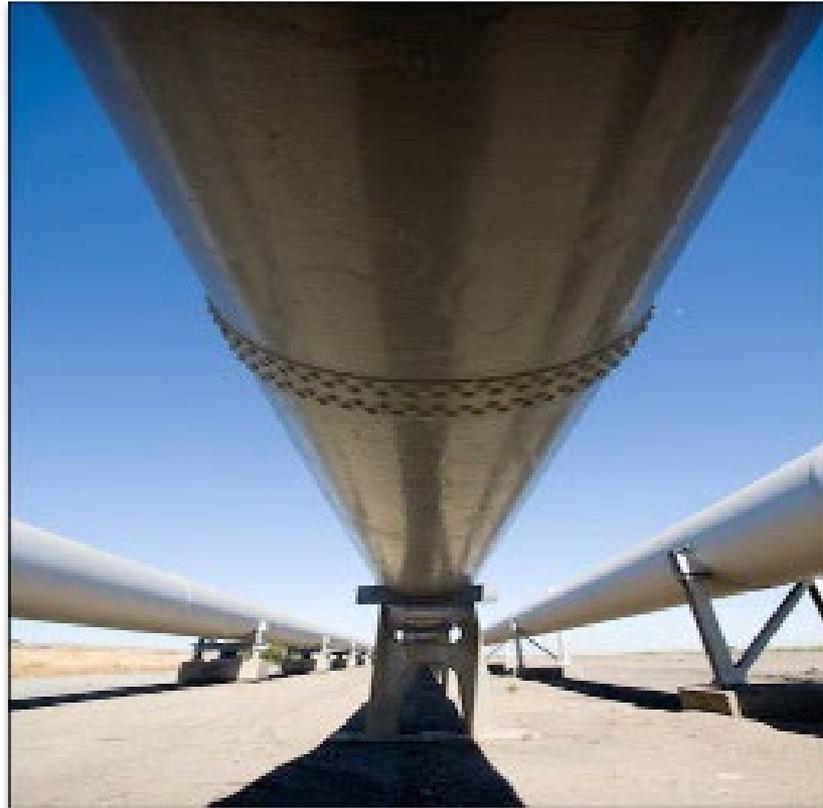


**Mokelumne
Aqueducts
Resiliency Project**



Purpose of the Meeting

- Discuss need for project
- Describe project
- Explain public review process
- Receive input



Agenda



- Project Schedule and Team
- EBMUD Water System
- Project Location
- Need for Project
- Project Description
- Environmental Review Process & Schedule
- Next Steps
- Questions and Comments

Project Schedule



Conceptual Design, Environmental Review & Public Outreach



Design and Agency Permitting



Construction

Project Team



EBMUD

- Bill Maggiore, Senior Civil Engineer, Water Distribution Planning
- David Rehnstrom, Manager, Water Distribution Planning
- Marshall McLeod, Senior Civil Engineer, Pipeline Infrastructure
- Carlton Chan, Manager, Pipeline Infrastructure
- Gerald Schwartz, Community Affairs

Consultants

- WSP USA, Inc.
- Panorama Environmental, Inc.

