



# Water Supply Roadmap Update

**OPERATIONS COMMITTEE  
MEETING**

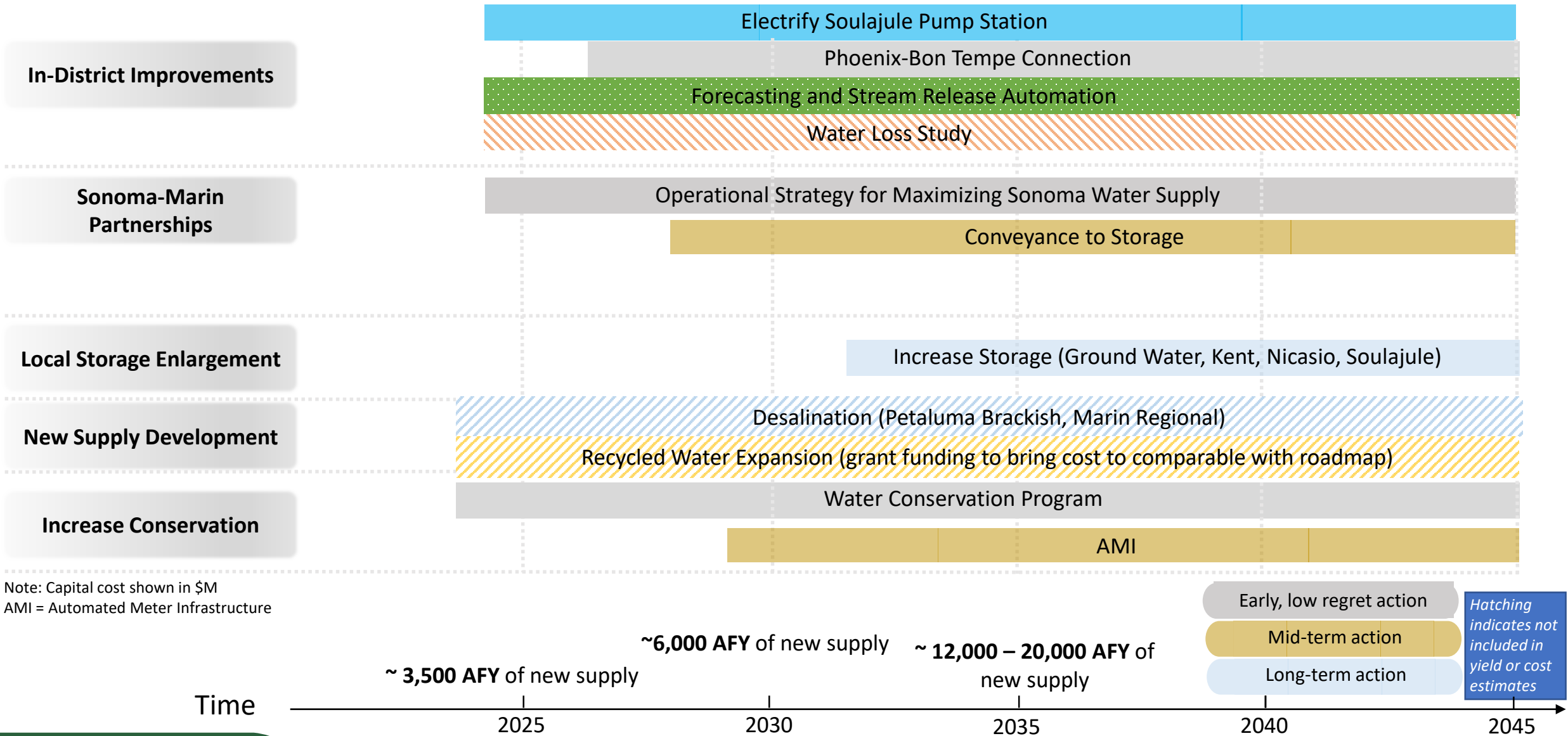
**January 12, 2024**



# Water Supply Roadmap Update: Overview

- Roadmap Review
- Early Action Projects
- Longer Term Projects
- Schedule
- Grant Funding and Project Budget Summary
- Next Steps

