



# Advancing Nature-based Shoreline Solutions

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Photo: Ben Botkin



San Francisco  
**ESTUARY PARTNERSHIP**



Partnership in Action



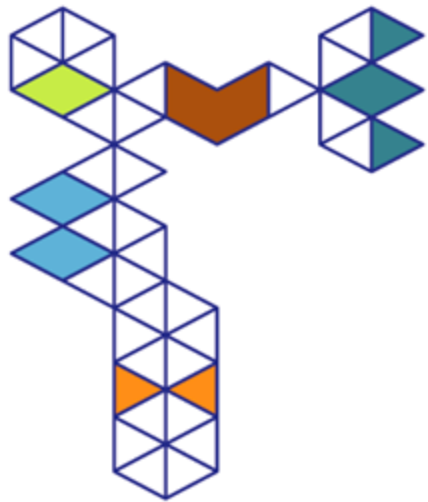
# San Francisco Estuary Partnership

- A place-based EPA program
- Collaborative and non-regulatory
- Leverage federal, state, and regional resources to implement the Estuary Blueprint



*Where do we want to be in 2050?*

*What can we do over the next 5 years to get there?*



SAN  
FRANCISCO

Estuary  
Blueprint

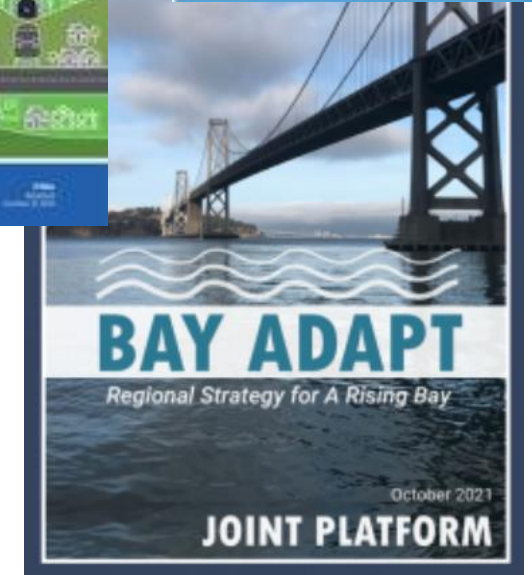
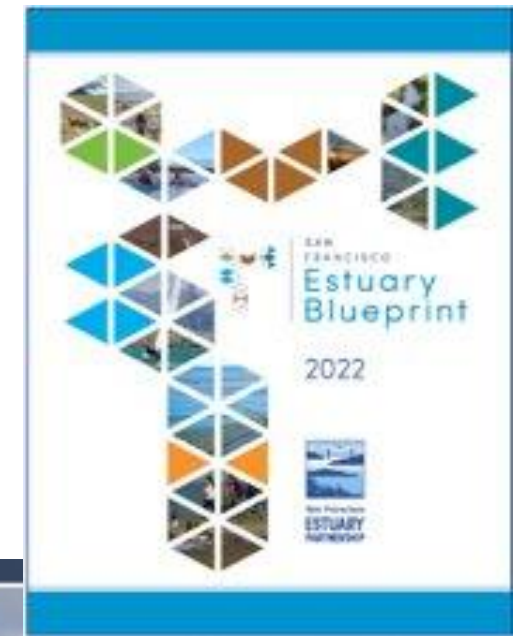
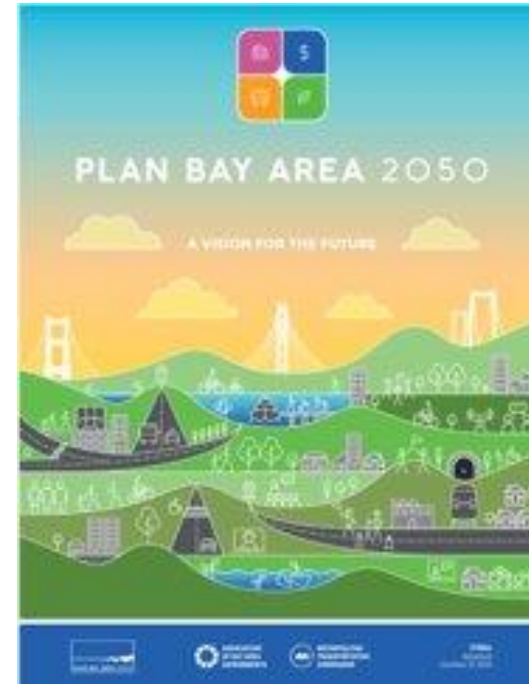