Mokelumne Aqueduct Resiliency Project



EBMUD Water System

EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

MOKELUMNE RIVER WATERSHED

WATER SERVICE AREA

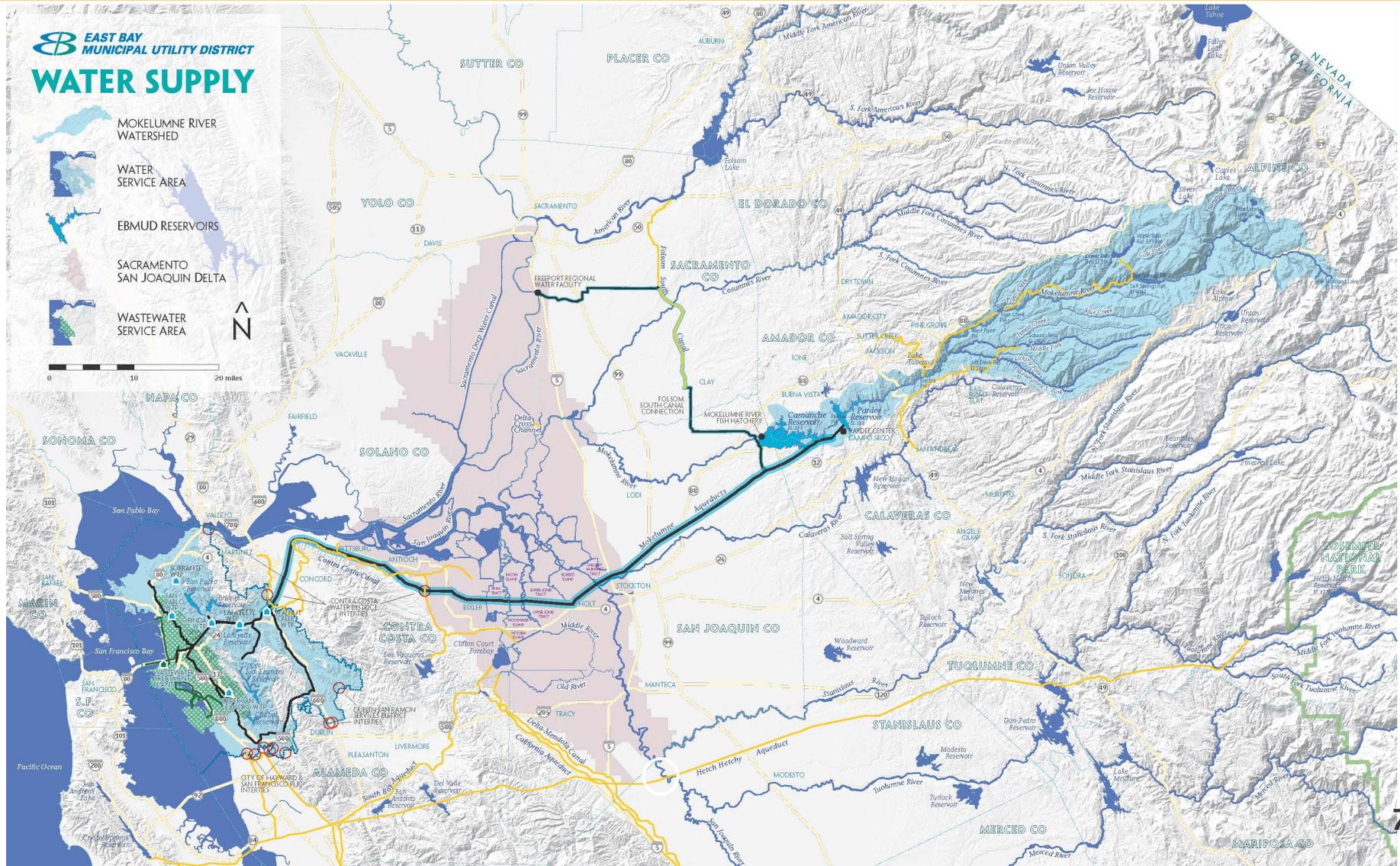
EBMUD RESERVOIRS

SACRAMENTO SAN JOAQUIN DELTA

WASTEWATER SERVICE AREA



0 10 20 miles

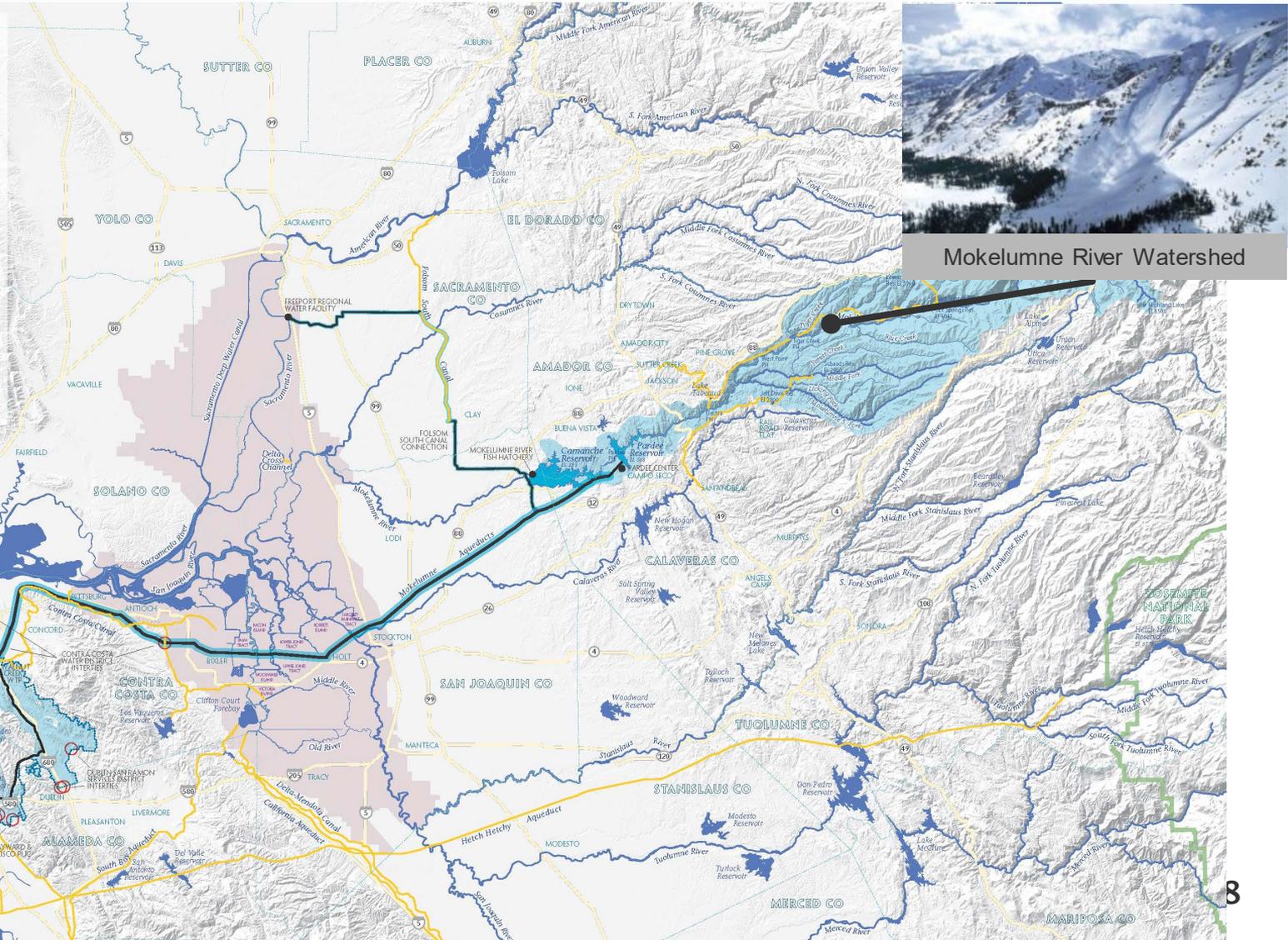


EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

- MOKELUMNE RIVER WATERSHED
 - WATER SERVICE AREA
 - EBMUD RESERVOIRS
 - SACRAMENTO SAN JOAQUIN DELTA
 - WASTEWATER SERVICE AREA
- 0 10 20 miles