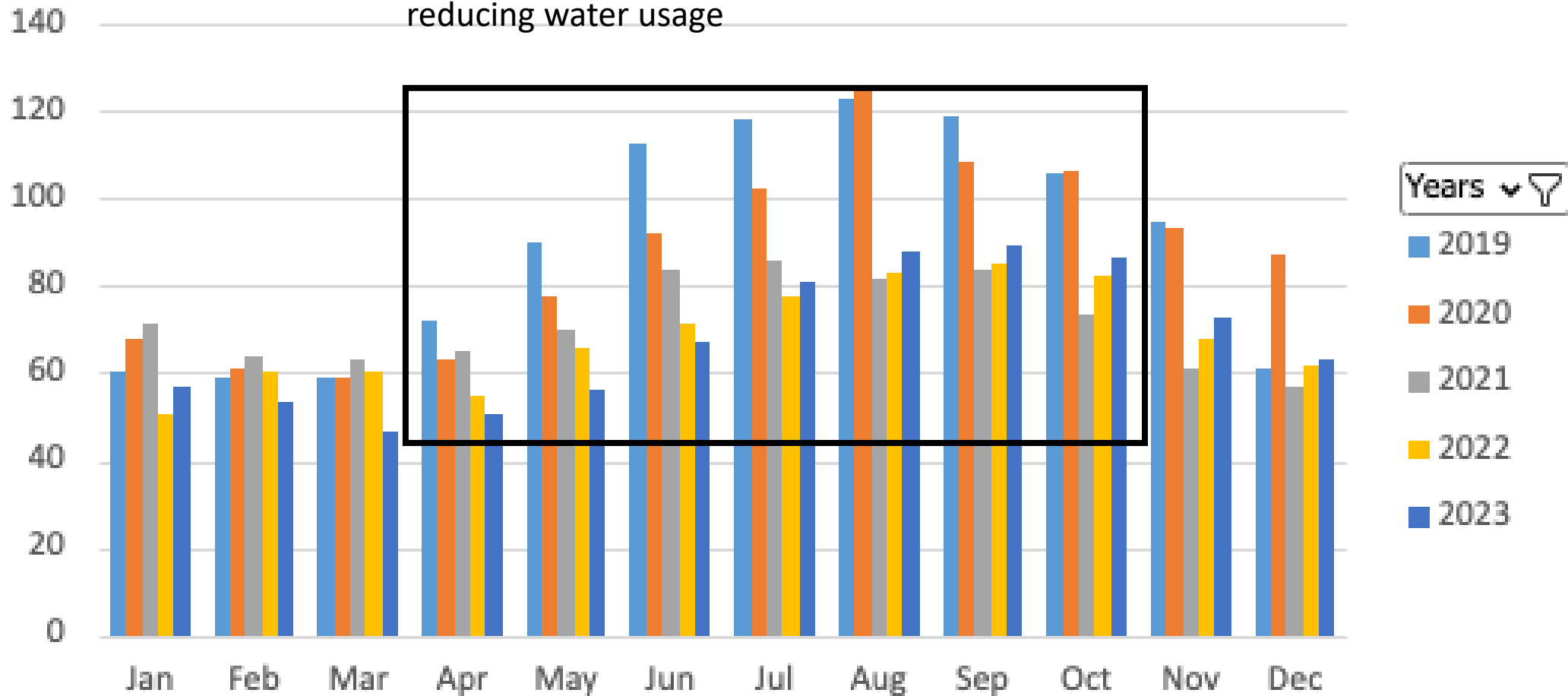
# Roadmap for Integrated Strategy



# Early Actions: Conservation

Sum of R-GPCD

District customers have done a commendable job reducing water usage



Reporting Month

# Water Efficiency

- Master Plan draft coming in Feb/March
- High water users AMI pilot program
- Review of Ordinances such as Graywater Ordinance
- Developing an online tool to help customers understand if they have efficient indoor use and how saving water can reduce their bill.
- Educational programs – Master Gardener and school programs
  - Landscape webinar scheduled for early Feb on composting and water wise gardening to help customers prep for Spring

# Current Water Saving Incentives

- Turf Conversion Rebates
- Pool or Spa Covers
- Smart Irrigation Controllers
- Graywater: Laundry-to-Landscape Kits
- Rain Barrels and Cisterns
- Flume Smart Home Water Monitor
- High Efficiency Toilets
- High Efficiency Clothes Washers
- Hot Water Recirculating System



[www.marinwater.org/rebates](http://www.marinwater.org/rebates)

# Water Loss Reduction Program

- Project goal is to develop approaches to reduce real water loss, currently District real losses are approximately ~1,000 AFY from system leaks, overflows and unauthorized consumption.
- District meets state standards for water loss:
  - State standard is 28.5 gallons/connection/day
  - District is 24.6 gallons/connection/day
- Water Loss analysis and strategy:
  - Evaluate existing water loss activities, processes and equipment
  - Consider what role technology can play in improving real water loss for Marin Water, for example - satellite imaging systems or permanent acoustic sensors
- Schedule: Update to Operations Committee February 16, 2024



# Early Actions: Stream Release

# Early Actions: Stream Release Automation Project Elements

- Project goal is to more accurately meet our stream flow requirements on Lagunitas and Walker Creek
- The project will ultimately replace a manual monitoring process with automated control of release water
- To achieve this we will:
  - Capture USGS streamflow data to District's SCADA system
  - Install an additional stream gages
  - Establish rating curves for the new gages
  - Develop control algorithm for release valves
  - Closely monitor releases
- Targeting summer 2024 for initial system testing



# Stream Gage Installation

- New Lagunitas stream gage installed October 2023
- Rating curve by October 2024
- Walker Creek gage is in planning stage
  - Real property lease or license Jan/Feb 2024
  - Gage installation in Spring 2024
- SCADA connection Feb/Mar 2024



