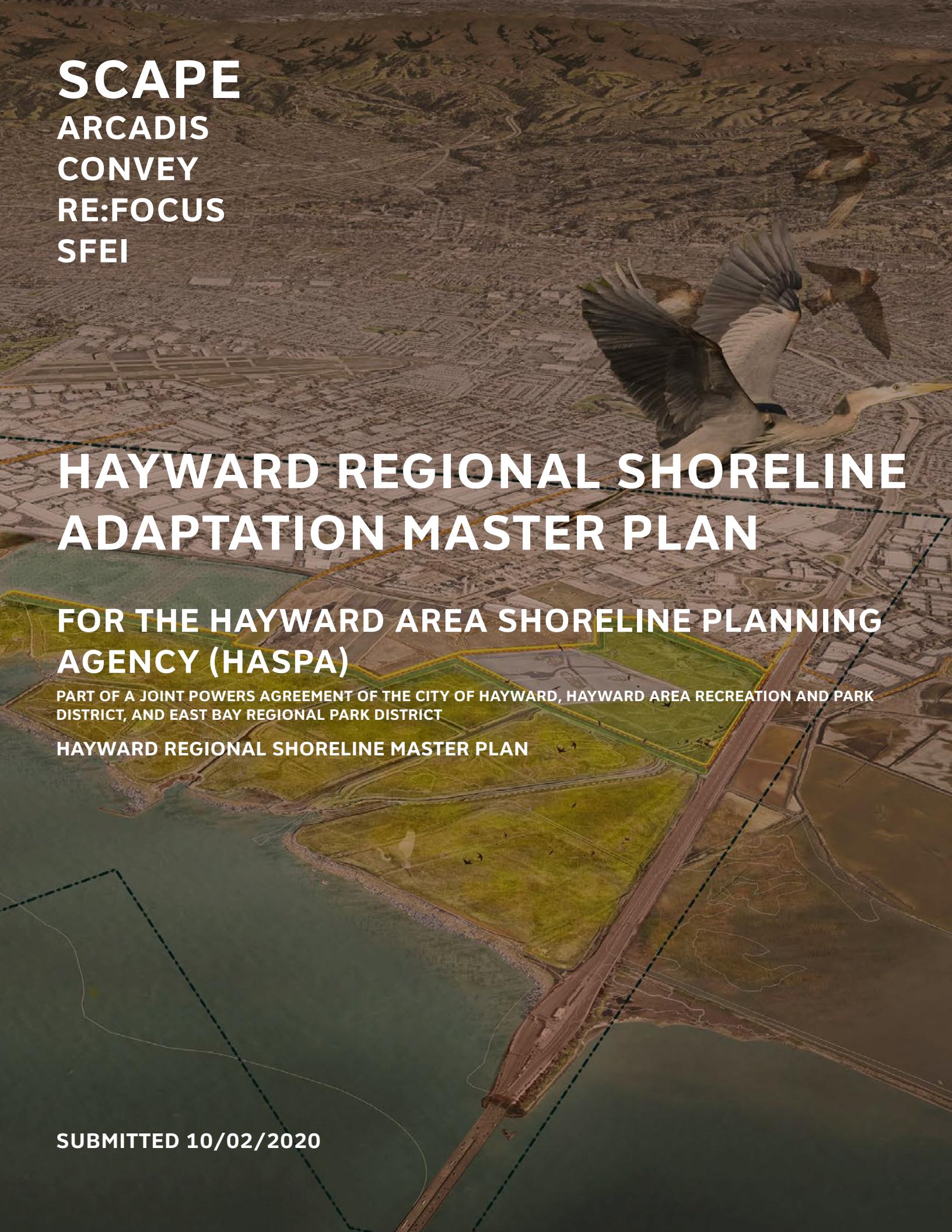


SCAPE
ARCADIS
CONVEY
RE:FOCUS
SFEI

# HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

## FOR THE HAYWARD AREA SHORELINE PLANNING AGENCY (HASPA)

PART OF A JOINT POWERS AGREEMENT OF THE CITY OF HAYWARD, HAYWARD AREA RECREATION AND PARK DISTRICT, AND EAST BAY REGIONAL PARK DISTRICT

HAYWARD REGIONAL SHORELINE MASTER PLAN

SUBMITTED 10/02/2020

# THE MASTER PLAN PROCESS

**The Hayward Regional Shoreline Adaptation Master Plan builds upon existing planning efforts to coalesce around a shared vision to plan for, mitigate against, and adapt to sea level rise.**

**The Plan began with an analysis of the site's existing conditions in January 2019. This base of research led to an investigation and the development of adaptation strategies that proposed ways of adapting the shoreline to sea level rise. The applicable strategies were ultimately combined to form a comprehensive plan for shoreline adaptation.**

**Frequent stakeholder and public engagement directly informed the Master Plan throughout every stage.**

**This planning document is a forward-looking tool to guide the phased implementation of projects that will adapt the Hayward Regional Shoreline as sea levels rise and mitigate the impacts of climate change.**

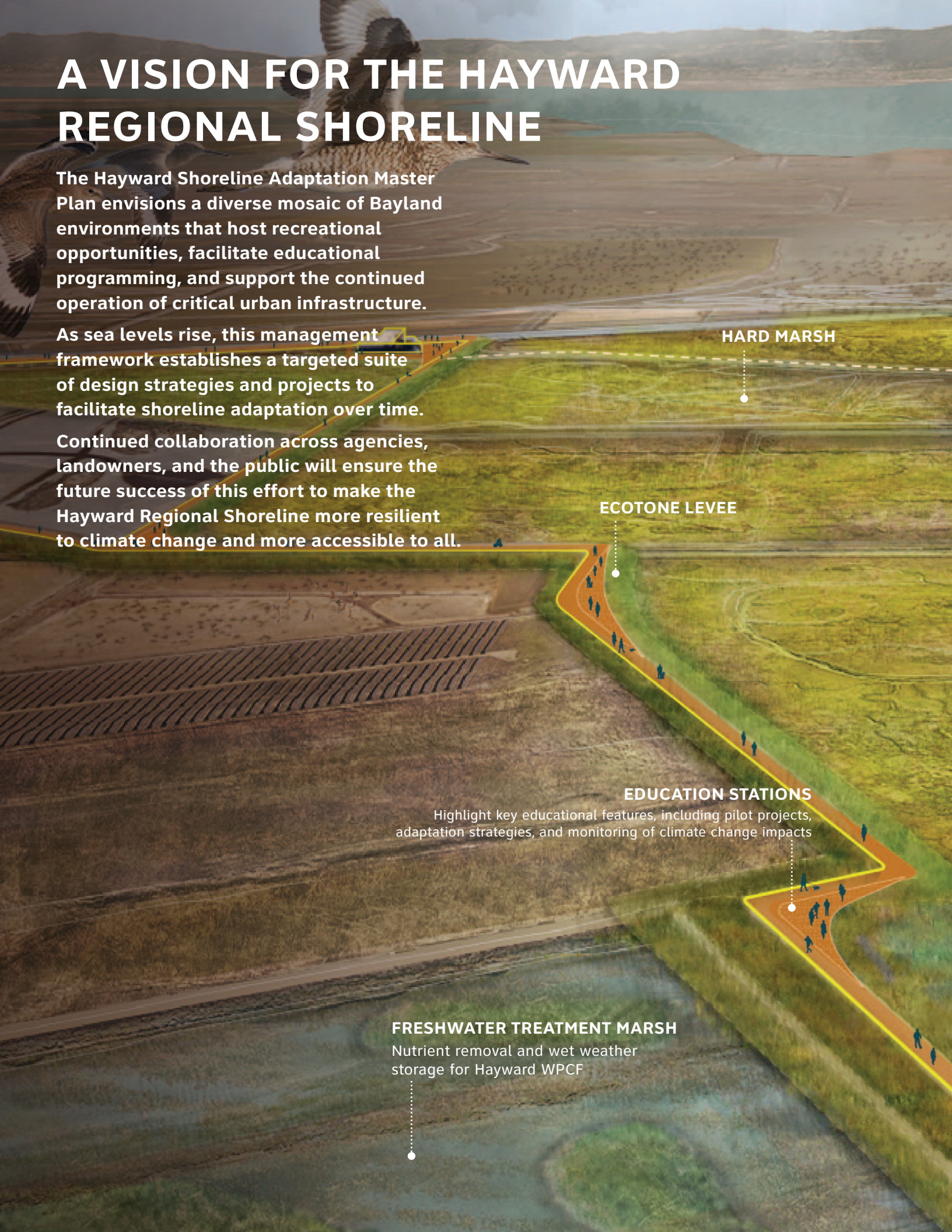

CITY OF
HAYWARD
COGSWELL
MARSH
HAYWARD
MARSH
HARD MARSH
SALT MARSH
HARVEST MOUSE
PRESERVE
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH

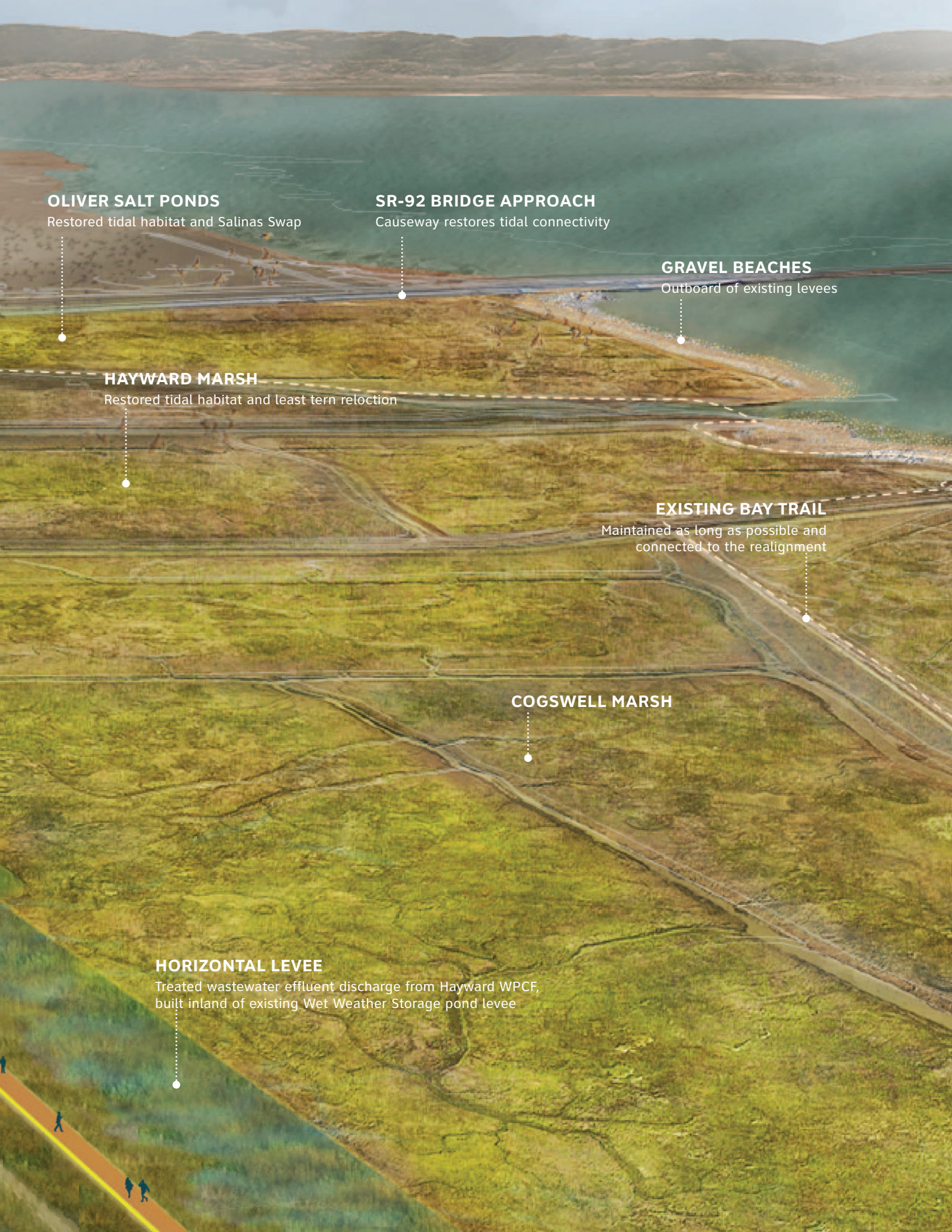
# A VISION FOR THE HAYWARD REGIONAL SHORELINE

**The Hayward Shoreline Adaptation Master Plan envisions a diverse mosaic of Bayland environments that host recreational opportunities, facilitate educational programming, and support the continued operation of critical urban infrastructure.**

**As sea levels rise, this management framework establishes a targeted suite of design strategies and projects to facilitate shoreline adaptation over time.**

**Continued collaboration across agencies, landowners, and the public will ensure the future success of this effort to make the Hayward Regional Shoreline more resilient to climate change and more accessible to all.**




OLIVER SALT PONDS
Restored tidal habitat and Salinas Swap
SR-92 BRIDGE APPROACH
Causeway restores tidal connectivity
GRAVEL BEACHES
Outboard of existing levees
HAYWARD MARSH
Restored tidal habitat and least tern reloction
EXISTING BAY TRAIL
Maintained as long as possible and connected to the realignment
COGSWELL MARSH
HORIZONTAL LEVEE
Treated wastewater effluent discharge from Hayward WPCF, built inland of existing Wet Weather Storage pond levee

# A FRAMEWORK FOR ADAPTATION

**The Hayward Shoreline Adaptation Master Plan provides a framework for shoreline adaptation that will guide the development of future projects to be implemented over time by proposing a piloting and monitoring strategy. Pilot projects will be the opportunity to test adaptation strategies, and to demonstrate their efficacy. Monitoring protocols will provide data on site-specific climate change impacts and track the pilot projects to scale-up shoreline adaptation through larger-scale applications of design strategies.**

**This framework of piloting, monitoring, and scaling-up will engage the community in shoreline adaptation, promote stewardship, and build capacity for future generations to adapt to climate change.**


EXISTING TIDAL MARSH

# THE ADAPTATION MASTER PLAN

## How to Read this Document

**Short Read** (a few minutes):

Read the Plan Overview & Goals, which outlines the purpose of the Master Plan, the project statement, and goals. These principles lay the foundation for the Master Plan.

**Medium Read** (30 minutes):

Read the Plan Overview & Goals, Context & Existing Conditions, which provides an overview of the study area and existing conditions inventory, Stakeholder Engagement, and A Vision for Shoreline Adaptation: The Hayward Regional Shoreline, which describes the Master Plan proposal and associated design strategies.

**Long Read** (60 minutes +):

Read the full plan, which outlines the research, design, and stakeholder engagement processes, culminating in the Preferred Alternative in A Vision for Shoreline Adaptation: The Hayward Regional Shoreline and an analysis of Implementation Considerations, which provides further details on how the Master Plan will be phased, funded, permitted, and managed over time.

**Key Terms:**

*Adaptation Strategies:* Physical design strategies that will help the shoreline adapt to climate change.

*Master Plan Assumptions:* This set of "rules" summarizes client and stakeholder feedback and set a framework to generate and compare the Design Alternatives.

*Design Alternatives:* Three initial visions for shoreline adaptation that outline spatial configurations of the Adaptation Strategies. These were formulated to solicit stakeholder, client, and public feedback, and were evaluated against a "no-action" scenario.

*Preferred Alternative:* The hybrid and final vision for the Hayward Shoreline. This was informed by feedback from the Design Alternatives.

## Document Summary

**Plan Overview & Goals**

This chapter provides an introduction to the Master Plan, the project purpose, goals, and an overview of the Master Plan process. These principles lay the foundation for the master plan as a whole.

**Context & Existing Conditions**

The Hayward Shoreline is a mosaic of Bayland environments that support diverse wildlife habitats, infrastructural assets, and recreational resources. This section provides an overview of the study area and a broad inventory of the existing conditions. This research served as a foundation for the design and development of the Master Plan.

**Stakeholder Engagement**

The Hayward Shoreline Adaptation Master Plan was developed through extensive stakeholder collaboration and public engagement that informed the planning process and fostered coordination across agencies, organizations, regulators, and the public. This section provides a summary of the stakeholder engagement process, which has the potential to be replicated in other planning efforts throughout the Bay to develop cohesive visions for shoreline adaptation. A detailed inventory of Stakeholder and Public Comments can be found in Appendix A: Stakeholder and Public Comments.

**Sea Level Rise and Flood Risk Impacts**

This section outlines the impacts of coastal flood risk, future trends, and provides a thorough analysis of three future sea level rise scenarios. This assessment identified potential future hazard areas for planning purposes in order to formulate appropriate adaptation strategies.

**Adaptation Strategies**

Based upon insight collected through public workshops and engagement, and as well as the analysis of sea level rise scenarios and related risks a catalog of potential design strategies to help the shoreline adapt to climate change were compiled. The feasibility and applicability of these strategies were evaluated across the project area, in consideration with the Project Goals and Policy Considerations. This section provides an inventory of the adaptation strategies identified as the most applicable to the Hayward Shoreline.

**Design Alternatives and Feedback**

This section provides an overview of the project parameters and considerations, including the Master Plan assumptions and policy considerations, which set a framework for the Master Plan. Three Design Alternatives were identified that combine a suite of adaptation strategies to meet the project goals. The spatial configuration and selection of strategies were carefully evaluated based on stakeholder and public feedback. This section also outlines a summary of stakeholder feedback.

**A Vision for Shoreline Adaptation: The Hayward Regional Shoreline**

This section introduces the Preferred Alternative, a future vision for the Hayward Shoreline to adapt to climate change. The hybrid Preferred Alternative was selected based upon further client and stakeholder feedback and includes two alternates with embedded flexibility. This chapter breaks the broad vision down into its respective parts, organized by theme, to provide further details.

**Implementation Concept**

The Preferred Alternative is evaluated further in this section to provide details on how the Master Plan vision will be phased, funded, permitted, and managed over time in coordination with all associated stakeholders. The Phasing Plan breaks down the Master Plan into discrete projects that are organized by time frame, Project Fact Sheets provide a detailed assessment of specific projects identified in the Phasing Plan, Non-Structural Strategies offer an overview of policy and programmatic recommendations, including financing, permitting, feasibility, and regional considerations.

*Supporting Documents:*

**Appendix A** provides a record of all stakeholder and public comments.

**Appendix B** provides a detailed breakdown of cost estimates for the three Design Alternatives, as well as the Preferred Alternative.

# TABLE OF CONTENTS

# PLAN OVERVIEW & GOALS

**This chapter includes the project purpose, timeline, project statement, and goals. These principles lay the foundation for the Adpatation Master Plan as a whole.**

*Fringe marsh at San Lorenzo Creek*

# MASTER PLAN PURPOSE

## HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

The Hayward Regional Shoreline Adaptation Master Plan was commissioned in 2019 by the Hayward Area Shoreline Planning Agency (HASPA) a joint powers agency consisting of representatives from the City of Hayward, East Bay Regional Park District (EBRPD), and Hayward Area Recreation and Park District (HARD).

The Master Plan will develop various multi-benefit strategies for the shoreline, its existing infrastructure, and the surrounding natural habitat in order to adapt to Sea Level Rise. Ultimately, it will act as a road map and help guide the development of future projects in a coordinated effort between state and local agencies, landowners, and the public.

Sea level rise is climate change-induced phenomenon that will inevitably cause flooding and harm to the various recreational, transportation, infrastructural, residential, economic, and ecological assets currently along the Shoreline. While the Shoreline's eight marshes provide some level of natural flood protection for these assets, including the entrance to the State Route 92 (SR 92) and the San Francisco Bay Trail, continually rising sea levels and stronger storm events are already overtaking these barriers two to three times a year. If no adaptation actions are taken, many of the tidal marshes and managed wetlands will be inundated by 2050 and the Bay Trail will be increasingly inaccessible to its thousands of visitors. The Plan will be a forward looking tool for preparation, mitigation, and adaptation to climate change.

# PROJECT STATEMENT & GOALS

## A FUTURE VISION FOR HOW THE HAYWARD REGIONAL SHORELINE CAN ADAPT TO SEA LEVEL RISE

The Hayward Regional Shoreline Adaptation Master Plan creates a framework for resilience to prepare for sea level rise (SLR), groundwater intrusion, and storm surge. The Master Plan is being managed by the Hayward Area Shoreline Planning Agency (HASPA), a joint power authority including the City of Hayward, Hayward Area Recreation and Park District (HARD), and East Bay Regional Park District (EBRPD).

The Hayward Regional Shoreline Adaptation Master Plan project area is bounded on the north by Bockman Channel (also called the Bockman Canal) and extends approximately 3.25 miles south to the State Route 92 San Mateo Bridge approach. The extent of the project area into the Bay was defined by the outermost limit of the Hayward Area Shoreline Planning Agency Jurisdictional boundary, and the inland extent of the project area are drawn at the Union Pacific Rail Corridor. In total, the project area covers six square miles of various land uses, including open space, urban infrastructure, industrial, and residential.

The project area supports ecological Bayland resources, hosts recreational opportunities along the San Francisco Bay Trail, and facilitates educational programming for adjacent residential neighborhoods and businesses at the Hayward Shoreline Interpretive Center. The shoreline is also home to critical urban infrastructure, including wastewater treatment plants, the Hayward-San Mateo Bridge approach (State Route 92), and landfills. The Master Plan will develop various multi-benefit strategies for the shoreline, its existing infrastructure, and the surrounding natural habitat. The Master Plan will consider multiple planning time horizons and sea level rise scenarios. Additionally, it will consider a range of adaptation strategies that can evolve and respond over time to changing sea levels.

## PROJECT GOALS

### Create a Resilient Shoreline Environment for People and Ecology

- Enhance the shoreline's ecological value and adapt to sea level rise
- Enhance recreational opportunities and adapt to climate change
- Create a management framework for adapting to sea level rise over time
- Provide refuge to help endangered shoreline species to adapt climate change

### Enhance the Shoreline Environment to Reduce Risk to Critical Infrastructure and Built Assets

- Align with and enhance existing management and capital improvement plans
- Reduce risk to regional critical utilities from sea level rise, groundwater intrusion, and flood events
- Reduce risk to transportation infrastructure from sea level rise, groundwater intrusion, and flood events
- Reduce risk to agency assets such as the San Francisco Bay Trail and marsh restoration project(s)

### Build Social Resilience in the Community

- Promote social equity, environmental justice, and public health
- Preserve the local economy and increase resilience to climate change
- Prevent the disruption of key community services

### Build Capacity for Future Generations to Adapt to climate change

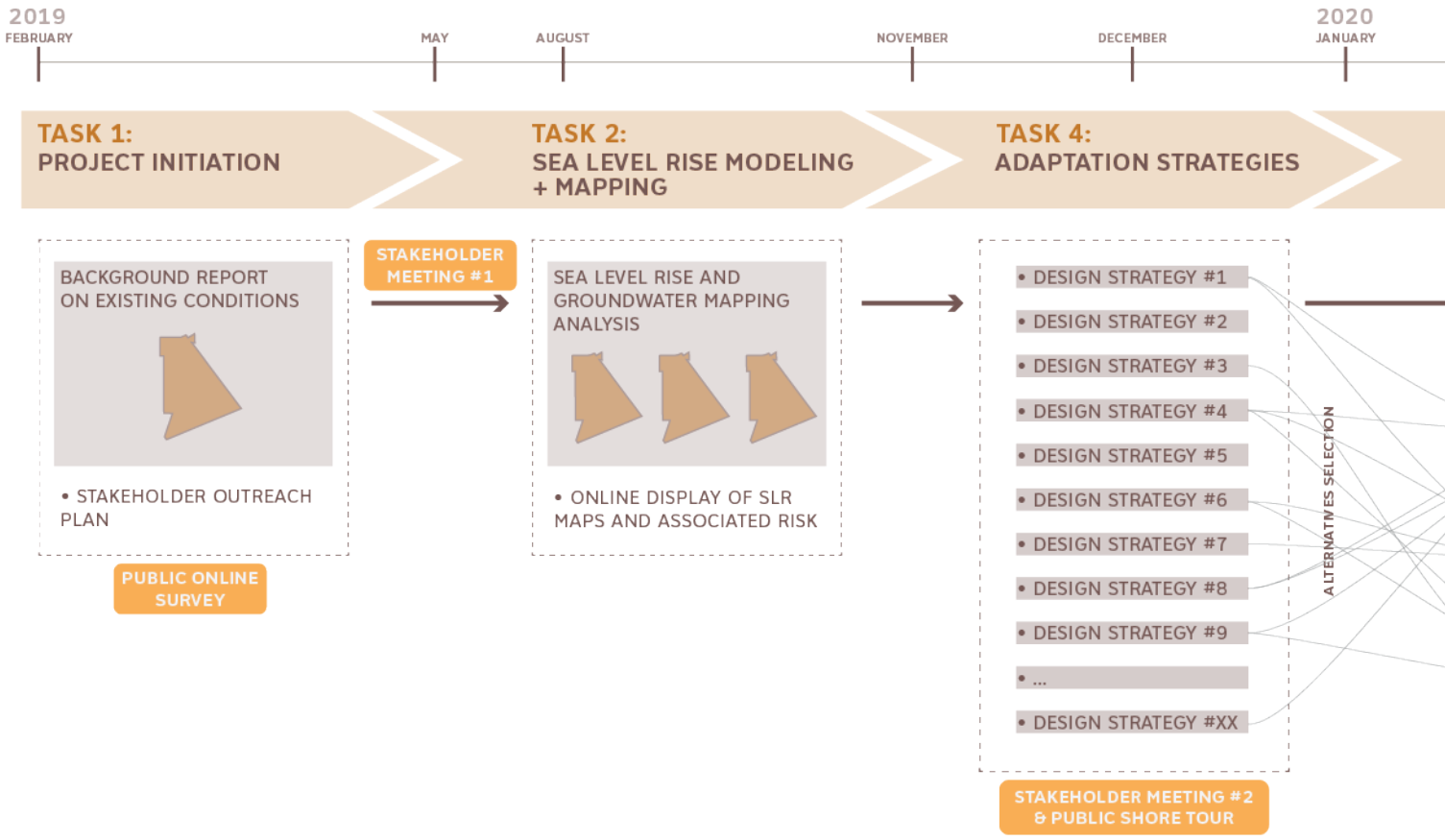
- Build organizational and community capacity
- Provide a place for education, interpretation and understanding of the shoreline and climate change
- Foster stewardship of the shoreline's cultural and ecological resources

*Bay Trail at Hayward Marsh*

# PROJECT PROCESS

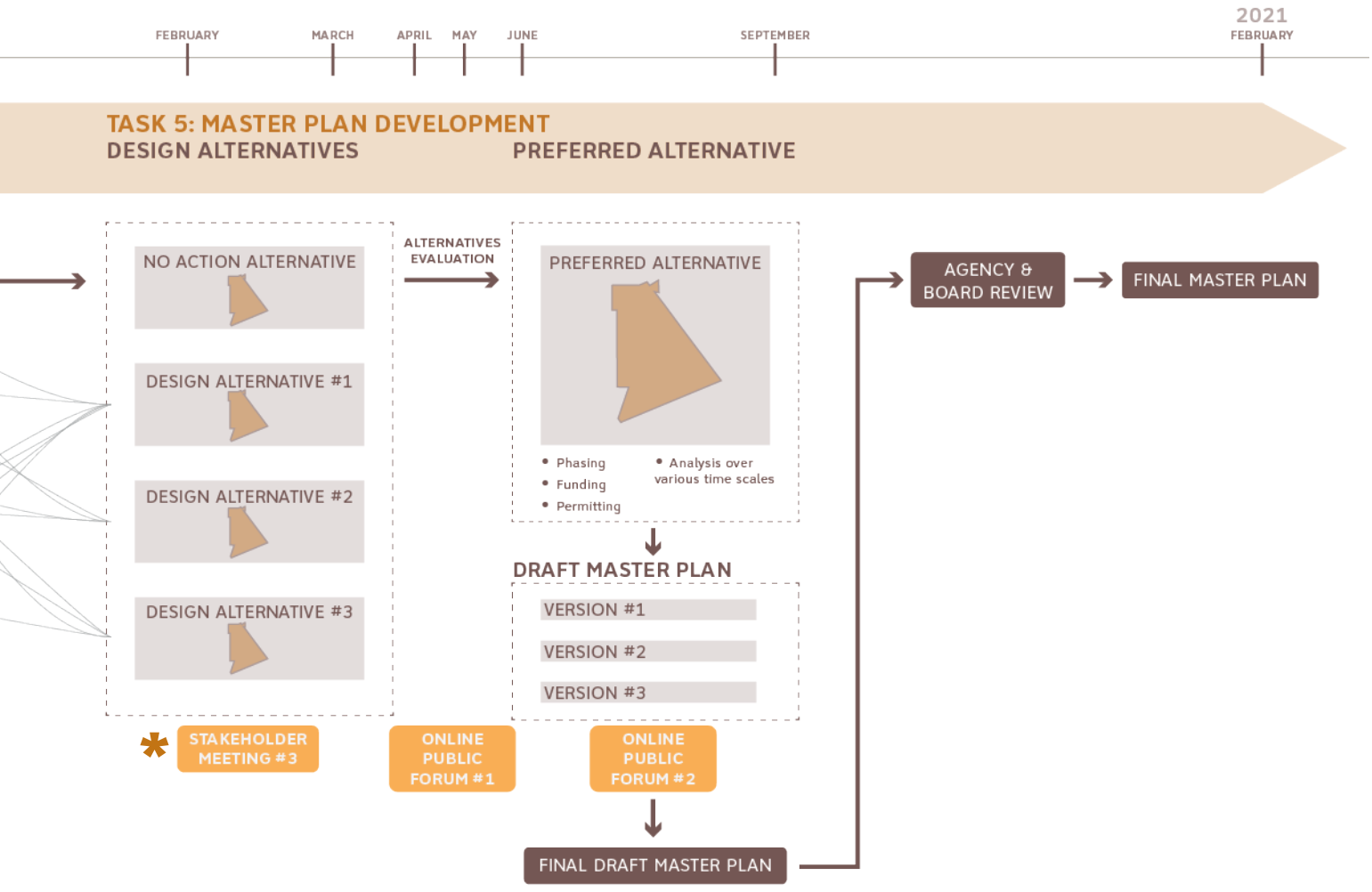
## A COLLABORATIVE PROCESS

The Shoreline Adaptation Master Plan began at the end of January 2019 with the project initiation phase, where a thorough analysis of existing conditions as well as stakeholder meetings were used to understand the constraints and opportunities for the project area. The Design Team then examined future risk across multiple scenarios through sea level rise modeling and mapping across various time scales. Subsequently, the Team identified potential adaptation strategies to help the shoreline adapt to climate change. These adaptation strategies were then consolidated and combined to generate three Design Alternatives. This led to the development of a Preferred Master Plan Alternative that hybridizes various projects elements that received the most stakeholder support.




* Adaptation to virtual engagement due to COVID-19 pandemic (March 2020)

**05/16/19 Stakeholder Workshop #1**
(SCAPE Site Photos, 2019)



# IMPLEMENTATION

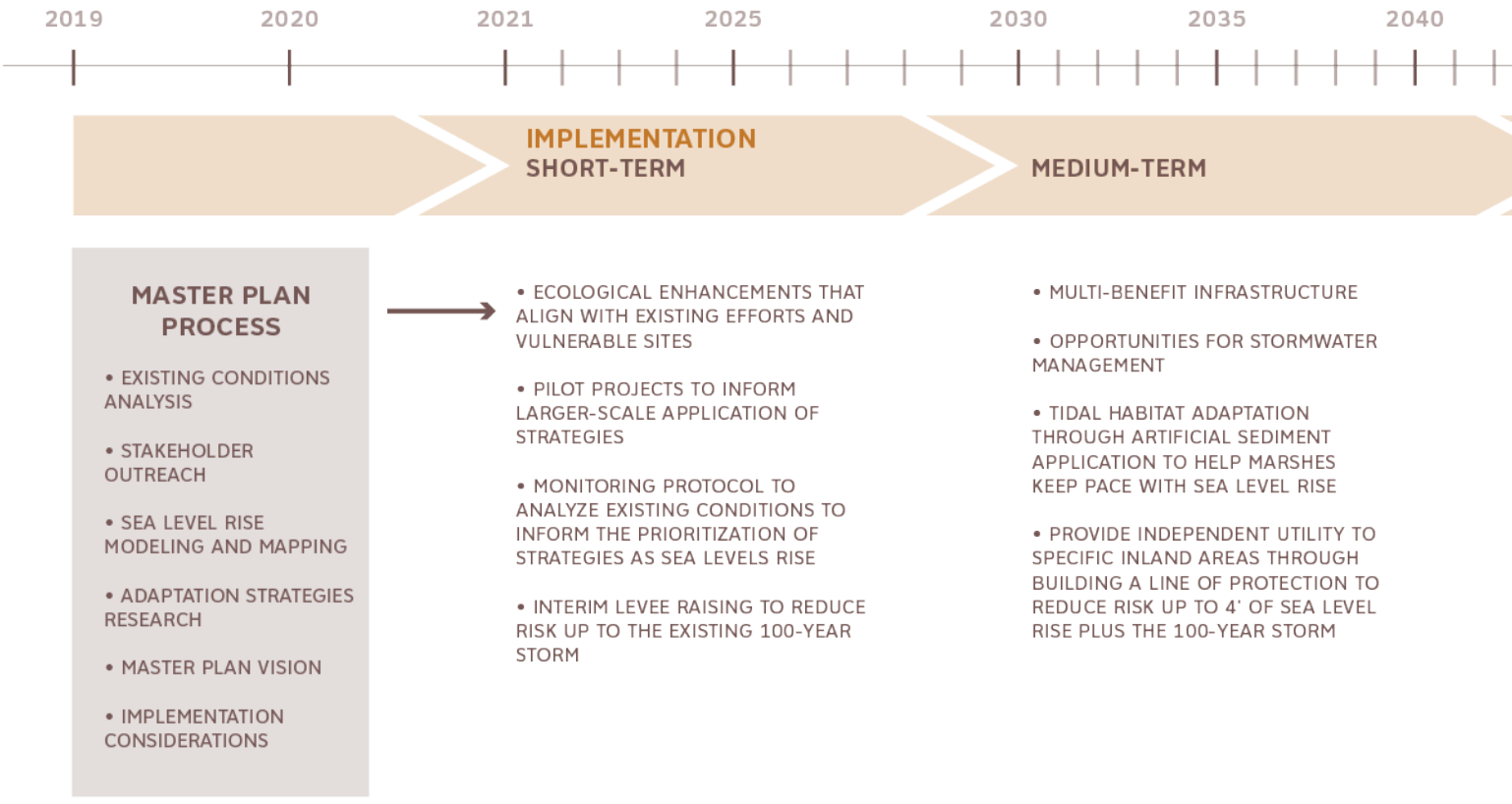
## AFTER THE MASTER PLAN

Following the adoption of the Master Plan, the project will not be over. In fact, the majority of the work will just begin.

This planning document provides a framework to adapt the Hayward Regional Shoreline to sea level rise. The strategies identified in this report should be used as a starting point to guide the development, and ultimately the implementation, of projects in a coordinated effort over time.

The implementation of the Hayward Regional Shoreline Master Plan will occur over many decades. For the purposes of this report, the planning horizons were divided into short, medium, and long-term time frames. For more details about the Phasing Plan and associated projects, please refer to the Implementation Considerations chapter.

The time frame and goals for each planning horizon are outlined below:



**West Winton Landfill looking towards Cogswell Marsh**
(SCAPE Site Photos, 2019)

2045+

## LONG-TERM

- COMPLETE FULL LINE OF PROTECTION TO REDUCE RISK UP TO 4' OF SEA LEVEL RISE PLUS 100-YEAR STORM
- CREATE A LAYERED SYSTEM OF EROSION CONTROL INFRASTRUCTURE
- WASTEWATER TREATMENT ADAPTATION TO FACILITATE LOCAL DISCHARGE

# CONTEXT & EXISTING CONDITIONS

**This chapter provides an overview of the study area and existing conditions analysis.**


HAYWARD SHORELINE MASTER PLAN
SAN FRANCISCO BAYLANDS
LEGEND
PROJECT BOUNDARY
STUDY AREA
BAYLANDS
N
0
1.5
3 MI
PIEDMONT
ALAMEDA
OAKLAND
SAN FRANCISCO
ALAMEDA COUNTY
SAN LEANDRO
SAN FRANCISCO BAY
HAYWARD
SAN FRANCISCO INTERNATIONAL AIRPORT
SAN MATEO BRIDGE
UNION CITY
SAN MATEO
FREMONT
NEWARK
REDWOOD CITY
PALO ALTO

# STUDY AREA

## HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

The Hayward Regional Shoreline Adaptation Master Plan study area is loosely defined. The northern boundary lies just above Lewelling Boulevard in San Lorenzo and the southern boundary is below Alameda Creek in Fremont. This study area is larger than the project area and was chosen to provide a regional context for the smaller and more precisely analyzed and designed project area.

The Study Area encompasses a long stretch of the East Bay shoreline, which is characterized by broad mudflats that extend for miles into the Bay itself.

**Hayward Area Recreation and Park District (HARD) Marsh looking towards CalPine / Russell City Energy Center**
(SCAPE Site Photos, 2019)

**Shorebird habitat**
(SCAPE Site Photos, 2019)


Sources:

1. San Francisco Estuary Institute and Aquatic Science Center 2015. *California Aquatic Resource Inventory.* (April 18, 2019)

# PROJECT AREA

## HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

The Hayward Regional Shoreline Adaptation Master Plan project area is bounded on the north by Bockman Channel (also called Bockman Canal) and extends approximately 3.25 miles south to the State Route 92 San Mateo Bridge approach. The extent of the project area into the Bay was defined by the outermost limit of the Hayward Area Shoreline Planning Agency jurisdictional boundary, and the inland extents of the project area are drawn at the rail corridor. In total, the project area covers 6 square miles of various land uses, including open space, urban infrastructure, industrial, and residential.

**Wet Weather Storage Ponds looking from West Winton Landfill**
(SCAPE Site Photos, 2019)

**Cogswell Marsh levee adjacent to the Bay**
(SCAPE Site Photos, 2019)


LEGEND
TIDAL MUDFLAT
TIDAL / MUTED TIDAL MARSH
DIKED POND/ WETLAND
DIKED STORAGE AND TREATMENT PONDS
INACTIVE SALT PONDS
UPLAND LANDFILL
N
0
0.5 MI
eBIRD SIGHTINGS
SNOWY PLOVER
LEAST TERN
RIDGSWAY'S RAIL
1-10 10-100 100+
ENDANGERED SPECIES
SNOWY PLOVER
LEAST TERN
RIDGSWAY'S RAIL
SALT MARSH HARVEST MOUSE
ANCHORAGE DRIVE
GRANT AVENUE
SAN LORENZO CREEK
BOCKMAN CHANNEL
PACIFIC FLY WAY
ORO LOMA MARSH
SULPHUR CREEK
ALAMEDA COUNTY LANDFILL
HAYWARD LANDING CANAL
WEST WINTON LANDFILL
WEST WINTON AVENUE
CABOT BOULEVARD
DEPOT ROAD
CITY OF HAYWARD
INDUSTRIAL
HAYWARD MARSH
HARD MARSH
OLIVER SALT PONDS
STATE ROUTE 92
MT. EDEN CREEK
SAN FRANCISCO BAY TRAIL
GOLF COURSE
eBird hotspot
Uplands provide refuge for shorebirds and mice during high tides
Eelgrass beds (Zostera marina)
Islands managed for snowy plover and least tern nesting
eBird hotspot
ORO LOMA MARSH
364-acre fully tidal marsh, seasonal wetland and transitional upland managed for endangered species and the removal of non-native Spartina alterniflora
TRIANGLE MARSH
8-acre muted tidal marsh targeted for enhancing shorebird habitat
COGSWELL MARSH
250-acre fully tidal marsh with islands for nesting wildlife, managed to control invasive Spartina alterniflora
HAYWARD MARSH
Diked Bayland that hosts the federally endangered California Least Tern and the Western Snowy Plover
SALT MARSH HARVEST MOUSE PRESERVE
Muted tidal marsh with seasonal wetlands and transitional uplands. Uplands provide refuge for mice during high tides
HARD MARSH
Fully tidal marsh with comprised of mudflats and low marsh habitats.

# ECOLOGICAL RESOURCES

## A MOSAIC OF ECOLOGY AND INFRASTRUCTURE

The Hayward Regional Shoreline is a mosaic of Bayland environments that supports diverse wildlife habitats. Formerly a zone of natural tidal marshes and salinas, this stretch of shoreline has undergone sequential transformations, resulting in the current mix of restored tidal marshes, inactive industrial salt ponds, filtration marshes, storage ponds, diked wetlands, landfills, solar fields, and biosolids drying beds. Restored tidal marsh is a dominant condition within the Hayward Regional Shoreline Adaptation Master Plan Project Area. The marshes in the Hayward Regional Shoreline serve as valuable stepping stones between the large, expansive blocks of marsh in the lower South Bay and North Bay.

Landfills are concentrated in the center of the project area where tidal Baylands were filled with unknown debris and waste. They are the two major topographic features of the shoreline and offer upland grassland habitat.

Inactive salt ponds and freshwater wetlands are also distributed throughout the site and contribute to habitat diversity. Some areas, such as the Oliver Salt Ponds, are historical resources that also support federally endangered bird species.

Below are descriptions of various endangered species habitat requirements and supporting habitats along the Hayward Regional Shoreline. Diverse habitats supporting wildlife.

**Ridgway's Rail,** *Rallus obsoletus*: These birds nest and feed in tidal salt marshes. The Ridgsway's Rail rarely flies, instead they build nests adjacent to small tidal sloughs for foraging and quick escapes from predators. Ridgsway's Rails also prefer to construct "brood nests" on higher ground to protect their young, so it is essential that marshes contain features with higher elevations. Cogswell Marsh, Oro Loma Marsh, and Triangle Marsh all provide the habitats required by Ridgsway's Rail populations.

**California Least Tern,** *Sternula anrilarus brownie:* Sandy beaches, berms, and mudflats are typical habitats needed for nesting Least Terns. Vegetative growth is cleared by the tides, and this allows bird colonies to establish themselves. Elevated mounds have been established within Hayward Marsh to support the only Least Tern Colony in the South Bay.

**Western Snowy Plover,** *Charadrius alexandrinus nivosus:* Snowy Plovers forage in both wet or dry beach conditions, and nest above the high tide line on coastal beaches, dunes, and salt pans; less common habitats are dry salt ponds. Along the Hayward Regional Shoreline, Snowy Plover nests have been observed at the Oliver Salt Ponds as well elevated mounds within Hayward Marsh.

**Black Skimmer,** *Rynchops niger:* The Black Skimmer is a tern-like seabird that lives primarily in coastal waters and nests primarily near coasts on sandy beaches, shell banks, coastal islands, and salt pond levees. Nests are usually in association with or near terns. The Black Skimmer is a species of special concern.

**Salt Marsh Harvest Mouse,** *Reithrodontomys raviventris:* The Salt Marsh Harvest Mouse lives within dense stands of pickleweed, where it can swim and climb to forage and nest. During high tides, the Salt Marsh Harvest Mouse must retreat to high ground or to mature marsh plant communities with high vegetative structure. Oro Loma Marsh, Cogswell Marsh, Triangle Marsh, and the Salt Marsh Harvest Mouse Preserve are habitats along the Hayward Regional Shoreline that provide the range of marsh elevations needed for these small rodents.

**Eelgrass,** *Zostera marina:* Intertidal and shallow subtidal areas support the growth of eelgrass at the breach of Cogswell Marsh. Eelgrass populations have been identified at that location, and the Hayward Regional Shoreline presents additional opportunities for future eelgrass restoration.

Sources:

1. Adapting to Rising Tides, Hayward Resilience Study. January 2015.

2. Phillip Williams and Associates, LTD., Preliminary Study of the Effects of Sea Level Rise on the Resources of the Hayward Shoreline. March 2010.


Sources:
1. City of Hayward. *Power Transmission Lines.* (April 1, 2019)
2. Alameda County Flood Control & Water Conservation District. *Pump Stations.* (April 1, 2019)
3. Alameda County Flood Control & Water Conservation District. *Gate.* (April 1, 2019)
4. Alameda County Flood Control & Water Conservation District. *Culverts.* (April 1, 2019)

# CRITICAL INFRASTRUCTURE

## URBAN ASSETS IN THE BAYLANDS

The City of Hayward depends on infrastructural assets that treat sewage, provide clean water, produce energy, store waste, and support transportation. In the adjacent map, facilities that perform these functions are located within or directly next to the Baylands, putting the City's most critical infrastructure at risk as sea levels rise.

**Transmission Lines and Utility Corridors:** PG&E overhead transmission lines cross the Hayward Regional Shoreline project area. Although the towers are set on concrete bases, sea level rise can potentially pose issues of access for maintaining and repairing the infrastructure. Saltwater corrosion can specifically pose significant risks to infrastructure, resulting in increased operation costs and decreased asset lifetimes. Underground utilities, including the East Bay Dischargers Authority (EBDA) Pipeline and an abandoned Shell Oil jet fuel pipeline, also run through the project area.  Sea level rise poses a risk to access roads that maintain these utilities as well.

**Landfills:** In the center of the Hayward Regional Shoreline, the City owned landfill and the Alameda County owned landfill are located at the edge of the bay. The landfills have been closed and capped, but this waste infrastructure is not built to withstand flooding or wave action. Sea level rise and storm events can pose potential risk of erosion and create a public health and environmental health hazard for the City of Hayward.

**Wastewater Treatment Plants and Pump Stations:** The Oro Loma Wastewater Treatment Plant and the Hayward Water Pollution Control Facility (WPCF) process sewage from the City of Hayward. Both facilities discharge into the EBDA pipeline, but during storm events WPCF relies on the Wastewater Wet Weather Storage ponds for water storage. Both facilities also use selected baylands as drying beds for biosolids. These assets need proper protection to prevent health and environmental hazards.

**EBDA (East Bay Dischargers Authority) Pipeline:** Along the East Bay shoreline, EBDA connects various wastewater treatment facilities, allowing treated effluent to enter a single pipeline that discharges into the center of the bay. This infrastructure runs through the Hayward Regional Shoreline project area, crossing tidal marshes, diked baylands, and industrial lands. Current vulnerabilities include ageing infrastructure, insufficient capacity during wet weather events, potential damages from rising groundwater, reduced infrastructure access due to rising sea levels, and public health hazards as a result of infrastructure failure.

**Solar Fields:** Two solar fields have been built within the project area, one in the north adjacent to Oro Loma Wastewater Treatment Plant and one adjacent to the Hayward Treatment Facility. The solar fields are within the extent of the baylands and are currently surrounded by levees. However, many of these levees are in poor condition and could potentially fail with future climate change impacts.

**Calpine Russel City Energy Center:** This gas-fueled energy facility was built in 2013 and has a life expectancy of 40 years. While this infrastructure is an economic asset to the City of Hayward, many access roads and utilities that support the plant are vulnerable to sea level rise and storm surge conditions.

**State Route 92 Bridge Approach:** State Route 92 is a regionally significant transportation corridor that connects the East Bay and the Peninsula. The bridge approach to this corridor is surrounded by low lying baylands and currently has stormwater drainage issues. With additional sea level rise, this critical commuter route is at risk of flooding, potentially rendering it impassible if climate change issues are not addressed.

Sources:

1. Adapting to Rising Tides, Hayward Shoreline Asset Vulnerability and Risk Profile Sheets. March 2015.


Sources:
1. Metropolitan Transportation Commission. *Regional Bike Facilities.* (April 18, 2019)
2. Metropolitan Transportation Commission. *San Francisco Bay Trail.* (April 18, 2019)
3. AC Transit. *Bus Route GIS shapefiles.* (April 18, 2019)
4. City of Hayward. *Hayward Bicycle Network.* (April 18, 2019)

# RECREATIONAL ASSETS

The Hayward Regional shoreline is an important recreational and educational asset for adjacent communities. Expansive trail networks traverse a diversity of Bayland environments and built infrastructure. These trails connect people to the Bay and its ecosystems while providing crucial recreational space that connects people to their environment. A popular bird watching spot, the shoreline offers opportunities to view wildlife and learn about the habitats they depend on.

Within the project area, public transportation has the potential to facilitate connections between urban developments and the Baylands. Bus routes and bus stops provide linkages throughout the City of Hayward, but only one route serves the project area along Cabot Boulevard, limiting direct connections with the Hayward Regional shoreline.

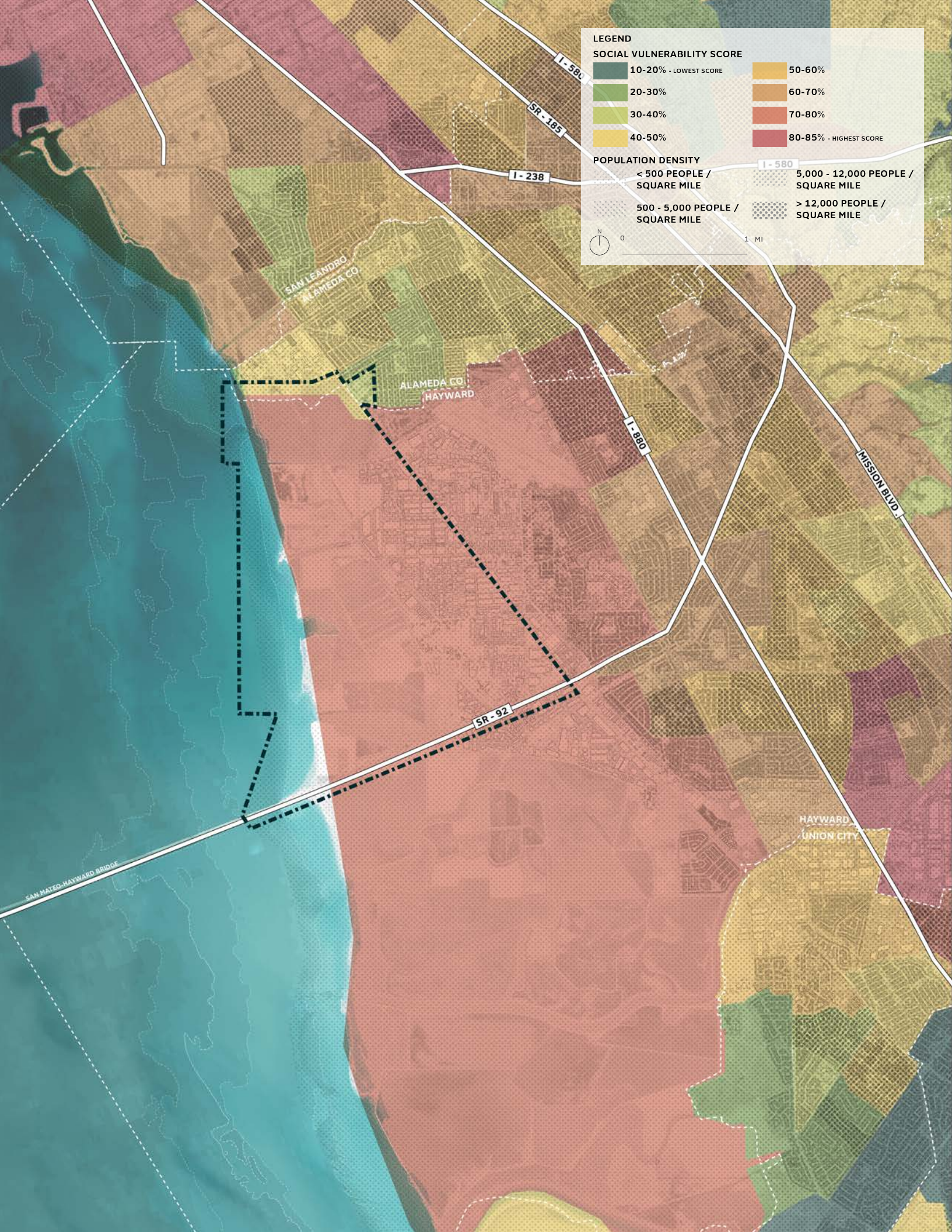
The Bay Trail, a critical piece of transportation infrastructure, offers walking, hiking, and cycling opportunities throughout the Baylands. Numerous regional cycling routes branch off from the Bay Trail and provide additional public access opportunities for adjacent communities.

Winton Road, the Hayward Shoreline Interpretive Center, and a staging area near San Lorenzo Creek serve as vehicular access points to the shoreline. While signage demarcates these access opportunities, they tend to be obscured by larger industrial developments that surround the baylands.

Major highways and roads such as State Route 92 serve as critical transportation corridors that link the City of Hayward to other regions of the Bay. These vital connections broaden opportunities to bring people to the shoreline and greatly expanded upon the existing access of the site.

**Hiking along the Bay Trail.**
(Ronald Horii, 2014)

**State Route 92 bridge approach heading toward San Mateo**
(CA COT, 2019)


LEGEND
SOCIAL VULNERABILITY SCORE
10-20% - LOWEST SCORE
20-30%
30-40%
40-50%
50-60%
60-70%
70-80%
80-85% - HIGHEST SCORE
POPULATION DENSITY
< 500 PEOPLE / SQUARE MILE
500 - 5,000 PEOPLE / SQUARE MILE
5,000 - 12,000 PEOPLE / SQUARE MILE
> 12,000 PEOPLE / SQUARE MILE
N
0
1 MI
I - 580
SR - 185
I - 238
I - 580
SAN LEANDRO
ALAMEDA CO
ALAMEDA CO
HAYWARD
I - 880
MISSION BLVD
SR - 92
HAYWARD
UNION CITY
SAN MATEO-HAYWARD BRIDGE

# DEMOGRAPHICS

## A DIVERSE CITY

The 2013-2017 American Community Survey ranks Hayward as one of the most diverse cities within the State of California.

Analysis of the census data shows the ethnic composition of Hayward is 62,287 Hispanic residents (40.3%), 39,187 Asian residents (25.4%), 26,470 White residents (17.1%), 16,705 Black residents (10.8%). The most common languages in addition to English in Hayward are Spanish (45,680 speakers), Tagalog (11,288 speakers), and Chinese (6,033 speakers). Compared to other American cities, Hayward has a relative high number of Tagalog, Hindi, and Other Pacific Islander language speakers.

**Social Vulnerabilities:** The Project Team used the CalEnviroScreen index to evaluate social vulnerabilities in the Hayward area. The CalEnviroScreen is a science-based index that helps identify California communities that are most affected by various sources of pollution and are especially vulnerable to pollution's effects. CalEnviroScreen uses environmental, health, and socioeconomic information to produce a numerical score for each census tract in the state.

A census tract with a high score experiences higher pollution burden and greater vulnerability than census tracts with low scores. CalEnviroScreen ranks census tracts based on data available from state and federal government sources. The numerical model is made up of a suite of 20 statewide indicators of pollution burden and population characteristics associated with increased vulnerability to pollution's health effects. The index uses a weighted scoring system to derive average pollution burden and population characteristics scores for each census tract. The score measures the relative pollution burdens and vulnerabilities in one census tract compared to others and is not a measure of health risk.

**Population Density:** Hayward ranks as the sixth largest city in the Bay Area and is home to a population of 154,507 people. The City spreads over approximately 64 square miles, 30% of which is water. The average population density in Hayward is 2,420 people per square mile, which is slightly higher than Alameda County's density, and higher than the density of the Metro Area as a whole (1,911 per sq mi).

The median property value in Hayward is $404,500, which is lower than the median property value of Alameda County ($842,000), and from 2015 to 2016 the median property value in Hayward went from $364,600 to $404,500, a 10.9% increase. The homeownership rate of Hayward is 51%, which is lower than the national average of 63.6%. Hayward residents have an average commute time of 30.8 minutes, and most commuters in the area drive alone. Car ownership in Hayward is approximately the same as the national average, with a mean of 2 cars per household.

The economy of Hayward is specialized in transportation and warehousing, wholesale trade, administration, and waste management services, which employ respectively 1.74, 1.39, and 1.21 times more people than what would be expected in a location of this size. The largest industries in Hayward are healthcare and social assistance, manufacturing, and retail trade. The highest paying industries are utilities ($65,385), professional, scientific, tech services ($61,971), and finance ($51,291).

The median household income in Hayward is $68,138, which is lower than both Alameda County median ($79,831) and the Metro Area median ($85,947).

Poverty status has been determined for 12.5% of the population, a number that is lower than the national average of 14%.

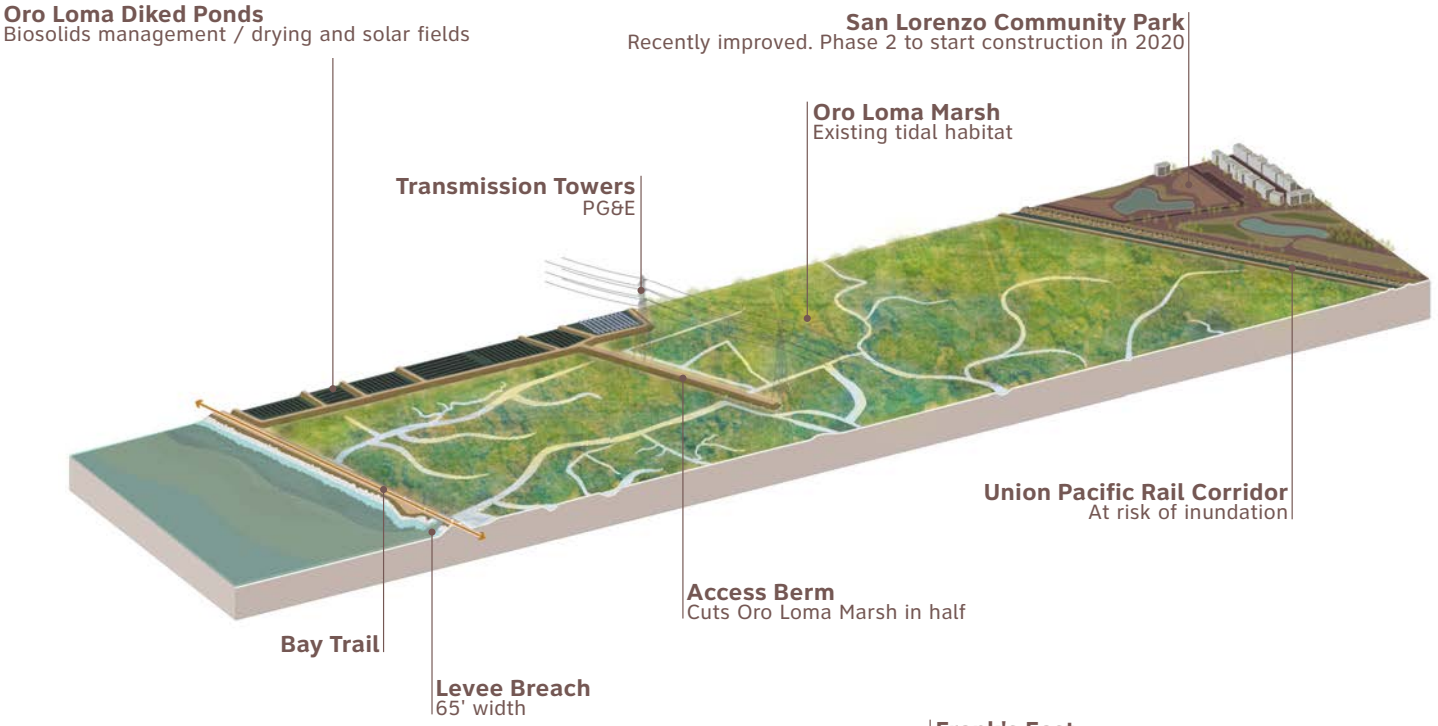
Sources:

1. Datausa.io

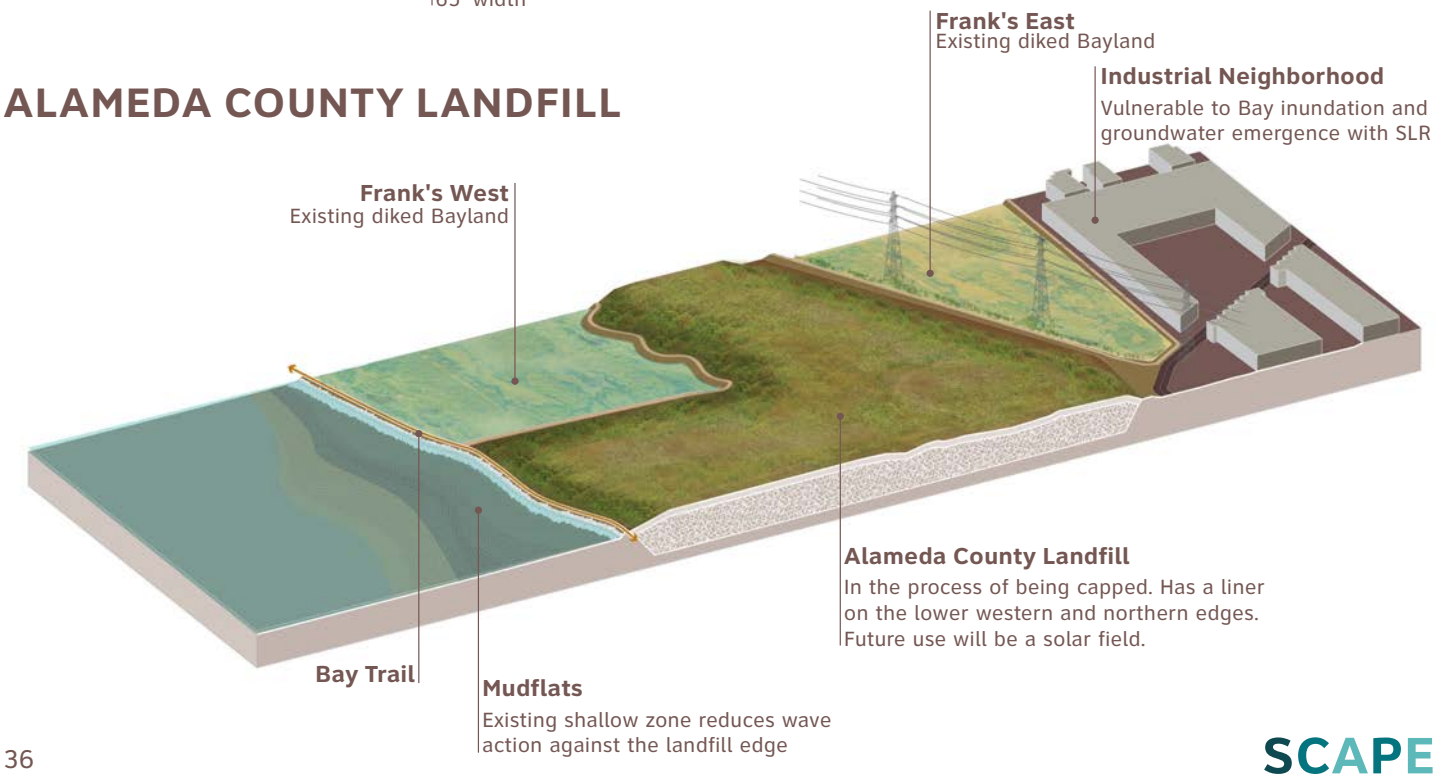
2. East Bay tops among California's most diverse places

# EXISTING CONDITIONS VISUALIZATIONS

## ORO LOMA MARSH



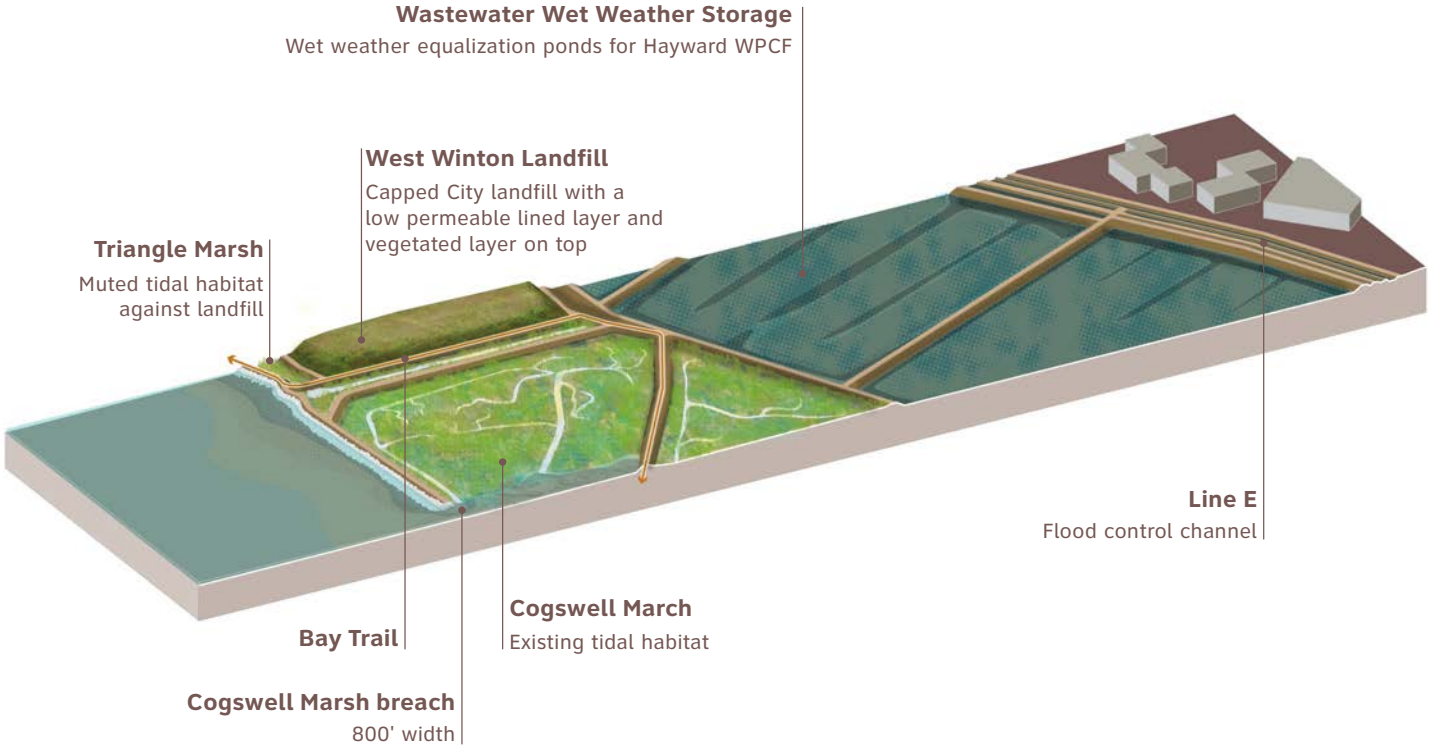

## ALAMEDA COUNTY LANDFILL



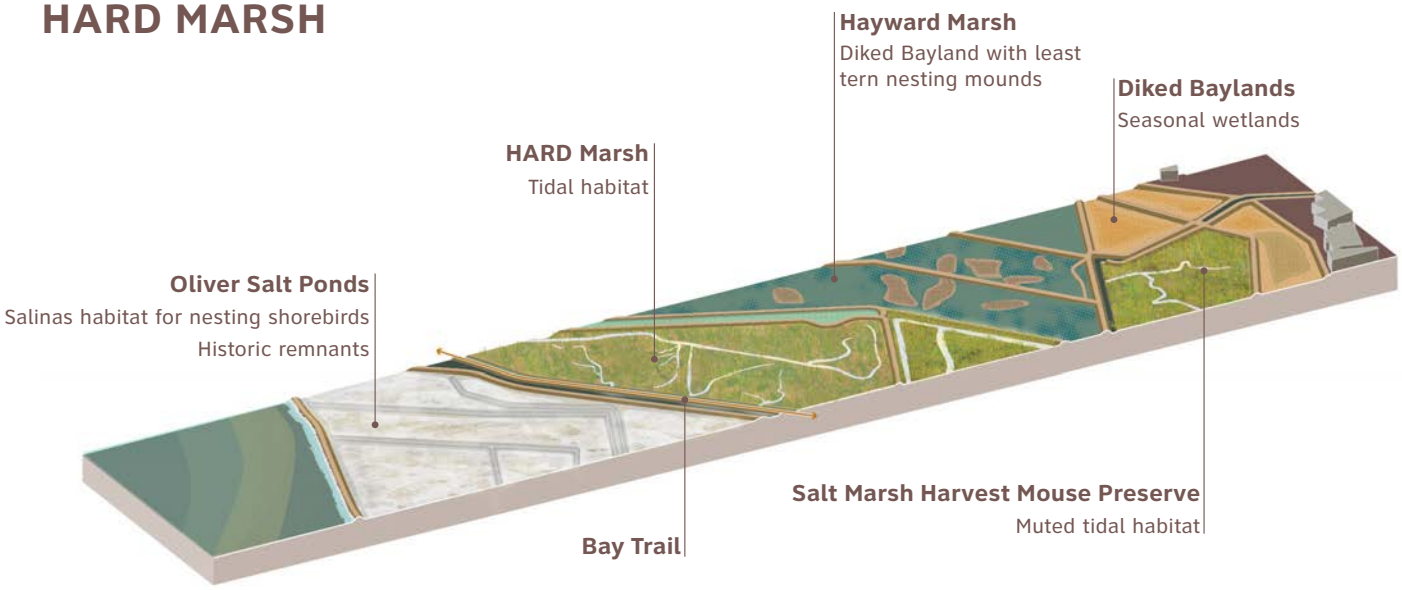



SCAPE


## COGSWELL MARSH




## HARD MARSH



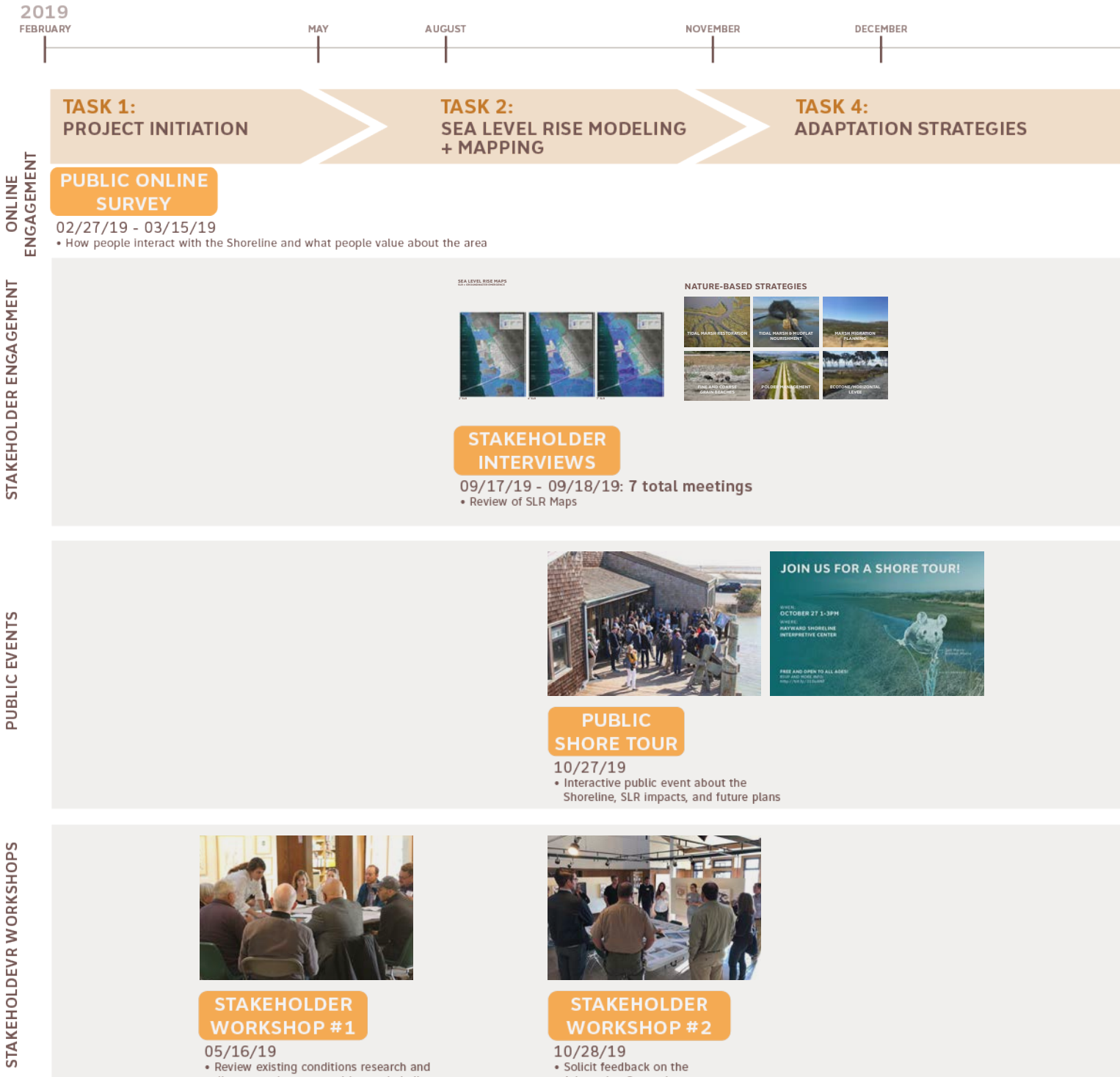

# STAKEHOLDER ENGAGEMENT

**This chapter provides a summary of the stakeholder engagement and feedback received in relation to the development of the Adaptation Master Plan.**

# STAKEHOLDER ENGAGEMENT

## AN ONGOING PROCESS

The Hayward Regional Shoreline Adaptation Master Plan process has engaged stakeholders and the public throughout every phase of the project. Consistent meetings, events, and workshops have brought people together to discuss a cohesive vision for the Hayward Regional Shoreline that balances competing needs and constraints. Coordination across agencies, organizations, regulators, landowners, and the public has been a key part of the planning process and project deliverables are continually reviewed and refined based upon this feedback.