Mokelumne River Watershed

EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

MOKELUMNE RIVER WATERSHED

WATER SERVICE AREA

EBMUD RESERVOIRS

SACRAMENTO SAN JOAQUIN DELTA

WASTEWATER SERVICE AREA



0 10 20 miles



Mokelumne River Watershed



Pardee Reservoir Outlet Tower



EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

MOKELUMNE RIVER WATERSHED

WATER SERVICE AREA

EBMUD RESERVOIRS

SACRAMENTO SAN JOAQUIN DELTA

WASTEWATER SERVICE AREA



0 10 20 miles



Sacramento River Freeport Intake



Mokelumne River Watershed



Pardee Reservoir Outlet Tower

EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT
WATER SUPPLY



90-mile Mokelumne Aqueduct System



Sacramento River Freepoint Intake



Mokelumne River Watershed



Pardee Reservoir Outlet Tower



Walnut Creek Water Treatment Plant

EBMUD Water System



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

MOKELUMNE RIVER WATERSHED

WATER SERVICE AREA

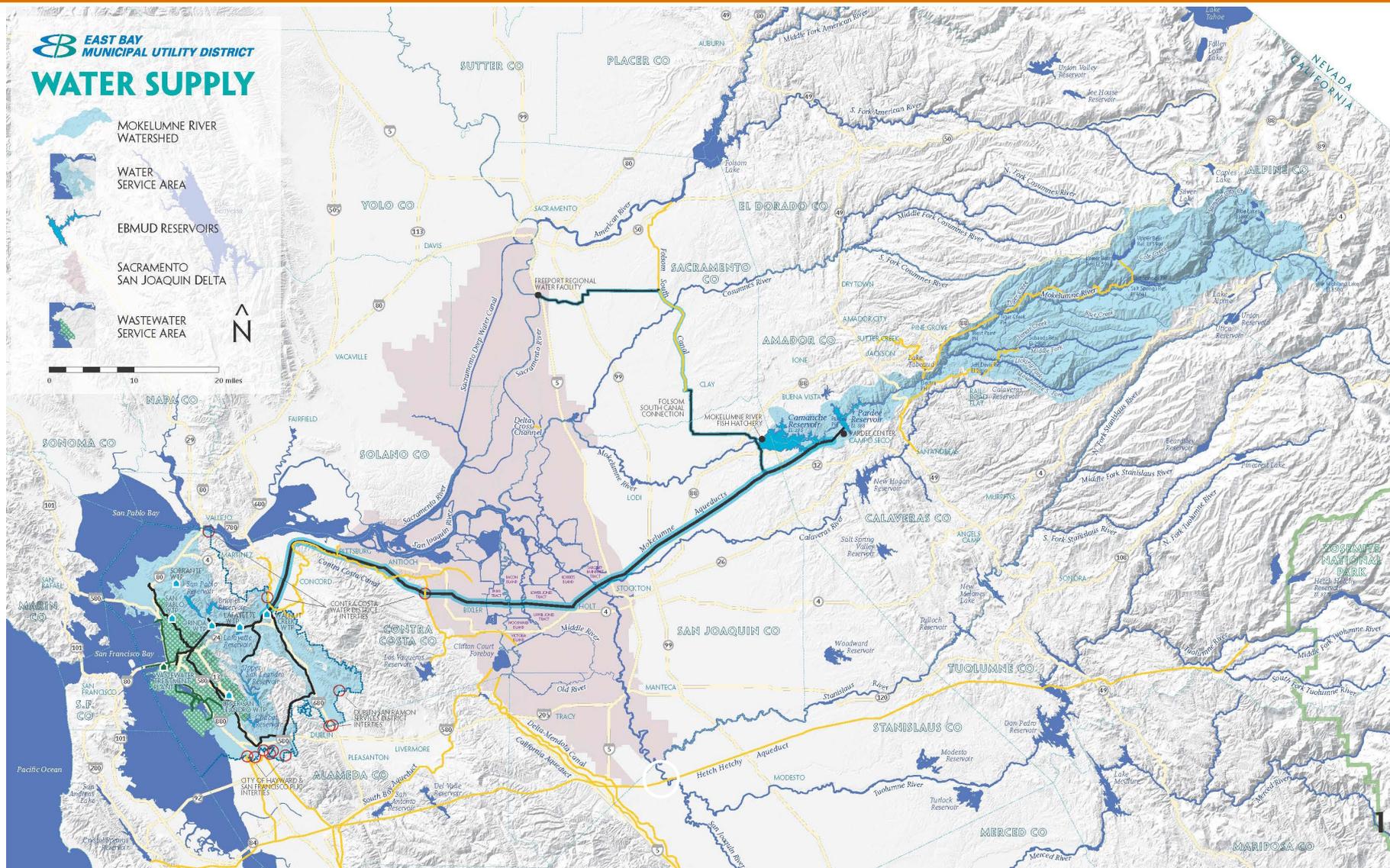
EBMUD RESERVOIRS

SACRAMENTO SAN JOAQUIN DELTA

WASTEWATER SERVICE AREA



0 10 20 miles



Project Vicinity



EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY

MOKELUMNE RIVER WATERSHED

WATER SERVICE AREA

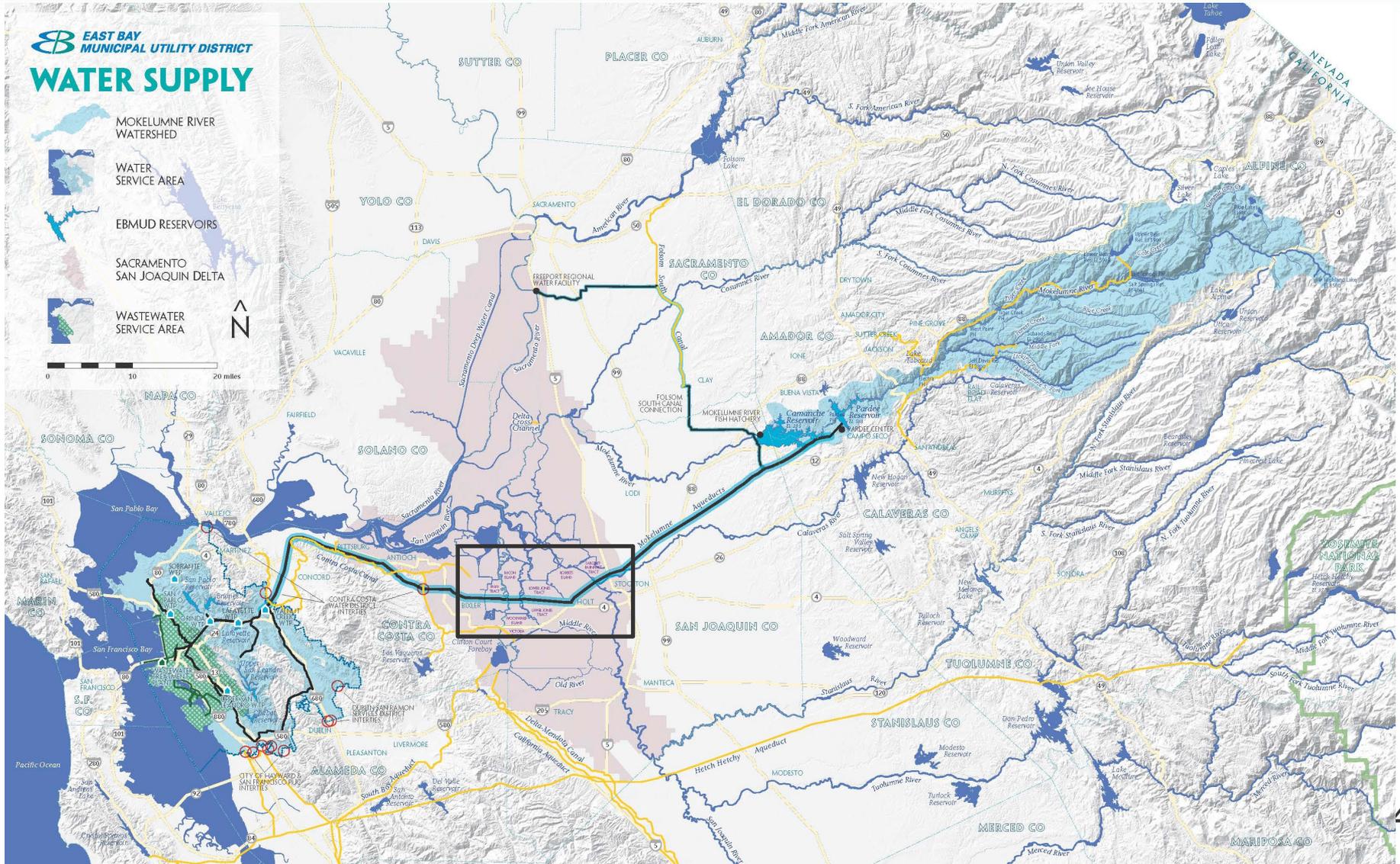
EBMUD RESERVOIRS

SACRAMENTO SAN JOAQUIN DELTA

WASTEWATER SERVICE AREA



0 10 20 miles

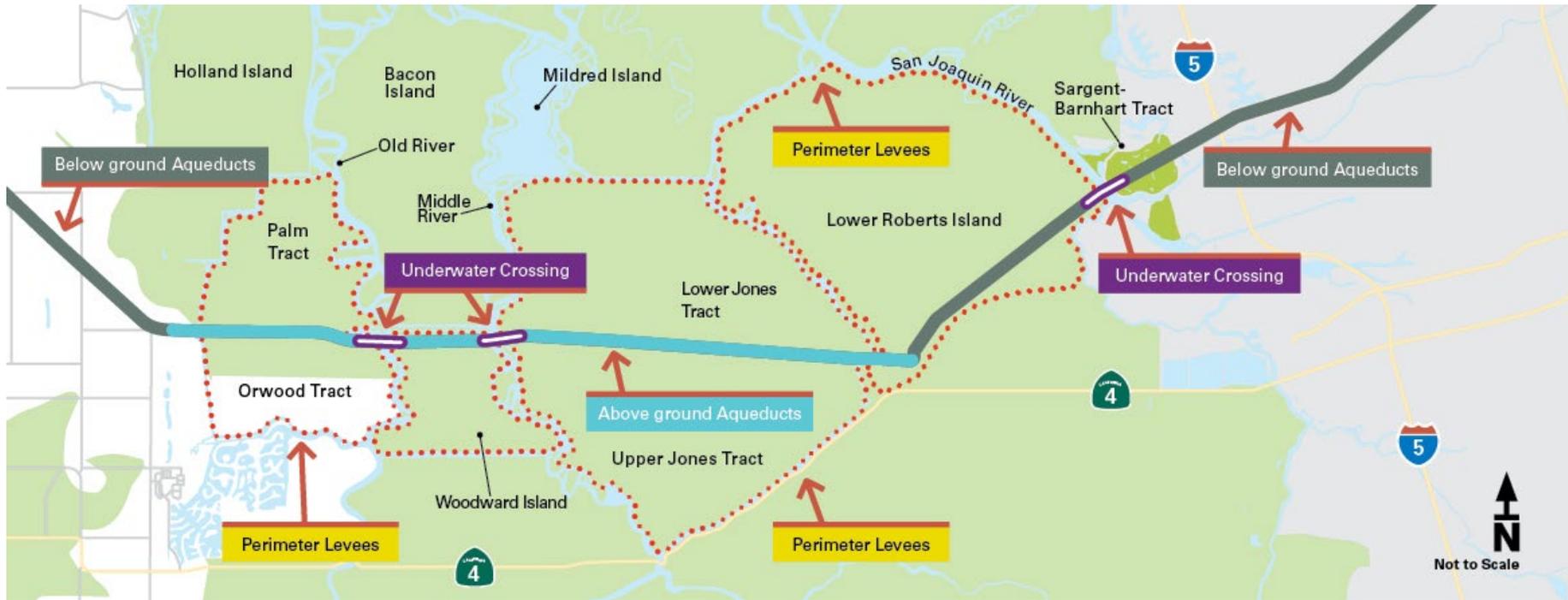


Mokelumne Aqueduct Resiliency Project

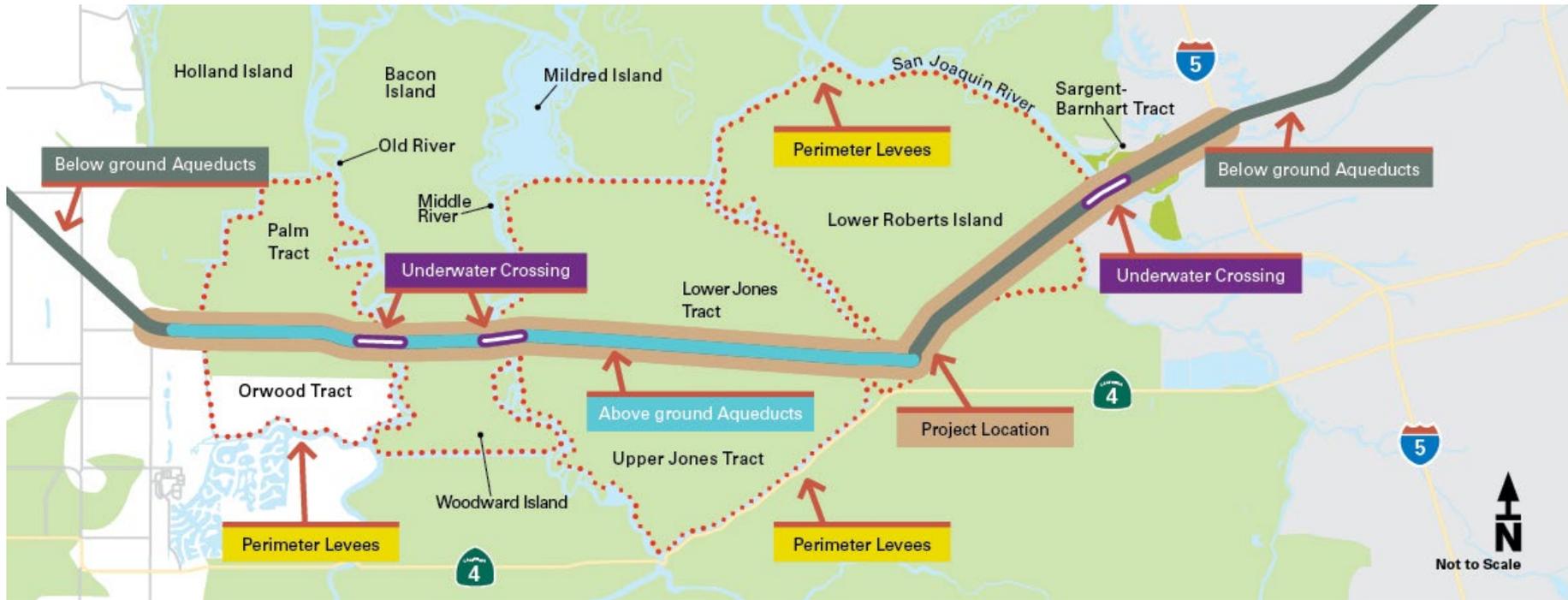


Project Location

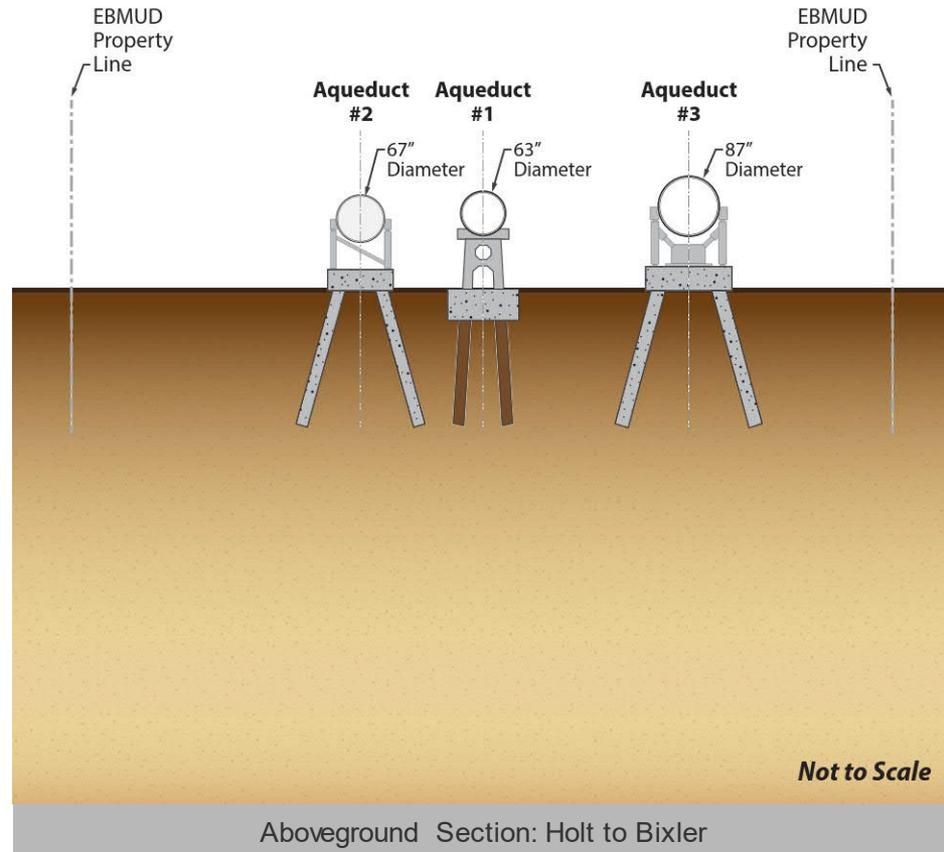
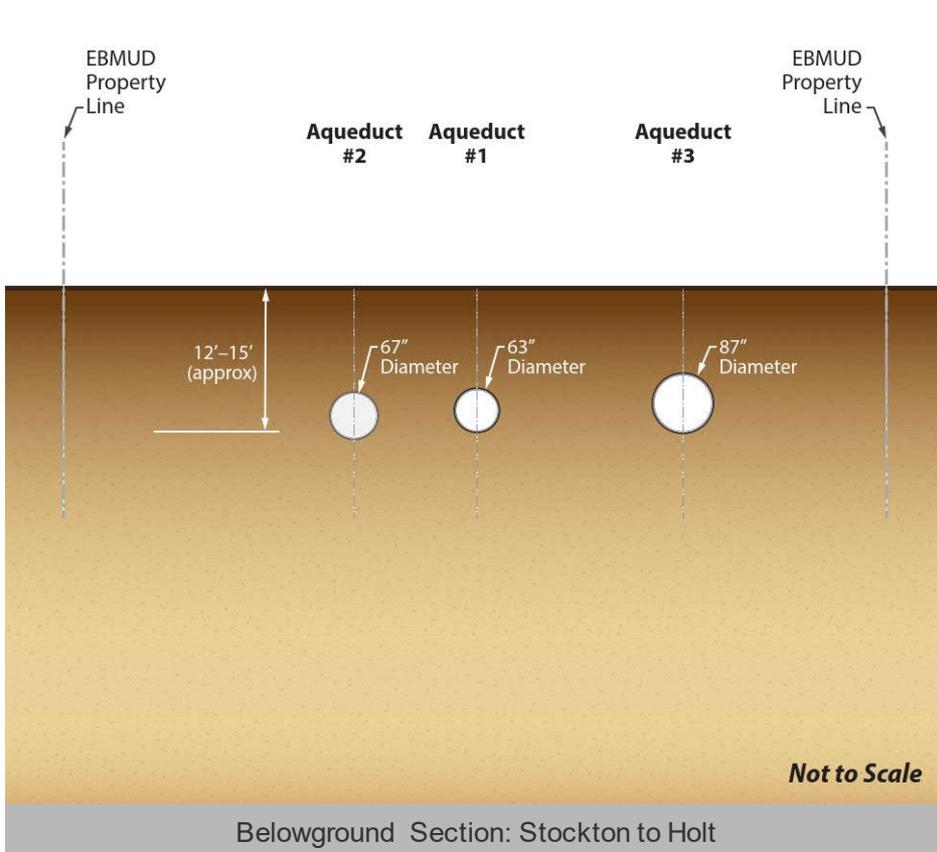
Project Location