*New Lagunitas Creek stream gage at Samuel P Taylor State Park*

# Early Actions: Phoenix Lake to Bon Tempe Reservoir

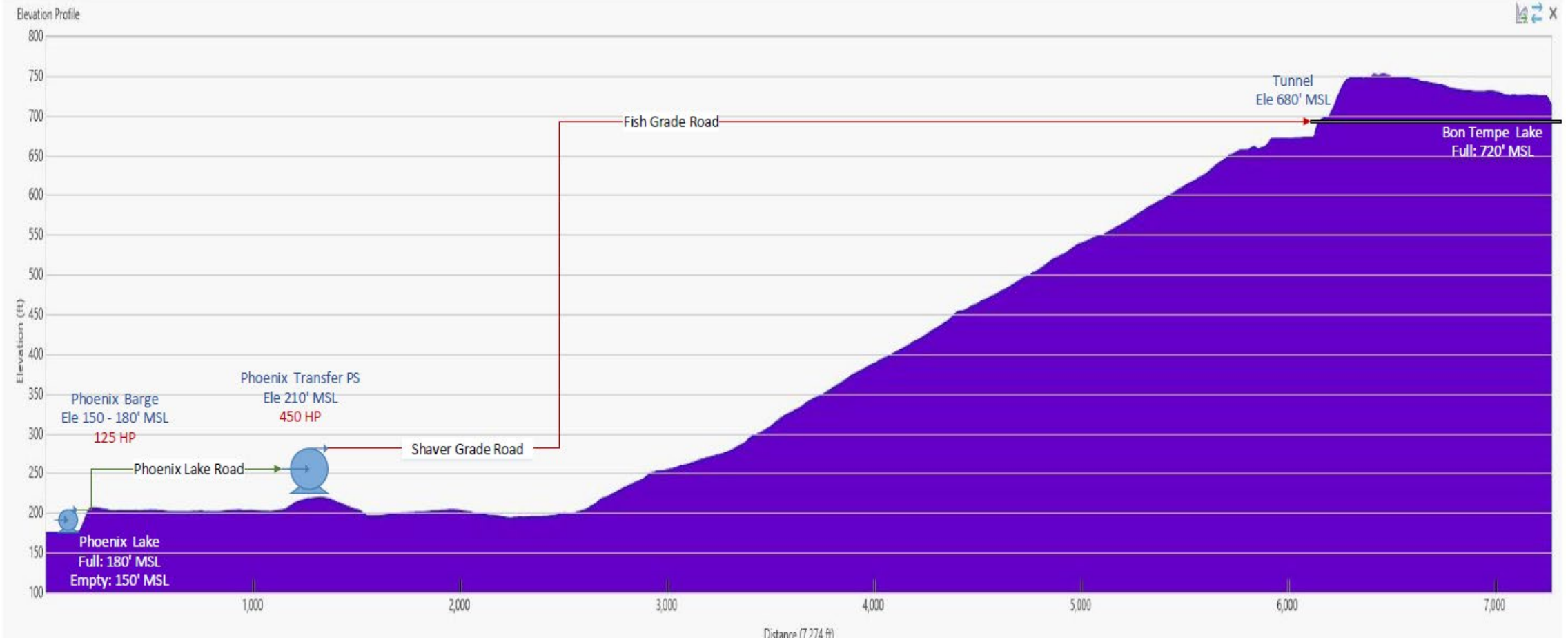
# Phoenix to Bon Tempe Overview

- Project will pump water from Phoenix Lake up to Bon Tempe reservoir for storage and use
- Geotech analysis indicates side slopes of reservoir are stable with 3-MGD pumping between elevation 174 ft – 158 ft, and at 1.9-MGD at water elevation levels lower than 158 ft.
- Current understanding is that County Flood Control do not have the resources to maximize flood control benefit for this project
- Possible opportunity to review use of release valve for flood control benefit

# Phoenix – Bon Tempe Alignment



# Hydraulic Grade Line



# Phoenix – Bon Tempe Project Schedule

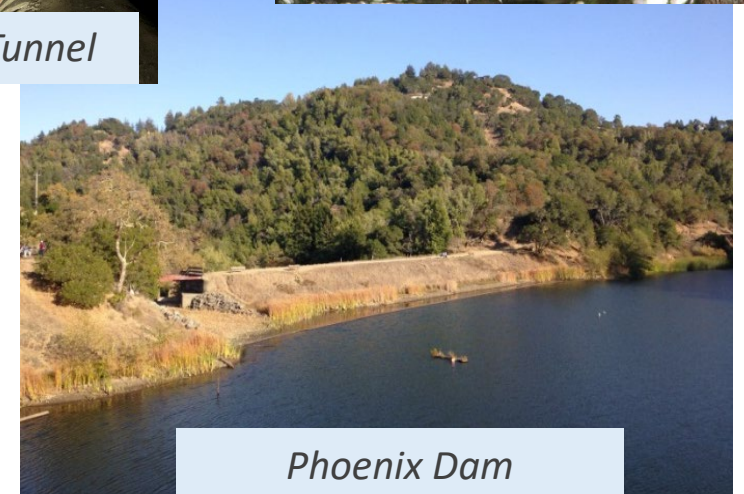
- Project is in Northern Spotted Owl habitat resulting in limited construction window
- Environmental compliance documentation is underway and anticipate a draft in March/April 2024
- Staff is designing pipeline with first 1200 ft scheduled to start August 2024 and second pipe segment in August 2025 to January 2026.
- Staff is working with consultant for Pump station design by January 2025 and construction complete January 2027



*Bon Tempe Tunnel*



*Northern Spotted Owl*



*Phoenix Dam*



# Early Actions: Electrification of Soulajule Pump Station

# Soulajule Project Overview

- Project goal is to provide electrical power to the Soulajule Pump station and install 2.5 miles of pipe to convey water directly to Nicasio reservoir.
- Improves operability and flexibility of storage facilities and increases reservoir yield by 420 AFY
- Staff working with consultant to develop pumping options that work within constraints of existing PG&E power



*Soulajule Dam & Pump Station*

# Review of Alternative Power Sources For Soulajule Electrification

- Following alternatives considered:
  - Generator – install permanent generator or continued use of rental generator
    - Long period between operation is challenge for diesel storage
  - Solar Panels
    - Floating solar required due to lack of space – installations on engineered ponds only, likely problematic for natural lake due change in surface area and lake level.
    - Demand for power is 24/7 when pumping is required - solar is operational only when sun is shining, resulting in need for battery storage
    - Reduced credit for selling excess energy back to grid under new regulations makes ROI dependent on operational frequency which is expected to be low
  - Batteries/fuel cells
    - Not favored due to required footprint and needed power source