# What do we mean by nature- based solutions?

*"Nature-based Solutions leverage nature and the power of healthy ecosystems to protect people, optimize infrastructure and safeguard a stable and biodiverse future"* - International Union for the Conservation of Nature and Natural Resources (IUCN)

# Why Nature-based Solutions (NbS)?

- Increasing urgency to advance projects using innovative approaches that support multiple benefit to people and nature
- Regional Guidance
  - Plan Bay Area 2050, , Estuary Blueprint, Bay Adapt Joint Platform
- State and Federal Guidance
  - Executive Orders



# Types of Shoreline NbS

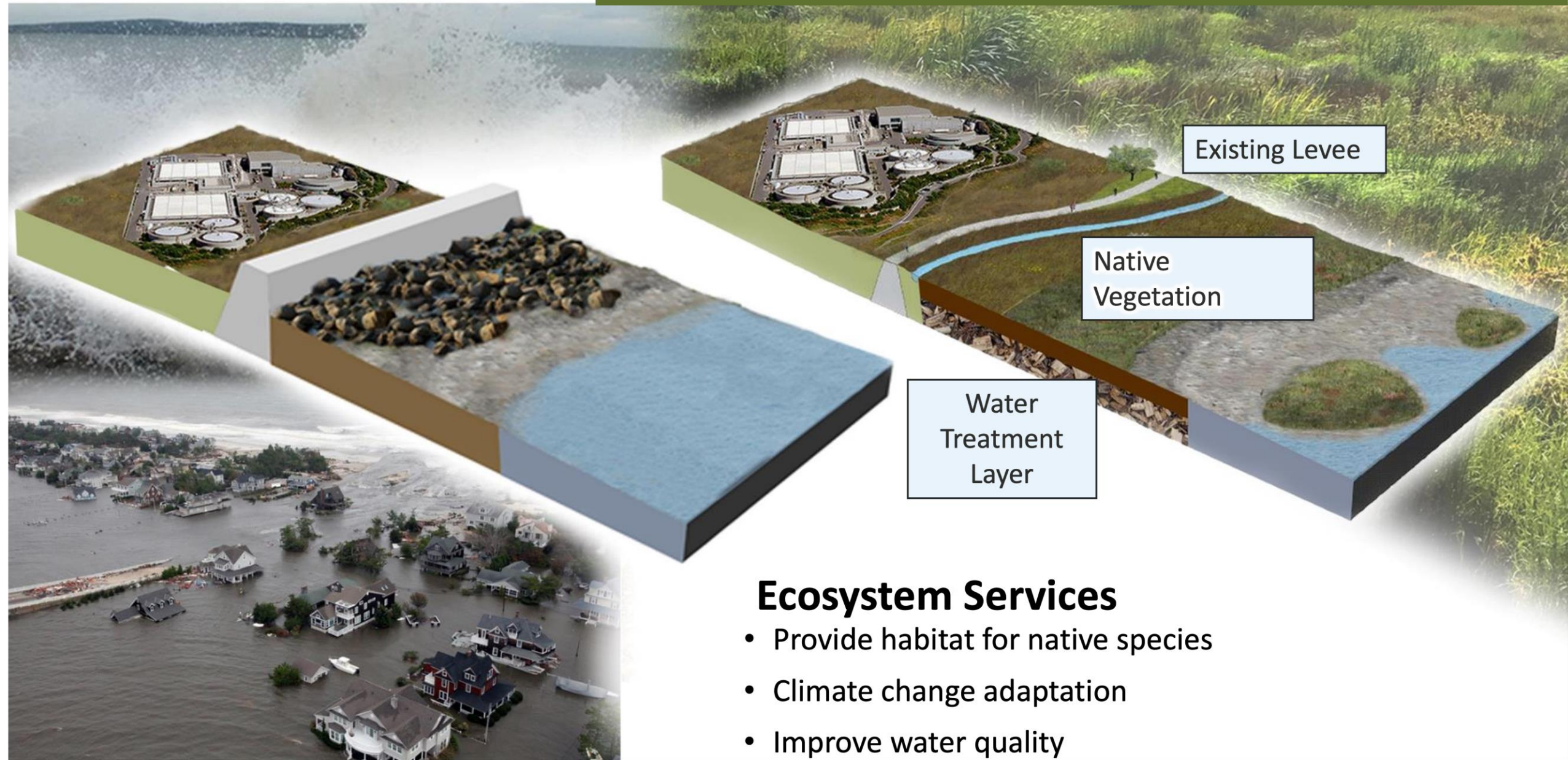
- Natural habitats such as tidal marshes, tidal flats, sandy beaches, eelgrass and oyster beds
- Hybrid approaches such as "living seawalls"
- "Ecotone" and "horizontal" levees