Project Location



Existing Typical Cross Section



Mokelumne Aqueduct Resiliency Project



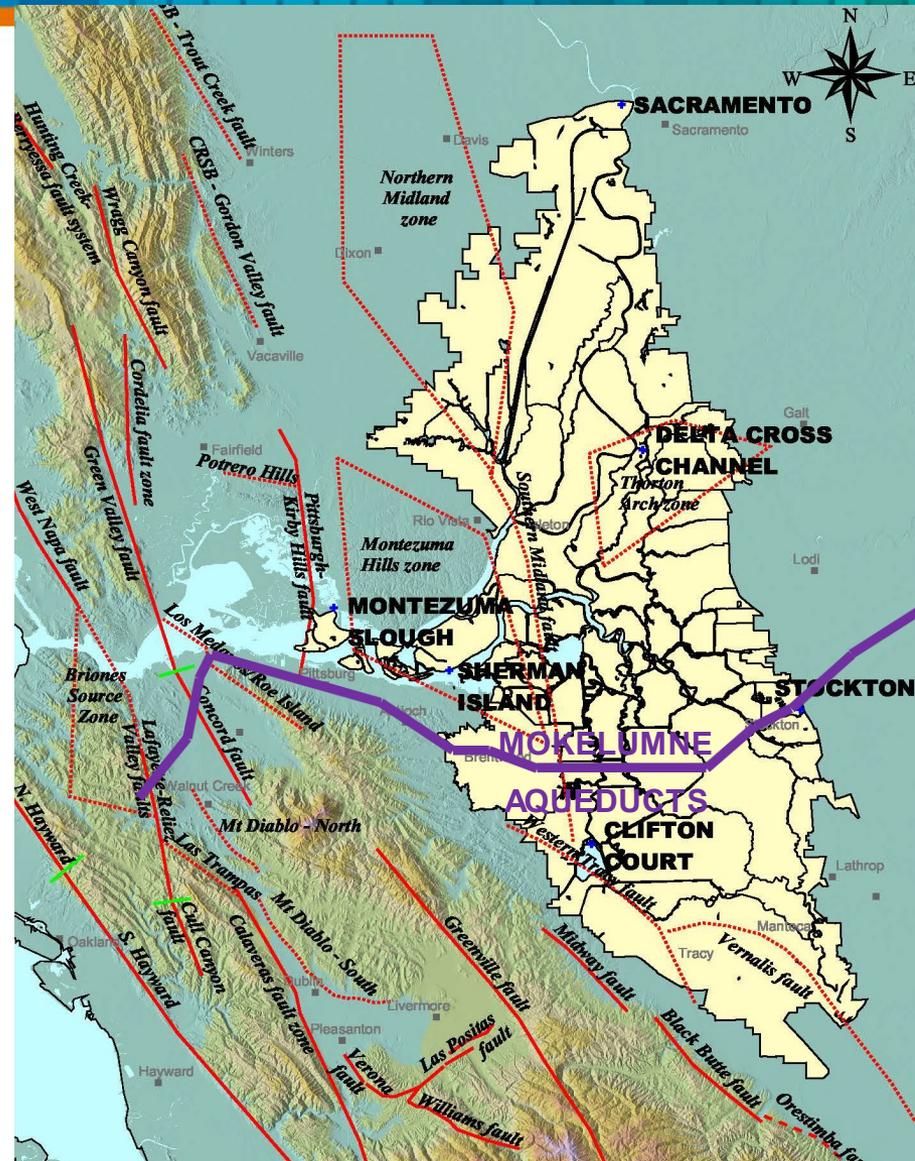
Need for Project

Project Purpose & Need



Improve the reliability of EBMUD's water supply conveyance through the Delta:

- against earthquake hazards and levee failure hazards
- by replacing and extending the life of aging infrastructure



Mokelumne Aqueducts are Aging

- Mokelumne Aqueduct No. 1 installed in 1929



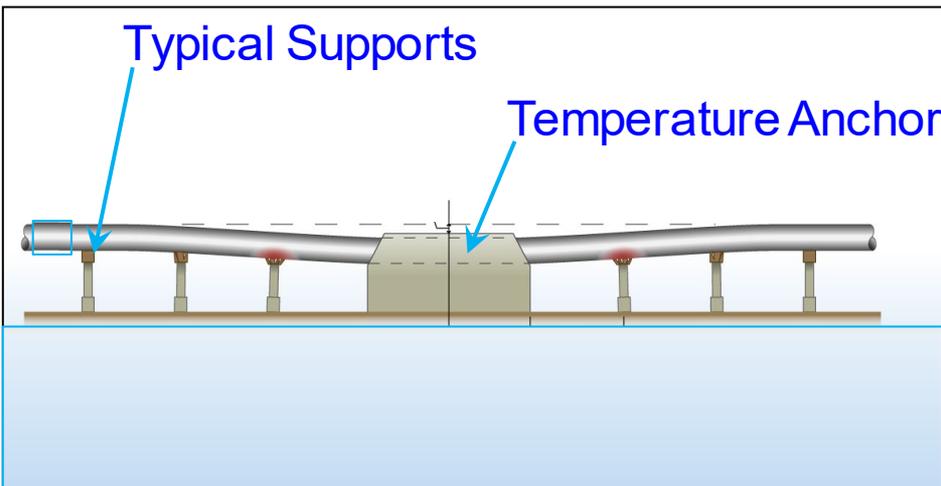
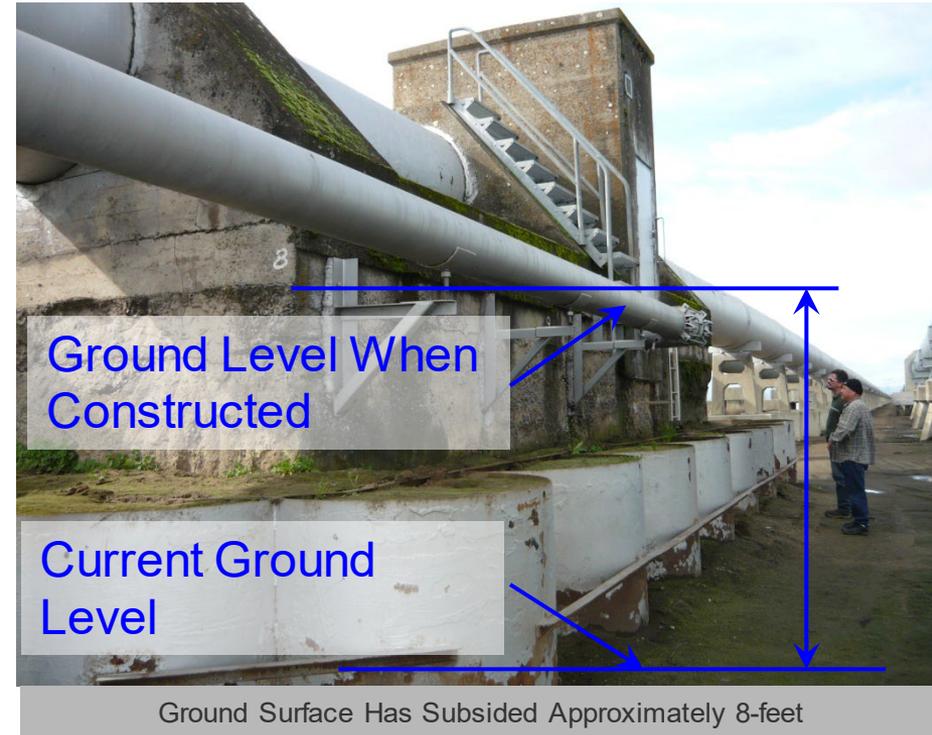
Underground section of No. 1 circa 1929



