

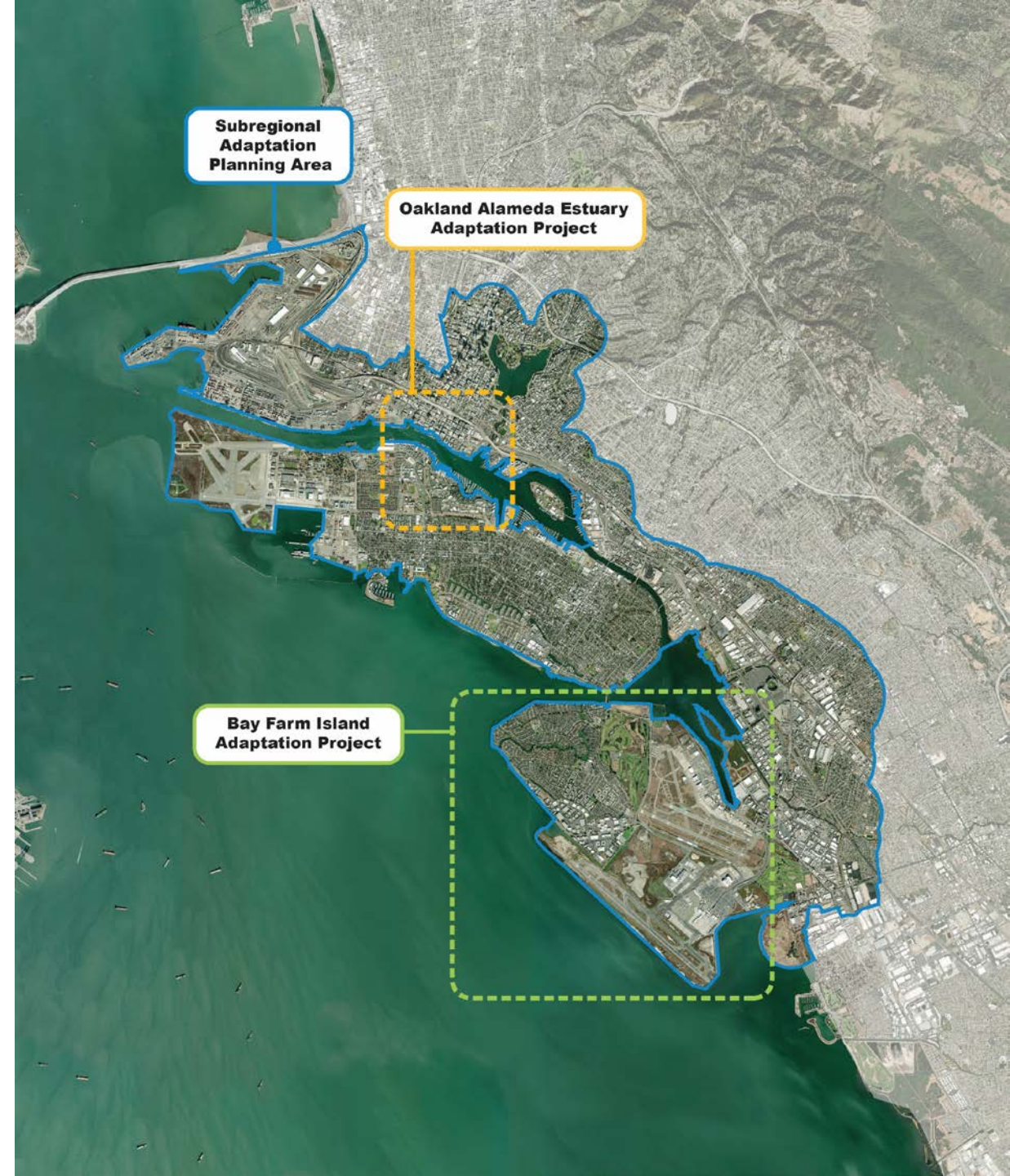
OAAC Adapt

Oakland-Alameda Estuary and Bay Farm Island Near-Term Adaptation Project Update



OAAC ADAPT Projects

- The **Subregional Adaptation Plan** is a long-term plan that details preliminary strategies and pathways for shoreline communities to take as the climate and shorelines change over time
- The **Oakland Alameda Estuary Project** is a near-term sea level rise adaptation design concept to address increased coastal, stormwater, and groundwater flooding for up to two feet of sea level rise over the coming decades
- The **Bay Farm Island Adaptation Project** is a near-term sea level rise adaptation design project to address compound flooding and up to two feet of sea level rise and long-term planning coordination.



Project Schedule

2023 FALL 2024 JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC 2025 JAN FEB MAR APR MAY JUNE JULY AUG SEPT

Planning Principles, Analysis and Criteria

Strategy Foundation

Strategy Development & Stakeholder Input

Strategy Refinement

Plan Completion & Council Hearings

Long-Term Subregional Adaptation Plan

Existing Conditions & Analysis

Develop Alternatives

Alternative Refinement & Stakeholder Input

Preferred Concept

30% Design Development of Preferred Concept

30% Design Completion & Council Hearings

Near-Term Bay Farm Island Adaptation

Existing Conditions & Analysis

Develop Alternatives

Alternative Refinement & Stakeholder Input

Final Concept Development

Final Concept & Council Hearings

Project Grant Deadline Feb 2025

Near-Term Oakland Alameda Estuary Adaptation

We are here!



Oakland Alameda Estuary
REAP Climate Center 8/3/24



Bay Farm Island
Leydecker Park 8/12/24

Oakland Alameda Estuary
Jack London Square 8/15/24



Potential Adaptation Measures

Levee and Seawall with Bay Trail



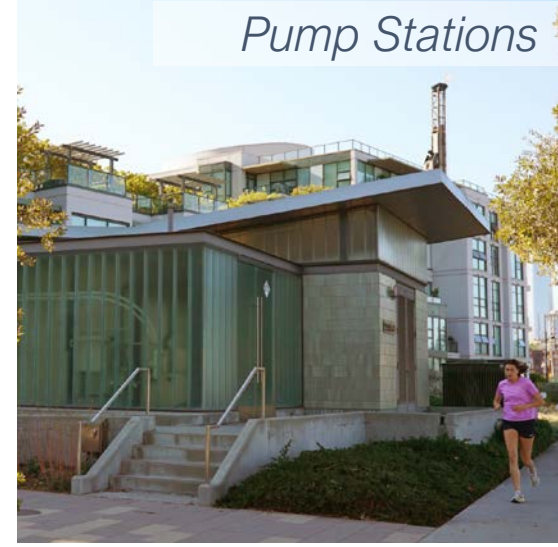
Levee with Beach Access



Green infrastructure



Pump Stations



Levee with Waterfront Park



Seawall with Tidal Marsh



Levee with Tidal Marsh



Opportunities to Grow Ecological Health & Habitat

Building on existing and historical habitat conditions in the near term

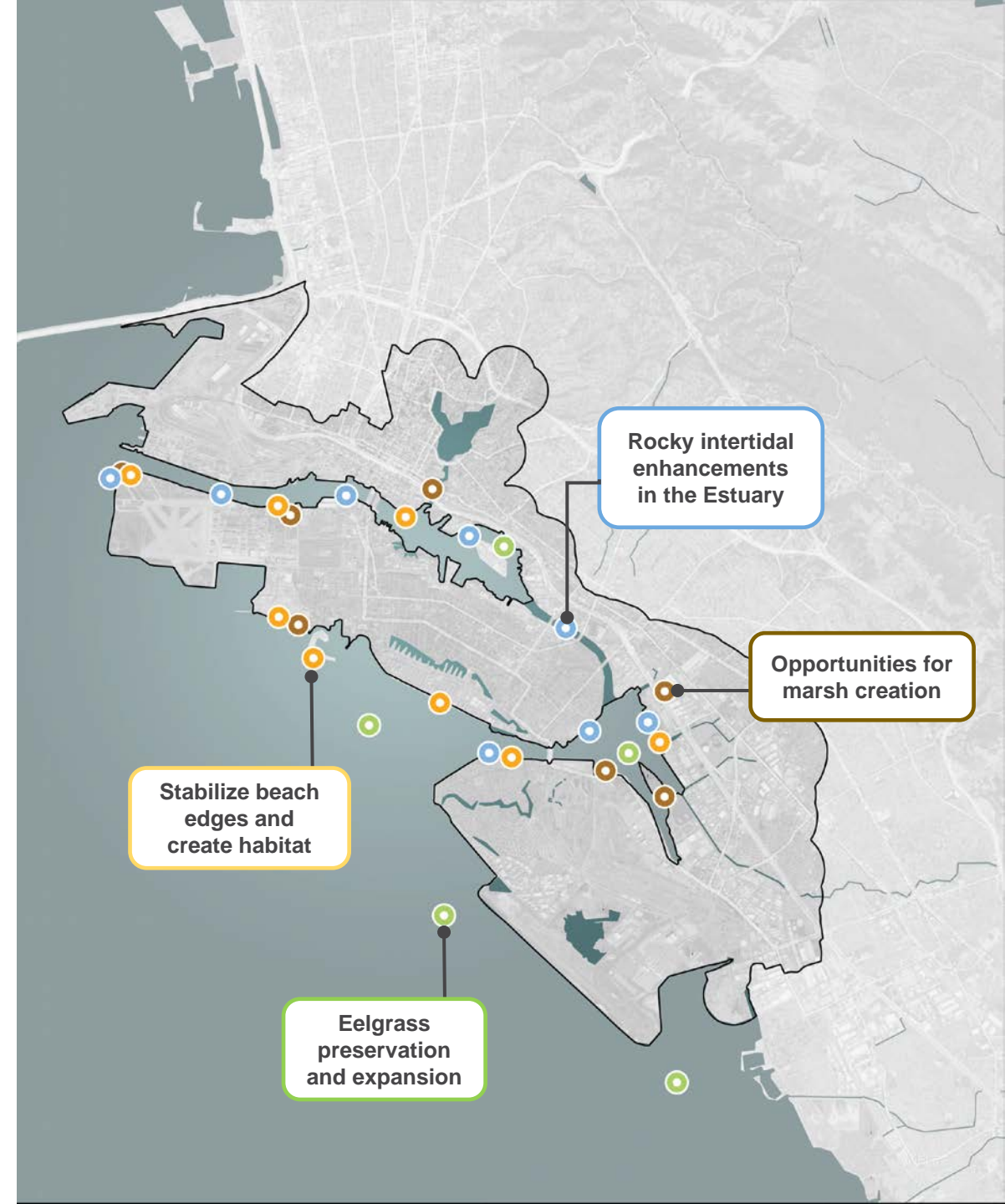
- Marsh and uplands transitions including marsh construction and preservation of existing marsh edge
- Beach stabilization and habitat improvements
- Eelgrass preservation and expansion
- Rocky intertidal enhancements such as living seawalls, enhanced riprap planting, tidepool and oyster bed creation