✱ Adaptation to virtual engagement due to COVID-19 pandemic (March 2020)

2020 JANUARY · FEBRUARY · MARCH · APRIL · MAY · JUNE · OCTOBER · 2021 FEBRUARY

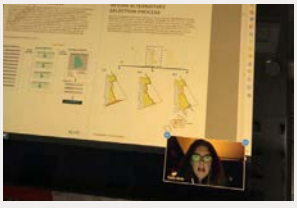
**TASK 5: MASTER PLAN DEVELOPMENT**

DESIGN ALTERNATIVES — PREFERRED ALTERNATIVE

✱ **ONLINE PUBLIC FORUM #1**
05/18/20 - 06/26/20
- Solicit feedback on the Design Alternatives

✱ **ONLINE PUBLIC FORUM #2**
10/2020 - 11/2020
- Solicit feedback on the Preferred Alternative

**STAKEHOLDER MEETINGS**
01/08/20 - 01/10/20: **6 total meetings**
- Solicit feedback on the Adaptation Strategies



✱ **STAKEHOLDER WORKSHOP #3**
04/08/20 - 04/13/20: **10 total meetings**
- Solicit feedback on the Design Alternatives

# STAKEHOLDER WORKSHOPS

A series of three stakeholder workshops were scheduled to solicit feedback during key phases of the Master Plan.

Stakeholder Workshop #1 consisted of an overview of the existing conditions of the project area and discussion of goals, opportunities, and potential challenges. This event was used to communicate to the public and stakeholders about the project, and to initiate the process of engagement.

Stakeholder Workshop #2 was used to solicit feedback on a broad range of adaptation strategies. Discussion across agencies and organizations led to a thorough understanding of potential strategies that would best fit the site conditions, opportunities, and constraints of the Hayward Regional Shoreline.

Stakeholder Workshop #3 was held virtually due to the COVID-19 pandemic. This series of virtual zoom calls engaged stakeholders on the Draft Design Alternatives. Feedback from this multi-day event was used to inform the selection of the hybrid Preferred Alternative.

Online Public Forum #1 occured on the project website, www.haywardshorelinemasterplan.com. The comment form was used to collect public feedback on the Design Alternatives.

Online Public Forum #2 used the project website to collect public feedback on the Preferred Alternative.

Additional stakeholder interviews and meetings were conducted throughout the project to solicit additional feedback on the study area to acquire a detailed understanding of the site conditions, constraints, and opportunities from relevant agencies and organizations.

**Project Communication and Feedback:** A key part of all stakeholder and community workshops was for the Project Team to communicate the project development to stakeholders and the public. Frequent project updates provide a platform for engagement that was used to solicit feedback that was then incorporated into the next phase of the project.

Often, the community and stakeholder workshops consisted of a presentation (project update), small group discussions, and roundtable discussions. Progress materials were printed for workshop members to mark up or add comments. These activities fostered discussions across multiple stakeholder groups that created a discourse that led the development of the project as a coordinated vision and set of goals were established.

Conference calls with stakeholders, agencies, and organizations were held throughout the Master Plan project to share project updates and ensure coordination as the design progressed. These calls utilized screen sharing to present slides that were used as part of the discussion.

**05/16/19 Public Meeting - Project Update Presentation**
(SCAPE Site Photos, 2019)


**05/16/19 Public Meeting - Informational Project Boards**
(SCAPE Site Photos, 2019)

**10/28/19 Stakeholder Workshop #2- Group Discussions**
(SCAPE Site Photos, 2020)

# SHORE TOUR

## INTERACTIVE PUBLIC EVENT

The Shore Tour was an interactive public event to engage members of the public in the Master Plan process, educate about the Hayward Regional Shoreline, and demonstrate how sea level rise may impact the project area. Three stations centered around ecology, sea level rise and infrastructure, and history, recreation and education. Experts from these three fields spoke about their respective topics and engaged participants in a Q&A session to share more information.

Despite unfavorable weather conditions, the event was still successful and transitioned to be held indoors at the Hayward Shoreline Interpretive Center. Over thirty people attended and comment cards were utilized to solicit written feedback on the Master Plan project.

Species cutout cards were created as a fun activity for all ages to use for pictures and education about the shoreline's flora and fauna. These cutout cards included easily identifiable species, such as the Salt Marsh Harvest Mouse, California Least Tern, Ridgway's Rail, Bat Ray, and Lined Shore Crab, among others. The hashtag #HAYWARDSHORELINE was used to tag photos on social media.

**10/27/19 Shore Tour - Shoreline Education**
(SCAPE Site Photos, 2019)


**10/27/19 Shore Tour - Mapping Exercise**
(SCAPE Site Photos, 2019)

**10/27/19 Shore Tour - Ecology Breakout Session**
(SCAPE Site Photos, 2019)

# ONLINE ENGAGEMENT

## ONLINE SURVEY

A 23-question survey was conducted on behalf of the Hayward Area Shoreline Planning Agency (HASPA) to assess the public's general understanding of Hayward Regional Shoreline, mainly in regard to sea level rise, potential flooding, and participants' feelings, concerns, and predictions regarding these issues.

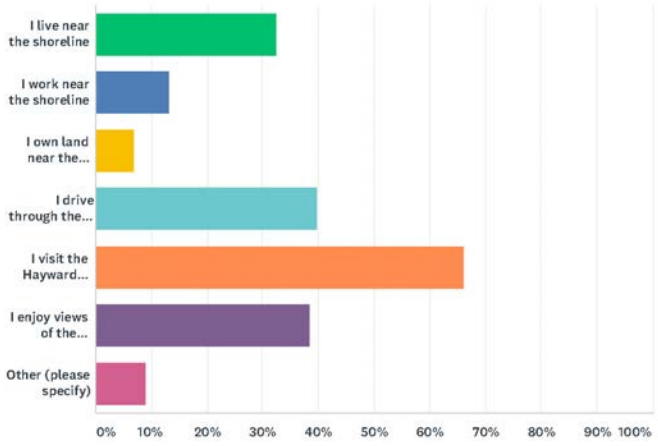
In the spring of 2019, this survey was completed by approximately 900 people throughout the Bay Area, primarily those who live, work, commute through, or recreate at or near the shoreline.

## ONLINE PUBLIC FORUM

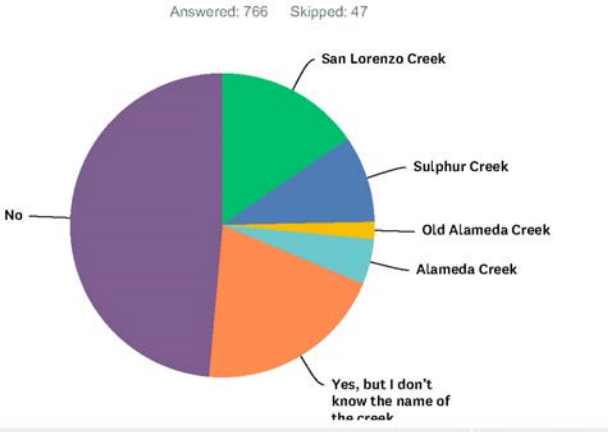
In light of the COVID-19 pandemic, the Project Team created a project website to virtually solicit feedback on the project. The website included a comment form with questions for community members to leave feedback on the Design Alternatives. In addition, the web page provided thorough descriptions of the project, Master Plan process, and work completed throughout the project. Two videos offered easily digestible narrative presentations that explained the Master Plan project and Design Alternatives in greater detail.

During the months of June and July 2020, more than 900 unique users visited the website and more than 55 community members or stakeholders submitted comments on the Design Alternatives.

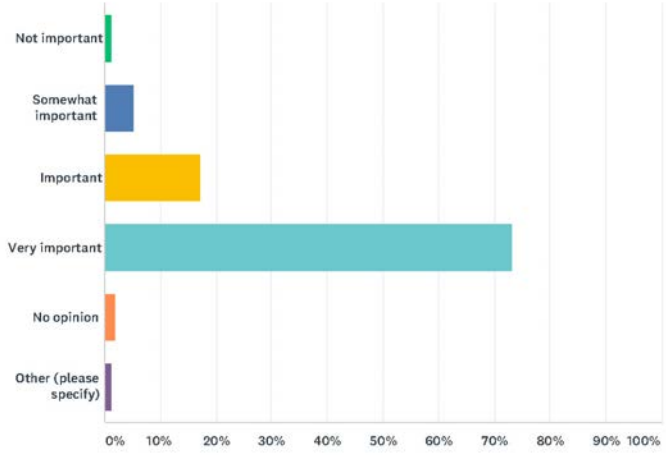
After it was utilized for feedback on the Design Alternatives, the project website transitioned to be used as a tool to share additional project updates. The comment form persisted for the public to leave additional feedback on the project.



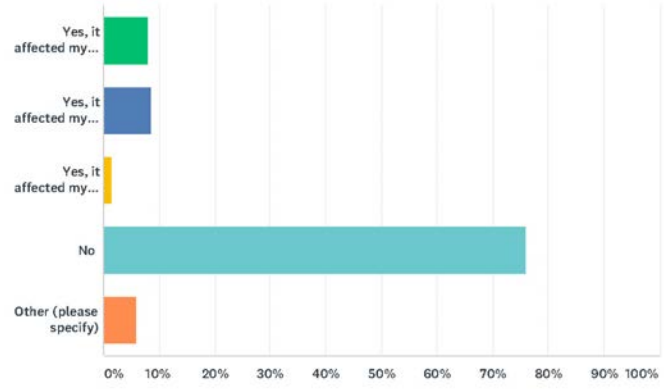

**Online Survey Result**
Question 2- What's your association with the project area?




**Online Survey Result**
Do you live or work near any of the major creeks or channels in the area?




**Online Survey Result**
Question 6- How important are wetlands and habitats for the health of the San Francisco Bay?




**Online Survey Result**
Have you or anyone close to you ever been personally affected by a flood, either here or elsewhere?


PROVIDE FEEDBACK ON THE MASTER PLAN HERE

## PURPOSE OF MASTER PLAN

The **Hayward Regional Shoreline Adaptation Master Plan** was commissioned in 2019 by the **Hayward Area Shoreline Planning Agency (HASPA)** a joint powers agency consisting of representatives from the City of Hayward, East Bay Regional Park District (EBRPD), and Hayward Area Recreation and Park District (HARD).

The Master Plan will develop various multi-benefit strategies for the shoreline, its existing infrastructure, and the surrounding natural habitat in order to adapt to Sea Level Rise. Ultimately, it will act as a road map and help guide the development of future projects in a coordinated effort between state and local agencies, landowners, and the public. The Plan will be a forward looking tool for preparation, mitigation, and adaptation to climate change.


**Online Public Forum- Project website with comment form**
www.haywardshorelinemasterplan.com

# SEA LEVEL RISE & FLOOD RISK IMPACTS

**This chapter outlines the potential impacts of coastal flooding, future trends, and provides a catalog of the sea level rise maps and associated risk analyses.**

# UNDERSTANDING COASTAL FLOOD RISK

## SEA LEVEL RISE

The California Coastal Commission Sea Level Rise Policy Guidance provides a summary of the best available science on sea level rise for California. It indicates that in the past century, global mean sea level (MSL) has increased by seven to eight inches, and that, with greater than a 95% probability, human influence has been the primary cause of the observed warming of the atmosphere and the ocean since the mid-20th century.

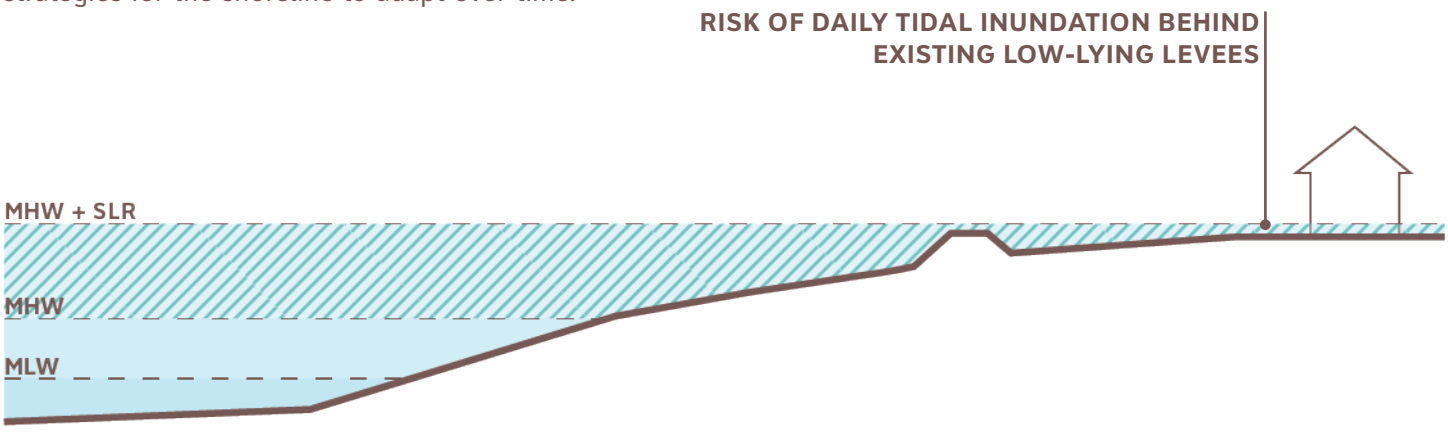
Relative average sea level rise is driven by:

- The expansion of ocean waters as they warm;
- The addition of freshwater to the ocean from melting land-based ice sheets and glaciers;
- Groundwater extraction contributing to land subsidence.

To capture regional and local factors (and thus to provide locally relevant data) that affect SLR variations, global-scale models are downscaled. *The State of California Sea Level Rise Guidance: 2018 Update* provides SLR projections that have been refined for 12 tide gauges, including the San Francisco tide gauge. These projections are given for each decade from 2030 to 2150.

Sea level rise also has the potential to increase erosion risk. As sea levels rise, shoreline levees, embankments, built infrastructure, and marsh edges will experience further wave and wind action, resulting in accelerated erosion.

For the purposes of the Adaptation Master Plan, a thorough analysis of three future sea level rise (SLR) scenarios was conducted. Sea level rise increments of 2', 4', and 7' were used to prepare inundation maps, evaluate climate change related risk and proposed strategies for the shoreline to adapt over time.

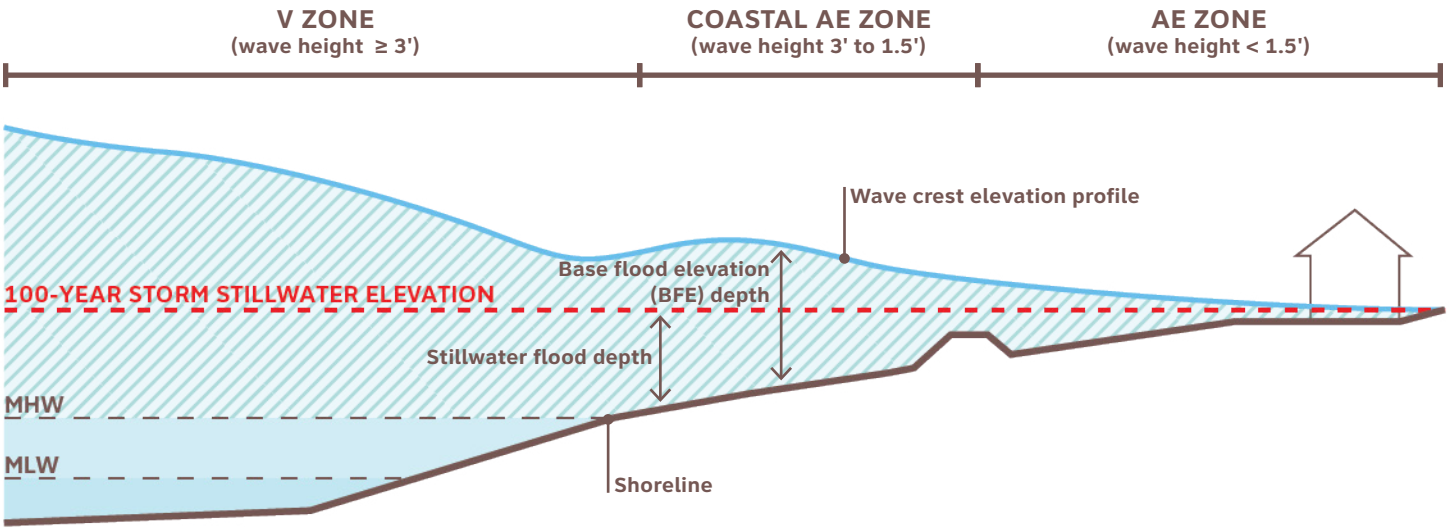


# COASTAL STORM SURGE

Storm surge is a temporary increase in the ocean water elevation due to low atmospheric pressure and wind effects that typically happens during storm events. The surge is caused primarily by a storm's winds pushing water onshore. The amplitude of the storm surge at any given location depends on the orientation of the coast line with the storm track; the intensity, size, and speed of the storm; and the local bathymetry.

The maximum water level reached during a storm event, which is the combination of the surge and tide, is called a storm tide. Coupled with sea level rise, this risk and the resulting damage increase. A less powerful storm in the future will produce the same amount of flooding as a more powerful storm of today, and a future storm will produce higher surge and a larger flood extent than it would today.

In the context of the Adaptation Master Plan, the Project Team has been considering the combined surge impacts of a 100-year storm with the different sea level rise increments previously defined. A 100-year flood is a flood event that has a 1 in 100 chance (1% probability) of being equaled or exceeded in any given year.

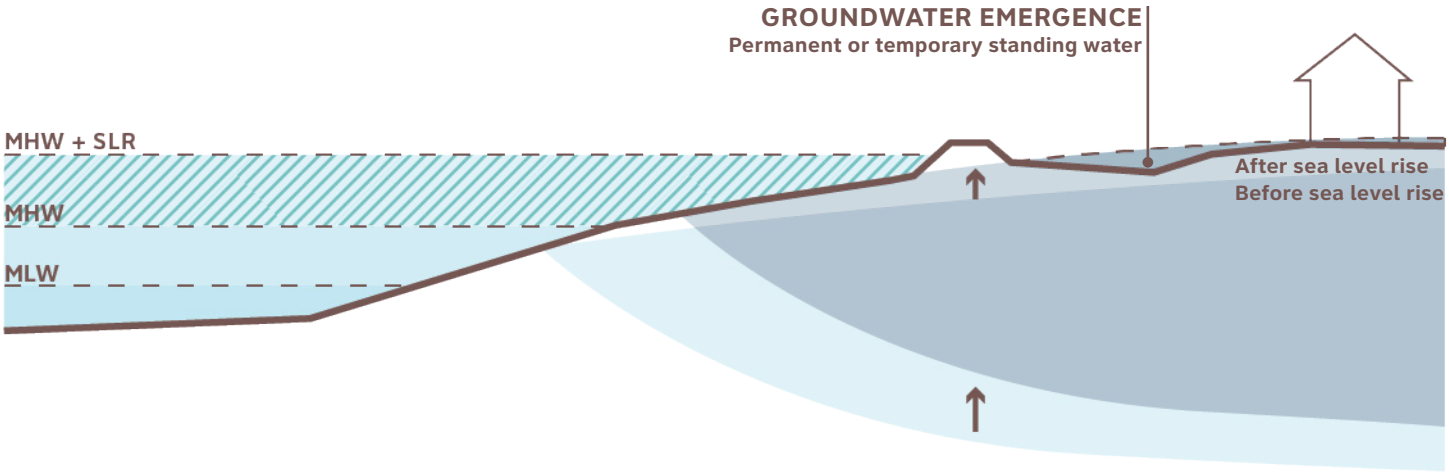


# GROUNDWATER

While the potential for coastal tidal inundation due to sea level rise is well documented, it is often overlooked that low-lying coastal areas may also be vulnerable to groundwater inundation, which is localized coastal-plain flooding due to a rise of the groundwater table with sea level. Understanding the extent and response of the coastal aquifers to sea level rise is key in preparing for mitigation and adaptation measures. The main factors that may determine the degree of sea-level-rise-driven groundwater inundation and shoaling in one specific location include:

- The proximity of the water table to the ground surface;
- The local geology (including distance to the shoreline);
- The local hydrology;
- Anthropogenic factors such as of groundwater extraction or addition.

Near the shoreline, the groundwater table in unconfined aquifers typically lies above mean sea level, fluctuating with daily tides and other low-frequency sources of ocean energy. Tidal influence decreases with distance from the shoreline. As sea level rises, the water table will likely rise simultaneously. For lower-lying interior areas this could mean that the groundwater may eventually break out above the land surface, causing inundation even though the area is not at, or directly connected to, the shoreline. The increased groundwater table could create new wetlands and expand others, change surface drainage, expand saturated soil conditions, and/or inundate the land, depending on local topography. This effect is expected to be more pronounced at the coastline than further inland. Flooding may be especially intense seasonally when high tide coincides with large rainfall events.

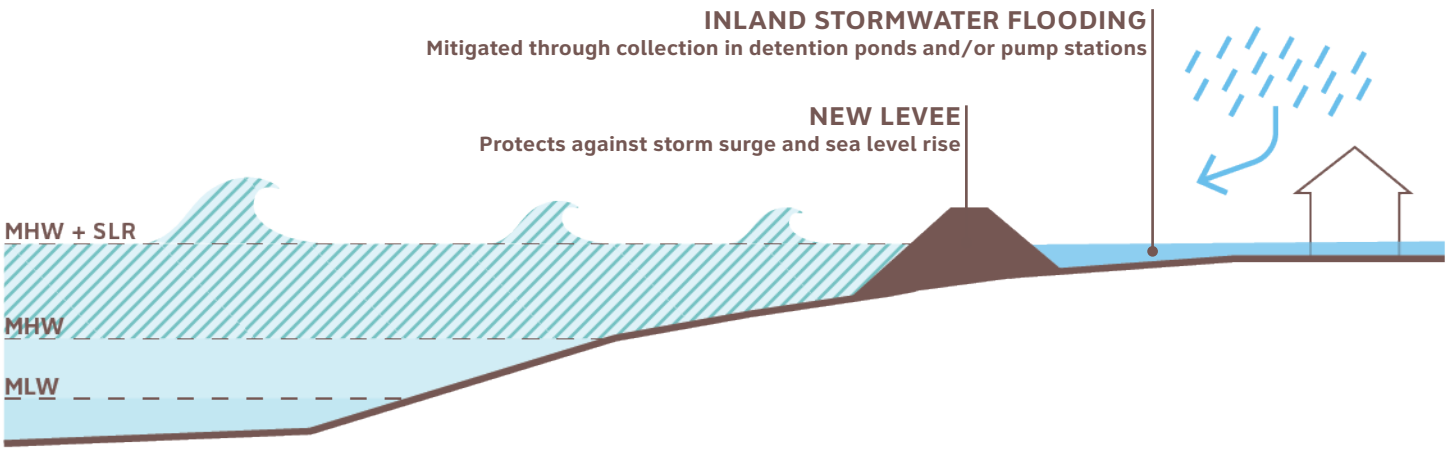


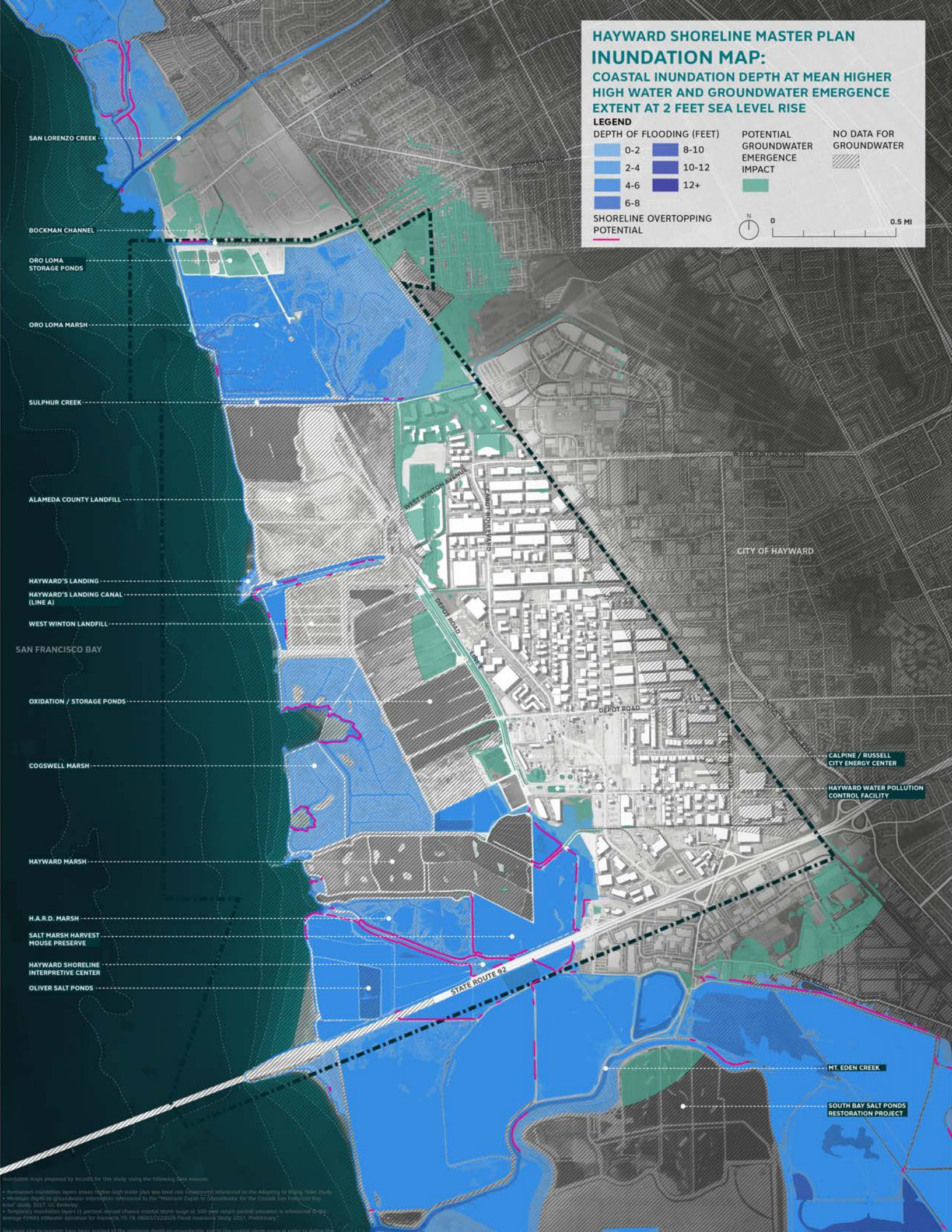
# PRECIPITATION

The largest storms in the Bay Area are called "atmospheric rivers" (ARs). These storms contribute to, on average, 40% of the Sierra snowpack and can also produce heavy rainfall and consequently substantial flood risk. Atmospheric theory and climate models both indicate that in California, the largest individual storms are becoming more intense with climate change, and there is some evidence that this might be also accompanied by more frequent extremely dry precipitation periods, as well as more frequent "whiplash" events that swing from extremely dry to extremely wet conditions.

In the study area, the flooding extent shown is primarily due to coastal storm surge and sea level rise rather than rainfall-runoff flooding, as this happens in a very limited area along Line A.

Although rainfall analysis and modeling was not part of the Adaptation Master Plan study, the Project Team is aware that detailed hydraulic and hydrologic analyses are underway by the Alameda County Flood Control and Water Conservation District (ACFCWCD), and results will likely be made available by the end of year 2020. Therefore, there is the opportunity to update the maps generated as part of this project once the above-mentioned maps are made available.






Inundation maps prepared by Arcadis for this study using the following data sources:

- Permanent inundation layers (mean higher-high water plus sea-level rise components) referenced to the Adapting to Rising Tides study.
- Minimum depth-to-groundwater information referenced to the "Minimum Depth to Groundwater for the Coastal San Francisco Bay Area" study, 2017, UC Berkeley.
- Temporary inundation layers (1 percent-annual chance coastal storm surge or 100-year return period) elevation is referenced to the average FEMA stillwater elevation for transects 70-79. 06001CV2D1D Flood Insurance Study, 2017, Preliminary.

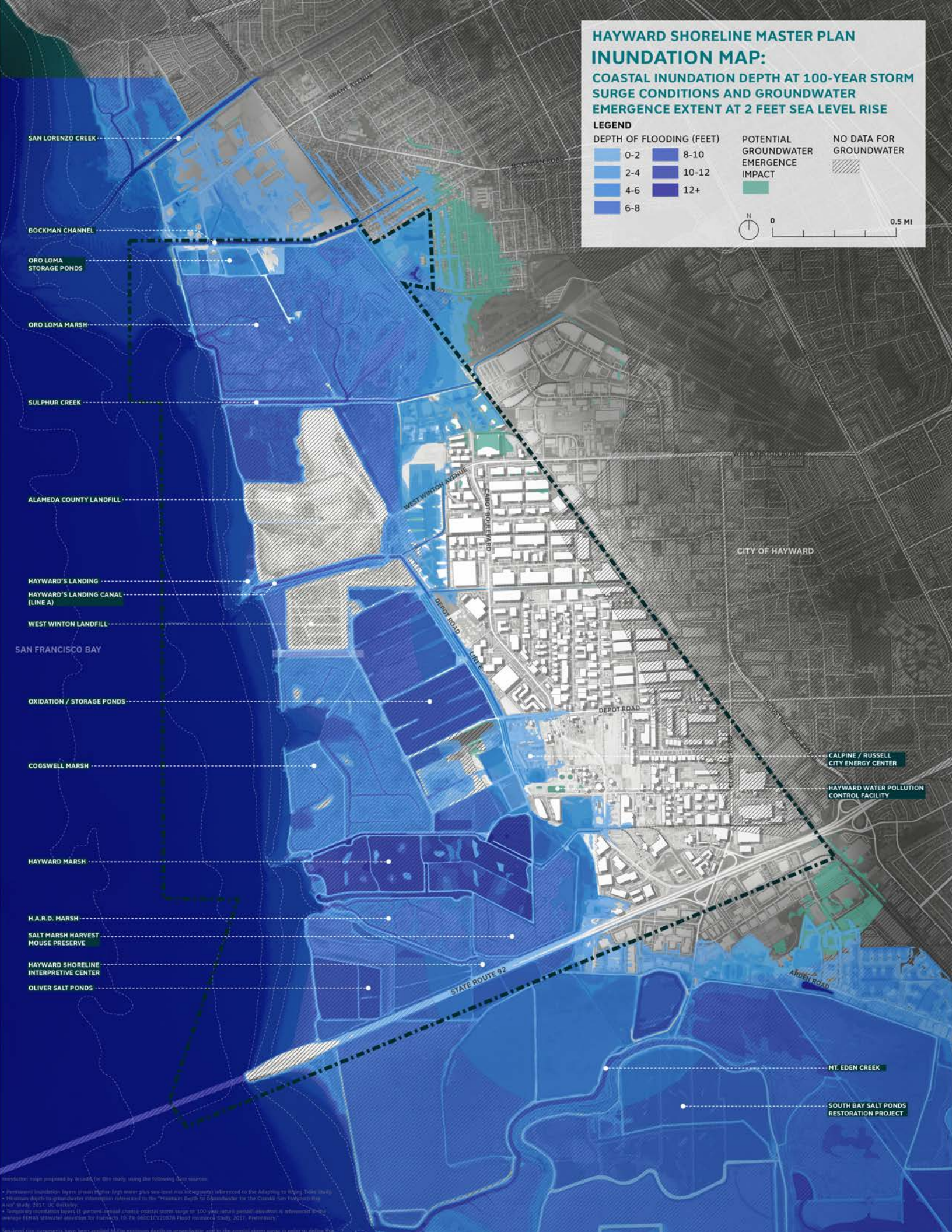
Sea-level rise components have been applied to the previous depth-to-groundwater and to the coastal storm surge in order to define the

# 2′ SEA LEVEL RISE SCENARIO

## SEA LEVEL RISE AND GROUNDWATER EMERGENCE

With 2′ of sea level rise, most of the natural features of the Hayward Regional Shoreline will experience daily inundation and the lowest-lying shoreline levees and embankments will be overtopped. Additionally, recreational resources will start to be impacted by daily inundation, including the Bay Trail, Interpretive Center, and shoreline access points. Built assets and critical infrastructure will also be more frequently inundated, which presents serious access and maintenance concerns.

The potential for groundwater emergence will start to impact the urban built area, specifically the northern end of the industrial neighborhood, as well as the San Lorenzo Community Park and adjacent residential areas.



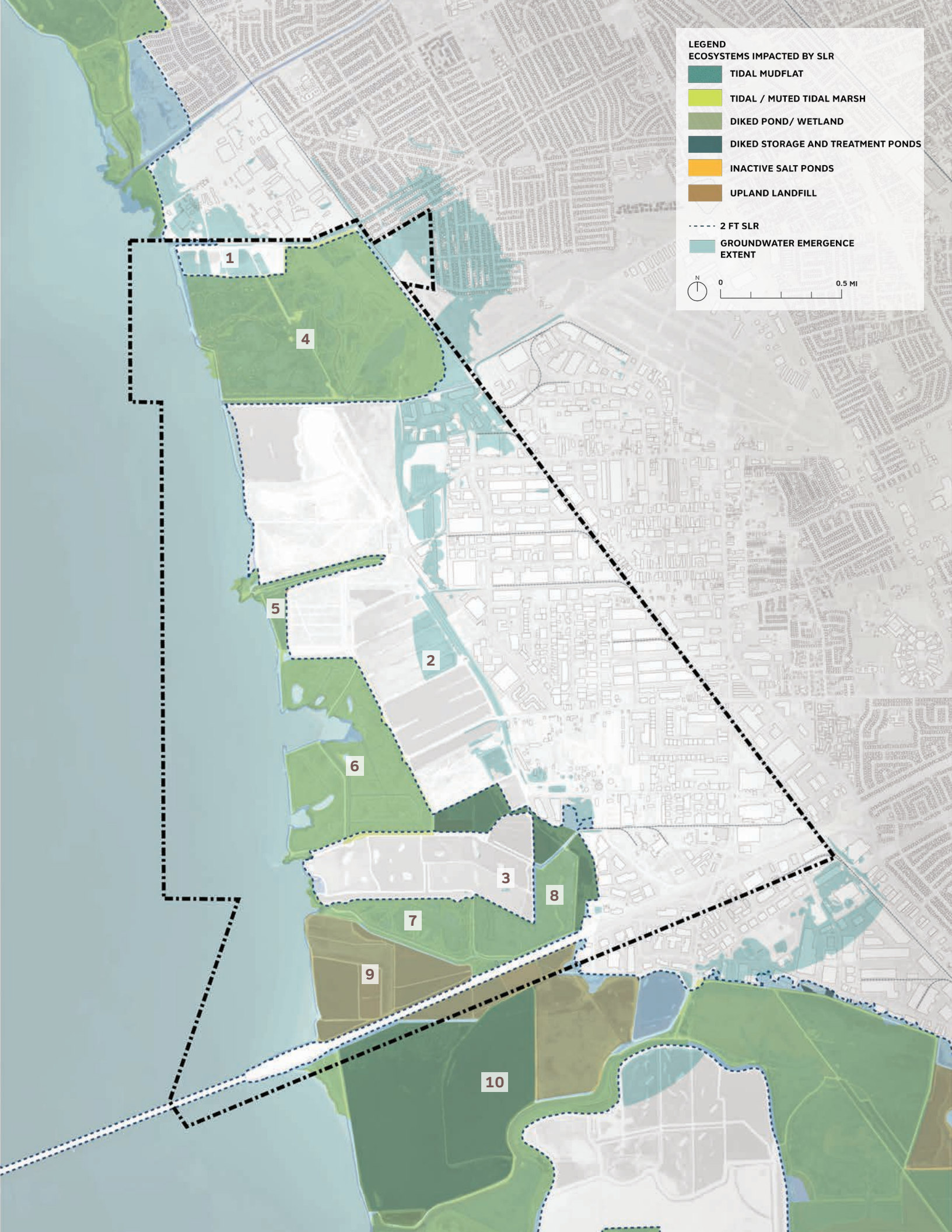

Inundation maps prepared by Arcadis for this study using the following data sources:

- Permanent inundation layers (mean higher-high water plus sea-level rise increments) referenced to the Adapting to Rising Tides Study.
- Minimum depth-to-groundwater information referenced to the "Maximum Depth to Groundwater for the Coastal San Francisco Bay Area" Study, 2017, UC Berkeley.
- Temporary inundation layers (1 percent-annual-chance coastal storm surge or 100-year return period) elevation is referenced to the average FEMA stillwater elevation for transects 70-79. 06001CV2002B Flood Insurance Study, 2017, Preliminary.

Sea-level rise increments have been applied to the maximum depth-to-groundwater and to the coastal storm surge in order to define the

## 100-YEAR STORM SURGE

Most of the natural features of the shoreline are inundated with a 100-year storm surge and urban built assets start to experience occasional inundation from the Bay. Areas of potential groundwater emergence in the 2’ sea level rise scenario are roughly correlated with areas of 100-year flood risk.


LEGEND
ECOSYSTEMS IMPACTED BY SLR
TIDAL MUDFLAT
TIDAL / MUTED TIDAL MARSH
DIKED POND/ WETLAND
DIKED STORAGE AND TREATMENT PONDS
INACTIVE SALT PONDS
UPLAND LANDFILL
2 FT SLR
GROUNDWATER EMERGENCE EXTENT
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10

# BAYLANDS AND ECOLOGICAL FEATURES AT RISK

With 2' of sea level rise, a larger extent of Baylands experience daily tidal inundation. The list below and associated map outline the major assets impacted.

### Diked storage and treatment ponds are impacted by potential groundwater emergence extent:

1. Oro Loma Storage Ponds
2. Wet Weather Storage Ponds
3. Hayward Marsh

### All tidal and muted tidal marshes experience greater inundation and potential habitat transition with sea level rise:

4. Oro Loma Marsh
5. Triangle Marsh
6. Cogswell Marsh
7. HARD Marsh
8. Salt Marsh Harvest Mouse Preserve

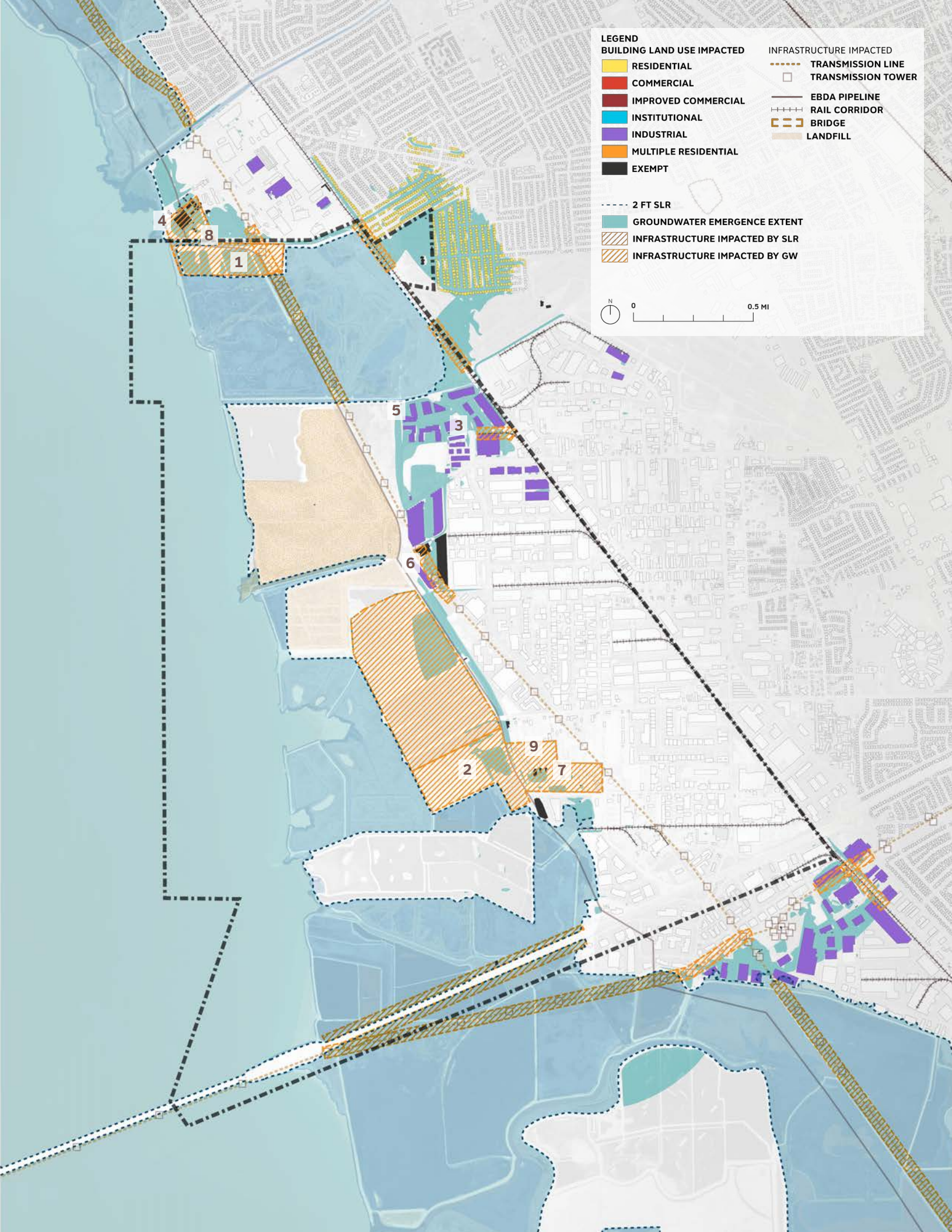
### All salt ponds are inundated with sea level rise:

9. Oliver Salt Ponds

### Diked ponds are impacted by potential groundwater emergence extent:

10. South Bay Salt Ponds Restoration Project

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.


LEGEND
BUILDING LAND USE IMPACTED
RESIDENTIAL
COMMERCIAL
IMPROVED COMMERCIAL
INSTITUTIONAL
INDUSTRIAL
MULTIPLE RESIDENTIAL
EXEMPT
INFRASTRUCTURE IMPACTED
TRANSMISSION LINE
TRANSMISSION TOWER
EBDA PIPELINE
RAIL CORRIDOR
BRIDGE
LANDFILL
2 FT SLR
GROUNDWATER EMERGENCE EXTENT
INFRASTRUCTURE IMPACTED BY SLR
INFRASTRUCTURE IMPACTED BY GW
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# BUILT ASSETS AND INFRASTRUCTURE AT RISK

With 2' of sea level rise, the risk of potential groundwater emergence impacts built assets and critical infrastructure. Additionally, increased sea levels puts access to critical infrastructure at risk. The list below and associated map outline the major assets impacted.

### Solar fields and biosolids drying/ management areas are impacted by potential groundwater emergence extent:

1. Oro Loma – Castro Valley Plant

2. Hayward Water Pollution Control Facility

### Northern Industrial Buildings are impacted by potential groundwater emergence extent

3. Northern Industrial Buildings

### Portions of the PG&E Power Lines are impacted by sea level rise

### All pump stations are impacted by potential groundwater emergence extent:

4. Oro Loma – Castro Valley Plant and Effluent Pump Station

5. Marathon Pump Station

6. Hayward Effluent Pump Station

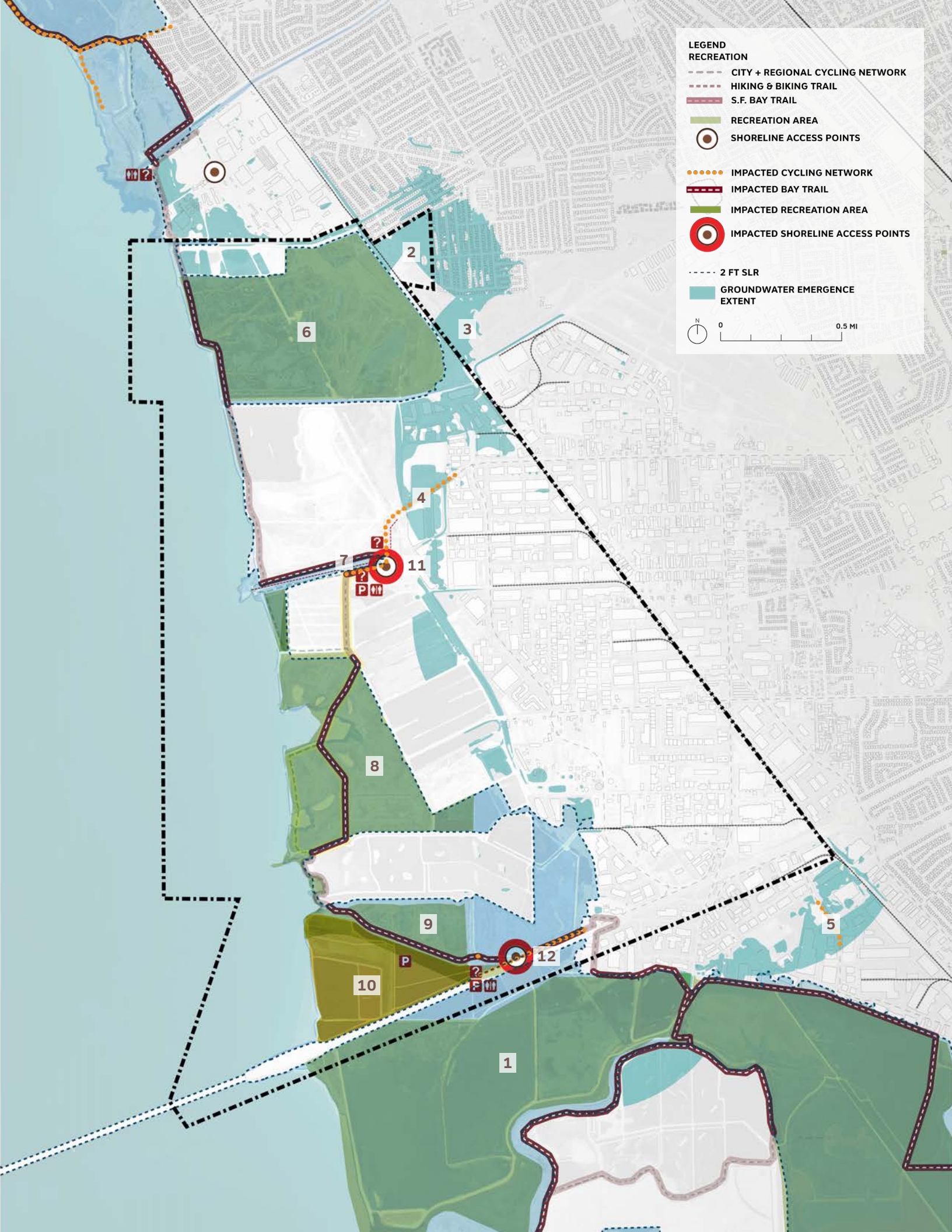
### Wastewater Treatment Plants and Energy Center are impacted by potential groundwater emergence extent:

7. Hayward Water Pollution Control Facility

8. Oro Loma Wastewater Treatment Plant

9. CalPine / Russell City Energy Center

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.


LEGEND
RECREATION
CITY + REGIONAL CYCLING NETWORK
HIKING & BIKING TRAIL
S.F. BAY TRAIL
RECREATION AREA
SHORELINE ACCESS POINTS
IMPACTED CYCLING NETWORK
IMPACTED BAY TRAIL
IMPACTED RECREATION AREA
IMPACTED SHORELINE ACCESS POINTS
2 FT SLR
GROUNDWATER EMERGENCE EXTENT
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# RECREATIONAL ASSETS AT RISK

With 2' of sea level rise, shoreline access points, SLCP, and trail networks are impacted by potential groundwater emergence or daily tidal inundation. The list below and associated map outline the major assets impacted.

### Recreation areas are impacted by potential groundwater emergence extent:

1. South Bay Salt Ponds Restoration Project
2. San Lorenzo Community Park (SLCP)
3. Skywest golf course

### Regional bike network is impacted by potential groundwater emergence extent:

4. Winton Ave
5. Corporate Ave

### All recreation areas are inundated with sea level rise

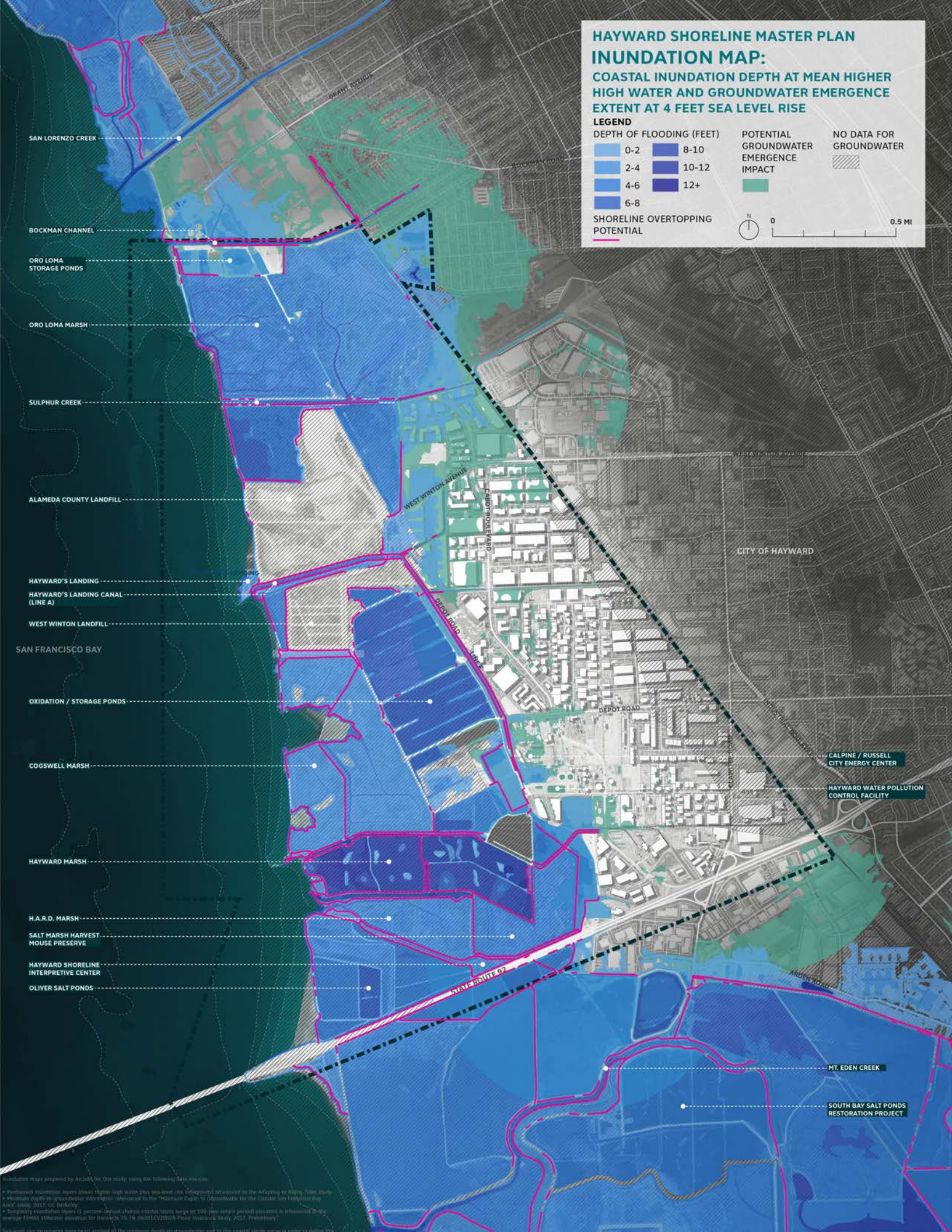
6. Oro Loma Marsh
7. Landfills
8. Cogswell Marsh
9. H.A.R.D. Marsh
10. Oliver Salt Ponds

### Some Shoreline Access Points are inundated with sea level rise

11. EBRPD Park Office Trail Entrance
12. Hayward Shoreline Interpretative Center Trail Entrance

### Parts of the Bay Trail are inundated with sea level rise.

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.

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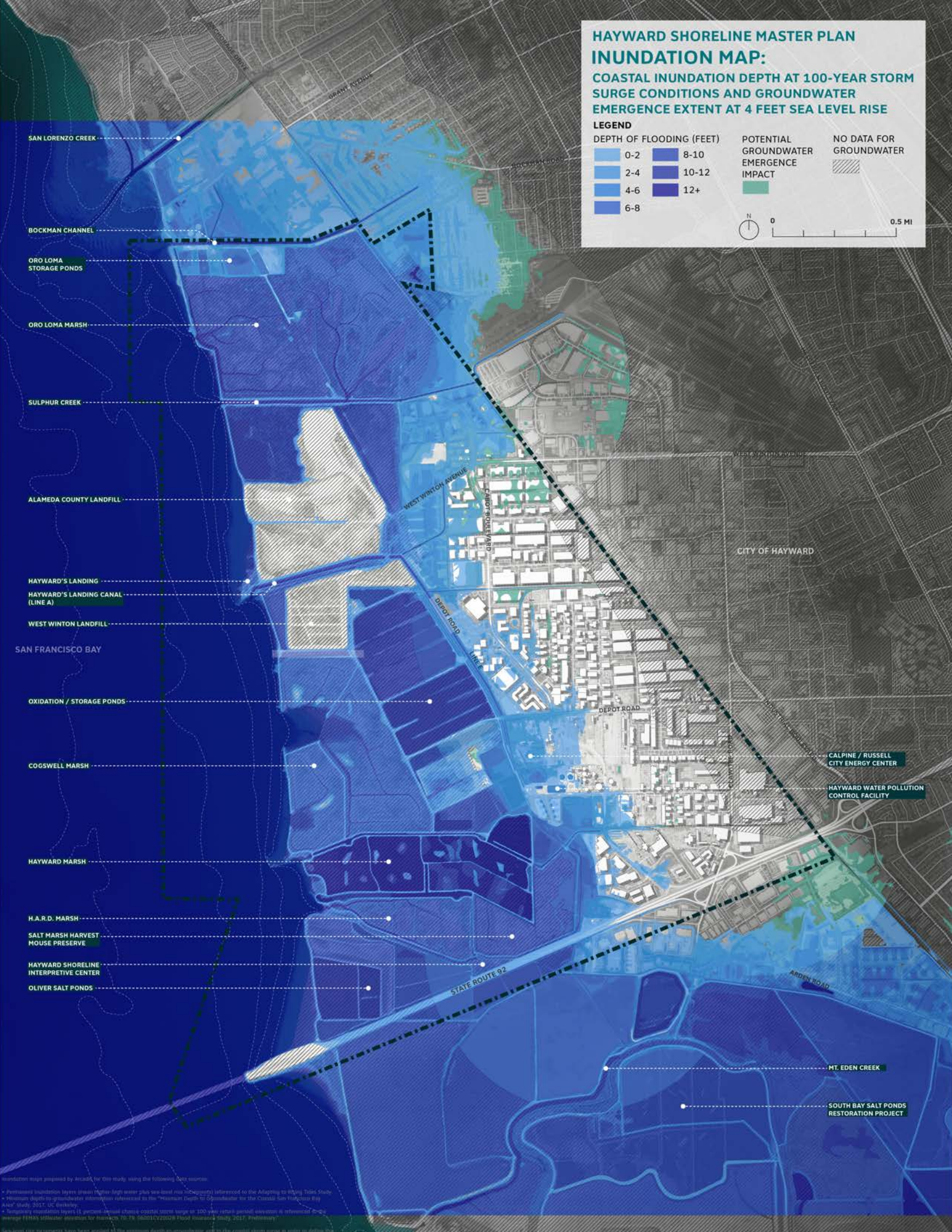
Sea-level rise components have been applied to the previous depth-to-groundwater and to the coastal storm surge in order to define the

# 4’ SEA LEVEL RISE SCENARIO

## SEA LEVEL RISE AND GROUNDWATER EMERGENCE

With 4’ of sea level rise, most of the natural features of the Hayward Regional Shoreline experience a greater level of daily inundation. A significant amount of shoreline levees and embankments are overtopped. Recreational resources are significantly impacted by daily inundation, including the Bay Trail, Interpretive Center, and shoreline access points. Built assets and critical infrastructure are even more frequently inundated, and access to them for maintenance becomes a larger issue. Direct impacts to critical infrastructure (San Mateo Bridge, Oro Loma Wastewater Treatment Plant, and the rail corridor).

The potential for groundwater emergence extends further inland to encompass a greater amount of the adjacent built urban areas.

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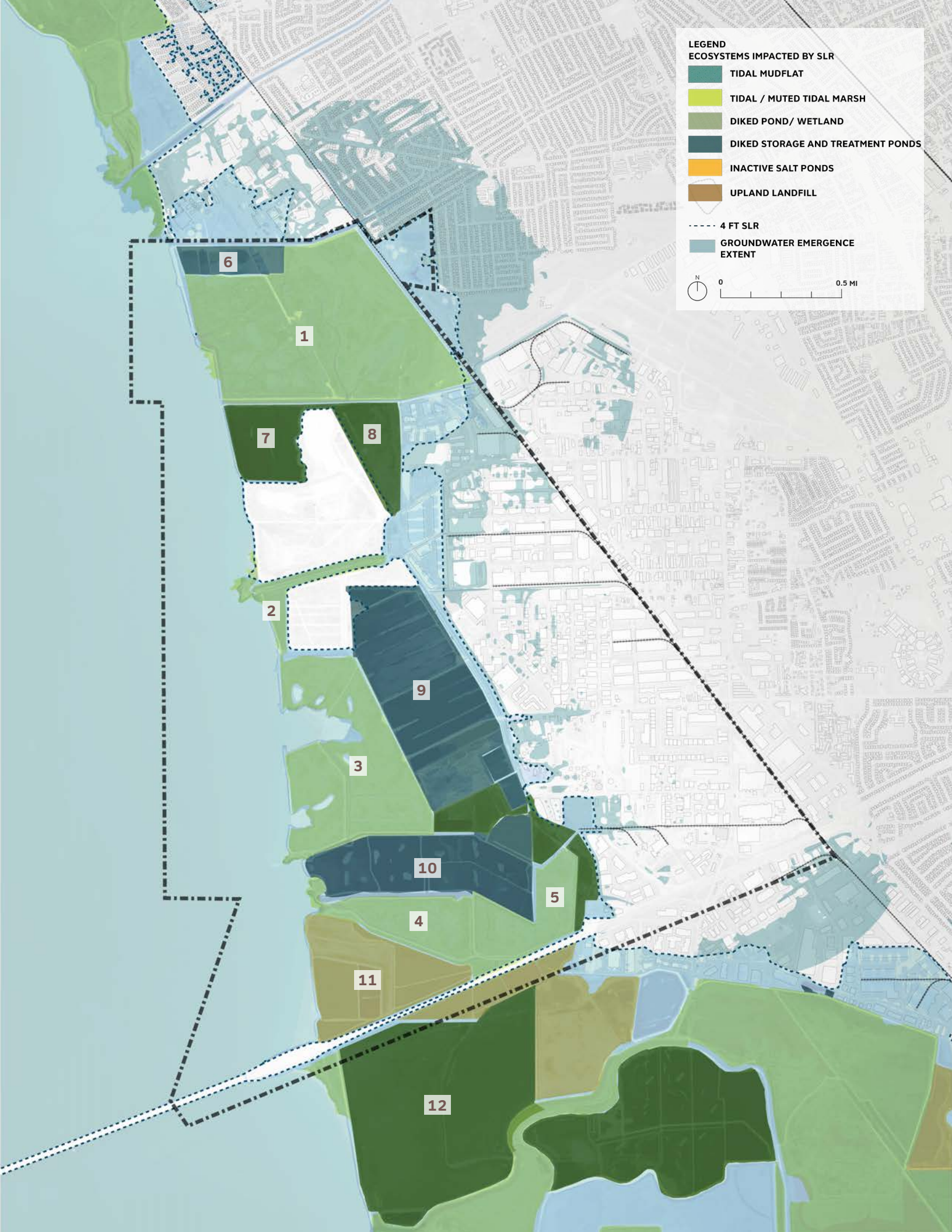
Sea-level rise increments have been applied to the maximum depth-to-groundwater and to the coastal storm surge to evaluate the

## 100-YEAR STORM SURGE

Areas of potential groundwater emergence in the 4' sea level rise scenario are roughly correlated with areas of 100-year flood risk. All of the natural features of the shoreline are inundated with a 100-year storm surge and a greater extent of urban built assets experience occasional inundation from the Bay.


LEGEND
ECOSYSTEMS IMPACTED BY SLR
TIDAL MUDFLAT
TIDAL / MUTED TIDAL MARSH
DIKED POND/ WETLAND
DIKED STORAGE AND TREATMENT PONDS
INACTIVE SALT PONDS
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GROUNDWATER EMERGENCE EXTENT
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# BAYLANDS AND ECOLOGICAL FEATURES AT RISK

With 4' of sea level rise, a broad extent of Baylands experience daily tidal inundation. This will result in large-scale habitat transition if ecosystems are not able to adapt with sea level rise. The list below and associated map outline the major assets impacted.