Traditional electrical service may be the most cost effective solution

# PG&E Electrical Service

- PGE load study shows that a combined 800hp load can be run with a maximum of 330 amps at any given motor
- Potential Solution
  - Install four (4) 200HP Vertical In-line Pumps.
    - Flowrate of approximately 4,200 GPM or 6.0 MGD
    - Costs estimate is \$2,740,000 with a range of \$1.9M to \$4.1M
- Uncertain how this solution may impact a future potential water supply project at SoulaJule

# Summary & Next Steps

- Proceed with discharge piping upgrade
- Pause electrification project until we have clarity on preferred future water supply project

# Longer Term Actions

# Implementation of Long Term Water Supply Projects

## Strategy ✓

- Define overall goals
- Quantify needs
- Identify potentially feasible alternatives
- Select basic strategy(ies)

## Planning

- Consider specific projects in line with strategy
- Initiate CEQA-NEPA
- Refine project-specific purpose, goals
- Refine and screen conveyance alternatives
- Further develop & evaluate remaining
- Identity preferred project(s)

## Predesign

- Substantial field investigations
- Develop preliminary design documents
- Complete CEQA-NEPA process
- Initiate permitting, ROW process

## Final design

- Finalize design documents
- Complete permitting, ROW process
- Update cost estimate

# Planning Activities

- Environmental approach is consistent and coordinated
- Alternatives are being refined so they can be differentiated, to allow a defensible selection
- A common mapping base is being established so that the entire team sees the same information
- First pass will be screening both storage and conveyance to proposed short lists
- Working with Sonoma Water to refine water availability estimates
- Modeling will quantify the long-term performance of alternative operational strategies



