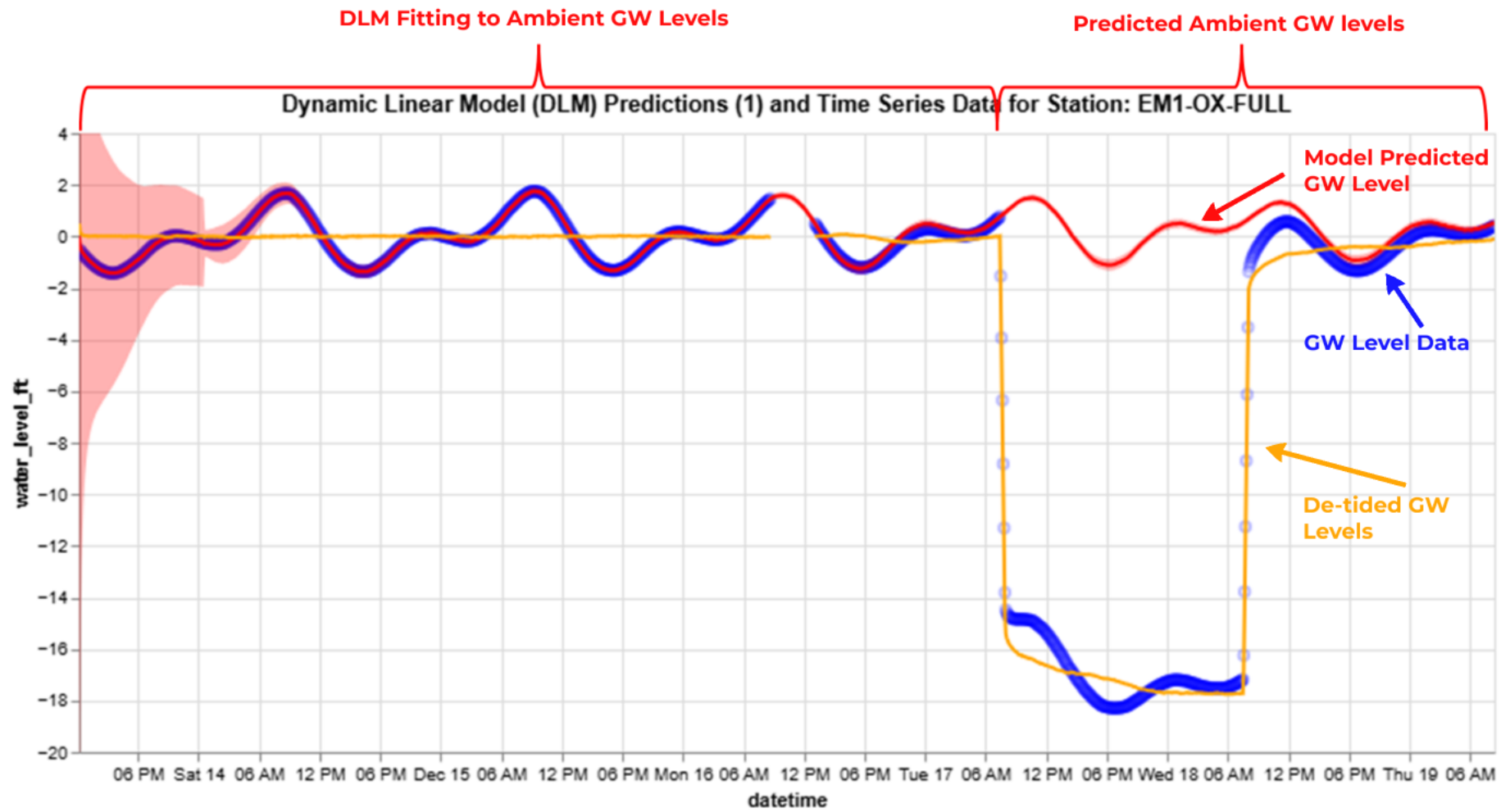
Boreholes provide data for extraction well design