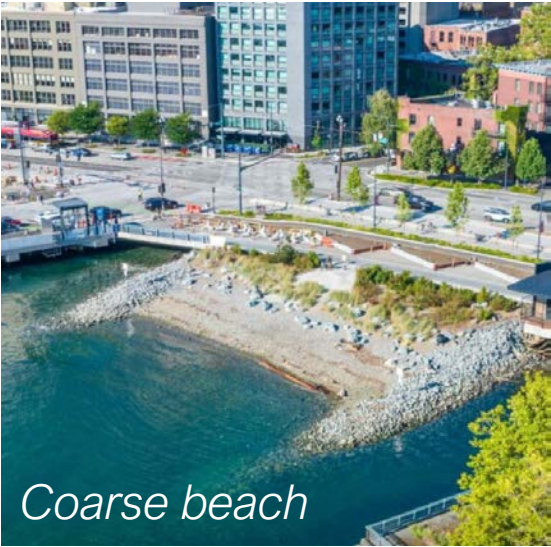
Existing eroding marsh edge along north shore of Bay Farm Island



Sand beach and debris preserving marsh edge and pond habitats within Elsie Roemer preserve.



Natural & Nature-Based Features



Oakland-Alameda Estuary



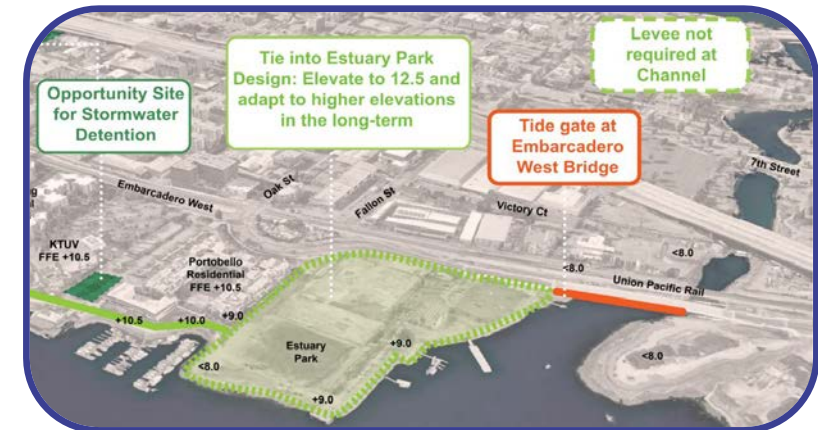
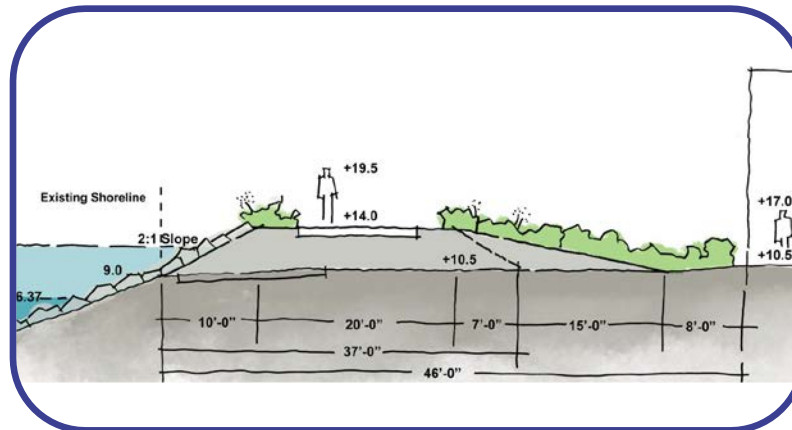
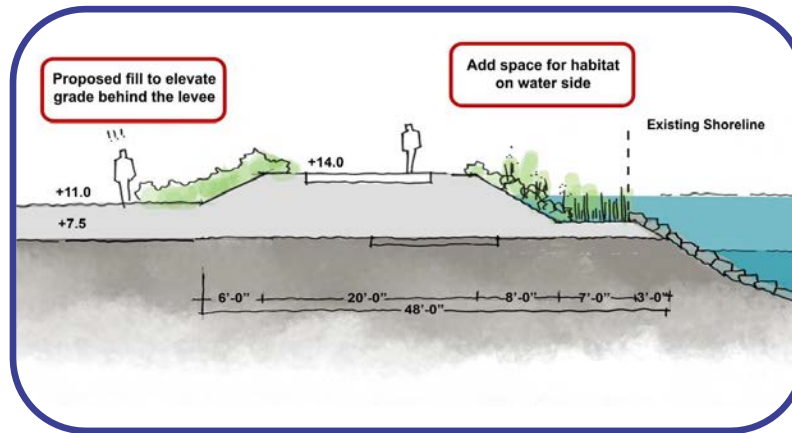
Existing Conditions & Analysis

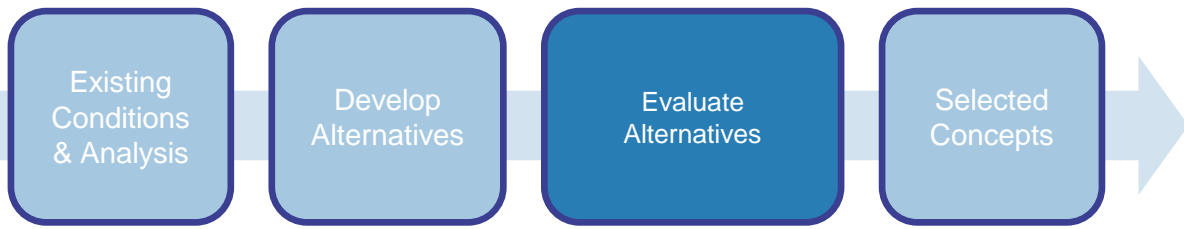
Develop Alternatives

Evaluate Alternatives

Refine Selected Concepts

Over 50 coastal and inland flood adaptation measures were considered for the zones along the Oakland-Alameda Estuary shoreline





The Alternatives were assessed relative to each other using the **Priority Evaluation Criteria** developed by the project consultants, community members and agency partners

COASTAL FLOOD PROTECTION: Does the Measure provide FEMA Accredited Coastal Flood Protection

ENVIRONMENTAL IMPACT: What is the Relative Value of the Environmental Impact of the Measure. This could be negative or positive benefit.