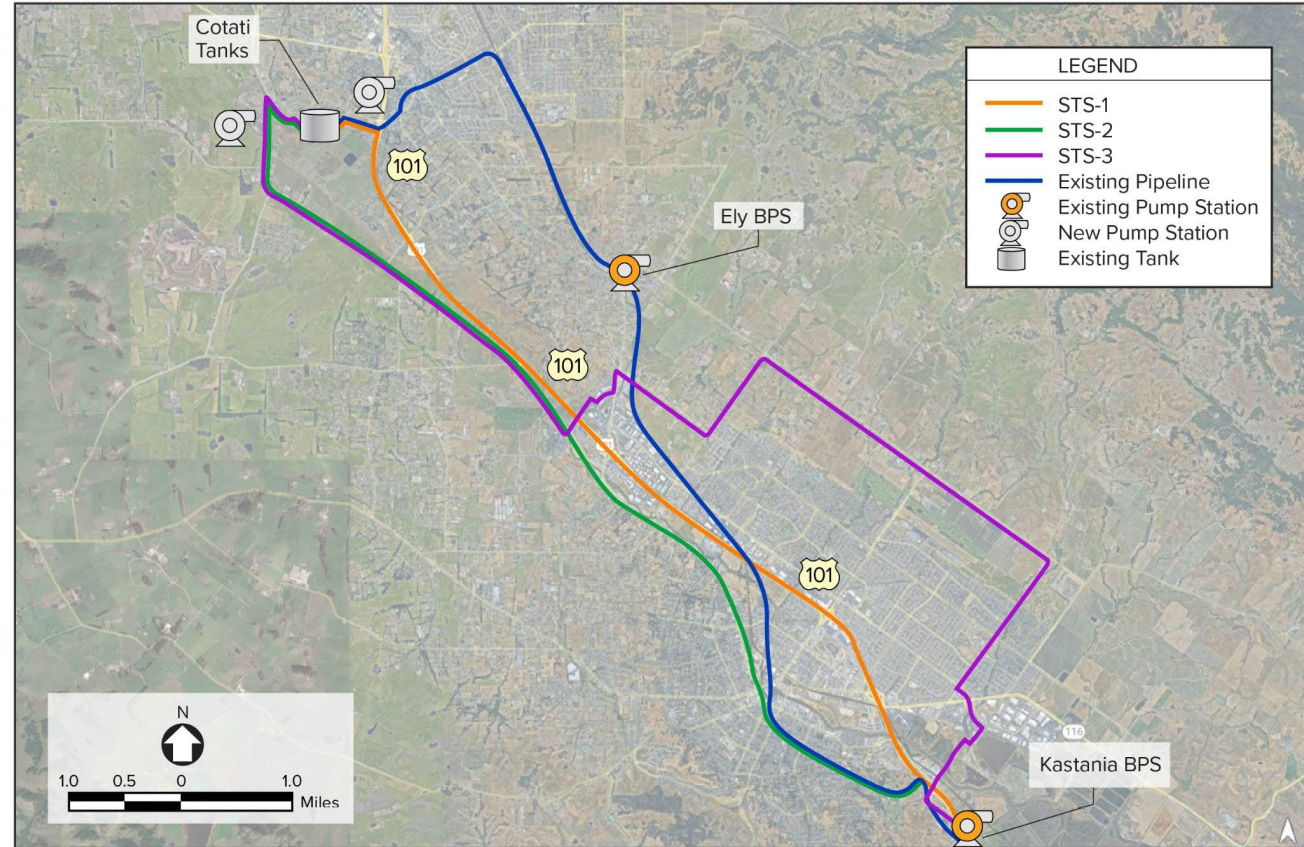
# Regional Conveyance Alternatives

Table 1 Summary of Alternatives

Alternative	Description
STS-1	Cotati Tanks to Kastania PS along 101 Corridor
STS-2	Cotati Tanks to Kastania PS through downtown Petaluma
STS-3	Cotati Tanks to Kastania PS through rural roads
STAF-1	Stafford Lake to Nicasio Reservoir
STAF-2	Stafford Lake to Soulajule Reservoir
STAF-3	Stafford Lake to Nicasio and Soulajule Reservoir
PETA-1	North Marin Aqueduct to Nicasio Reservoir
PETA-2	North Marin Aqueduct to Soulajule Reservoir
PETA-3	North Marin Aqueduct to Nicasio and Soulajule Reservoir
PETA-4	North Marin Aqueduct to Nicasio and Soulajule Reservoir via San Antonio Road.
COTATI-1	Cotati Tanks to Nicasio Reservoir
COTATI-2	Cotati Tanks to Soulajule Reservoir
COTATI-3	Cotati Tanks to Nicasio and Soulajule Reservoir

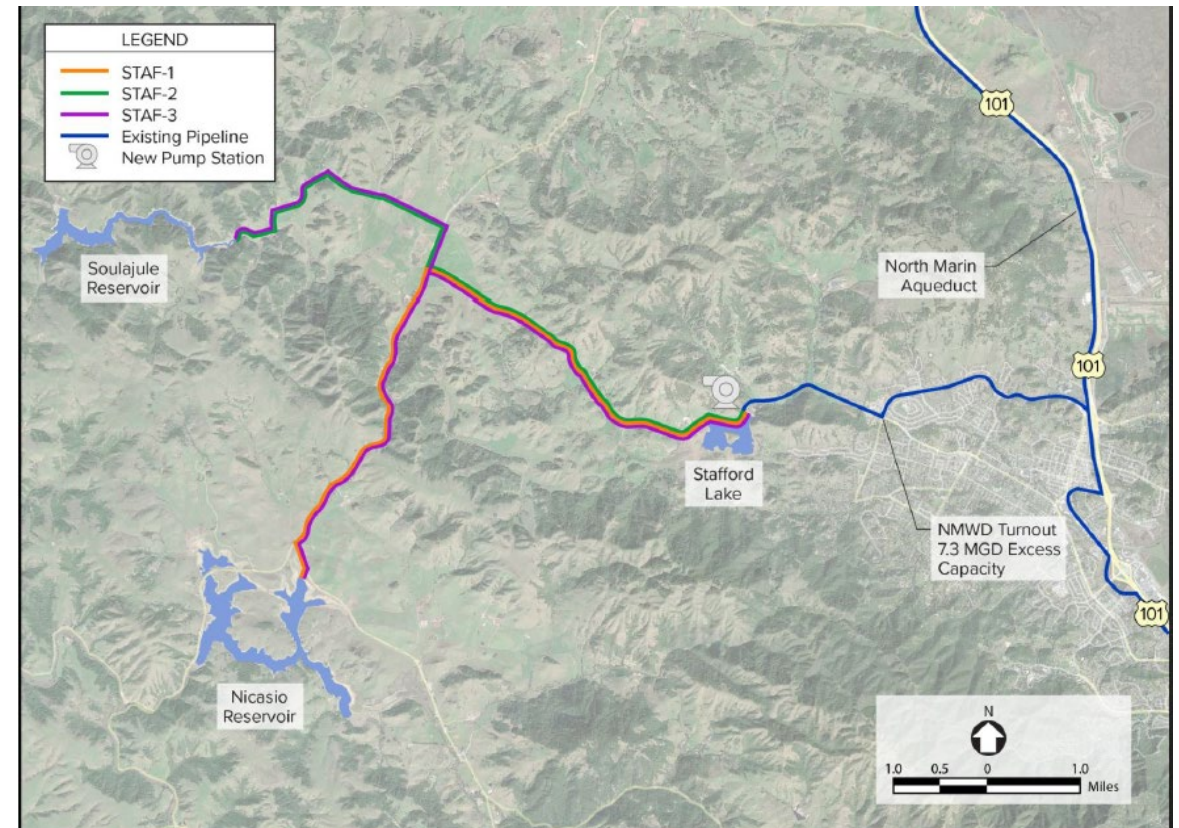
# South Transmission System (STS) Project Alternatives

- STS-1: Cotati Tanks to Kastania PS along the Highway 101 Corridor.
- STS-2: Cotati Tanks to Kastania PS through downtown Petaluma.
- STS-3: Cotati Tanks to Kastania PS through rural roads.