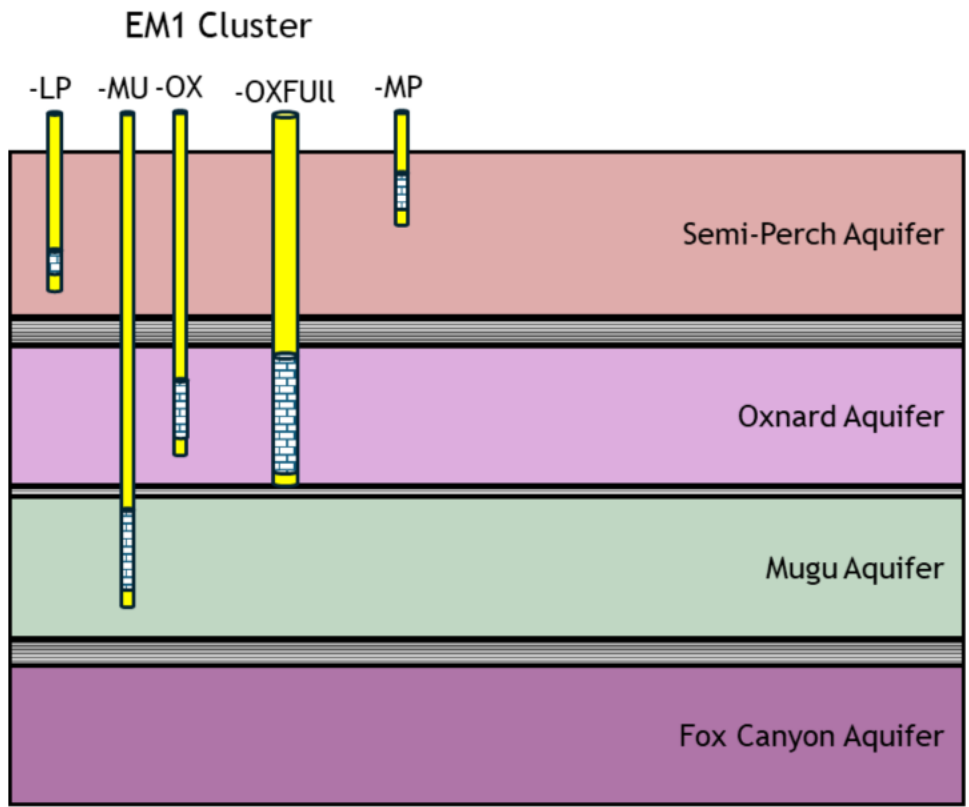
24 Hour Pump Set



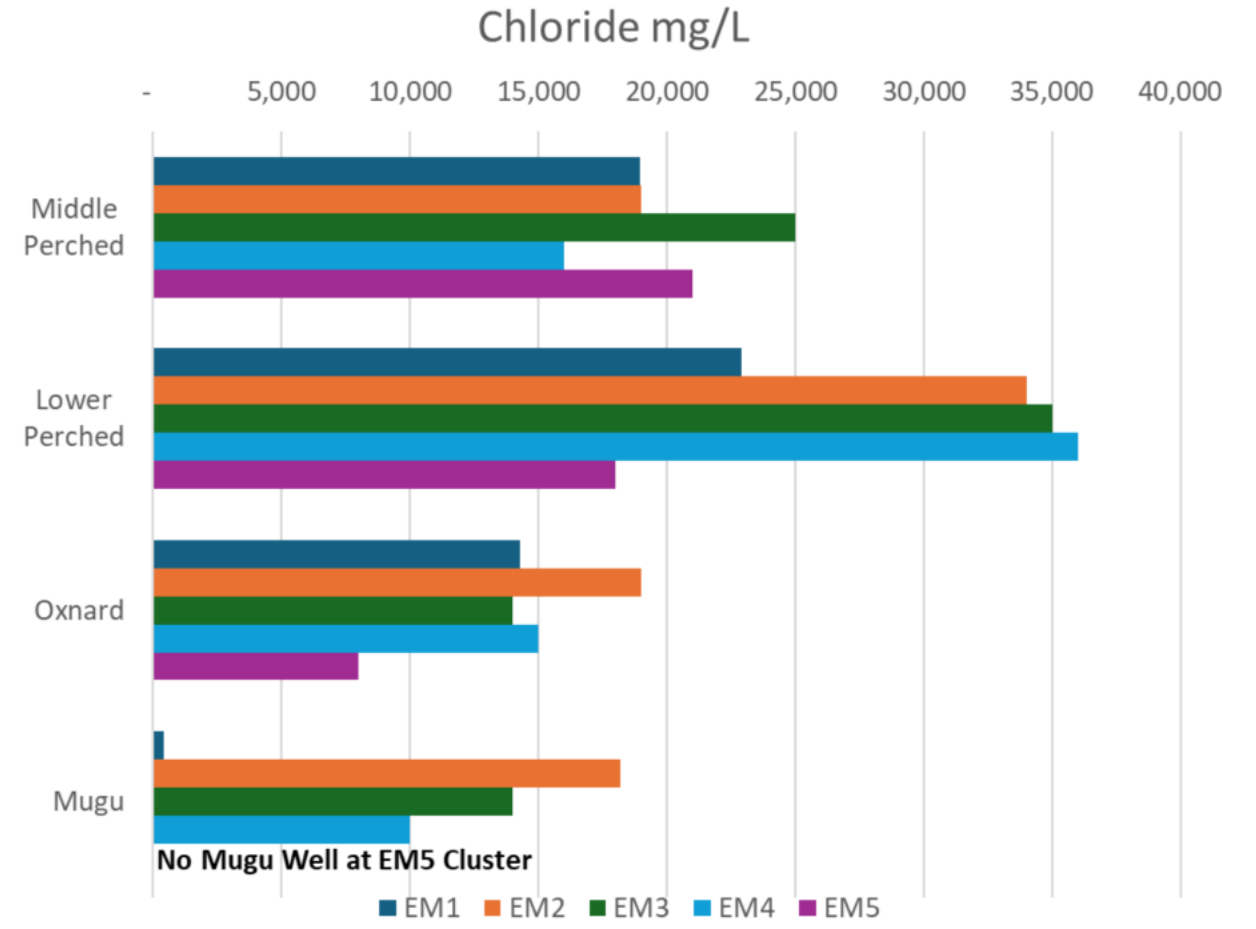
24 Hour Pump Set



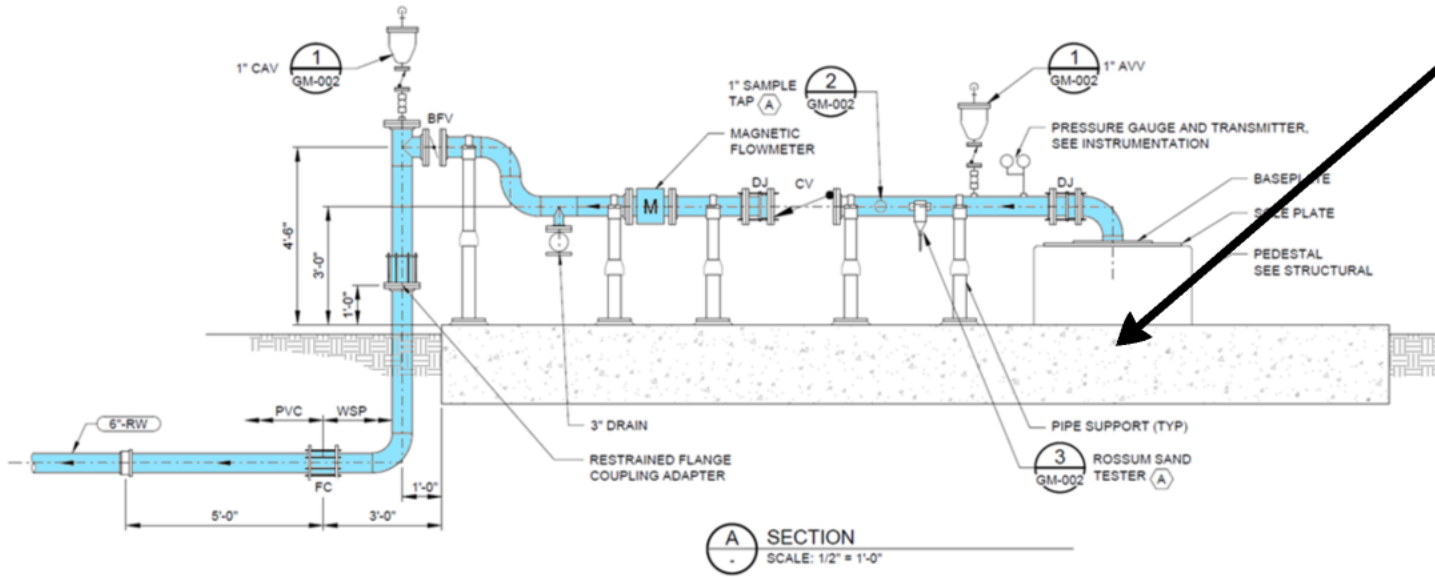
Water Quality Data Collection



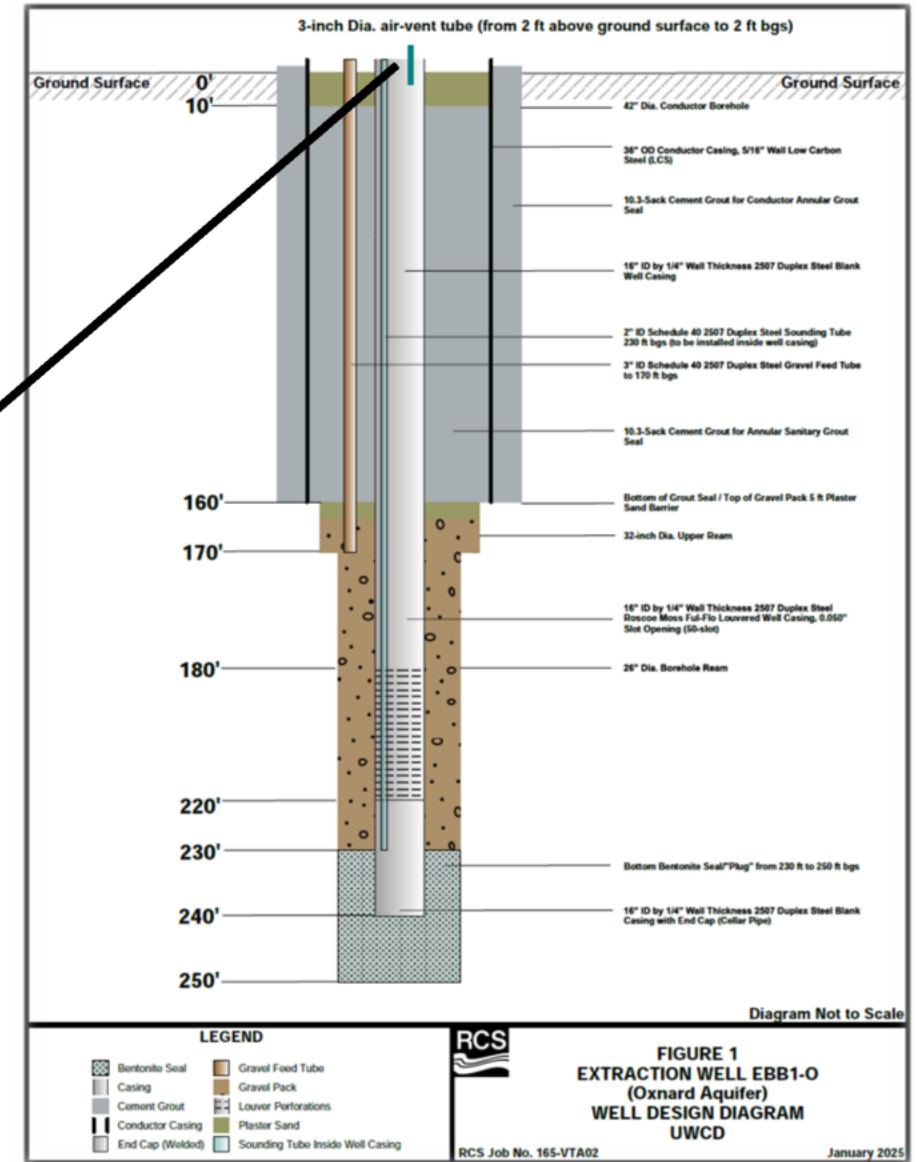
New Monitoring Wells



Extraction Wells



**30% Design Level
(Pre-Decisional)**



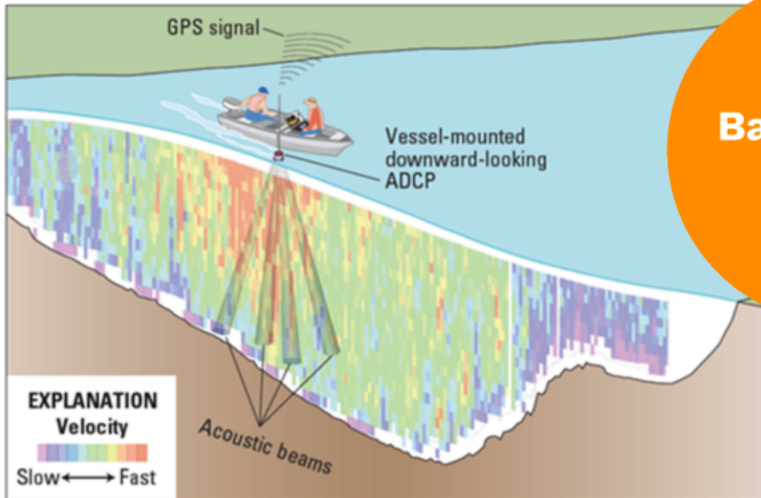
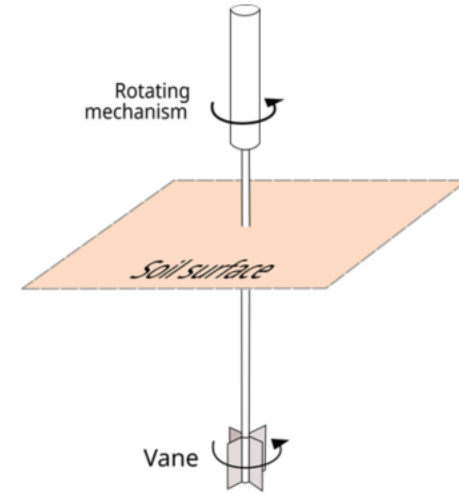
Field Studies