### All tidal and muted tidal marshes experience greater inundation and potential habitat transition with sea level rise:

1. Oro Loma Marsh
2. Triangle Marsh
3. Cogswell Marsh
4. HARD Marsh
5. Salt Marsh Harvest Mouse Preserve

### All diked storage and treatment ponds are inundated with sea level rise:

6. Oro Loma Storage Ponds
7. Frank's West
8. Frank's East
9. Wet Weather Storage Ponds
10. Hayward Marsh

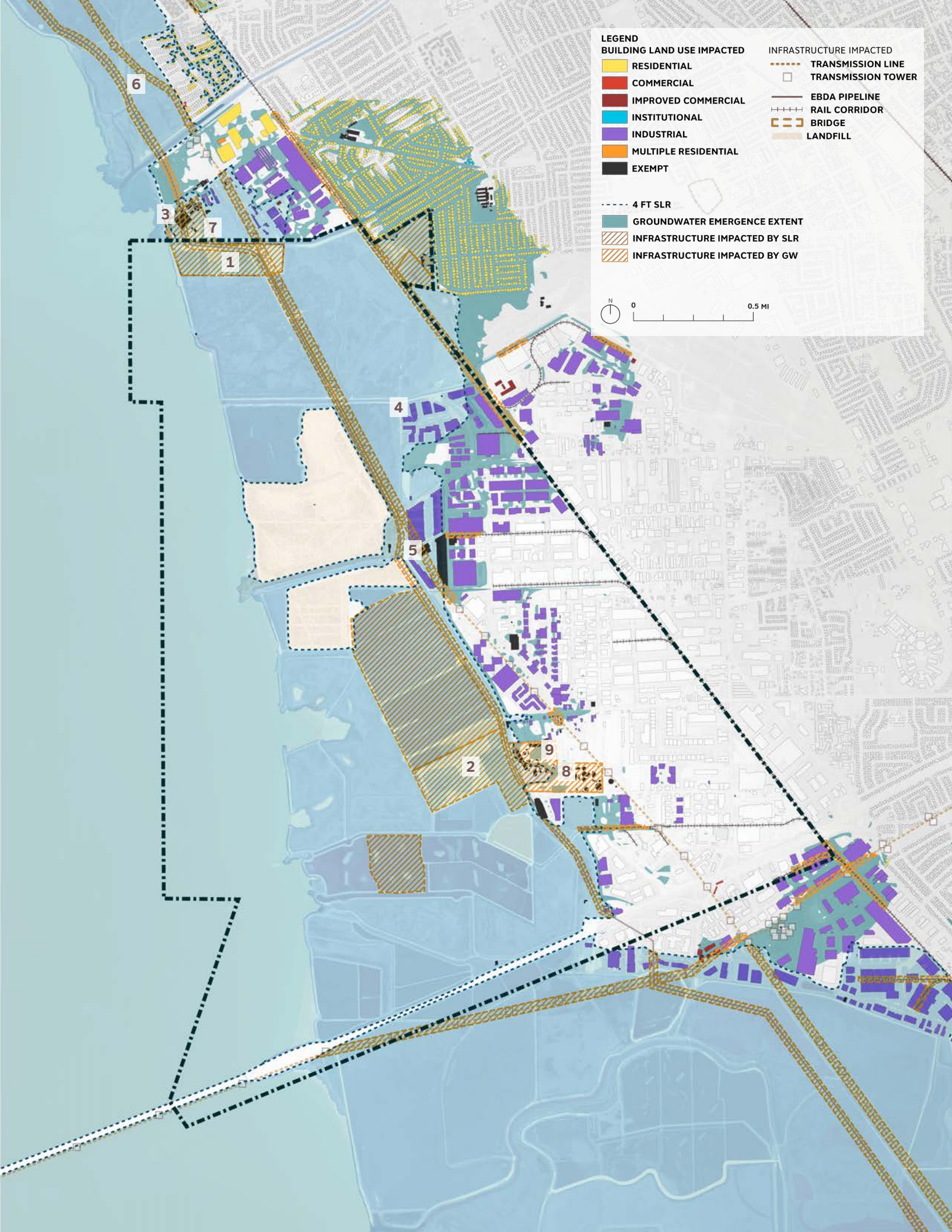
### All salt ponds are inundated with sea level rise:

11. Oliver Salt Ponds

### Diked ponds are impacted by potential groundwater emergence extent:

12. South Bay Salt Ponds Restoration Project

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.


LEGEND
BUILDING LAND USE IMPACTED
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# BUILT ASSET AND INFRASTRUCTURE AT RISK

With 4' of sea level rise, daily tidal inundation and the risk of potential groundwater emergence impacts a larger extent of built assets and critical infrastructure. Additionally, access becomes a major concern. The list below and associated map outline the major assets impacted.

### Solar fields and biosolids drying/management areas are inundated by sea level rise:

1. Oro Loma – Castro Valley Plant
2. Hayward Water Pollution Control Facility

### Northern Industrial Buildings are impacted by sea level rise and potential groundwater emergence extent

### All pump stations and plants are inundated with sea level rise:

3. Oro Loma - Castro Valley Effluent Station
4. Marathon Pump Station
5. Hayward Effluent Pump Station
6. Lavwma Valve Box

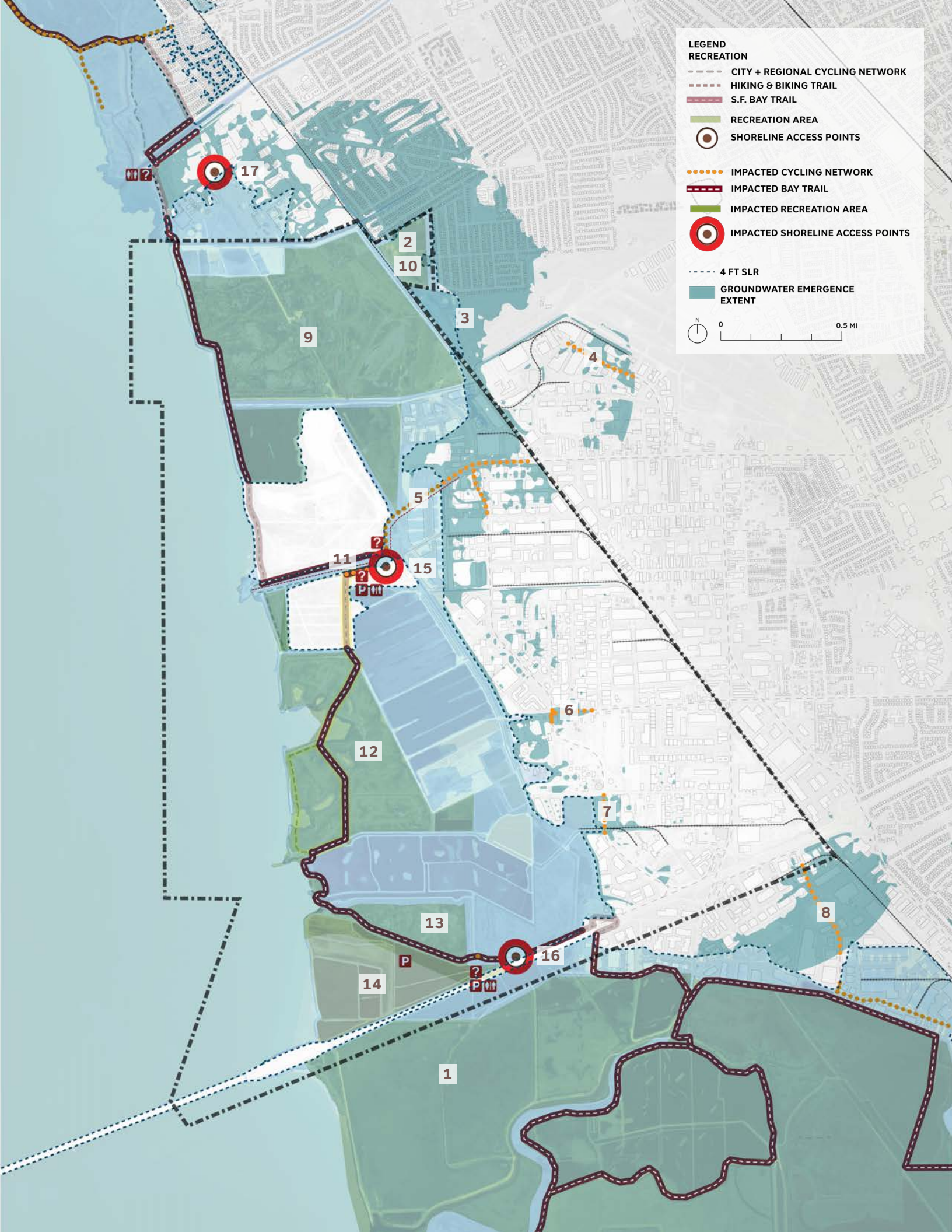
### Most of the PG&E Power Lines are impacted by sea level rise

### Industrial Buildings are impacted by potential groundwater extent

### All Wastewater Treatment Plants and Energy Center are impacted by sea level rise:

7. Oro Loma Castro Valley Plant
8. Hayward Water Pollution Control Facility
9. Calpine/Russell City Energy Center

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.


LEGEND
RECREATION
CITY + REGIONAL CYCLING NETWORK
HIKING & BIKING TRAIL
S.F. BAY TRAIL
RECREATION AREA
SHORELINE ACCESS POINTS
IMPACTED CYCLING NETWORK
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# RECREATIONAL ASSETS AT RISK

With 4' of sea level rise, all shoreline access points, SLCP, and a large extent of trail networks are impacted by daily tidal inundation. The list below and associated map outline the major assets impacted.

### Recreation areas are impacted by potential groundwater extent:

1. South Bay Salt Ponds Restoration Project
2. San Lorenzo Community Park
3. Skywest golf course

### Regional bike network is impacted by sea level rise and potential groundwater extent:

4. Corsair Blvd
5. Winton Ave
6. Depot Rd
7. Whitesell St
8. Corporate Ave

### All recreation areas are inundated with sea level rise

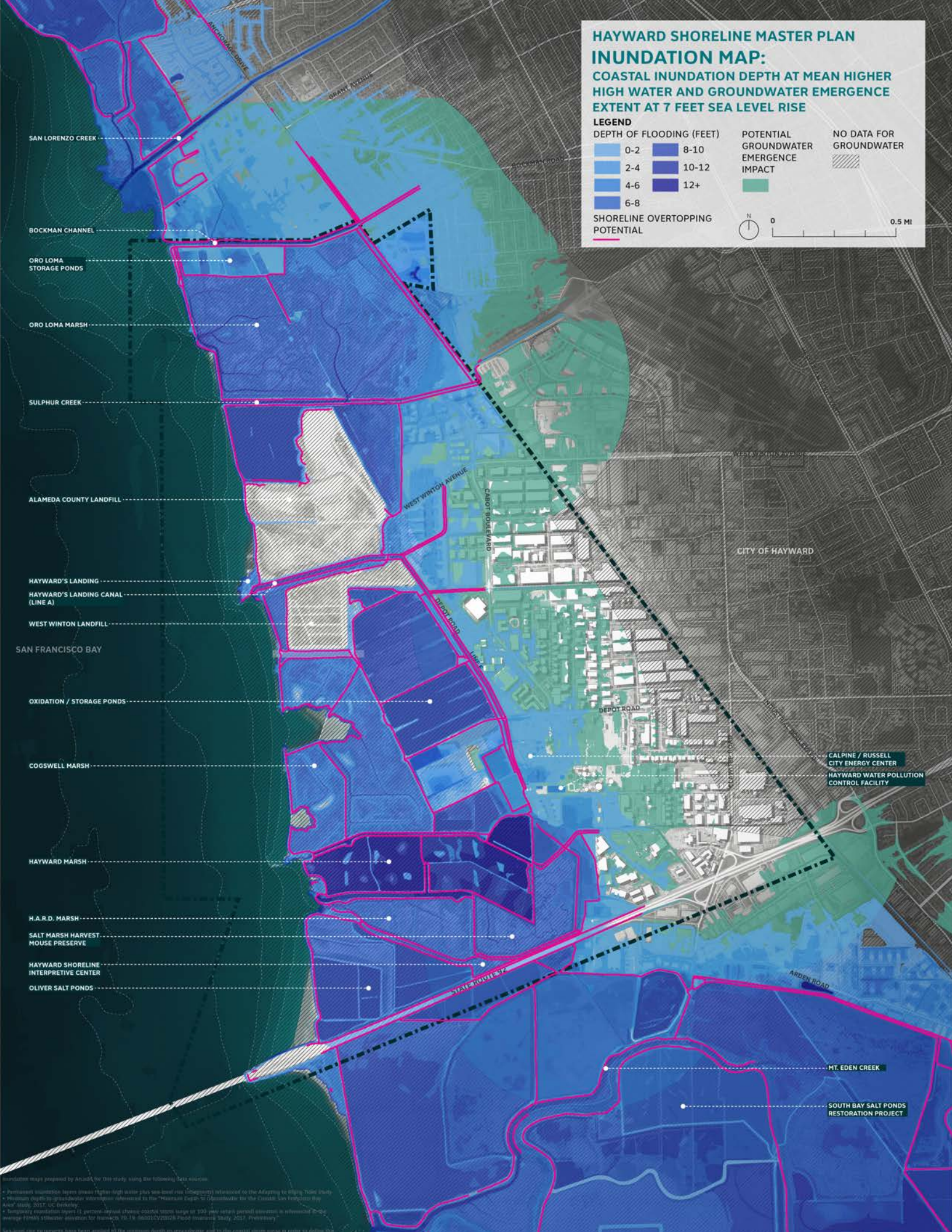
9. Oro Loma Marsh
10. San Lorenzo Community Park (SLCP)
11. Landfill
12. Cogswell Marsh
13. H.A.R.D. Marsh
14. Oliver Salt Ponds

### All Shoreline Access Points are inundated with sea level rise

15. EBRPD Park Office Trail Entrance
16. Hayward Shoreline Interpretative Center Trail Entrance
17. San Lorenzo Trail Entrance

### A majority of the Bay Trail is inundated with sea level rise.

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.

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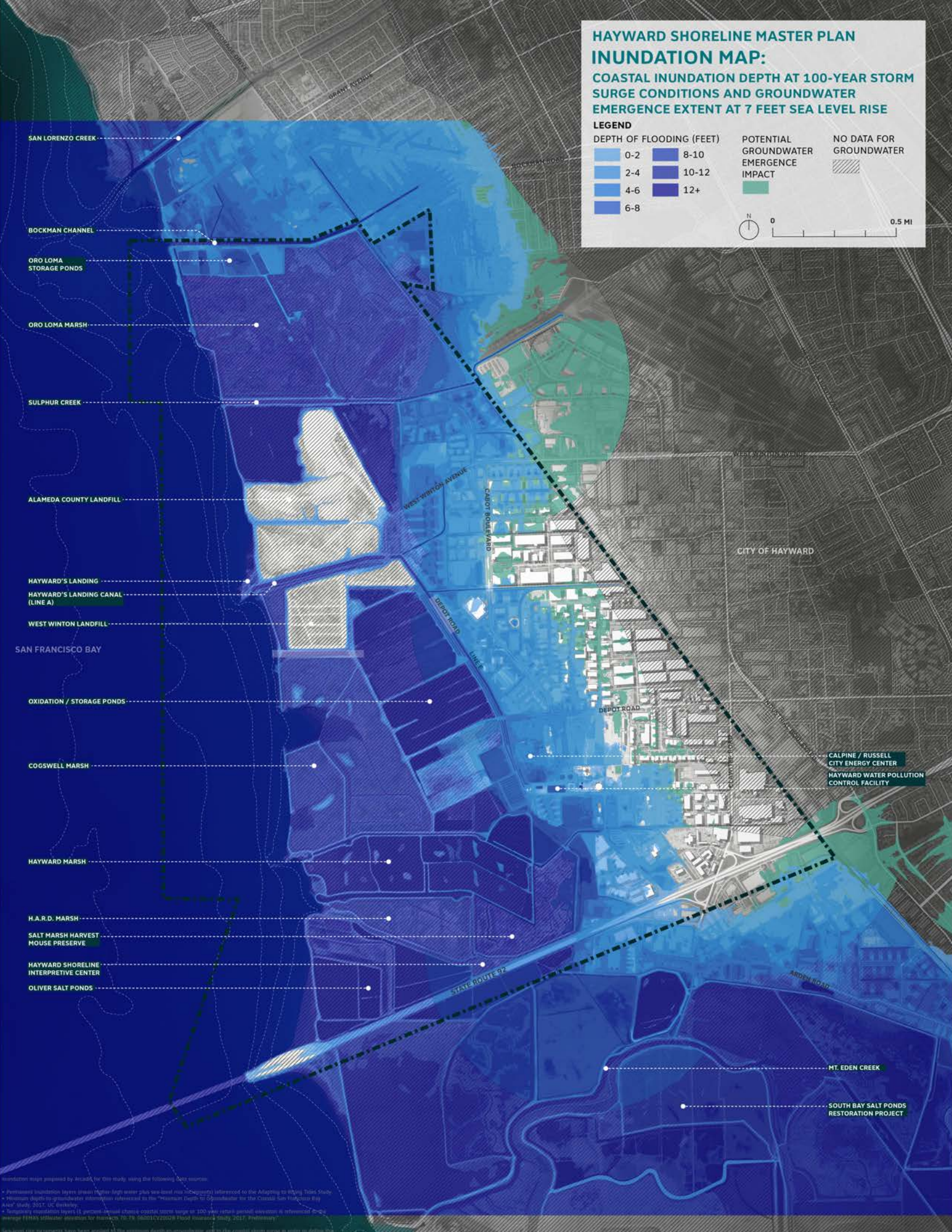
# 7’ SEA LEVEL RISE SCENARIO

## SEA LEVEL RISE AND GROUNDWATER EMERGENCE

With 7’ of sea level rise, all of the natural and recreational features of the Hayward Regional Shoreline experience an extreme level of daily inundation. Most of the shoreline levees and embankments are overtopped in this scenario.

Almost all critical infrastructure is impacted by sea level rise, including significant impacts to the San Mateo Bridge approach and inundation of the landfill perimeters. The industrial neighborhoods experience major impacts from sea level rise and groundwater emergence. In addition, all stormwater and flood control channels experience significant backups.

The potential for groundwater emergence expands to encompass a large extent of the built urban areas.

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## 100-YEAR STORM SURGE

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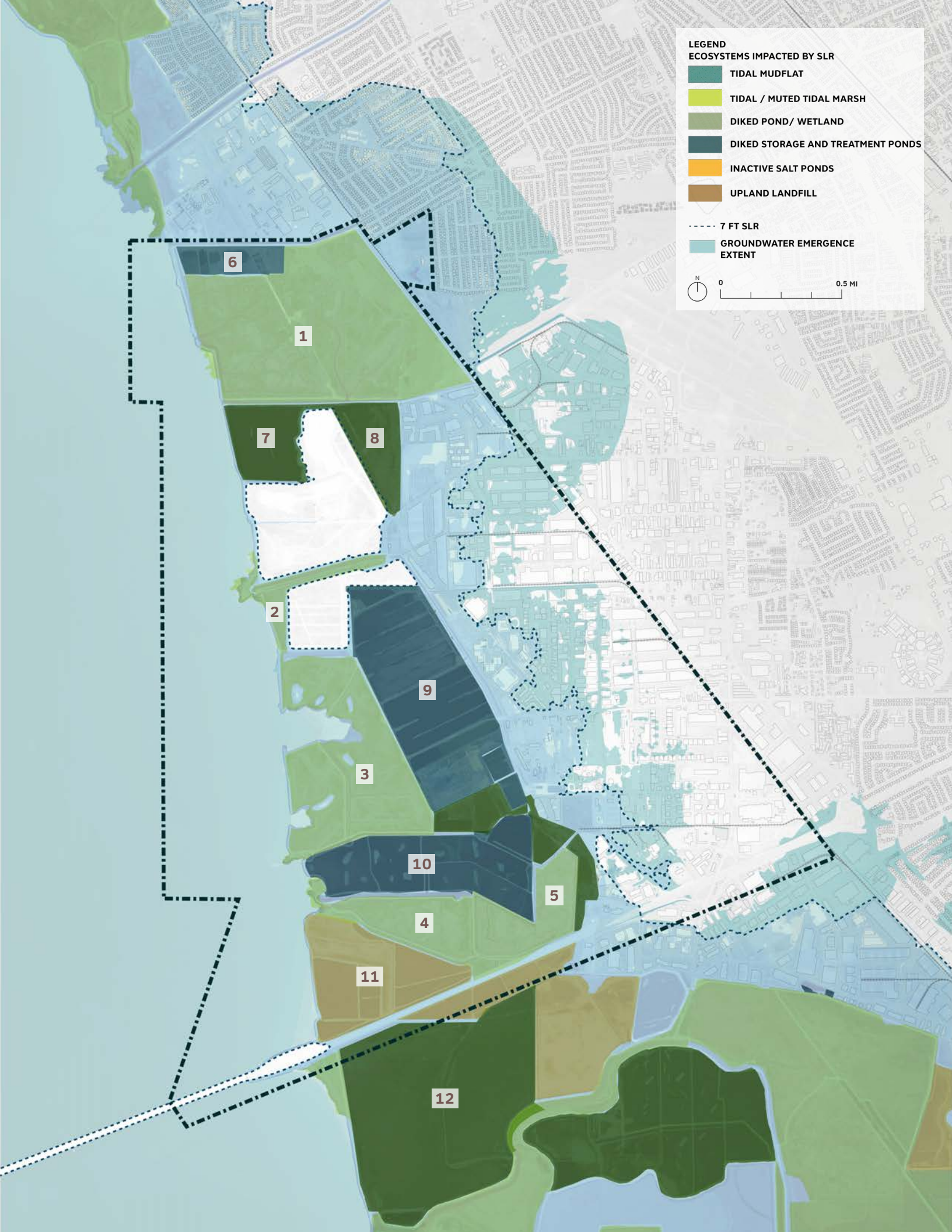
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### All tidal and muted tidal marshes experience greater inundation and potential habitat transition with sea level rise:

1. Oro Loma Marsh
2. Triangle Marsh
3. Cogswell Marsh
4. HARD Marsh
5. Salt Marsh Harvest Mouse Preserve

### All diked storage and treatment ponds are inundated with sea level rise:

6. Oro Loma Sludge Ponds
7. Frank's West
8. Frank's East
9. Wet Weather Storage Ponds
10. Hayward Marsh

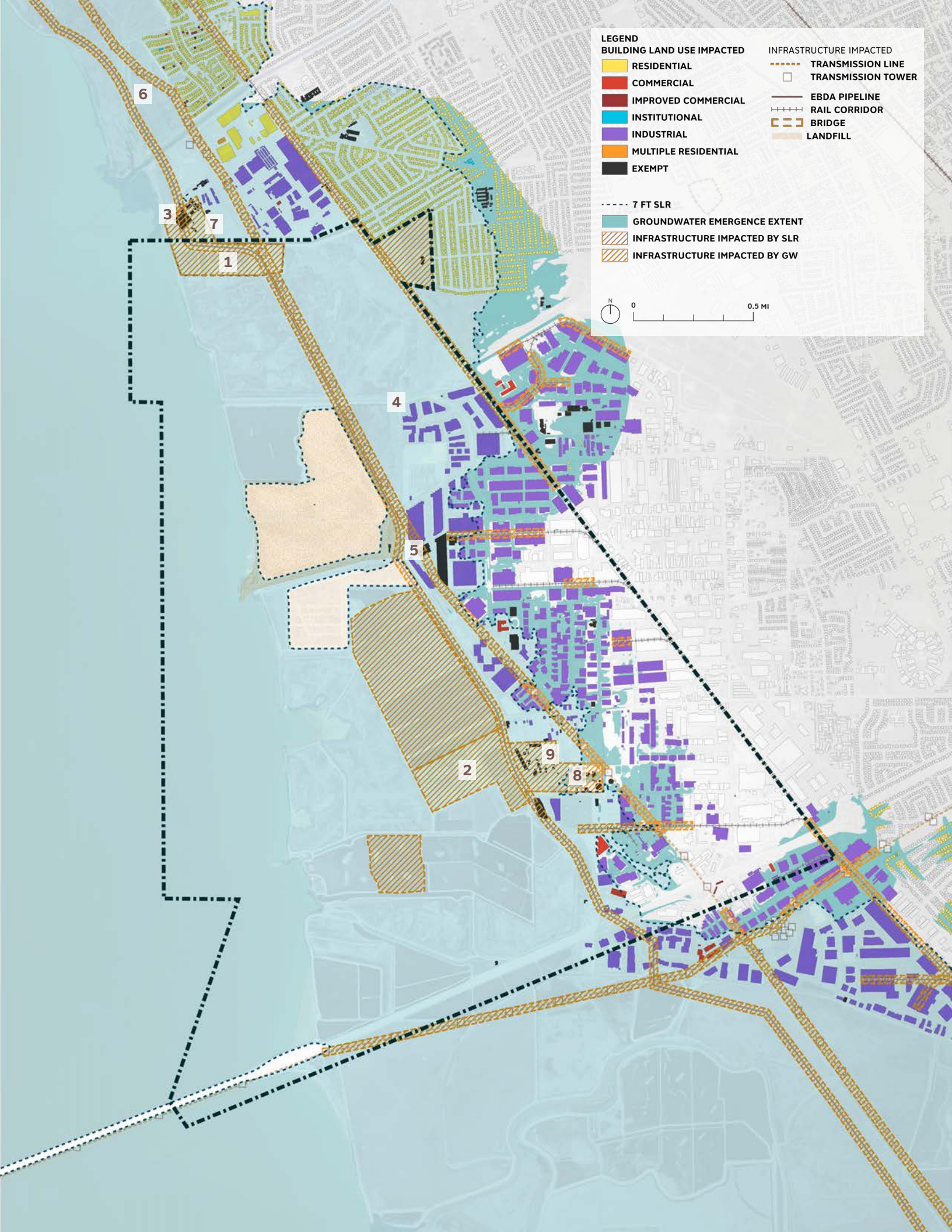
### All salt ponds are inundated with sea level rise:

11. Oliver Salt Ponds

### All diked ponds are inundated by sea level rise:

12. South Bay Salt Ponds Restoration Project

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.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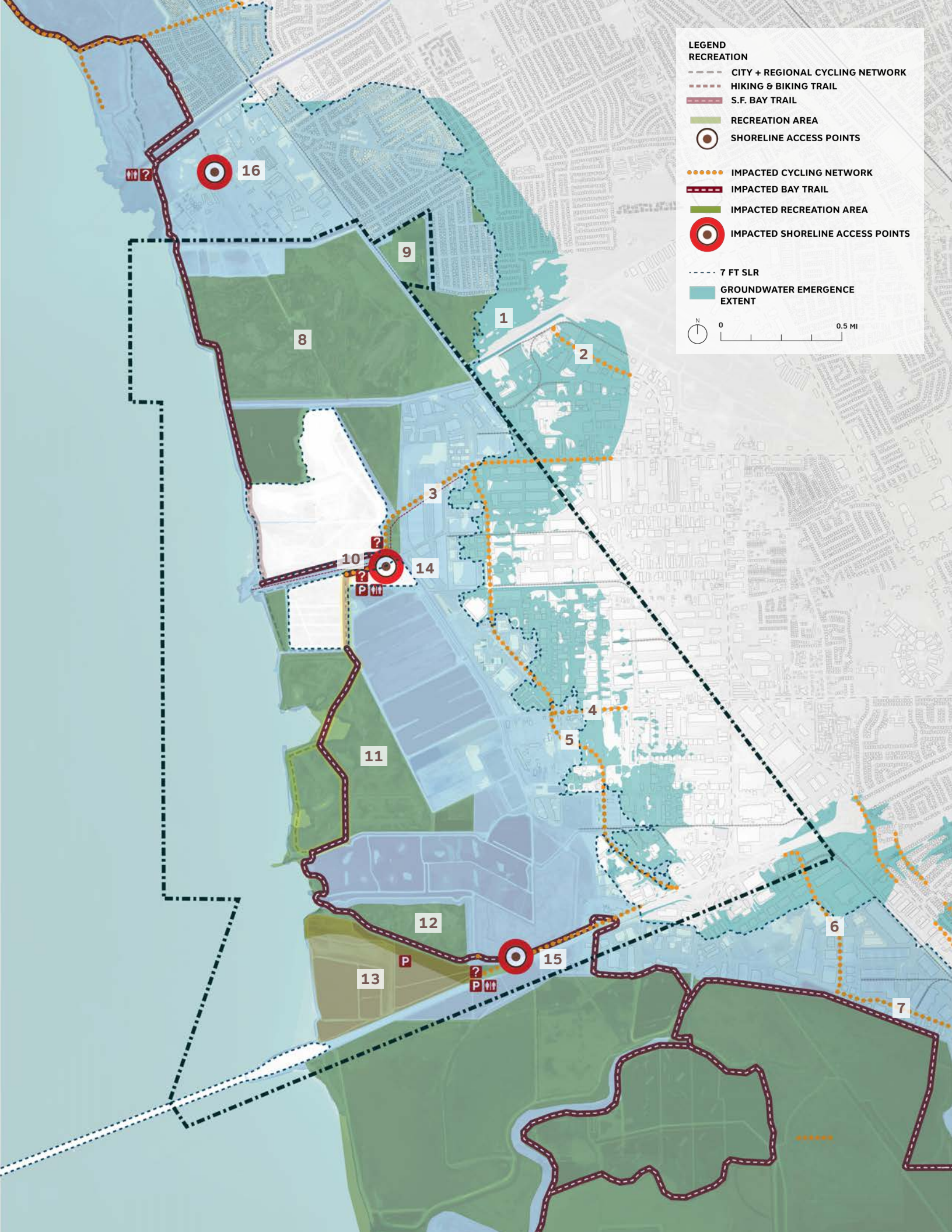
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# RECREATIONAL ASSETS AT RISK

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4. Depot Rd
5. Whitesell St
6. Corporate Ave
7. Arden Rd

### All recreation areas are inundated with sea level rise

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### All Shoreline Access Points are inundated with sea level rise

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### A majority of the Bay Trail is inundated with sea level rise

### The shoreline may experience increased erosion risk with further wave and wind action as sea levels rise.

# ADAPTATION STRATEGIES

**This chapter provides a catalog of nature-based solutions, hard infrastructure and non-structural adaptation strategies that the Project Team explored and eventually combined into Design Alternatives.**

*Frank's East, looking towards Alameda County Landfill*

# ADAPTATION STRATEGIES

## SELECTION PROCESS

The Project Team considered the full project area of the Hayward Regional Shoreline Adaptation Master Plan, stretching over three miles from San Lorenzo Creek south to State Route 92, to produce a catalog of potential design strategies to help the shoreline adapt to climate change.

This suite of nature-based, engineered, and non-structural strategies were selected to mitigate future risk to a complex diversity of shoreline assets, including ecological features, built infrastructure, the urban fabric, and recreational resources.

An extensive list of design strategies were considered and analyzed through a process of detailed stakeholder and agency review. This chapter provides a catalog of the strategies that received the most support.

The final selection of proposed adaptation strategies are the most applicable and site-specific ways to help the Hayward Regional Shoreline adapt to climate change.

# NATURE-BASED STRATEGIES

**This section provides a catalog of nature-based design strategies that incorporate coastal risk reduction and ecological infrastructure to adapt shoreline assets to sea level rise.**

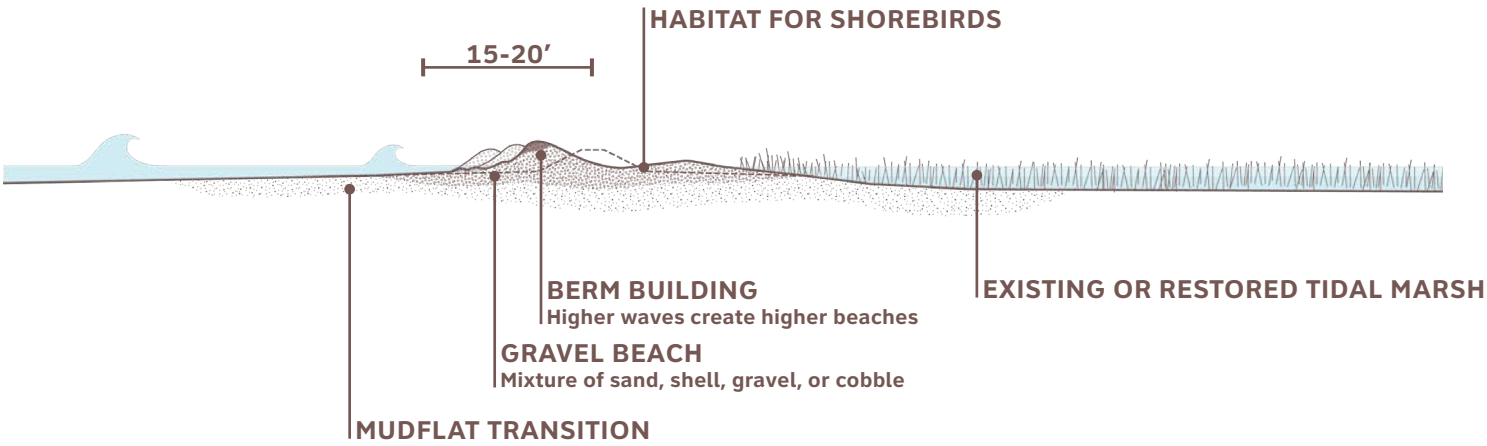
# FINE AND COARSE GRAIN BEACHES

## DESCRIPTION

Coarse or composite estuarine beaches are dynamic features that consist of a mixture of sand, shell, gravel, or cobble. Beaches include a supratidal beach berm and a beach face. Gravel and cobble beaches can dissipate wave energy over shorter distances and are generally more suitable within the urbanized and constrained estuary than sand beaches. They can be placed in front of levees, roads or other vulnerable infrastructure to reduce erosion. Many beaches provide habitat benefits to shorebirds.

## GOAL/OBJECTIVE

- Reduce erosion of levees
- Ecological enhancement (provide shorebird nesting habitat)




### Arambaru Island Enhancement Project

**Marin County, CA**

A restoration project to stabilize the eroding eastern shoreline, enhance habitats, and encourage seabird and seal use. A new beach gives the habitats time to transition as sea levels rise.

- Focus is on creating habitat for terns and other water birds
- Gravel, sand, and oyster shell hash shoreline with eucalyptus log stabilization infrastructure
- Larger rocks and driftwood help trap finer sediments
- Erosion of island was slowed, holding up against winter storms and continual increases in waves

**Gravel Beach, Arambaru Island**
(www.kqed.org)

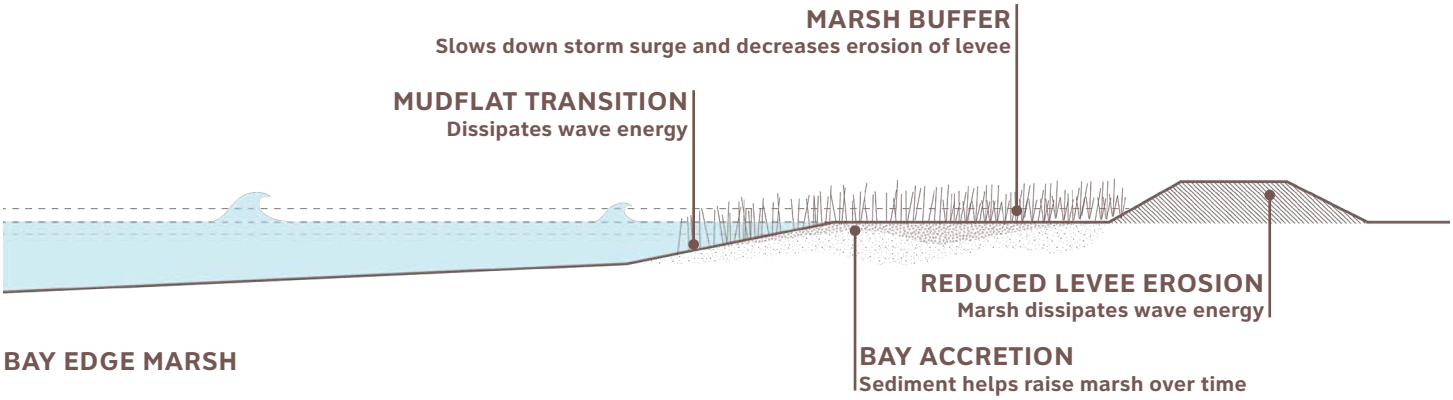
# TIDAL MARSH RESTORATION

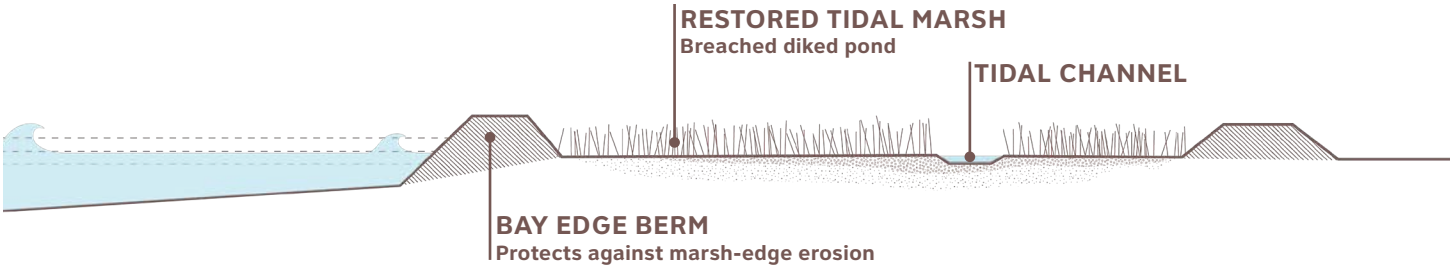
## DESCRIPTION

In the face of climate change, protecting, maintaining, and restoring tidal marshes and their associated mudflats is critical to maintain flood control and ecosystem services. Techniques include restoring diked baylands, planting native species to accelerate colonization, placing sediment to raise subsided areas, and creating high tide refugia within marshes. Existing marshes have the capacity to vertically accrete along with sea level rise if they have sufficient sediment supply. In low sediment scenarios, they may convert to mudflats or subtidal ecosystems.

## GOAL/OBJECTIVE

- Ecological enhancement (provide critical habitat)
- Reduce erosion risk along the shoreline and attenuate waves



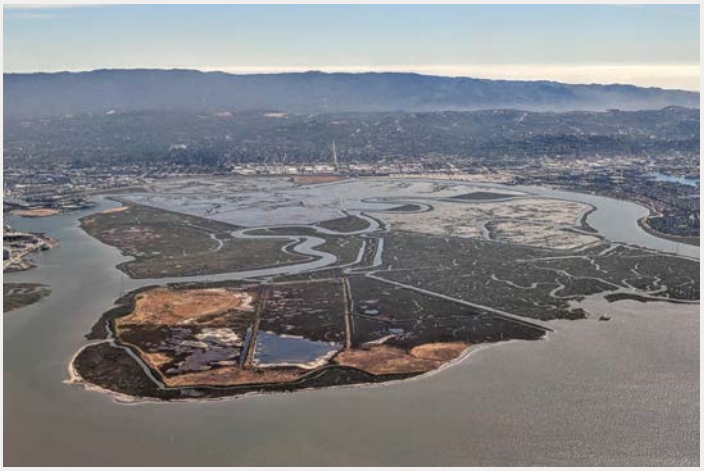

**DIKED POND MARSH RESTORATION**

### Bair Island Wetland Restoration

**Redwood City, CA**

The breaching of perimeter levees of this formerly diked complex allowed for the restoration of tidal marshes to improve water quality, expand and enhance wildlife habitat, and reduce mosquito breeding conditions by restoring tidal flow.

- Formerly diked and drained for agriculture
- Restored 1,552 acres of tidal wetland
- Pedestrian bridge and trail access
- Subsided ponds were raised with dredge material and upland fill over 8 years with over 1.5 million CY of fill
- Perimeter levee was breached in the restoration



**Aerial view of Bair Island after restoration**
(www.smccvb.com)

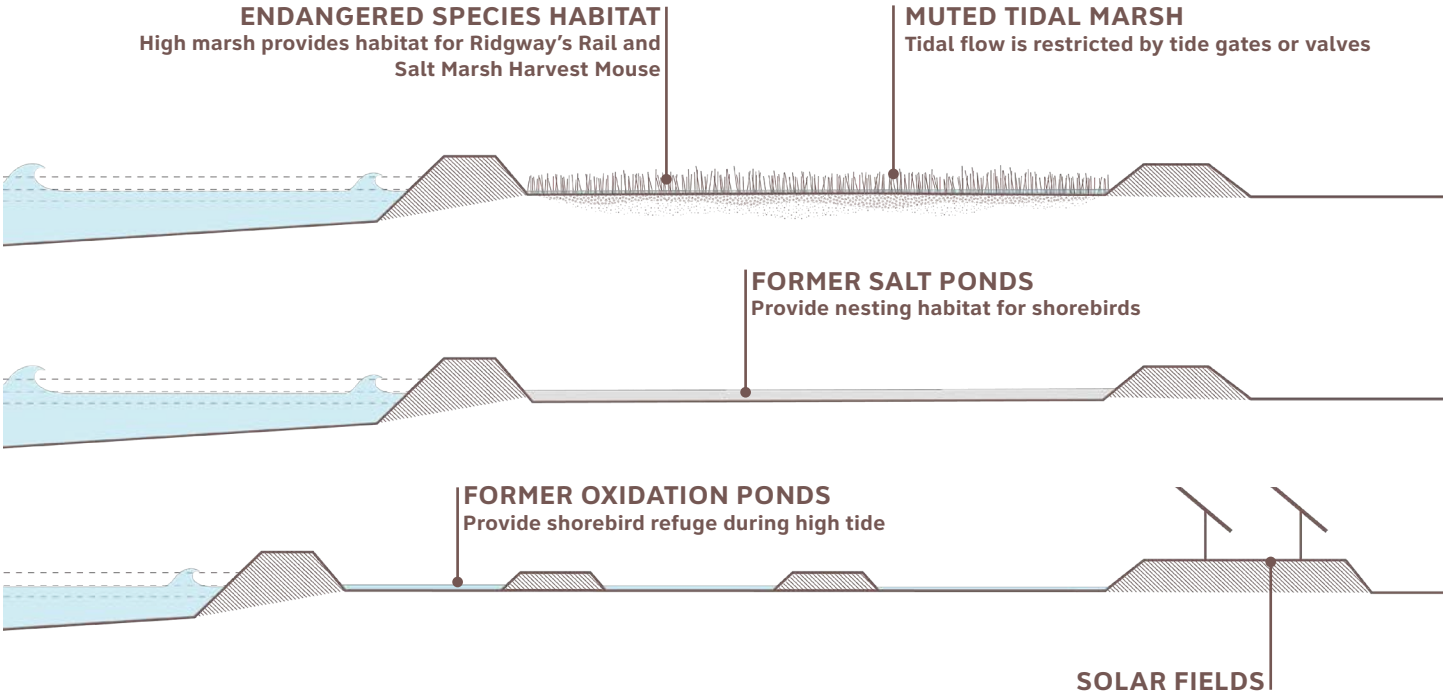
# DIKED POND MANAGEMENT

## DESCRIPTION

Diked baylands can be managed as flood retention basins or used for habitat purposes. Low-lying diked baylands can be used to store stormwater storage capacity from precipitation or flood events to be drained and pumped to the Bay. They can also be used to store groundwater pumped from urban areas. Additionally, he dikes are often used to locate transmission lines, rail lines, wastewater lines, and other infrastructure. When used for habitat purposes, diked ponds can provide salt pond habitat for endangered species, particularly shorebirds.

## GOAL/OBJECTIVE

- Flood control (provide stormwater storage space)
- Ecological enhancement (provide shorebird habitat)




## Shorebird Marsh

**Corte Madera, CA**

Former tidal marsh that was diked and filled with construction refuse. Efforts between 1983-1974 restored tidal flow and designed the marsh with the dual purpose of providing shorebird habitat while serving as a stormwater detention basin.

- Delivered by a series of channels and lagoons, treated stormwater from the Town of Corte Madera collects in the low-lying marsh area
- Water levels are adjusted to increase storage capacity for winter storms and for seasonal enrichment of bird habitat. Ring levee surrounds and protects critical habitat within the marsh
- The water flow management regime reduces erosion and sedimentation from the connecting channel

**Aerial view of Corte Madera Ecological Reserve**
(Marin Independent Journal, 2018)

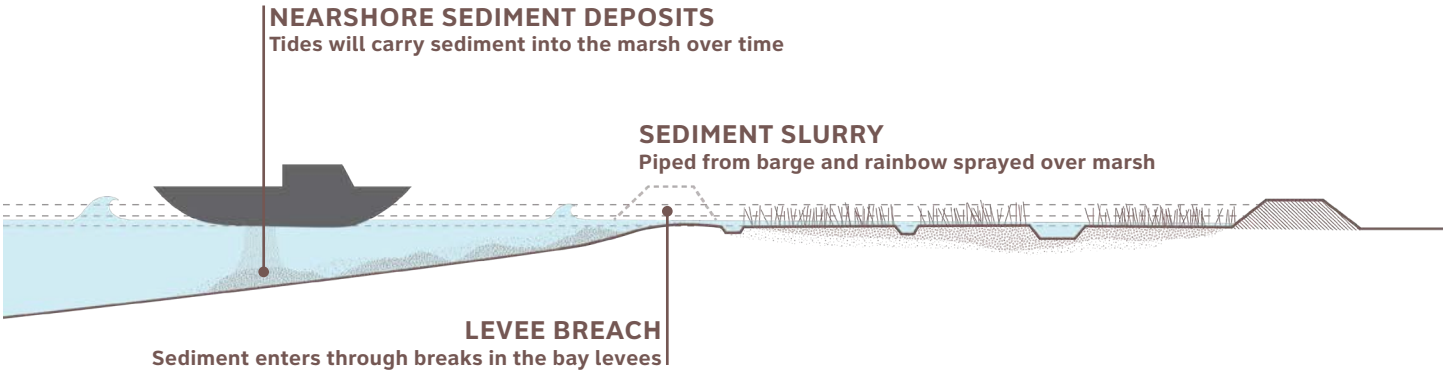
# FINE SEDIMENT AUGMENTATION

## DESCRIPTION

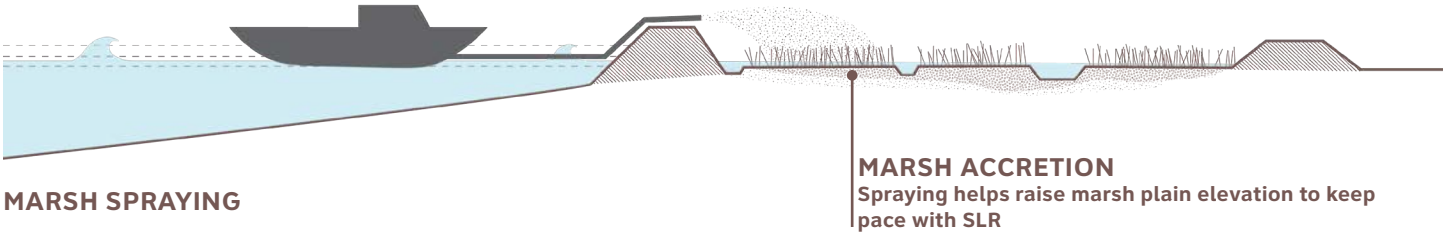
The direct or indirect placement of fine sediments to increase mudflat and marsh elevation relative to the tides. This can help protect and sustain marshes, mudflats, and shorelines when sediment supply is low to help them accrete and keep pace with sea level rise. Techniques include water column seeding, nearshore placement, and thin layer placement.

## GOAL/OBJECTIVE

- Maximize the potential of marshes to maintain themselves in the future with sea level rise




**SHALLOW WATER PLACEMENT**




**MARSH SPRAYING**

## Salt Marsh Sediment Augmentation Project

**Seal Beach, Orange County, CA**

Subsidence, limited sediment accretion, and sea level rise led to the complete inundation of the refuge's Pacific cordgrass and eliminated natural rail nesting areas during high tide. The marsh was augmented with thin-layer sediment placement to raise the marsh plain to keep pace with SLR.

- 10" layer of sediment applied through rainbow spraying from sediment slurry delivered via a floating or submerged pipeline directly from a dredge or barge
- Thin-layer placement of sediment on 8 acres of existing low salt marsh habitat
- One of the goals was to improve Rail habitat

**'Rainbow' spray of sediment onto the augmentation site**
(Rick Nye)

# TRIBUTARY CONNECTION TO BAYLANDS

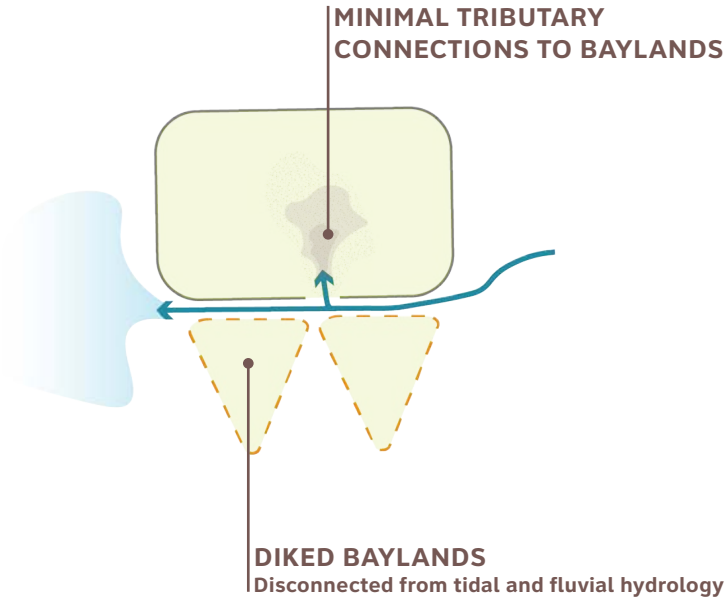
## DESCRIPTION

Reconnecting creeks to their adjacent baylands through levee breaching or removal helps improve sediment supply, nutrient, and freshwater delivery to the Baylands while achieving flood risk management and habitat benefits.

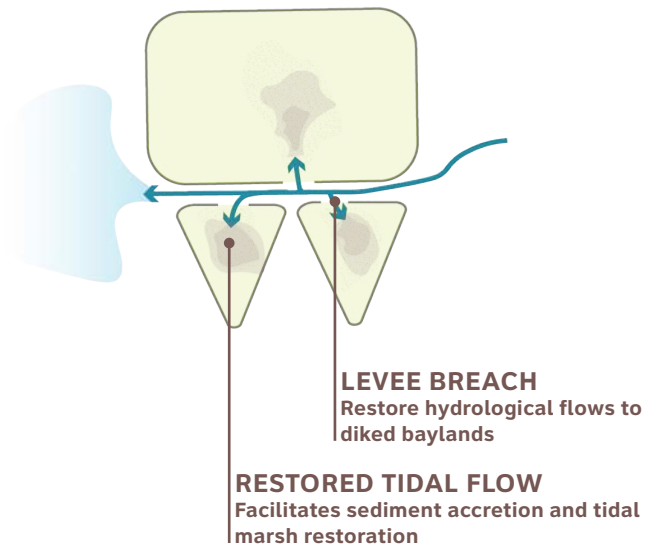
## GOAL/OBJECTIVE

- Ecological enhancement (restore sediment and tidal flows for marsh restoration / health)

**BEFORE**




**AFTER**




## Lower Walnut Creek Restoration Project

**Contra Costa County, CA**

The project will restore and enhance wetlands and associated habitats while also providing sustainable flood management and increased resiliency to sea level rise. Restoration will allow increased opportunities for public access and recreation.

- In 2014, legislation removed the USACE from management of the lowest 4 miles of Walnut and Pacheco Creeks
- Creeks are now locally controlled by the FCD, allowing restoration work
- On-site placement of material
- Improved biological connectivity- levee lowering and marsh plain excavation

**Walnut Creek and adjacent marsh**
(www.contracosta.ca.gov)

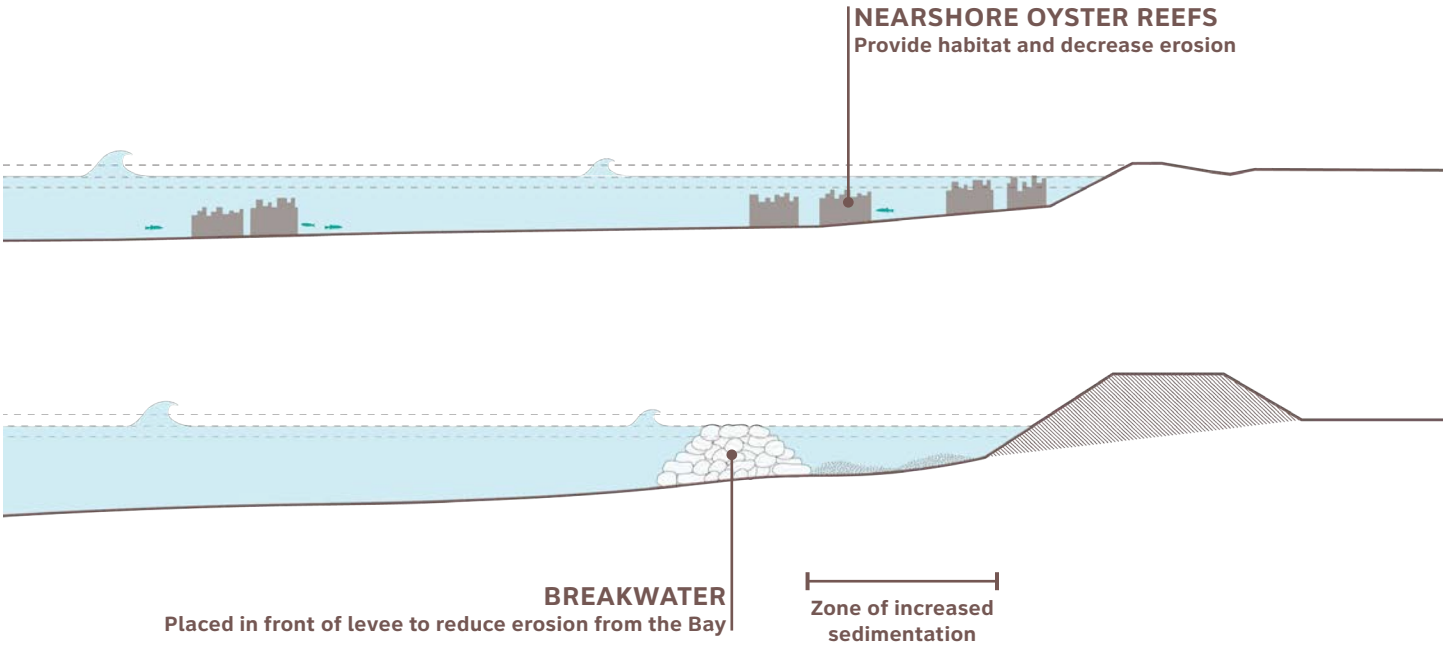
# REEFS AND BREAKWATERS

## DESCRIPTION

Nearshore reefs made of oyster shell and Baycrete (a cement mixture composed mostly of Bay sand and shells) provide hard substrate for shellfish and other aquatic plants and animals. They can reduce wave transmission at lower tidal elevations and stabilize areas in their lee. Breakwaters reduce the intensity of wave action in inshore waters, thereby reducing coastal erosion.

## GOAL/OBJECTIVE

- Reduce erosion to critical infrastructure
- Ecological enhancement (hard substrate habitat)




## SCC Living Shorelines Project

**San Francisco Bay, CA**

Living shorelines use nature-based infrastructure to create shoreline buffers that reduce impacts of sea level rise and erosion, while creating habitat for fish and wildlife.

- 350 oyster reef elements are made of a mixture of native sand and oyster shell mixed with cement
- Subtidal habitat restoration of native oyster and eelgrass beds, provide habitat for Pacific Herring and Olympia Oyster
- Natural structures buffer and protect adjacent tidal wetlands

**Oyster Reef Installation**
(www.scc.ca.gov)

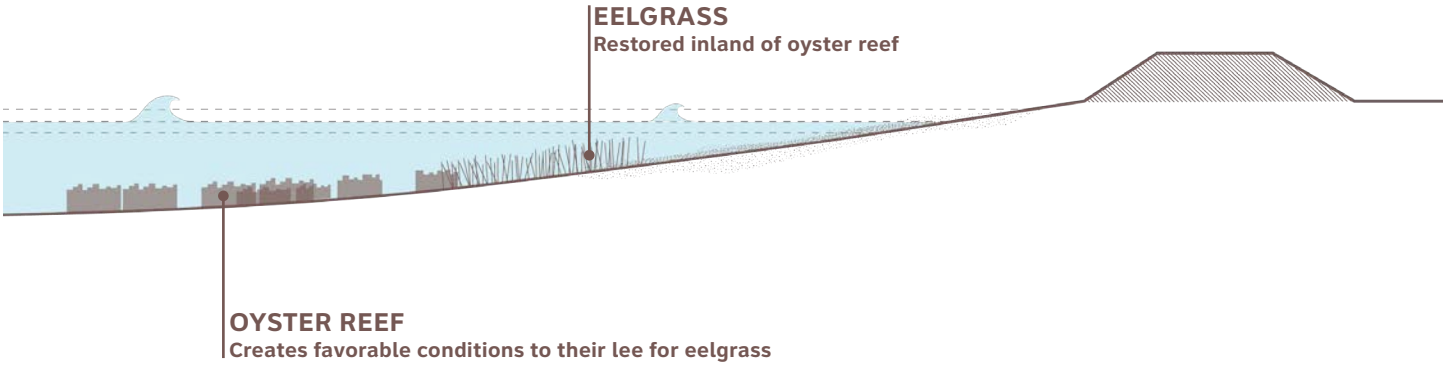
# EELGRASS RESTORATION

## DESCRIPTION

Eelgrass is submerged aquatic vegetation that contributes to trapping sediment and slowing shoreline erosion. Habitat suitability depends on depth of water, light, current speed, exposure to wind waves, water temperature, and salinity.

## GOAL/OBJECTIVE

- Ecological enhancement (provides habitat)




## SCC Living Shorelines Project

**San Francisco Bay, CA**

Eelgrass provides valuable ecological services by supporting diverse communities of invertebrates, fish, and waterfowl. Eelgrass is one of several habitat elements combined at Giant Marsh to create a living shoreline.

- Subtidal habitat restoration of native oyster and eelgrass beds
- Use natural structures to buffer and protect adjacent tidal wetlands

**Eelgrass planting**
(www.caseagrant.ucsd.edu, 2016)

*Cogswell Marsh, looking towards CalPine / Russell City Energy Center*

# HARD INFRASTRUCTURE STRATEGIES

**This section provides a catalog of engineered design strategies that are usually constructed with harder materials and mainly address the adaptation of built assets to sea level rise.**

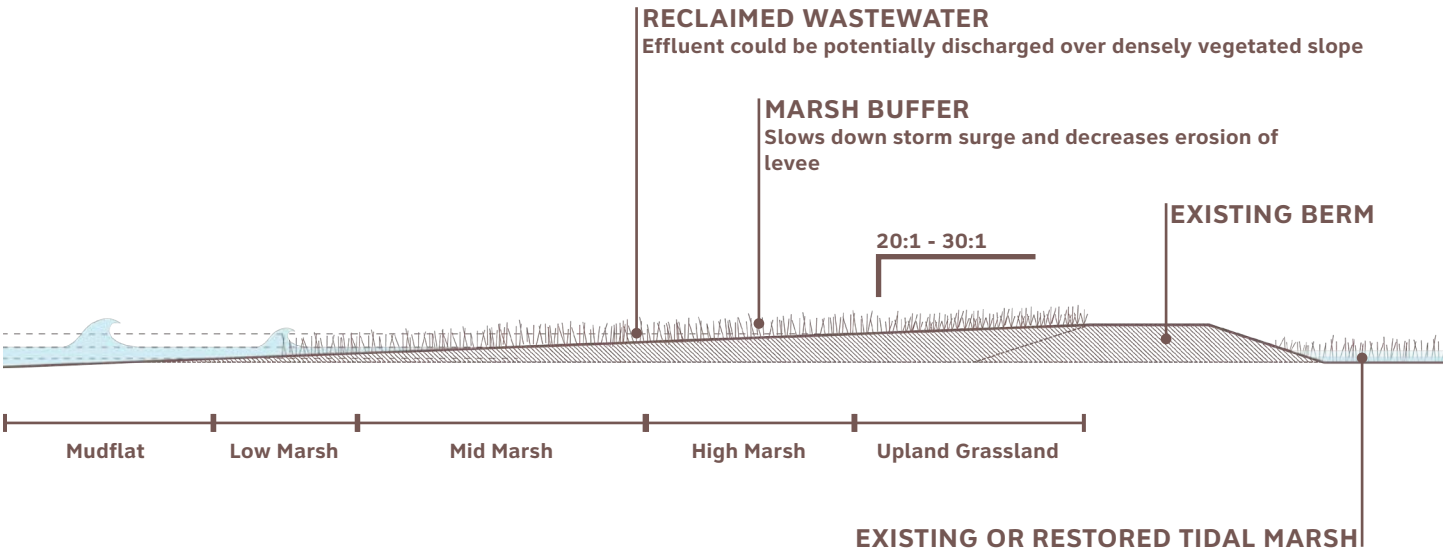
# ECOTONE LEVEE

## DESCRIPTION

Ecotone levees are vegetated gentle slopes or ramps on the bay side of a levee. They can attenuate waves, provide high-tide refuge for marsh wildlife, and allow room for marshes to migrate upslope with sea level rise. Ecotone levees have a larger footprint but can provide many resilience benefits.

## GOAL/OBJECTIVE

- Provide flood protection
- Enhance ecological function (provide transition zone, marsh migration space)




## Oro Loma Sanitary District

**Alameda County, CA**

A partnership between the Oro Loma and Castro Valley Sanitary Districts, UC Berkeley, Save the Bay, and others, this project is testing different techniques to utilize natural systems to filter wastewater and protect the shoreline.

- Vegetated slope on Bay side of levee serves as a natural alluvial fan / creek mouth
- Restores groundwater flow that used to occur with treated wastewater
- Vegetated slope of 30H:1V filters the water over 150 linear feet
- Potential to further decentralize EBDA pipeline

**Demonstration project at Oro Loma Sanitary District**
(www.oroloma.org)

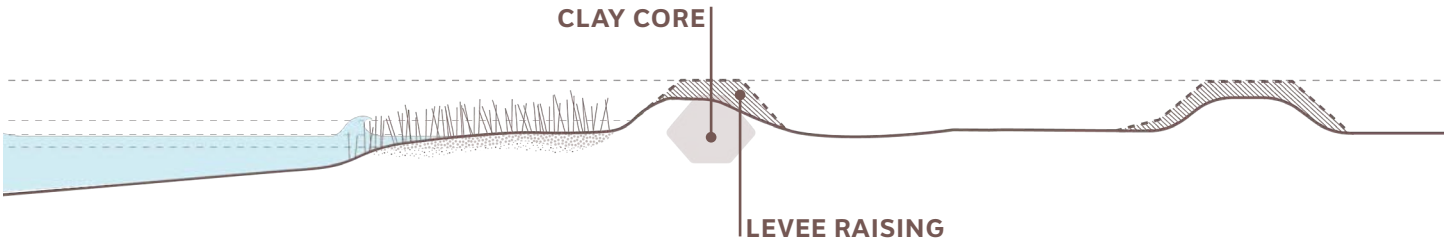
# LEVEE IMPROVEMENTS

## DESCRIPTION

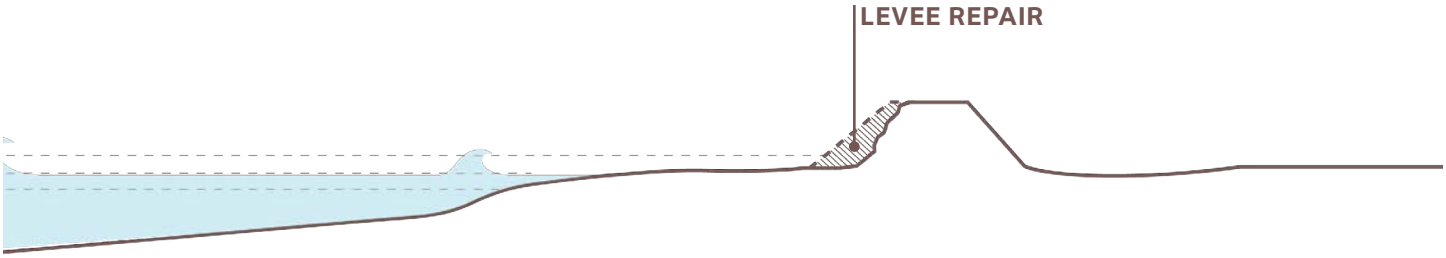
Existing levees can be raised, repaired, or strengthened to increase their resiliency to storms and sea level rise.

## GOAL/OBJECTIVE

- Provide further flood protection
- Reduce erosion to marshes / infrastructure in their lee
- Enhance recreational opportunities




LEVEE RAISING



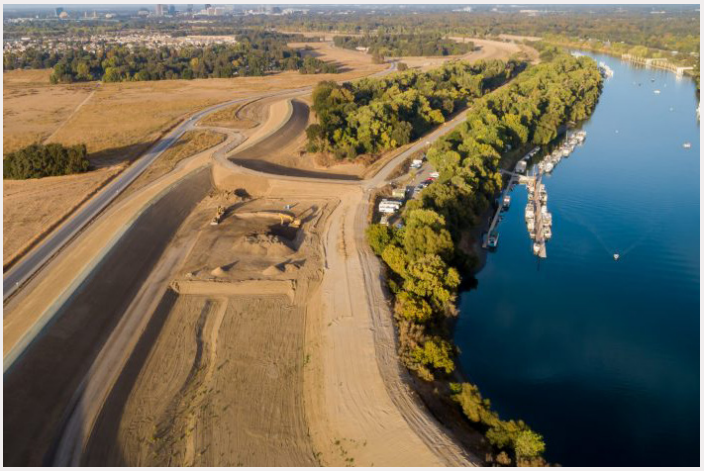

LEVEE REPAIR

### Southport Sacramento River Levee Improvement Project

**Sacramento County, CA**

A combination of existing levee improvements and embankment setbacks will increase flood protection and repair the most vulnerable part of the City's levee system to achieve a 200-year minimum level of levee performance for West Sacramento.

- Flood-risk reduction measures along vulnerable levee segments of the Sacramento River
- Includes construction of levee embankment, cutoff walls, seepage berms, and associated relocation and improvement measures
- An increased floodplain between the old and new levee allows for wetland creation and increased storage space



**Sacramento River levee**
(www.blackburnconsulting.com, SkyHigh Perspectives)

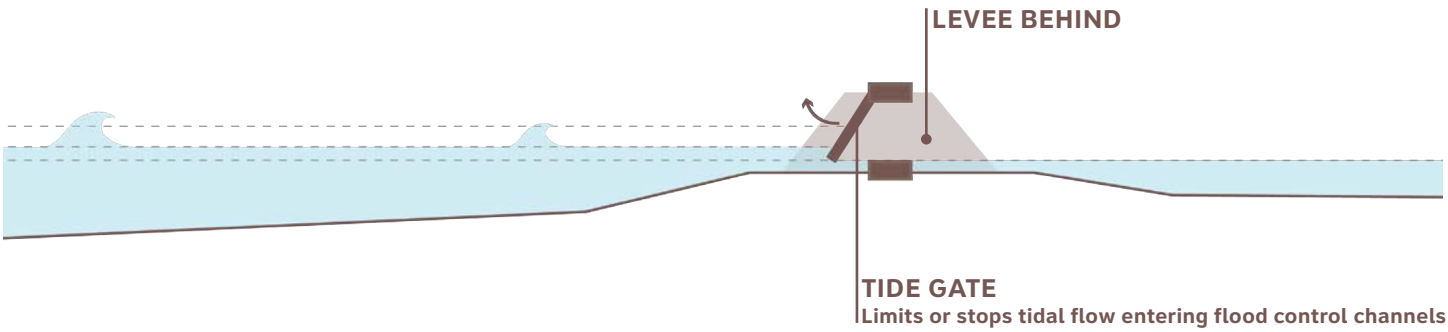
# TIDE GATES & WATER CONTROL STRUCTURES

## DESCRIPTION

Tide gates control the movement of water, specifically from a tidewater area and a drained, upland area. The gates have hinged doors at the end of culverts; they are controlled by mechanisms that open or close them as tides ebb and flow.

## GOAL/OBJECTIVE

- Flood protection (prevent tidal water from entering channel, allow stormwater out)
- Limit maximum elevation of water ("muted tidal"- tide gates close at a certain elevation, open at same elevation on ebb tide)




### Ballona Wetlands Project

**Los Angeles County, CA**

600 acres of the once 2,000-acre mosaic of marshes, mud flats, salt pans, and sand dunes make up the Ballona Wetlands Reserve. A new tide gate is part of the Ballona Wetlands Restoration Project to revive natural coastal wetland functions where they were drastically reduced by residential development.

- Manages flood control while allowing water to flow into the Reserve - recreating a tidal influence
- Enables fish to access wetland habitat
- Increased tidal flushing enhances aquatic habitat
- Seawater within the salt marsh reaches one meter in height

**Tide gate enables water flow into the reserve**
(http://www.goldenharvestinc.com/)

# WASTEWATER TREATMENT ADAPTATION

## DESCRIPTION

There is potential to retrofit wastewater treatment plants along the shoreline, where they are vulnerable to sea level rise. There is interest in studying the decentralization of WWTP treated discharge, the decommissioning of the EBDA pipeline, and the potential to introduce freshwater inputs to the shoreline with horizontal levee features and other methods of water polishing and local discharge. There is also a need to adapt wastewater treatment infrastructure through raising critical assets or providing flood protection.