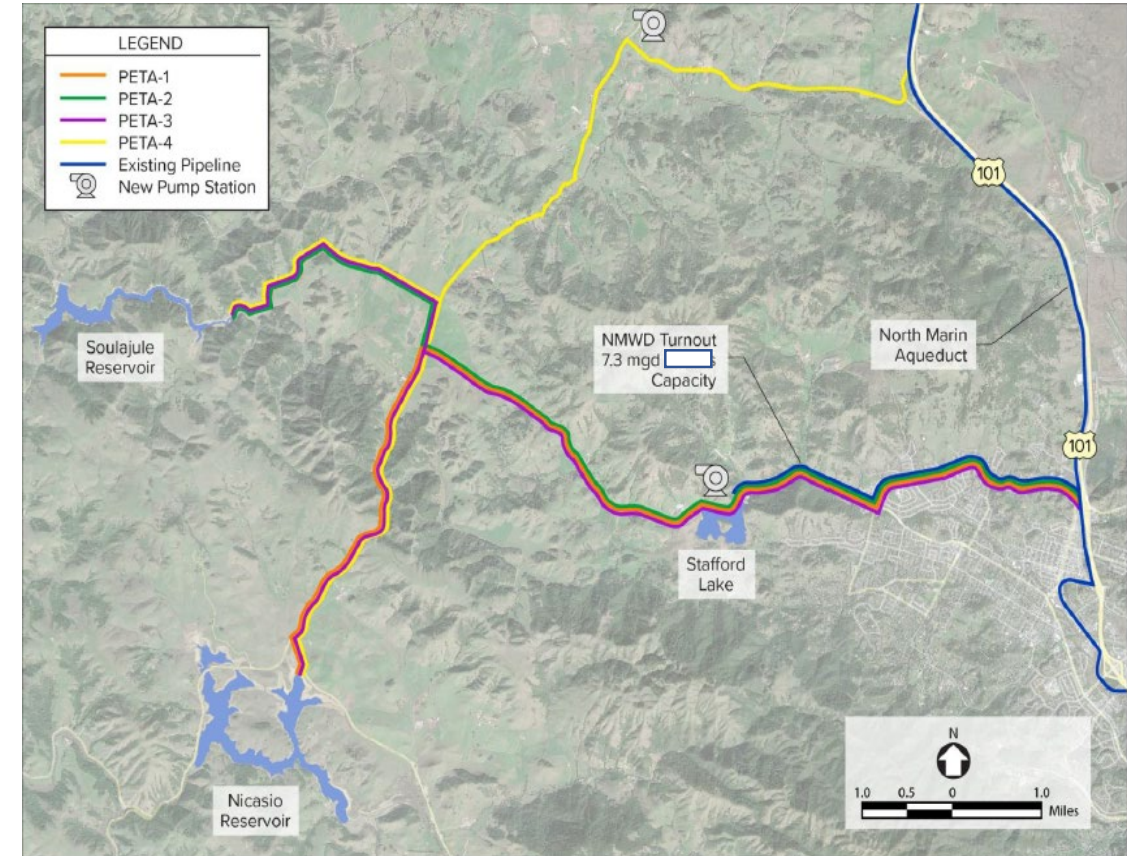
# Stafford Lake to Reservoirs (STAF) Project Alternatives

- STAF-1: Stafford Lake to Nicasio Reservoir.
- STAF-2: Stafford Lake to Souldajule Reservoir.
- STAF-3: Stafford Lake to Nicasio and Souldajule Reservoir.



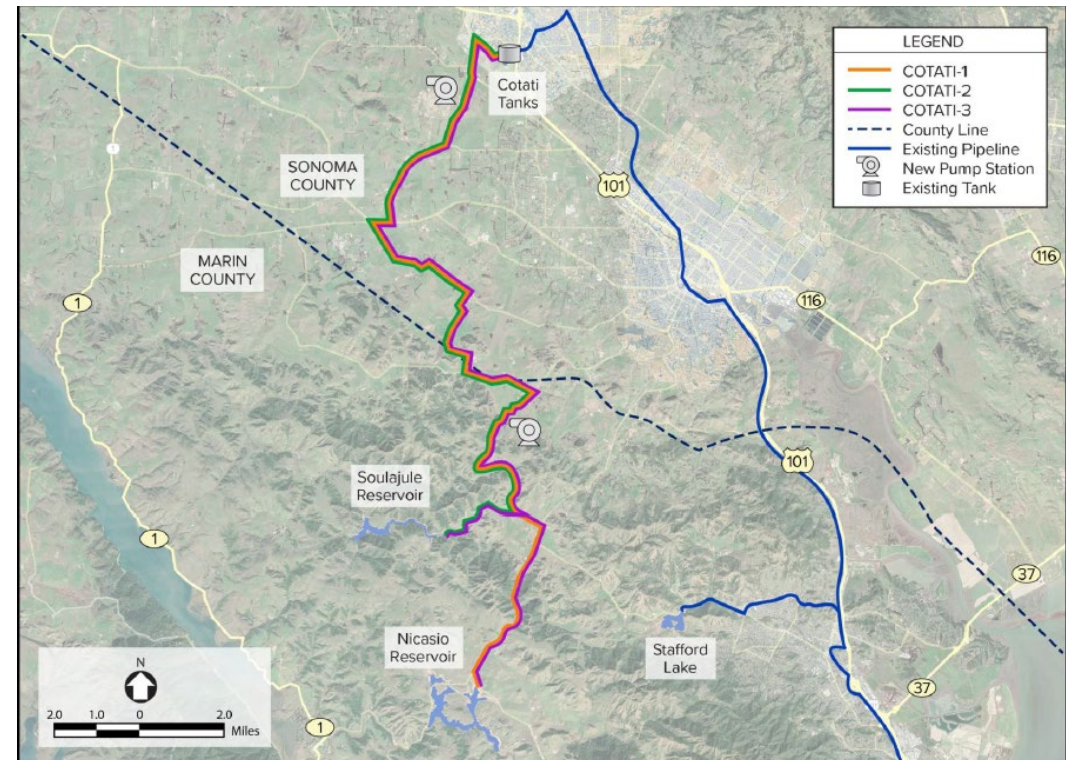
# North Marin Aqueduct to Reservoirs (PETA) Project Alternatives

- PETA-1: North Marin Aqueduct to Nicasio Reservoir.
- PETA-2: North Marin Aqueduct to Soulajule Reservoir.
- PETA-3: North Marin Aqueduct to Nicasio and Soulajule Reservoir.
- PETA-4: North Marin Aqueduct to Nicasio and Soulajule Reservoir via San Antonio Road.