Single-beam echosounder with RTK-GPS



Shear Vane Testing

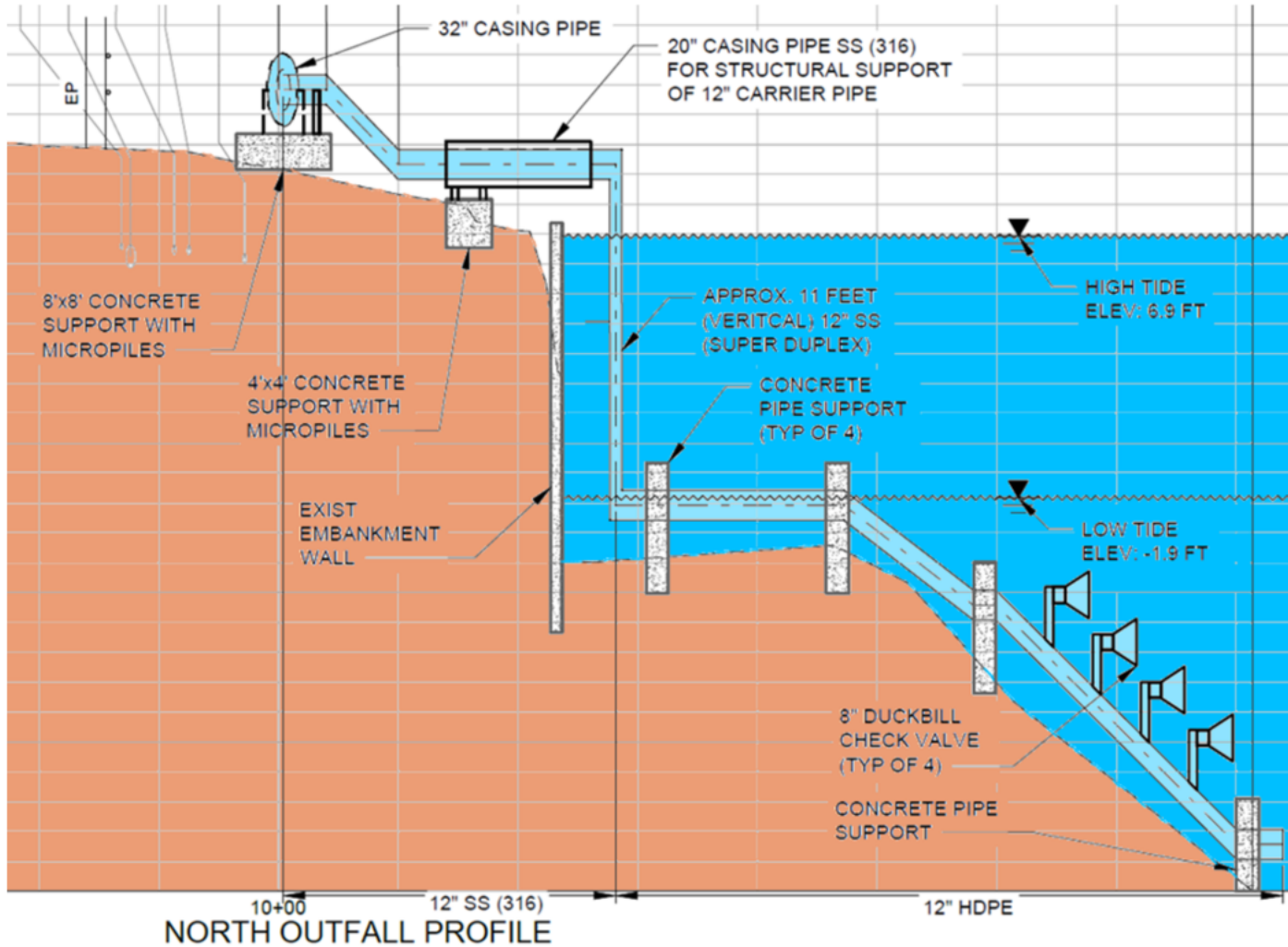


Bathymetry Study



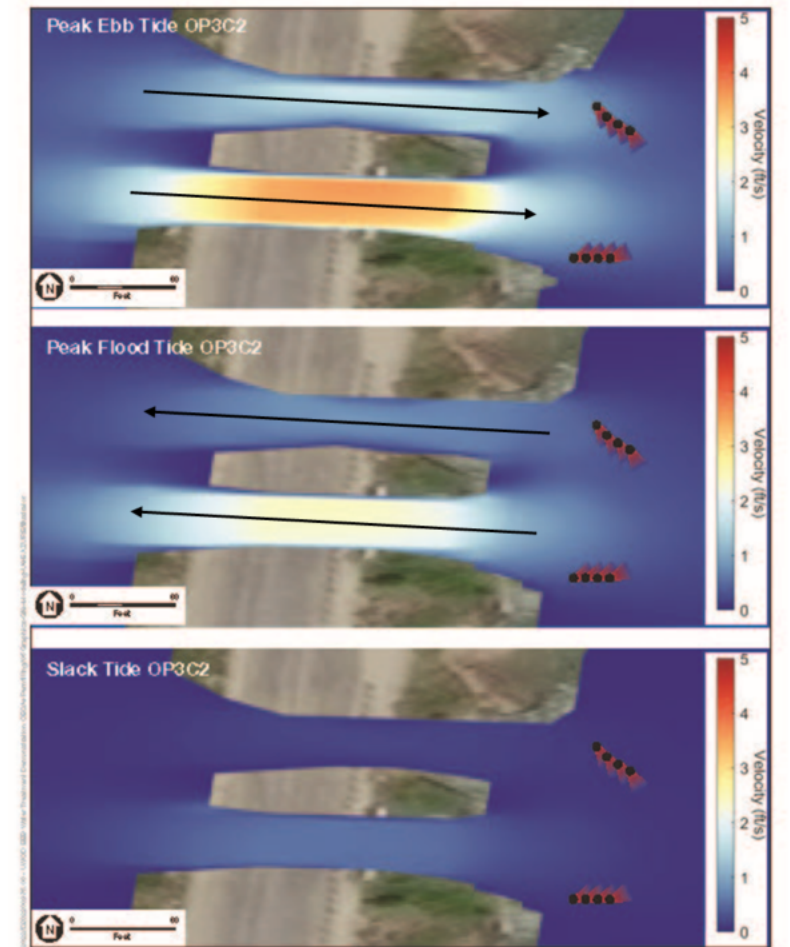
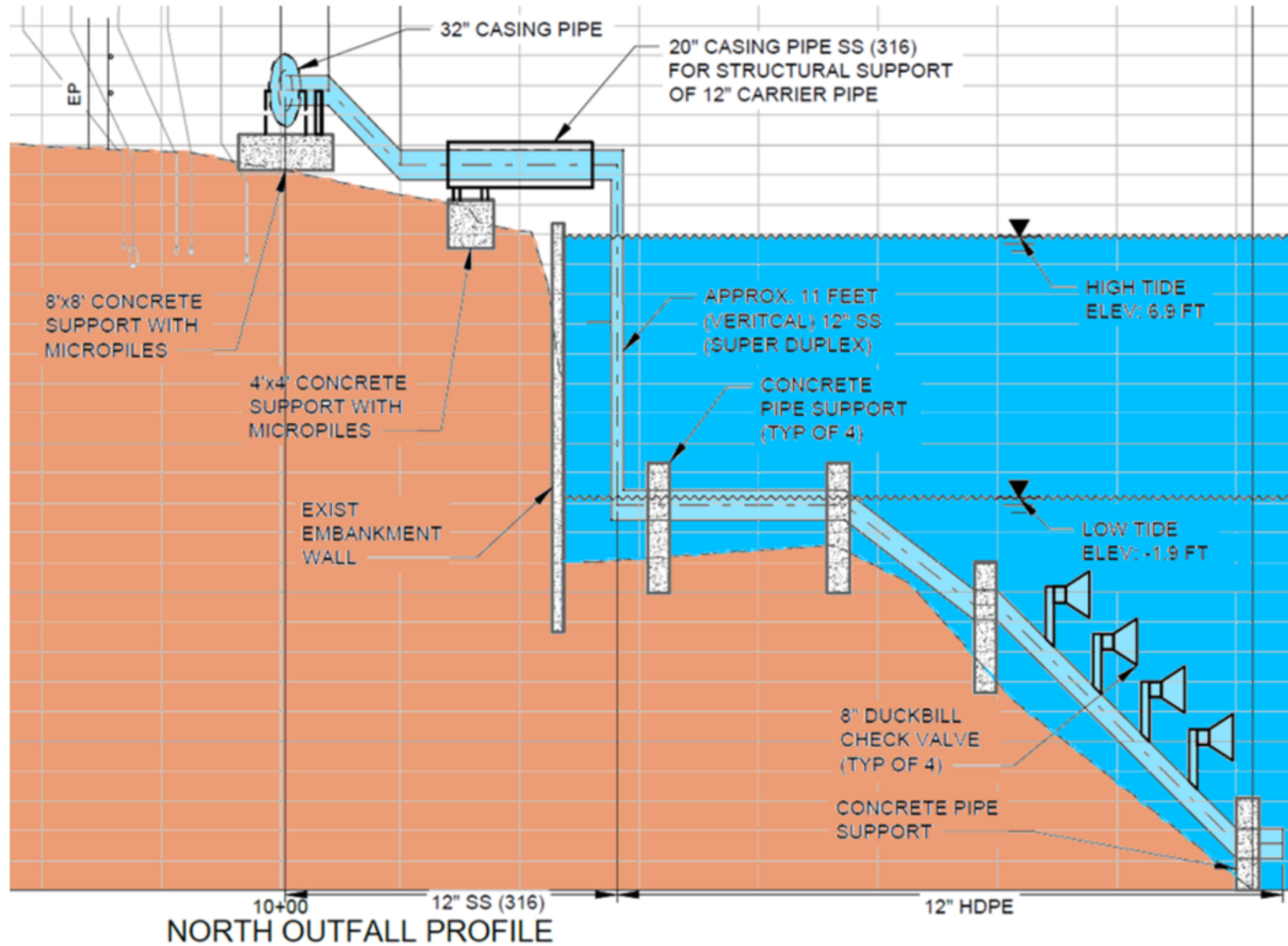
Acoustic Doppler Current Profiler

Discharge Facility



30% Design Level (Pre-Decisional)