ADAPTABILITY: Is the Measure Adaptable in the future for Long-Term Flood Protection? (Elev. 17 or greater)

COST: What is the Cost of the Measure Relative to other Measures

PUBLIC REALM: What is the Relative Quality Public Access and Public Space Provided by the Measure

TIMELINE: Can the measure be implemented by 2035 (within 10 years)



Alameda:
Mariner Square
to Marina
Village



Shoreline Analysis



MARINER SQUARE
OAKMONT
FFE +10.5

BOHOL CIRCLE
IMMIGRANT
PARK
+13.5

CARDINAL
POINT
+10.5

BARNHILL MARINA
FLOATING HOMES
+9.0 +10.5

EXTENDED
STAY AMERICA
FFE +12.5

NAVIGABLE CHANNEL

WEBSTER TUBE

MARINER SQUARE DR

POSEY TUBE

SHIPWAYS
+10.5

MITCHELL AVE

Webster Tube
Entrance
<math>< 6.0'</math>

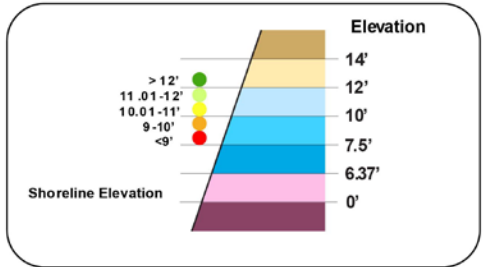
Posey Tube
Entrance
<math>< 6.0'</math>

MARINA VILLAGE PKWY
+10.0 +9.0 +10.5 +12.0

SHORELINE
PARK
+12.0

MARINA VILLAGE

WEBSTER ST / 260



Alameda Near Term Adaptation Concept

Alameda Coastal Flood Protection

MARINER SQUARE TO SHIPWAYS

SHIPWAYS TO MARINA VILLAGE



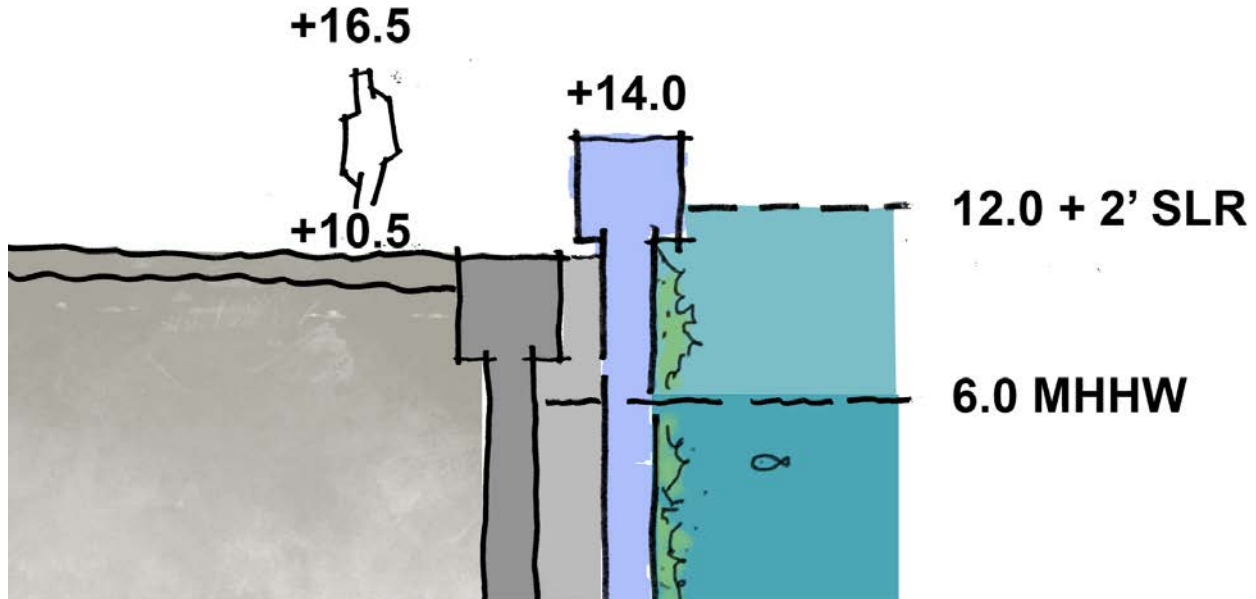
Alameda Concept Plan – Mariner Square to Shipways



**Finished Floor Elevation

Alameda Shoreline – Near Term Adaptation Elevated Seawall

**Build new Seawall water side
of existing wall.
Environmental permits and
agency coordination required.**

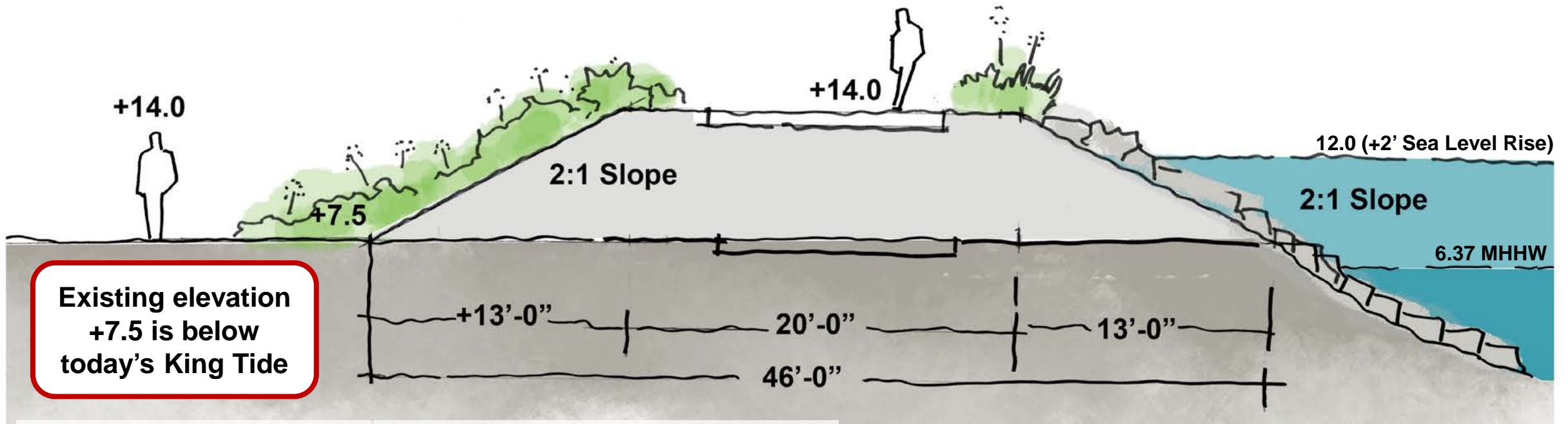


Section 1 – Typical condition at
Cardinal Point and Mariner Square Drive



Alameda Shoreline – Near Term Adaptation Shoreline Levee

Levee elevated to +14.0.
Over 6 feet tall relative to
adjacent grade.



Existing elevation
+7.5 is below
today's King Tide

Section 2 – Typical condition at Barnhill Marina

Alameda Shoreline

PICNIC AREA

UPLAND HABITAT
PLANTING

LEVEE & IMPROVED
BAY TRAIL

SLOPE ENHANCEMENT & PLANTING FOR ROCK AND
LOG INTERTIDAL HABITAT



Existing Shoreline (elev. 10.5)

+14.0

12.0 (+2'-0" SLR)