## CONVENTIONAL LEVEES & SEA WALLS

## HORIZONTAL LEVEE SOLUTION



### Ecosystem Services

- Provide habitat for native species
- Climate change adaptation
- Improve water quality



**Reimagining  
Wastewater  
as a  
Resource**





# Reimagining Wetlands for People and Nature



# SFEP's Work on NBS

## Regional Scale

- Technology transfer & convenings
- Address barriers to implementation – funding, regulatory, governance
- Support funding to local communities – grant writing, federal coordination

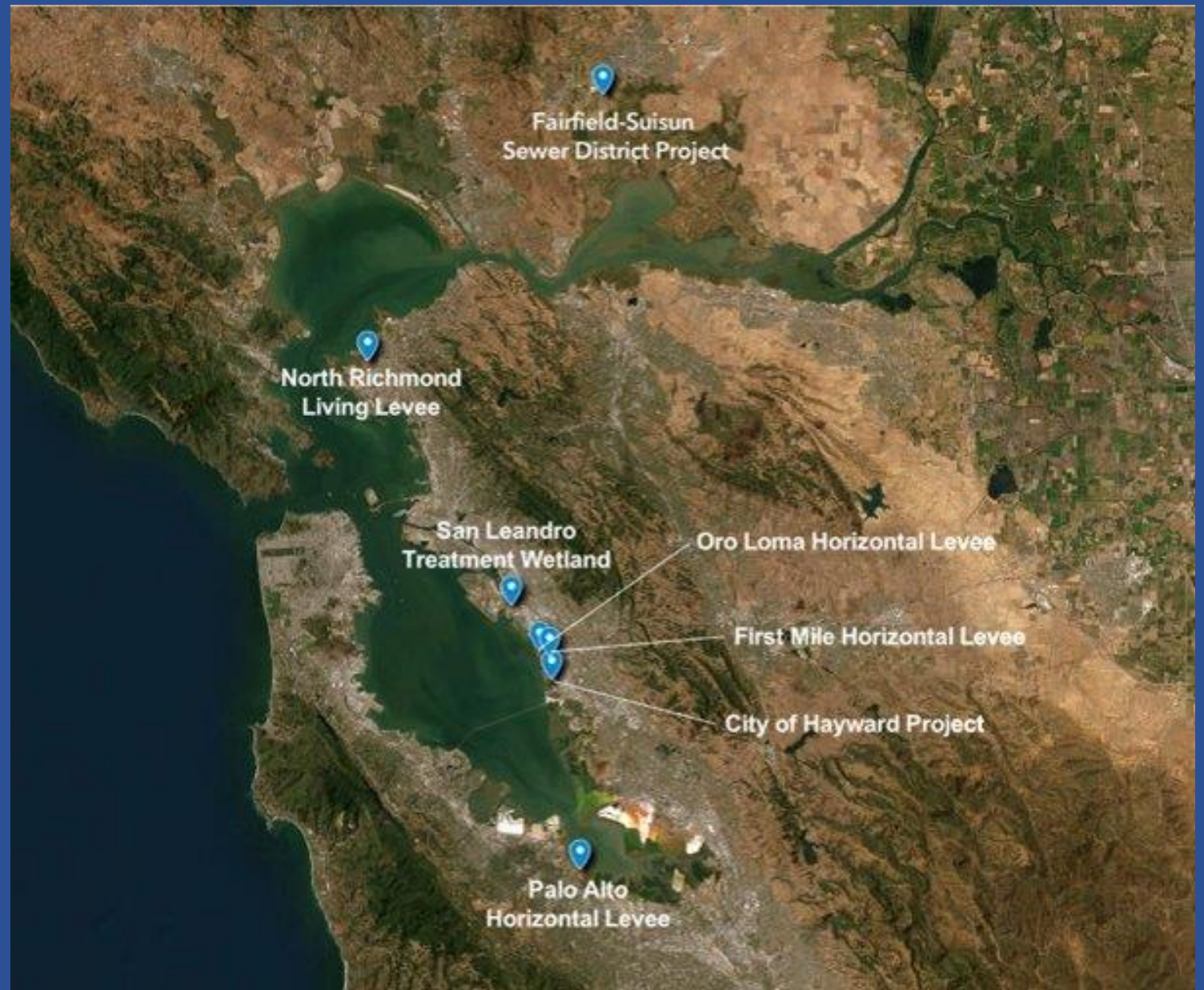
## Local Scale

- Advance on the ground projects in partnership with local jurisdictions and communities