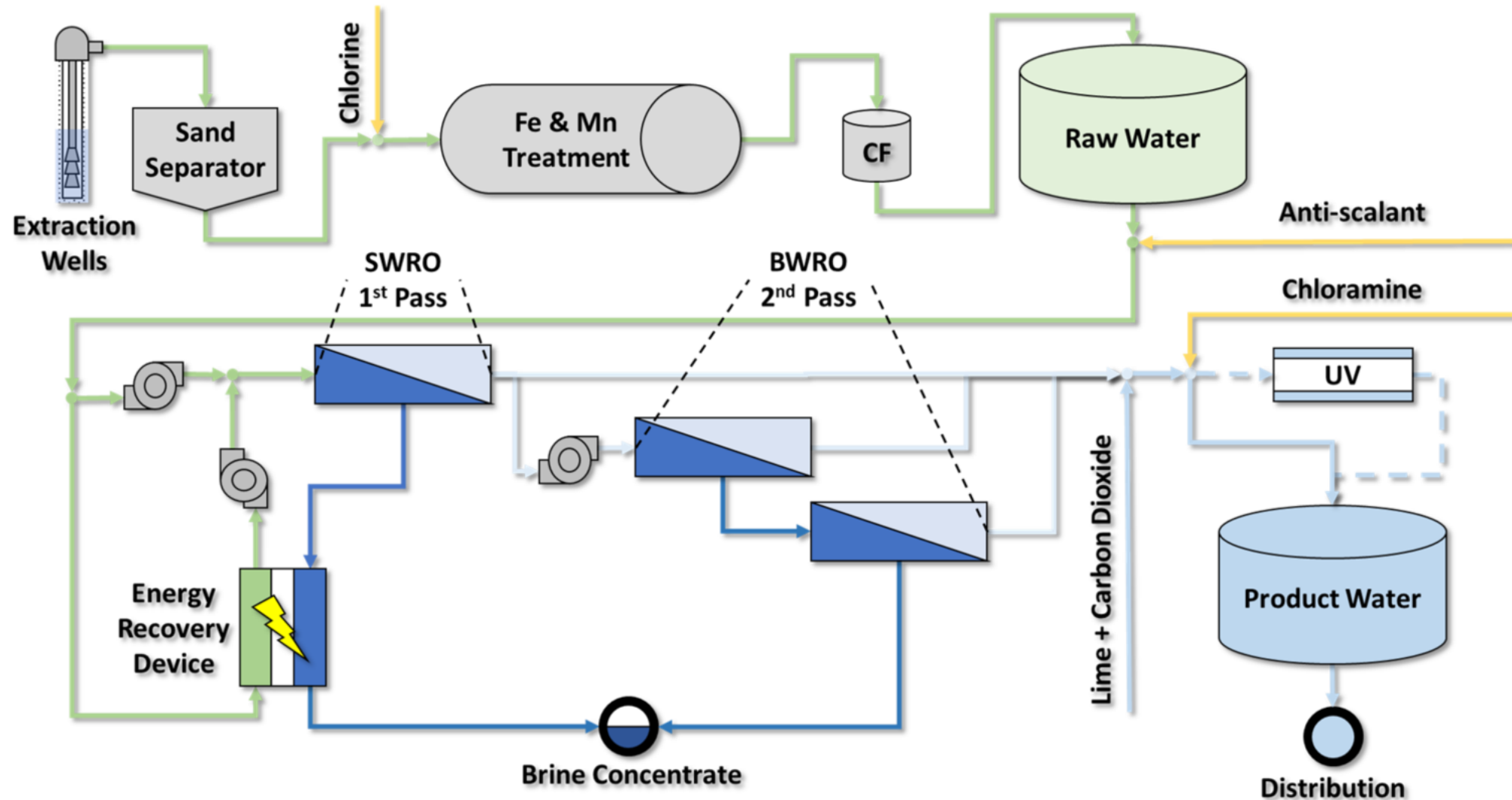
Discharge Facility



30% Design Level (Pre-Decisional)

Conceptual Treatment

Pre-Decisional



Conceptual Treatment

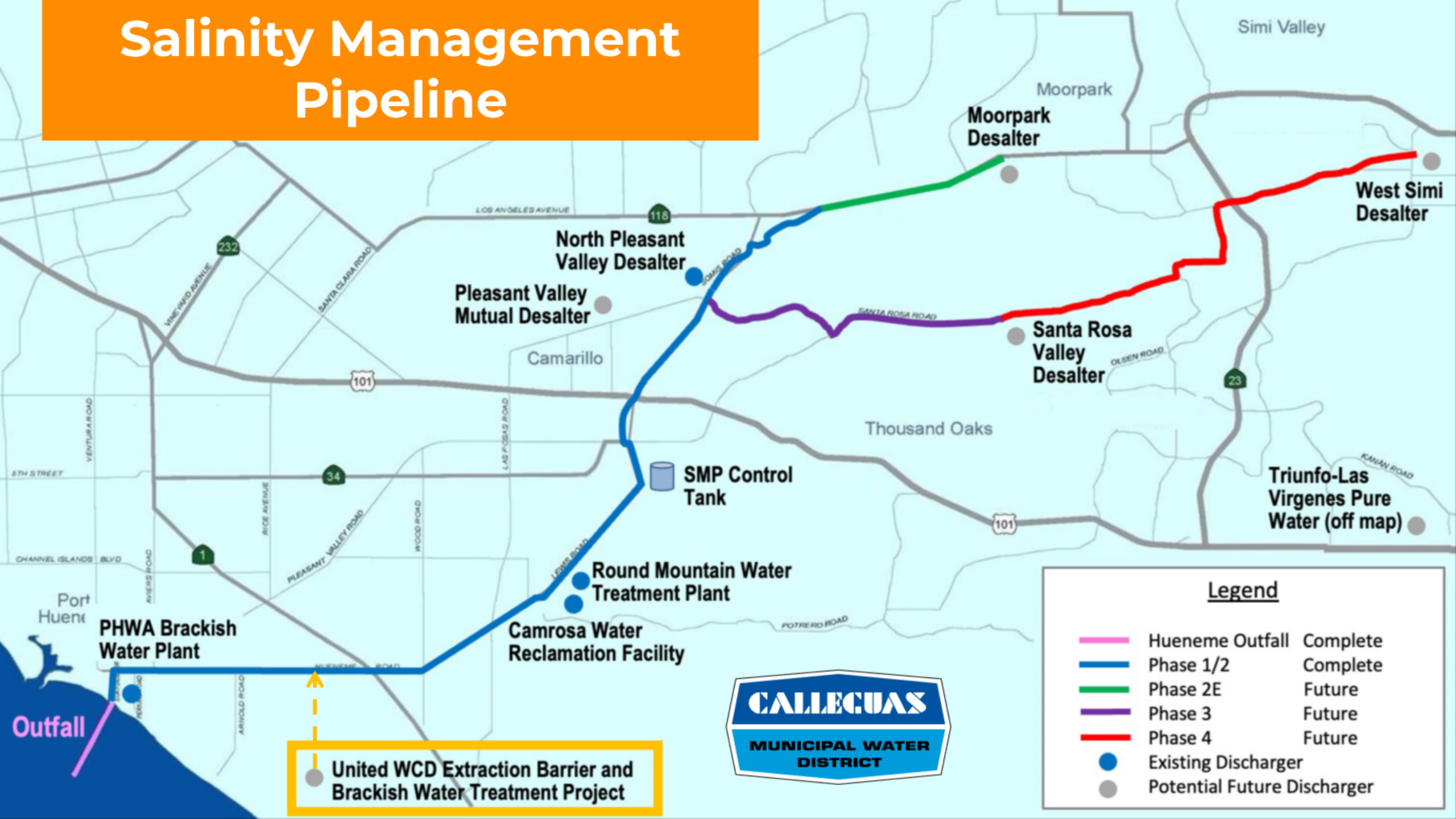
Pre-Decisional

Category	Parameter	100% Seawater	50/50 Blend
Raw Water	TDS (mg/L)	35,000	18,000
	Chloride (mg/L)	17,000	9,000
	Iron ($\mu\text{g/L}$)	8,000	4,000
	Manganese ($\mu\text{g/L}$)	700	500
Overall Recovery		48	67
Permeate	TDS (mg/L)	50-110	40-90
	Chloride (mg/L)	30-70	20-50
Concentrate	TDS (mg/L)	67,000-79,000	55,000-63,000
	Chloride (mg/L)	38,000-44,000	30,000-35,000

Transition Over Time



Salinity Management Pipeline



EBB Water Treatment Project Implementation

Phase 1



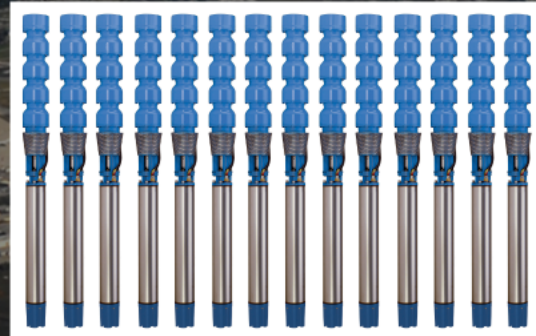
Extraction Wellfield
3,500 AFY or 3.1 MGD



Discharge to
Mugu Lagoon

\$51.3 M

Phase 2 (Pre-Decisional)