6.37 MHHW

Section 3 - View of shoreline protection and improvements near hotel



Alameda Concept Plan – Mariner Square to Shipways



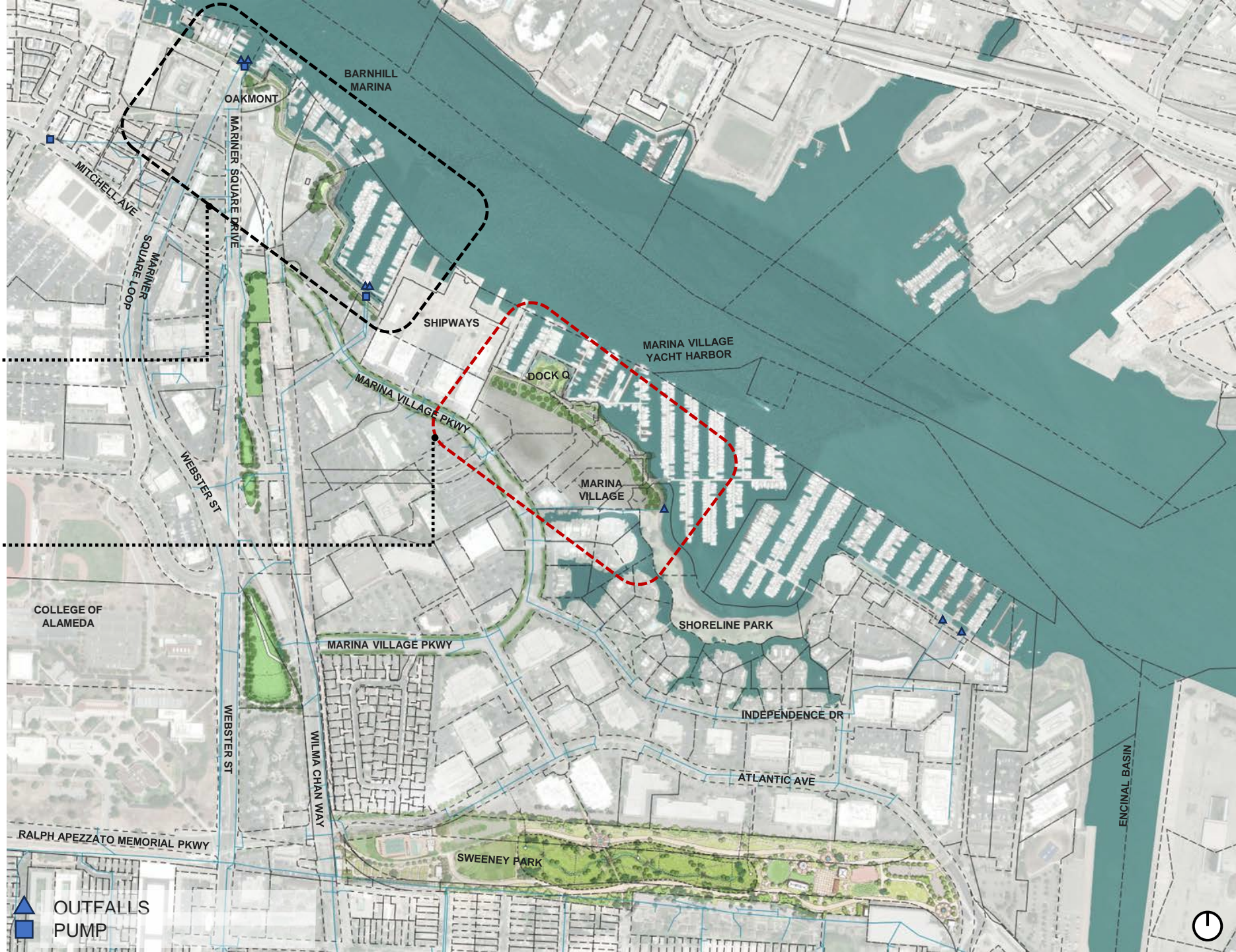
**Finished Floor Elevation

Alameda Near Term Adaptation Concept

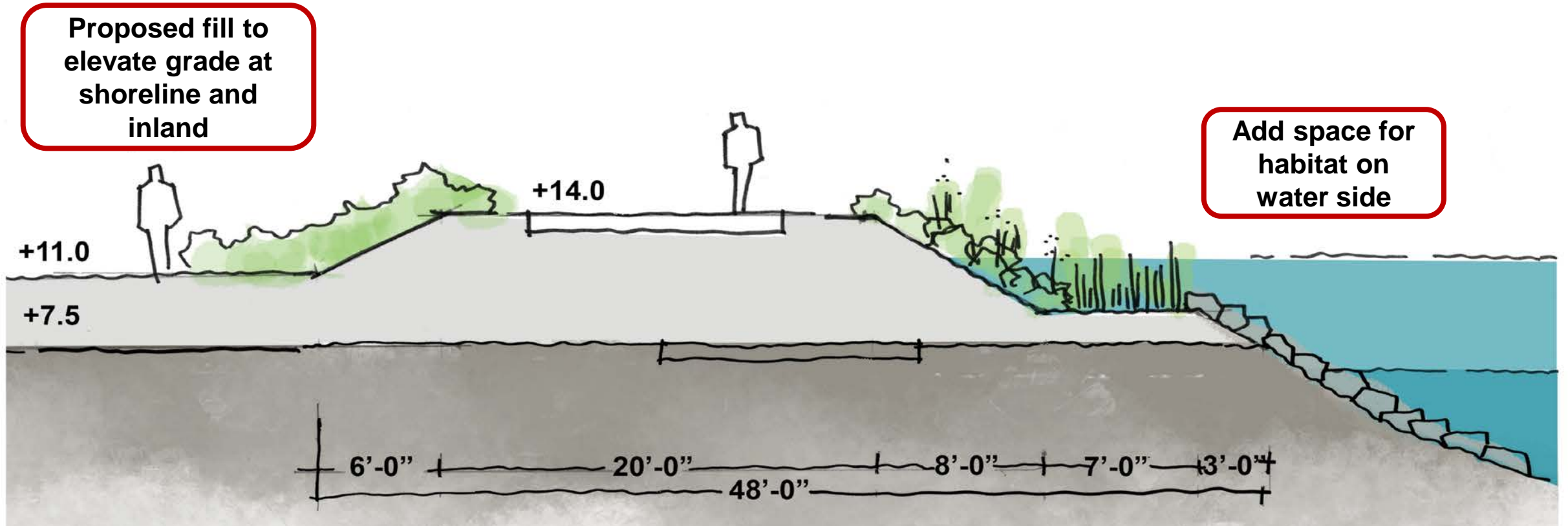
Alameda Coastal Flood Protection

MARINER SQUARE TO SHIPWAYS

SHIPWAYS TO MARINA VILLAGE

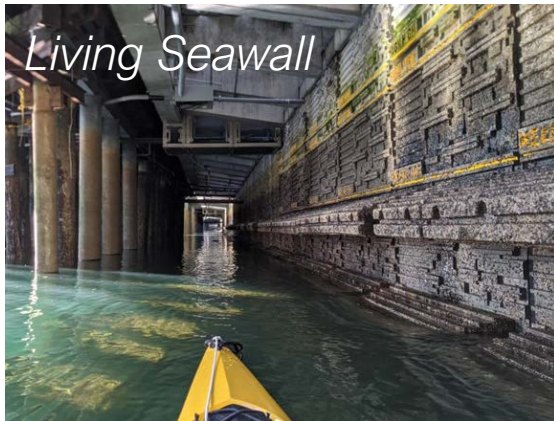


Alameda Shoreline – Near Term Adaptation Raised Grade at Shoreline and Inland



Section 4 – Typical condition at Marina Village

Potential Natural & Nature-Based Features



Inland Flooding Analysis

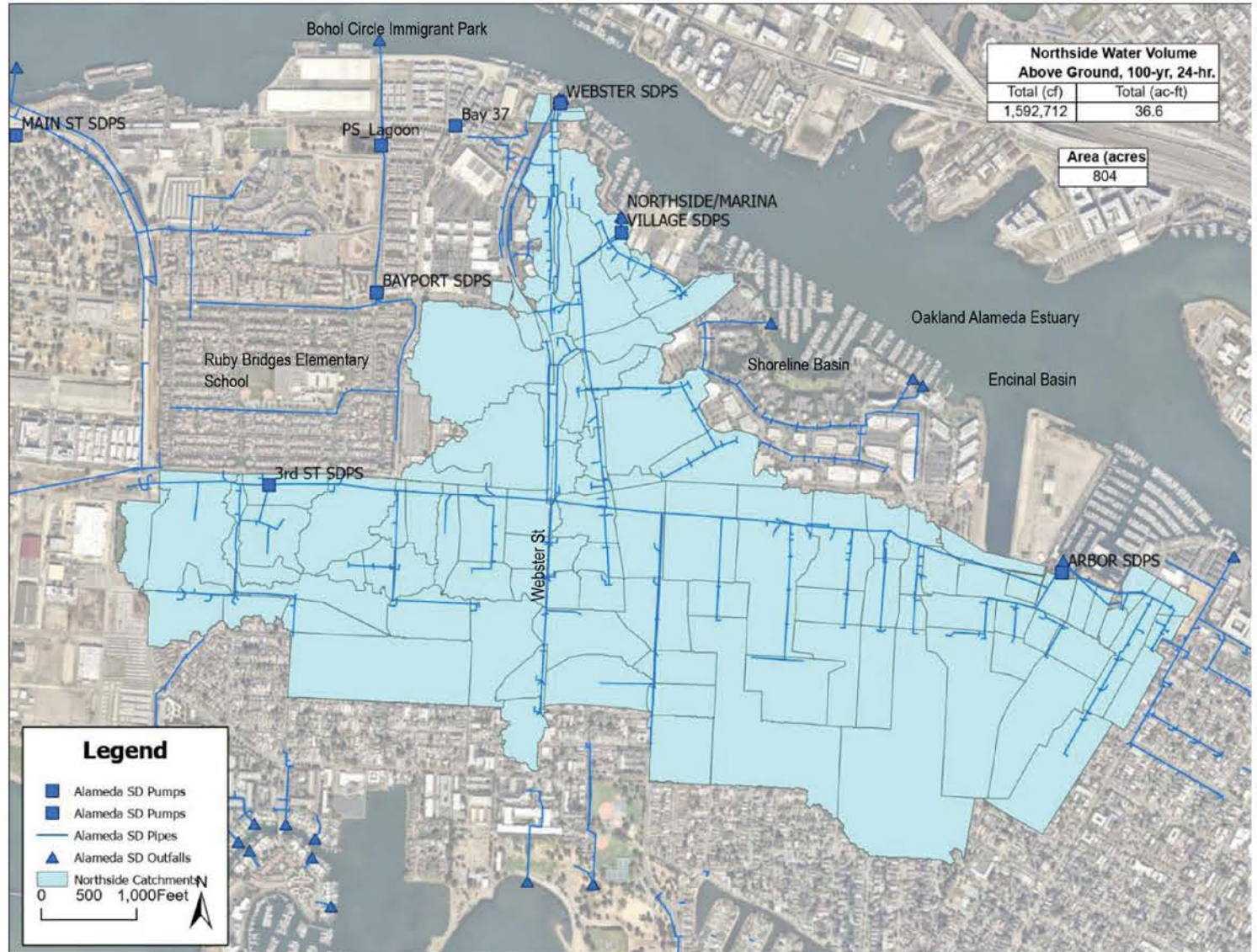
Stormwater Modeling: Northside of Alameda

- Volume of water above ground (stormwater flooding) currently generated by 100-yr, 24-hr storm: 36.6 acre-feet
- This is the volume of water that does not fit in Alameda's storm drain system today.
- Analysis includes stormwater detention for today's volume with added capacity for future increases.