## GOAL/OBJECTIVE

- Reduce risk to regional critical utilities


**MAP OF EBDA PIPELINE**

### Novato Wastewater Treatment Plant

**Novato, Marin County, CA**

An upgraded plant replaced two aging facilities and combines the capacity to meet future needs with a reduced carbon footprint through greater energy efficiency.

- New WWTP was raised to improve the hydraulic gradient so wastewater flows depend more on gravity and less on pumping. Added bonus is that it is less vulnerable to sea level rise, some parts were raised 10 to 14 feet higher
- Lowered energy costs dramatically by cutting pumping demand in half
- The sewer collection system master plan is working to upgrade, improve, and maintain the whole collection system for the Novato Sanitary District

**Aerial view of upgraded plant**
(Novato Sanitary District)

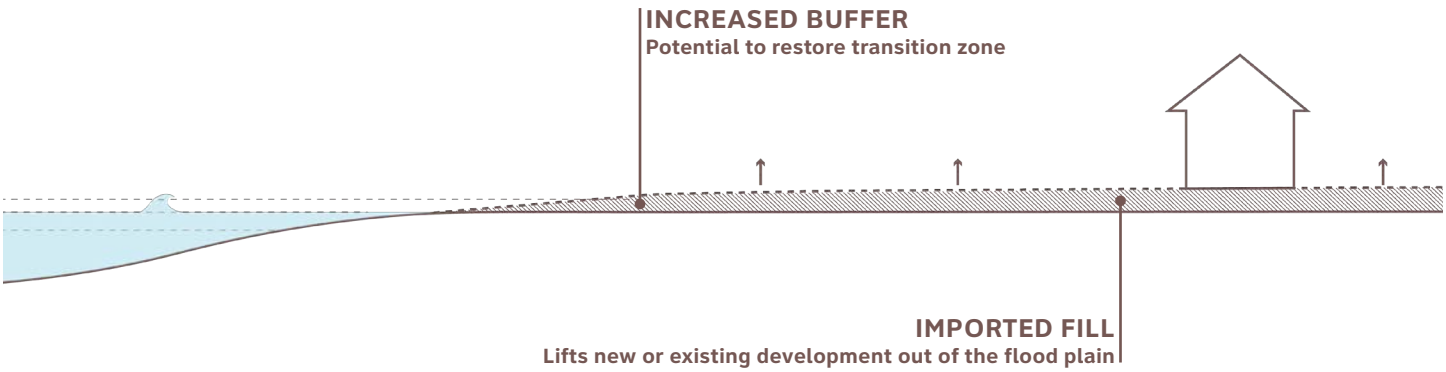
# LAND ELEVATION

## DESCRIPTION

Elevating the ground level at the site or district scale above the design flood elevation lifts future development and transportation assets out of the flood zone and reduces the risk of groundwater emergence. This is often done to reduce the risk of flooding for new development or new uses.

## GOAL/OBJECTIVE

- Reduce risk to SLR, flood events, and groundwater emergence




### Arverne-By-The-Sea

**New York City, NY**

Developers added more than half a million cubic yards of fill to raise most of the site 3-9' above the 100 year flood level. Combined with a number of other resiliency features such as expanded beach, fortified dunes, extensive stormwater drainage, and on-site stormwater retention, this strategy protected the infrastructure during Superstorm Sandy.

- Wide beach and fortified dunes act as first line of defense against storm surges and sea level rise.
- Sandy dunes may not settle as much as compacted fill
- Resilience measures help avoid significant damage in storm events and save costs associated with flood insurance

**Aeral view of raised community**
(www.housingmatters.urban.org)

# HAYWARD-SAN MATEO BRIDGE LANDING

## DESCRIPTION

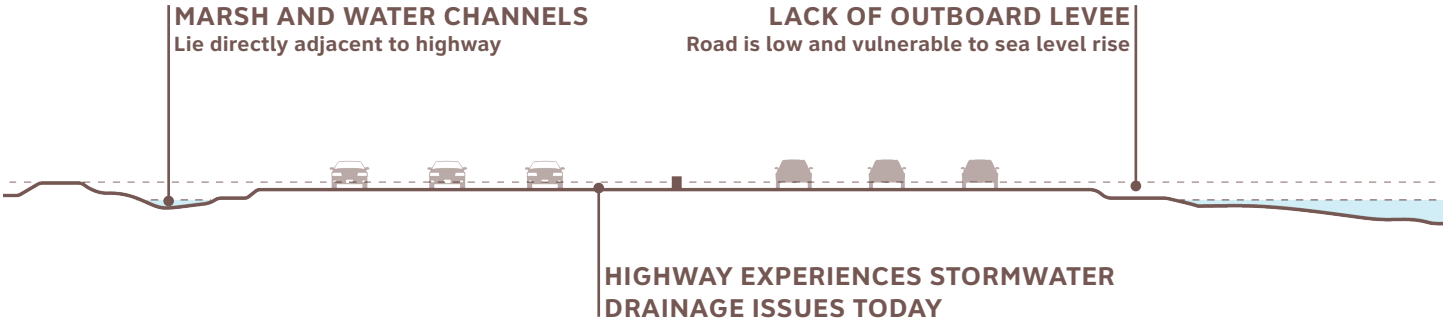
The eastern approach to the Hayward-San Mateo Bridge (SR-92) is critical infrastructure that is vulnerable to inundation by sea level rise. SR-92 is used by 86,000 passengers, 1,600 transit riders, and 6,000 trucks daily. Any flooding of the bridge and approaches would impact regional mobility and increase congestion.

The following adaptation strategies were considered by the Design Team for the Hayward-San Mateo Bridge landing:

- Flood walls on both side of SR-92
- Flood protection levees on both side of SR-92
- Elevate SR-92 / Embankment
- Raise SR-92 on Piles / Causeway
- Floating bridge

## GOAL/OBJECTIVE

- Reduce risk to transportation infrastructure from SLR, groundwater intrusion, and flood events




**EXISTING CONDITION**

### Miami Beach: Rising Above

**Miami Beach, Miami-Dade County, FL**

City of Miami Beach aims to have all roads elevated to 3.7'NAVD88 to mitigate flooding issues.

- Roadways in Sunset Harbor Neighborhood have been raised by approximately 3 feet
- Sidewalks and adjacent public space have been retrofitted to align with the increased road elevation

**Raised road during construction**
(http://www.mbrisingabove.com/)

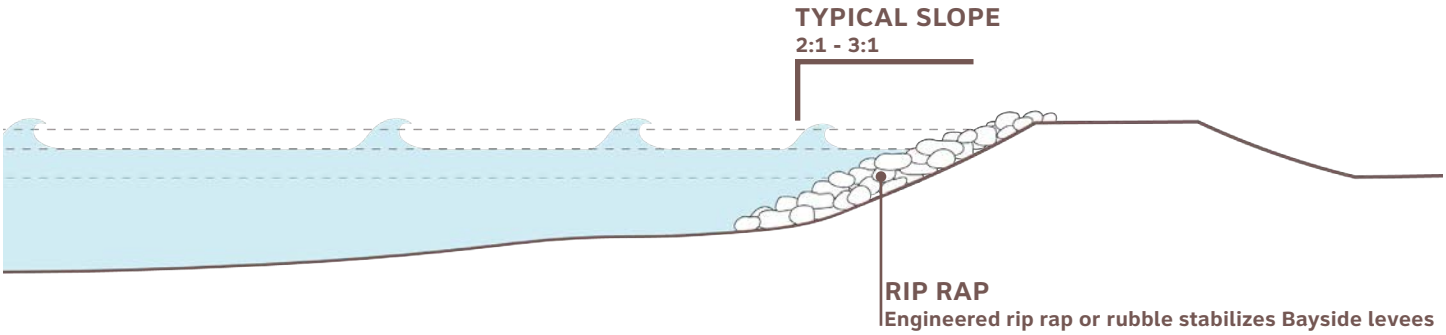
# REVETMENTS

## DESCRIPTION

Edge stabilization provides protection along tidal areas to prevent wave erosion. Revetments are hardened structures made of concrete, rocks, wood, or other materials that are placed along waterways to stabilize them against wave erosion. Riprap, which is rock or concrete, is the most common form of shoreline protection revetment structure in San Francisco Bay.

## GOAL/OBJECTIVE

- Reduce erosion along levees, landfills, and marshes




## Eastern Scheldt Dike Enhancement

**Zeelandbrug, The Netherlands**

Dike enhancement included the provision of tidal pools, or "eco-basins," intended to improve biodiversity and bio-productivity.

- Important design parameters include the shape and the slope of the structure, the choice of materials, the size distribution, and the porosity of the structure
- Stones were loosely stacked to provide spaces that shelter species from predators. Stones are heavy enough to withstand the forces of wave impact
- The design could be tailored to provide habitat for reef builders such as mussels and oysters (including associated species, such as crabs), or for macro-algae, which provide habitat for fish and invertebrates

**Tidal pool along stabilized revetment**
(www.publicwiki.deltares.nl)

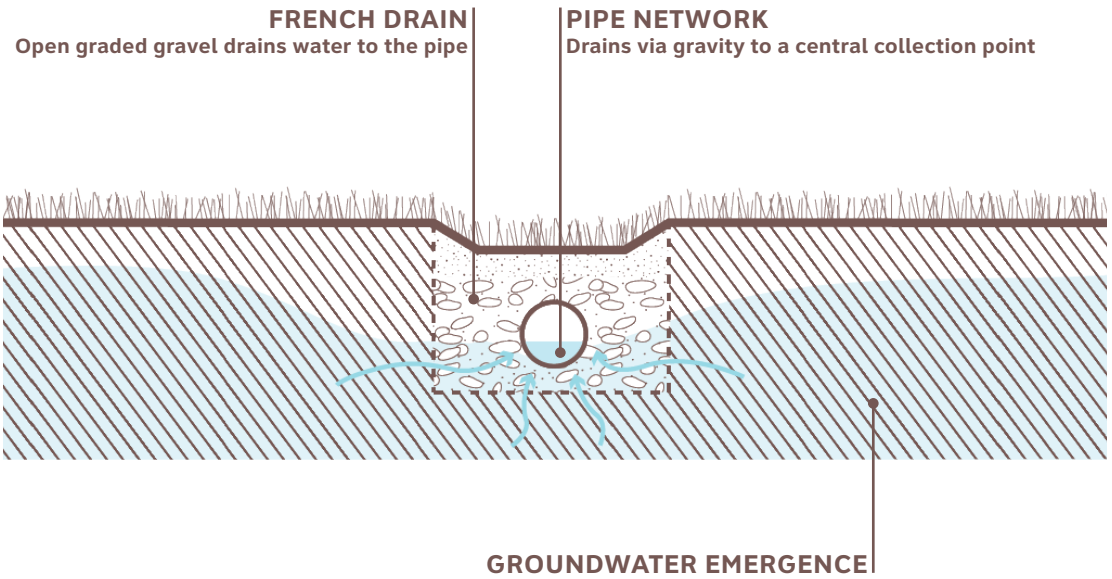
# SUBSURFACE DRAINAGE

## DESCRIPTION

Rising groundwater tables can be addressed through an expanded subsurface drainage network that feeds into trenches/canals that flow to the bay at low tide, or through wells and pumping. Tide gates are needed to prevent the influx of high tides. This strategy would require additional inland storage space to collect and manage groundwater during storm events while it is pumped to the Bay.

## GOAL/OBJECTIVE

- Reduce risk of groundwater emergence



# NON-STRUCTURAL STRATEGIES

**This section provides a catalog of design strategies that deal with policies and regulations that can help built and natural assets adapt to sea level rise.**

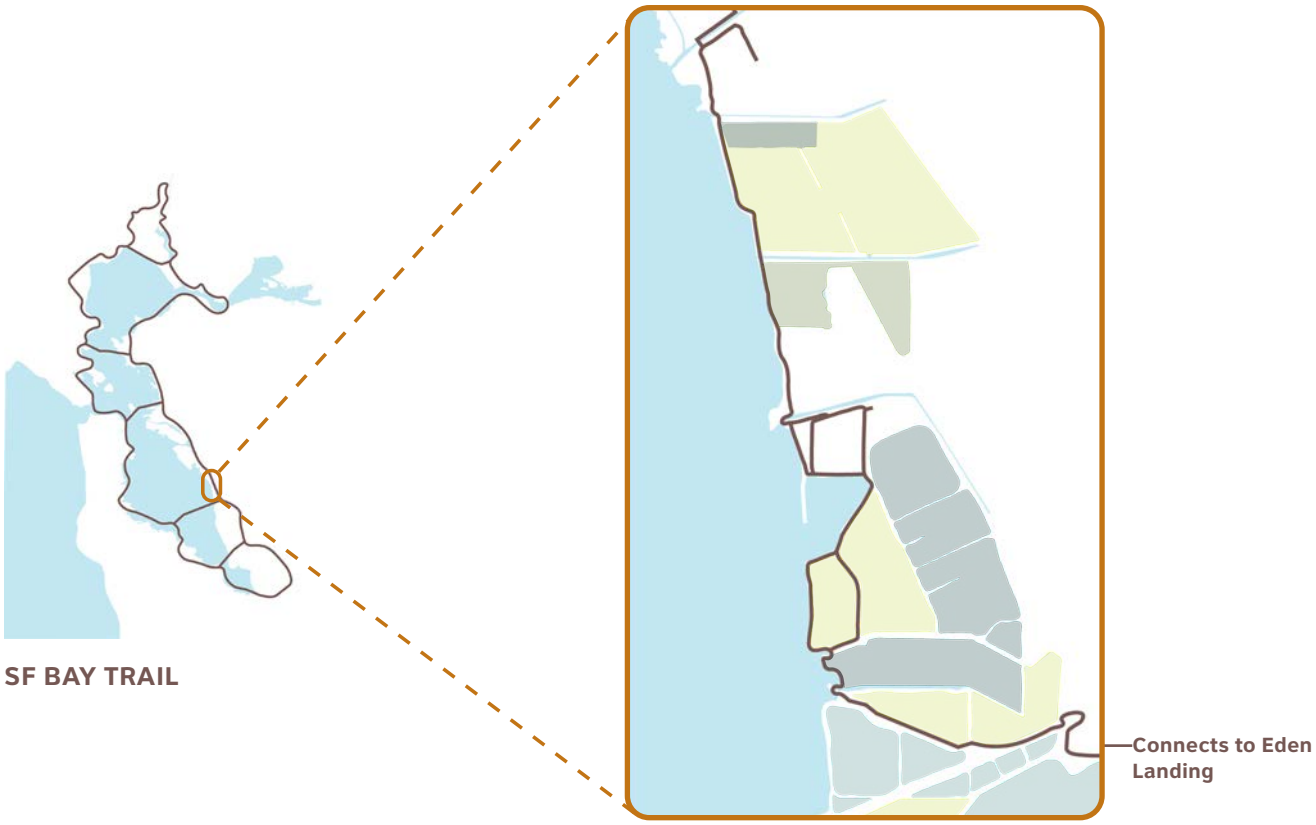
# PUBLIC ACCESS & THE BAY TRAIL

## DESCRIPTION

Public access strategies include Bay Trail adaptation plans, additional sites for public access, new types of recreation, expansion of the San Francisco Bay Water Trail, and enhanced connections. Aligning with other adaptation and restoration projects may enhance recreation benefits and increase community connections.

## GOAL/OBJECTIVE

- Enhance recreational opportunities and adapt to SLR
- Create a management framework for adapting to SLR over time




**Bay Trail flooding during Jan 2017 King Tide**
(H.A.R.D., 2017)

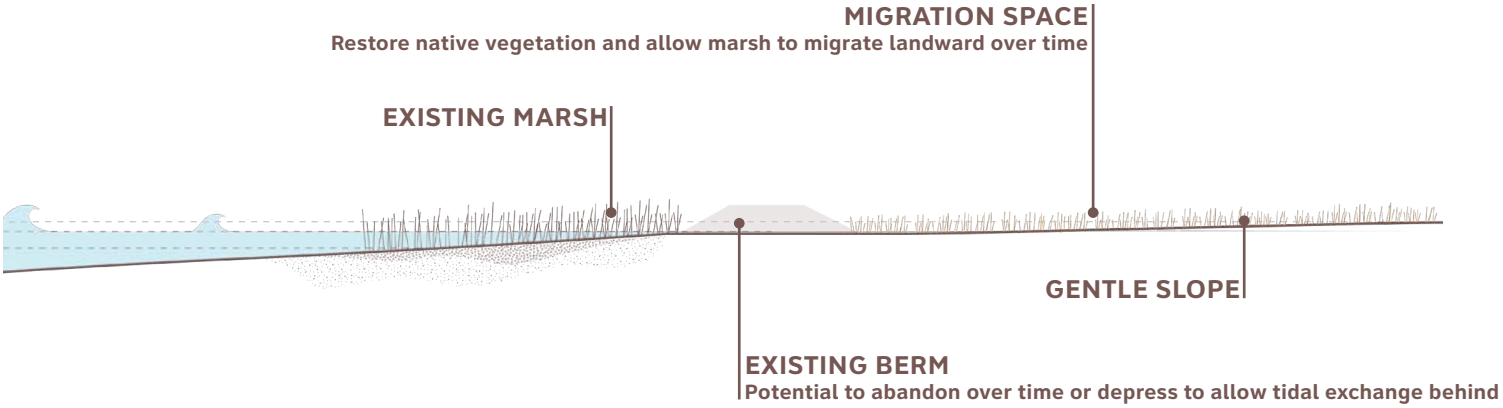
# MARSH AND MUDFLAT MIGRATION PLANNING

## DESCRIPTION

Natural wetland-upland transition zones adjacent to present and potential marshes can be protected, enhanced, or restored to allow marshes to migrate landward as sea level rises. This can be paired with levee / berm realignment and other flood control projects and may require the removal of berms to ensure hydrological connectivity.

## GOAL/OBJECTIVE

- Create a management framework for adapting to SLR over time




### North Richmond Shoreline Vision

**Richmond, Contra Costa, CA**

The shoreline area will provide space for marshes to migrate landward as sea level rises. The plan's strategies include:

- Acquiring contiguous shoreline parcels from willing sellers to protect and conserve open space
- Connecting and completing Bay Trail segments to improve and increase shoreline access and public understanding
- Supporting compatible uses within the transition zone such as renewable energy pilot projects
- Completing Giant Marsh Living Shorelines project and other opportunities to restore and enhance a diversity of habitats

**Aerial view of North Richmond shoreline**
(www.sfestuary.org)

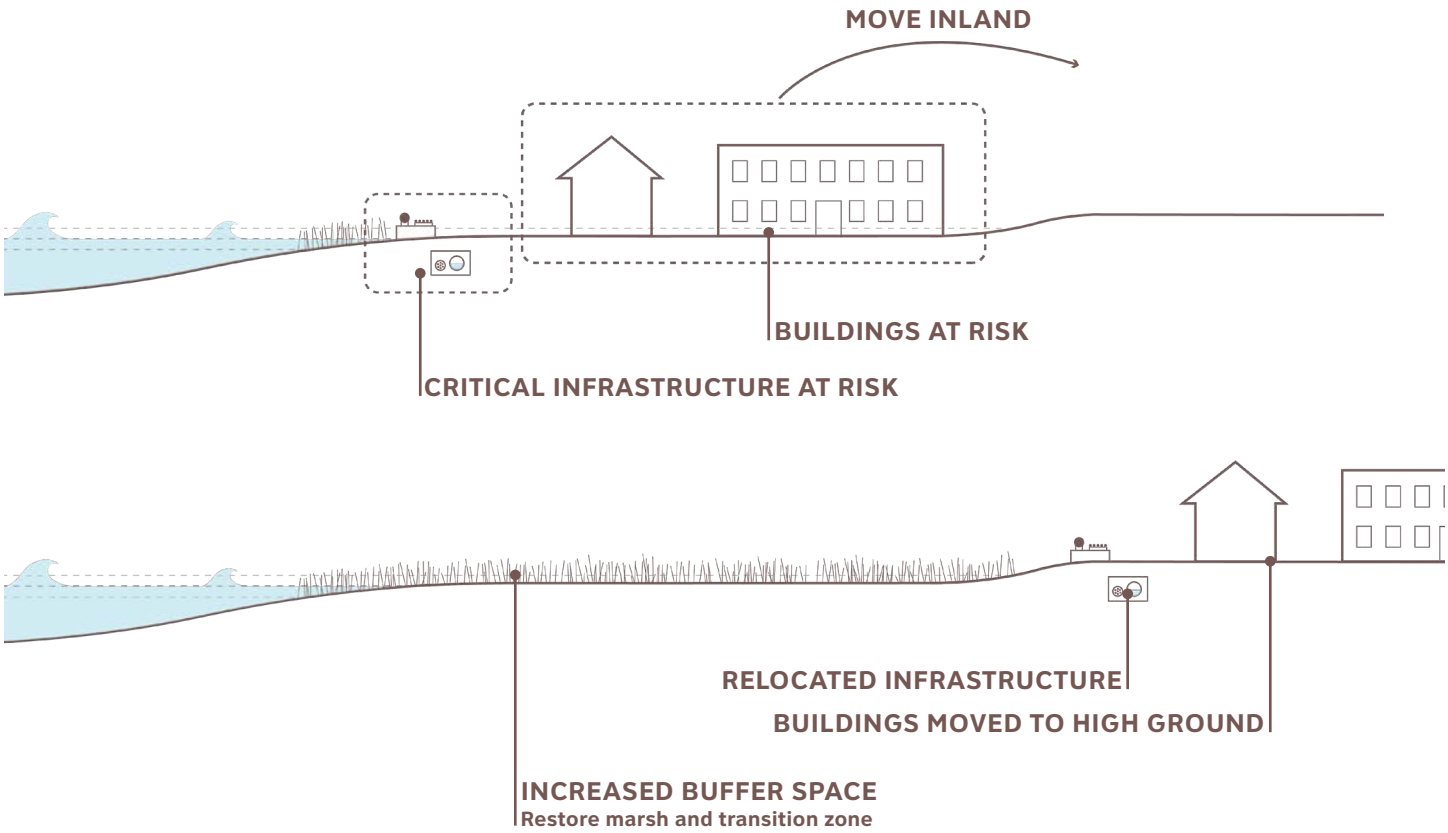
# MANAGED RETREAT

## DESCRIPTION

Managed retreat is a management strategy for retreating from vulnerable coastal areas, moving the shoreline inland, and restoring natural areas, thereby providing a buffer from flooding and better managing hazard risk.

## GOAL/OBJECTIVE

- Create a management framework for adapting to sea level rise over time




## America Center Drive

**San Jose, Santa Clara County, CA**

America Center is a 63-acre brownfield redevelopment project that contains 30 acres of land preserve dedicated for burrowing owl habitat. Phase 1 of the project included two six-story office buildings located on top of a closed landfill that extends 65' deep. Phase 2 added two more buildings in 2018.

- Concrete reinforced piles were used after cores were drilled out to avoid environmental contamination from pile driving through land fill

**Access roads were raised to reach the higher elevation** (www.steelwavellc.com)

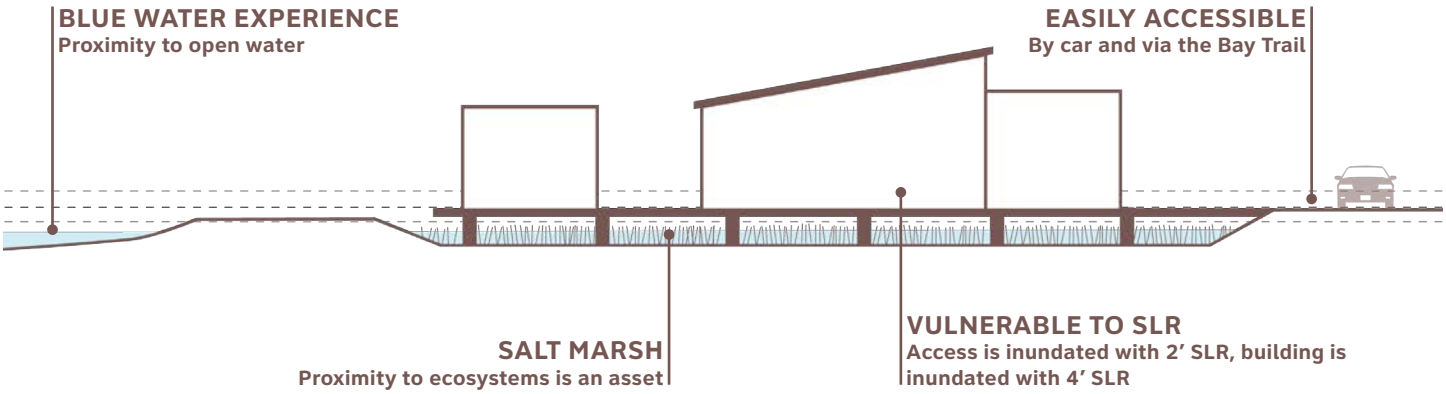
# RELOCATION OF HAYWARD SHORELINE INTERPRETIVE CENTER

## DESCRIPTION

Relocation or retrofitting strategies may help the Hayward Shoreline Interpretive Center maintain its educational program and adapt to sea level rise. Pairing relocation with new restoration or pilot projects can provide new educational and stewardship opportunities.

## GOAL/OBJECTIVE

- Enhance educational opportunities and adapt to sea level rise
- Create a management framework for adapting to sea level rise over time




### Arcata Marsh & Wildlife Sanctuary

**Arcata, Humboldt County, CA**

The Arcata Marsh Interpretive Center has interactive exhibits, free maps and literature, and a bookstore. It is located directly adjacent to a series of sewage treatment ponds and wetlands.

- Arcata's wastewater is treated locally, utilizing natural wetland processes
- Combination of treatment plant, publicly accessible wetlands, wildlife habitat, and recreational opportunities
- Interpretive Center has interactive exhibits, free maps and literature, bird checklists, and a bookstore.

**Arcata Marsh Interpretive Center**
(George Ziminsky, 2013)

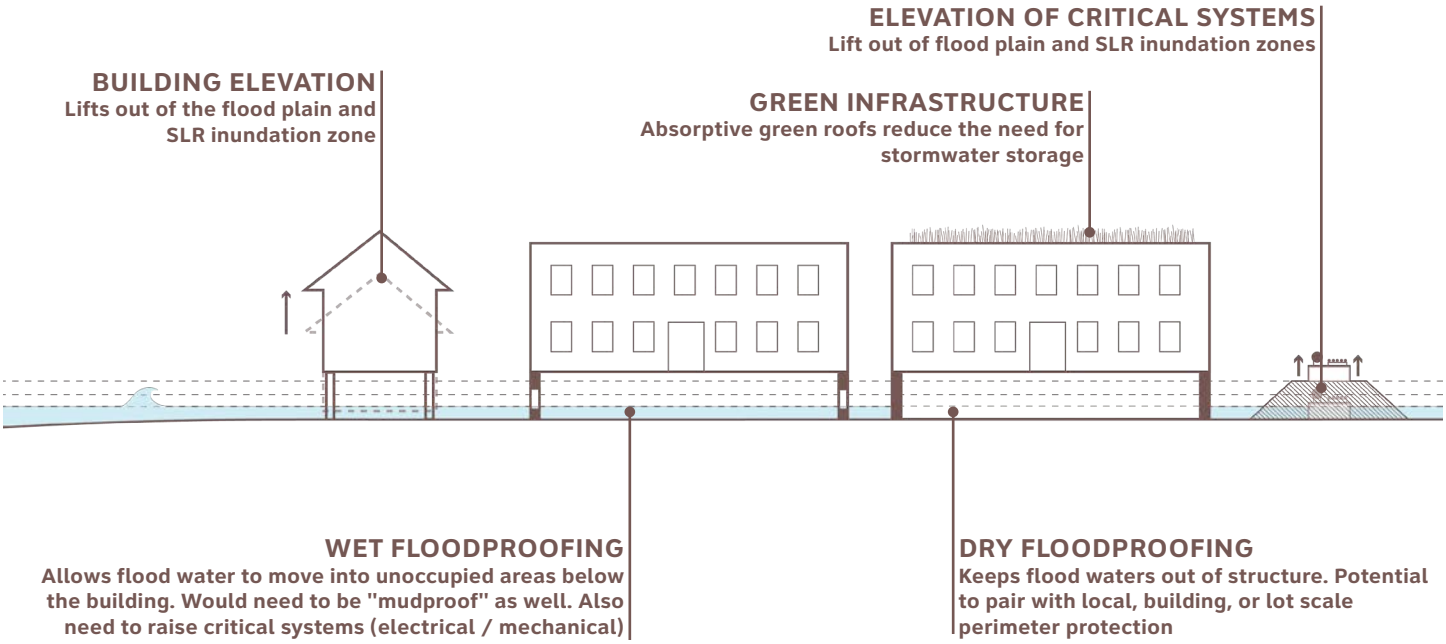
# BUILDING SCALE STRATEGIES

## DESCRIPTION

There are many building scale strategies that can be implemented to adapt to sea level rise, from improving standards, such as building codes and removing regulatory impediments, such as zoning height restrictions. The City can also aid businesses and homeowners to assist them with understanding the resilience options available to them and with finding the funding to support those options.

## GOAL/OBJECTIVE

- Improve design of buildings to increase resiliency to SLR and climate change




## HafenCity

**Hamburg, Germany**

To protect them from storm surge, all buildings in HafenCity are built on artificially structured plinths that are compacted to a height of 8-9 meters above sea level. In the interior of HafenCity, the plinths provide ample space for underground carparks, reducing the amount of car parking space required in the streets of the new development.

- All streets and bridges are sited at flood-protected levels, at least 7.8-8.5 meters above sea level to prevent flooding
- Water levels are adjusted to increase storage capacity for winter storms and for seasonal enrichment of bird habitat

**HafenCity is designed to withstand repeated flooding front the Elbe River** (Steven Valentino / WNYC)


*Line A, looking south at the industrial neighborhood edge*

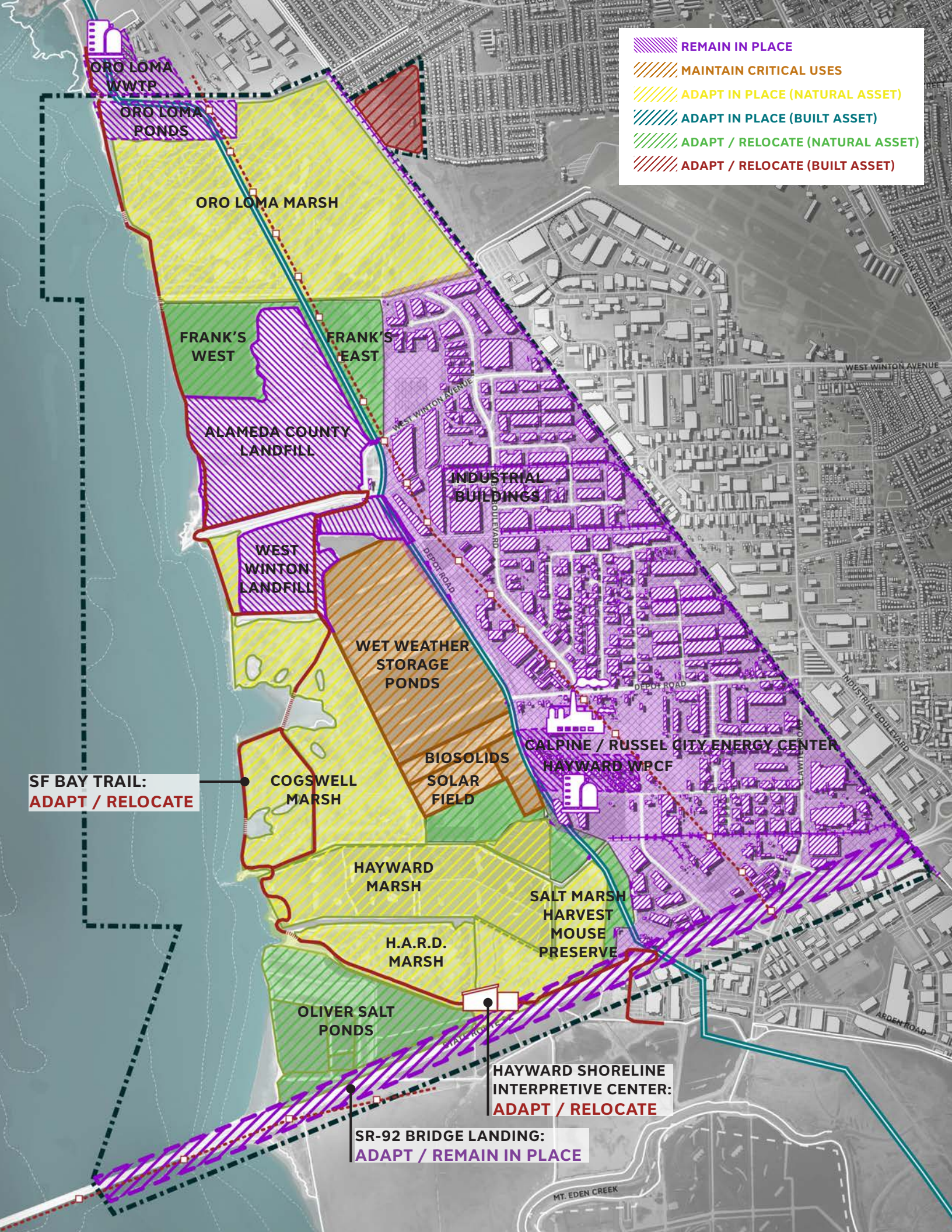

NEXT STEPS
Task 5
DESIGN STRATEGIES
DESIGN ALTERNATIVES
NO ACTION ALTERNATIVE
DESIGN ALTERNATIVE #1
DESIGN ALTERNATIVE #2
DESIGN ALTERNATIVE #3
PREFERRED ALTERNATIVE
DRAFT MP
FINAL MASTER PLAN

# DESIGN ALTERNATIVES & FEEDBACK

**This chapter provides an overview of the project parameters and considerations, including the Master Plan assumptions and policy considerations. It also includes a summary of the different Design Alternatives, associated feedback, and evaluation points.**

# PROJECT PARAMETERS & CONSIDERATIONS

**This section provides an overview of the Master Plan assumptions and policy considerations.**


REMAIN IN PLACE
MAINTAIN CRITICAL USES
ADAPT IN PLACE (NATURAL ASSET)
ADAPT IN PLACE (BUILT ASSET)
ADAPT / RELOCATE (NATURAL ASSET)
ADAPT / RELOCATE (BUILT ASSET)
ORO LOMA WWTP
ORO LOMA PONDS
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
INDUSTRIAL BUILDINGS
WET WEATHER STORAGE PONDS
BIOSOLIDS SOLAR FIELD
CALPINE / RUSSEL CITY ENERGY CENTER
HAYWARD WPCF
SF BAY TRAIL:
ADAPT / RELOCATE
COGSWELL MARSH
HAYWARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
H.A.R.D. MARSH
OLIVER SALT PONDS
HAYWARD SHORELINE INTERPRETIVE CENTER:
ADAPT / RELOCATE
SR-92 BRIDGE LANDING:
ADAPT / REMAIN IN PLACE
WEST WINTON AVENUE
DEPOT ROAD
INDUSTRIAL BOULEVARD
ARDEN ROAD
MT. EDEN CREEK

# MASTER PLAN ASSUMPTIONS

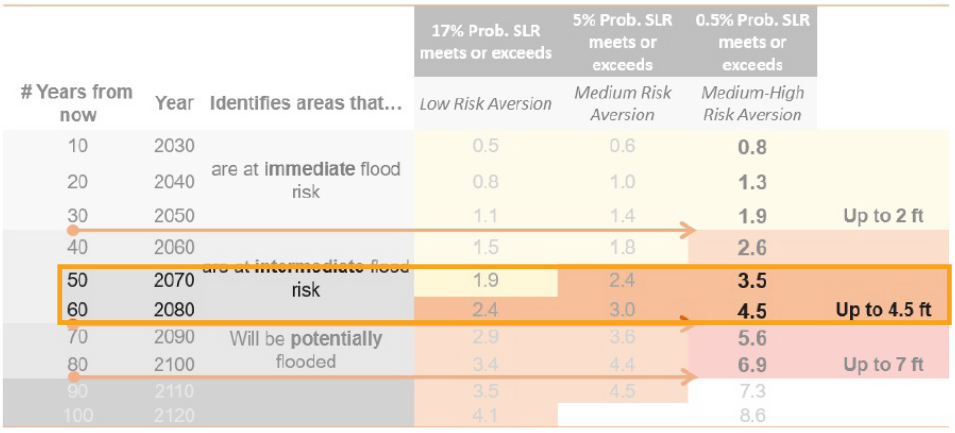
## OVERARCHING ASSUMPTIONS

The Master Plan Assumptions helped inform the planning and alternative selection process. They summarize client and stakeholder feedback and set a framework to generate and compare the Design Alternatives.

- The plan aims to preserve and enhance the ecological features of the Hayward Regional Shoreline over time. Many Bayland ecosystems, like tidal marshes and mudflats, require connectivity to the Bay for survival, but are also vulnerable to sea level rise.
- The plan assumes that there will be **little change to the urban fabric** (streets, buildings), **economy, land use, and critical built infrastructure** on the site over the planning horizon.
- The plan is considering a **perimeter protection approach to critical assets** and an **adaptation approach to shoreline ecosystems.** This approach has been developed in conversation with many stakeholders and landowners in the project area.
- **Non-structural strategies,** such as retreat and land elevation, are not articulated in this plan, although they will be layered on to further reduce risk, and would likely be required to adapt to a higher SLR scenario long-term.
- The plan is looking at **reducing risk to critical assets** from **daily tidal inundation and future 100-year storm surge in a up to 4' of sea level rise scenario**.
- For planning purposes, the Project Team has been considering a **target elevation of 14.3"** (NAVD 88) to evaluate the various Design Alternatives and to assess the feasibility of the Preferred Alternative
- The plan is based on adapting the project area over a **mid-range time frame.** Based on State guidance, this time frame is estimated to be between 50 and 60 years long.

| SLR | MHHW + SLR | MHHW + SLR + 100 YEAR STORM | MHHW + SLR + 100 YEAR STORM + 2' FREEBOARD | MHHW + SLR + 500 YEAR STORM |
|---|---|---|---|---|
| 0' | 7' | 10.3' | 12.3' | 11.3' |
| 2' | 9' | 12.3' | 14.3' | 13.3' |
| 4' | 11' | 14.3' | 16.3' | 15.3' |
| 7' | 14' | 17.3' | 19.3' | 18.3' |

**Design Flood Elevations with Sea Level Rise**
(For planning purposes only)




**Sea Level Rise increments by time horizon and level of risk aversion**
(California Coastal Commission reccomendations, 2018)

*Cogswell Marsh, looking from West Winton Landfill*

SCAPE

# MASTER PLAN ASSUMPTIONS

## SITE ASSETS & PLANNING ASSUMPTIONS

This is table summarizes the Master Plan resilience planning assumptions for key shoreline assets.

| | ASSET | PLANNING ASSUMPTION |
|---|---|---|
| WASTEWATER INFRASTRUCTURE | Oro Loma Wastewater Treatment Plant | • Remain in place |
| | Hayward Water Pollution Control Facility | • Remain in place |
| | Wastewater Wet Weather Storage | • Maintain critical uses |
| | Biosolids Management, Aging, Drying | • Maintain critical uses |
| | Solar Field | • Maintain critical uses |
| | EBDA Pipeline | • Adapt - decommission over time |
| TRANSPORTATION INFRASTRUCTURE | SR-92 Bridge Landing | • Remain in place / adapt |
| | Union Pacific Rail Corridor | • Remain in place |
| | Street Grid | • Maintain access to industrial zone from inland roads<br>• Maintain ingress and egress to surrounding residential neighborhoods |
| ENERGY INFRASTRUCTURE | Transmission Lines | • Adapt / Relocate |
| | Jet Fuel Pipeline | • Remain in place - avoid disturbing function and use |
| | Natural Gas Pipeline | • Remain in place - maintain access |
| COMMUNICATION INFRASTRUCTURE | Fiber Optics | • Remain in place - avoid disturbing function and use |
| BUILDINGS & LAND USE | Industrial Land Use | • Remain in place- reevaluate at 4' SLR |
| RECREATIONAL INFRASTRUCTURE | Bay Trail | • Adapt / relocate<br>• Connect through the site north-south<br>• Access the Interpretive Center<br>• Connect to trail heads and parking areas<br>• Maximize blue water experience |
| | Hayward Shoreline Interpretive Center | • Adapt and decommission over time<br>• Relocate<br>• Ensure vehicular and pedestrian access and parking<br>• Locate along the Bay Trail<br>• Locate in proximity to educational opportunities that won't be inundated |
| | San Lorenzo Community Park | • Adapt and decommission over time<br>• Relocate<br>• Ensure vehicular and pedestrian access and parking |
| HABITATS & ECOSYSTEMS | Existing Tidal Habitat + Hayward Marsh Restoration | • Adapt to 4' SLR |
| | Muted & Managed Marsh | • Adapt or preserve Salt Marsh Harvest Mouse preserve<br>• Adapt or preserve endangered species habitat |
| | Historic Salt Ponds | • Adapt / relocate |
| | Seasonal Wetlands | • Adapt / relocate |
| | Mudflats | • Enhance |
| LANDFILLS | Alameda County & West Winton Landfills | • Remain in place<br>• Prevent erosion and seepage |

# POLICY CONSIDERATIONS

## ROLE OF POLICIES IN THE HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

Before developing adaptation strategies, it is important to understand the planning and policy context for the Hayward Regional Shoreline Adaptation Master Plan. There are a variety of ways in which the plans and policies of project stakeholders have informed the development of strategies and the Shoreline Adaptation Master Plan. Policies can present opportunities, such as the ability to shape a funding plan or regulatory change to promote the Shoreline Adaptation Master Plan's implementation. Policies can also shape the project or the process by presenting regulations or processes that must be accommodated.

## KEY POLICY CONSIDERATIONS

Following an extensive review of stakeholders in the project area, the Project Team identified the following initial key policy considerations. These can be updated as the project progresses.

- **There is broad support and consensus around the need to plan for sea level rise with a focus on habitat restoration, and an evolving playbook on how to balance long-term, conflicting needs.**
  Planning agencies, regulatory bodies, and infrastructure operators are well-aligned on the need to plan for sea level rise. Not all wetland restoration projects have considered sea level rise in the past, but the concept of adaptive management is gaining acceptance and becoming part of regulation. While there is no clear answer on how to balance the needs of vulnerable infrastructure and communities with the opportunities to maintain and improve habitat, there are many active organizations focused on developing policies and plans to address all aspects of these issues.
- **There is an extensive permitting process and many regulatory requirements that will likely drive the implementation process.**
  There are numerous agencies that will likely be involved in the permitting processes for any modifications to the Hayward Regional Shoreline. Recent reforms aimed at streamlining the process are positive signs, though they are focused on ecological restoration, and it is unclear how hybrid grey infrastructure approaches will be treated.
- **There are many stakeholders in how water is managed with specific interests that will need to be navigated in order to identify an implementable strategy.**
  The Hayward Regional Shoreline contains an extensive water management infrastructure network, including water treatment, wetland management, and flood control. Changes to the system may have system-wide impacts and require buy-in the from agencies and authorities involved.
- **Innovative approaches to shoreline access may be needed to allow for a full exploration of potential strategies.**
  While the Bay Trail has historically prioritized a "blue water" experience with the trail directly adjacent to the shoreline, there is an opportunity to create a diverse shoreline recreational experience, including moving inland to accommodate shoreline habitats and the inclusion of high points at vistas.
- **There are opportunities for the Shoreline Adaptation Master Plan to advance regional policy on climate adaptation and ecosystem management.**
  There are numerous organizations and agencies active in sea level rise adaptation and habitat restoration in the Bay Area. While numerous studies and toolkits are being advanced, there is a need for built projects to test and advance innovative ideas for how to adapt to sea level rise while improving ecosystem health. This project can serve as a test bed for such ideas and serve to advance this issue across the region.
- **The East Bay Regional Park District Master Plan sets forth policies on climate change that guided the Shoreline Adaptation Master Plan.**
- Climate change is expected to affect the park's resources in various ways. Changes in the ranges of various species and increased potential for wildfires and pests are anticipated with this change in weather. In a manner consistent with the desire to "conserve and enhance" its resources, the District must closely track the impact of this phenomenon, and if necessary, act to relocate or protect in situ resources that are being degraded or potentially lost by this change.
- The District will specifically track and monitor the effects of climate change on its resources, interceding when necessary to relocate or protect in-situ resources that are being degraded or lost by this shift in the environment.

- To help mitigate the effects of climate change, the District will endeavor to conserve and connect habitat for native species through its acquisition and planning processes.
- **The City of Hayward General Plan includes a Hazards Element with policies relevant to flooding and sea level rise that guided the Shoreline Adaptation Master Plan.**
- One of the plan's goals is to "protect life and minimize property damage from potential flood hazards." As part of this goal, the plan calls for the City to coordinate with the Alameda County Flood Control and Water Conservation District to evaluate the need to expand the capacity of flood control facilities in response to climate change to promote greater public awareness of flooding hazards. And promote resources and programs to help property owners protect their homes and businesses from flood damage.
- Another goal is to "safeguard the Hayward Regional Shoreline, open space, recreational resources, and urban uses from flooding due to rising sea levels." As part of this goal, the plan calls on the city to coordinate with the Hayward Area Shoreline Planning Agency, the Bay Conservation Development Commission, and other agencies to develop and implement a "Regional Shore Realignment Master Plan" that shall identify a preferred long-term strategy and implementation program to protect the shoreline, interim standards to regulate development within areas potentially affected by sea level rise prior to the construction of shoreline protection, and potential flood mitigation measures to apply to development projects within potentially affected areas.

The attached chart provides a summary of relevant organizations, agencies, plans, and policies. The second column summarizes the agency's or organization's general role or mission. The third column highlights the specific regulatory or planning jurisdictions, land ownership, or policies that specifically relate to the study area or master plan. The last column identifies relevant regulations, plans, or guidance documents.

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| Hayward Area Shoreline Planning Agency (HASPA) | • Joint powers agency comprised of representatives from Hayward Area Recreation and Park District, East Bay Regional Park District, and the City of Hayward.<br>• Works with the Hayward Area Shoreline Citizens Advisory Committee (HASCAC) to coordinate agency planning activities and adopt and carry out policies for the improvement of the Hayward Regional Shoreline for future generations. | • Under a joint exercise of powers agreement, HASPA is charged with the power to undertake all planning activities associated with sea level rise, and the power to develop plans, prepare studies and reports, and make recommendations for the Hayward Regional Shoreline. [1] | • Preliminary Study of the Effect of Sea Level Rise on the Resources of the Hayward Shoreline (2011)<br>• Adapting to Rising Tides Resilience Study (March 2015)[2] |
| Hayward Area Recreation and Park District (HARD) | • Independent special use district created to provide park and recreation services for the over 280,000 residents in the Hayward area.<br>• HARD's park system includes 104 sites covering about 1,357 acres.<br>• Member of HASPA | • Owns and manages 788 acres in the project area including: HARD marsh (a 79-acre, fully tidal marsh), Triangle Marsh (an 8-acre muted tidal marsh system restored in 1990), Oliver Salt Ponds, the San Lorenzo Community Park and other diked ponds and wetlands south of Sulphur Creek. Beyond the Shoreline Facilities, HARD owns and manages over 120 parks, trails, and facilities in the greater Hayward Area.[3]<br>• Operates the Hayward Shoreline Interpretive center. | • Regulations Governing Use of Parks, Recreation Areas, and Facilities[4]<br>• HARD Parks Master Plan (2019) [5] |
| East Bay Regional Park District (EBRPD) | • Regional park district managing 73 parks and 124,000 acres of space and 1,250 miles of trails throughout East Bay in Alameda and Contra Costa counties.<br>• Member of HASPA | • Owns and manages Cogswell Marsh (250 acres tidal/low marsh habitat), Salt Marsh Harvest Mouse Preserve (27 acres muted tidal system), and the Hayward Marsh (145-acre fresh and brackish water marsh that relies on secondary treated effluent as freshwater source).<br>• Supports proposed project to modify Hayward Marsh to convert from a freshwater effluent fed system to a fully tidal or muted tidal system. EBRPD plans to put out a bid for full design in the future. | • Ordinance 38 Rules and Regulations[6]<br>• 2013 Master Plan[7] - defines the mission and vision for the Park District for its stewardship and development<br>• Board of Directors has adopted multiple plans including: ADA Self Evaluation and Transition Plan, Environmental Review Manual, Park Operations guidelines, Sustainability Policy, Wildlife Hazard Reduction and Resource Management Plan<br>• District Standard Plans[8] - design guidelines for districts<br>• *Resolution to Establish a Policy Framework for Managing Park Resources in a Changing Climate at The East Bay Regional Park District*. Adopted April 2018 |

1 https://lafco.acgov.org/lafco-assets/docs/JPAs/HASPA%20(Hayward%20Area%20Shoreline%20Planning%20Agency).pdf
2 http://www.adaptingtorisingtides.org/wp-content/uploads/2014/12/HaywardShorelineResilienceStudyReport_sm.pdf
3 https://www.hayward-ca.gov/residents/arts-leisure/parks-recreation
4 https://www.haywardrec.org/DocumentCenter/View/2874/District-Regulation-Handbook?bidId=
5 https://www.haywardrec.org/DocumentCenter/View/6911/Hayward-Area-Recreation-and-Park-District_Park-Master-Plan?bidId=
6 https://www.ebparks.org/activities/ord38.htm
7 https://www.ebparks.org/civicax/filebank/blobdload.aspx?BlobID=23499
8 https://www.ebparks.org/about/bids/district_standard_plans.htm

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| City of Hayward | • Land use planning and zoning<br>• Conducts development and environmental review<br>• Capital improvement planning<br>• Hazard mitigation planning<br>• Member of HASPA | • Manages capital improvement plan for city infrastructure, including the wastewater treatment plant and local roadways.<br>• Owns and operates Hayward Executive airport.<br>• Owns the Skywest Golf Course that is leased to HARD.<br>• Develops changes to the zoning code to implement land use plans | • General Plan[9]<br>• Zoning maps and use charts[10]<br>• Capital Improvement Budget[11]<br>• Economic Development Strategic Plan[12]<br>• Design Guidelines[13]<br>• Neighborhood Plans[14]<br>• 2016 Hayward Local Hazard Mitigation Plan[15]<br>• Green Infrastructure Plan[16] |
| San Francisco Bay Restoration Regulatory Integration Team (BRRIT)[17] | • Composed of staff from the six state and federal regulatory agencies with jurisdiction over wetland restoration projects: U.S. Army Corps of Engineers (Corps); U.S. Fish and Wildlife Service (USFWS); NOAA National Marine Fisheries Service (NOAA Fisheries); San Francisco Bay Regional Water Quality Control Board (RWQCB); California Department of Fish and Wildlife (DFW); and San Francisco Bay Conservation and Development Commission (BCDC). Also includes representatives from the U.S Environmental Protection Agency (EPA). | • The purpose of the BRRIT is to improve the permitting process for multi-benefit wetland restoration projects and associated flood management and public access infrastructure in San Francisco Bay. | • Webinar on how to submit projects[18] |
| California Natural Resources Agency | • The Natural Resources Agency develops guidelines for the implementation of the California Environmental Quality Act (CEQA), a broad environmental law with the goal of disclosing to the public the significant environmental effects of a proposed project through the preparation of an Initial Study (IS), Negative Declaration (ND), or Environmental Impact Report (EIR).<br>• Unlike NEPA, requires adoption of all feasible measures to mitigate environmental impacts | • CEQA applies to all discretionary projects proposed to be conducted or approved by a California public agency, including private projects requiring discretionary government approval<br>• Construction of seawalls, revetments/riprap, bulkheads, or super levee that would modify land near the shoreline or the elevation of land might trigger CEQA<br>• Geologic Hazard Abatement Districts are exempt from CEQA<br>• Impacts to wetlands would have to be addressed under CEQA | • Governor's Office of Planning and Research (OPR) and the Natural Resources agency develop CEQA guidelines[19] |

9 https://www.hayward2040generalplan.com/
10 https://www.hayward-ca.gov/services/city-services/explore-zoning-use-charts
11 https://www.hayward-ca.gov/your-government/documents/capital-improvement-program
12 https://www.hayward-ca.gov/your-government/documents/economic-development-strategic-plan
13 https://www.hayward-ca.gov/your-government/documents/planning-documents
14 https://www.hayward-ca.gov/your-government/documents/planning-documents
15 https://www.hayward-ca.gov/sites/default/files/pdf/2016%20City%20of%20Hayward%20Local%20Hazard%20Mitigation%20Plan.pdf
16 https://www.hayward-ca.gov/green-infrastructure-plan
17 http://www.sfbayrestore.org/san-francisco-bay-restoration-regulatory-integration-team-brrit
18 https://www.youtube.com/watch?v=UBcWVP9qQfM&feature=youtu.be
19 http://opr.ca.gov/ceqa/updates/guidelines/

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| Alameda County Flood Control & Water Conservation District (ACFCWCD) | • Provides flood protection for the citizens and business of Alameda County, while safeguarding the Bay Area's natural environment<br>• Prevents waste of water or diminution of the water supply<br>• Owns and operates flood control infrastructure (system of pump stations, erosion control structures, dams, and pipeline, channels, levees, and creeks)<br>• Works with federal, state, and local governmental agencies (USACE, FEMA, USGS, NOAA, Water Board, etc.) | • Owns and operates flood control infrastructure in the study area, including:<br>Storm drains, channels, pipelines to San Lorenzo Creek<br>Cull and Don Castro Reservoirs<br>Nine pump stations (Eden Landing, Ruus Road, Besco, Westview, Alvarado, Industrial, Ameron, Stratford, Eden Shores)[1]<br>• Channel property under ACFWCD ownership (Bockman, Sulfur, Line A) could be opened up to public access, potentially aligning with project goals (if maintenance and liability responsibilities can be passed on to another agency).<br>• Considers larger-scale, regional flood protection planning to be beyond their mission. | • Currently conducting Coastal and Riverine Flood Assessment<br>• Hydrology & Hydraulics Manual: Defines current practices for the hydrologic and hydraulic design of all flood control facilities in Alameda County that are subject to District approval<br>• Alameda County Public Works Agency Engineering Design Guidelines<br>• Floodplain Management Ordinance[2]<br>• Stormwater Management and Discharge Ordinance[3]<br>• Grading, Erosion, and Sediment Control Ordinance[4]<br>• California Regional Water Quality Board, Municipal Regional Stormwater NPDES Permit[5]<br>• Zone 3A Drainage Master Plan Study[6] |
| Alameda County Mosquito Abatement District (ACMAD) | • Formed by City Councils of Berkeley, San Leandro, Hayward, Oakland, Alameda, Piedmont, and Emeryville to address the problem of large flights of mosquitoes from the bay marshes to the hills from March to October<br>• Developed ditching in the marshes to promote drainage of salt marsh mosquito breeding sources<br>• Committed to improving the health and comfort of Alameda County residents by controlling mosquitoes and limiting the transmission of mosquito-borne diseases | • Provides assistance to local code enforcement agencies to enforce state laws, regulations, and local ordinances related to rodent, wildlife, or insect vectors that pose a threat to public health and safety | • Control Program[7]<br>• Invasive Mosquito Response Plan[8]<br>• ACMAD Strategic Plan 2018-2021[9]<br>• BMPs for Mosquito Control[10] |

1 http://acfloodcontrol.org/wp-content/uploads/2016/02/acfcd2004report.pdf
2 https://library.municode.com/ca/alameda_county/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.40FLMA
3 https://library.municode.com/ca/alameda_county/codes/code_of_ordinances?nodeId=TIT13PUSE_CH13.08STMADICO
4 https://library.municode.com/ca/alameda_county/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.36GRERSECO
5 https://www.waterboards.ca.gov/rwqcb2/board_decisions/adopted_orders/2009/R2-2009-0074.pdf
6 https://acfloodcontrol.org/projects-and-programs/flood-control-projects/zone-3a-drainage-master-plan-study/
7 https://www.mosquitoes.org/files/c1804f413/Control+Program.pdf
8 https://www.mosquitoes.org/files/12711fa88/ACMAD-Invasive-Mosquito-Species-Response-Plan-09_07_2017-1.pdf
9 https://www.mosquitoes.org/files/8206d6935/Alameda+Strategic+Plan.pdf
10 https://www.mosquitoes.org/files/4210fdde3/BMPsforMosquitoControl.pdf

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|---|---|---|---|
| Union Sanitary District | • Independent special district which provides wastewater collection, treatment and disposal services to the residents and businesses of the cities of Fremont, Newark and Union City in Southern Alameda County, CA<br>• Sanctioned under California law to perform specific local government functions within certain boundaries<br>• Derives authority from California Health & Safety Code | • Operates a 33 million gallon per day wastewater treatment facility in Union City and provides collection, treatment and disposal services to a total population of over 347,000 in Fremont, Newark, and Union City, CA<br>• Maintains over 800 miles of underground pipelines in its service area | • Sewer System Management Plan[11] |
| East Bay Dischargers Authority (EBDA) | • Formed in 1974 by a joint exercise of powers agreement by the City of Hayward, City of San Leandro, Oro Loma Sanitary District, Union Sanitary District, and Castro Valley Sanitary District<br>• Purpose is to collectively manage the wastewater treatment and disposal of these agencies, servicing about 800,000 people[12]<br>• Owns and operates four effluent pump stations, a dichlorination facility, and a force main and Bay Outfall system for effluent disposal into the San Francisco Bay[13] | • Operates pipelines connecting various wastewater treatment facilities, allowing treated effluent to enter a single pipeline that discharges into the center of the Bay – this infrastructure runs through the Hayward Regional Shoreline project area, crossing tidal marshes, diked baylands, and industrial lands<br>• EBDA is a partner in the Hayward Marsh redesign (see above).<br>• Joint Powers Agreement (JPA) sets flow amounts, and that is in the process of being updated for the next 20 years, to plan for future alternatives to the EBDA system | • East Bay Dischargers Authority Sea Level Rise Adaptation Planning Project, 2015[14]<br>• Wastewater Reclamation and Reuse Study for the Union Sanitary District Area, May 1976[15]<br>• Joint Powers Agreement |
| East Bay Municipal Utility District (EDMUD) | • Provides high-quality drinking water for 1.4 million East Bay customers in a 332 square mile area<br>• Wastewater system serves 685,000 people in an 88-square mile area | • Some properties in the City of Hayward get water from EBMUD | • East Bay Watershed Master Plan[16]<br>• Watershed Rules and Regulations[17] |
| Calpine (Russell City Energy Center) | • Private power company serving 600,000 households<br>• PG&E is contracted to buy the energy produced by the plant and will ship it to San Francisco and San Mateo counties[18] | • Plant is in study area, opened in 2013, built on former landfill site, owned by Union Sanitary District.<br>• Combined-cycle, natural gas-powered electric generating facility with advanced air emissions control technologies. Plant consists of two combustion turbine generators, two heat recovery steam generators with duct burners and a single condensing steam turbine generator.<br>• Plant will likely be decommissioned in the next thirty years, making the land available for reuse by Sanitary District. | |

11 https://www.unionsanitary.com/images/documents/USD-SSMP-2018-19-Update.pdf
12 http://www.ebda.org/
13 http://www.ebda.org/about-us
14 http://www.ebda.org/sites/default/files/EBDA%20Climate%20Ready%20Final%20Report%20Report_August2015.pdf
15 http://www.ebda.org/sites/default/files/WW_Reclamation_and_Reuse_Study_1976.pdf
16 https://www.ebmud.com/recreation/east-bay/east-bay-watershed-master-plan-update/
17 https://www.ebmud.com/recreation/rules-and-regulations/
18 https://www.eastbayexpress.com/oakland/foes-of-hayward-power-plant-fight-back/Content?oid=1905883

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| San Francisco Bay Trail | • Partnered with State Coastal Conservancy to develop 500-mile regional trail<br>• Offers grants to local entities to assist in completion of the trail<br>• Works with state and federal agencies, towns, cities, counties, park districts, etc.<br>• Connects communities to parks, open spaces, schools, transit and to each other and provides a commute corridor | • Bay Trail Plan adopted by the Association of Bay Area Governments per Senate Bill 100 in 1989<br>• Policies and design guidelines are intended to complement rather than supplant adopted regulations and guidelines of local managing agencies<br>• Alternative locations for the Bay Trail were investigated during the Adapting to Rising Tides study, including inland routes, that were considered incompatible with the Bay Trail's 'blue water experience' that they prioritize.<br>• Preference for hard surfaces, though may accommodate other surfaces on top of a levee. | • Bay Trail Plan, Design Guidelines & Toolkit[1] |
| PG&E | • Provides natural gas and electric service to 16 million people throughout a 70,000 square mile service area<br>• Although the company has infrastructure throughout Hayward, the City now requires all commercial and residential properties to switch from PG&E and instead buy power from non-profit provider East Bay Community Energy[2]<br>• Overseen by California Public Utilities Commission | • PG&E overhead transmission lines cross the Hayward Regional Shoreline project area. The towers are on concrete bases, but sea level rise could cause issues with access for maintenance and repairing the infrastructure.<br>• Additional energy infrastructure is present in the study area that may impact project design. | |
| Union Pacific Railroad | • Freight railroad owner and operator in Western U.S. | • Owns and operates freight rail line in the study area. Part of the Union Pacific Coast Line that runs from Los Angeles to the Bay Area.<br>• Work near the railroad must be coordinated with Union Pacific | |
| California Public Utilities Commmission (CPUC) | • CPUC regulates electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation utilities and companies. | • PG&E and Union Pacific Railroad are regulated by CPUC. Changes to their assets may be subject to review by CPUC. | |

1 https://baytrail.org/wp-content/uploads/2015/12/San-Francisco-Bay-Trail_-Bay-Trail-Plan-Summary.pdf
2 https://sanfrancisco.cbslocal.com/2018/03/08/hayward-goodbye-pge-renewable-energy/

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|---|---|---|---|
| San Francisco Bay Conservation & Development Commission | • California state planning and regulatory agency with regional authority over the San Francisco Bay, the Bay's shoreline, and the Suisun Marsh<br>• Mission is to protect and enhance San Francisco Bay and encourage the Bay's responsible and productive use<br>• Leads the Bay Area's multi-agency regional effort to address impacts of rising sea level on shoreline communities and assets<br>• Authority found in McAteer-Petris Act, San Francisco Bay Plan, and other special area plans and laws and policies.<br>• Issues Coastal Zone Management consistency determination. | • Issues permits for fill in the Bay (including intertidal lands and salt ponds) and for projects within a 100-foot buffer from the bay. Permit conditions require projects to minimize any fill and maximize feasible public access for all projects within the Bay's 100-foot shoreline band.<br>• Interested in highlighting and sharing this project as example of innovative projects in the bay and as a way to share lessons learned around the region.<br>• The Habitat for Fill Bay Plan Amendment was recently adopted to address the need to place in increasing amount of Bay fill to restore and enhance habitat in light of seal rise impacts on Bay habitats. This change will make it easier to get a permit for fill to pursue thin layer placement, gravel beaches, strategic placement of dredge / mudflat seeding. Such projects are likely to require monitoring and adaptive management plans.[3] | • San Francisco Bay Plan (updated with environmental justice and social equity amendment) – includes policies to guide future use of the Bay and shoreline and maps that apply the policies to the Bay and shoreline<br>• Special area plans and design guidelines[4] |
| California State Coastal Conservancy (SCC) | • State agency established in 1976 to protect and improve natural lands and waterways, help people access and enjoy the outdoors, and sustain local economies along the length of California's coast and San Francisco Bay[5]<br>• Climate Ready Program helps natural resources and human communities along California's coast and San Francisco Bay adapt to the impacts of climate change | • Provides grants and guidance for climate adaptation planning and projects consistent with the Strategic Plan | • "The Baylands and Climate Change: What We Can Do: The 2015 Science Update to the Baylands Ecosystem Habitat Goals Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project"<br>• Strategic Plan[6]<br>• Adaptation Tools Spreadsheet[7] |
| Metropolitan Transportation Commission (MTC) | • Metropolitan planning organization for nine-county San Francisco Bay Area (federal designation) and regional transportation planning agency (state designation), responsible for Bay Area transportation and long-range planning<br>• Assigned duties by federal government, state Legislature, and Bay Area voters<br>• Regional transportation and financing in the Bay Area, oversee toll revenue on state-owned bridges | • Have decision-making authority over the State Transportation Improvement Program (STIP) and administer various federal funding<br>• With ABAG, developing regional plan (Bay Plan 2050), which identifies priority conservation areas, priority development areas, and priority production areas. Hayward Regional Shoreline is eligible to be a PDA-Connected Community, which may provide opportunities for transit funding. Requires passage of policies to reduce vehicle miles traveled. | • Plan Bay Area 2040[8]<br>• Plan Bay Area 2050[9] |

3 https://bcdc.ca.gov/BPAFHR/FillHabitat.html
4 https://bcdc.ca.gov/publications/
5 https://scc.ca.gov/
6 https://scc.ca.gov/files/2018/01/CoastalConservancy_StrategicPlan_2018_2022.pdf
7 https://scc.ca.gov/climate-change/climate-change-projects/#slr-adaptation
8 https://mtc.ca.gov/sites/default/files/Final_Plan_Bay_Area_2040.pdf
9 https://www.planbayarea.org/

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|---|---|---|---|
| CA State Lands Commission | • Established in 1938, manages 4 million acres of tidal and submerged lands and beds of navigable rivers, streams, lakes, bays, estuaries, inlets, and straits (mostly Public Trust lands)<br>• Monitors sovereign land granted in trust by the California Legislature to approximately 70 local jurisdictions that generally consist of prime waterfront lands and coastal waters<br>• Issues leases for use or development, provides public access, resolves boundaries between public and private lands, and implements regulatory programs to protect state waters from oil spills and invasive species | • Mostly has jurisdiction over sovereign land (tidal and navigable waters) and school lands (lands granted to public school system) | • Strategic Plan 2016-2020[1] |
| San Francisco Estuary Institute | • Aquatic and ecosystem science institute dedicated to providing scientific support and tools for decision-making and communication through collaborative efforts<br>• Through Resilient Landscapes, develops strategies to adapt to climate change[2]<br>• Advises state, federal, and regional agencies, as well as business and NGO leaders | • On the Hayward Regional Shoreline Adaptation Master Plan team<br>• Prepared the San Francisco Bay Shoreline Adaptation Atlas with SPUR, which includes the study area | • San Francisco Bay Shoreline Adaptation Atlas[3]<br>• Regional Monitoring Program for Water Quality in San Francisco Bay[4]<br>• Alameda Creek Historical Ecology study[5]<br>• Forthcoming Healthy Watershed Resilient Baylands study looking at an updated sediment budget for the Bay |
| SPUR (San Francisco Bay Area Planning and Urban Research Association) | • Non-profit research, education, and advocacy organization focused on planning and governance issues in SF | • Prepared the San Francisco Bay Shoreline Adaptation Atlas with SPUR, which includes the study area | • San Francisco Bay Shoreline Adaptation Atlas<br>• SPUR's Agenda for Change<br>• SPUR Regional Strategy 2070[6] |
| San Francisco Bay Restoration Authority | • Regional agency created to fund shoreline projects that will protect, restore, and enhance San Francisco Bay<br>• Allocates funds raised by the Measure AA parcel tax | • Measure AA funding can go towards projects that protect, restore and enhance the San Francisco Bay, including habitat restoration projects; flood protection projects that are part of a habitat restoration project; and shoreline access and recreational amenity projects that are part of a habitat restoration project. [7] | • Grant Program Guidelines[8] |

1 https://www.slc.ca.gov/wp-content/uploads/2018/07/StrategicPlan.pdf
2 https://www.sfei.org/contact#sthash.WinLZ0L2.dpbs
3 https://www.sfei.org/adaptationatlas
4 https://www.sfei.org/sites/default/files/biblio_files/2019%20Multi-Year%20Plan%20-%20SC%20Approved%2020190430%20-%20050119.pdf
5 https://www.sfei.org/projects/AlamedaCreekHE#sthash.1JuSjXnU.dpbs
6 https://www.spur.org/featured-project/regional-strategy
7 http://www.sfbayrestore.org/
8 http://sfbayrestore.org/sites/default/files/2019-09/final_grant_program_guidelines_9.17.19.pdf

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| Alameda County Water District (ACWD) | • Supplies water to residents and businesses of southern Alameda County<br>• Sources of water supply – 40% State Water Project, 20% San Francisco PUC, 40% Alameda Creek Watershed Runoff<br>• Service area includes about 357,000 residential and 84,000 business customers[9] | • The District's jurisdictional boundary includes the southern portion of the City of Hayward<br>• Owns and operates groundwater wells in the project area | • Five Year Strategic Plan [10]<br>• Urban Water Management Plan 2015-2020 |
| Association of Bay Area Governments (ABAG) | • Regional planning agency and council of governments for the counties, cities, and towns of the Bay region.<br>• Works on regional issues such as land use, environmental stewardship, energy efficiency, and water resource protection.<br>• Shares joint responsibility for Plan Bay Area with MTC. | • With MTC, developing regional plan (Bay Plan 2050), which identifies priority conservation areas, priority development areas, and priority production areas. Hayward Regional Shoreline is eligible to be PDA-Connected Community, which may provide opportunities for transit funding. Requires the passage of policies to reduce vehicle miles traveled. | • Plan Bay Area 2050 |
| Cal Trans (California Department of Transportation) | • Manages California's highway and freeway lanes, provides inter-city rail services<br>• Executive department of the US State of California, part of the cabinet-level California State Transportation Agency | • Owns State Route 92 (plaza and eastern approach to Hayward-San Mateo Bridge) which is vulnerable to SLR and has drainage issues.<br>• Cal Trans sees the need for more study of the hydrologic conditions around the bridge approach, hasn't yet developed an adaptation plan for the asset. | • Caltrans Climate Change Vulnerability Assessment[11]<br>• Climate Change Vulnerability Assessment[12] |
| SF Regional Water Quality Control Board (WQCB) | • A division of the State Water Resources Control Board charged with the protection of water quality through regulation of stormwater discharges, landfills, alteration of federal water bodies, and other activities.<br>• Issues water discharge requirements, takes enforcement action against violators, and monitors water quality | • Submerged features, like fill, require Water Board permits, as do modifications of the shoreline.<br>• Regulates landfills and waste ponds, including both active and closed facilities. Regulation consists of design standards for liners, covers, etc., environmental monitoring, and cleanup when necessary.<br>• Consultation likely required in permitting process. | • Water Quality Control Plan for the San Francisco Bay Basin[13] |
| California Department of Fish and Wildlife (CDFW) | • Mission is to manage the State's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.<br>• Issues permits to ensure regulatory compliance and statewide consistency with the California Endangered Species Act. | • Issues permits to ensure regulatory compliance and statewide consistency with the California Endangered Species Act.<br>• Consultation likely required in permitting process. | |

9 https://www.acwd.org/DocumentCenter/View/1264/ACWDs-2015---2020-UWMP?bidId=
10 https://www.acwd.org/DocumentCenter/View/2048/2018-ACWD-Strategic-Plan-?bidId=
11 https://dot.ca.gov/programs/transportation-planning/office-of-smart-mobility-climate-change/climate-change
12 https://www.arcgis.com/apps/webappviewer/index.html?id=517eecf1b5a542e5b0e25f337f87f5bb
13 https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html

| AGENCY OR ORGANIZATION | GENERAL ROLE(S) / MISSION | PLANNING & REGULATORY JURISDICTION / LAND OWNERSHIP RELEVANT TO STUDY AREA AND MASTER PLAN | RELEVANT REGULATIONS, PLANS, POLICIES, GUIDANCE, AND STUDIES |
|---|---|---|---|
| U.S. Fish and Wildlife Service (USFWS) | • Issues permits for activities that impact plants and animals designated as endangered or threatened, and the habitats upon which they depend. | • Several known species in the study area (Salt Marsh Harvest Mouse, Ridgway's Rail, California Least Tern, and the Western Snowy Plover) are federally designated endangered species.<br>• Consultation likely required in permitting process. | |
| NOAA National Marine Fisheries Service (NMFS) | • With USFWS (above) implements the National Endangered Species Act.<br>• Responsible for endangered and threatened marine and anadromous species | • Consultation may be required in permitting process. | |
| Federal Emergency Management Agency (FEMA) | • Develops Flood Insurance Rate Maps (FIRMs) and administer National Flood Insurance Program<br>• Administers standards for flood resistant construction codes | • Accreditation of flood protection structures and levees to enable neighborhoods, infrastructure, and developed areas to be eligible for reduced or eliminated flood insurance rates under the NFIP<br>• Sets insurance rates under the NFIP, currently under reform[1] | • FIRMS[2]<br>• Guidance on Levee Accreditation[3] |
| United States Army Corps of Engineers (USACE) | • Regulatory agency responsible for issuing permits for all structures and work on waterways within its jurisdiction of waters of the United States, including dredging, marinas, piers, wharves, floats, intake/outtake pipes, pilings, bulkheads, ramps, fills, and overhead transmission lines.<br>• Develops plans for regional dredge management and is studying strategic placement of dredge material and identifying opportunities for beneficial use in the Bay Area. | • Developed and constructed Alameda County's flood control system, including the Alameda Creek, San Lorenzo Creek, and San Leandro Creek flood channels (although the channels are maintained by the ACFCWCD) | • Regional Dredge Material Management Plan[4]<br>• Permitting regulations and guidance[5] |

1 https://www.fema.gov/nfiptransformation

2 https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd&extent=-122.43945211509653,37.43674391029817,-121.86129659751919,37.708853832347565

3 https://www.fema.gov/media-library/assets/documents/9208

4 https://www.spn.usace.army.mil/Portals/68/docs/Dredging/DDMP/PMP_SFBay_RDMMP_DRAFT%205-23-19docx.pdf?ver=2019-07-09-184445-433

5 https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Federal-Regulation/

*Diked Bayland adjacent to Oro Loma WWTP and San Lorenzo Creek*

# DESIGN ALTERNATIVES

**This section provides an overview of the three Design Alternatives that were developed to solicit stakeholder and client feedback. The Design Alternatives combine the adaptation strategies into a detailed spatial configurations along the Hayward Regional Shoreline and provide different options to adapt the Project Area to sea level rise.**

# DESIGN ALTERNATIVES

## SELECTION PROCESS

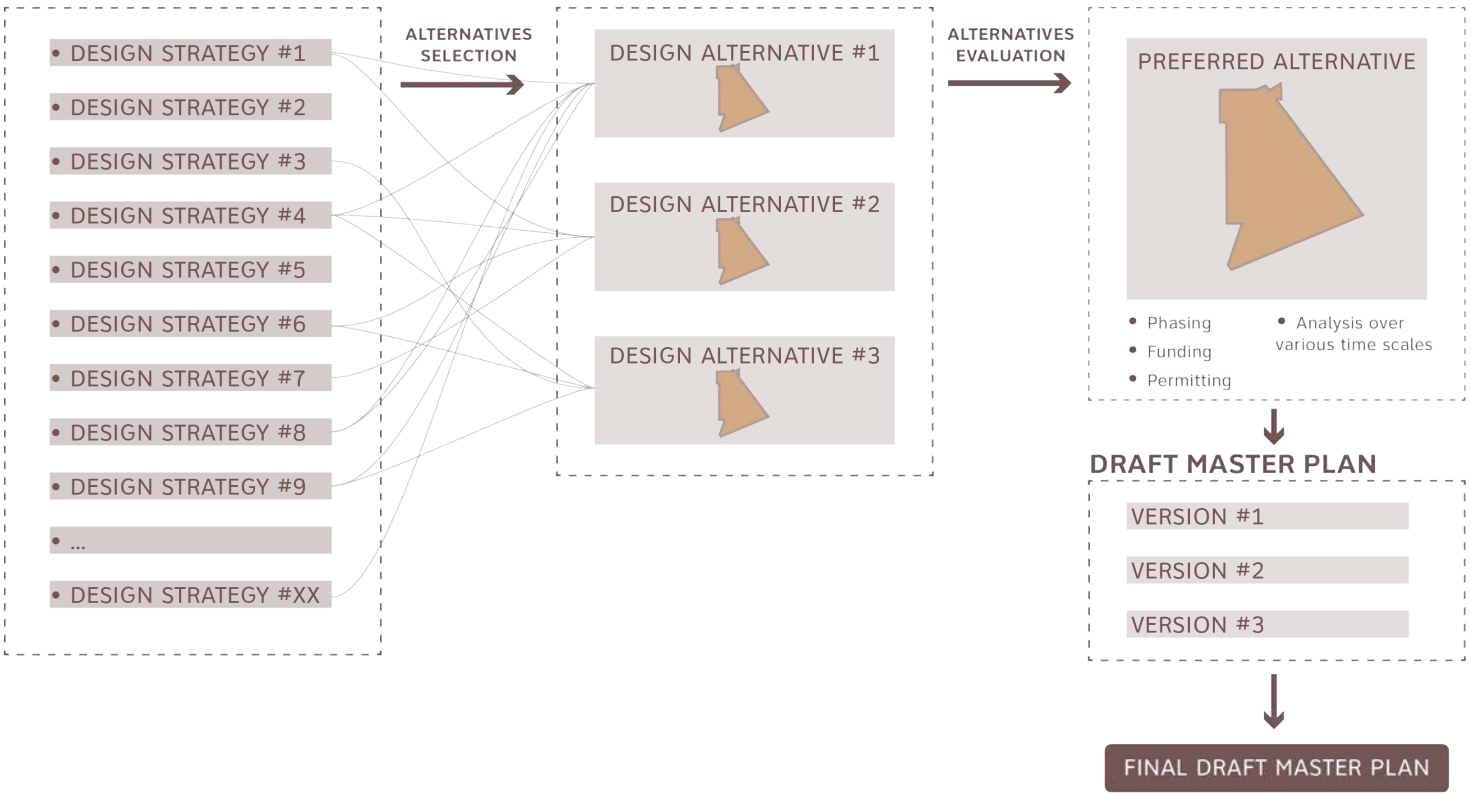
Based on stakeholder and client feedback, the Project Team identified three Design Alternatives that represent a balanced approach to mitigate the effects of sea level rise to the Hayward Regional Shoreline. Although considered, a full perimeter protection at the Bay's edge and a full retreat scenario were discarded because of cost implications, permitting and feasibility challenges, and lack of landowner and stakeholder support.