Extraction Wellfield
Capacity TBD

\$360 M



Treatment



Concentrate

Salinity
Management
Pipeline



Distribution

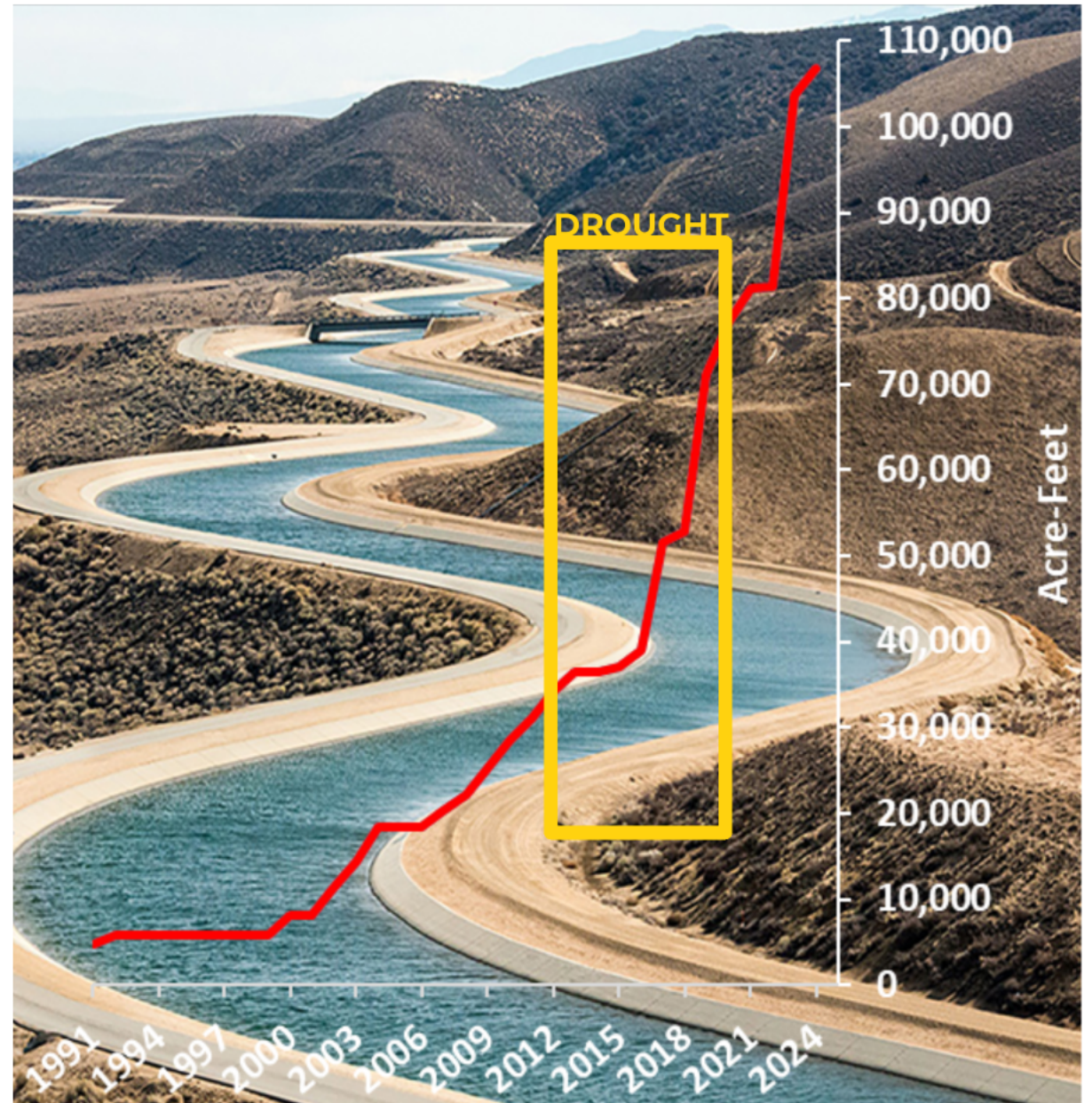
NBVC Point
Mugu and
Oxnard Plain
Users

Challenges

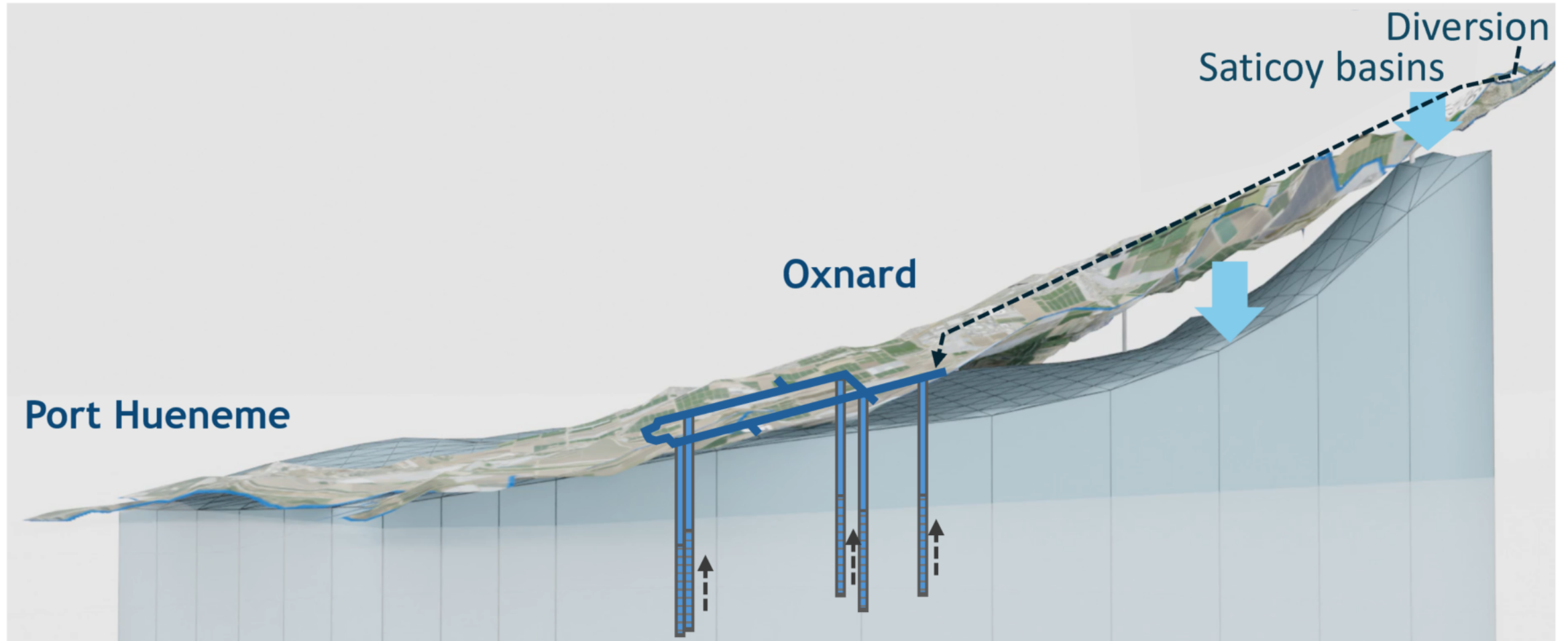
- | | | |
|-------------------------------|---|--|
| ✓ Stop Seawater Intrusion | ➔ | Build Extraction Barrier |
| ✓ Extraction Barrier Location | ➔ | <ul style="list-style-type: none">• At the Source of Seawater Intrusion• Regional Project• Collaboration with the U.S. Navy |
| ✓ Project Implementation | ➔ | <ul style="list-style-type: none">• Multiphase• Phase 1 - Extraction Barrier• Phase 2 - Treatment, Distribution, and Concentrate Disposal |
| ■ Funding | ➔ | <ul style="list-style-type: none">• \$8.45M - SWRCB GWGP Grant• Additional Funding Needed |

State Water Project

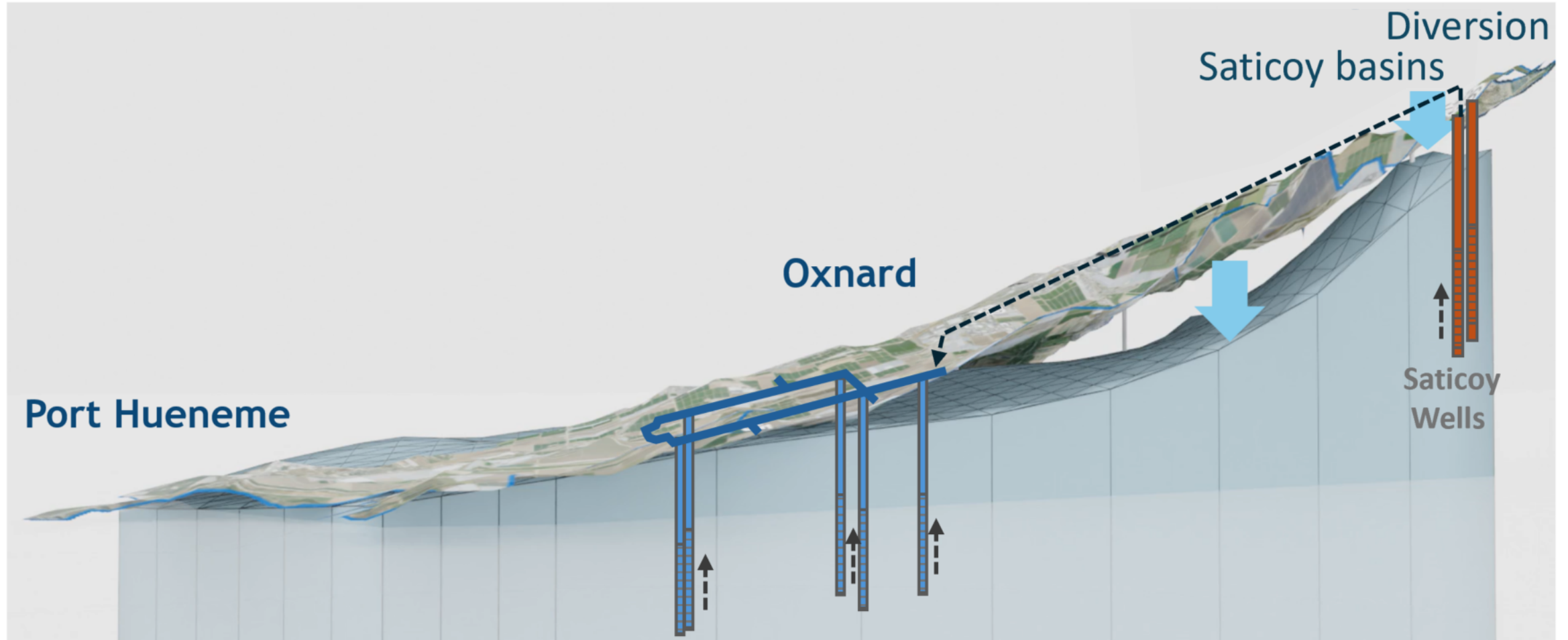
- Approx. 107,000 AF or 35 Billion Gallons Imported Water (since 1991)
- Additional 99,700 AF or 33 Billion Gallons Flood Flow releases from Castaic (2017-2025)