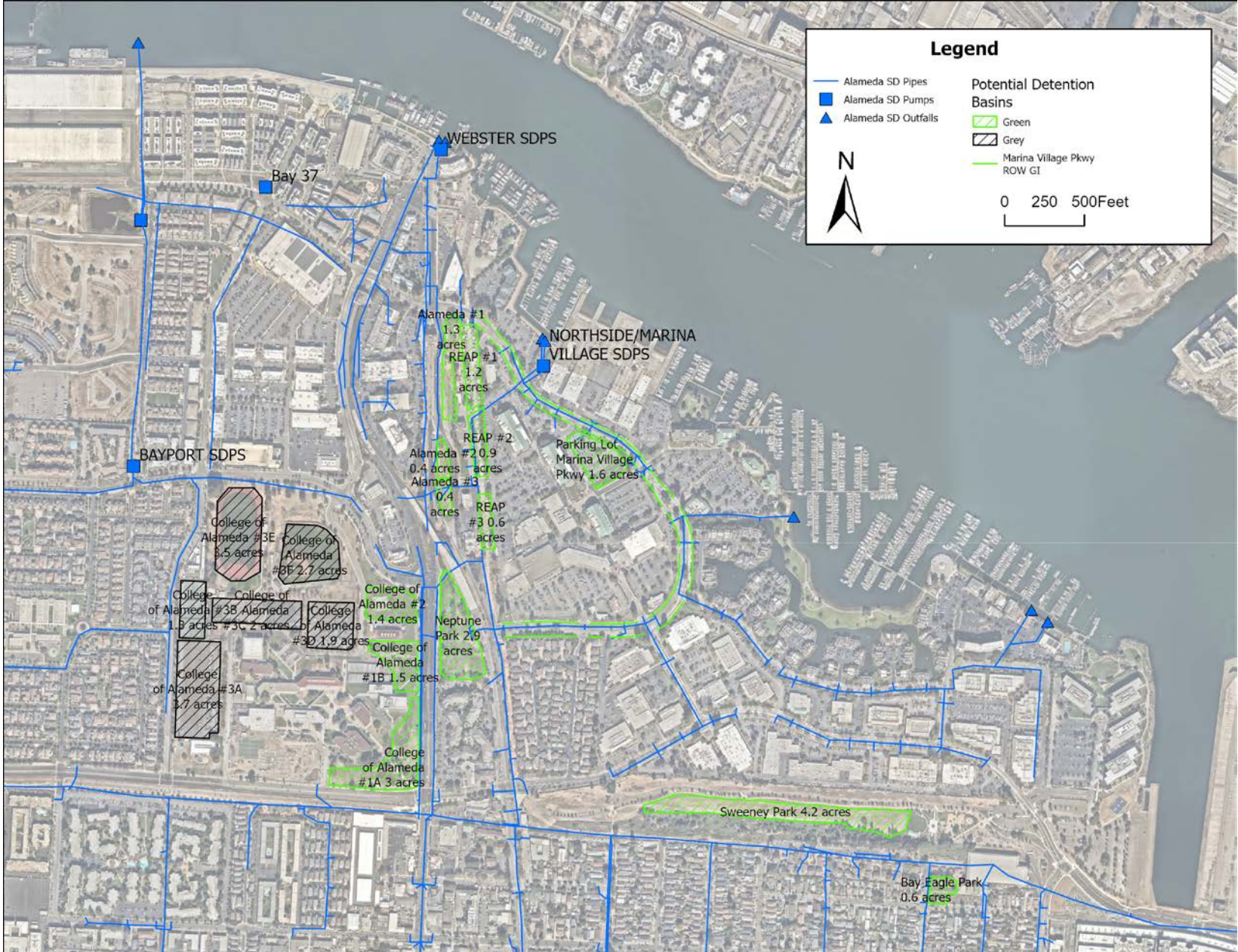
Estimated Future Precipitation % Increase With Climate Change

		10-yr	100-yr
2050	3-hr	21.6%	25.8%
	24-hr	17.9%	22.1%
2060	3-hr	27.8%	32.7%
	24-hr	22.2%	26.8%
2070	3-hr	33.7%	39.3%
	24-hr	25.9%	31.2%
2080	3-hr	40.7%	47.1%
	24-hr	30.7%	36.6%
2090	3-hr	49.6%	56.9%
	24-hr	37.1%	43.7%
2100	3-hr	59.0%	67.2%
	24-hr	43.6%	51.0%