Aboveground section of No. 1 circa 1929

Subsidence is Creating Structural Concerns

- Exposed piles
- Differential settlement
- Loss of lateral support



Differential Settlement Causing Stress on Pipeline

Expected Earthquake Damage

Earthquakes expected to cause ground settlement

- Liquefiable soils underlying Mokelumne Aqueducts alignment in the Delta
- Earthquake induced liquefaction causes ground settlement at the surface



2004 Chūetsu Earthquake (Japan) Magnitude 6.8

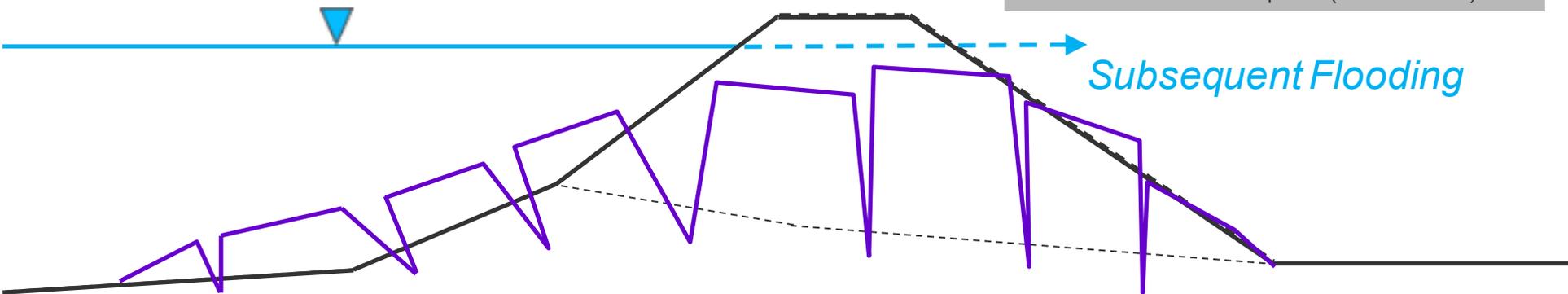
Expected Earthquakes Damage

Earthquakes Expected to Cause Multiple Levee Failures

- Levees expected to experience lateral spreading during large earthquake
- May require years to dewater islands and repair levees



Levee Lateral Spreading Failure in 2011 Christchurch Earthquake (New Zealand)



Zone of Liquefied Loose Sands

Recent Levee Failures Threatened the Mokelumne Aqueducts



- Levee breaches cause deep scour holes
- Pipelines are vulnerable to damage when islands are flooded



Breach in Lower Jones Tract in 1980



Breach in Upper Jones Tract in 2004

Expected Flood Damage



Scour hole after breach in Upper Jones Tract in 2004

Flood scour holes significantly below aqueduct pile foundation elevations



Submerged Mokelumne Aqueducts after breach in Upper Jones Tract in 2004

Submerged pipelines vulnerable to damage from wave action, floating debris, buoyancy, and corrosion

Mokelumne Aqueduct Resiliency Project

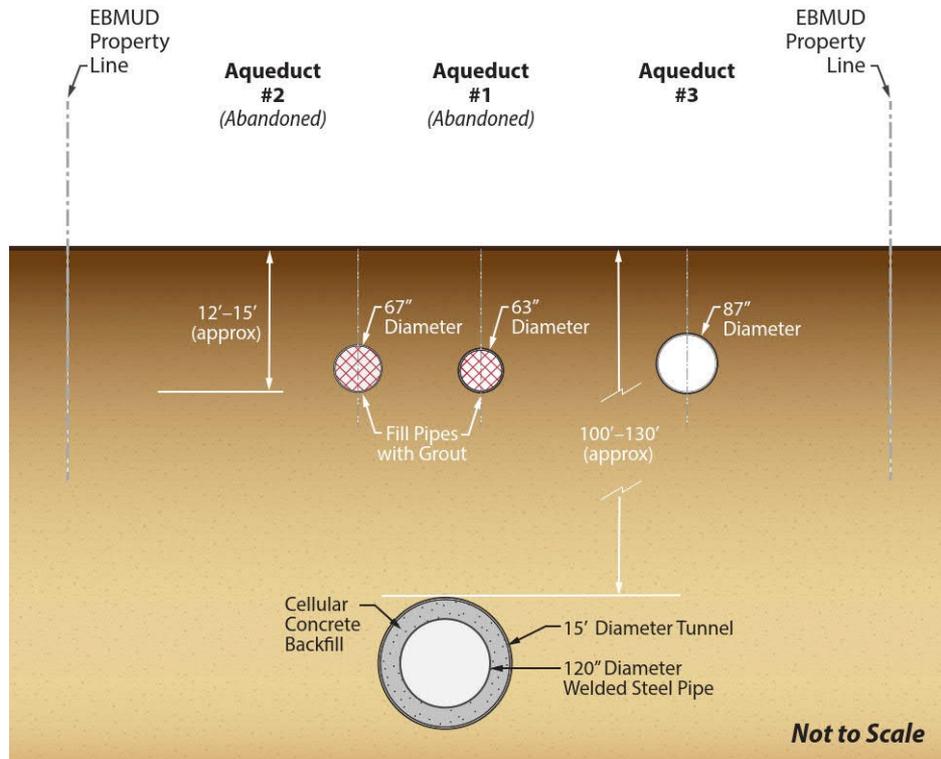


Project Description

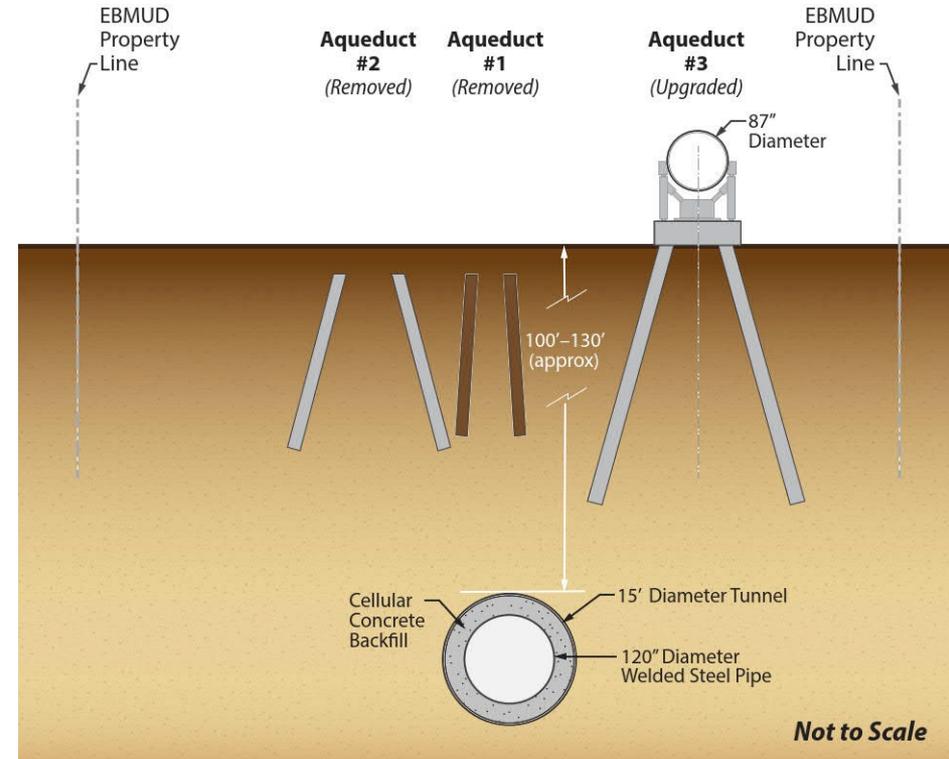
Proposed Project Conceptual Typical Cross Section