# Cotati Tanks To Reservoirs

- COTATI-1: Cotati Tanks to Nicasio Reservoir.
- COTATI-2: Cotati Tanks to Soulajule Reservoir.
- COTATI-3: Cotati Tanks to Nicasio and Soulajule Reservoir.



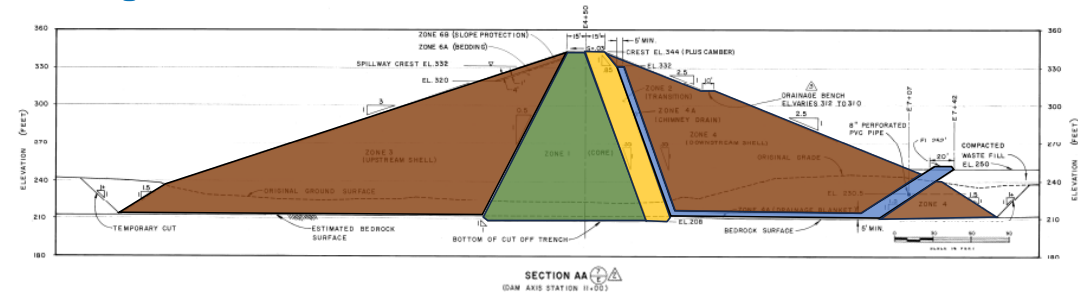
# Local Storage Alternatives

- Existing Dam Enlargement
  - Soulajule Reservoir by means of dam raise
  - Nicasio Reservoir by means of reservoir dredging
  - Nicasio Reservoir by means of dam raise
  - Kent Reservoir by means of dam raise
- New Dam Construction
  - Construction of new Halleck Reservoir
  - Construction of new Devil's Gulch Reservoir
- Spillway reconfiguration
  - Kent Reservoir
  - Nicasio Reservoir
  - Soulajule Reservoir
  - Alpine Reservoir

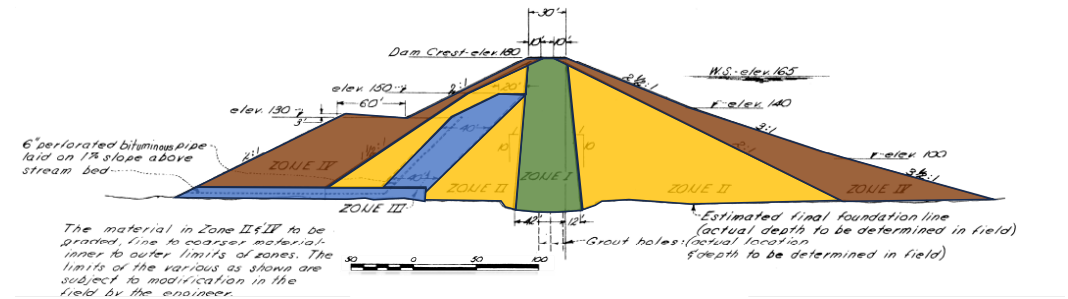


# Each Reservoir Has Unique Characteristics

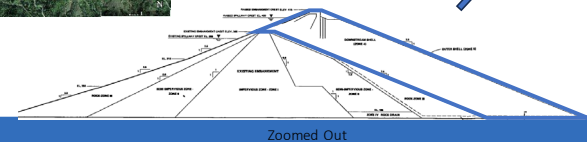
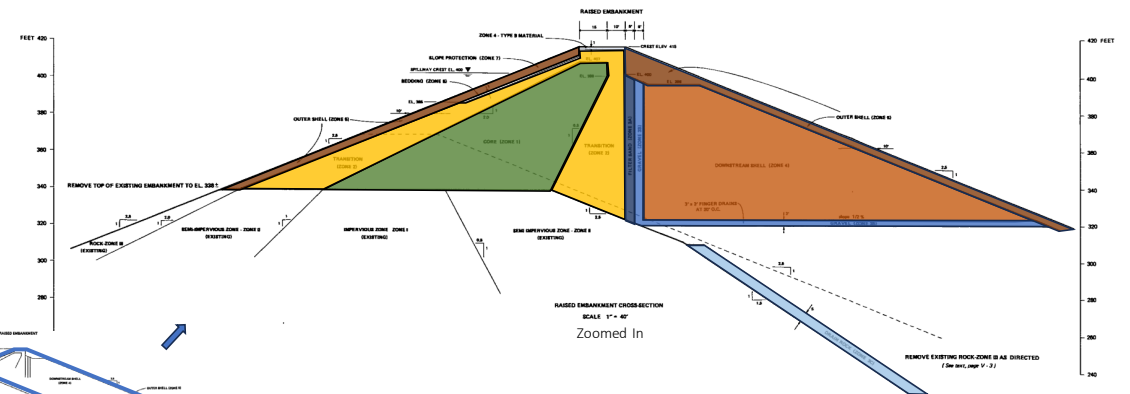
**Soulajule Reservoir**  
Capacity: 10,570 AF