We partner  
with  
communities  
around the  
region





# Oro Loma Horizontal Levee

- Pilot project built in 2015 to study water quality improvement opportunities
- Partnership between UC Berkeley, Valley Water, Oro Loma Sanitary District, SF Estuary Institute, Save The Bay, East Bay Dischargers Authority, SFEP
- Findings show significant removal of nutrients and contaminants of emerging concern





# Project Highlights

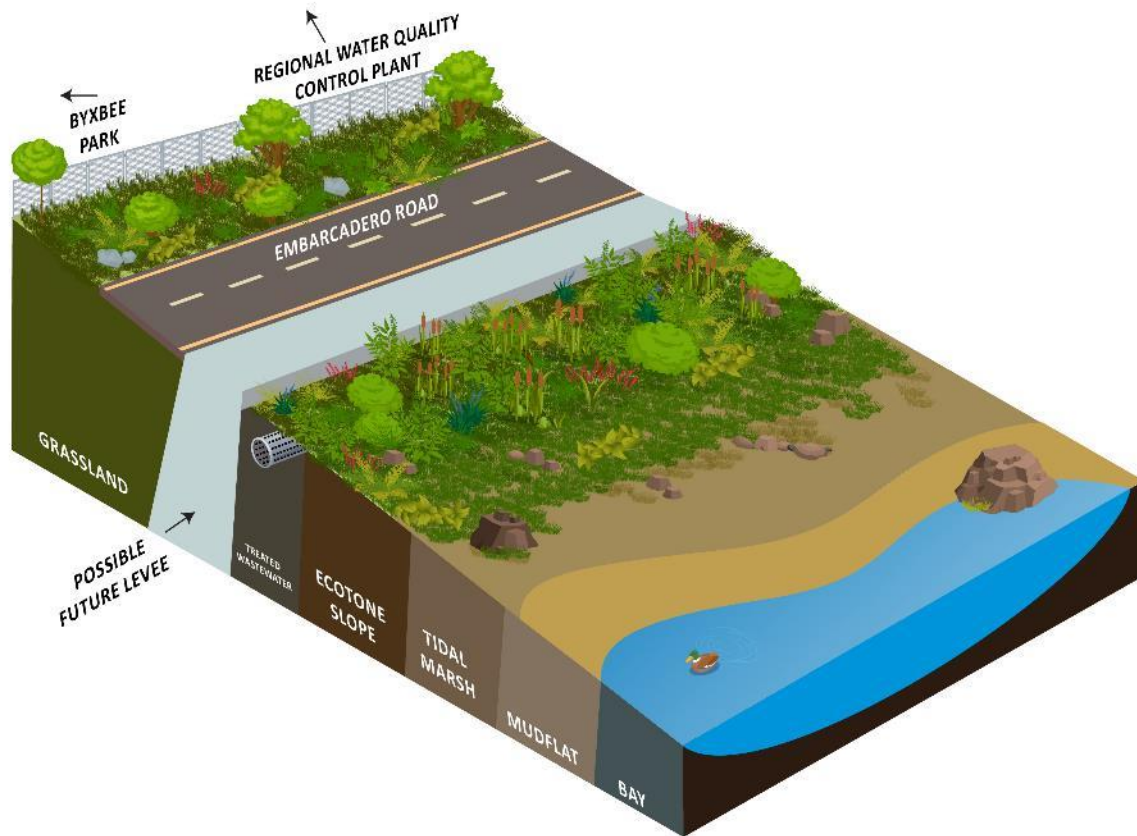
- **First horizontal levee** with treated wastewater conveyance directly to the SF Bay
- **Implements Estuary Blueprint** Task 3-1, 4-1, 4-2 – focused on design and implementation of nature-based shoreline adaptation projects
- **Innovative** design, permitting and construction strategies
- **Paves the way** for future horizontal levee projects regionally
- **Funding** from US EPA Region 9 WQIF and Climate Ready Estuaries, State Coastal Conservancy, City of Palo Alto



Expected Construction start date – July 2024



# Palo Alto Horizontal Levee – Project Goals



- Improve habitat along the perimeter of Harbor Marsh.
- Adapt to sea level rise and coordinate with future larger levee improvement project (i.e., SAFER Bay/Shoreline Study).
- Maintain public access to the existing trail system while providing opportunities for compatible low-impact recreation, increased social infrastructure, and educational opportunities on sea level rise.
- Ensure perspectives of marginalized communities are incorporated into social infrastructure and educational components.
- Provide polishing treatment to discharged treated wastewater.



# Key Implementation Challenges

PACE AND  
SCALE

REGULATORY

GOVERNANCE

KEEPING  
COMMUNITIES  
AT THE CENTER

# Thank you!

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