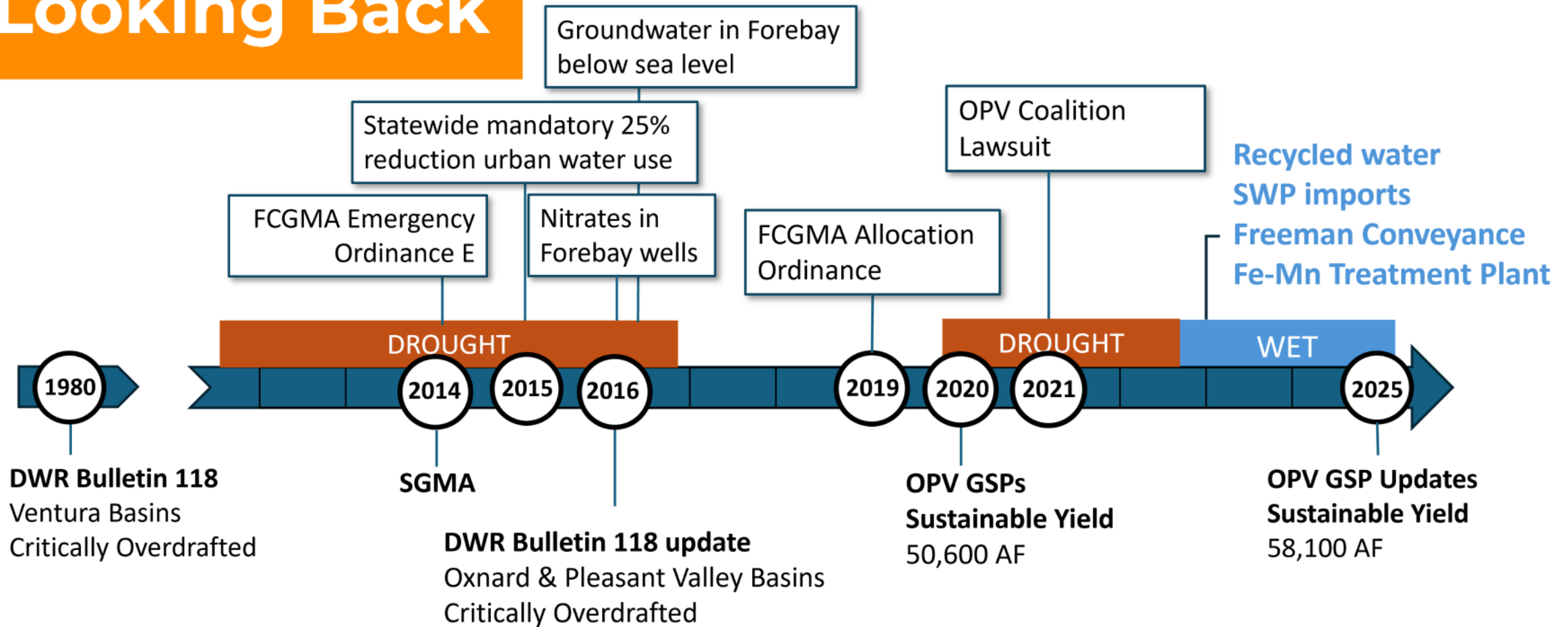
SCR Flex Program



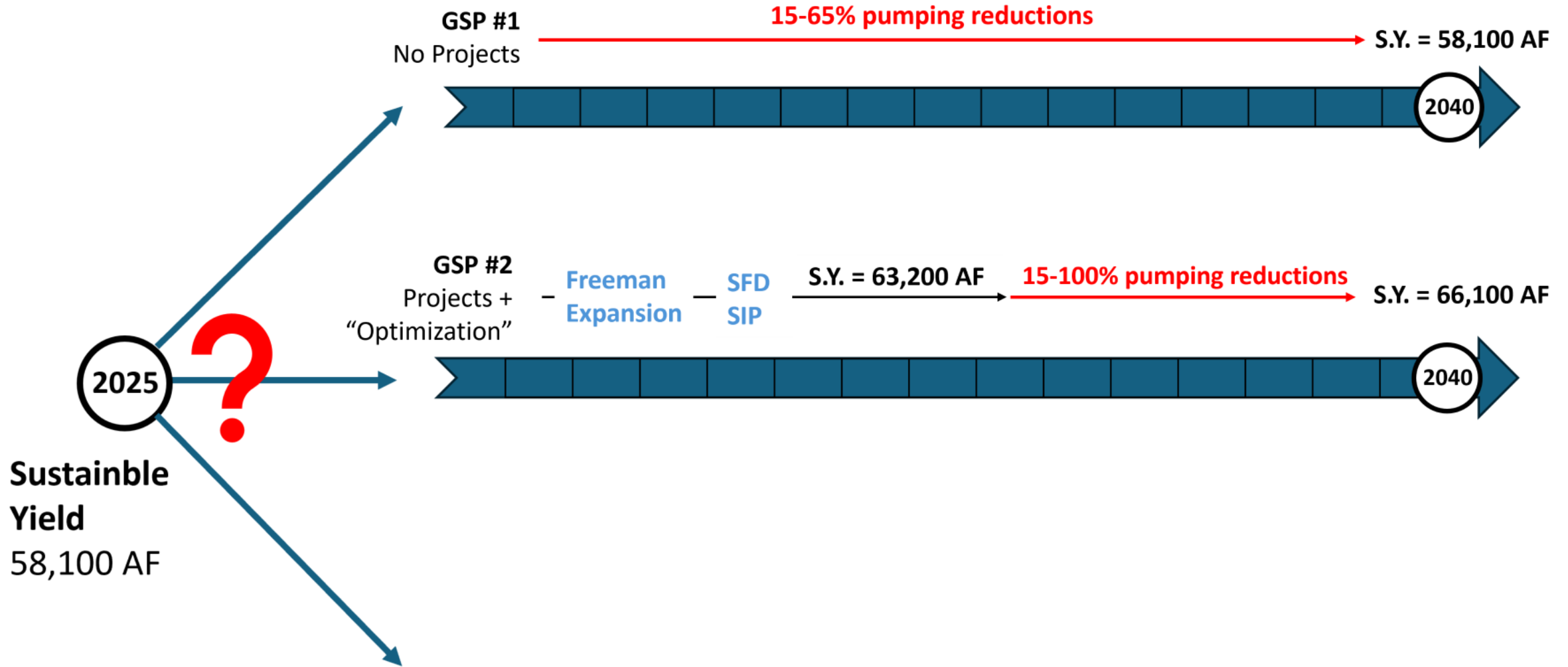
Saticoy Storage Program



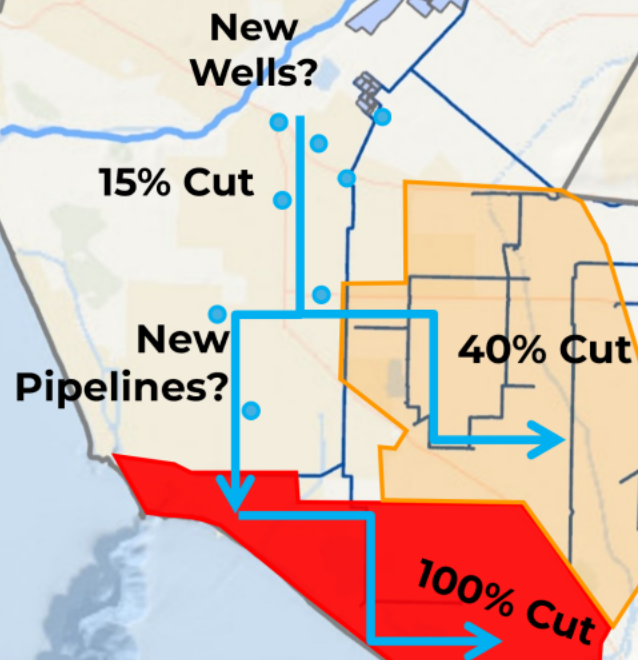
Looking Back



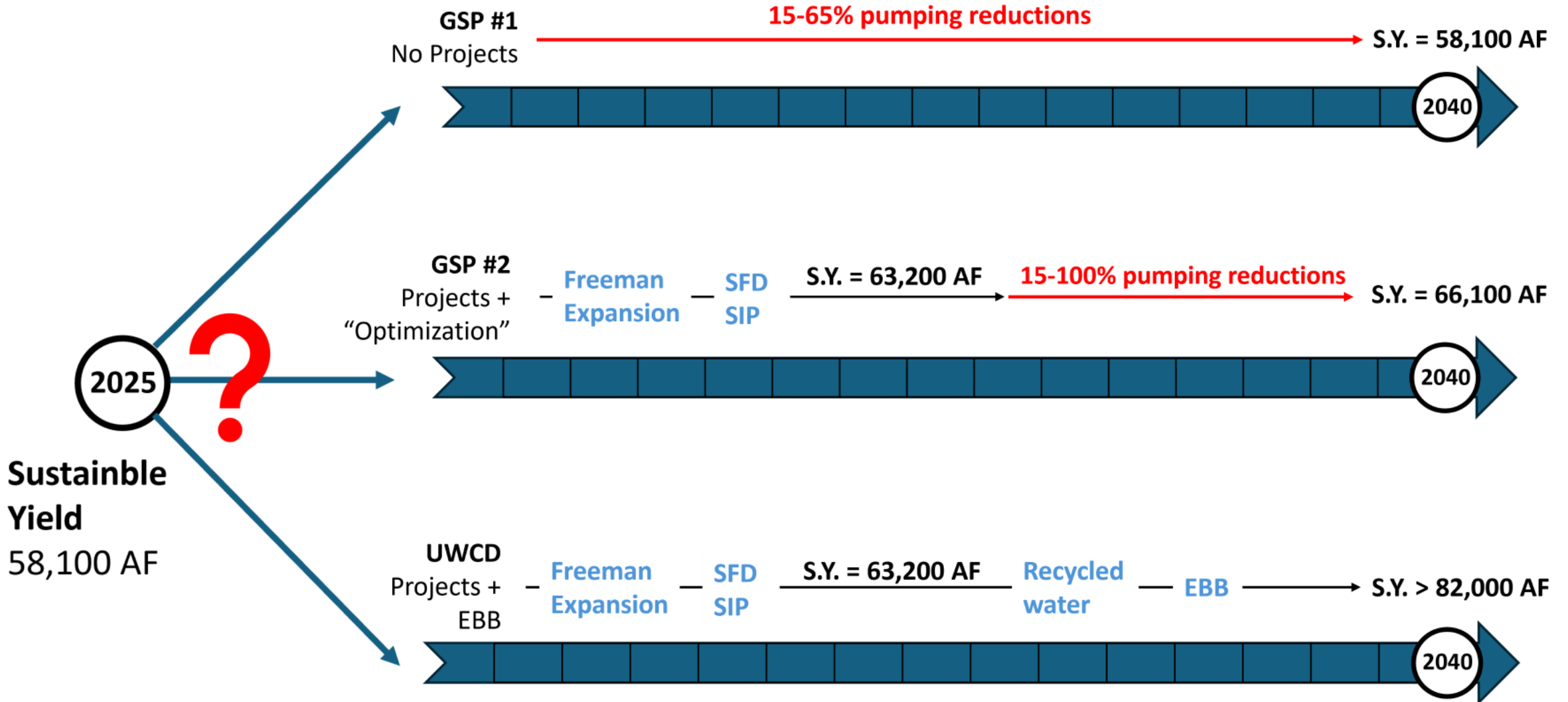