San Francisco Bay Area Domain SSP5-8.5



Inland Flooding Conceptual Detention Basin Locations



Conceptual Stormwater Detention Basin Locations - City of Alameda Land

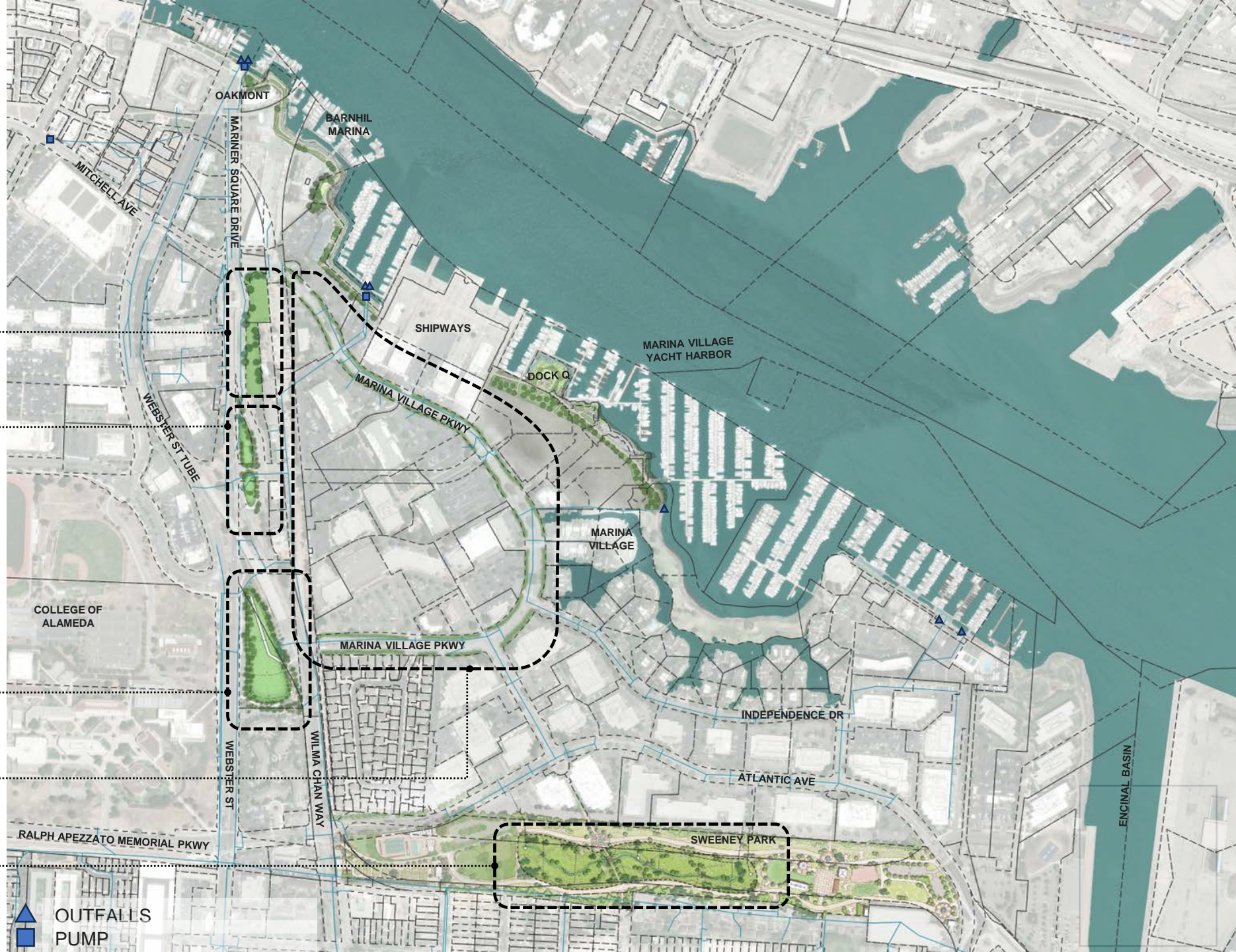
ALAMEDA #1
2 acre-ft

ALAMEDA #2 & #3
2 acre-ft

NEPTUNE PARK
8 acre-ft

MARINA VILLAGE
PARKWAY RIGHT-OF-WAY
5 acre-ft

JEAN SWEENEY PARK
18 acre-ft



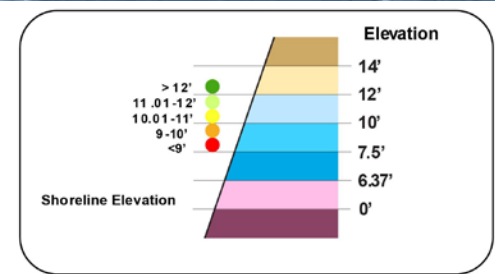
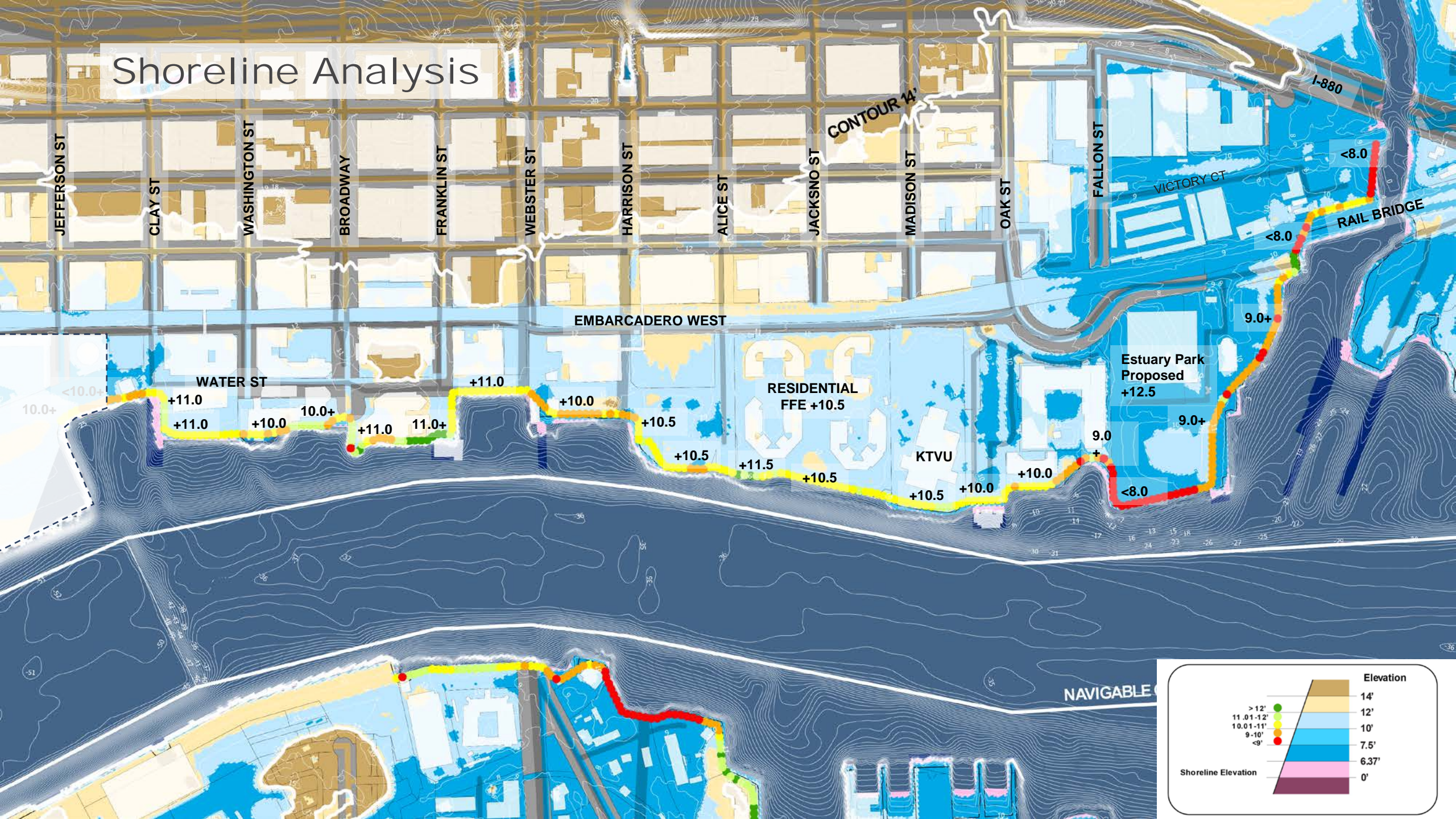
▲ OUTFALLS PUMP
■ PUMP

Oakland Coastal Flood Protection Concept

*Alice Street to Lake
Merritt Channel*



Shoreline Analysis



Jack London Square - Port of Oakland Area of Study*



*AREA IS UNDER STUDY BY THE PORT OF OAKLAND'S VULNERABILITY ASSESSMENT, AND ADAPTATION PLAN

Oakland Concept Plan



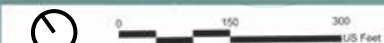
ENLARGEMENT: ALICE ST TO ESTUARY PARK

TIDE GATE

AQUATIC CENTER TO BE ADAPTED FOR SEA LEVEL RISE IN FUTURE PLANNING

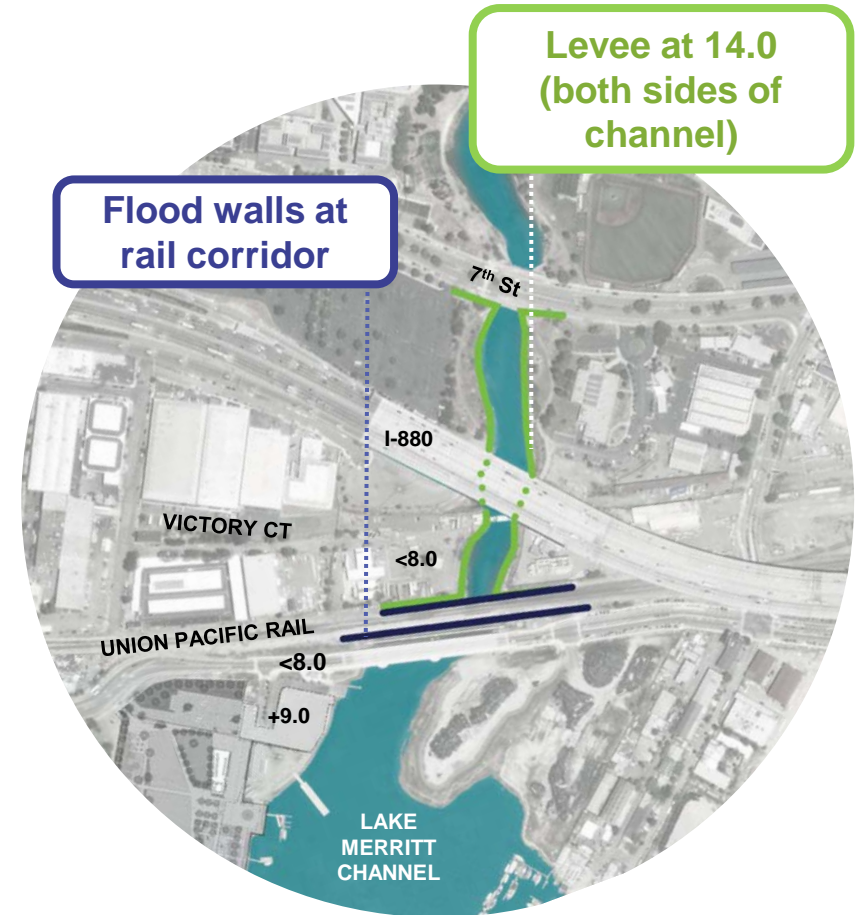
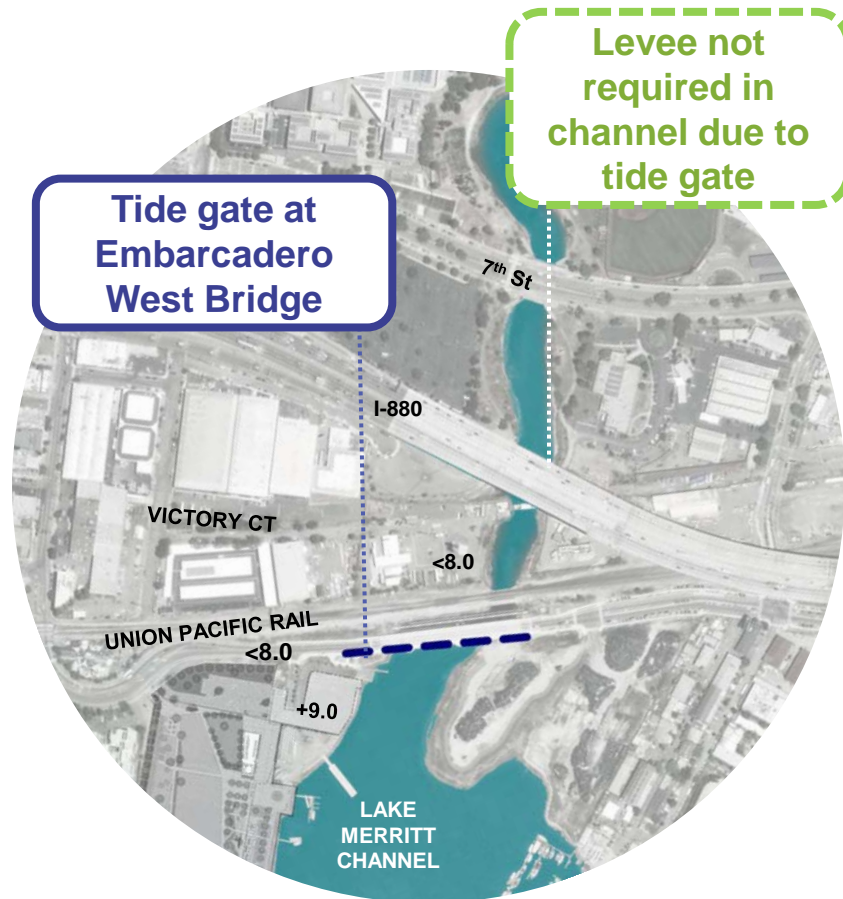
TIE INTO ESTUARY PARK DESIGN: ELEVATE TO 12.5 AND ADAPT TO HIGHER ELEVATIONS IN THE LONG TERM (CITY OF OAKLAND PROPOSED PROJECT)