The Project Team did not assume that one of the alternatives will be selected for further analysis in the final Master Plan, but rather anticipated that discrete elements and projects from each alternative would be combined into the hybrid Preferred Alternative.

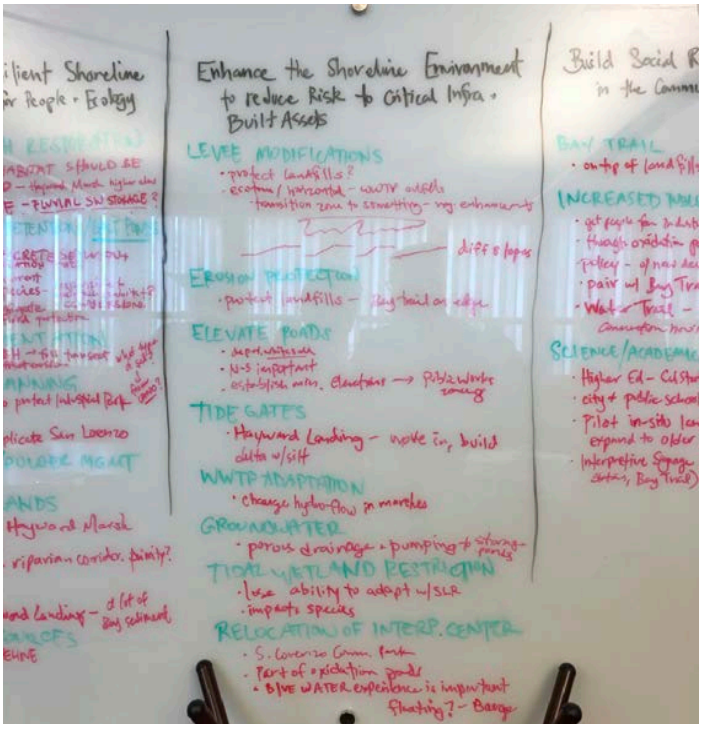
The Design Alternatives were formulated to easily compare one another to inform the Preferred Alternative selection process and for stakeholders to provide feedback.

**Design Alternatives Selection Process:**

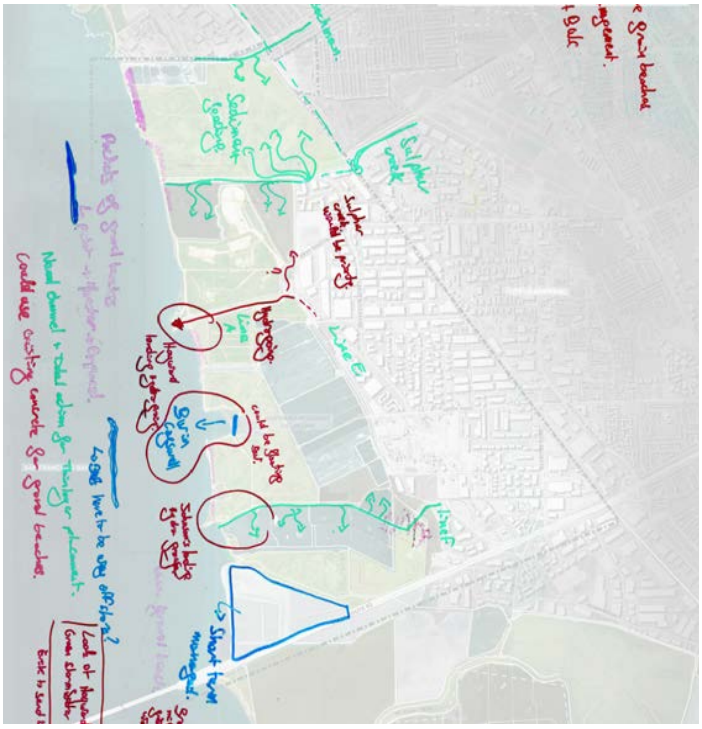
The Design Alternatives were evaluated against a No Action Alternative, which is analyzed in the Sea Level Rise and Flood Risk Impacts chapter, starting at page 47.



**09/30/19 TAC Charrette**
(SCAPE Site Photos, 2019)




**09/30/19 TAC Charrette**
(SCAPE Site Photos, 2019)



**09/30/19 TAC Charrette Sketches**
(SCAPE Scans, 2019)


**01/31/20 Design Alternative Sketches**
(SCAPE Scans, 2020)

# EVALUATING THE DESIGN ALTERNATIVES

In relation to the project goals and in order to help evaluate and compare the three Design Alternatives, the Project Team has defined a list of evaluation points that highlight key elements of the Shoreline Adaptation Master Plan.

**Line of Protection**

- All alternatives are assumed to include a continuous "line of protection" to prevent rising sea levels from inundating built assets within the study area. The line of protection is assumed to be a FEMA-certified levee that will reduce risk to inland communities by buffering the shoreline from the impacts of sea level rise and storm surge. The spatial alignment of this levee has multiple implications on cost, maintenance, and what the new flood protection infrastructure safeguards.

**Tidal Habitat**

- Preserving, enhancing, or creating tidal habitat is a common goal for all alternatives. The future extent of tidal habitat encompasses tidal habitat and muted tidal habitat, which is a controlled system. The spatial extent of connective blocks of marsh and proportion of tidal versus muted tidal habitat varies amongst the three alternatives.

**Erosion Control**

- Reducing coastal erosion is a key objective. Each alternative uses a layered strategy of erosion control that aims to reduce the risk of erosion and shelter inland marshes and ecosystems. Gravel beaches attenuate waves and provide shorebird nesting habitat and revetments provide a more conservative approach to edge stabilization for critical infrastructure.

**Stormwater Management**

- Once a line of protection is established, the stormwater and groundwater management inland of the levee system is critical, especially with increased precipitation events. In order to mitigate rainfall impacts and any bathtub effects on the dry side of the line of protection, all the alternatives are looking at various options to manage stormwater. A system of detention ponds, tide gates and water control structures, and flood control channels can be used to manage stormwater and move it away from inland communities.

**Wastewater Treatment**

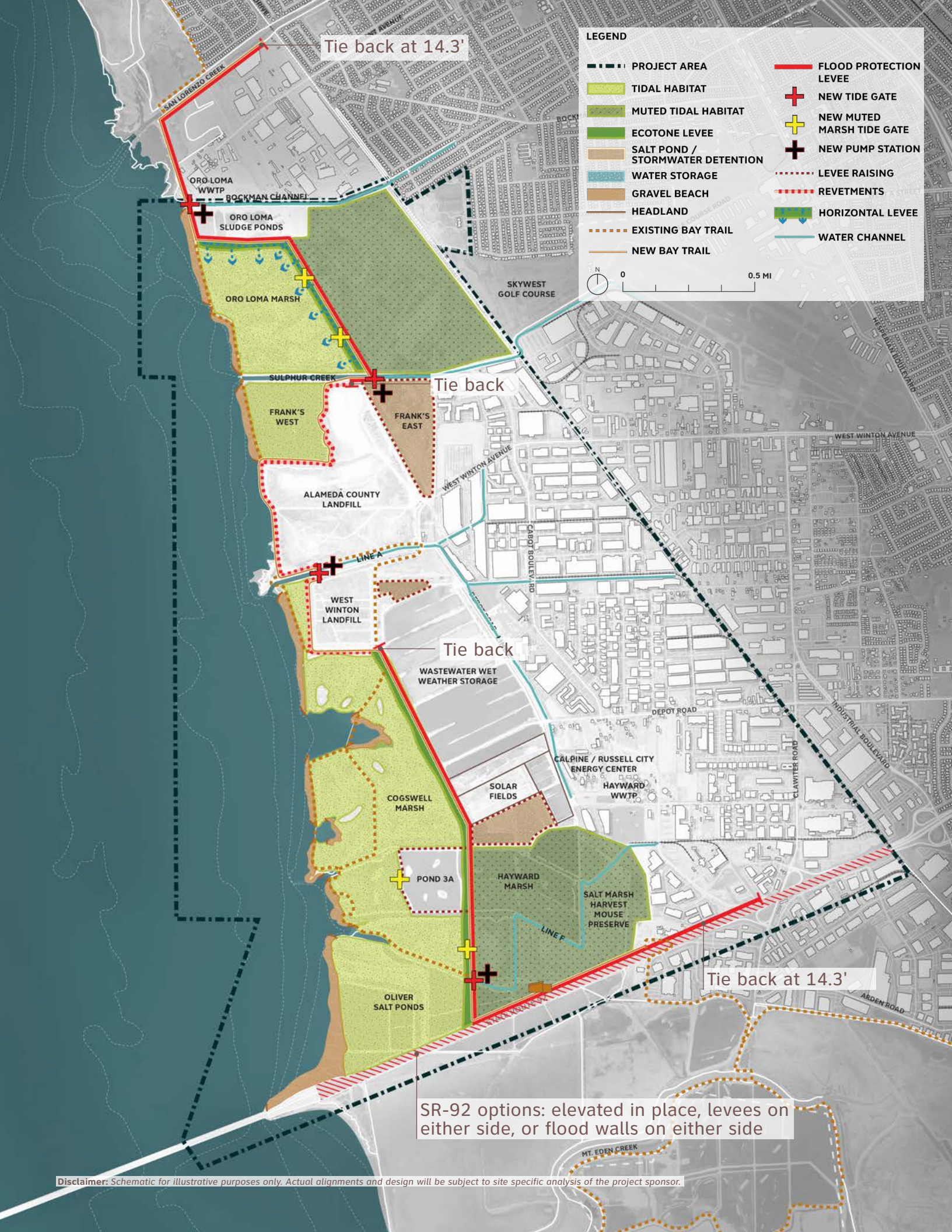
- For all the alternatives, the critical uses of wastewater treatment are maintained or enhanced with new multi-benefit infrastructure. Horizontal levees align with the First Mile project and possible future needs for local discharge.

**Bay Trail**

- The Bay Trail is a key feature of the Hayward Regional Shoreline, its future location prioritizes the blue water experience where possible, maintains a variety of experiences, and aligns with new infrastructure improvements. For all three alternatives, the current alignment of the Bay Trail will be maintained as long as possible (until it is inundated with sea level rise) and connect to the realignment.

**Hayward Shoreline Interpretive Center**

- The Hayward Shoreline Interpretive Center provides educational and programming opportunities for all community members and plays a key role in supporting and promoting social resilience in the East Bay. Its future is connected to new infrastructure improvements proposed by the plan. A variety of options are explored to retrofit the center in place and  locate the center in proximity to new educational opportunities. All three alternatives maintain a link to the Bay Trail.




**Disclaimer:** *Schematic for illustrative purposes only. Actual alignments and design will be subject to site specific analysis of the project sponsor.*

# #1: CLOSER TO THE BAY

## DESCRIPTION

Alternative 1 shows a conservative line of protection closer to the Bay that reduces risk for a larger portion of the shoreline and urban assets.

In the north end of the project area, the line of protection ties back along the San Lorenzo Creek channel and wraps in front of Oro Loma Wastewater Treatment Plant to protect it in place. It then cuts through the middle of Oro Loma Marsh and ties back to high ground at the two existing landfills. In the south, the alignment then follows the western edge of the Wet Weather Storage ponds and cuts immediately south through Hayward and HARD Marsh. A raised access road along SR-92 ties back to high ground at the intersection of Clawiter Road.

The line of protection places a larger extent of marsh inland of the line of protection where marsh tidal water levels can be more carefully managed over time. However, this strategy will most likely negatively impact the existing marsh habitat by transforming part of the tidal marsh into muted tidal habitat. A zone of tidal habitats exists outboard of the line of protection, where it may accrete any available sediment faster than the muted marsh system. This option presents permitting and regulatory challenges from impacts to existing tidal marsh habitat. It also requires more active management of the muted marsh inland of the line of protection, which will become increasingly difficult with rising sea levels and subsiding land.

Vulnerable ecosystems, like the Oliver Salt Ponds, would be restored to tidal marshes as sea levels rise and make perimeter levee maintenance less feasible. Salt pond habitat is restored further inland where it is at less risk of inundation. Tidal marshes, existing and restored, would be monitored over time with an adaptive management plan that could use sediment augmentation to sustain healthy mudflat elevations in strategic areas.

Ecotone levees are proposed along most of the line of protection. Ecotone levee are shallow slope levees that provide a transition slope for marshes to adapt to Sea Level Rise.

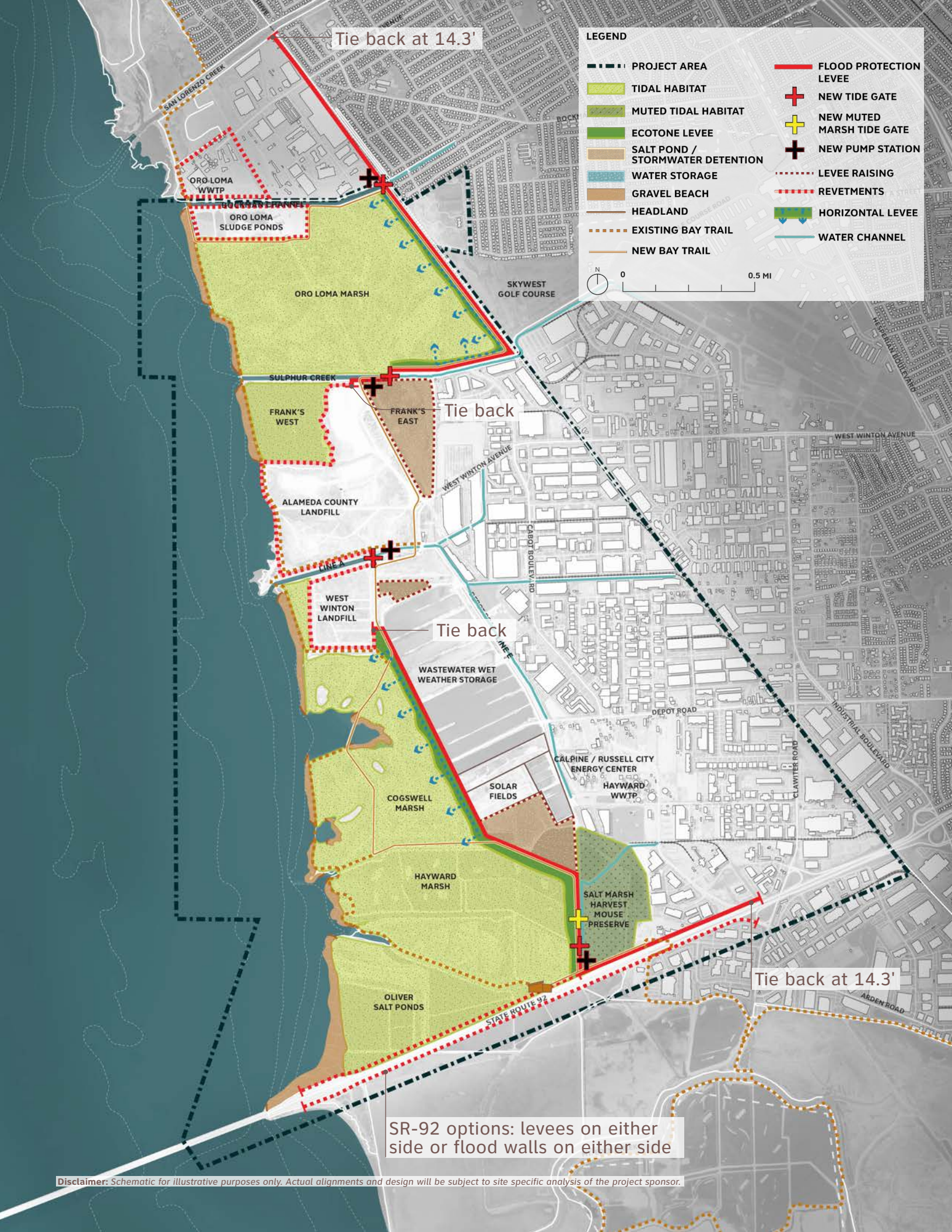
This alternative proposes a layered system of erosion control measures using gravel beaches that reduce the risk of erosion to levees that shelter the marshes behind. Bayside levees and interior levees would be retained in place to provide additional layered protection for as long as they are feasible to maintain. Revetments along the two landfills help to reduce the risk of erosion and seepage.

There is a great need for stormwater and groundwater management inland of the new line of protection to reduce the risk of flooding with increased precipitation events and reduce any bathtub effect impacts. This alternative presents inland detention ponds that serve the dual purpose of salt pond habitat and storage space during storm events to temporarily collect and hold stormwater before it is discharged to the Bay. This alternative provides the greatest storage capacity and this is a strength of this alternative.

This Alternative presents the smallest local discharge opportunity for treated wastewater effluent. Critical wastewater treatment functions are maintained and enhanced at Oro Loma Wastewater Treatment Plant with a horizontal levee that outlets effluent to Oro Loma Marsh. Horizontal levees have vegetated ecotone slopes that are irrigated by treated wastewater.

With this alternative, the Bay Trail is aligned closer to the blue water of the Bay where possible and connected to new infrastructure improvements. A phased realignment of the trail will maintain its existing alignment until sea level rise impacts to the existing trail push the trail inland over time.

Located behind the line of protection, the Hayward Shoreline Interpretive Center is protected in place. An ecotone levee in immediate adjacency to the center presents opportunities for education programming related to future restoration and adaptive management projects.




**Disclaimer:** *Schematic for illustrative purposes only. Actual alignments and design will be subject to site specific analysis of the project sponsor.*

# #2: DOWN THE MIDDLE

## DESCRIPTION

This alternative looks at an alignment that balances risk reduction and ecological enhancement with a line of protection that runs through the middle of the shoreline area.

The line of protection is pulled back in the north along the Union Pacific Rail Corridor and ties back to high ground at the San Lorenzo Creek channel. It then ties back to high ground at the two existing landfills and follows the western extent of the Wet Weather Storage ponds to the south. The alignment pulls back in the southern portion of the site and cuts through the middle of the Salt Marsh Harvest Mouse Preserve, then ties back along a new levee along the access road for SR-92.

A larger extent of tidal habitat is enhanced outboard of the line of protection. Tidal marshes, existing and restored, would be monitored over time with an adaptive management plan that could use sediment augmentation to sustain healthy mudflat elevations in strategic areas. New tidal marsh is restored at Frank's West and Hayward Marsh. Vulnerable ecosystems, like the Oliver Salt Ponds, would also be restored to tidal marshes as sea levels rise and make perimeter levee maintenance less feasible.

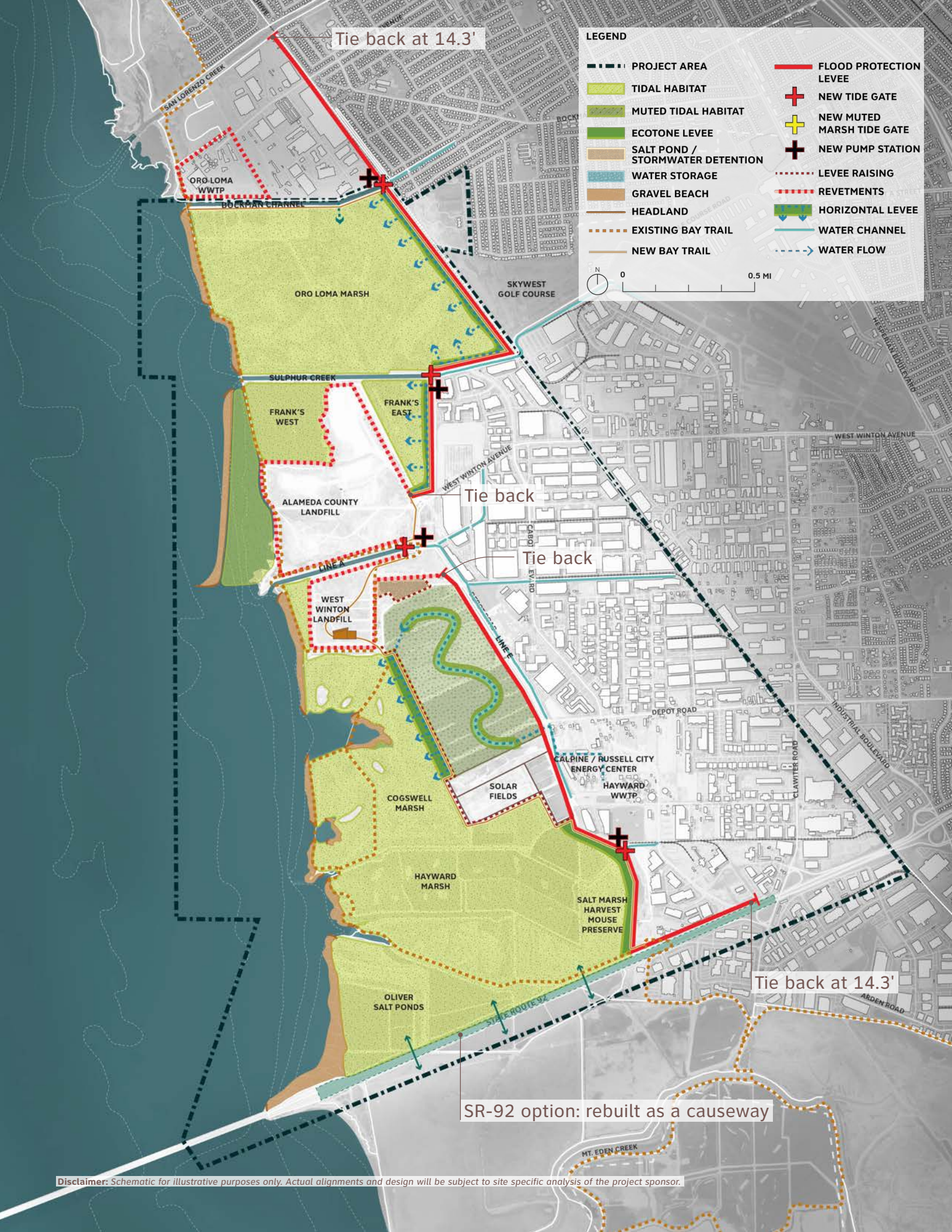
Similar to alternative #1, this alternative presents a layered system of erosion control measures using gravel beaches that reduce the risk of erosion to levees that shelter the marshes behind. Bayside levees and interior levees would be retained in place to provide additional layered protection for as long as they are feasible to maintain. Revetments along the two landfills reduces the risk of erosion and seepage.

In this alternative, inland detention ponds are utilized to hold stormwater before it is pumped to the Bay.

Critical wastewater treatment functions are maintained and enhanced at Oro Loma and Hayward Wastewater Treatment Plants with horizontal levees that outlet effluent to Oro Loma and Cogswell Marsh. Most of Hayward WPCFs existing function and storage capacity is maintained.

The Bay Trail is aligned to promote a diversity of experiences while reducing the risk of flooding. A phased realignment of the trail will maintain its existing alignment until sea level rise impacts to the existing trail push the trail inland over time.

The Hayward Shoreline Interpretive Center is adapted in place through the elevation of the building itself. Its location within a marsh maintains a direct connection to shoreline ecosystems.




**Disclaimer:** *Schematic for illustrative purposes only. Actual alignments and design will be subject to site specific analysis of the project sponsor.*

# #3: FURTHER INLAND

## DESCRIPTION

This alternative explores an alignment that is pulled the furthest inland to maximize ecological restoration along the shoreline and layer risk reduction infrastructure.

In the north, the line of protection is pulled back along the Union Pacific Rail Corridor and ties back to high ground at the San Lorenzo Creek channel. It then aligns to the eastern edge of Frank's East and ties back to high ground at the two existing landfills. It is pulled to the east of the Wet Weather Storage ponds and follows the eastern extent of the diked Baylands to the south before tying back to high ground with a levee parallel to SR-92 along Clawiter Road.

This alternative prioritizes a larger extent of connected tidal habitat that is Bayward of the line of protection and incorporates ecological and risk reduction infrastructure along a wider extent of Baylands. Although this alternative provides a more connected tidal habitat configuration, it also reduces the diversity of habitats and ecosystems in the study area and these ecosystems may transition to deeper water ecosystems over time with sea level rise. Tidal marshes, existing and restored, would be monitored over time with an adaptive management plan that could use sediment augmentation to sustain healthy mudflat elevations in strategic areas. New tidal marsh is restored at Frank's West and East, Hayward Marsh, inland diked ponds, and at vulnerable locations along the Bay's edge, such as Oliver Salt Ponds.

Like the previous alternatives, a layered system of erosion control measures utilizes gravel beaches that reduce the risk of erosion to levees that shelter the marshes behind. Bayside levees and interior levees would be retained in place to provide additional layered protection for as long as they are feasible to maintain. Revetments along the two landfills reduces the risk of erosion and seepage.

In this alternative, no detention space is proposed, which could lead to flooding impacts or require constant pumping from the flood control channels to the bay, which has significant long-term maintenance cost implications.

Critical wastewater treatment functions are maintained and enhanced at Oro Loma and Hayward Wastewater Treatment Plants with horizontal levees that outlet effluent to Oro Loma and Cogswell Marsh. This alternative assumes that EBDA is decommissioned. This allows for a freshwater treatment marsh in the former wet weather equalization ponds at Hayward WPCF to facilitate local discharge to Cogswell marsh.

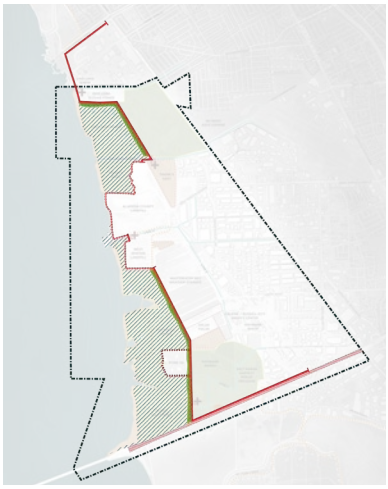
The Bay Trail is pulled back to a higher inland elevation to reduce the risk of flooding with sea level rise. A phased realignment of the trail will maintain its existing alignment until sea level rise impacts to the existing trail push the trail inland over time.

The Hayward Shoreline Interpretive Center is relocated to the West Winton landfill where it is protected from flooding. The high point maintains visibility of the structure and offers expansive views of the Bay.

# EVALUATION POINTS

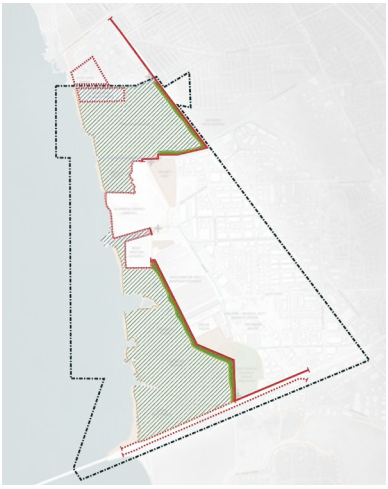
## LINE OF PROTECTION

The line of protection includes a FEMA-certified levee that will reduce risk to inland communities by buffering the shoreline to the impacts of sea level rise and storm surge. The spatial alignment of this levee has multiple implications on cost, maintenance, and what the new flood protection infrastructure safeguards.



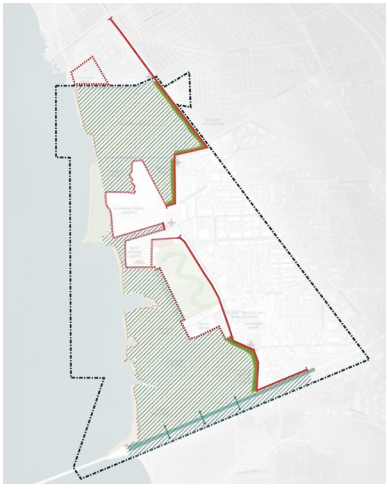
### #1: CLOSER TO THE BAY

- Protects the most amount of shoreline infrastructure assets, including the Wastewater Wet Weather Storage Ponds, Oro Loma Wastewater Treatment Plant and sludge ponds, and PG&E lines.
- Shortest alignment through marsh in the southern reach and longer alignment along SR-92 to tie back to higher ground.



### #2: DOWN THE MIDDLE

- Protects fewer infrastructure assets than #1 but protects a majority of the infrastructure assets along the shore, including the Wastewater Wet Weather Storage Ponds.
- PG&E lines, Oro Loma Wastewater Treatment Plant and sludge ponds are not protected by a FEMA certified levee.
- Longer alignment through marsh in the southern reach and shorter alignment along SR-92 to tie back to higher ground.

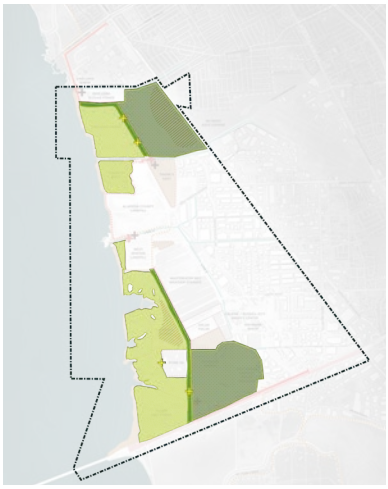


### #3: FURTHER INLAND

- Protects fewer infrastructure assets than #1 and #2.
- PG&E lines, Oro Loma Wastewater Treatment Plant and sludge ponds, and Wastewater Wet Weather Storage Ponds are not protected by a FEMA certified levee.
- LOP is furthest inland and closer to urban fabric.
- Longest alignment adjacent to marsh in the southern reach and shortest alignment along SR-92 to tie back to higher ground.

# TIDAL HABITAT

The future extent of tidal habitat encompasses tidal habitat and muted tidal habitat, which is a controlled system. The spatial extent of connective blocks of marsh and proportion of tidal versus muted tidal habitat varies amongst the three alternatives.

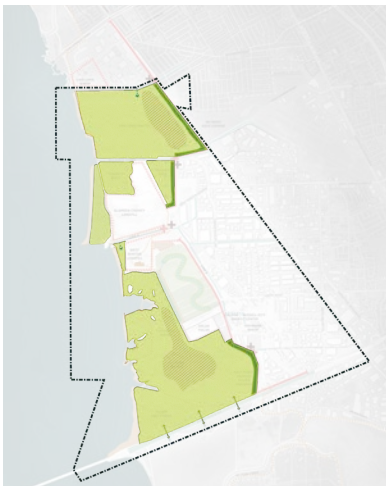


## #1: CLOSER TO THE BAY

- Negative impacts to existing tidal marsh. Tidal marsh is converted to muted tidal habitat, however muted tidal habitat has limited lifespan with greater rates of SLR.
- Creates the least amount of new tidal habitat.
- Remaining tidal habitat likely to require active management /sediment nourishment over time.
- Some tidal habitat created in the middle reach.
- Protects the most amount of shoreline infrastructure assets-wet weather storage ponds. Wastewater Wet Weather Storage Ponds are protected. Shortest alignment through marsh / longer alignment along SR-92.

## #2: DOWN THE MIDDLE

- Maintains existing location of tidal habitat.
- Maintains and expands muted tidal habitat. Muted tidal habitat has limited lifespan with greater rates of SLR.
- Tidal habitat likely to require active management/ sediment nourishment over time.

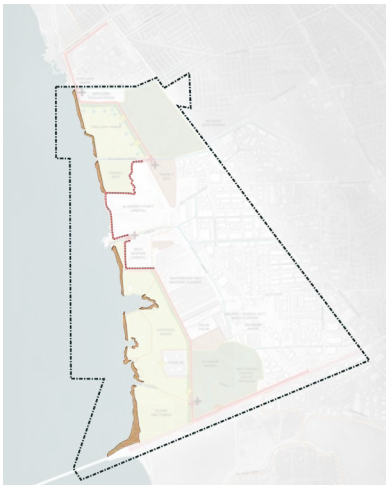


## #3: FURTHER INLAND

- Maintains existing location of tidal habitat.
- Creates the most amount of new tidal habitat.
- Maintains no muted tidal habitat.
- Tidal habitat likely to require active management/ sediment nourishment over time.

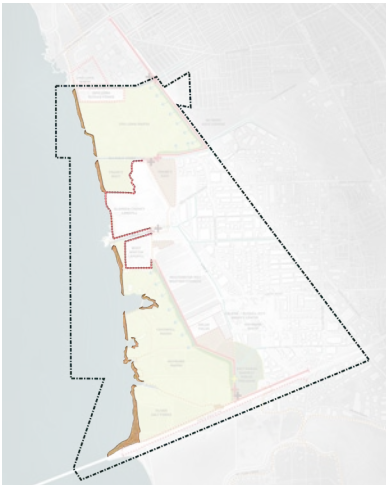
# EROSION CONTROL

A layered strategy of erosion control aims to reduce the risk of erosion and shelter inland marshes and ecosystems. Gravel beaches attenuate waves and provide shorebird nesting habitat and revetments provide a more conservative approach to edge stabilization for critical infrastructure.



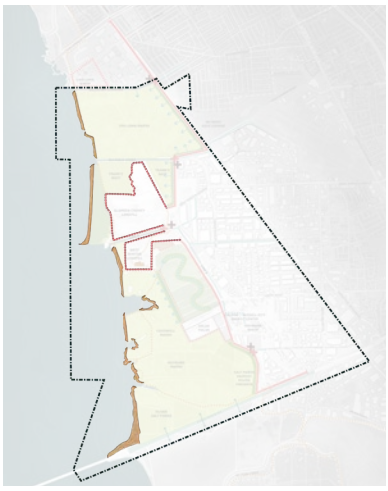
## #1: CLOSER TO THE BAY

- Minimized erosion protection and subsurface cutoff along landfill edges with tide gate closer to the Bay.



## #2: DOWN THE MIDDLE

- More erosion protection and subsurface cutoff than #1 along landfill edges with tide gate further inland.

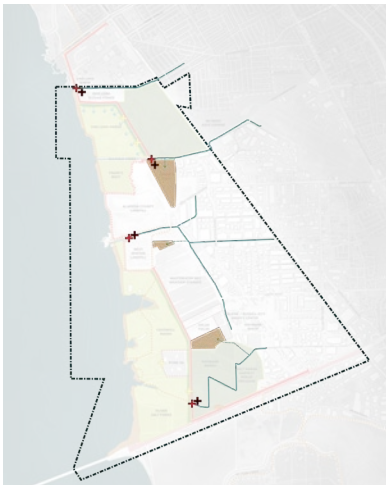


## #3: FURTHER INLAND

- Greatest extent of erosion protection and subsurface cutoff along landfill edges.
- Greatest extent of gravel beaches.
- Gravel beach outboard of fringe marsh restoration adds a layer of erosion protection for the Alameda County Landfill.

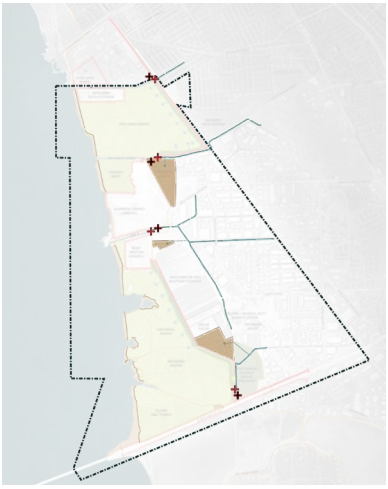
# STORMWATER MANAGEMENT

Once a line of protection is established, the stormwater and groundwater management inland of the levee system is critical, especially with increased precipitation events and to mitigate impacts of any bathtub effects that are created. A system of storage ponds, tide gates and water control structures, and flood control channels is used to manage stormwater and move it away from inland communities.



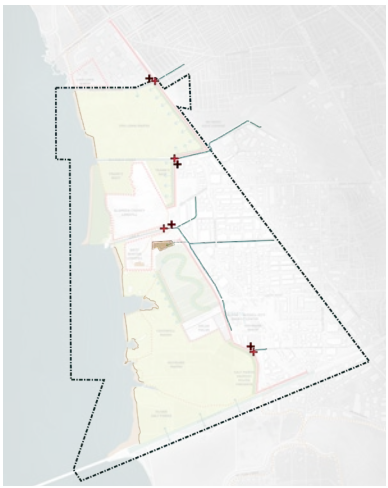
## #1: CLOSER TO THE BAY

- Greatest amount of stormwater detention capacity, which provides cost savings with reduced capacity of the pump stations. Also increases redundancy and creates a less vulnerable system for flood control.
- Potential to use the back half of Oro Loma Marsh for stormwater detention from Bockman Channel and Sulphur Creek
- Stormwater storage space isn't directly adjacent to flood control channels in the southern reach.
- Potential to use muted marsh in the southern reach for detention.
- Stormwater detention at Frank's East reduces burden on the Sulphur Creek pump station.



## #2: DOWN THE MIDDLE

- Stormwater detention provides cost savings with reduced capacity of the pump stations. Also increases redundancy and creates a less vulnerable system for flood control.
- Stormwater detention in the southern reach isn't directly adjacent to flood control channels.
- Potential to use muted marsh in the southern reach for detention.
- Stormwater detention at Frank's East reduces burden on the Sulphur Creek pump station.

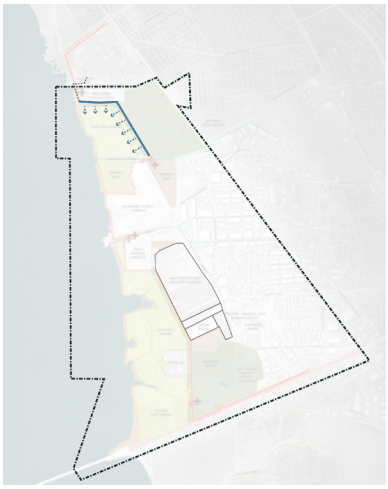


## #3: FURTHER INLAND

- No stormwater detention space, which presents flood control challenges.
- No stormwater detention space increases burden on all pump stations, which are vulnerable to power outages.

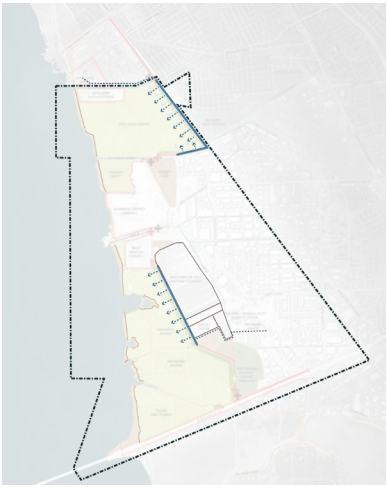
# WASTEWATER TREATMENT

The critical uses of wastewater treatment are maintained or enhanced with new multi-benefit infrastructure. Horizontal levees align with the First Mile project and possible future needs for local discharge.



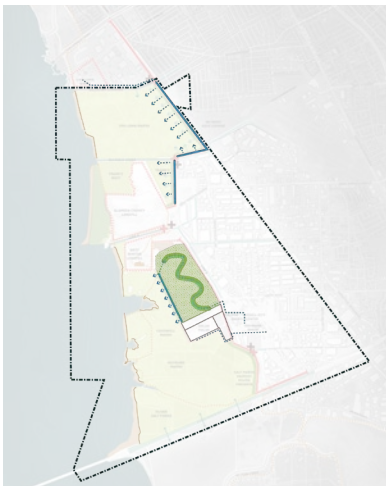
## #1: CLOSER TO THE BAY

- Horizontal levee in Oro Loma Marsh provides potential for effluent discharge from Oro Loma WWTP. This location is further away from the recycled water pipeline that would be utilized for wastewater effluent.
- Maintains full capacity of the Wastewater Wet Weather Storage ponds.
- No horizontal levee for Hayward WPCF.



## #2: DOWN THE MIDDLE

- Horizontal levee in Oro Loma Marsh provides potential for effluent discharge from Oro Loma WWTP. This location is also adjacent to the recycled water pipeline that would be utilized for wastewater effluent.
- Ecotone levee decreases capacity of the Wastewater Wet Weather Storage ponds.
- No horizontal levee for Hayward WPCF.

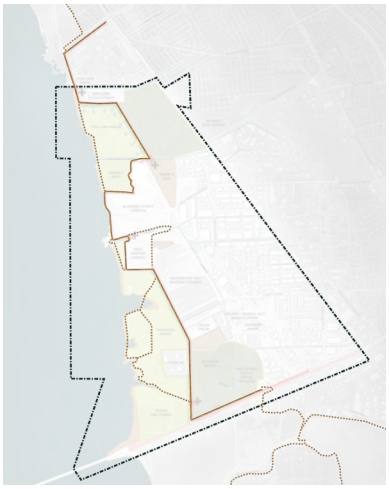


## #3: FURTHER INLAND

- Horizontal levee in Oro Loma Marsh provides potential for effluent discharge from Oro Loma WWTP. This location is also adjacent to the recycled water pipeline that would be utilized for wastewater effluent.
- A treatment wetland for Hayward WPCF treats flow that is not treated by the nutrient removal plant upgrades.
- Broad support for Horizontal levee & Freshwater Treatment Marsh for Hayward WPCF effluent discharge.

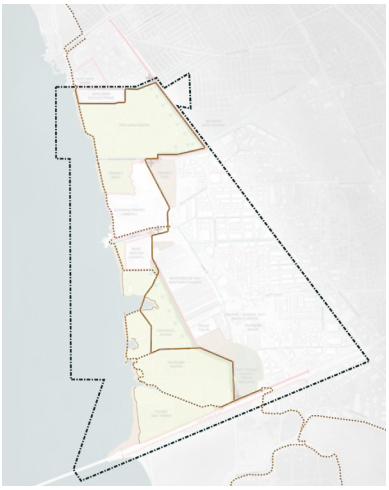
# BAY TRAIL

The future location of the Bay Trail prioritizes the blue water experience where possible, maintains a variety of experiences, and aligns with new infrastructure improvements. For all three alternatives, the current alignment of the Bay Trail will be maintained as long as possible (until it is inundated with sea level rise) and connect to the realignment.



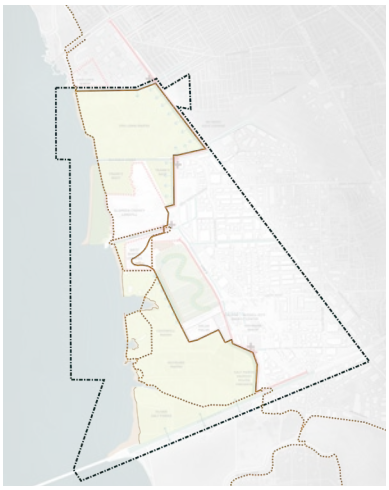
## #1: CLOSER TO THE BAY

- Closest to the existing Bay's edge.
- Traverses tidal and muted tidal habitats.
- Maintains a direct link to the Hayward Shoreline Interpretive Center.



## #2: DOWN THE MIDDLE

- Bay Trail pulls further back from the existing Bay's edge than #1.
- Requires levee raising to connect to existing alignment by Oro Loma WWTP.
- Proximity to the rail corridor is not favorable.
- Aligns through Cogswell Marsh on a pile supported structure to maintain a diversity of experiences- increases costs but removes the trail from wastewater uses.
- Aligns to the east of the two landfills, which completely disconnects trail users from blue water or Bay habitat.
- Maintains a spur link to the Hayward Shoreline Interpretive Center. which is not favorable.

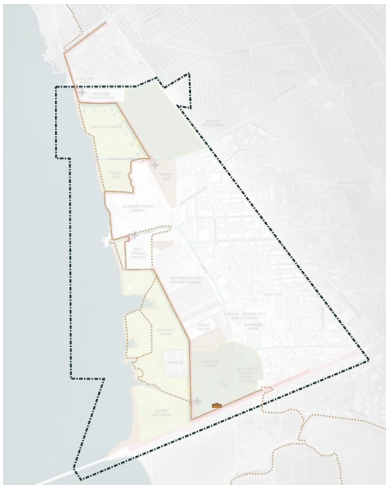


## #3: FURTHER INLAND

- Bay Trail pulls the furthest back from the existing Bay's edge.
- Requires levee raising to connect to existing alignment by Oro Loma WWTP.
- Proximity to the rail corridor is not favorable.
- Aligns on top of the landfill for expansive views.
- Aligns along Bay tidal habitat but is close to industrial edge near Frank's East.
- Maintains a direct link to the Hayward Shoreline Interpretive Center.

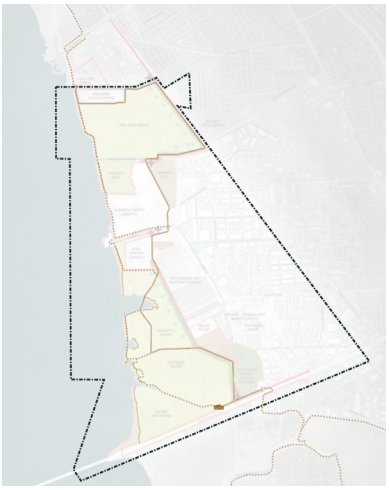
# HAYWARD SHORELINE INTERPRETIVE CENTER

The future of the Hayward Shoreline Interpretive Center is connected to new infrastructure improvements. A variety of options are explored to retrofit the center in place and  locate the center in proximity to new educational opportunities. All three alternatives maintain a link to the Bay Trail.



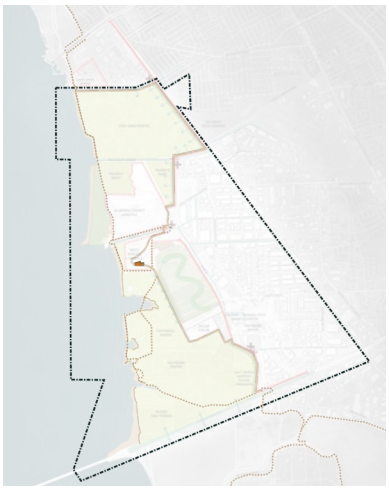
## #1: CLOSER TO THE BAY

- Interpretive Center is protected in place, but would likely require structure upgrades in the planning time frame of this project.
- Proximity to future educational opportunities / new pilot projects (e.g. portion of an ecotone levee).



## #2: DOWN THE MIDDLE

- Interpretive Center is retrofitted in place yet still vulnerable to wave action. Access is a concern and this alternate would require road raising.
- A floating education center was not reccomended based on the site conditions. It may be cost prohibitive to construct given the site constraints. Additionally, permits may be hard to get given the BCDC requirements (a floating barge would be considered as fill). One of the main benefits of a floating center is its ability to move to different locations, but given the very shallow water and mudflats along the Shoreline, a floating building on the Hayward Regional Shoreline would not have enough depth to move to other locations. Since there is a large range of tidal fluctuation along the shoreline, the building would likely get stuck in the mud during daily tides, which would make it increasingly vulnerable to daily flooding and storm surge.
- Proximity to future educational opportunities / new pilot projects (e.g. portion of an ecotone levee).



## #3: FURTHER INLAND

- Interpretive Center is relocated to the landfill where it is protected from flooding.
- Less visibility than immediate adjacency to SR-92.
- Provides expansive Bay views of new restoration projects.
- Proximity to future educational opportunities / new pilot projects (e.g. portion of an ecotone levee).

# STAKEHOLDER FEEDBACK SUMMARY

## KEY TAKEAWAYS

**EBRPD (East Bay Regional Park District)**

- Strong emphasis on marsh nourishment and protection.
- Highlight the utilization of nature-based solutions in the Preferred Alternative, continued preservation of the Bay Trail, and maintaining public access.

**COH (City of Hayward) / PUBLIC WORKS**

- Preference for Alt 1 to completely protect Wet Weather Storage Ponds.
- No support for the use of Skywest Golf Course for surface/subsurface stormwater detention.

**HARD (Hayward Area Recreation and Park District)**

- Interest in phasing and how projects will be managed by different agencies. Priorities are protecting habitat and maintaining recreation opportunities (Bay Trail and Interpretive Center).
- Support for Interpretive Center relocating to the landfill and San Lorenzo Community Park is a recreational asset to be protected.

**SFEI (San Francisco Estuary Institute)**

- Ecologically, fully tidal marshes are preferable over muted tidal- they support more species and provide more ecosystem services. Prioritize sediment placement.
- Provide a gradient of habitat types on both sides of the levee (tidal marsh-muted marsh-upland-seasonal wetland).

**ACMAD (Alameda County Mosquito Abatement District)**

- Largest concern is access by foot or truck. Prefer Alt 1 / Southern End of Alt 2.
- Vegetation selection and long-term maintenance plans/funding are key.

**BAY TRAIL**

- Prefers Alt 1- maintains a Bay and Blue Water experience.
- Likes bridge structures and the Interpretive Center along the Bay Trail, not a spur.

**CALTRANS**

- Hydraulics office prefers a causeway for SR-92 to ensure the road is out of the flood zone and no concern over road drainage backing up.
- Raising in place will widen embankment footprint and may impact bridge touchdown.

**EBDA (East Bay Dischargers Authority) / ORO LOMA / SFEP (San Francisco Estuary Partnership)**

- Recycled water pipeline along the rail corridor to tap into for the wastewater source. EBDA pipeline will likely not be decommissioned, but repurposed for another use.
- EBDA likes Alt 3 for Hayward area- horizontal levee and freshwater treatment marsh (wet weather storage in the winter).

**BCDC (San Francisco Bay Conservation and Development Commission)**

- Alt 1 will be difficult to permit- preference for a hybrid between Alt 2 and Alt 3.
- Design for flexibility over time- increase levee elevation over time, be adaptable in the future.

**SBSP (South Bay Salt Pond Restoration Project)**

- Stormwater management is a big consideration. Avoid NOLA situation. Bay ecosystems are used to fluctuating stormwater.
- Get in front of regulators early and follow their recommendations- will make permitting and implementation a lot easier later.

**CDFW (California Department of Fish and Wildlife)**

- Think about transition zone on the inboard side of the levees- break wave run-up and provide habitat.
- Concern over hydrological connectivity south of SR-92 broad picture may impact hydrological flows and habitat restoration and flood infrastructure.

**ACFCD (Alameda County Flood Control District)**

- Concern over levee tie-backs and pushing water to other people.
- May not be enough area for detention for the pump stations to accommodate all of the flow.

**USFWS (United States Fish and Wildlife Service)**

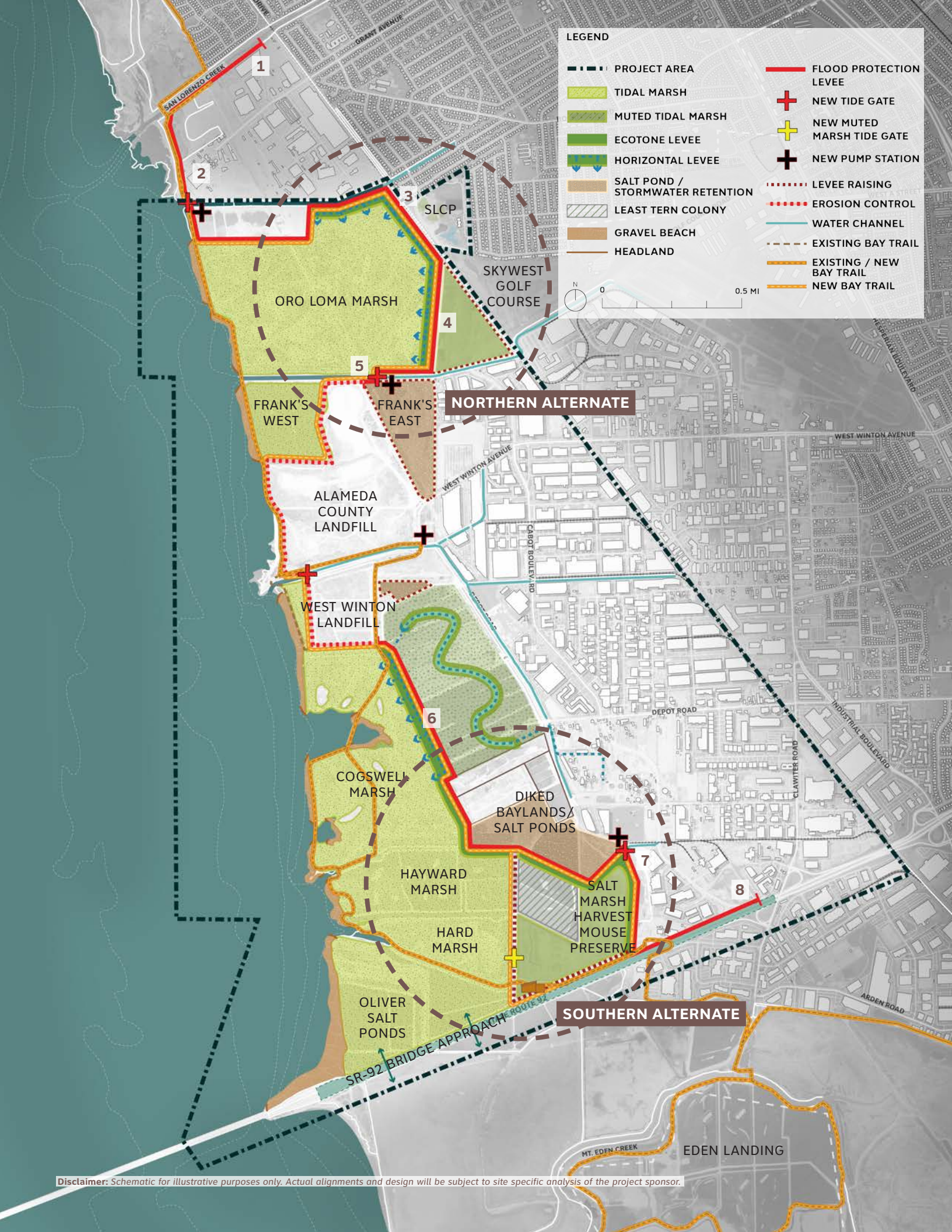
- Alt 1 raises the most concern from bisecting existing marshes in half. Preference for Alt 2 or 3, at face value.
- USFWS involvement is typically triggered under the Federal Endangered Species Act or Fish and Wildlife Coordination Act

**USACE (United States Army Corps of Engineers)**

- Look at overall impacts of projects- be adaptable to future permitting context.
- Alt #1 is most challenging from a regulatory perspective. USACE prefers the max area and function for waters of the US.

# A VISION FOR SHORELINE ADAPTATION: THE HAYWARD REGIONAL SHORELINE

**This chapter introduces the Preferred Alternative and its various components. The hybrid Preferred Alternative was selected based upon client and stakeholder feedback and includes two alternates with embedded flexibility.**




**Disclaimer:** *Schematic for illustrative purposes only. Actual alignments and design will be subject to site specific analysis of the project sponsor.*

# PREFERRED ALTERNATIVE

## A COORDINATED VISION FOR THE HAYWARD REGIONAL SHORELINE

The Preferred Alternative balances risk reduction and ecological enhancement to foster a robust and layered system of shoreline adaptation. This hybrid configuration is based upon stakeholder feedback received during the Design Alternatives process.

In the north end of the project area, the line of protection ties into existing levees along San Lorenzo Creek (1) and wraps in front of Oro Loma Wastewater Treatment Plant (2) to protect it in place before crossing Bockman Channel with a new tide gate. It then pulls back along the Union Pacific Rail Corridor (3), then aligns through the southeastern corner of Oro Loma Marsh (4) before crossing Sulphur Creek with a new tide gate and tying back to high ground at the two existing landfills (5). It then follows the western extent of the Wet Weather Storage ponds to the south (6). The alignment pulls back in the southern portion of the site to wrap the back of the Salt Marsh Harvest Mouse Preserve (7), then ties back along a new levee along the access road for SR-92 (8).

A large extent of tidal habitat is enhanced outboard of the line of protection. Tidal marshes, existing and restored, would be monitored over time with an adaptive management plan that could use sediment augmentation to sustain healthy mudflat and marsh elevations in strategic areas. New tidal marsh is restored at Frank's West and Hayward Marsh. Vulnerable ecosystems, like the Oliver Salt Ponds, would also be restored to tidal marshes as sea levels rise and make perimeter levee maintenance less feasible.

A layered system of erosion control measures utilizes gravel beaches to reduce the risk of erosion to levees that shelter the marshes behind. Bayside levees and interior levees would be retained in place to provide additional layered protection for as long as they are feasible to maintain. Erosion protection and subsurface cutoff along the two landfills reduces the risk of erosion and seepage.

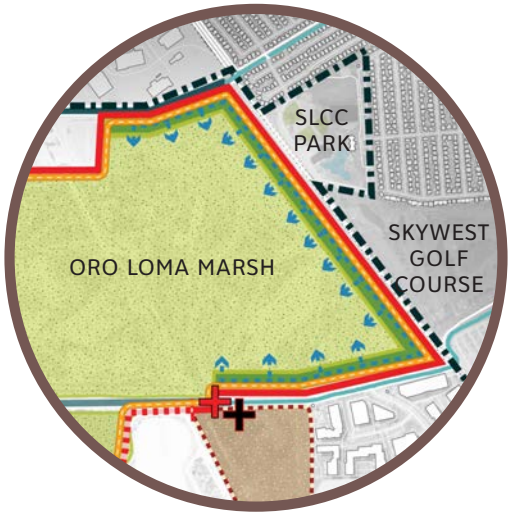
Inland detention ponds at Frank's East and the back portion of Oro Loma Marsh are utilized to hold stormwater before it is pumped to the Bay.

Critical wastewater treatment functions are maintained and enhanced at Oro Loma and Hayward Wastewater Treatment Plants with horizontal levees that outlet treated wastewater effluent across an ecotone slope. Hayward WPCF's existing functions are enhanced with a freshwater treatment marsh that provides nutrient removal and wet weather storage.

The Bay Trail is aligned to promote a diversity of experiences while reducing the risk of flooding.

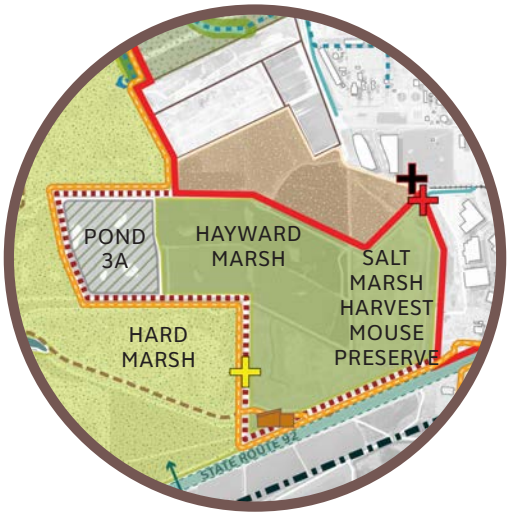
The Hayward Shoreline Interpretive Center is protected in place with interim levee raising and future adaptation could occur through the elevation of the building itself. Its location within a marsh maintains a direct connection to shoreline ecosystems. The San Lorenzo Community Park is also protected in place, but vulnerable to potential groundwater emergence.