Looking Ahead



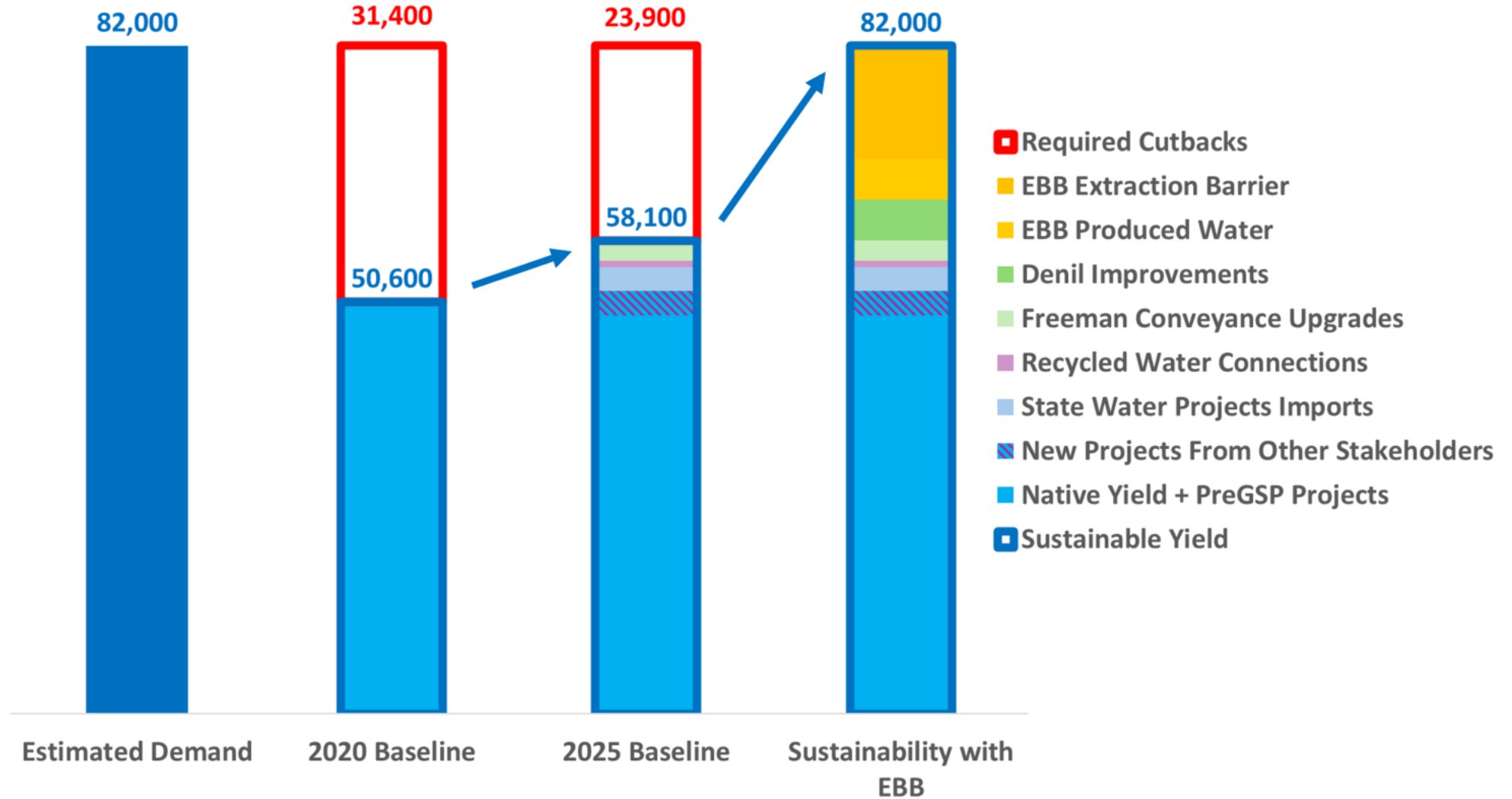
GSP #2: Projects + Optimization



Looking Ahead



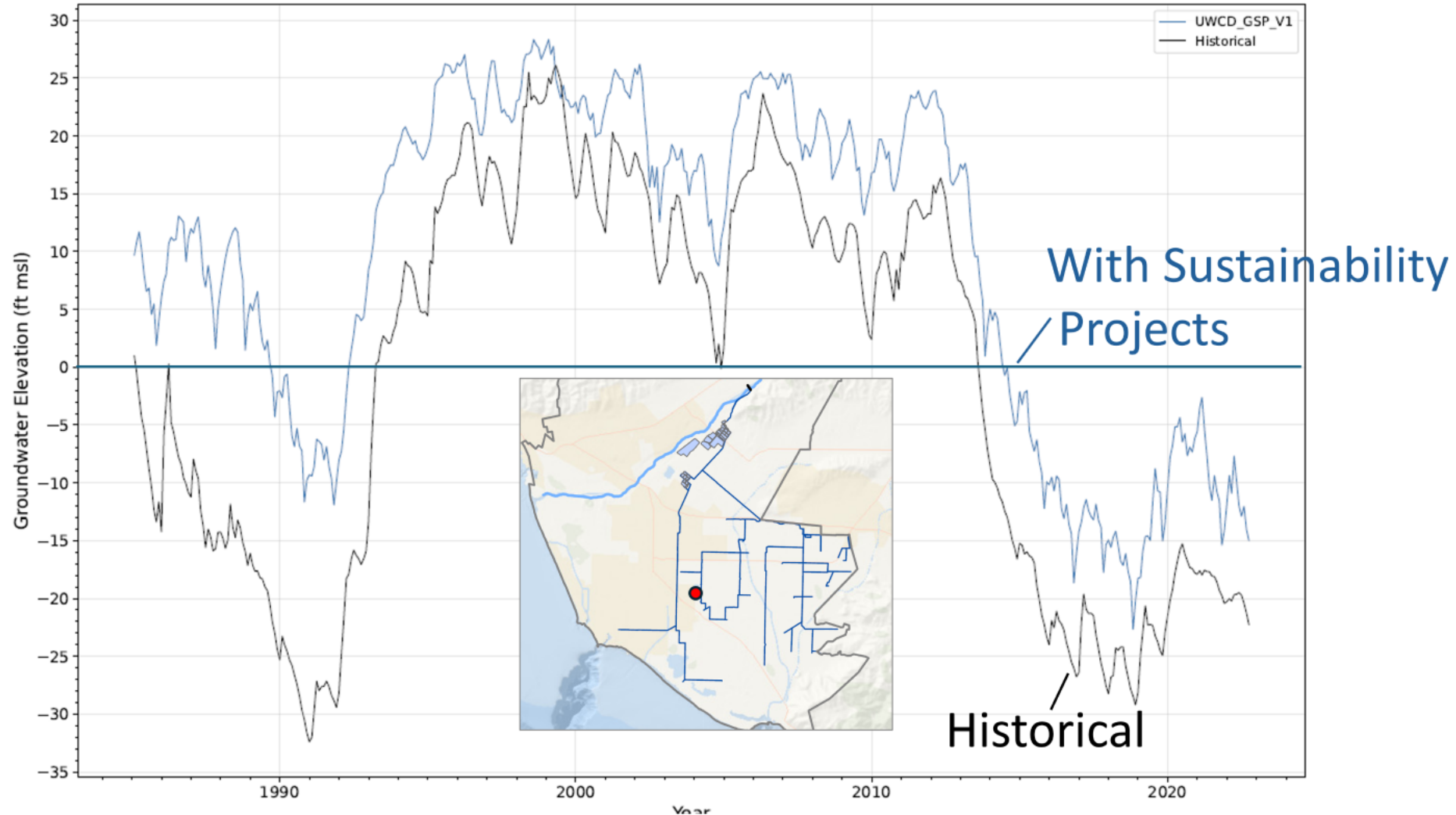
All Projects Contribute to Sustainability