*This adaptation alternative is developed to a conceptual planning level only. Port properties in this area are under study by the Port of Oakland's Vulnerability Assessment, and Adaptation Plan
**"Finished Floor Elevation" (estimated)



Oakland Concept

Alternative to Tide gate at Lake Merritt Channel: Flood Walls at Union Pacific Rail Bridge



Oakland Shoreline



Bay Farm Island Near-Term Adaptation



Preferred Near-Term Adaptation Alternative

- Levee improvements from lagoon outfall to Veterans Court
- Lagoon management: Tide gate & pump station replacement
- Storm drain system modifications to remove penetrations
- Nature-based solutions

Nature-Based Solutions

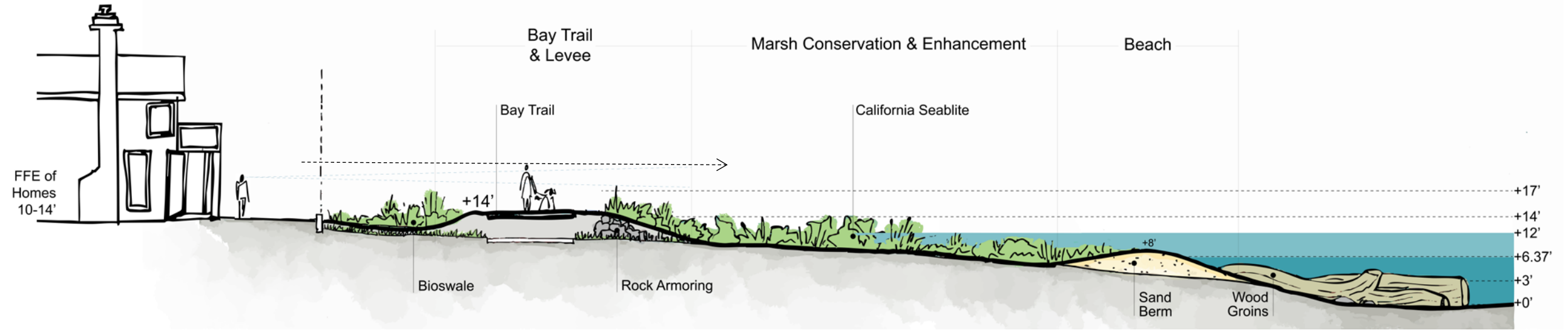
Levee & Floodwall & Nature-Based Solutions



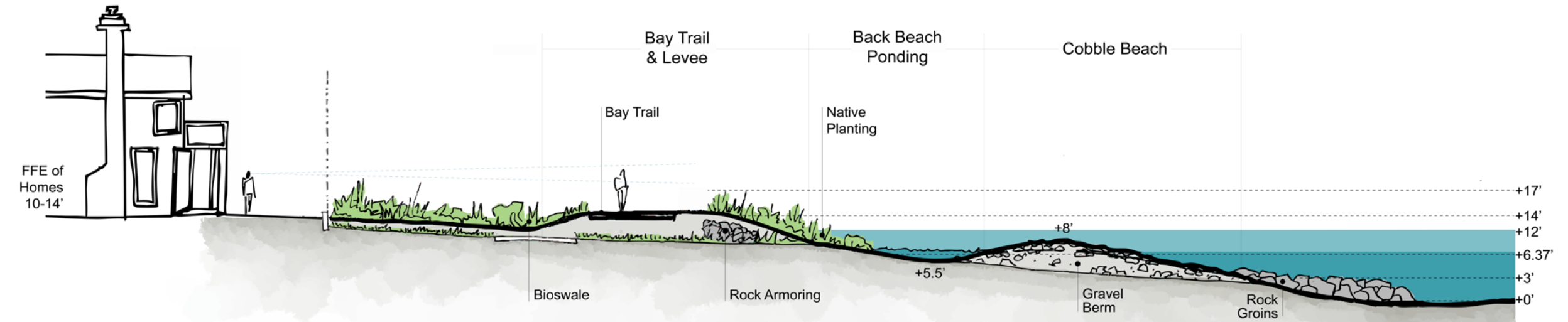
Near-Term Adaptation Focus Area



Levee, Bay Trail & Marsh Creation



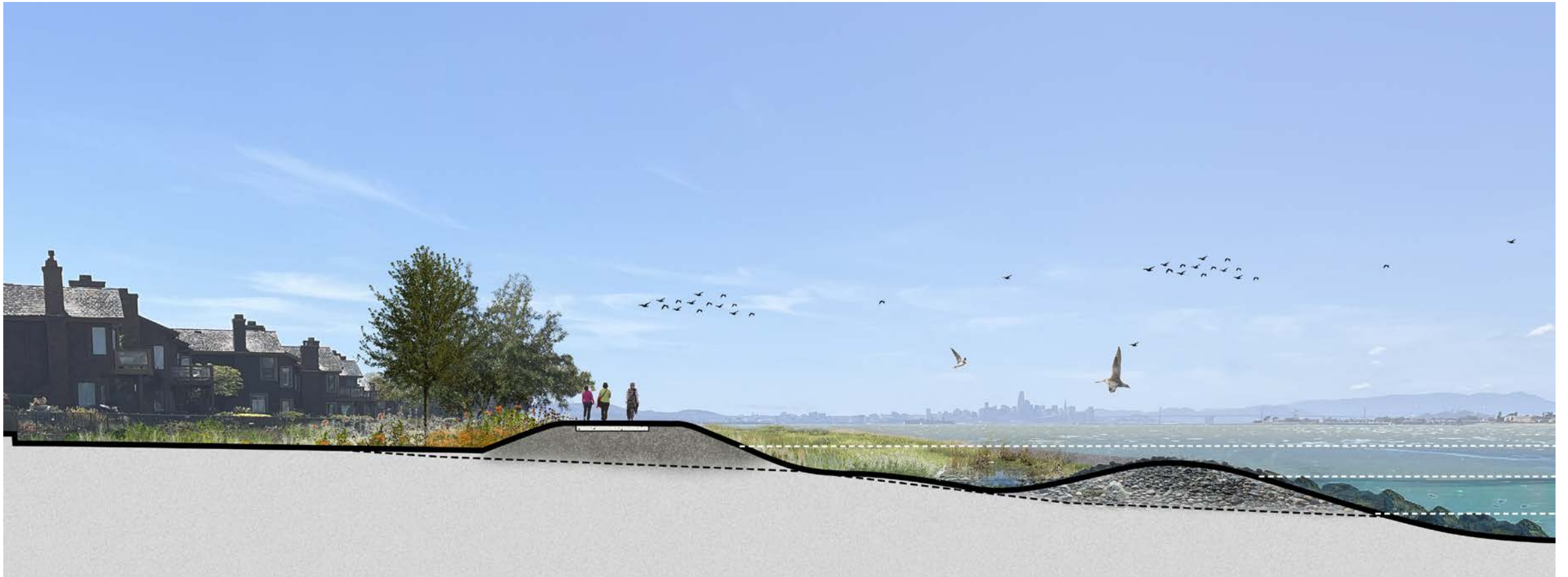
Levee – 12' Bay Trail, 18' crest, expanded habitat area