Two alternate configurations are outlined below in two areas that may require additional flexibility to align with ongoing projects and permitting constraints.




**Northern Alternate**

- May be easier to permit since the LOP is outside of BCDC Jurisdiction but more expensive due to lack of stormwater storage capacity

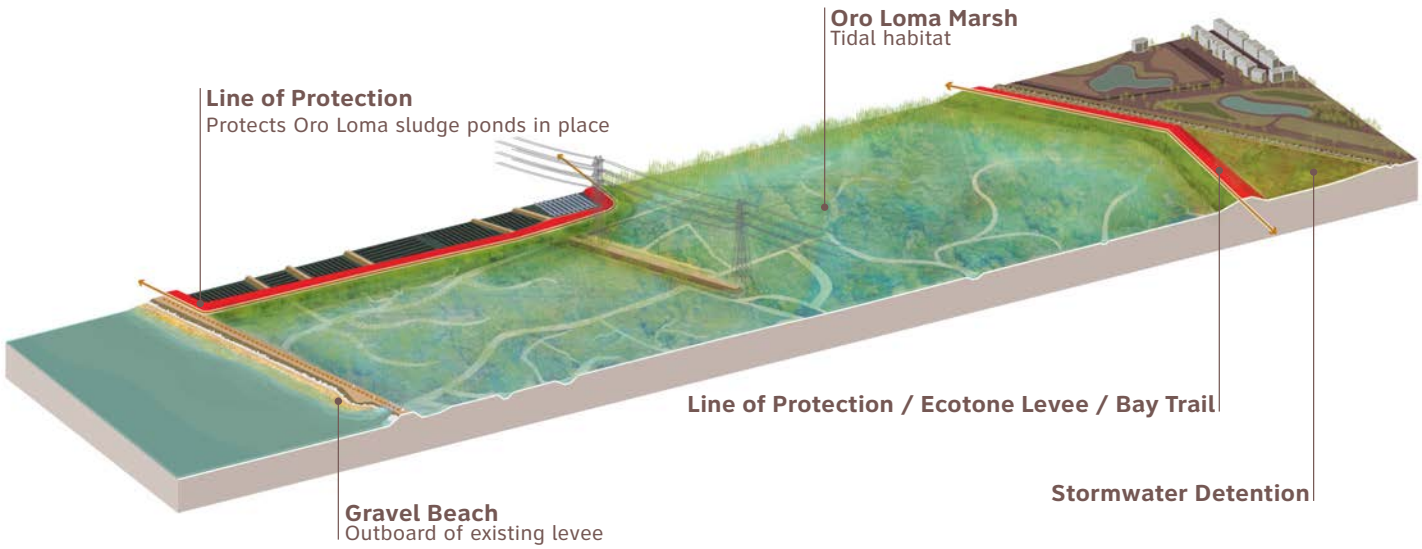



**Southern Alternate**

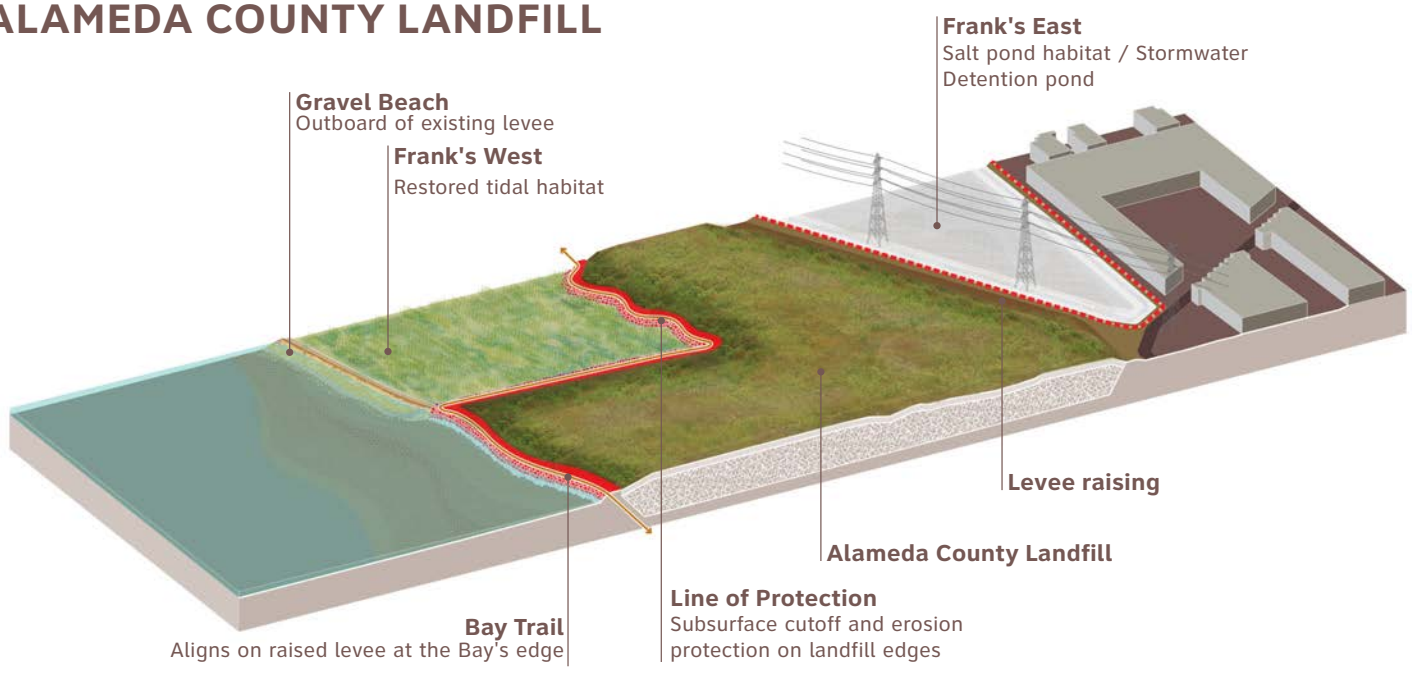
- Levee raising goes around Pond 3A (least tern nesting colony)

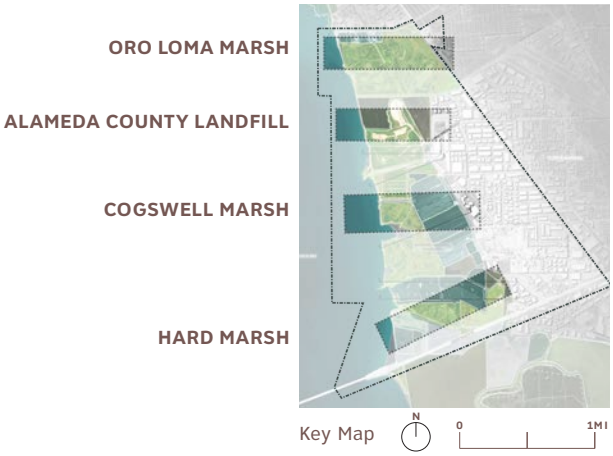
# PREFERRED ALTERNATIVE VISUALIZATIONS

## ORO LOMA MARSH

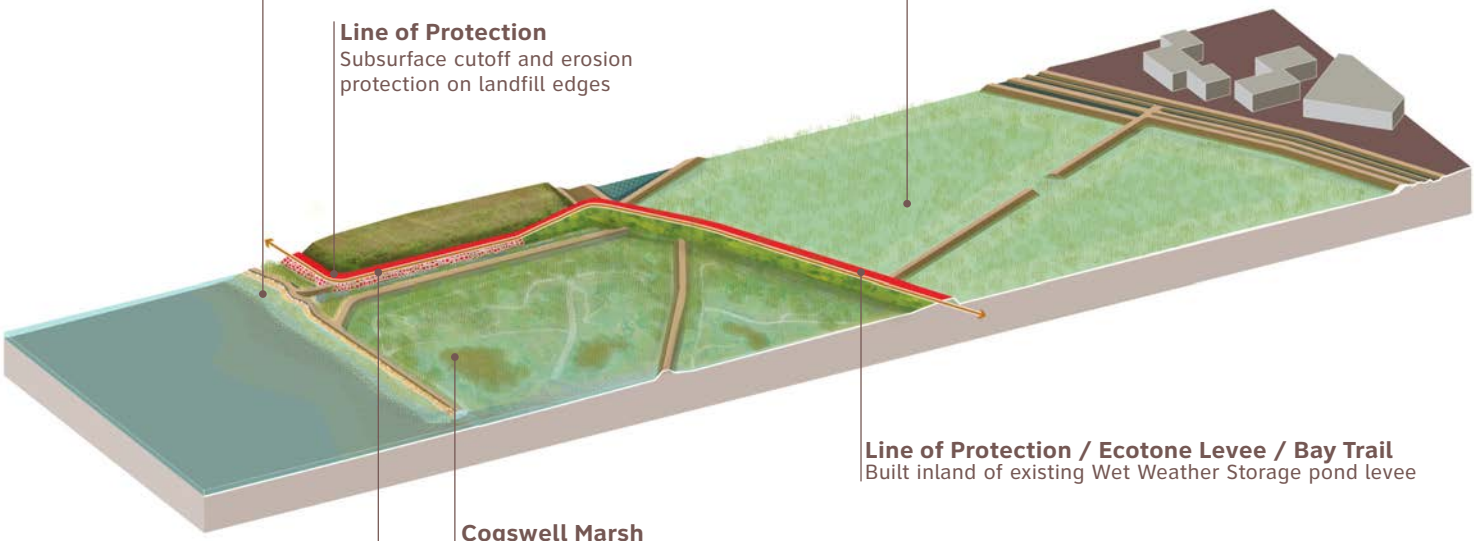



## ALAMEDA COUNTY LANDFILL

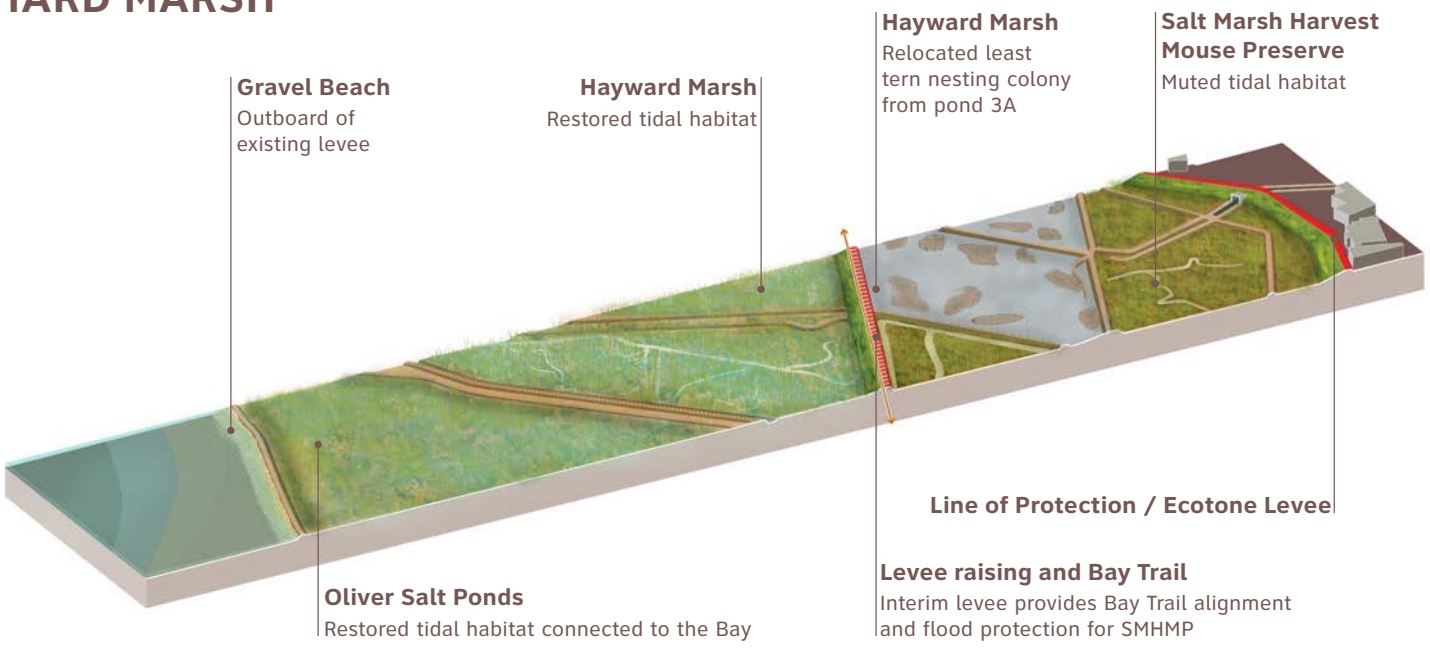


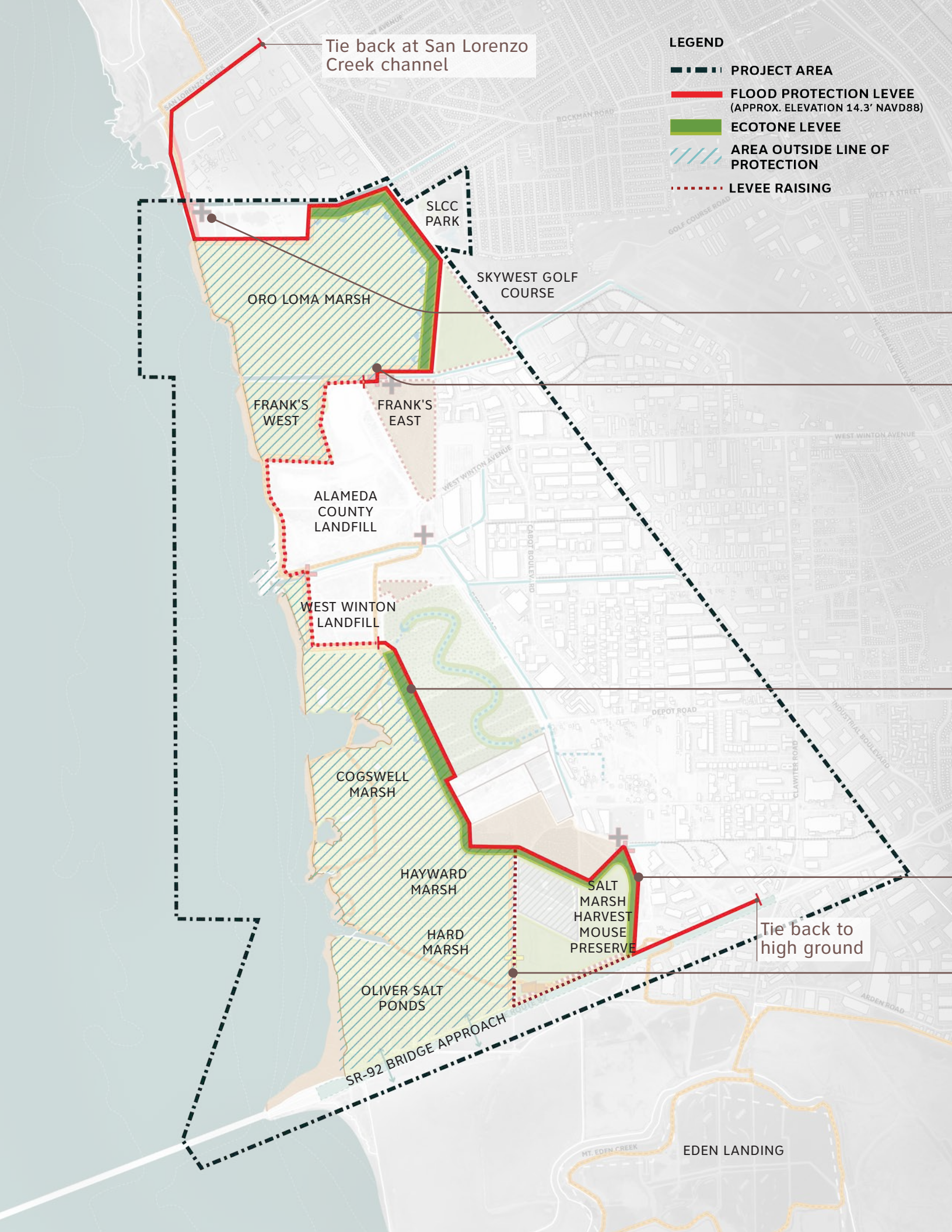



## COGSWELL MARSH




## HARD MARSH




Tie back at San Lorenzo Creek channel
LEGEND
PROJECT AREA
FLOOD PROTECTION LEVEE
(APPROX. ELEVATION 14.3' NAVD88)
ECOTONE LEVEE
AREA OUTSIDE LINE OF PROTECTION
LEVEE RAISING
SLCC PARK
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD MARSH
HARD MARSH
OLIVER SALT PONDS
SALT MARSH HARVEST MOUSE PRESERVE
Tie back to high ground
SR-92 BRIDGE APPROACH
EDEN LANDING
BOCKMAN ROAD
WEST WINTON AVENUE
DEPOT ROAD
CLAWITER ROAD
INDUSTRIAL BOULEVARD
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

## LINE OF PROTECTION

The line of protection includes a FEMA-certified levee that will reduce risk to inland communities by buffering the shoreline to the impacts of sea level rise and storm surge. The spatial alignment of this levee has multiple implications on cost, maintenance, and the new flood protection infrastructure safeguards.

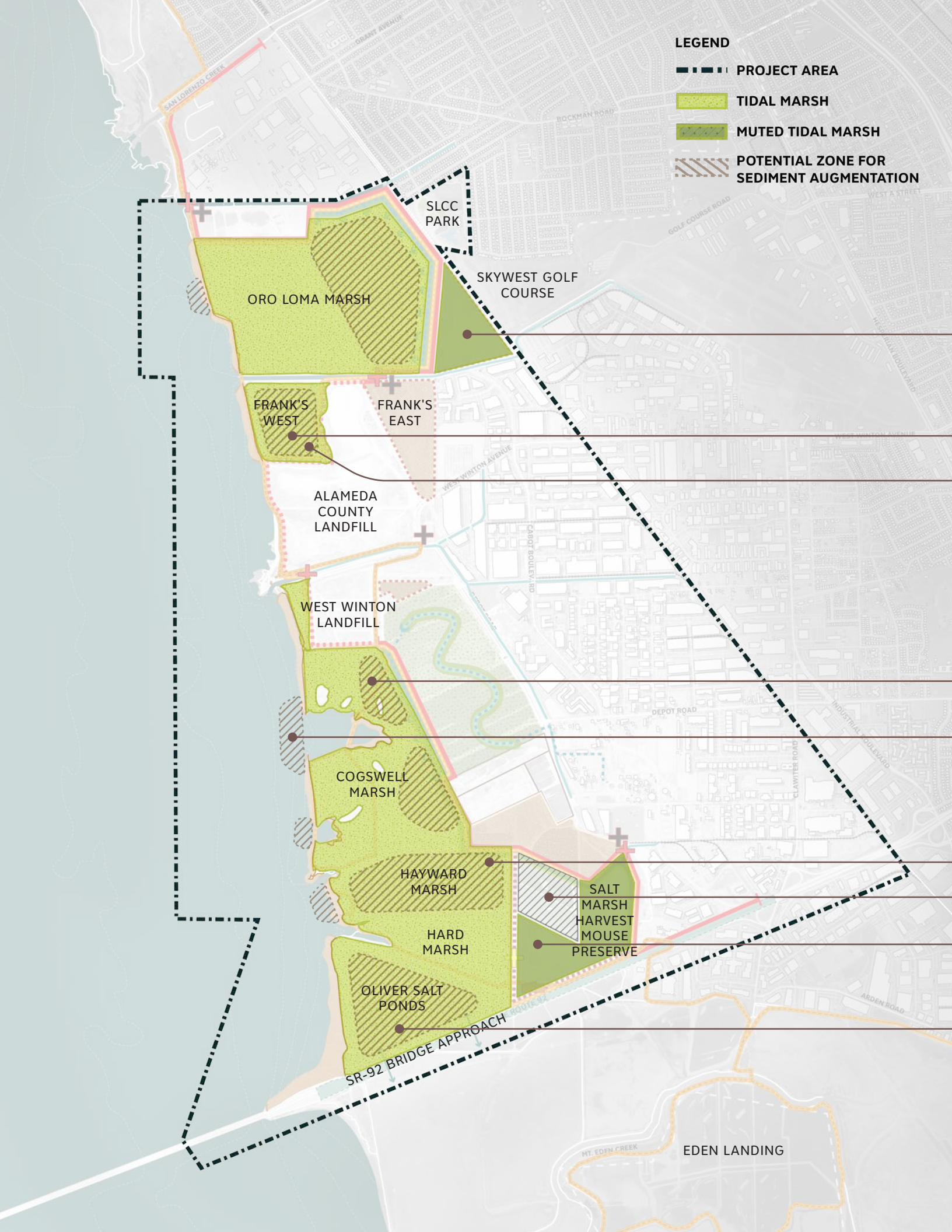
**LOP protects Oro Loma Wastewater Treatment Plant and sludge ponds in place**

**LOP and new tide gate to preserve breach into Oro Loma Marsh**

**LOP aligns to the west of the Wet Weather Storage Ponds**

**LOP aligns in the back of the SMHMP**

**Interim levee raising**


LEGEND
PROJECT AREA
TIDAL MARSH
MUTED TIDAL MARSH
POTENTIAL ZONE FOR SEDIMENT AUGMENTATION
SLCC PARK
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
HARD MARSH
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
EDEN LANDING
SAN LORENZO CREEK
GRANT AVENUE
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
WEST WINTON AVENUE
CARGO BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

## TIDAL HABITAT

The future extent of tidal habitat encompasses tidal habitat, which is open to Bay water flows, and muted tidal habitat, which is a controlled system inland of the line of the protection where water levels can be more carefully managed over time. Tidal marshes, existing and restored, would be monitored over time with an adaptive management plan that could use sediment augmentation to sustain healthy mudflat elevations in strategic areas.

Muted tidal habitat requires more active management inland of the line of protection, which will become increasingly difficult with rising sea levels and subsiding land.

**High ground in the back of Oro Loma Marsh becomes muted tidal and provides stormwater storage capacity**

**Tidal habitat created at Frank's West**

**Potential for sediment augmentation to lift diked ponds before tidal marsh restoration**

**Potential for sediment augmentation in the back of existing marshes to elevate the marsh plain to keep pace with SLR**

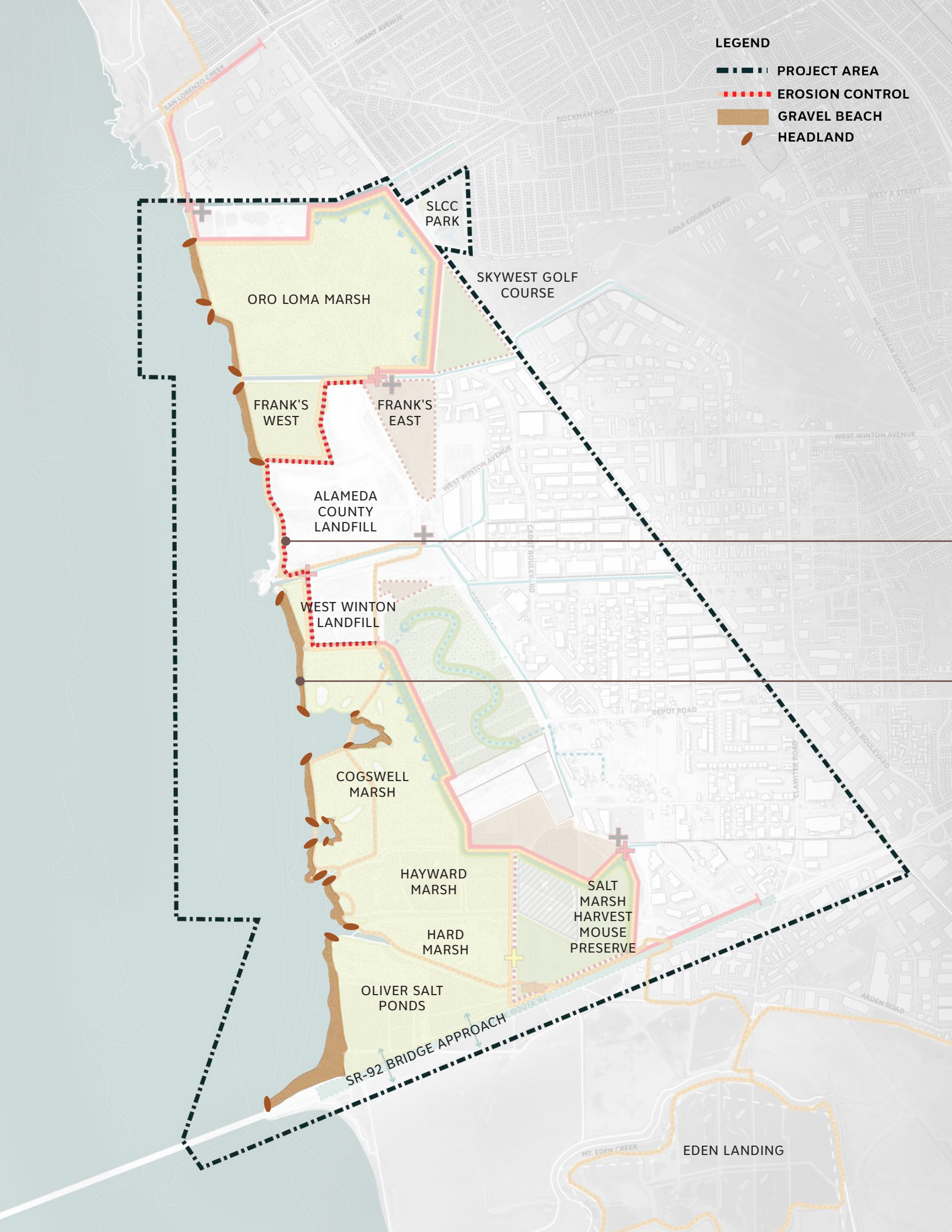
**Potential for sediment augmentation at marsh breaches**

**Tidal habitat created at Hayward Marsh by restoring the Hayward Marsh treatment ponds**

**Least Tern Colony is relocated within Hayward Marsh**

**Salt Marsh Harvest Mouse Preserve is maintained and expanded**

**Tidal habitat created at Oliver Salt Ponds**


LEGEND
PROJECT AREA
EROSION CONTROL
GRAVEL BEACH
HEADLAND
SLCC PARK
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD MARSH
HARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
EDEN LANDING
SAN LORENZO CREEK
GRANT AVENUE
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
HESPERIAN BOULEVARD
WEST WINTON AVENUE
CARLOS BEE BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ROUTE 92
ARDEN ROAD
MT. EDEN CREEK

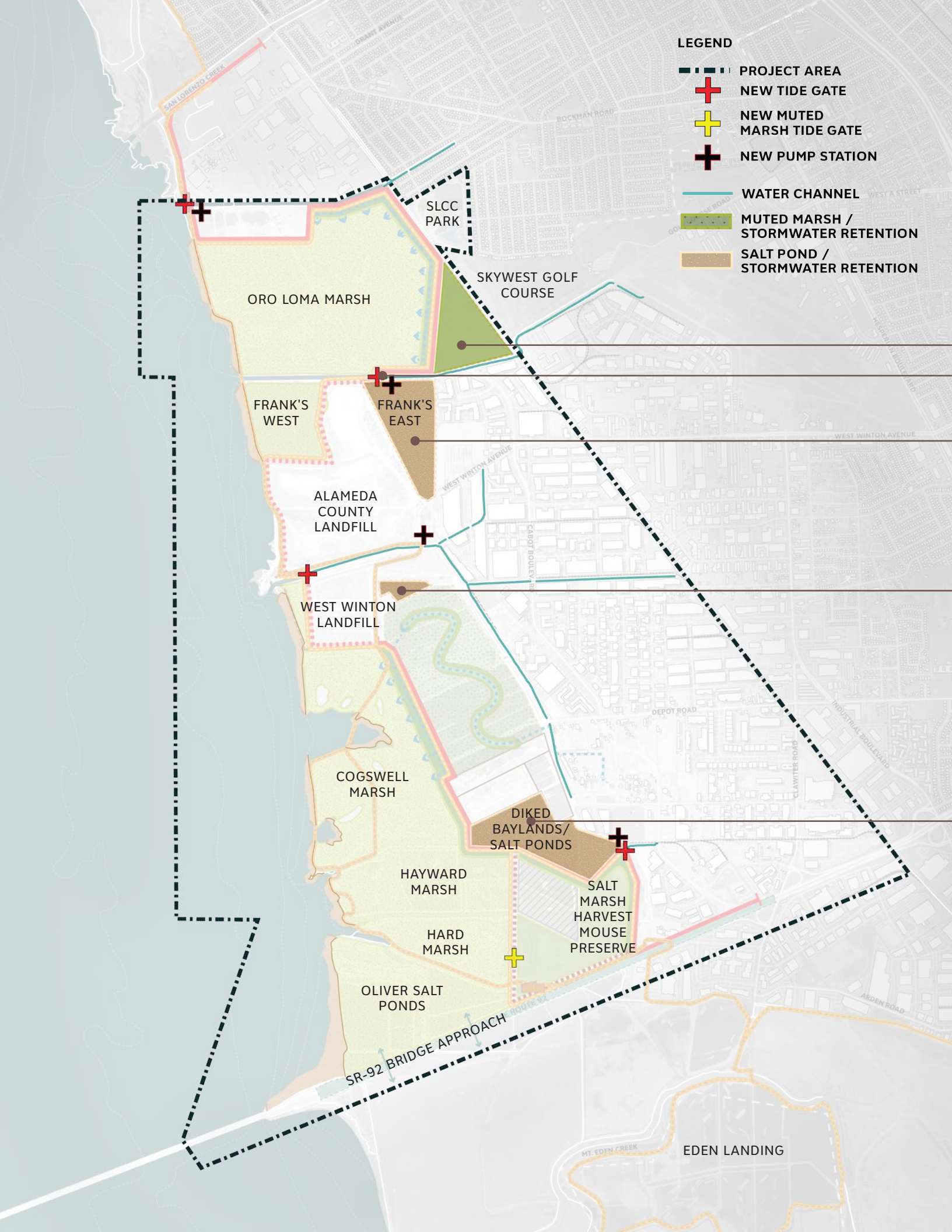
# PREFERRED ALTERNATIVE

## EROSION CONTROL

A layered strategy of erosion control aims to reduce the risk of erosion to the landfills, the Bay Trail and the marsh edge; and protect inland marshes and ecosystems. Gravel beaches attenuate waves and provide shorebird nesting habitat and revetments provide a more conservative approach to edge stabilization for critical infrastructure.

**Erosion protection and subsurface cutoff to maintain existing landfills**

**Gravel beaches in front of existing levees to increase erosion protection**


LEGEND
PROJECT AREA
NEW TIDE GATE
NEW MUTED MARSH TIDE GATE
NEW PUMP STATION
WATER CHANNEL
MUTED MARSH / STORMWATER RETENTION
SALT POND / STORMWATER RETENTION
SLCC PARK
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
DIKED BAYLANDS/ SALT PONDS
HAYWARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
HARD MARSH
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
EDEN LANDING
GRANT AVENUE
SAN LORENZO CREEK
BOCKMAN ROAD
WEST WINTON AVENUE
DEPOT ROAD
CLAWITER ROAD
INDUSTRIAL BOULEVARD
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

## STORMWATER MANAGEMENT

Once a line of protection is established, the stormwater and groundwater management inland of the levee system is critical, especially with increased precipitation events and to mitigate impacts of any bathtub effects that are created. A system of detention ponds, tide gates and water control structures, and flood control channels are used to manage stormwater and move it away from inland communities.

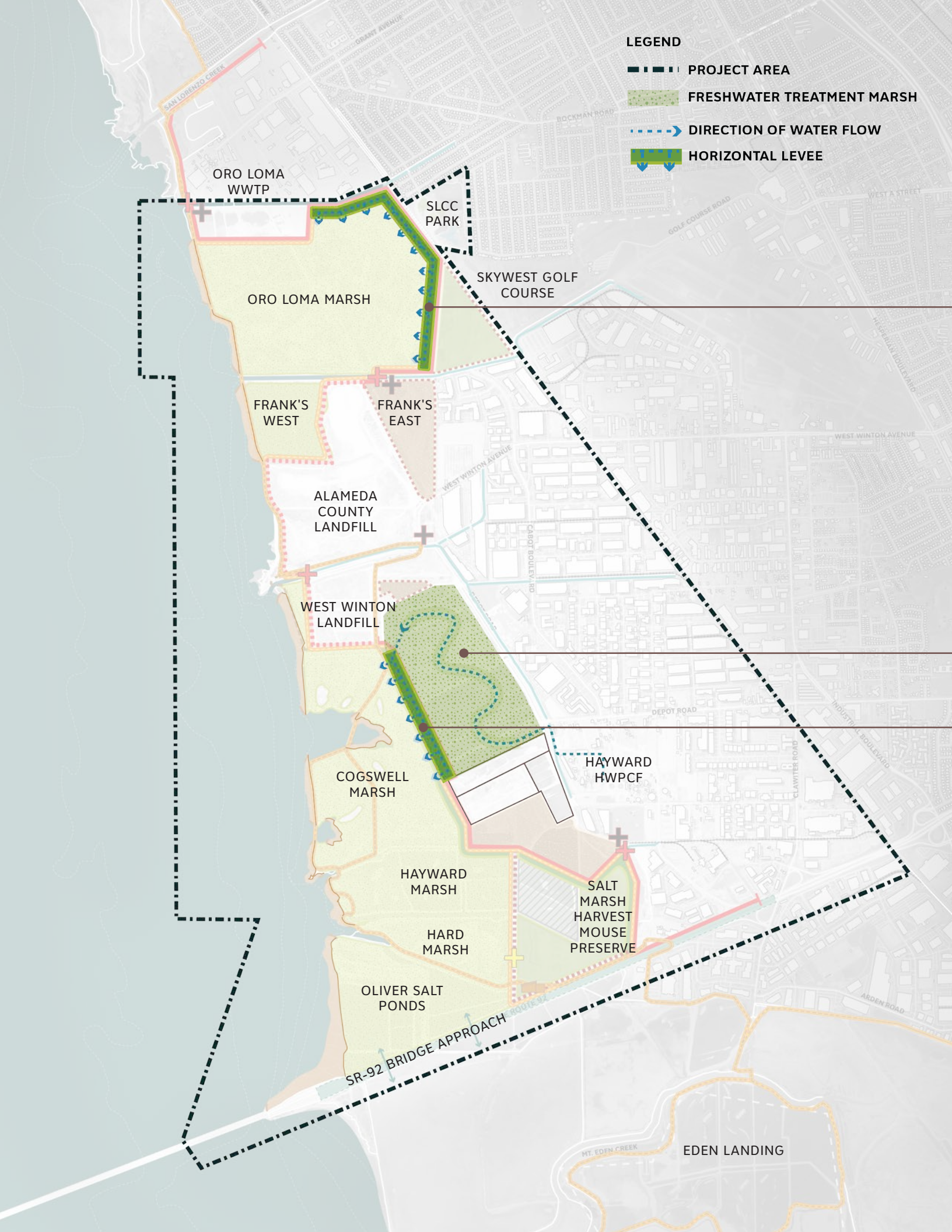
**Southeastern corner of Oro Loma Marsh provides stormwater detention for Sulphur Creek**

**Tide gate located inland of Oro Loma Marsh breach from Sulphur Creek**

**Salt Pond habitat / Stormwater Detention for Sulphur Creek**

**Salt Pond habitat / Stormwater Detention**

**Salt Pond habitat expanded**


LEGEND
PROJECT AREA
FRESHWATER TREATMENT MARSH
DIRECTION OF WATER FLOW
HORIZONTAL LEVEE
ORO LOMA WWTP
SLCC PARK
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD HWPCF
HAYWARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
HARD MARSH
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
EDEN LANDING
GRANT AVENUE
SAN LORENZO CREEK
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
HESPERIAN BOULEVARD
WEST WINTON AVENUE
CARGO BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ROUTE 92
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

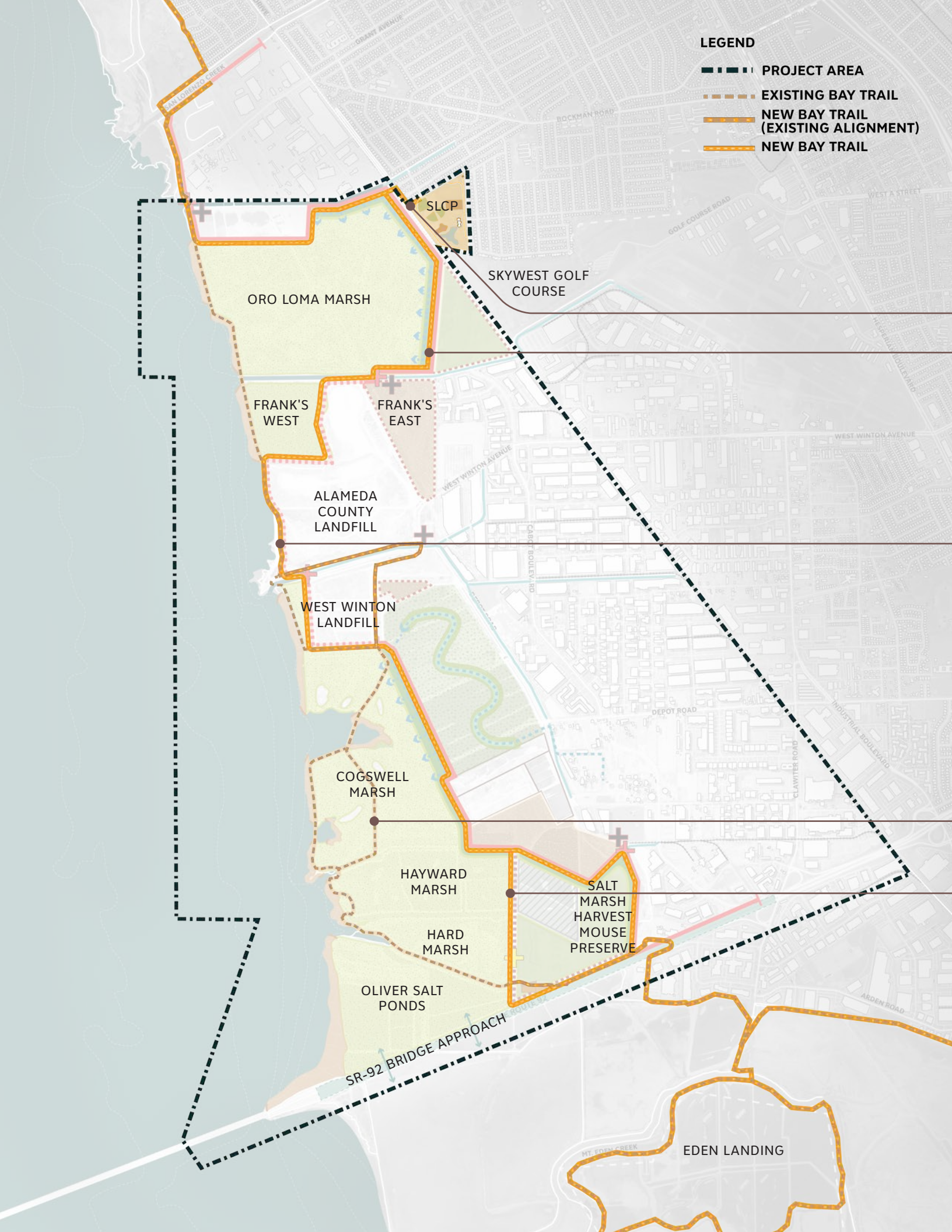
## WASTEWATER TREATMENT

The critical uses of wastewater treatment are maintained or enhanced with new multi-benefit infrastructure. Horizontal levees align with the First Mile project and possible future needs for local discharge.

**Horizontal levee for Oro Loma Wastewater Treatment Plant for treated wastewater effluent discharge**

**Freshwater treatment marsh for Hayward WPCF nutrient removal and wet weather storage**

**Horizontal levee for Hayward WPCF for treated wastewater effluent discharge**


LEGEND
PROJECT AREA
EXISTING BAY TRAIL
NEW BAY TRAIL (EXISTING ALIGNMENT)
NEW BAY TRAIL
SLCP
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD MARSH
HARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
EDEN LANDING
GRANT AVENUE
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
WEST WINTON AVENUE
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

## BAY TRAIL

The future location of the Bay Trail prioritizes the blue water experience where possible, maintains a variety of experiences, and aligns with new infrastructure improvements. The current alignment of the Bay Trail will be maintained as long as possible (until it is inundated with sea level rise) and connected to the realignment.

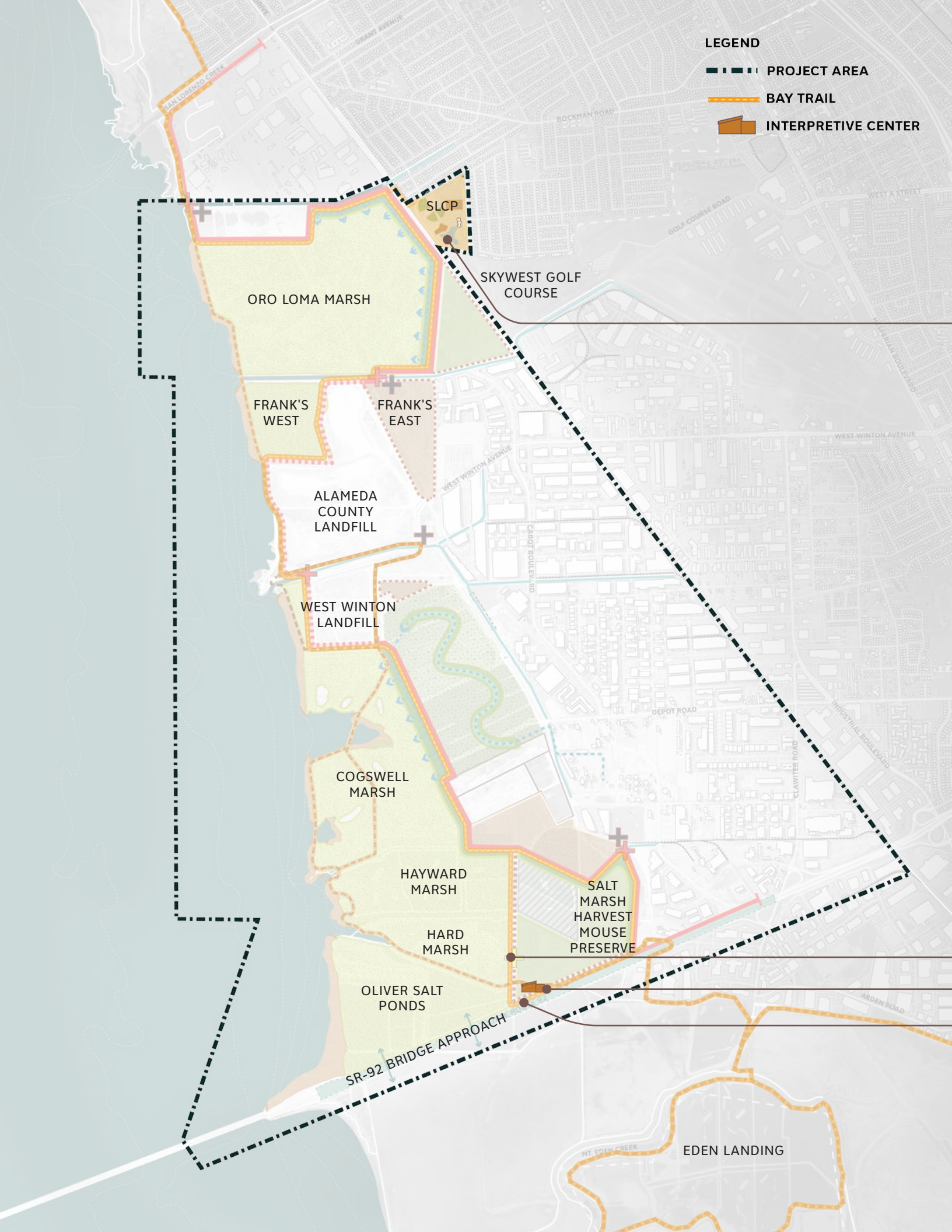
**Bay Trail connects to San Lorenzo Community Park**

**Bay Trail aligns away from the rail corridor**

**Bay Trail aligns on landfill erosion control infrastructure to maintain blue water experience**

**Existing alignment will be maintained as long as possible and connected to the realignment**

**Bay Trail aligns on raised levee and provides views to tidal and muted tidal marshes**


LEGEND
PROJECT AREA
BAY TRAIL
INTERPRETIVE CENTER
SLCP
SKYWEST GOLF COURSE
ORO LOMA MARSH
FRANK'S WEST
FRANK'S EAST
ALAMEDA COUNTY LANDFILL
WEST WINTON LANDFILL
COGSWELL MARSH
HAYWARD MARSH
HARD MARSH
SALT MARSH HARVEST MOUSE PRESERVE
OLIVER SALT PONDS
SR-92 BRIDGE APPROACH
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GOLF COURSE ROAD
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CABOT BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ARDEN ROAD
MT. EDEN CREEK

# PREFERRED ALTERNATIVE

## RECREATIONAL ASSETS

The future of Hayward Regional Shoreline's recreational assets are connected to new infrastructure improvements. The current Interpretive Center is retrofitted in place and located in proximity to new educational opportunities. A direct connection to to the Bay Trail is maintained. The San Lorenzo Community Park is protected in place, yet vulnerable to groundwater emergence.

**San Lorenzo Community Park is protected from sea level rise, but might be vulnerable to groundwater inundation. Educational programming opportunity.**

**Raised levee protects Interpretive Center in place short-term**

**Interpretive Center can be raised in place long-term**

**Maintains link to the Bay Trail**

# IMPLEMENTATION CONSIDERATIONS

**This chapter provides further details on how the Master Plan vision will be phased, funded, permitted, and managed over time in coordination with all associated stakeholders.**

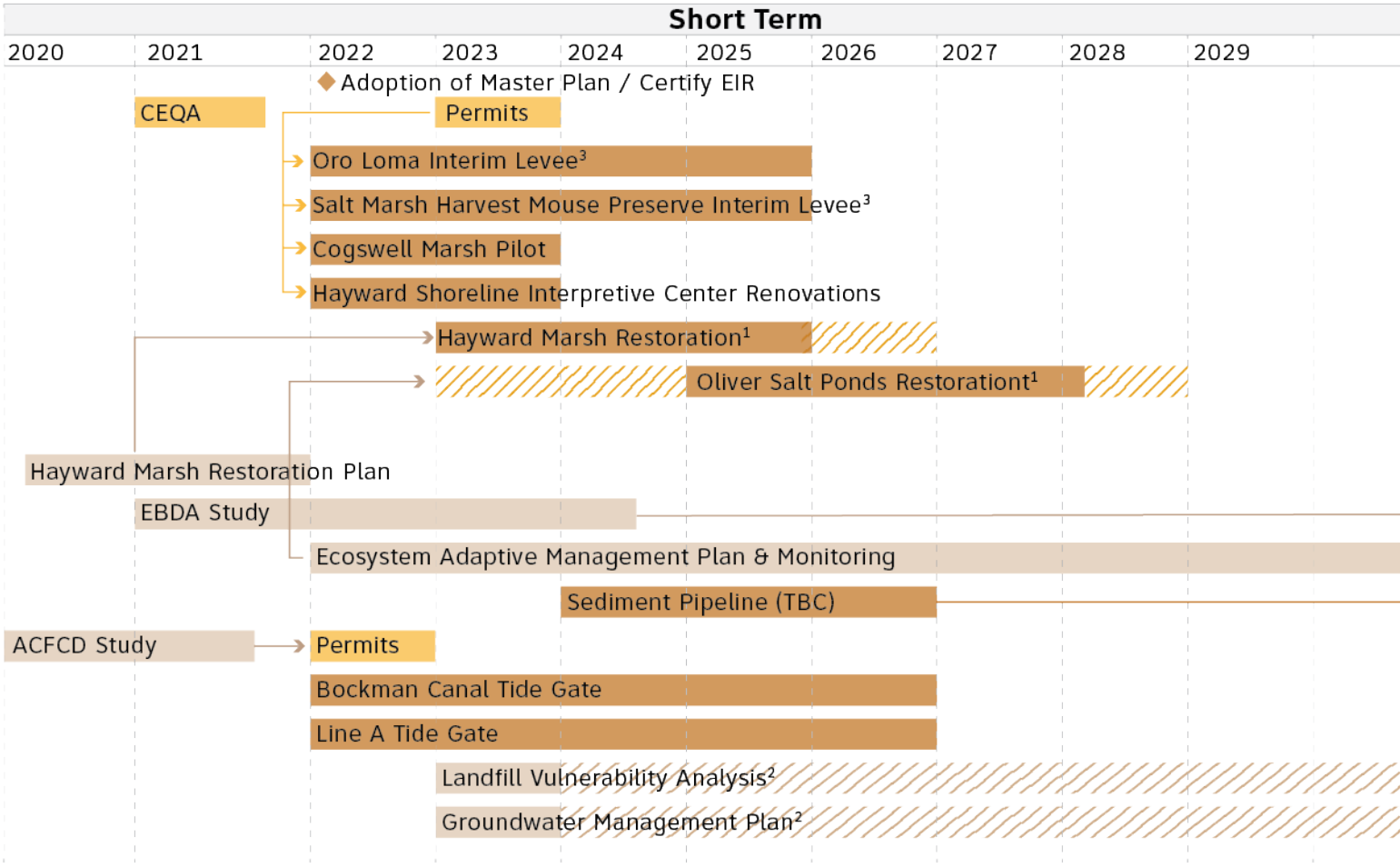
# PHASING PLAN

**This section breaks the Preferred Alternative down into discrete projects and provides a pathway towards implementation through different planning horizons.**

# PHASING STRATEGY

## IMPLEMENTATION SCHEDULE

The Preferred Alternative is a long-term vision that will be broken down into discrete projects that will be phased over time. The projects identified in the Phasing Plan are initial recommendations, based on guidance from the Project Team. The actual time frames for each project will need to be flexible to align with design, permitting, funding, and construction timelines on a project basis.



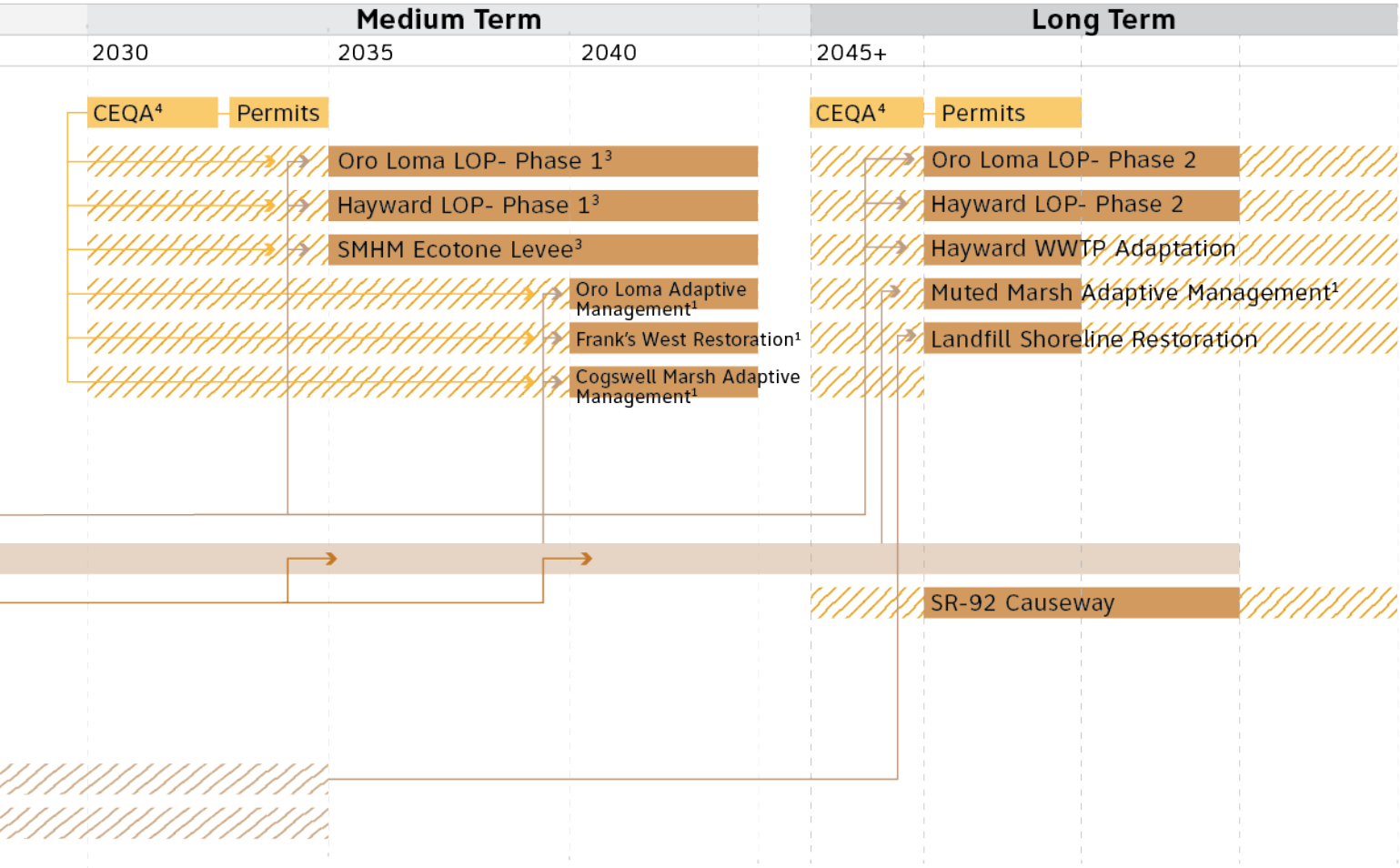

Legend

- Permitting
- Design & Construction
- Study, Monitoring

*Hatching represents timing flexibility, see foot notes for more information

Footnotes

[1] Timing dependent on rates of SLR, erosion and sediment accretion, to be monitored through this management plan
[2] Timing flexible, needed to inform medium and long term projects
[3] Timing could be staggered with aligned projects, depending on funding and permitting
[4] CEQA update dependent on changes in scope since EIR


Medium Term
Long Term
2030
2035
2040
2045+
CEQA[4]
Permits
CEQA[4]
Permits
Oro Loma LOP- Phase 1[3]
Hayward LOP- Phase 1[3]
SMHM Ecotone Levee[3]
Oro Loma Adaptive Management[1]
Frank's West Restoration[1]
Cogswell Marsh Adaptive Management[1]
Oro Loma LOP- Phase 2
Hayward LOP- Phase 2
Hayward WWTP Adaptation
Muted Marsh Adaptive Management[1]
Landfill Shoreline Restoration
SR-92 Causeway


1a
1b
1f
1c
1d
1f
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1f
SAN LORENZO CREEK
GRANT AVENUE
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
HESPERIAN BOULEVARD
WEST WINTON AVENUE
WEST WINTON AVENUE
CARROT BOULEVARD
DEPOT ROAD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
STATE ROUTE 92
ARDEN ROAD
MT. EDEN CREEK

# SHORT TERM PROJECTS

The projects identified in the short term are projected to be constructed in less than 10 years. This time frame and associated projects are an initial idea of how the phasing may work, based on the Project Team's recommendations. These projects and time frames will need to be flexible, since the ability to implement a project depends on multiple external factors, such as funding acquisition, permitting, and construction cycles.

The short-term projects give priority to ecological enhancements that align with existing efforts and vulnerable sites.

Pilot projects will provide valuable information to inform a larger scale application of strategies in the medium and long-term.

Setting up a monitoring protocol in the short-term will provide valuable information to analyze existing conditions to inform what sites and strategies should be prioritized as sea levels rise.

Strategies such as interim levee raising aim to reduce risk up to the existing 100-year storm.

**Projects shown on the map:**

1a. Oro Loma Interim Levee

- Bockman Channel Pump Station
- Levee in front of Oro Loma WWTP and Sludge Ponds to the rail corridor
- Levee Raising along San Lorenzo Creek
- New Bay Trail- Oro Loma WWTP Section

1b. Line A Tide Gate Improvement

1c. Cogswell Marsh Pilot

- Gravel Beaches
- Marsh Management and Sediment Placement

1d. Hayward Marsh Restoration

- Tidal Habitat Restoration
- Muted Tidal Habitat Restoration
- Marsh Management and Sediment Placement
- Least Tern Colony Relocation
- Gravel Beach

1e. Salt Marsh Harvest Mouse Preserve Interim Levee

1f. Oliver Salt Ponds Restoration / Salinas Swap

- Gravel Beaches
- Sediment Placement
- Tidal Habitat Restoration
- Salinas habitat north of Hayward Marsh and near West Winton Landfill

**Projects not shown on the map:**

1g. Landfill Vulnerability Assessment

1h. Groundwater Management Plan

1i. Stormwater Management Study

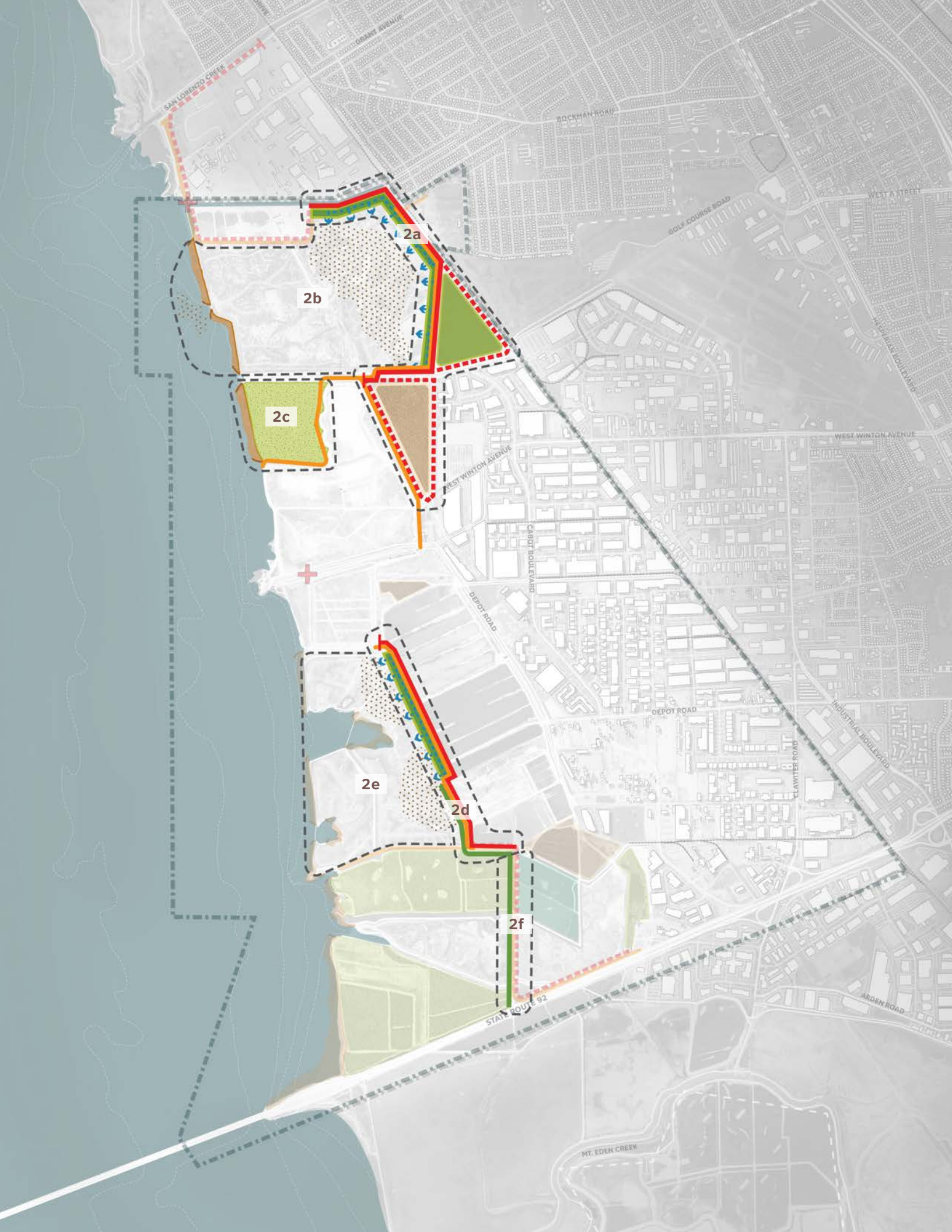
1j. EBDA Study

1k. Ecosystem Adaptive Management & Monitoring

1l. Hayward Shoreline Interpretive Center Renovation

1m. Sediment Pipeline

1n. CEQA


2a
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SAN LORENZO CREEK
GRANT AVENUE
BOCKMAN ROAD
WEST A STREET
GOLF COURSE ROAD
HESPERIAN BOULEVARD
WEST WINTON AVENUE
CARLOF BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
STATE ROUTE 92
ARDEN ROAD
MT. EDEN CREEK

# MEDIUM TERM PROJECTS

The projects identified in the medium term are projected to be constructed in 10-25 years. This time frame and associated projects are an initial idea of how the phasing may work, based on the Project Team's recommendations. These projects and time frames will need to be flexible, since the ability to implement a project depends on multiple external factors, such as funding acquisition, permitting, and construction cycles.

The medium-term projects give priority to multi-benefit infrastructure and opportunities for stormwater management.

Tidal habitat adaptation to sea level rise is a crucial project in the medium-term. The rate of sea level rise and sediment accretion will provide data to inform what marshes will need artificial sediment application to keep pace with sea level rise.

Parts of the line of protection (LOP) are established to reduce risk up to 4' of sea level rise plus the 100-year storm. These discrete portions of levee provide independent utility to specific inland areas.

**Projects shown on the map:**

2a. Oro Loma LOP- Phase 1

- FEMA Certified Levee, designed to protect for 4' SLR plus 100-year storm
- Sulphur Creek tide gate and pump station
- Muted Tidal Habitat and Levee Raising
- Frank's East Salinas / Stormwater Detention
- First Mile Project Horizontal Levee
- New Bay Trail Section- back of Oro Loma Marsh

2b. Oro Loma Adaptive Management

- Gravel Beaches
- Marsh Management and Sediment Placement

2c. Frank's West Restoration

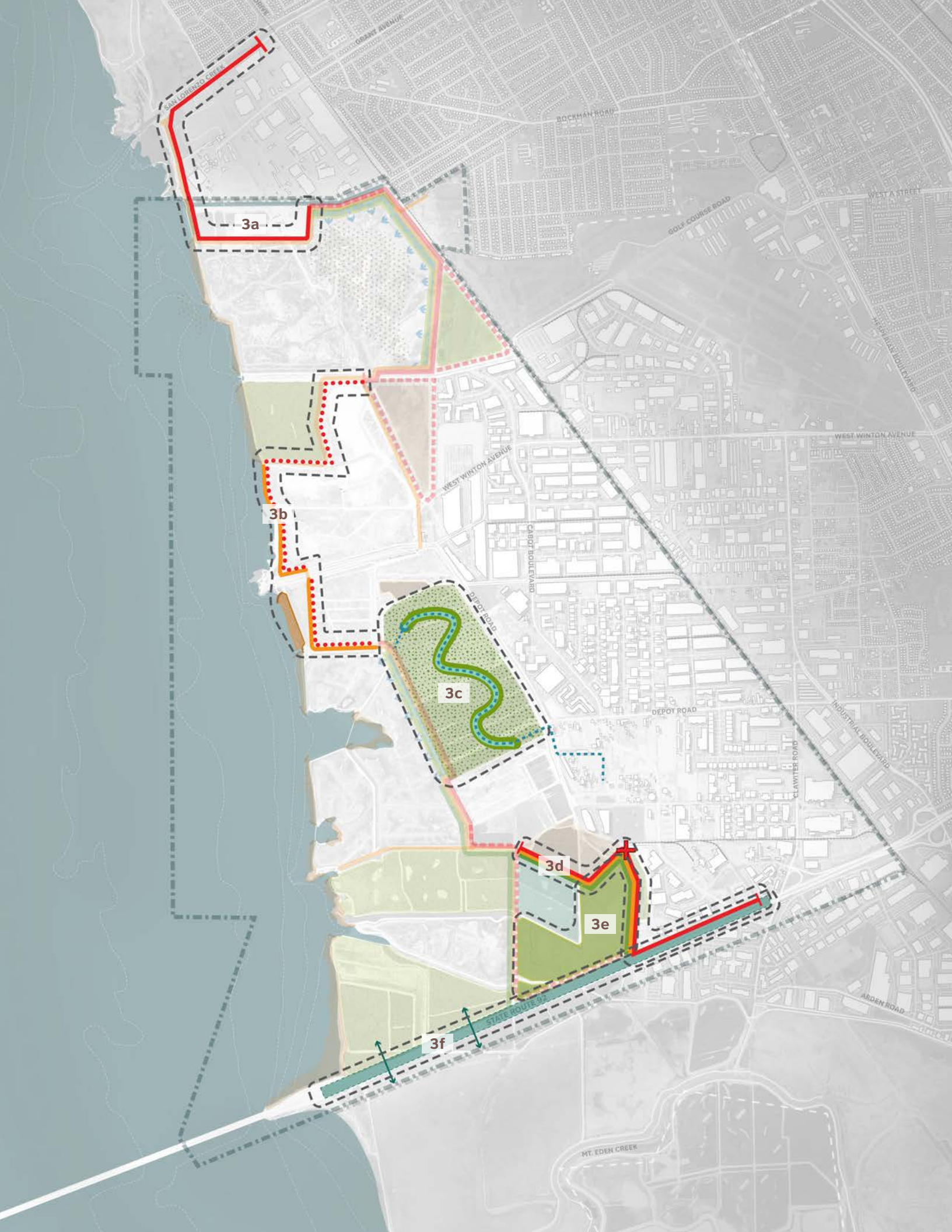
- Tidal Habitat Restoration
- Gravel Beaches

2d. Hayward LOP- Phase 1

- FEMA Certified Levee, designed to protect for 4' SLR plus 100-year storm
- Hayward WWTP Horizontal Levee
- New Bay Trail Section

2e. Cogswell Marsh Adaptive Management

2f. Salt Marsh Harvest Mouse Preserve Ecotone Levee


3a
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SAN LORENZO CREEK
GRANT AVENUE
BOCKMAN ROAD
WEST A STREET
GOLF COURSE ROAD
HESPERIAN BOULEVARD
WEST WINTON AVENUE
CARPOT BOULEVARD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
STATE ROUTE 92
ARDEN ROAD
MT. EDEN CREEK

# LONG TERM PROJECTS

The projects identified in the long term are projected to be constructed in over 25 years. This time frame and associated projects are an initial idea of how the phasing may work, based on the Project Team's recommendations. These projects and time frames will need to be flexible, since the ability to implement a project depends on multiple external factors, such as funding acquisition, permitting, and construction cycles.

The long-term projects give priority to completing a full line of protection and creating a layered system of erosion control infrastructure.

Wastewater treatment plants are adapted to facilitate local discharge.

The line of protection (LOP) is established to reduce risk up to 4' of sea level rise plus the 100-year storm. This alignment will connect the discrete portions of levees built in the medium-term scenario.