**Nicasio Reservoir**  
Capacity: 22,430 AF



**Kent Reservoir**  
Capacity: 32,895 AF

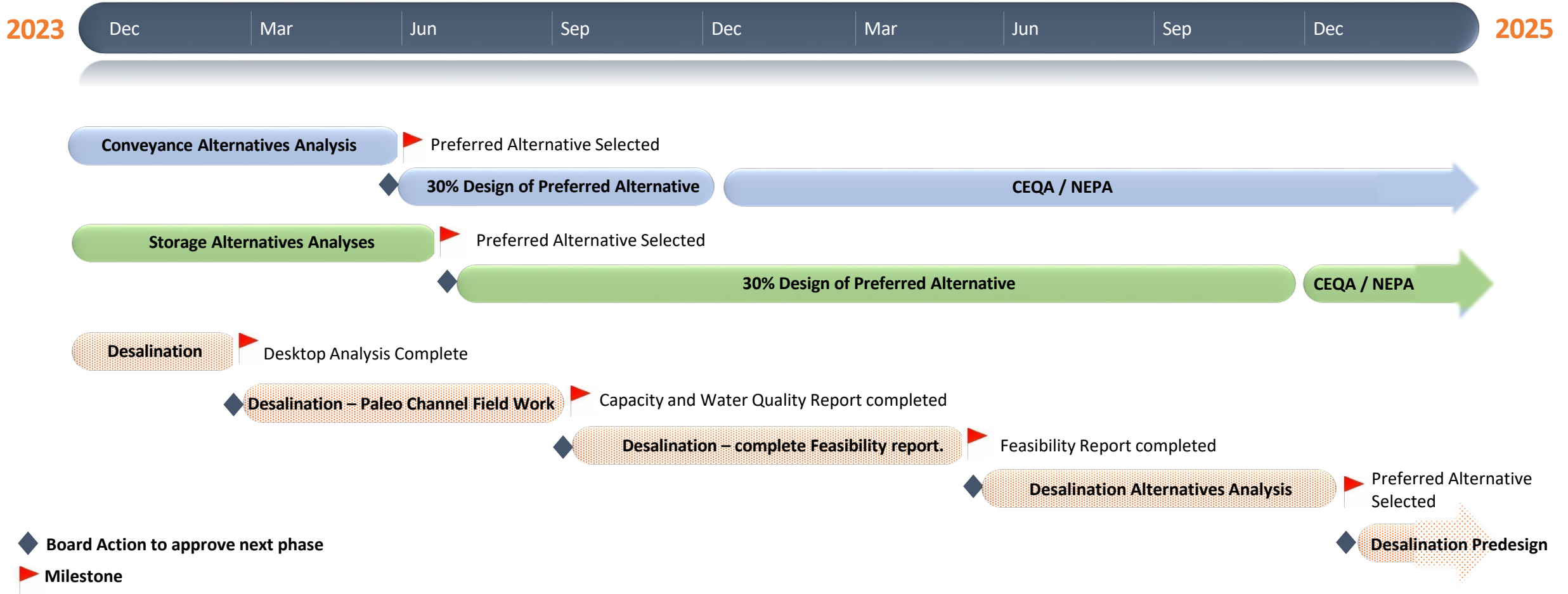


# Desalination Update

- Original project goal was to establish feasibility of brackish water desalination near the Petaluma River. Early results indicated that the water was generally not brackish and part of the existing groundwater basin
- Revised project goal is to determine feasibility of desalination in the area around the Petaluma River near the bay
- Currently in process of determining if we can identify a subterranean channel that could be used as an intake for a desalination plant
- Depending on results of the desktop analysis the next stage would be to seek authorization from the board to drill test wells to locate the channel and determine capacity to convey water.
- Results of desktop analysis Feb/March 2024



# Water Supply Roadmap: Schedule



# Roadmap Grant Funding

- DWR \$2M Drought relief grant – we received payment of \$540k which pays for the majority of Strategic Water Supply Assessment work and will use the remaining funds towards the current roadmap work underway right now.
- WRDA \$28M – we are in a good position and working with the SF Office to keep them engaged and aware of our project.
- Applied for USBR WaterSmart Applied Science Program in October for funding to advance the District's modelling and decision making framework to improve water management decisions

# Summary Table – 2024 Projects Budget

Project	2024 Budget	2024 Budget Need	Expenditure to date	Remaining Budget
Soulajule Electrification	\$0.50	\$0.5	\$0.06	88%
Phoenix to Bon Tempe	\$0.50	\$0.48	\$0.36	25%
Optimize SCWA	\$0.30	\$0.45	\$0.15	67%
Stream Flow Automation	\$0.10	\$0.10	\$0.03	71%
Water Loss	\$0.10	\$0.03	\$0.03	12.50%
Conservation	\$1.70	\$1.70	\$0.91	46%
Petaluma Brackish Desal	\$0.25	\$0.13	\$0.02	87%
Marin– Sonoma Options (Regional Conveyance)	\$0.50	\$0.95	\$0.07	92%
Increase Storage	\$1	\$0.90	\$0.00	99%
<b>Total</b>	<b>\$4.95</b>	<b>\$5.40</b>	<b>\$1.70</b>	<b>68%</b>

Note - funds in millions of dollars

# Next Steps

- Continue implementation work on Early Action projects
- Screening Conveyance and Storage alternatives to proposed shortlists
- Complete desktop analysis for Petaluma River Desalination Feasibility
- Continue to track and pursue grants to support roadmap implementation
- Ongoing routine updates to board on progress and status of work