Levee – 12' Bay Trail, 18' crest, 3:1 side slope



Levee, Bay Trail & Nature-Based Solutions



Perspective View of Typical Bay Trail condition



Nature-Based Solutions: Elsie Roemer Precedent



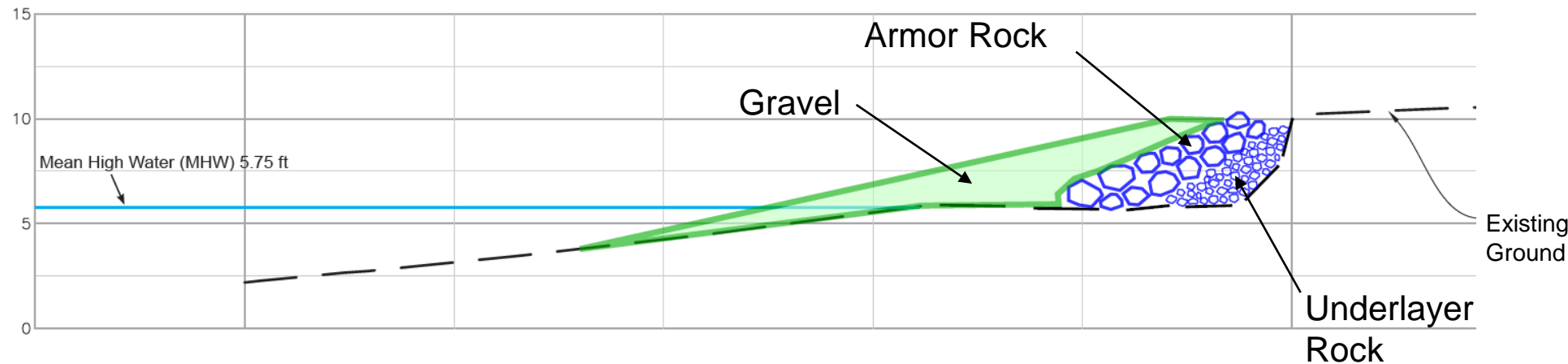
Erosion Hot Spots



Immediate-Term Shoreline Protection: Sandbags + Rock Armoring

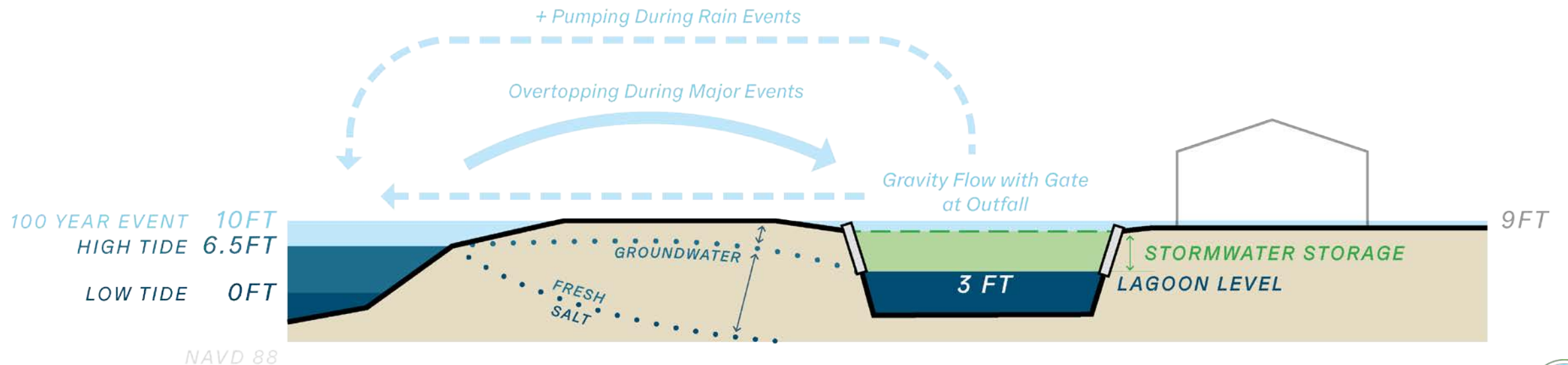
Temporary Soft Armor Option – Large (1 cubic yard) Sandbags in lieu of armor rock

- Temporary soft armor to be replaced with permanent armor rock as part of the Near-Term Project.
- Sandbags conform to existing ground – minimal site preparation required.
- Sandbags can be removed entirely or cut open to allow sand to remain.

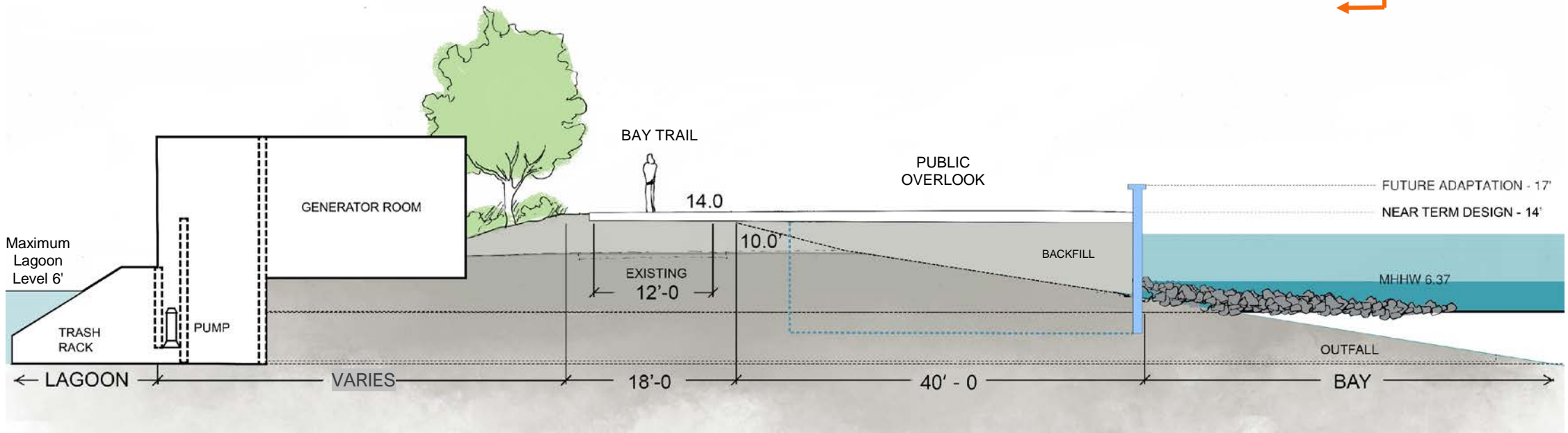


Existing Storm Drain System

- Management for water quality & quantity
- Requires proactive decision to draw down in advance of storm
- Privately-owned by HOA; managed by City
- Lagoon outfall is operated by gravity flow with a gate
- Augmented by a pump system
- Automatic operation per water level sensor
- Need to add backup power
- Seismic stability will be required for FEMA



Pump Station & Tide Gate Replacement



- Interior drainage analysis/improvements to comply with FEMA 65.10
- Maintain existing lagoon circulation & stormwater management goals



Adaptation Alternative - Veterans Court



- Expands marsh to enhance habitat
- Shortens road to Veterans Park
- Maintains 20-25 parking spaces including ADA spaces
- Does not include wooden bicycle/pedestrian bridge – analysis for replacement or for underpass of Doolittle Drive will occur in near term (Phase 2)



Bay Trail Bridge



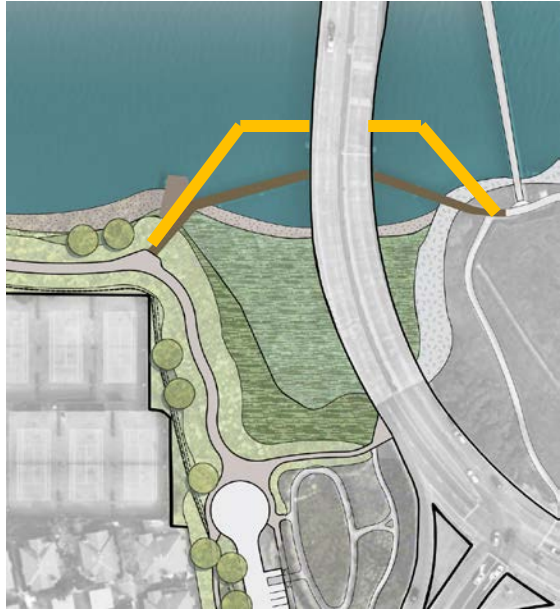
WEST SIDE (looking east)



EAST SIDE (looking west)



Bay Trail Bridge Long Term Adaptation Alternatives



Alternative 1
Bridge Relocation Outboard



Alternative 2
Underpass Crossing



Alternative 3
Bridge Over Land



Alternative 4
At Grade Crossing



Thank you!