Total Project Benefit

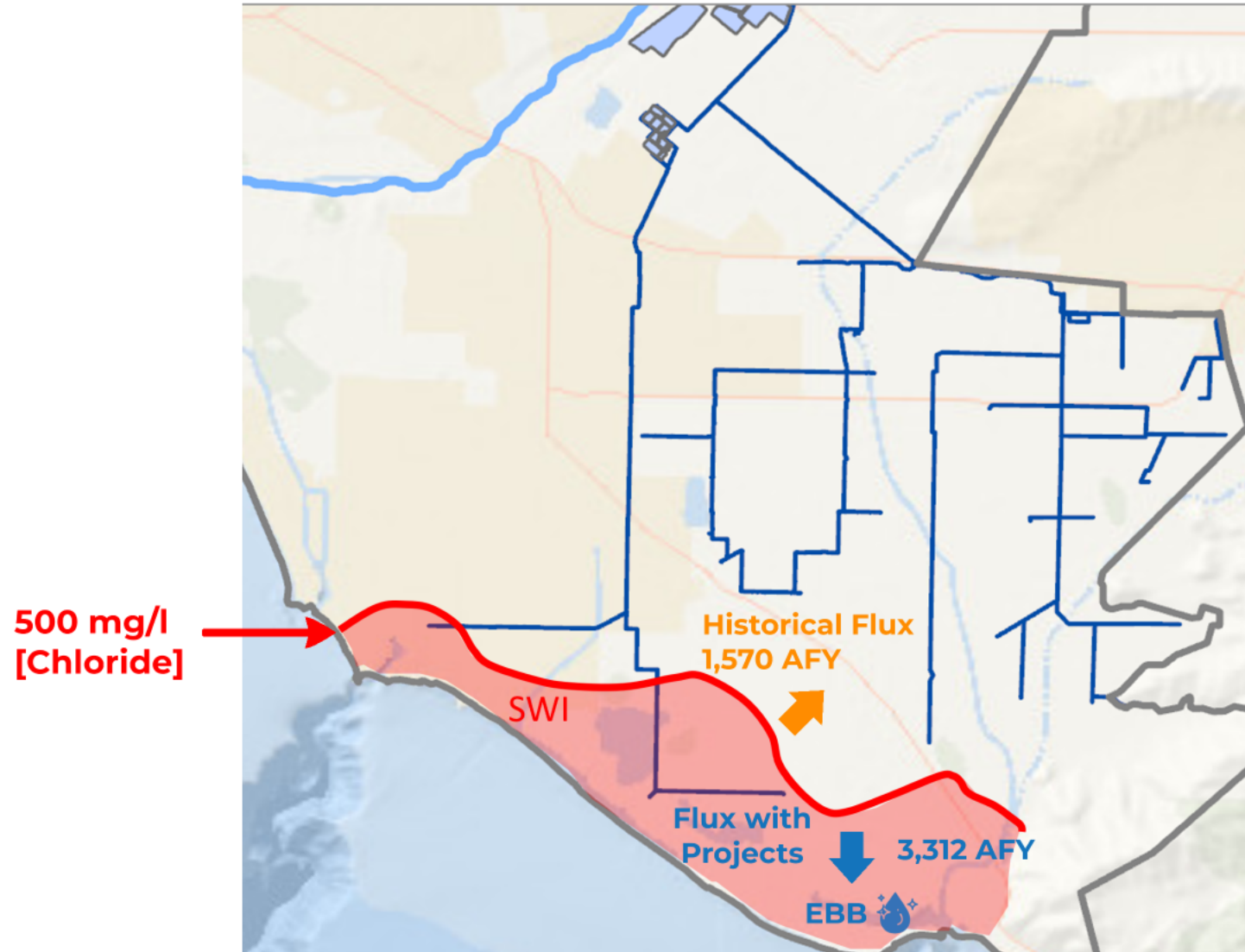
Projects increase groundwater elevations on Coastal Plain

01N22W12P01S, Screened in Oxnard Aquifer



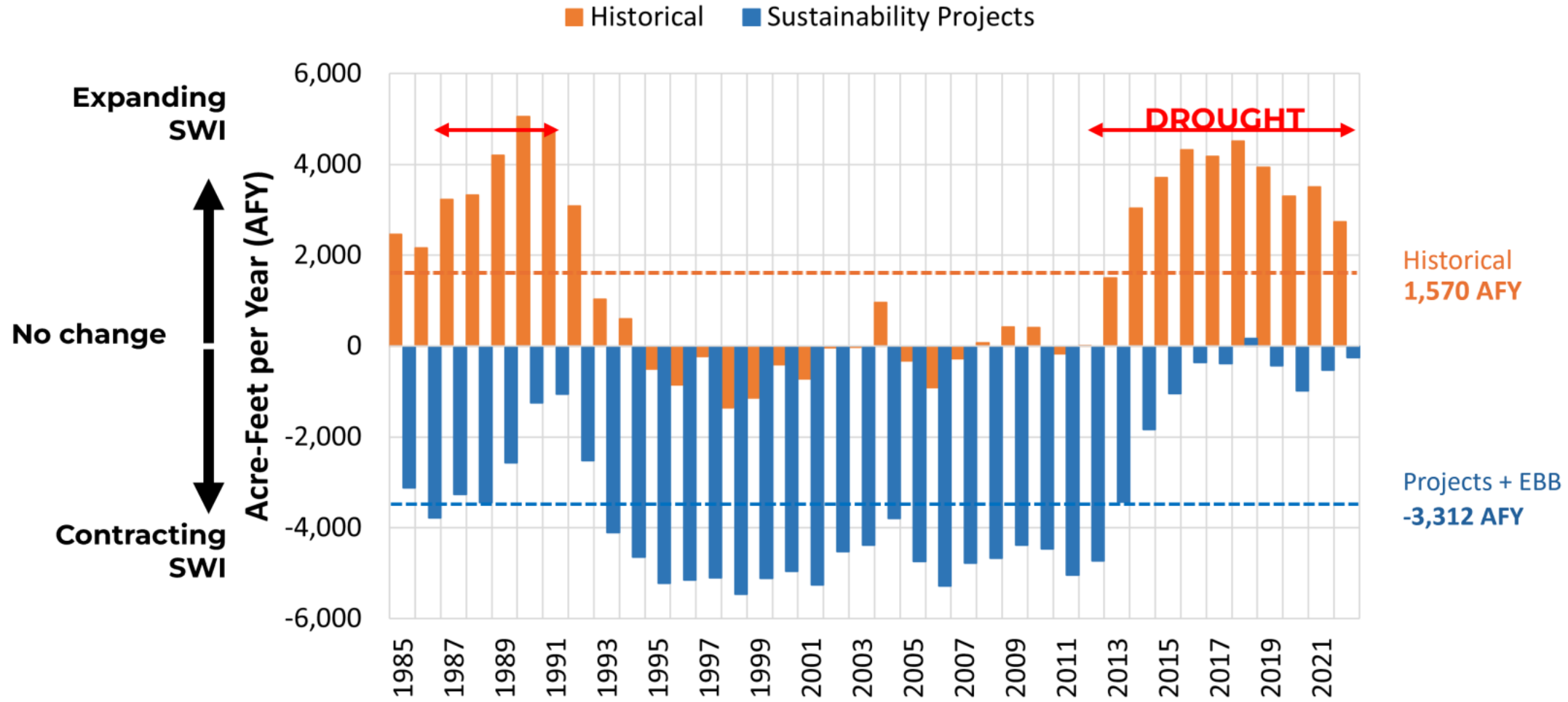
Seawater Intrusion

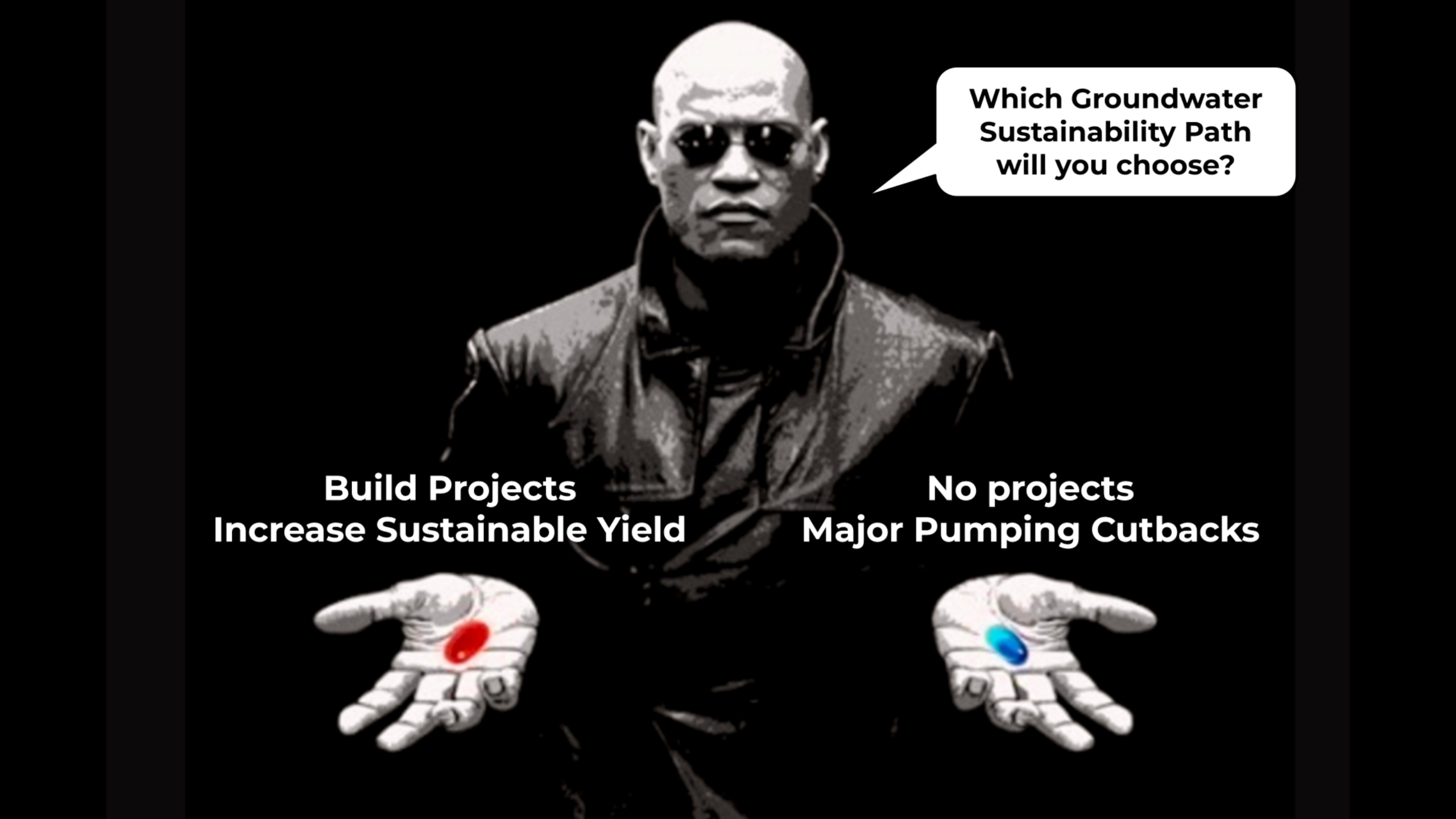
Projects reverse seawater intrusion



Seawater Intrusion

Projects reverse seawater intrusion





Which Groundwater Sustainability Path will you choose?

Build Projects
Increase Sustainable Yield

No projects
Major Pumping Cutbacks