**Projects shown on the map:**

3a. Oro Loma LOP- Phase 2

- FEMA Certified Levee, designed to protect for 4' SLR plus 100-year storm

3b. Landfill Shoreline Restoration

- Triangle Marsh Gravel Beach
- West Winton Landfill erosion protection and subsurface cutoff
- Alameda County Landfill erosion protection and subsurface cutoff
- New Bay Trail Sections

3c. Hayward WWTP Adaptation

- Freshwater Treatment Marsh

3d. Hayward LOP- Phase 2

- FEMA Certified Levee, designed to protect for 4' SLR plus 100-year storm
- Line F Tide Gate

3e. Muted Marsh Adaptive Management

3f. SR-92 Causeway

# SHORT TERM PROJECTS

| ID | STANDALONE PROJECT | PROJECT COMPONENTS |
|---|---|---|
| 1a | Oro Loma Interim Levee | • Bockman Channel pump station<br>• Levee in front of Oro Loma + Sludge Ponds<br>• Levee raising along San Lorenzo Creek<br>• New Bay Trail - Oro Lomo WWTP Section |
| 1b | Line A Tide Gate Improvement | • Line A Tide Gate |
| 1c | Cogswell Marsh Pilot | • Cogswell Marsh (sediment placement at breaches)<br>• Cogswell Marsh gravel beaches |
| 1d | Hayward Marsh Restoration | • Least Tern Colony relocation<br>• Hayward Marsh gravel beach<br>• Hayward Marsh tidal habitat restoration<br>• Diked Baylands east of the SMHM Preserve |
| 1e | Salt Marsh Harvest Mouse Preserve Interim Levee | • Access road from Interpretive Center to Bay Trail Pedestrian Bridge<br>• Levee raising west of SMHM from Solar Fields to SE corner of SMHM Preserve |
| 1f | Oliver Salt Ponds Restoration | • Oliver Salt Ponds gravel beach<br>• Oliver Salt Ponds (sediment placement to raise pond)<br>• Oliver Salt Ponds<br>• Salinas habitat north of Hayward Marsh<br>• Salinas habitat near West Winton Landfill |
| 1g | Landfill Vulnerability Assessment | • Landfill vulnerability Assessment (characterisation, hydrogeology) |
| 1h | Groundwater Management Plan | • Groundwater Management Plan |
| 1i | Stormwater Management Study | • Stormwater Management Study |
| 1j | EBDA Study | • EBDA Study |
| 1k | Ecosystem Adaptive Management Plan & Monitoring | • Adaptive Management Plan |
| 1l | Hayward Shoreline Interpretive Center Renovation | • Hayward Shoreline Interpretive Center renovations |
| 1m | Sediment Pipeline | • Don Castro Sediment Pipeline |
| 1n | CEQA | • CEQA EIR |

| | AGENCIES | NOTES |
|---|---|---|
| | ACFCD, HASPA, Oro Loma WWTP, Bay Trail, EBRPD | Designed to current 100-year, San Lorenzo Creek to rail corridor, includes new bay trail spur & near term sulphur creek tide gate/pump station |
| | ACFCD, HASPA | Pending results of ACFCD stormwater study, to protect from 2' of SLR |
| | EBRPD, BCDC, USACE | Sediment placement and gravel beaches to reduce erosion |
| | EBRPD, BCDC, USACE, CDFW, HASPA | Timing dependent on pilot monitoring and Adaptive Management Plan |
| | EBRPD, HASPA, HARD, ACFCD | Interim levee to protect from 2' of SLR, along current levee alignments from Interpretive center through HARD Marsh, ending at Hayward Marsh. Need to examine stormwater management needs. Restoration work could be separate but may be advantageous from funding/regulatory perspective to combine. |
| | EBRPD, BCDC, USACE, CDFW, HASPA | Timing dependent on pilot monitoring of adjacent sites and Adaptive Management Plan |
| | COH | To assess existing conditions and needs |
| | COH, Property Owners | To study feasibility of various approaches |
| | ACFCD | Already begun |
| | EBDA | To inform design of horizontal levee |
| | HASPA | To develop pilot and monitoring plan, identify triggers for restoration, inform future restoration plans |
| | HARD | ADA Access improvements and facility needs / energy retrofits |
| | ACFCD, EBRPD, BCDC | Deliver sediment to Baylands. Timing uncertain. |
| | HASPA, EBRPD, COH, HARD | CEQA EIR for Master Plan projects. |

## MEDIUM TERM PROJECTS

| ID | STANDALONE PROJECT | PROJECT COMPONENTS |
|---|---|---|
| 2a | **Oro Loma LOP- Phase 1** | • Frank's East salinas<br>• Sulpur Creek Tide Gate, Pump station<br>• Oro Loma muted tidal levee raising<br>• First Mile project in the back of Oro Loma Marsh<br>• Frank's East levee raising<br>• Oro Loma southeastern triangle<br>• New Bay Trail - back half of Oro Lomo Marsh Section |
| 2b | **Oro Loma Adaptive Management** | • Oro Loma gravel beaches<br>• Oro Loma Marsh (sediment placement at breaches)<br>• Oro Loma Marsh (sediment placement in eastern half) |
| 2c | **Frank's West Restoration** | • Frank's West gravel beach<br>• Frank's West (sediment placement to raise pond)<br>• Frank's West tidal habitat restoration |
| 2d | **Hayward LOP- Phase 1** | • Levee tie-back along raised SR-92 access road<br>• New Bay Trail - WWTP to SR92<br>• Hayward horizontal levee (South of Landfills) |
| 2e | **Cogswell Marsh Adaptive Management** | • Cogswell Marsh (sediment placement to raise eastern edges) |
| 2f | **Salt Marsh Harvest Mouse Preserve Ecotone Levee** | • Ecotone levee from Wet Weather Storage Ponds to SR-92 |

## LONG TERM PROJECTS

| ID | STANDALONE PROJECT | PROJECT COMPONENTS |
|---|---|---|
| 3a | **Oro Loma LOP- phase 2** | • FEMA levee around Oro Loma sludge ponds to tie-back at SLC channel |
| 3b | **Landfill shoreline restoration** | • Triangle Marsh gravel beach<br>• West Winton Landfill erosion protection + subsurface cutoff<br>• Alameda County Landfill erosion protection + subsurface cutoff<br>• New Bay Trail - Alameda County Landfill<br>• New Bay Trail - West Winton Landfill |
| 3c | **Hayward WWTP Adaptation** | • Freshwater treatment marsh |
| 3d | **Hayward LOP- phase 2** | • Line F tide gate + pump station<br>• Ecotone levee along new LOP around SMHM Preserve |
| 3e | **Muted Marsh Adaptive Management** | • Marsh Management + Sediment Placement |
| 3f | **SR-92 Causeway** | • SR-92 Causeway |

| | AGENCIES | NOTES |
|---|---|---|
| | ACFCD, HASPA, Oro Loma WWTP, Bay Trail, EBRPD | FEMA levee from Oro Loma sludge ponds to Landfill, includes stormwater improvements, sulphur creek tide gate, and Bay Trail sections |
| | EBRPD, BCDC, USACE | Timing dependent on pilot monitoring of adjacent sites and Adaptive Management Plan |
| | EBRPD, BCDC, USACE | Timing dependent on pilot monitoring of adjacent sites and Adaptive Management Plan |
| | ACFCD, HASPA, Oro Loma WWTP, Bay Trail, EBRPD, CalTrans, COH, Public Works | FEMA levee from Landfill to SMHM levee raising, includes horizontal levee and Bay Trail sections |
| | EBRPD, BCDC, USACE | Timing dependent on pilot monitoring and Adaptive Management Plan |
| | ACFCD, EBRPD | Ecotone levee in front of SMHM levee raising |

| | AGENCIES | NOTES |
|---|---|---|
| | Oro Loma WWTP, ACFCD, HASPA | FEMA levee from Oro Loma sludge ponds to tie back along SLC, includes stormwater improvements, Bockman tide gate, and Bay Trail sections |
| | EBRPD, BCDC, COH, Bay Trail | Pending vulnerability assessment, includes erosion control and subsurface cut off, includes adjacent sections of Bay Trail |
| | COH, Public Works, EBDA, ACFCD | Freshwater treatment marsh for local discharge using horizontal levee |
| | ACFCD, HASPA, EBRPD | FEMA levee from SMHM levee raising to tie back near Clawiter Rd, includes stormwater improvements, Line F tide gate, and Bay Trail sections |
| | EBRPD, HASPA, BCDC | Adaptive Management of muted tidal habitat inland of SMHM Interim Levee |
| | CalTrans | CalTrans retrofit of SR-92 Bridge approach |

# POTENTIAL MARSH SEDIMENT NEED TO KEEP PACE WITH 4' OF SLR


Sources:

1. San Francisco Estuary Institute and Aquatic Science Center 2015. California Aquatic Resource Inventory. (April 18, 2019)



SCAPE

# STRATEGIES FOR SEDIMENT MANAGEMENT

## SHORELINE ADAPTATION WITH SEA LEVEL RISE

Sediment scarcity is a regional problem in the San Francisco Bay that could greatly impact existing and new marsh restoration projects and exacerbate the risks of sea level rise.

The Hayward Regional Shoreline was historically built with sediment. However, after a series of creek channelization in the mid-1950s, much of the sediment-rich water could no longer reach the Baylands.

Today, the Hayward Regional Shoreline Baylands are living infrastructure that contains marshes and tidal flats that buffer vulnerable edges and levees from wave action and tidal energy. Yet this protective infrastructure is at risk of being outpaced by sea level rise. As sea levels rise, the accretion of sediment is critical to Bayland survival. Without deposits of this muddy material, tidal marshes and mudflats will not be able to withstand rising water levels, and this will ultimately lead to marsh decline and marsh drowning.

Low sediment supply with sea level rise triggers habitat shifts, increased flood intensity and tidal elevations, which presents serious risks to humans and ecosystems over time.

Experts at the Department of California Fish and Wildlife, San Francisco Estuary Institute, and the US Army Corps of Engineers referenced an average sediment accretion rate of 6 mm per year for the baylands, and this number was factored into all sediment calculations. For the Hayward Regional Shoreline, sediment projections look bleak, as there are no local sources of sediment from natural creeks. It is important to note that scientists are actively researching sediment accretion in the Bay and data on this topic is subject to change.

With climate change, low-sediment or high-sediment conditions differentially impact accretion rates for Bayland resources. Because of this, it is crucial to consider new sediment sources and their potential to deliver material to the Bay.

There are a variety of strategies to be piloted and implemented for the future of sediment management along the Hayward Regional Shoreline. Many of these strategies are not permittable in the current regulatory climate, but as climate change threats become more real, pilot projects can help inform new permitting structures that facilitate ecosystem adaptation to sea level rise.

There are two main types of sediment management to consider that could help adapt the Hayward Regional Shoreline in the future:

**Sediment Placement to lift Diked Baylands**

Many of the diked Baylands in the Hayward Regional Shoreline have subsided over time and their elevations are close to or below mean sea level. In order to ensure successful marsh restoration projects in the future, these diked Baylands will need to be raised to marsh plain elevation before they are exposed to tidal action.

There are a variety of potential fill materials to lift the pond elevations, such as:

- Clean Construction fill may be used to lift ponds. (The Bair Island Restoration used this strategy)
- The potential Don Castro Sediment pipeline has the potential to transport trapped sediment behind the Don Castro Dam and transport it in a slurry pipeline to diked Baylands in the project area.

**Sediment Augmentation for Ecosystem Adaptation with Sea Level Rise**

- Dams and Reservoirs - Reservoirs such has the Don Castro Reservoir, could be used to provide sediment for thin-layer placement on existing marshes, depending on the sediment size and quality.
- Beneficial reuse of Dredge Material - Working with the USACE and BCDC, there are a variety of beneficial reuse strategies to lift existing marshes as sea levels rise. These include shallow water placement and thin-layer placement on existing marshes.
- Berms, or physical structures to reduce wind/wave fetch - Structures in marshes may reduce wave action and help sediment settle out to facilitate accretion.
- Creek widening - Opening up the mouths of creeks may help bring more sediment into marshes. Most of the sediment that is trapped in creek systems is below head of tide. Widening creek mouths may help facilitate the trapping of sediment from both fluvial and Bay sources.
- Small channel openings - Breaching existing levees at regular intervals can open up marsh systems to more tidal flow and sediment. Smaller breaches may help reduce erosion potential.
- Mud berms - Placing sediment on tidal flats in front of existing marshes may help transport sediment through tidal action to the marsh itself. This presents feasibility challenges due to the shallow water conditions of the Hayward Shoreline.

# PROJECT FACT SHEETS

**This section breaks provides a detailed assessment of specific projects identified in the Phasing Plan.**

# LANDFILL VULNERABILITY ASSESSMENT

## PROJECT SUMMARY

The purpose of this project is to assess the existing conditions and resiliency issues of Alameda County and West Winton landfills. Both sites were closed in the 1970s but were not designed to experience inundation or wave action. The conditions of the cap and the contents of the landfill are largely unknown, and more data investigation and analysis are needed to understand how they may be impacted by erosion, coastal flooding, sea level rise, and groundwater emergence. Once this investigation has been done, design solutions and phasing for how to address these issues can be developed.

## PROJECT SITE & OWNERSHIP

The landfills are located on the water's edge in the middle reach of the site and are owned by Alameda County and the City of Hayward.

## KEY STAKEHOLDERS

- City of Hayward
- Alameda County Flood Control District

## COST ESTIMATE

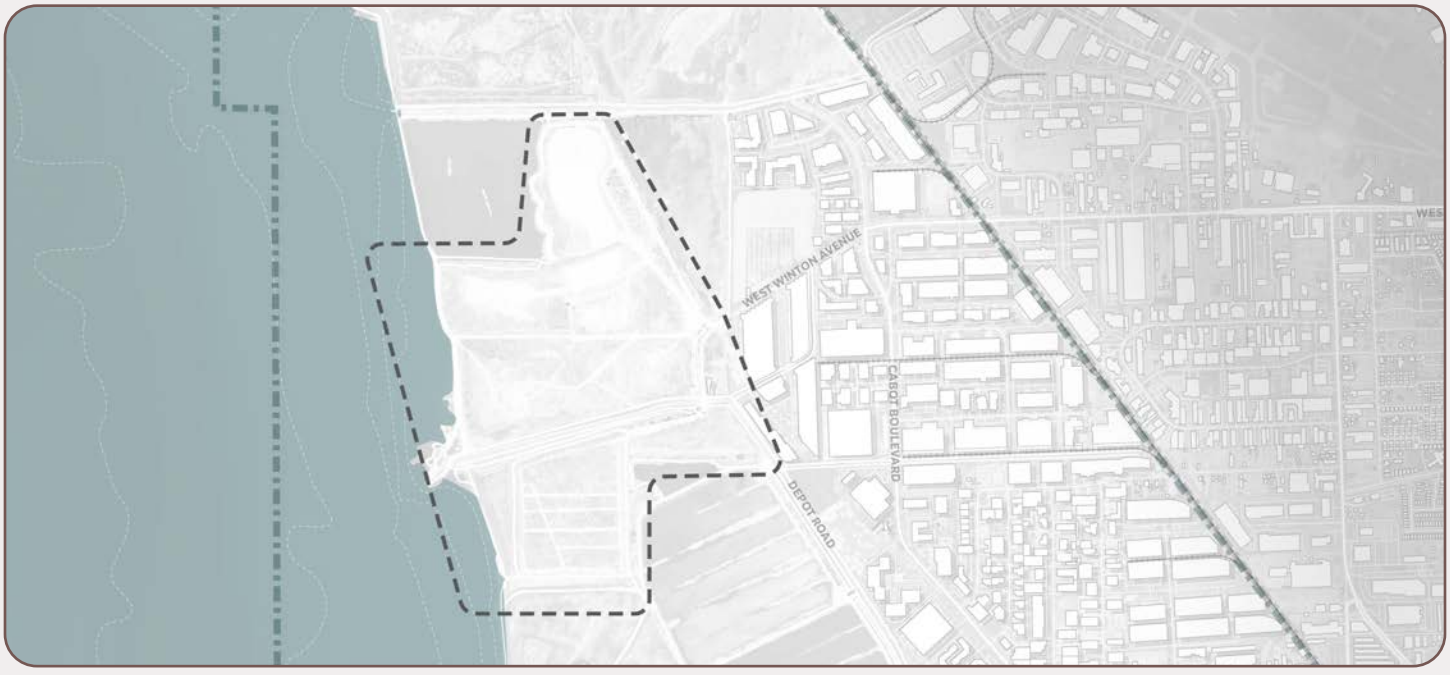
Low (<$5M)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **U.S. EPA Brownfields Assessment or Multipurpose (MP) Grants**
  https://www.epa.gov/brownfields/types-brownfields-grant-funding
- **California Coastal Commission LCP Local Assistance Grant**
  https://www.coastal.ca.gov/lcp/grants/#:~:text=The%20Local%20Coastal%20Program,level%20rise%20and%20climate%20change.



# GROUNDWATER MANAGEMENT PLAN

## PROJECT SUMMARY

The purpose of this project is to study the feasibility of various approaches for managing rising groundwater tables due to sea level rise. As the sea level rise maps demonstrate, portions of the industrial district and residential areas are vulnerable to potential groundwater emergence with 2 feet of sea level rise and with 4 or 7 feet of sea level rise greater portions of surrounding neighborhoods are also impacted.

Rising groundwater cannot be mitigated through the approaches that address inundation from tides or coastal surge. Seepage barriers below seawalls or levees can mitigate temporary groundwater rise due to a coastal storm but are not effective at preventing elevated groundwater tables due to gradual sea level rise.

To mitigate groundwater emergence, the overall options are:

- Drainage and additional pumping
- Elevation of the land
- Relocation/retreat.

The stormwater drainage and pumping improvements proposed in the master plan will provide some benefits to groundwater management, but additional strategies are likely necessary to manage rising groundwater tables as sea levels rise. Additional drainage infrastructure may be necessary to collect and drain groundwater into the stormwater system, and land elevation may be necessary in some areas. These solutions should be further explored and tested before plans for new infrastructure or new development standards are put into place. Ultimately multiple strategies may be necessary. This is an area of evolving science and research that should be coupled with ongoing monitoring of sea level rise and groundwater tables.

The Alameda County Water District has prepared a Groundwater Sustainability Plan (GSP) for the Niles Cone Subbasin, which underlies most of the Hayward Shoreline. (https://www.acwd.org/566/Sustainable-Groundwater-Management-Act ) In addition, the City of Hayward is working with the East Bay Municipal Utility District (EBMUD) to prepare a GSP for the East Bay Plain Basin, which underlies the northern portion of the shoreline area ( https://www.hayward-ca.gov/content/sustainable-groundwater-management) This project will be done in coordination with the water districts and these two GSPs."

## PROJECT SITE & OWNERSHIP

Whole study area

## KEY STAKEHOLDERS

- City of Hayward
- Property Owners affected by groundwater emergence in the study area
- Members of the public
- Alameda County Flood Control District

## COST ESTIMATE

Low (<$5M)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **NOAA California State Sea Grant Program**
  https://seagrant.noaa.gov/state-competitions and https://caseagrant.ucsd.edu/grants-and-funding
- **California Coastal Commission LCP Local Assistance Grant**
  https://www.coastal.ca.gov/lcp/grants/#:~:text=The%20Local%20Coastal%20Program,level%20rise%20and%20climate%20change.

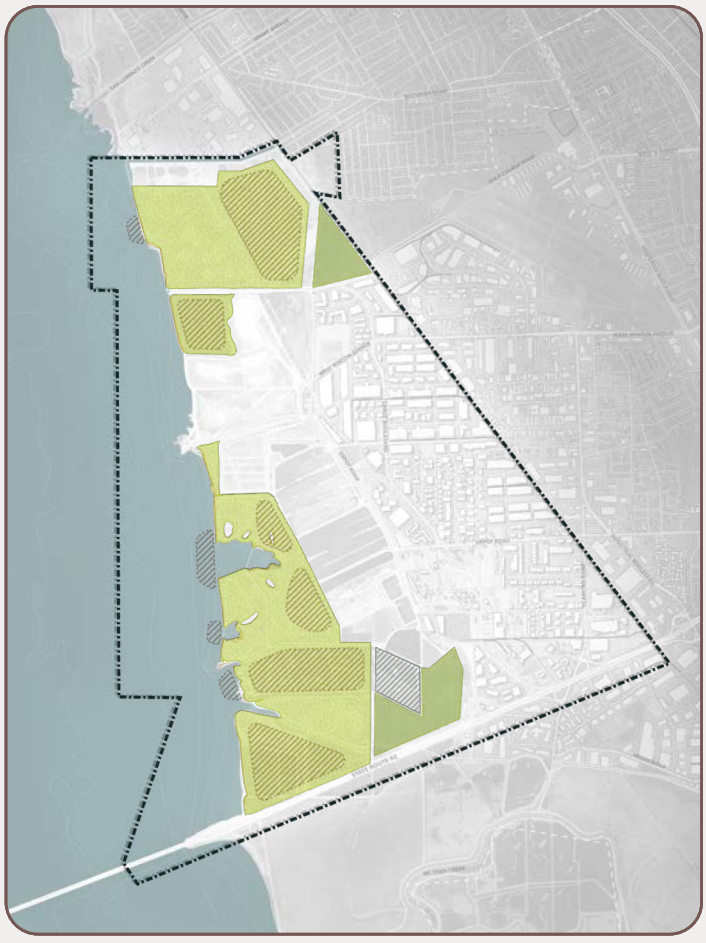
# ECOSYSTEM ADAPTATIVE MANAGEMENT PLAN & MONITORING

## PROJECT SUMMARY

The purpose of this project is to develop an ecosystem management plan for the mosaic of existing and proposed wetland complexes in the Hayward Regional Shoreline. This management plan will focus on identifying in greater detail the potential impacts of sea level rise on tidal wetlands and muted marshes through the development of an ongoing monitoring program. This will include monitoring of tide levels and sediment accretion, as well as tracking of changes in vegetation to identify potential triggers for restoration and to inform future restoration plans. This program can include opportunities for community stewardship and volunteering, as discussed further on page 210.

## PROJECT SITE & OWNERSHIP

Study area wide, potentially headquartered at the Hayward Shoreline Interpretive Center



## KEY STAKEHOLDERS

- HASPA
- Hayward Area Recreation and Park District
- East Bay Regional Park District

## PERMITTING ASSESSMENT


## COST ESTIMATE

Low (<$5M)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **NOAA State Sea Grant Program**
  https://seagrant.noaa.gov/state-competitions and
  https://caseagrant.ucsd.edu/grants-and-funding

# LINE A TIDE GATE IMPROVEMENTS

## PROJECT SUMMARY

This project is pending the results of the Alameda County Flood Control District's study of the combined impacts of sea level rise (up to 2 feet) and increased precipitation on water levels in the bay and inland waterways. This study will examine potential flood control infrastructure needs throughout the service area, including San Lorenzo Creek, Sulphur Creek, Bockman Canal, Line A, and Line F. Other improvements are proposed to be integrated into adjacent flood protection levee projects, but Line A should move forward independently. The Line A tide gate will be relocated to connect the high points of the two landfills. Potential strategies include tide gate improvements, raising of canal walls, or other features to protect the service area from flooding from stormwater, sea level rise, and storm surge.

## PROJECT SITE & OWNERSHIP

- Line A is located in the middle reach of the site, between the two landfills. The site is owned by the City of Hayward.

## KEY STAKEHOLDERS

- HASPA
- Alameda County Flood Control District

## PERMITTING ASSESSMENT

Permitting challenges are dependent on the eventual scope and design of the project, but as an improvement to existing infrastructure it would likely be a straightforward permitting process.

EASY HARD

## COST ESTIMATE

Low (<$5M)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **State of California Department of Water Resources Coastal Watershed Flood Risk Reduction**
  https://www.grants.ca.gov/grants/coastal-watershed-flood-risk-reduction-2/
- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

# ORO LOMA INTERIM LEVEE

## PROJECT SUMMARY

This project is intended to protect the Oro Lomo wastewater treatment plant and surrounding industrial district from flooding. It includes a flood protection levee designed with meet today's 1% annual chance flood with allowance for mid-range sea level rise, but with a foundation system that allows for the levee to be elevated in the future to accommodate a higher elevation with sea level rise.

The project also includes a new Bay Trail spur extending inland from the shoreline and could provide a connection across the rail line to San Lorenzo Community Park.

A new tide gate and pump station on Bockman Canal is also proposed, which would be planned in coordination with ACFCD pending the results of their stormwater study.

## PROJECT SITE & OWNERSHIP

The site is located in the northern reach of the study area. It is owned by the Oro Loma Sanitary District.

## KEY STAKEHOLDERS

- HASPA
- City of Hayward
- Oro Lomo Sanitary District
- Bay Trail
- East Bay Regional Parks District
- Alameda County Flood Control District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

Regulators are likely to be supportive of the intent of this project, but the permitting process will be extensive.


## COST ESTIMATE

High (>$20 M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **State of California Department of Water Resources Coastal Watershed Flood Risk Reduction**
  https://www.grants.ca.gov/grants/coastal-watershed-flood-risk-reduction-2/
- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

# SALT MARSH HARVEST MOUSE PRESERVE INTERIM LEVEE

## PROJECT SUMMARY

This project is an interim levee designed to preserve important endangered species habitat, as well as some of the critical infrastructure inland of the site such as the Calpine / Russel City Energy Center and the Hayward Wastewater Treatment Plant. It is intended to protect against today's 1% annual chance flood and in the future will remain as a buffer from more frequent storm events while the long-term Hayward Line of Protection project located further inland will provide greater protection to inland critical infrastructure. The project includes levee raising west of the SMHM preserve from the Solar Fields to the SE corner of the SMHM Preserve. It is planned to run along the current levee alignments from the Hayward Interpretive Center through HARD Marsh. A new spur of the Bay Trail would be provided on top of the levee, which would connect back to the existing Bay Trail along the northern levee of Hayward Marsh.

## PROJECT SITE & OWNERSHIP

- The project site is located in the southern reach of the study area, slightly inland from the Bay. East Bay Regional Parks District owns most of the site, with some portions owned by the City of Hayward.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- City of Hayward
- Hayward Area Recreation and Park District
- Alameda County Flood Control District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

Regulators are likely to be supportive of the intent of this project, but the permitting process will be extensive. There will be special review regarding impacts on endangered species.

EASY HARD

## COST ESTIMATE

Medium ($5-$20 M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities
- **CA Department of Fish and Wildlife Endangered Species Conservation and Recovery Grant Program**
  https://wildlife.ca.gov/Grants/Endangered-Species

# COGSWELL MARSH PILOT

## PROJECT SUMMARY

This pilot project includes sediment placement to augment the marsh and a gravel beach along the shoreline to reduce marsh erosion. This pilot is intended to test these strategies as a sustainable strategy for adapting the area marshes. The pilot will be monitored as part of the ecosystem adaptive management plan and inform mid and long term restoration projects.

## PROJECT SITE & OWNERSHIP

- The project site is located along the Bay in the southern reach of the site just south of the landfills. It is owned by East Bay Regional Parks District.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- Hayward Area Recreation and Park District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

As a pilot projects this is likely a simpler permitting process than other projects. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.

EASY HARD

## COST ESTIMATE

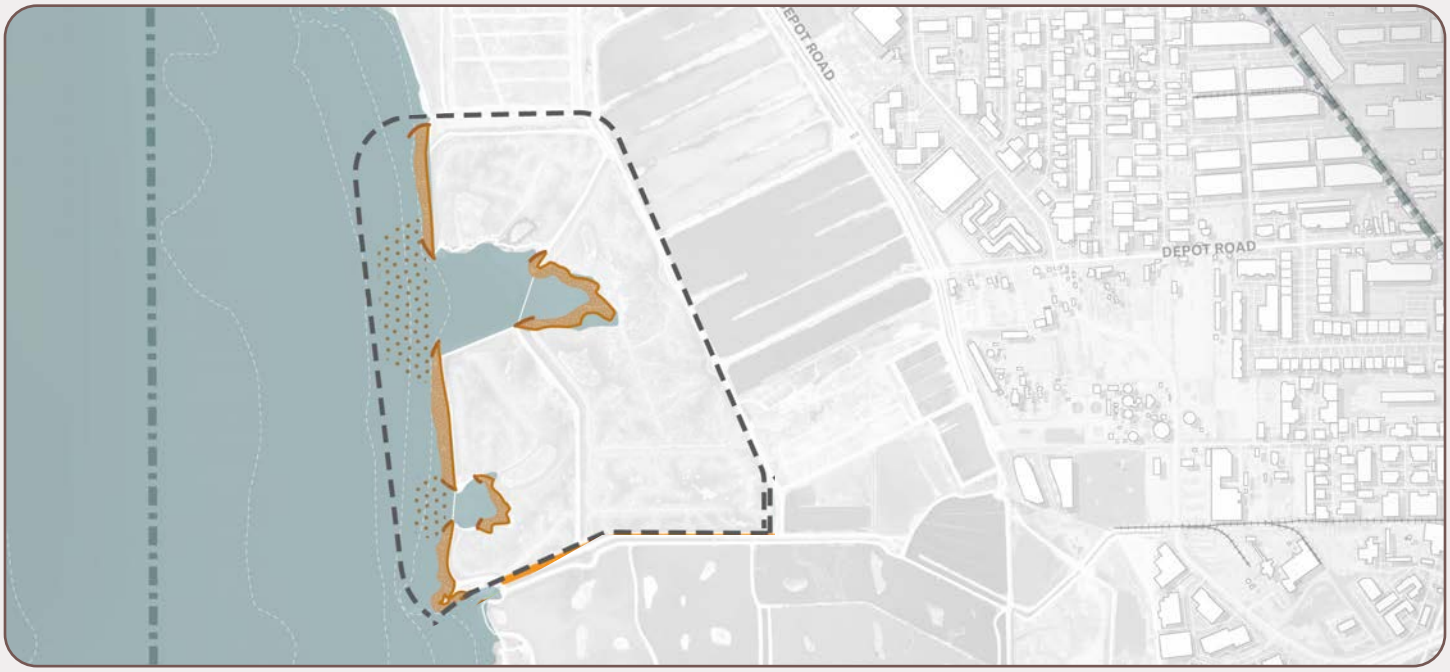
Low (<$5M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **California Division of Boating and Waterways Shoreline Erosion Control & Public Beach Restoration Program**
  https://dbw.parks.ca.gov/?page_id=28766



# HAYWARD SHORELINE INTERPRETIVE CENTER RENOVATION

## PROJECT SUMMARY

This project includes overall improvements to address structural and programmatic needs of the interpretive center including ADA access improvements and energy retrofits.

## PROJECT SITE & OWNERSHIP

- The Hayward Shoreline Interpretive Center is located in the southern reach of the project area, just north of SR-92. It is owned by Hayward Area Recreation and Park District

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- Hayward Area Recreation and Park District

## PERMITTING ASSESSMENT

As an improvement to an existing facility, this is likely a simpler permitting process than other projects.

EASY HARD

## COST ESTIMATE

Low (<$5M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **HUD Better Buildings Financing Navigator**
  https://www.hudexchange.info/programs/better-buildings-challenge/energy-and-water-efficiency-resources/retrofit-finance/

# HAYWARD MARSH RESTORATION

## PROJECT SUMMARY

This project aligns with the current Hayward Marsh Restoration Plan currently underway with East Bay Regional Park District. It is intended to promote the health and resilience of Hayward Marsh and incorporate new restoration projects for shoreline resilience. The design and management of Hayward Marsh will be informed by the pilot monitoring and the Ecosystem Adaptive Management Plan. This project includes the Least Tern Colony relocation, a gravel beach, tidal habitat restoration, and includes the diked bay lands east of the SMHM Preserve.

## PROJECT SITE & OWNERSHIP

- The project site is located along the Bay in the southern reach of the site south of Cogswell Marsh and north of Oliver Salt Ponds. It is owned by East Bay Regional Parks District.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- Hayward Area Recreation and Park District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

Regulators are likely to be supportive of the intent of this project, but the permitting process will be extensive. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.

EASY HARD

## COST ESTIMATE

Medium ($5 - $20 M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **CA Department of Fish and Wildlife Habitat Management Grants**
  https://wildlife.ca.gov/Grants

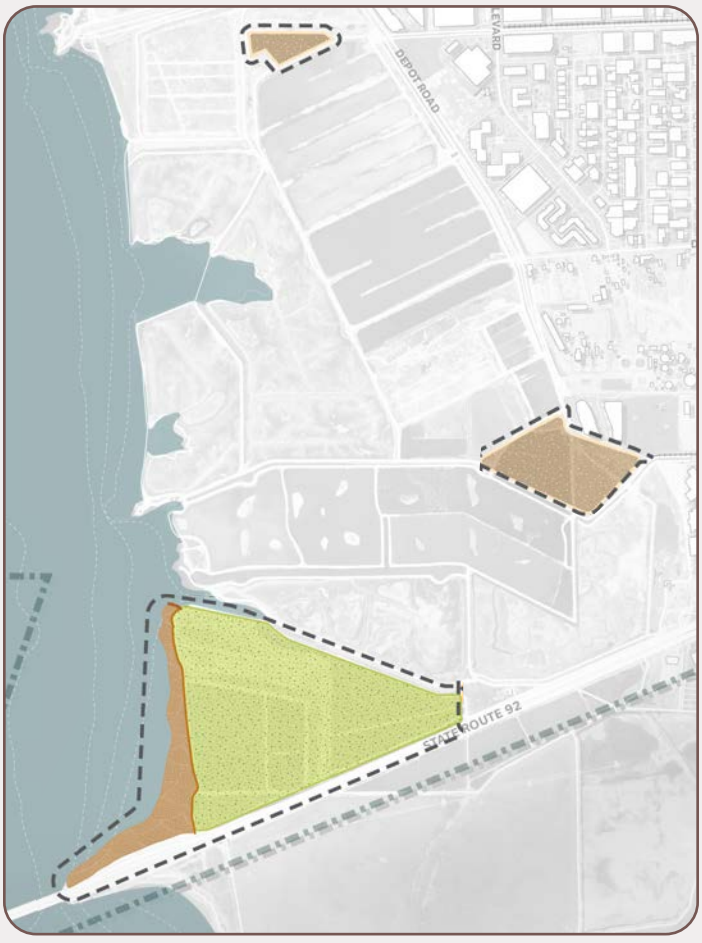
# OLIVER SALT PONDS RESTORATION

## PROJECT SUMMARY

The timing of this project is dependent on the pilot monitoring of adjacent sites and the Adaptive Management Plan. Oliver Salt Ponds is vulnerable to sea level rise and its restoration can facilitate long-term resilience. Tidal habitat restoration is paired with new salt pond habitat that will provide similar shorebird habitat further inland, where it is less vulnerable to inundation. This project includes the Oliver Salt Ponds gravel beach, sediment placement, and the Salinas habitat north of Hayward Marsh and near West Winton Landfill.

## PROJECT SITE & OWNERSHIP

- The site is located in the southern reach of the project area, just north of SR-92. It is owned by Hayward Area Recreation and Park District.




## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- Hayward Area Recreation and Park District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

Regulators are likely to be supportive of the intent of this project, but the permitting process will be extensive. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.

EASY HARD

## COST ESTIMATE

Medium ($5 - $20 M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **CA Department of Fish and Wildlife Habitat Management Grants**
  https://wildlife.ca.gov/Grants

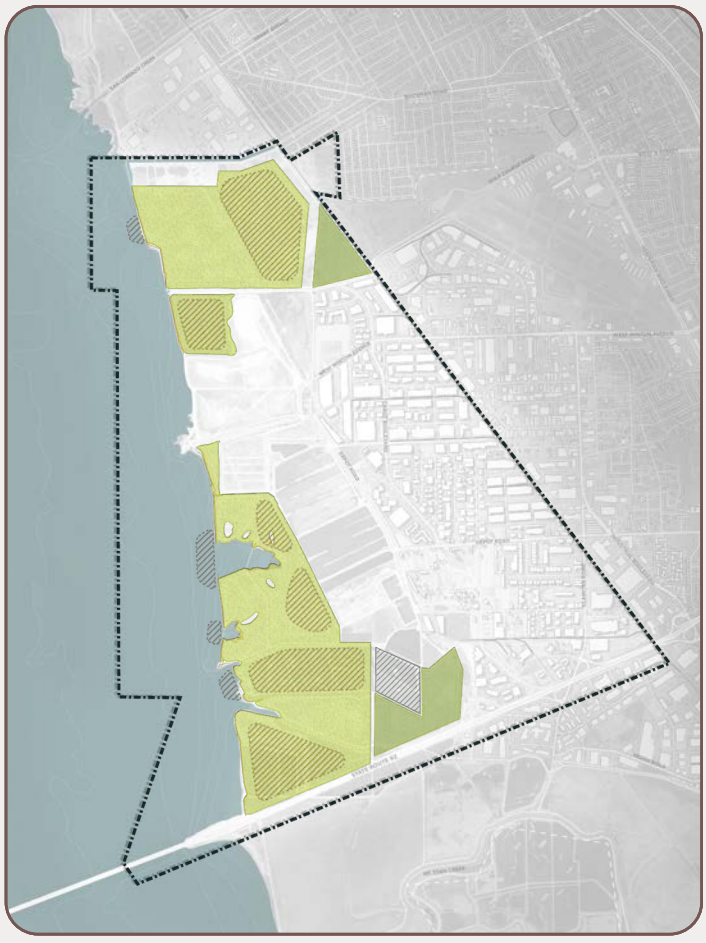
# DON CASTRO SEDIMENT PIPELINE

## PROJECT SUMMARY

This project is to create a pipeline from the Don Castro Reservoir to the bay to provide a sediment source for restoration and adaptation projects. The Don Castro reservoir has filled with sediment, reducing its flood control capacity. This sediment has the potential to be piped in a slurry to the Hayward Regional Shoreline for reuse. Alameda County Flood Control District has studied the pipeline as a cost-effective piece of infrastructure that would increase flood capacity. There is great potential to utilize the sediment slurry in new restoration or adaptation projects to create a multi-benefit piece of infrastructure that can be utilized over time.

## PROJECT SITE & OWNERSHIP

This project is in early development and details are unknown about the alignment, but it would likely cross boundaries of multiple property owners, extending from Don Castro Reservoir, along San Lorenzo Creek, then to the Hayward Regional Shoreline.



## KEY STAKEHOLDERS

- HASPA
- Alameda County Flood Control District

## PERMITTING ASSESSMENT

This project is in early development but would likely involve an extensive permitting process.


## COST ESTIMATE

High (>$50 M.)

## TIME FRAME

Short Term

## FUNDING & FINANCING RECOMMENDATIONS

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities
- **US EPA and Army Corps of Engineers — Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material [Manual]**
  https://dots.el.erdc.dren.mil/guidance/PlanningManual.pdf

# COGSWELL MARSH ADAPTIVE MANGEMENT

## PROJECT SUMMARY

Following the near-term Cogswell Marsh pilot to place sediment and control erosion through a gravel beach, the site will be monitored through the area-wide Ecosystem Adaptive Management Program to study how effective the pilot was to augment marsh health and resilience to sea level rise and erosion. Future adaptive measures may be necessary, including additional sediment placement and additional erosion protection measures. Strategies and timing will be further developed based on the results of the monitoring program, but it is envisioned to involve sediment placement to raise the eastern edges of the marsh to keep pace with sea level rise.

## PROJECT SITE & OWNERSHIP

- The project site is located along the Bay in the southern reach of the site just south of the landfills. It is owned by East Bay Regional Parks District.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.


## COST ESTIMATE

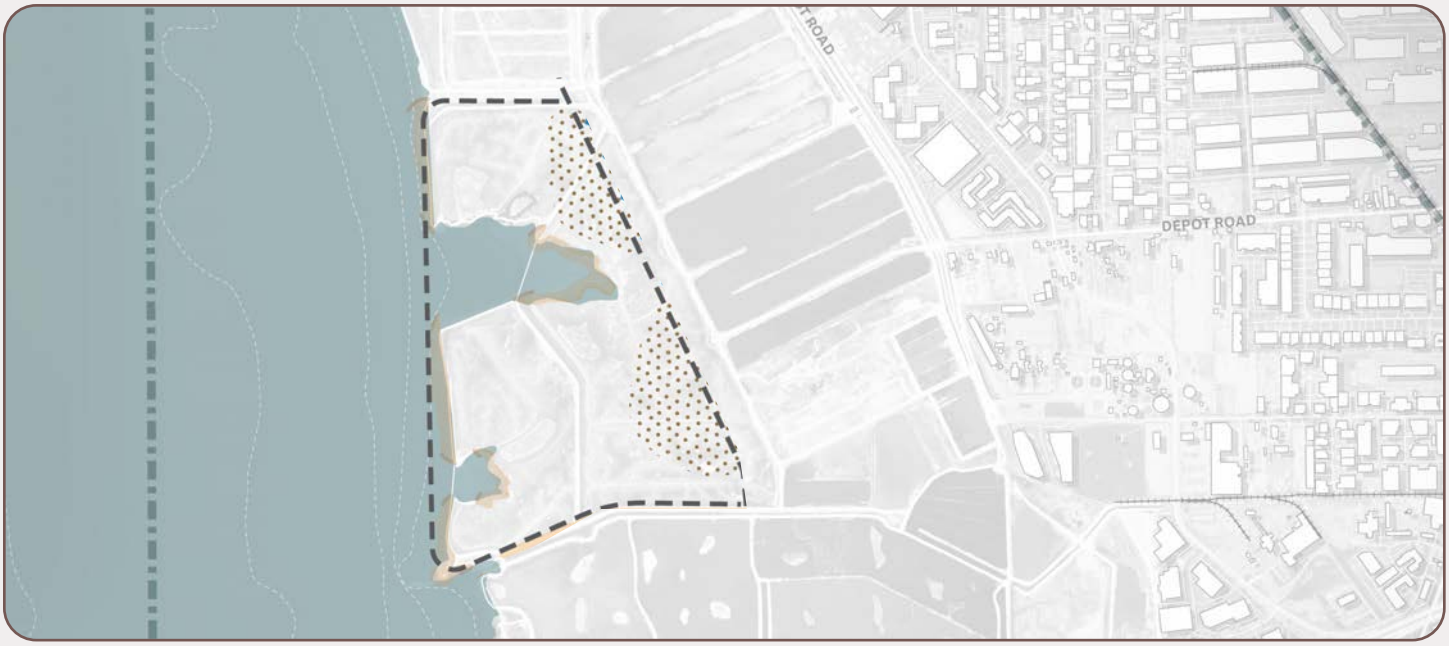
Low (<$5M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **CA Department of Fish and Wildlife Habitat Management Grants**
  https://wildlife.ca.gov/Grants



# ORO LOMA ADAPTIVE MANAGEMENT

## PROJECT SUMMARY

This project will promote the health and resilience of Oro Loma marsh through a gravel beach to mitigate erosion, sediment placement at the breaches, and sediment placement in the eastern half of the marsh to help keep pace with sea level rise. The strategies and timing of this project will be further developed based on the results of the area-wide Ecosystem Adaptive Management Program.

## PROJECT SITE & OWNERSHIP

- The site is located in the northern reach of the study area. It is owned by East Bay Regional Parks District.

### KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.


## COST ESTIMATE

Medium ($5-$20M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **California Division of Boating and Waterways Shoreline Erosion Control & Public Beach Restoration Program**
  https://dbw.parks.ca.gov/?page_id=28766

# FRANK'S WEST RESTORATION

## PROJECT SUMMARY

This project is to promote the health and resilience of the Frank's West through a gravel beach to mitigate erosion, sediment placement to raise the ponds, and tidal habitat restoration. The strategies and timing of this project will be further developed based on the results of the area-wide Ecosystem Adaptive Management Program.

## PROJECT SITE & OWNERSHIP

- The project site is located between the landfills and Oro Lomo marsh in the north reach of the study area. It is owned by Hayward Area Recreation and Park District.

## KEY STAKEHOLDERS

- HASPA
- Hayward Area Recreation and Park District
- East Bay Regional Parks District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process. Recent policy shifts towards how agencies consider fill in the bay for the purposes of ecological enhancements can benefit this project.


## COST ESTIMATE

Medium ($5-$20M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **California Division of Boating and Waterways Shoreline Erosion Control & Public Beach Restoration Program**
  https://dbw.parks.ca.gov/?page_id=28766
- **CA Department of Fish and Wildlife Habitat Management Grants**
  https://wildlife.ca.gov/Grants
- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

# SALT MARSH HARVEST MARSH ECOTONE LEVEE

## PROJECT SUMMARY

This project includes an ecotone levee in front of the Salt Marsh Harvest Marsh preserve from Wet Weather and storage ponds to SR-92. This levee was already raised as short-term project, so this project will be to augment the site with an ecotone, vegetated slope to create a tidal marsh transition zone that will provide wildlife refugia.

## PROJECT SITE & OWNERSHIP

- The project site is located in the southern reach of the study area, slightly inland from the Bay. East Bay Regional Parks District owns most of the site, with some portions owned by the City of Hayward.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- City of Hayward
- Alameda County Flood Control District

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process.


## COST ESTIMATE

Medium ($5-$20M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

# ORO LOMA LOP – PHASE 1

## PROJECT SUMMARY

This project is a FEMA-certified flood protection levee, designed to protect inland areas from the 1% annual chance storm with allowance for 4' of sea level rise. The levee will be integrated with a vegetated gradual slope to create a tidal marsh transition zone and area for the treatment of wastewater. This section is envisioned as the First Mile project in coordination with Oro Lomo Wastewater Treatment Plant and the East Bay Dischargers Authority. Areas behind the line of protection will be created to store stormwater when needed, including at Franks East Salinas and the southeastern corner of Oro Loma Marsh. The levee at Frank's east will need to be raised to enhance the site's stormwater storage capacity. Additionally, a tide gate at Sulphur Creek will prevent sea level rise and storm surge from entering through the levee system. A pump station near the creek will be necessary to pump stormwater to the bay side. The project also include additional sections of the Bay Trail, extending the portion created through the Oro Lomo Interim Levee further to the south and to Alameda County Landfill.

## PROJECT SITE & OWNERSHIP

- The site is located in the northern reach of the study area. It is owned by East Bay Regional Parks District.

## KEY STAKEHOLDERS

- HASPA
- East Bay Regional Parks District
- Alameda County Flood Control District
- East Bay Discharge Authority
- Oro Loma Sanitary District
- Bay Trail
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process.

EASY HARD

## COST ESTIMATE

High (>$20M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

# HAYWARD LOP – PHASE 1

## PROJECT SUMMARY

This project includes a FEMA-certified flood protection levee integrated with a horizontal levee and a new segment of the Bay Trail. The levee is designed to protect inland areas from the 1% annual chance storm with allowance for 4' of sea level rise and includes a tie-back along a raised SR-92 access road. This levee will protect the City of Hayward's Wastewater Wet Weather Storage ponds, as well as portions of the inland industrial area. The horizontal levee will create another opportunity for local discharge and treatment of wastewater. A new section of the Bay Trail will connect the portion to the south created by the SMHM interim levee and extend north to the landfill.

## PROJECT SITE & OWNERSHIP

- The project site is located in the middle reach of the site, just inland from Cogswell Marsh and along the City if Hayward WWTP ponds. The site is owned by the City of Hayward though directly adjacent to Cogswell Marsh which is owned by East Bay Regional Parks District.

## KEY STAKEHOLDERS

- HASPA
- Oro Loma Sanitary District
- East Bay Regional Parks District
- Bay Trail
- City of Hayward Public Works
- CalTrans
- Alameda County Flood Control District
- San Francisco Bay Conservation and Development Commission
- U.S. Army Corps of Engineers

## PERMITTING ASSESSMENT

While regulators are likely supportive of the intent of this project, it is likely to be time consuming permitting process.


## COST ESTIMATE

High (>$20M)

## TIME FRAME

Medium Term

## FUNDING & FINANCING RECOMMENDATIONS

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

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# NON-STRUCTURAL STRATEGIES

**This section provides an overview of policy and programmatic recommendations.**

# POLICY AND PROGRAMMATIC RECOMMENDATIONS

Achieving the master plan vision for the Hayward Regional Shoreline will require collective action on behalf of numerous stakeholders in Hayward and the Bay Area. The following recommendations for policy changes and development of new programs will, along with the structural projects outlined in the master plan, advance a forward-looking vision for the Hayward Regional Shoreline. These include policies that may be pursued by HASPA, its member agencies, as well as other stakeholders in the region. Some of the concepts outlined in this section can be advanced immediately as part of the early project phases, while others will take time to develop consensus among stakeholders and work towards implementation.

The Master Plan vision was shaped through research into existing plans and policies, as well direct engagement with stakeholders charged with planning for the future of the Hayward Regional Shoreline and the Bay Area. See chart on page 126 for a summary of relevant organizations, agencies, plans, and policies.

## 1. Advance regional dialogue into mechanisms for balancing the protection of at-risk communities and infrastructure and restoring ecosystems.

**Key Stakeholders:** HASPA, BCDC, ACFCD

There is broad support and consensus throughout the region on the need to plan for sea level rise with a focus on habitat restoration, and an evolving playbook on how to balance long-term, conflicting needs. Planning agencies, regulatory bodies, and infrastructure operators are well-aligned on the need to plan for sea level rise. While there is no clear answer on how to balance the needs of vulnerable infrastructure and communities with the opportunities to maintain and improve habitat, there are many active organizations focused on developing policies and plans to address all aspects of these issues.

HASPA should coordinate with the San Francisco Bay Conservation and Development Commission (BCDC) and other area stakeholders on using the Hayward Regional Shoreline Adaptation Master Plan as a case study in developing innovative solutions that balance these conflicting needs and developing guidance for how other stakeholders in the region can undertake similar processes.

Fully implementing the Master Plan will require an extensive permitting process. Recent reforms aimed at streamlining the process are positive signs, though they are focused on ecological restoration, and it is unclear how hybrid grey infrastructure approaches will be treated. In order to advance the Master Plan as well as similar approaches throughout the region, BCDC and other permitting agencies should coordinate on additional permitting reforms to balance near-term habitat impacts with long-term ecosystem health.

In addition, HASPA should coordinate with ACFCD and other stakeholders on how to integrate this Master Plan into their long-term plans for flood protection and stormwater management.

## 2. Increase flood protection standards for new construction and renovations.

**Key Stakeholders:** City of Hayward

A significant portion of Hayward's industrial district is at risk storm surge, sea level rise and groundwater emergence. Increasing standards for new construction means incorporating higher standards of flood protection to reduce risk to future development. Some areas may be removed from the floodplain following the construction of a FEMA-certified levee, however, additional code standards are still recommendation to serve as redundancy measures in the case of overtopping.

Hayward's current municipal code requires that the lowest floor in any new or substantial improvement of any residential structure to be at or above the Base Flood Elevation (BFE). The lowest floor of a nonresidential structure, including the basement, is required to be floodproofed so that the structure's walls located below the base flood level are substantially impermeable to the passage of water. To increase standards for new construction, an amount of "freeboard," or additional elevation above the BFE could be required and applied to all FIRM zones. These floodplain requirements also could be extended to the 500-year floodplain.

Additional improvements could include strengthening storage requirements for hazard materials in areas at risk from storm surge, as well as modifying stormwater management standards and incorporating additional requirements to manage rising groundwater tables.

These are several examples of how codes can be modified to advance the resiliency of future development to flooding. The City should pursue

a thorough review of its code standards to identify ways in which new buildings could be designed to withstand storm surge through floodproofing and manage more stormwater on site.

## 3. Remove regulatory impediments to higher standards of flood protection

**Key Stakeholders:** City of Hayward, BCDC, BRRIT

In Hayward, existing regulatory impediments may hinder enacting further resilience measures. These could include zoning height limits, permitting requirements and fees, and any unintended side effects of these policies. Removing regulatory impediments would make it easier, faster, and more affordable to adopt resilience measures.

Hayward's Industrial District encourages the development of industrial uses to promote a desirable and attractive working environment with a minimum disruption to surrounding properties. Currently under this zoning, there are no height limits in this area for industrial buildings. The maximum height for an office or commercial building is 40ft. Retaining walls which are not a part of walls of buildings shall not exceed 6 feet in height as measured from finished grade elevation to top of wall.

Hayward should review zoning code limits on buildings and walls to ensure that they would not pose a barrier to property pursuing floodproofing. Additional measures could include working alongside the San Francisco Bay Restoration Regulatory Integration Team (BRRIT) to improve the permitting process in terms of either shortening the length of providing technical assistance for the pre-application phase for flood management infrastructure.

## 4. Provide support for property owners to protect assets through loans, grants, and tax incentives.

**Key Stakeholders:** City of Hayward, State of California

A main deterrent to building resilient new construction projects or the retrofitting of existing buildings is funding. Funding in the form of loans, grants, and tax incentives will ensure more developers and property owners are able to promote resilient development. These funding mechanisms can be modeled after existing programs in California like water board brownfield remediation loans/grants or solar tax credits.

**Brownfield remediation grant[1]:**

The Targeted Site Investigation Program (TSI) is funded by the United States Environmental Protection Agency (U.S. EPA). TSI Program has been part of California Department of Toxic Substances Control (DTSC) CERCLA 128(a) State and Trial Response Program Grant. DTSC provides environmental services to local governments, school districts, and non-profit organizations to facilitate the return of brownfields to safe and productive uses. The program focused on properties with a clear need for redevelopment, strong redevelopment potential, real or perceived contamination, and municipal/ community support for redevelopment. Assessment, investigation, and cleanup planning have been provided to over 100 projects, in 68 cities, and 30 counties, throughout the State of California.

**Solar tax credits[2]:**

The Investment Tax Credit (ITC) grants an amount of 26% of the purchase cost of your solar system to homeowners. A tax credit is a dollar-for-dollar reduction in the income taxes that a person or company would otherwise pay the federal government. The ITC is based on the amount of investment in solar property. Both the residential and commercial ITC are equal to 26 percent of the basis that is invested in eligible solar property which has begun construction through 2019.

Using the brownfield remediation grants and solar tax credits as example funding mechanisms, Hayward could work to develop and secure funding for resilient development.

## 5. Develop technical support and education to help industrial businesses understand risks from sea level rise and develop mitigation actions

**Key Stakeholders:** City of Hayward, private agencies, local non-profits, and community groups

In order to develop effective resilience measures within Hayward's industrial district, climate and flood risk must be broadly understood by stakeholders in the area. Providing technical support and education specifically to industrial businesses in the area may increase protection and reduce risk. Technical support and education may include awareness campaigns, community engagement, risk audits, risk modeling, and more.

Hayward could partner with organizations like The Business Resiliency Initiative (BRI) to promote resiliency plans for industrial businesses along the shoreline. BRI is a project launched by Valley Vision and its partners to increase the resilience of our regional economy by increasing the preparedness

Sources:

1. https://www.cclr.org/DTSC_Funding#:~:text=Targeted%20Site%20Investigation%20(TSI)%20Program,school%20districts%2C%20and%20nonprofit%20organizations.

2. https://solartechonline.com/blog/california-solar-tax-credit/#:~:text=The%20Investment%20Tax%20Credit%20(ITC,down%20to%2022%25%20in%202021.

of the business community, and particularly the small business community, in the region. Valley Vision is a civic leadership organization dedicated to improving the livability of the Sacramento region.

Foundational funding support for the BRI is provided by the Sacramento Air Quality Management District (SMAQMD); the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E). BRI provides a toolkit that is designed with the small business in mind, and provides a concise, accessible, action-oriented, easy-to-use guide to creating a resiliency plan for your business.

Partnerships, like this one, could provide resources for communities to more quickly recover from and more effectively prepare for future floods and climate risks.

## 6. Plan for long-term growth management and potential strategic relocation

**Key Stakeholders:** City of Hayward

Hayward's Industrial District is one of the areas most vulnerable to future sea level rise and flooding in the City of Hayward. This district is made up of the following zoning subdistricts: Light Industrial, Industrial Park, and General industrial (See Hayward Zoning Map on next page).

The Light Industrial Subdistrict, applies to areas that generally contain small parcels located in relatively close proximity to residential areas, accommodates a wide variety of light industrial uses taking place primarily within enclosed buildings and producing minimal impacts on nearby properties.

Industrial Park Subdistrict, applies to areas with generally larger parcel sizes and uniform streetscapes, as well as areas with existing or potential industrial park development, is intended to provide areas for high technology, research and development, and industrial activities in an industrial park or campus-like atmosphere.

The General Industrial Subdistrict, applies to areas with a variety of parcel sizes and where a wide range of general industrial uses already exist, is intended to accommodate the widest variety of industrial uses including heavy industrial and warehousing/distribution uses.

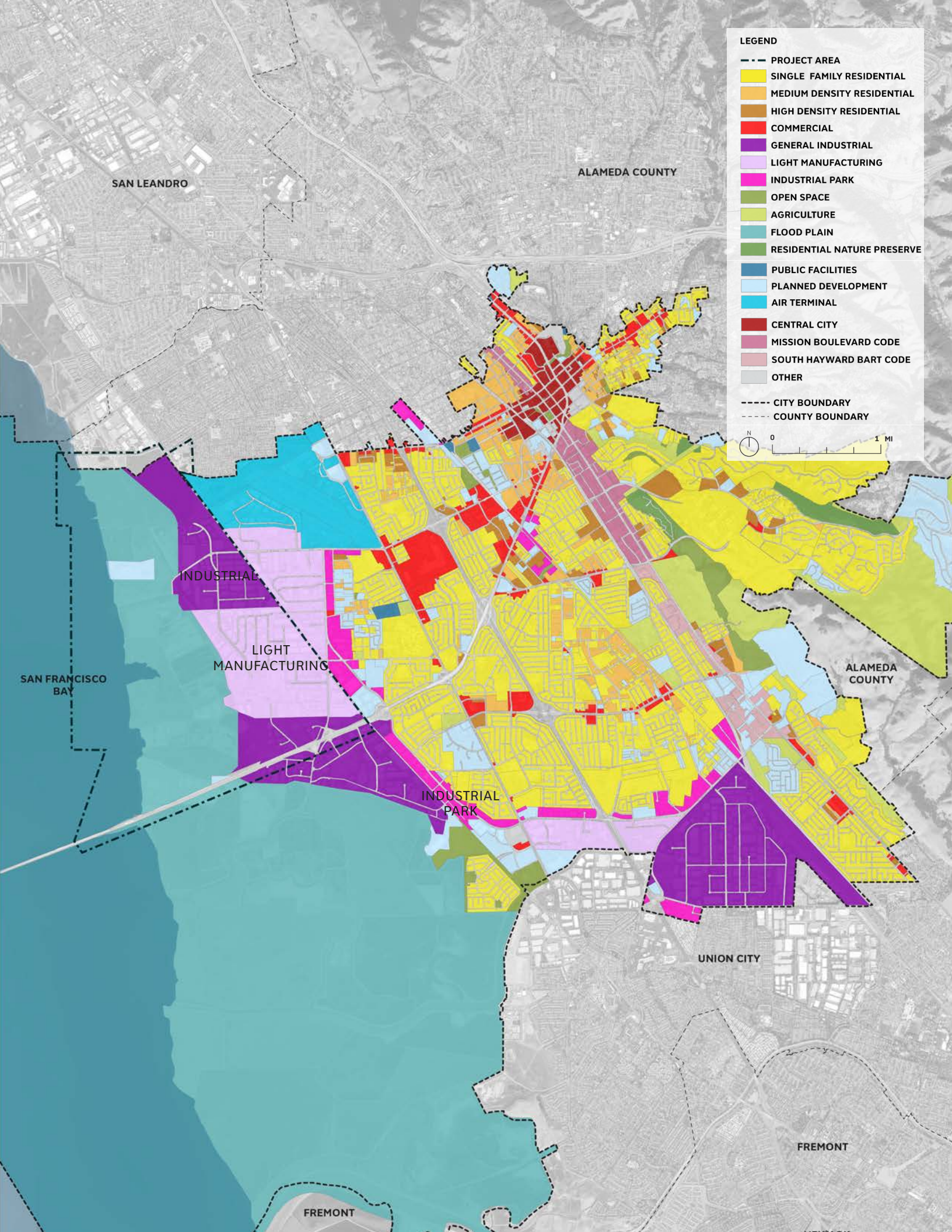
This area is also referred to as the Industrial Technology and Innovation Corridor. Future changes to this area are expected to include building and landscaping improvements, infill development, and the redevelopment of underutilized properties. The Corridor is expected to grow as an economic and employment center, achieving a balance of traditional manufacturing and information- and technology-based uses. This is also supported by Hayward's latest Capital Improvement Plan FY 2021-2030. The plan allocates technology services capital funds in the City's industrial areas to expand broadband infrastructure. The Highspeed Hayward projects aims to support business attraction efforts toward industrial areas.

Over the long-term, higher levels of sea level rise may create groundwater conditions that can no longer be managed through stormwater management strategies and will require land to either be significantly elevated or land uses to move inland. As sea level rise progresses, these issues should be monitored. Elevating the whole district would be costly, challenging to implement, and could lead to other issues, like increased subsidence and earthquake risks. Over the long-term, it may be necessary to limit additional growth and investment in the industrial district to develop a longer-term plan for more substantial changes in built form, or relocating to a safer, more viable location.

To promote reduced growth in this area in the future, zoning could be changed to other districts that allow for lower intensity of uses like Flood Plain Districts or Open Space/Parks and Recreation Districts. In addition, other planning documents and policies could be used to reduce growth in this area.

The San Francisco Bay Plan, developed by San Francisco Bay Conservation and Development Commission (BCDC), states policies and commission suggestions for the Hayward Regional Shoreline that are more aligned toward conservation. Some existing key recommendations include to preserve the interpretive center, continue to manage for wildlife and wildlife habitats, and provide wildlife compatible recreation activities. The BCDC advocates for maintaining trails and continuing to provide environmental education. The priority use in this area is designated as wildlife refuge and waterfront park/beach. These policies are consistent with reducing intensity of development in the industrial district over time.

Future changes to the Bay Plan could be used to further limit long-term growth or investment in areas at risk to sea level rise and groundwater emergence, such as the Hayward industrial district, similar to how the Bay Plan currently identifies Priority Conservation Areas (PCAs). PCAs are established through the purchase of key natural lands, or through conservation easements with willing property owners. These sites are identified in partnership with property owners, land trusts, open space districts, cities' and counties' parks and recreation departments, and other local jurisdictions.  Plan Bay Area 2040 already helps to preserve over 100 regionally significant open spaces which have a broad consensus for long-term protection but face nearer-term development pressures.


LEGEND
PROJECT AREA
SINGLE FAMILY RESIDENTIAL
MEDIUM DENSITY RESIDENTIAL
HIGH DENSITY RESIDENTIAL
COMMERCIAL
GENERAL INDUSTRIAL
LIGHT MANUFACTURING
INDUSTRIAL PARK
OPEN SPACE
AGRICULTURE
FLOOD PLAIN
RESIDENTIAL NATURE PRESERVE
PUBLIC FACILITIES
PLANNED DEVELOPMENT
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INDUSTRIAL
LIGHT MANUFACTURING
SAN FRANCISCO BAY
INDUSTRIAL PARK
ALAMEDA COUNTY
UNION CITY
FREMONT
FREMONT

# STEWARDSHIP & EDUCATIONAL PROGRAMS

The Hayward Regional Shoreline is an extraordinary resource for adjacent communities, providing access to unique recreational and educational assets across a wide extent of Baylands. The future of the shoreline is dependent on active stewardship, maintenance, and education to ensure the longevity of healthy Baylands and public awareness.

The COVID-19 pandemic shed light on the importance of the Shoreline and its key role in providing accessibility to outdoor areas that benefits public health.

The diversity of ecosystems and built infrastructure that traverse the Hayward Regional Shoreline presents a variety of opportunities for education and stewardship. With new infrastructure improvements, incorporating educational programming will engage people in the new shoreline systems and recreational assets that shape the future of their environment.

**Stewardship and Volunteer Programs:** These have the ability to build upon existing efforts at the Hayward Shoreline Interpretive Center to engage schools and the general public in the monitoring of wildlife and climate change impacts. Tracking and analyzing shoreline change will help communicate potential risks and aid in the building of a Hayward Regional Shoreline constituency. These programs can be facilitated by Naturalists and Biologists at the Hayward Shoreline Interpretive Center.

**Engagement with Schools and Service Learning:** The Hayward Shoreline Interpretive Center is set up to continue engagement with schools, and service learning with high schools and elementary schools. Connecting with students will tap into the younger generation to educate about the inherent value the Shoreline has and the need to continue to preserve its assets.

**Education Stations along the Bay Trail** can provide areas to rest and educate about the shoreline ecosystems, climate change, and adaptation strategies to climate change. A prototype of a simple kiosk and bench can easily be replicated along the shoreline to highlight key educational features.

**A robust monitoring and educational outreach strategy** can be incorporated in all future projects identified in the Phasing Strategy. This will raise awareness about the adaptation strategies and projects being implemented. Citizen science can supplement larger-scale monitoring efforts to help to inform broader applications of adaptation strategies.


EXIT

# ADDITIONAL CONSIDERATIONS

**This section provides an overview of ongoing projects, funding and financing recommendations, permitting considerations, and feasibility and operations considerations.**

# ONGOING PROJECTS

The following adjacent ongoing projects present opportunities for coordinating with the implementation of elements of the Hayward Regional Shoreline Adaptation Master Plan.

## 1. ORO LOMA HORIZONTAL LEVEE[1]

Project Summary: The Oro Loma Horizontal Levee is a pilot project to test an innovative approach to flood protection, ecosystem restoration, and wastewater treatment. Instead of a vertical wall to protect against storm surges, the Oro Loma Horizontal Levee project uses vegetation on a slope to break waves. The project consists of two components. The first is a two-acre wetland basin that can both remove nutrients from wastewater and provide extra wet weather storage capacity. The second is an experimental levee on one side of the basin. The combination of treatment wetlands and newly designed habitats, and surface and sub-surface filtering processes, will support native plants and purify water while providing flood protection.

Current Status: The project was completed in April 2017. A UC Berkeley research team is currently monitoring and evaluating the effectiveness of the project. The results will inform future discussions about horizontal levees on the East Bay Shoreline and beyond.

Coordination Opportunity: Monitoring and evaluation of the Oro Loma Horizontal Levee pilot is an opportunity to inform the design and implementation of the proposed Hayward Horizontal Levee.

Lead Agencies/Organizations: Oro Loma Sanitary District, Castro Valley Sanitary District, UC Berkeley

## 2. FIRST MILE HORIZONTAL LEVEE[2]

Project Summary: The First Mile Horizontal Levee project builds off the Oro Loma Horizontal Levee project. The goal of this project is to design and seek funding for a full-scale Horizontal Levee in the East Bay Discharge Authority service area. This project has received funding from the Environmental Protection Agency's (EPA) San Francisco Bay Water Quality Improvement Fund.

Current Status: As of December 2019, this project is in the siting, design, and permitting phase.

Coordination Opportunity: The First Mile Horizontal Levee could connect with the proposed Hayward Horizontal Levee in the northern reach of the study area to form a connective regional system for coastal protection, wastewater treatment, and ecosystem improvement.

Lead Agencies/Organizations: East Bay Dischargers Authority, San Francisco Estuary Partnership

## 3. TREATMENT WETLANDS STUDY FOR WET WEATHER STORAGE PONDS[3]

Project Summary: EBDA plans a feasibility study to examine the potential for seasonally repurposing the oxidation ponds for effluent treatment during the summer and wet weather storage during the winter.

Current Status: Scoping of study underway now.

Coordination Opportunity: This feasibility study could further examine the proposed horizontal levee throughout the Hayward study area as part of a regional strategy for managing wastewater and providing ecosystem restoration.

Lead Agencies/Organizations: East Bay Dischargers Authority, City of Hayward

## 4. HAYWARD MARSH RESTORATION STUDY[4]

Project Summary: EBRPD will be examining opportunities to improve the functioning of the tidal marsh habitat and potential for new high ground of islands for wildlife refugia, particularly least terns.

Status: Scoping of study underway now.

Coordination Opportunity: The Hayward Marsh study is an opportunity to further examine the preferred alternative and alternate configuration for Hayward Marsh including creation of tidal habitat, the alignment of coastal protection, and the location of the least tern nesting colony.

Lead Agencies/Organizations: East Bay Regional Park District

## 5. DON CASTRO SEDIMENT PIPELINE[5]

Project Summary: The Don Castro Sediment Pipeline will allow the Alameda County Flood Control and Water Conservation District to transport sediment removed from the bottom of the Don Castro Reservoir to the Salt Pond Restoration projects in the Eden Landing Salt Ponds. The existing sediment volume is estimated to be 450,000 cy. The preliminary design includes approximately 12.4 miles of 20" RCP and HDPE pipeline and four pump stations.