- 16.5-mile tunnel with steel carrier pipeline sized for full design flow
- Remove/abandon Mokelumne Aqueducts No. 1 and No. 2
- Upgrade/maintain Mokelumne Aqueduct No. 3 for operational flexibility and tunnel outages



Belowground Section: Stockton to Holt



Aboveground Section: Holt to Bixler

Tunnel and Carrier Pipeline

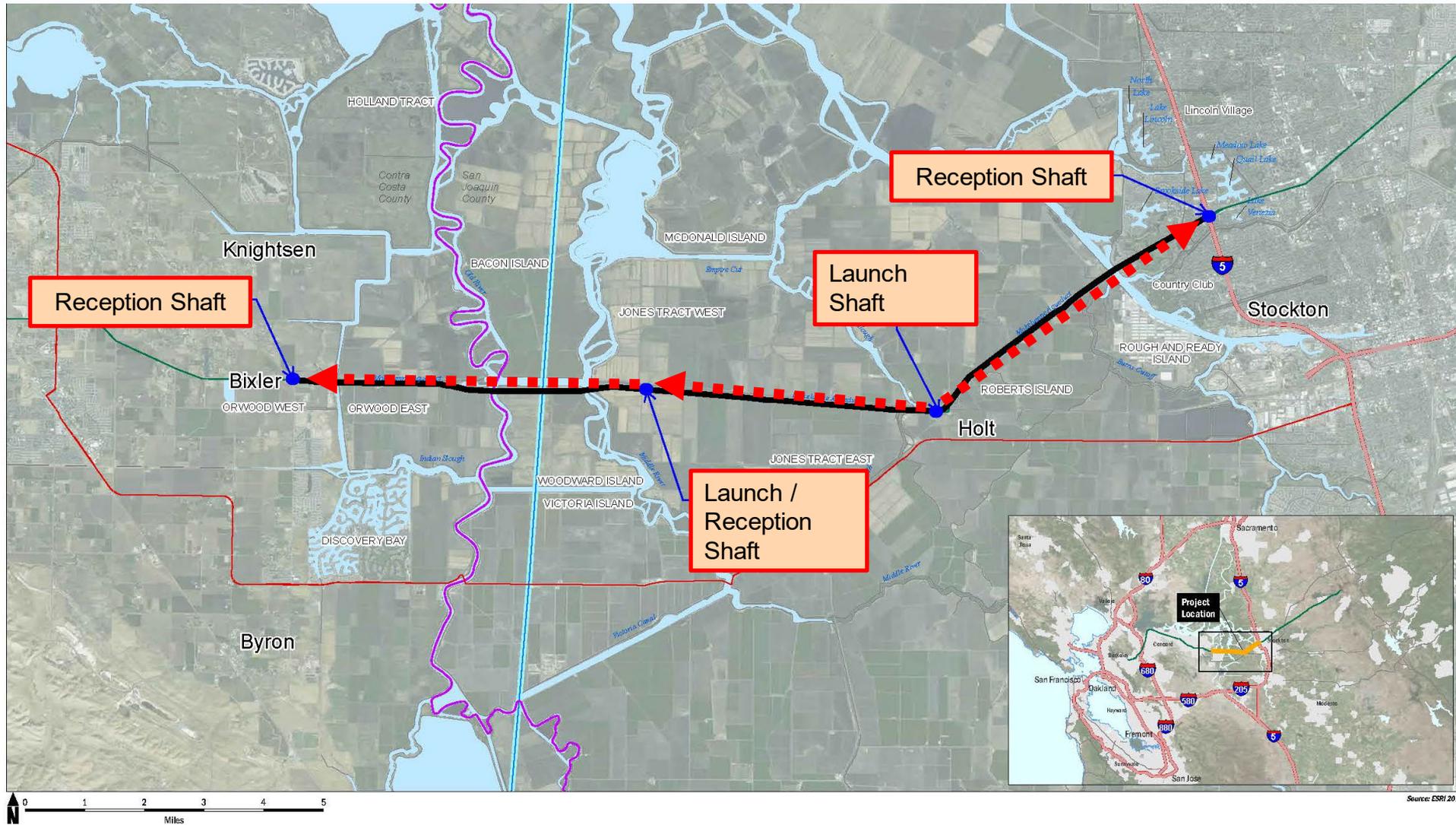


Inside of a Tunnel After Constructed



Inserting the Carrier Pipeline into the Tunnel

Proposed Project Tunneling Plan



Tunnel Temporary Features



- Approximately 60-foot diameter launch shafts with staging areas
- Approximately 32-foot diameter reception shafts with staging areas



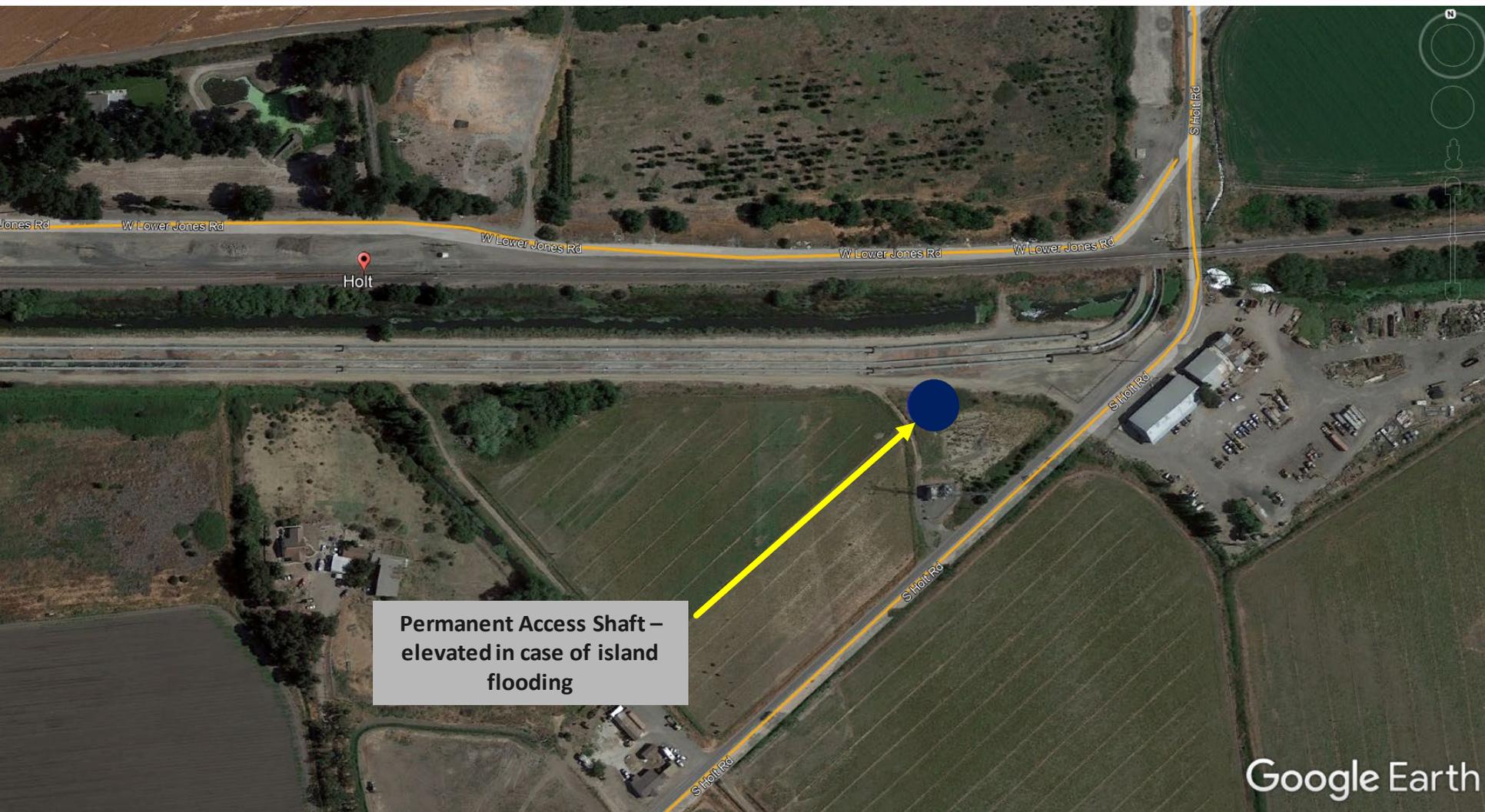
Launch Shaft Construction Activities



- Insertion of tunnel boring machine (TBM), concrete segments, and carrier pipeline
- Ventilation, power supply and soil extraction



Holt Shaft Approximate Location



Permanent Access Shaft –
elevated in case of island
flooding

Jones Tract West Approximate Location



Permanent Access Shaft –
elevated in case of island
flooding

Reception Shaft Construction Activities



- Removal of TBM
- Installation of below ground steel pipeline connections



Bixler Shaft Approximate Location



Permanent access shaft -
near ground surface

Stockton Shaft Approximate Location



Permanent access shaft -
near ground surface

Mokelumne Aqueduct Resiliency Project



Environmental Review Process and Schedule

What is an EIR?



Purpose:

To inform the public and agencies of the environmental consequences of projects

EIR is required:

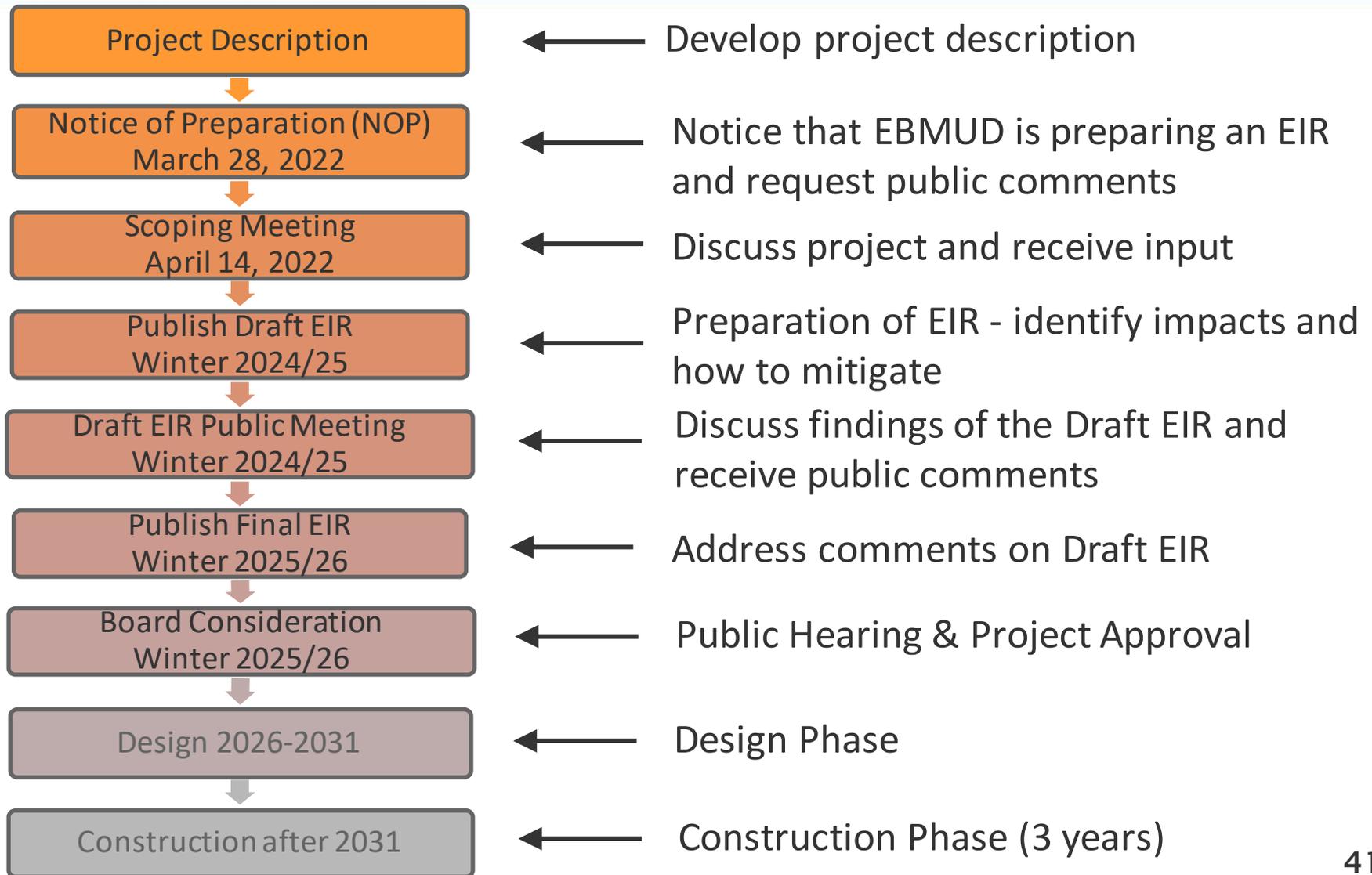
When there is potential that a project may have significant impacts

EIR Analysis of Impacts



Environmental Resource Category	Less than Significant	Less than Significant with Mitigation	Significant and Unavoidable	
Aesthetics				
Agriculture/Forestry				
Air Quality				
Biological Resources				
Cultural Resources				
Energy	<i>To be analyzed in the EIR</i>			
Geology				
Greenhouse Gases				
Hazards and Hazardous Materials				
Hydrology/Water Quality				
Land Use/Planning				
Noise				
Recreation				
Transportation				
Tribal Cultural Resources				
Utilities/Service Systems				

Environmental Review Schedule



Next Steps



- Consider incorporation of NOP comments into project
- Develop the conceptual design
- Outreach to agencies and property owners
- Perform environmental studies
- Prepare Draft Environmental Impact Report to be released Winter 2024/25

Mokelumne Aqueduct Resiliency Project



Questions and Comments

Thank You for your participation



More information and tonight's presentation can be found at the
Project Website:

www.ebmud.com/marp

Contact for Project Questions:

mokelumne.aqueducts.resiliency@ebmud.com

Or by mail:

David Rehnstrom, Manager of Water Distribution Planning
East Bay Municipal Utility District
375 Eleventh Street, MS 701
Oakland, CA 94607-4240

Send written NOP comments by April 28, 2022

Contact for General EBMUD Questions:

Gerald Schwartz, Community Affairs Representative
gerald.schwartz@ebmud.com

Questions and Comments

- To participate, please click “Raise Hand” at the bottom of your screen.
- A member of our team will prompt you to speak.
- Please first state your full name.
- After you have made your comment, click “Lower Hand.”