Status: Project under review and consideration by ACFCD

Coordination Opportunity: The sediment pipeline is a potential opportunity to provide a sediment source for the proposed marsh restoration projects in the Hayward Regional Shoreline Adaptation Master Plan

Lead Agencies/Organizations: Alameda County Flood Control and Water Conservation District

## 6. COUNTY LANDFILL SOLAR FARM[6]

Project Summary: West Winton landfill will be transformed into a solar farm, providing 6.6 megawatts of power, enough to power 1,200 homes. It is one of the largest solar project in the state and is part of the Regional Renewable Energy Procurement effort which aims to create solar network on publicly owned property around the Bay Area.

Status: Construction was expected to start in August 2015

Coordination Opportunity: Ongoing coordination is needed with the solar farm plan and the implementation of shoreline protection along West Winton Landfill

Lead Agencies/Organizations: Alameda County General Service Agency, Sun Edison

## 7. SAN LORENZO COMMUNITY PARK PHASE 2[7]

Project Summary: This project provides for the development of construction documents for the San Lorenzo Community Park Phase 2 & 3 portion of the existing 31-acre community park. Phase 1 improvements were completed in 2017. Phase 2 improvements include a multi-purpose field, two soccer fields, a dog park, community green, a neighborhood play area, additional picnic facilities and exercise stations and parking. Construction of Phase 2 will be funded with future Bond proceeds. The third and final phase will renovate the existing 8,200 square-foot community center as well as the remainder of the park adjacent to the center. Construction of phase 2 and 3 will be funded by future bond agreements.

Status: This project was estimated to start in the summer of 2020.

Coordination Opportunity: There is an opportunity to improve the connection from this park and other recreation assets in the region, as well provide stormwater retention, through the implementation of the Hayward Regional Shoreline Adaptation Master Plan.

Lead Agencies/Organizations: Hayward Area Recreation and Park District

## 8. ACFCD STORMWATER STUDY

Project Summary: ACFCD is studying the combined impacts of sea level rise (up to 2 feet) and increased precipitation on water levels in the bay and inland waterways, and examining potential flood control infrastructure needs throughout its service area.

Status: The first phase of the study to develop a model of the region is underway now. Future phases will include proposals for new and modified flood control infrastructure.

Coordination Opportunity: There is an opportunity to more deeply examine proposed near-term flood control infrastructure needs as part of this study, such as floodwalls along channels, tide gate, pump station improvements, and others as identified, in ways that are consistent with the preferred alternative.

Lead Agencies/Organizations: Alameda County Flood Control District

## 9. GRAVEL BEACH FOR EROSION CONTROL PILOT

Project Summary: The California State Coastal Conservancy is examining he feasibility of an expanded gravel beach in the south bay to provide shoreline habitat and reduce erosion of tidal marshes and mudflats.

Status: Under design now.

Coordination Opportunity: Monitoring and evaluation of the gravel beach pilot project offers an opportunity to inform the design and engineering of erosion control strategies for the Hayward Regional Shoreline Adaptation Master Plan.

Lead Agencies/Organizations: TBD

Sources:


1. Oro Loma Sanitary District, "Horizontal Levee Project," https://oroloma.org/horizontal-levee-project/

2. East Bay Dischargers Authority, "Projects," https://ebda.org/projects/

3. Source: Phone call with EBDA and Hayward Shoreline Master Plan Technical Advisory Committee, 6/29/2020

4. Source: Phone call with Hayward Shoreline Master Plan Technical Advisory Committee, 7/1/2020

5. Technical Memo from WRI to ACFCD, 11/15/13

6. Alameda County, Public Works Department, Resolution, May 7, 2015, http://www.acgov.org/board/bos_calendar/documents/DocsAgendaReg_05_12_15/SITTING%20AS%20THE%20FLOOD%20CONTROL%20AND%20WATER%20CONSERVATION%20DISTRICT/Regular%20Calendar/ACPWA_217937.pdf

7. Hayward Area Recreation and Parks District, Capital Improvement Projects, https://hard.icitywork.com/

# FUNDING & FINANCING RECOMMENDATIONS

With the global impact of the COVID-19 crisis, cities and utilities are facing unprecedented economic challenges. The timing of lockdowns and associated revenue losses in Spring 2020 aligned with the final quarter of many local government fiscal years and the balanced budget requirements of most state and local governments are likely to make coming budget years (starting with FY21) especially difficult. With that backdrop, funding and financing for major capital projects and infrastructure investments will not be as straightforward or predictable as in years past.

Despite these challenges, there are opportunities to strategically move forward green and resilient infrastructure projects as part of a broader economic recovery strategy. Taking advantage of these resources will require a balance between being opportunistic, particularly about short-term recovery and stimulus funds, and strategic about longer-term costs and needs. The following recommendations offer a flexible approach for pursuing short, medium, and longer-term resources to advance the vision for the full Hayward Shoreline Adaptation Master Plan. Most of these funding and financing options will require coordination among multiple stakeholders and decision-makers. Depending on the source (sectoral focus) of specific funds, the lead applicant will also likely vary. Because the budget and revenue impacts of COVID-19 are anticipated to be far-reaching, none of the recommended funding sources in this section are mutually exclusive, and pursuing multiple funding sources is strongly recommended as an "all of the above" approach to maximize both public and private resources for implementation.

## Recommendations

There are several key elements of the Hayward Shoreline Adaptation Master Plan that offer a strong basis for public funding and private financing to support ecosystem restoration and enable long-term risk reduction. These elements include:

- Protecting infrastructure and high-value assets (e.g., Oro Loma waste water treatment plant and sludge ponds, PG&E transmission lines)
- Protecting critical rail corridors and roadways (SR-92) from disruption
- Reducing short- and long-term flood risk and flood losses
- Enhancing regional economic resilience

The types of funds available for these kinds of projects can be divided into two main categories: ecosystem-specific funds and broader economic and regional development funding sources. While the Hayward Shoreline Adaptation Master Plan as a whole is designed to create myriad ecosystem benefits, the four elements above align particularly well with broad funder and investor interests in creating quantifiable benefits, for example, measurable risk reductions and long-term cost savings. Given the scope of the Hayward Shoreline Adaptation Master Plan, these types of funding applications should be as detailed as possible about the anticipated economic benefits and outcomes of the proposed project to support the pursuit of larger funding amounts rather than niche, piecemeal grants. For ecosystem specific funds, HASPA and its partners should seek support to quantify the economic and financial benefits of key ecosystem services for stormwater management, wastewater treatment, and erosion control, among other services to lay the data and analytic groundwork for tapping into larger and more general funding sources in future.

This section highlights several large-scale general and ecosystem-specific funding opportunities. The recommended resources are organized into three main categories:

- **Short-term:** Apply within the next 1-2 years for projects to be initiated and completed in less than 10 years
- **Medium-term:** Prepare applications for submission within 2-5 years for projects to be completed in the 10-25 year timeframe
- **Long-term:** Initiate long-term data gathering and analysis to support eventual application for projects in the 25+ year time horizon

The final sub-section lists additional non time-sensitive resources for regional projects or program-specific solutions, such as environmental education, that can also be pursued for project implementation, operations, and maintenance moving forward.

## Leveraging Existing Sources of Support & Meeting Matching Fund Requirements

The Hayward Shoreline Adaptation Master Plan is well aligned with multiple complementary initiatives and investments. In addition to providing direct support for aspects of the Hayward Shoreline Adaptation Master Plan, projects that are already funded or highly likely to move forward can help meet local funding "match" or cost-share requirements that can be up to 50% of the total award for some larger federal funding applications. Examples of these types of existing and potential near-term sources of support include:

**Transforming Shorelines Project**—In 2019 the Oro Loma Sanitary District completed construction on a $9.1 million, 8-million gallon wetland basin or 'horizontal levee.' In addition, the USEPA made a $1.5 million award to the San Francisco Estuary Partnership to evaluate the project for its treated wastewater filtration and storm surge protection benefits and complement EBDA's related work on the First Mile Horizontal Levee Project.

**US Army Corps of Engineers Resilient San Francisco Bay Project**—In 2018 the Army Corps selected the San Francisco Bay as one of ten communities in its beneficial use of dredged material pilot program. The total project cost is estimated to be $51.05 million over 10 years. The California State Coastal Conservancy covers the 35% non-federal cost-share requirement for the project as the non-federal sponsor and implementing agency for four restoration sites.

**Wetlands Mitigation Banking**—Explore engagement with BART, CALTRANS, and other major project developers seeking wetlands mitigation options to provide funding for eligible segments of the project, including creating a publicly owned conservation or mitigation bank for eligible portions of the Hayward Shoreline Adaptation Master Plan.

## Short-Term Regional and Federal Funding Opportunities

The level of detail in the Hayward Shoreline Adaptation Master Plan offers a strong basis for applying for larger regional and federal grants (~$10-$30 million) for the next level of design development and implementation. The amounts of funding and application timeframes vary by agency, but the funding opportunities below are already available or anticipated to be released in the 2020 and 2021 calendar years. These early stage funds can significantly advance the next phase of project design and implementation and lay the groundwork for seeking additional resources for future phases of work.

**Department of Commerce Economic Development Administration (EDA) FY20/21 Public Works and Economic Adjustment Assistance Program**

The EDA makes annual grants for projects that support sustainable regional economic growth and diversification. Two of its key investment priorities are:

(1) Recovery & Resilience: Projects that assist with economic resilience and long-term recovery from natural disasters and economic shocks.

(2) Critical Infrastructure: Projects that establish the fundamental building blocks of a prosperous and innovation-centric economy and a secure platform for American business, including physical (e.g., broadband, energy, roads, water, sewer) and other economic infrastructure.

The portions of the Hayward Shoreline Adaptation Master Plan that specifically protect infrastructure and access to critical services (via rail and roadways) are especially well suited for this type of funding. The ceiling for awards is $30 million, applications are accepted on a rolling basis until program funds are expended, and projects must connect to an existing EDA approved Comprehensive Economic Development Strategy (CEDS). An additional $1.5 billion in funds was also made available in May 2020 for projects that help communities "prevent, prepare for, and respond to coronavirus" or respond to "economic injury as a result of coronavirus."

*Recommendation:* Reach out to ABAG to discuss how the Hayward Shoreline Adaptation Master Plan connects to the current Bay Area CEDS and explore options for applying for $5-$30 million in funds. Identify potential matching funds to meet EDA's 50% cost-share requirement for standard public works grants and develop more detailed workforce and job creation benefits estimates in preparation

for either a CARES Act (coronavirus response) or standard application for the FY21 grant cycle.

**FEMA Building Resilient Infrastructure and Communities (BRIC) Program**

As part of the Disaster Recovery Reform Act of 2018 (DRRA), FEMA established a new grant program on Building Resilient Infrastructure and Communities (BRIC). This program replaces the existing Pre-Disaster Mitigation program and will be funded by a 6% set-aside from every major disaster declaration. Funds will go to a National Public Infrastructure Pre-Disaster Mitigation Fund for projects that improve community resilience before a disaster occurs. Total funds are anticipated to be $300-$500 million/year on average. The program opened its first application cycle in September 2020.

*Recommendation:* Review BRIC program notice of funding availability and guidance materials and begin assembling relevant risk-reduction and mitigation metrics for an application in the next one to two funding cycles.

**SF Bay Restoration Authority (Measure AA funds) Grant**

The SF Bay Restoration Authority awarded the first round of grants funded by Measure AA in April 2018. Since then the Authority has funded 14 projects ranging in size from $175,000 to just over $60 million. Funds are made available through a competitive RFP process at least once and up to twice each year based on the availability of and demand for funds.

*Recommendation:* Follow-up on the $500,000 Hayward Marsh Restoration Project application (recommended for funding in May 2020) to discuss a larger submission for the next grant application cycle and/or submittal of the Hayward Shoreline Adaptation Master Plan as a "multi-benefit wetland restoration projects for consideration and possible addition to the Bay Restoration Regulatory Integration Team's (BRRIT's) priority project list." Discuss plans for also pursuing federal funds in alignment with Measure AA's emphasis on leveraging additional resources.

## Medium-Term Resources & Recovery Funds

Given the depth and breadth of COVID-19's impacts on the US economy as a whole, it is likely that the federal government will develop additional economic stimulus and recovery funding measures that stretch over the next 2-3 years. While it is unclear if any of these measures will focus specifically on infrastructure or a "green stimulus," there is a high likelihood that projects that create strong workforce and jobs benefits and support local governments through periods of significant revenue loss will be prioritized. In order to best prepare for applying for these funds once available, HASPA and its member agencies should invest up-front in developing a strong quantitative case on the regional economic (protecting infrastructure, industry, and critical services) and workforce benefits (short-term construction and longer-term O&M) of the Hayward Shoreline Adaptation Master Plan.

Other medium-term funding opportunities, to consider include:

- State stormwater and ecosystem grants (e.g. remaining Prop 1 & Prop 68 funds)
- Federal grants/loans for sector-specific project elements
    - DOT funds for SR-92 upgrade (causeway elevation) with CalTrans
    - EPA (grants & state revolving loan funds) for wastewater treatment plant upgrades and protections with the Oro Lomo Sanitary District

*Recommendation:* Reach out to regional philanthropies with a focus on nature-based solutions and green workforce issues to pursue grant funding for a comprehensive workforce, economic resilience, and equity study to complement the Hayward Shoreline Adaptation Master Plan. Develop relevant workforce training and community partnerships in preparation for future economic recovery funding applications. Coordinate with the Oro Lomo Sanitary District and CALTRANS to align interests for pursuing future EPA and DOT funds.

## Longer-Term Public and Private Finance Options

Once the local economic recovery from COVID-19 has more firmly taken hold, HASPA and its member agencies can also explore how revenue mechanisms and private finance can be brought in alongside federal and state funds for implementing the Hayward Shoreline Adaptation Master Plan. The timing for pursuing any of these options will depend on the financial position of the city, utility, and local taxpayers and their respective willingness to take on additional costs or fees to support the project. Some potential options include:

- Develop a new public-private partnership (P3) with a major infrastructure fund or operating firm to finance specific project components that generate operational saving, such as reduced pumping costs, reduced maintenance or asset replacement costs, lower losses, or lower liability (for example, from flood damages). The options for designing a performance based P3 to capture savings and efficiencies will depend heavily on the financial position and interests of the primary public partner (likely the utility) and need to take into account market impacts of COVID-19. The Prince George's County Clean Water Partnership in Maryland is a highly successful example of a Community Based P3.

- Work with the beneficiaries of the proposed shoreline protections to create a new coastal Geologic Hazard Abatement District (GHAD) or risk pool to bring together a majority of beneficiaries to directly finance elements of the project. Explore options for pooling insurance savings from reduced flood losses.

    - A GHAD is an administrative entity created by a majority of property-owners or a sponsoring agency in a designated area to collect property-based fees to address probable geologic hazards, including flood and erosion risks, and help stabilize property and asset values.

    - A public entity risk pool is a not-for-profit, member-driven public organization that typically provides more affordable insurance coverage than otherwise available. Participating entities can be co-owners of the pool, and pools are typically governed by elected member boards.

For suggested models for both GHADs and risk/resource pools, see SPUR and SFEI's governance recommendations for regional shoreline protection.

*Recommendation:* Collaborate with one or more philanthropies in the impact investing space to convene leading private sector firms in a workshop to explore options for a new P3 or risk pool, discuss the pros and cons of specific approaches, gather market insights, and gauge interest from potential investors and partners. Explore equitable cost-share or PPP structures to avoid reinforcing existing economic and social inequities. For example, consider innovative approaches to equitable financing structures to ensure that socially and economically vulnerable residents are not paying beyond their means and/or that project areas with greater ability to pay are not receiving more immediate protection at the expense of others.

## Additional Resources

In addition to the strategic funding recommendations above, below is a more general list of resources that HASPA and its members and collaborators can pursue as funds become eligible/available to implement specific aspects of the Hayward Shoreline Adaptation Master Plan.

### Federal Funding Opportunities

- **EPA Water Infrastructure and Resiliency Finance Center**—Catalogue of financing tools and resources to help local decision makers make informed decisions for drinking water, wastewater, and stormwater infrastructure to protect human health and the environment.
- **DOT Federal Highway Administration (FHWA) Resilient Infrastructure**— Support for expenditures that improve the resilience of transportation assets to changing conditions are generally eligible under the National Highway Performance Program and the Surface Transportation Block Grant Program (potential grant funding for eligible Hayward Shoreline Adaptation Master Plan elements aligned with CALTRANS roadway resilience investments).
- **HUD Community Development Block Grant Mitigation (CDBG-MIT) Program**—Assistance for areas with qualifying disasters to support projects that increase resilience and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship by lessening the impact of future disasters.
- **EPA and National Environmental Education Foundation (NEEF) Environmental Education Grants**—Support for environmental education projects that promote awareness and stewardship and provide people with the formal and informal skills to take action to protect local and regional ecosystems, such as training for citizen science activities for baseline and predevelopment data collection and monitoring.

### California State Grants

- *CA Natural Resources Agency*—State grant resources available for Trails and Greenways; Environmental Enhancement and Mitigation; Green Infrastructure; Urban Greening; and Cultural, Community and Natural Resources. https://resources.ca.gov/grants/Grant-Program-Resources
- *CA Department of Fish and Wildlife*—The State Wildlife Grant (SWG) Program provides federal grant funds for the development and implementation of programs for the benefit of wildlife and their habitat, including species that are particularly vulnerable to climate change. https://wildlife.ca.gov/Grants/State-Wildlife-Grants
- *CA Department of Parks and Recreation*—The Office of Grants and Local Services (OGALS) develops grant programs that provide funding for local, state, and nonprofit organization projects. Grant projects generally address park, recreation and resources related needs. http://www.parks.ca.gov/?page_id=29742
- *CA Department of Water Resources*—Grant and loan programs that support integrated water management activities, environmental stewardship, water supply reliability, public safety, and economic stability. https://water.ca.gov/Work-With-Us/Grants-And-Loans
- *State Water Resources Control Board (via the CA Financing Coordinating Committee)*—The SWRCB's Division of Financial Assistance provides funding for projects that preserve, enhance, and restore California's water resources. Financial assistance programs include loan and grant funding for planning, design, and construction of the following general project types: municipal sewage and water recycling facilities, drinking water infrastructure for public water systems, groundwater clean-up, storm water management, nonpoint source pollution control, and watershed protection. https://www.cfcc.ca.gov/funding-programs/
- CA Wildlife Conservation Board—Annual grants for wildlife conservation and related public recreation https://wcb.ca.gov/Grants#86211-current
- *CA Coastal Conservancy*—Annual grants to non-profit organizations, public agencies, and federally-recognized tribes for projects that restore and protect the California coast, increase public access to it, and increase communities' resilience to climate change. https://scc.ca.gov/grants/
- *SF Bay Restoration Authority (Measure AA funds)*—Annual grants for habitat restoration, flood protection, and shoreline access projects from a 20-year parcel tax (~$25 million/yr). http://sfbayrestore.org/overview

### Follow-on Funding for Ongoing Regional Projects

- *Alameda County Flood Control & Water Conservation District (ACFCD)*— Explore additional funding opportunities to use the Don Castro sediment pipeline as a potential sediment source for the proposed marsh restoration projects in the Hayward Shoreline Adaptation Master Plan.
- *East Bay Dischargers Authority (EBDA)*—Opportunity to collaboratively seek funding to link the First Mile Horizontal Levee with the proposed Hayward Horizontal Levee in the northern reach of the study area to form a connective regional system for coastal protection, wastewater treatment, and ecosystem improvement and provide additional support for full-scale implementation of both projects.
- *East Bay Regional Park District (EBRPD)*—Potential for coordination with and follow-up to Hayward Marsh Restoration Study to enhance coastal protection alignment to support tidal marsh

habitat functioning and identify high ground of islands for wildlife, particularly least terns.

- *Oro Lomo Sanitary District*—Data sharing from monitoring and evaluation of the Oro Loma Horizontal Levee pilot to inform design and implementation of the proposed Hayward Horizontal Levee and support additional funding applications for implementation and evaluation.

# PERMITTING CONSIDERATIONS

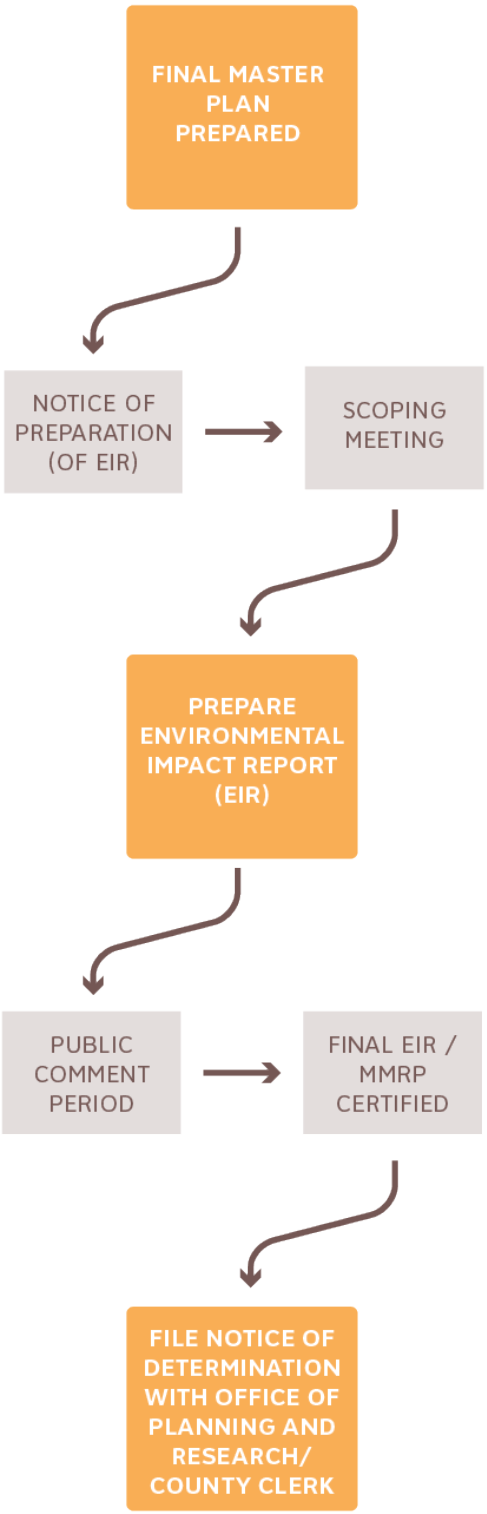
Implementation of the Hayward Regional Shoreline Adaptation Master Plan will require numerous permits and an environmental review process. This process will engage a variety of local, state, and federal agencies, many of whom have been engaged throughout the process to lay the groundwork for the implementation of the plan.

**California Environmental Quality Act (CEQA)** requires state and local agencies to assess the potential environmental impacts of proposed projects, disclose this information to decision makers and the public, and reduce the impacts to the extent feasible. Following the completion of the Master Plan, HASPA will determine how to proceed with preparing an Environmental Impact Report (EIR), which should include potential elements and projects. There may be potential environmental impacts to wetlands and endangered species that will require analysis and potential mitigation. The CEQA process will also involve public review and comment, as well coordination with permitting actions by various resource agencies (see below).

If federal funding or federal discretionary approval is required by any element of the Master Plan, HASPA will also need to follow the requirements of the National Environmental Policy Act (NEPA), including the development of an Environmental Impact Statement (EIS). The EIS and EIR can be combined into a single document but must meet the requirements of both.

In addition to environmental review, permits from a variety of state and federal agencies will likely be required for elements of the master plan. This includes:

- Bay Conservation and Development Commission (BCDC)
- California Department of Fish and Wildlife (CDFW)
- San Francisco Regional Water Quality Control Board (WQCB)
- U.S Fish and Wildlife Service (USFWS)
- NOAA Marine Fisheries Service (NMFS)
- U.S. Army Corps of Engineers (USACE)




**CEQA Flow Process**

Notes:

1 CEQA– California Environmental Quality Act

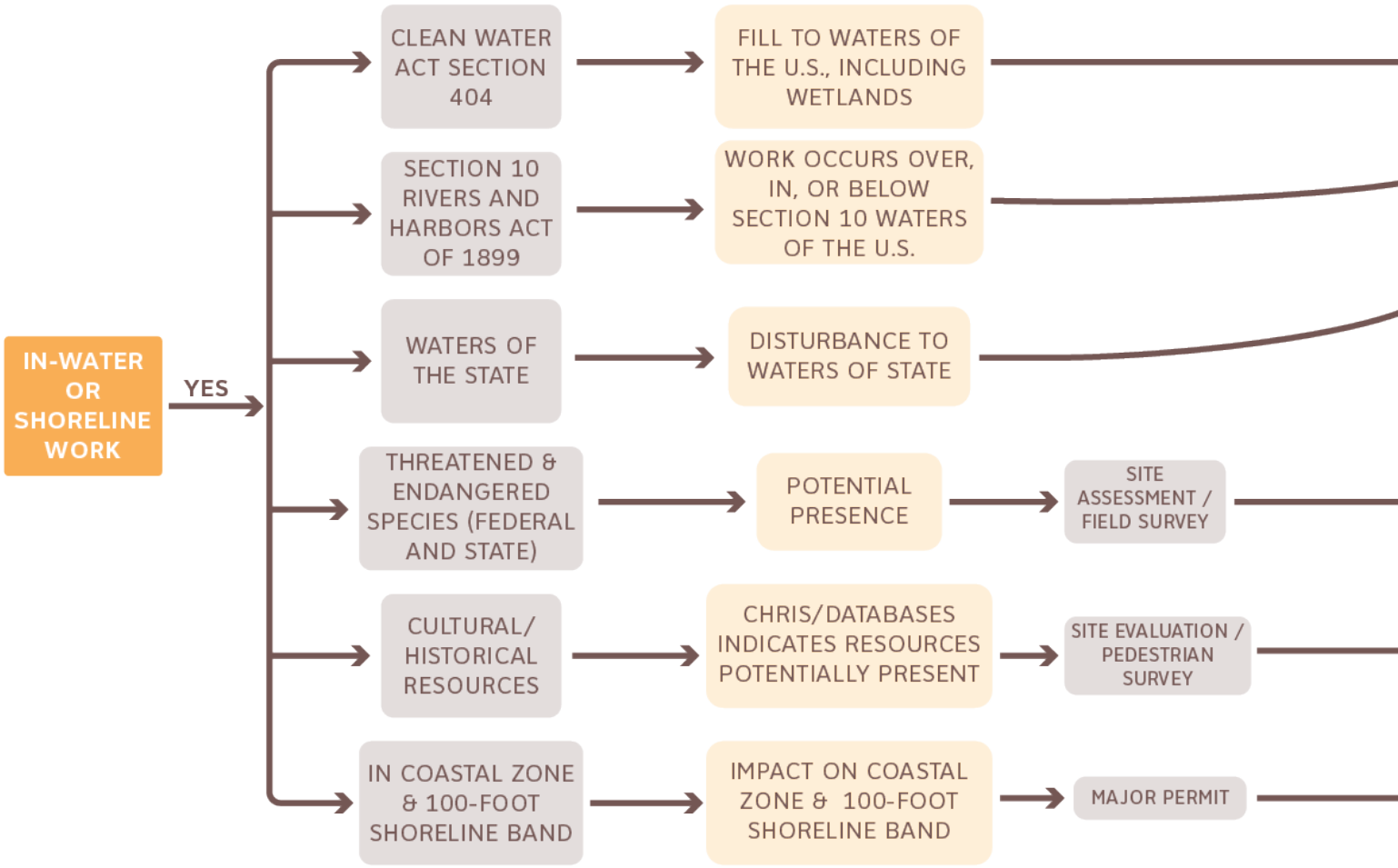
2. EIR– Environmental Impact Report

3. MMRP – Mitigation, Monitoring, and Reporting Plan

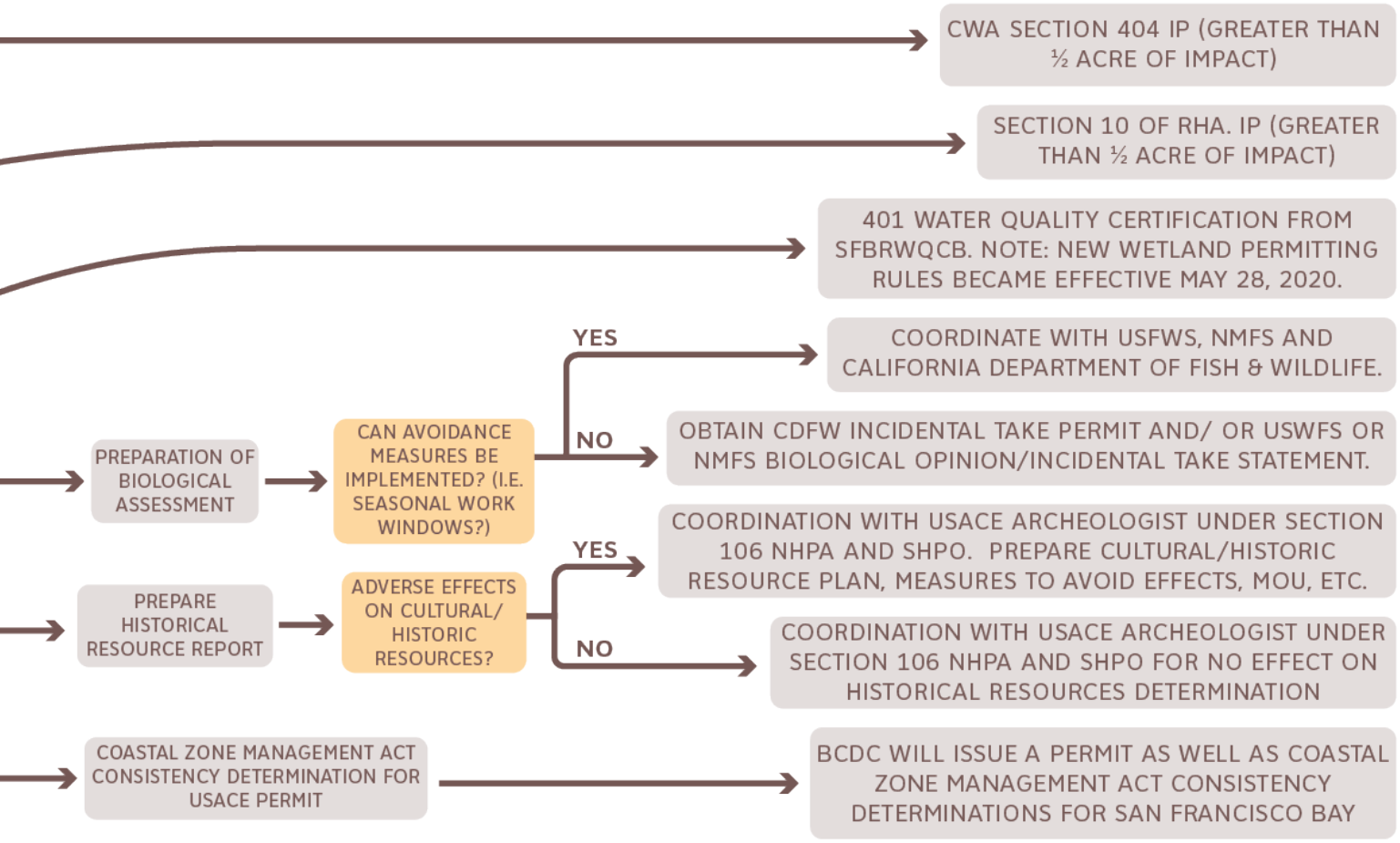
# PERMITTING

Projects implemented in the Hayward Regional Shoreline involve an extensive permitting process and many regulatory requirements that involve local, state, and federal agencies. These requirements will likely drive the implementation process.

The permitting flow of in-water or shoreline projects is outlined below:

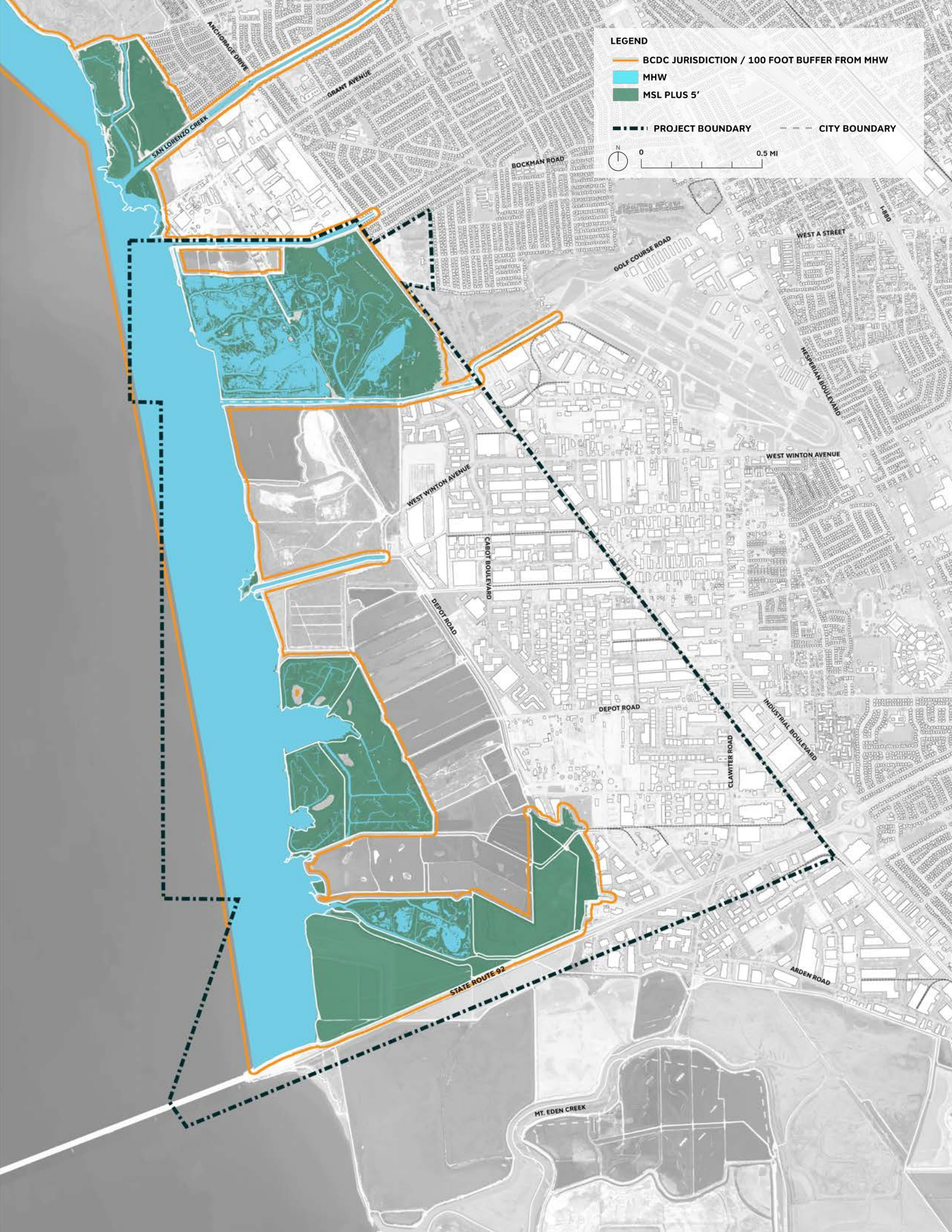



**Permitting Flow Diagram**




Notes:

1. BCDC – San Francisco Bay Conservation and Development Commission.
2. NHPA – Section 106 of the National Historic Preservation Act
3. USACE – United States Army Corps of Engineers
4. SHPO - State Historic Preservation Office
5. SFBRWQCB – San Francisco Bay Regional Water Quality Control Board
6. CWA – Clean Water Act, Sections 404 and 401
7. RHA – Section 10 of the Rivers and Harbors Act
8. IP – Individual Permit (under CWA Section 404)
9. CDFW – California Department of Fish and Wildlife


LEGEND
BCDC JURISDICTION / 100 FOOT BUFFER FROM MHW
MHW
MSL PLUS 5'
PROJECT BOUNDARY
CITY BOUNDARY
N
0
0.5 MI
ANCHORAGE DRIVE
GRANT AVENUE
SAN LORENZO CREEK
BOCKMAN ROAD
GOLF COURSE ROAD
WEST A STREET
I-880
HESPERIAN BOULEVARD
WEST WINTON AVENUE
WEST WINTON AVENUE
CABOT BOULEVARD
DEPOT ROAD
DEPOT ROAD
INDUSTRIAL BOULEVARD
CLAWITER ROAD
ARDEN ROAD
STATE ROUTE 92
MT. EDEN CREEK

# BCDC JURISDICTION MAPPING

A map depicting the jurisdiction of the Bay Conservation and Development Commission (BCDC) was developed to aid in the development of master plan consistent with the Bay Plan. The Bay Plan was adopted in 1968 to guide future uses of the Bay and the shoreline. The BCDC issues permits for activities within its jurisdiction for filling and dredging of the bay, as well as shoreline development. BCDC's bay jurisdiction includes all areas subject to tidal action, including lands under water and up to five feet above mean sea level. The shoreline band jurisdiction is defined as a band extending 100 feet landward of the shoreline. Salt ponds and managed wetlands existing as of 1969 are also included in the BCDC's jurisdiction. In addition, the map shows areas o the study area that identified as either salt ponds or tidal marshes in the Bay Plan, as well as areas with priority uses, such as waterfront park or wildlife refuge.

# FEASIBILITY & CONSTRUCTABILITY CONSIDERATIONS

A broad range of feasibility and constructability considerations were incorporated into the development of alternatives and selection of the preferred alternative. However, there are additional issues that will need to be evaluated in subsequent engineering feasibility and design phases, as described below.

**Line of Protection**

More detailed analysis is needed to determine an optimal flood protection design height, considering costs, technical feasibility, and risk reduction benefits. A detailed cost benefit analysis should be conducted that compares the costs of the flood protection system, including design, permitting, and mitigation, to the cost of inaction.

More information and technical analysis of urban hydrology and hydraulics is needed to develop a comprehensive strategy for flood protection, in coordination with ACFCD.

Geotechnical surveys will be required to better understand subsurface conditions, which may inform the feasibility of the line of protection alignment and other project elements, as well as their eventual design.

In addition, more detailed technical analysis will be needed to evaluate the proposed tie-ins to high ground, access needs across the line of protection (for transportation connectivity, wildlife, safety, etc.) as well as evaluate the potential for increasing flood levels in surrounding communities.

Land ownership will need to be confirmed and any necessary easements (for construction as well as operations and maintenance) will need to be identified and secured.

To qualify the area for reduced flood insurance premiums, the flood protection levee will need to be designed to meet FEMA standards. This includes:

- Meeting flood elevation and freeboard requirements, which have been assumed throughout the master plan)
- Designing openings and closures following sound engineering practice, which often means limiting active deployable elements),
- Ensuring the stability of the embankment and foundation to erosion, seepage, and settlement
- Interior drainage must be managed, which will require further analysis of the joint probability of interior and exterior flooding

At the landfills, more information on existing conditions is needed to better understand what is needed from a flood control perspective, and to evaluate the need to address other issues, including the potential need for subsurface cut-off to prevent release of contaminants.

**Tidal Habitat**

Further analysis is needed of the proposed muted marsh tide gates at HARD Marsh to ensure water levels are maintained at elevations appropriate for target ecosystems.

**Erosion Control**

More detailed study of erosion process and drivers and engineering solutions will be needed, particularly around the landfill where more information is needed on existing conditions and future needs and objectives.

**Stormwater Management**

More detailed analysis of the stormwater management system will be needed including geotechnical surveys as mentioned above, as well as coordination with ACFCD to develop a management plan. While there has been significant new analysis of groundwater emergence risks, more analysis is needed to understand effectiveness of various approaches to managing groundwater.

In addition, while there is inland storage identified in the preferred alternative, identification of additional inland storage opportunities to reduce pumping needs is recommended.

**Wastewater Treatment**

Further technical engineering analysis is needed of wastewater management elements of the preferred alternative in coordination with EBDA. This includes assessing space needed for the treatment wetland, as well as how the design may be impacted by the potential decommissioning of the EBDA pipeline.

**SR-92**

Additional study is needed of the proposed elevated pile-supported structure as part of a long-term plan for the bridge is needed.

# OPERATION & MAINTENANCE CONSIDERATIONS

As a dynamic, highly managed coastal system, ongoing operations and maintenance will be an import element of the success of the Master Plan. Likewise, the operations and management approach of various project elements need to be adaptable and dynamic in order to respond to changes in conditions and evolving needs. The operations and management considerations outlined below will be highly dependent on the rate of sea level rise, which is highly uncertain. Thus, ongoing monitoring and reevaluation of operating procedures and maintenance needs will be necessary.

Additional coordination with ACFCD, EBDA and others will also be needed to develop more specific plans for operations and management of specific elements of the Master Plan.

### Line of Protection

In addition to the design requirements to meeting FEMA standards above, the flood protection levee and related stormwater drainage system needs have an operations and maintenance plan, which must include:

- Flood warning system, including triggers for emergency operation and proof of adequate time between triggers and completed operation of all closure structures and mechanized drainage elements
- Operational plan including specific names or titles of responsible individuals
- Periodic operation and inspection of closure structures and mechanized drainage systems
- Provision of manual backup for the activation of any automatic systems

In addition, FEMA requires that one or more public agencies be identified as responsible parties for the operations and maintenance plan (it cannot be a private entity).

### Tidal Habitat

Sediment sources need to be identified and a plan for monitoring the impacts of sea level rise on wetlands and placement of sediment will need to be developed.

### Erosion Control

Erosion should be monitored over time. Ongoing maintenance and repairs will be necessary, and needs will evolve over time dependent on storm events and the rate of sea level rise.

### Stormwater Management & Wastewater Treatment

Active stormwater management and wastewater treatment structures, such as pump stations and tide gates on Bockman Channel, Sulphur Creek, and Line A will require funding for ongoing operation. These needs depend upon storage capacity and may be re-evaluated as additional storage opportunities are identified. All elements will require ongoing maintenance and repairs, as necessary.

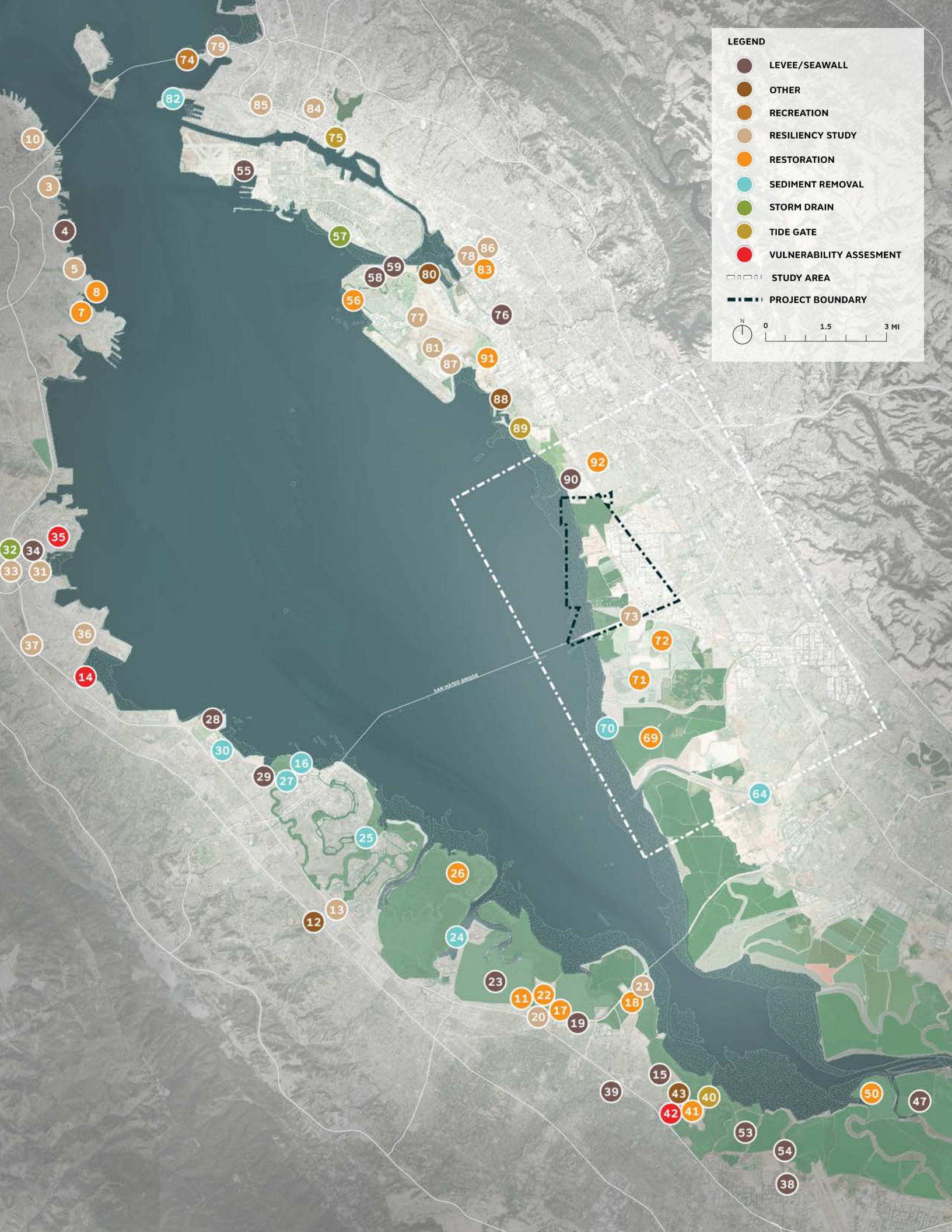
# GOVERNANCE CONSIDERATIONS

## COORDINATION ACROSS AGENCIES AND ORGANIZATIONS

Implementation of the full range of proposed projects that are part of the preferred alternative will rely on actions of multiple stakeholders. As the lead for the development of the master plan, HASPA and its member agencies are critical stakeholders who are likely to take a lead role in implementing elements of the proposed project that are under their direct control, however other elements will require leadership from other agencies, including Alameda County Flood Control District (ACFCD), East Bay Dischargers Authority (EBDA), CalTrans, and others. In addition, there are numerous additional projects in the study area that present near-term coordination opportunities or necessities (as discussed on page 220). To achieve the long-term vision of the Master Plan and ensure that the actions of individual agencies and private entities are coordinated, additional forms on ongoing governance should be explored. Potential options, which are not mutually exclusive, include:

- Dedicated staff at HASPA member agencies: The Technical Advisory Committee, made up of key staff from City of Hayward, EBRPD, and HARD, has led the development of the master plan. To ensure the ongoing coordination of these agencies to implement the plan, dedicated staff resources will be required. An additional option would be to create a position within one or more member agencies that is dedicated to resilience planning and the implementation of the Master Plan.
- Regional coordination entity: To facilitate implementation of projects beyond the direct control of HASPA member agencies, new forms of regional coordination are needed. There are many existing forums and potential avenues that could form the basis of this coordination within the Bay Area, such as the Bay Adapt platform led by BCDC, or the San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group (CHARG) effort led by the Bay Area Flood Protection Agencies Association. A new entity specifically focused on the Hayward Region, that includes HASPA as well as other key entities such as ACFCD, may be appropriate. This approach is being taken in other parts of the Bay Area, such as the San Mateo Flood and Sea Level Rise Resilience District, a proposed new agency created to coordinate across jurisdictional lines and leverage state and federal funding sources.

*Union Pacific Rail Corridor between Skywest Golf Course and Oro Loma Marsh*


LEGEND
LEVEE/SEAWALL
OTHER
RECREATION
RESILIENCY STUDY
RESTORATION
SEDIMENT REMOVAL
STORM DRAIN
TIDE GATE
VULNERABILITY ASSESMENT
STUDY AREA
PROJECT BOUNDARY
N
0
1.5
3 MI
SAN MATEO BRIDGE

# REGIONAL CONSIDERATIONS

**Advancing a Regional Strategy:** There are numerous projects in the Bay Area seeking to provide shoreline protection, habitat restoration, and stormwater management. These are being advanced by a variety of local, state, federal and private actors. Coordinating with these actors towards a regional strategy will ultimately be necessary to build towards addressing these issues in a cohesive and comprehensive way.

Project List:

**Levee/Seawall**
4. Pier 70 Project
15. San Francisquito Creek - S.F. Bay to Hwy 101
19. New Facebook Campus
23. Cargill Salt Works Redwood City
28. Coyote Point Eastern Promenade
29. San Mateo Levee + Wastewater Plant Upgrade
34. Colma Creek Flood Control Zone Channel Improvement Project
38. Google Campus Expansion
39. San Francisquito Creek - Upstream of Hwy 101
44. SBSPR: Ponds A9-15, A18
47. FWS and SCVWD Levee Maintenance
53. SBSPR: Mountain View Ponds
54. Stevens Creek Levee
55. Alameda Point Development
58. Alameda-Harbor Bay Isle Lagoon Protection
59. Veteran's Court Resiliency Project
66. Laguna Creek Channel Widening and Floodwall
76. San Leandro Creek Levee Project
90. San Lorenzo Creek Levee Project

**Other**
12. Three Cities Creek and Novartis Improvement
43. Palo Alto Wastewater Treatment Outfall
45. RWF CIP Master Plan Projects
60. Albany Beach
68. Laguna Creek I-880 Crossing Improvement
80. Doolitle Drive Enhancements
88. San Leandro Coastal

**Recreation**
61. Bay Trail
74. Gateway Park

**Resiliency Study**
2. Alcatraz Embarkation Study
3. Mission Creek Climate Adaptation Project
5. Islais Creek Climate Adaptation Project
10. BART Sea Level Rise and Flooding Resiliency Study: Embarcadero
13. Belmont Creek Watershed Management Plan
20. Bay Front Canal and Watershed Resilience
21. East Palo Alto and Dumbarton Bridge Resilience Study
31. SFO/San Bruno Creek/Colma Creek Resiliency Study
33. South SF Flood Risk Study
36. Climate Ready SFO
37. BART Sea Level Rise and Flooding Resiliency Study: SFO/Millbrae
73. MTC/BCDC/BART/Caltrans/FHWA Project Hayward Area
77. Oakland/Alameda Resiliency Study
78. MTC/BCDC/BART/Caltrans/FHWA Project Oakland Coliseum Area
79. MTC/BCDC/BART/Caltrans/FHWA Project Bay Bridge Approach
81. Port of Oakland AB 691 SLR Analysis
84. Oakland Preliminary Sea Level Rise Road Map
85. BART Sea Level Rise and Flooding Resiliency Study: West Oakland
86. BART Sea Level Rise and Flooding Resiliency Study: Coliseum
87. BART Sea Level Rise and Flooding Resiliency Study: Oakland Airport

**Restoration**
1. Horseshoe Cove Restoration
7. India Basin 900 Innes Remediation
8. Heron's Head Living Shoreline
9. Crissy Marsh - Tennesse Hollow
11. Bayfront Canal and Atherton Channel Flood Management Plan
17. SBSPR: Ravenswood
18. SBSPR: SF2
22. Bayfront Canal and Atherton Channel Flood Protection and Restoration Project
26. Bair Island Restoration Project
41. Palo Alto Horizontal Levee
46. SBSPR: A8
48. SCVWD: Hg and Steelhead
49. SBSPR: A16/17
50. SBSPR: A6
51. Calabasas Creek and San Tomas Creek Realignment
56. BFI Shore Protection
62. North Basin Living Shoreline
67. SBSPR: Island Ponds
69. SBSPR: Southern Eden Landing
71. SBSPR: E8A/9/8X
72. SBSPR: E12/13
83. Zone 12 Line M Railroad Crossing
91. San Leandro Treatment Wetland
92. San Lorenzo Creek Restoration and Sediment Replacement

**Sediment Removal**
16. Baywinds
24. Redwood City Port Deepening Project
25. Foster City Dredging
27. San Mateo Dredging
30. North Shoreview Flood Improvements
64. Alameda Creek Dredging
70. Alameda Sediment Disposal Site
82. USACE Annual Dredging of Oakland Harbor

**Storm Drain**
32. Colma Creek Connector
57. Storm Drain System Upgrades

**Tide Gate**
40. Palo Alto Flood Basin Structure Improvement
65. Fremont Blvd Widening and Tide Gate Structures
75. Lake Merritt Connection
89. Estudillo Canal Tide Gates

**Vulnerability Assessment**
6. Crissy Field SLR Analysis
14. City of Millbrae Sea Level Rise Adaptation Assessment
35. South SF Shoreline Assessment of Vulnerable Properties and Livelihoods
42. Palo Alto Baylands Vulnerability Assessment
52. Silicon Valley 2.0
63. San Francisco Bay Trail Risk Assessment and Adaptation Prioritization Plan

# AFTERWORD

# GLOSSARY OF TERMS

**100-year flood (1% annual chance flood)**

A flood that has a 1% probability of occurring in any given year. The 100-year floodplain is the extent of the area of a flood that has a 1% chance of occurring or being exceeded in any given year.

**500-year flood (0.2% annual chance flood)**

A flood that has a 0.2% probability of occurring in any given year. The 500-year floodplain is the extent of the area of a flood that has a 0.2% chance of occurring or being exceeded in any given year.

**Adaptation**

Adjustment in natural or human systems to a new or changing environment that seeks to maximize beneficial opportunities or moderate negative effects.

**Base flood elevation (BFE)**

The elevation of surface water resulting from a flood that has a 1% annual chance of occurring or being exceeded in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM).

**Climate**

The average weather (or more rigorously a statistical description of the average in terms of the mean and variability) over a period of time, usually 30 years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

**Climate change**

Changes in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature, as well as shifts in precipitation, changing risk of certain types of severe weather events and changes to other variables of the climate system.

**Climate change risk**

The chance that investments (such as buildings and infrastructure) can be affected by the physical impacts of climate change. Risks are evaluated as a product of the likelihood of occurrence (probability) and the damages that would result if they did occur (consequences).

**Climate risk assessment**

A climate risk assessment involves a detailed, project-specific analysis that includes a vulnerability and risk assessment, often followed by cost-benefit analysis, to assess and select investments in climate risk mitigation. Risk is assessed as a function of the likelihood and consequence of a given climate change hazard.

**Climate vulnerability**

The degree to which systems and populations are at risk and unable to cope with adverse impacts. It is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

**Design life**

The life expectancy of an asset or product as determined during design. As opposed to useful life (see below).

**Extreme event**

Unexpected, unusual, or unpredictable weather or flooding compared to historical or future projected distribution. Extreme events include, for example, heat waves, cold waves, heavy rains, periods of drought and flooding and severe storms.

**Freeboard**

An additional amount of height above the base flood elevation used as a factor of safety (e.g., 2 feet above the base flood) in determining the level at which a structure's lowest floor must be elevated or floodproofed to be in accordance with state or community floodplain management regulations.

**Green infrastructure**

An array of practices that use or mimic natural systems to manage urban stormwater runoff. Water is either directed to engineered systems for infiltration or detained for longer periods before it enters the combined sewer system.

**Resiliency**

The ability to bounce back after change or adversity. The capability of preparing for, responding to and recovering from difficult conditions.

**Storm surge**

The water height during storms such as hurricanes that is above the normal level expected at that time and place based on the tides alone.

**Tidal inundation**

Flooding which occurs at high tides due to climate-related sea level rise, land subsidence and/or the loss of natural barriers.

**Useful life**

The period over which an asset or component is expected to be available for use by an entity. This depends on regular and adequate maintenance. This period of time typically exceeds the design life (see above). The combined effect of operational importance and useful life is practical in determining the investment in improving resilience.

**Weather**

The state of the atmosphere at a given time with regard to temperature, cloudiness, precipitation, wind and other meteorological conditions.

# ABBREVIATIONS:

ABAG: Association of Bay Area Governments

ACFCWCD: Alameda County Flood Control & Water Conservation District

ACMAD: Alameda County Mosquito Abatement District

ACWD: Alameda County Water District

BCDC: San Francisco Bay Conservation and Development Commission

BRRIT: San Francisco Bay Restoration Regulatory Integration Team

Cal Trans: California Department of Transportation

Calpine: Russell City Energy Center

CDFW: California Department of Fish and Wildlife

CEQA: California Environmental Quality Act

COH: City of Hayward

CPUC: California Public Utilities Commission

EBDA: East Bay Dischargers Authority

EBRPD: East Bay Regional Park District

EDMUD: East Bay Municipal Utility District

FEMA: Federal Emergency Management Agency

HARD: Hayward Area Recreation and Park District

HASPA: Hayward Area Shoreline Planning Agency

MTC: Metropolitan Transportation Commission

NMFS: NOAA National Marine Fisheries Service

SCC: California State Coastal Conservancy

SLCP: San Lorenzo Community Park

SPUR: San Francisco Bay Area Planning and Urban Research Association

USACE: United States Army Corps of Engineers

USFWS: U.S. Fish and Wildlife Service

WQCB: SF Regional Water Quality Control Board

SCAPE
ARCADIS
CONVEY
RE:FOCUS
SFEI

# HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

## FOR THE HAYWARD AREA SHORELINE PLANNING AGENCY (HASPA)

PART OF A JOINT POWERS AGREEMENT OF THE CITY OF HAYWARD, HAYWARD AREA RECREATION AND PARK DISTRICT, AND EAST BAY REGIONAL PARK DISTRICT

HAYWARD REGIONAL SHORELINE MASTER PLAN

# APPENDIX A STAKEHOLDER AND PUBLIC COMMENTS

SUBMITTED 10/02/2020

# PUBLIC ONLINE SURVEY

**02/27/19 - 03/15/19**

# ONLINE SURVEY SUMMARY

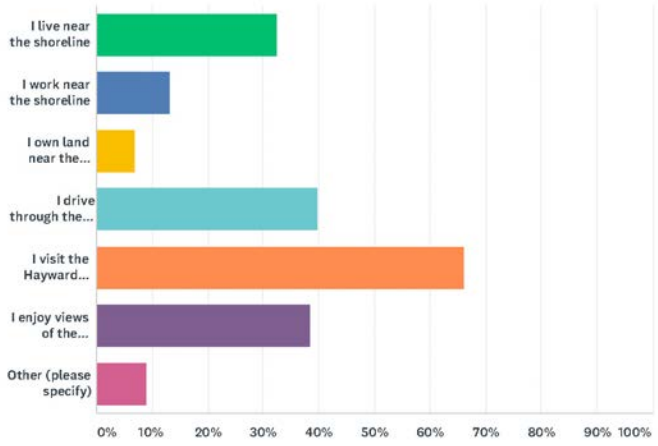
A 23-question survey was conducted on behalf of the Hayward Area Shoreline Planning Agency (HASPA) to assess the public's general understanding of Hayward Regional Shoreline, mainly in regard to sea level rise, potential flooding, and participants' feelings, concerns, and predictions regarding these issues. In the spring of 2019, this survey was completed by approximately 900 people throughout the Bay Area, primarily those who live, work, commute through, or recreate at or near the shoreline.

1. **Are you familiar with the Hayward Regional Shoreline that is managed by East Bay Regional Park District and Hayward Area Recreation and Park District?**

   The majority of people surveyed are familiar with the Hayward Regional Shoreline.

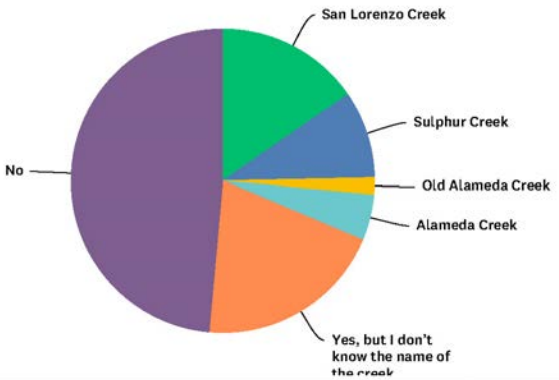
2. **What's your association with the project area?**

   The majority of those surveyed either drive through the area or enjoy the views of the Shoreline. Approximately two thirds of those surveyed visit the Shoreline and about one third live near the Shoreline. A smaller percentage (about ten percent) specified that they enjoy activities such as birding, cycling, jogging or walking along the Shoreline. A negligible amount of those surveyed stated they'd like to see restaurants built on the area. Some surveyed stated concern for the wetlands and habitats.



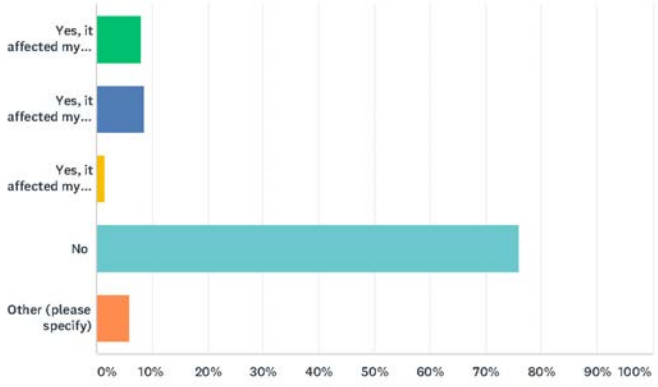

3. **Do you live or work near any of the major creeks or channels in the area?**

   Approximately half of those surveyed do not live or work near major creeks or channels in the area. About 15% of those surveyed live near San Lorenzo Creek. Almost half of residents who live near a creek or channel do not know the name of that creek or channel. The rest of those surveyed stated they live near Sulphur Creek, Alameda Creek, or Old Alameda Creek (in descending order). A small portion of those surveyed mentioned concerns over climate change, compromised creeks, and rising sea levels.




4. **Have you or anyone close to you ever been personally affected by a flood, either here or elsewhere?**

   The vast majority of those surveyed have not been affected by a flood nor do they know anyone personally affected by a flood. A small percentage (less than 10%) were affected a flood that affected their home and transportation, in equal parts.





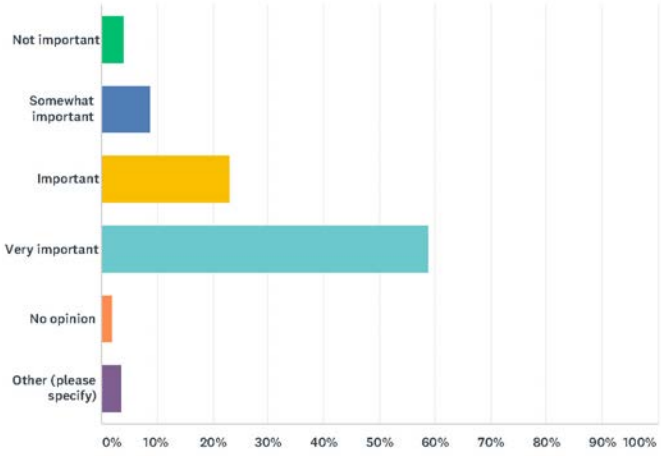

SCAPE

5. **Do you belong to any environmental, shoreline protection, or shoreline-related recreational groups?**

   The vast majority of those surveyed do not belong to an environmental group or shoreline protection-related group. Of those that are involved in an environmental group, frequently mentioned groups, in descending order, were: The Sierra Club, Save the Bay, Audubon Society, East Bay Regional Parks, and Hayward Shoreline Volunteer Opportunities.

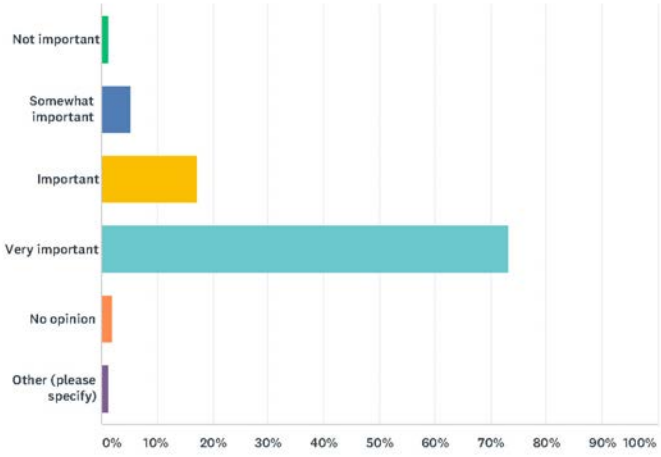
6. **How important is it to be protected against flooding?**

   The majority of those surveyed think it is very important or important to be protected against flooding. A smaller portion (approximately 10%) feel it is not important. A general sentiment with those surveyed was that they were unsure what exactly the term "protected against flooding" implies. Some were concerned around where funding would come from and how, specifically, communities could be protected from flooding.



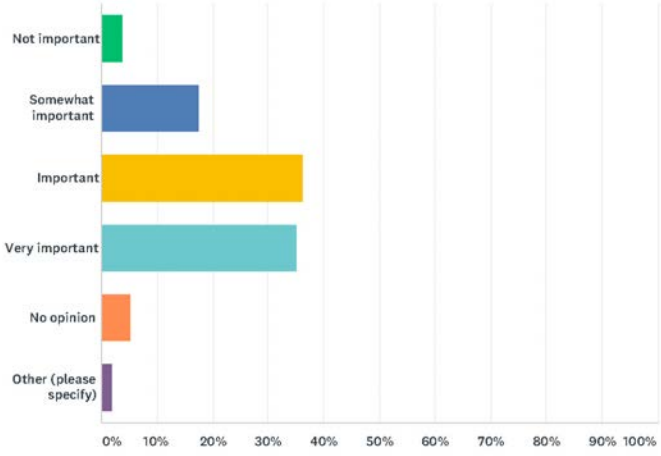
7. **How important are wetlands and habitats for the health of the San Francisco Bay?**

   The vast majority of those surveyed feel wetlands are vital to the health of the Bay. In the comments section of this question, a few people stated people's property should take priority over all else, and that wetlands and other conservation efforts should come in secondary. A small portion of those surveyed are not sure the effects the wetlands have on the environment of the area. A small minority surveyed feel with rising sea level, conservation efforts are hopeless.



8. **How important is it for people to take part in shoreline recreation?**

   The majority of those surveyed feel shoreline recreation is important to very important. A large portion surveyed feel recreation is somewhat important, and a small percentage do not feel this is important. In general, people feel shoreline recreation creates a bond with ecological resources and establishes a greater commitment to conservation efforts in the area.

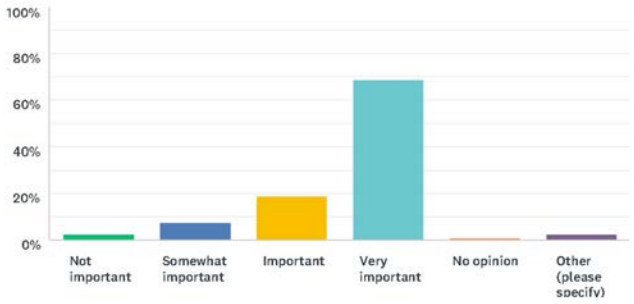


1. **How important is it to have uninterrupted shoreline views?**

   Survey participants were divided on the importance of having uninterrupted shoreline views, and responded to the question in nearly equal parts, spanning from "not important" to "very important." A general sentiment was that shoreline views do not perform in any way to alleviate the impacts of climate change. Commenters stressed that access is more important than views.

2. **How important is it to conserve the shoreline's natural environment?**

   The vast majority of those surveyed said that it is very important to conserve the shoreline's natural environment. A very small percentage feel it is not important. A general sentiment among commenters was that shoreline conservation is vital, and some mentioned the idea of compromise around what areas to protect and at what cost, both financial and spatial.




3. **What do you think are the most important natural features that help create a healthy environment?**

   The most common answer to the question about factors for a healthy environment was biodiversity, in both native plant species and native animals. Also frequently mentioned were maintaining natural habitats, preserving the wetlands, and having clean water and air. A moderate number of participants stated that restricting human access and keeping out of nature is an important way to create a healthy environment. An even smaller portion felt that saving or maintaining the environment was hopeless.

4. **Are you currently planning any significant construction or development projects?**

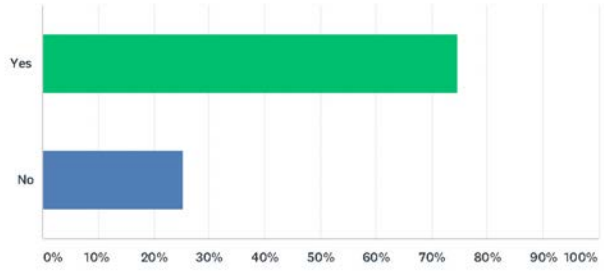
   Almost all participants stated that they are not planning any significant construction or development projects. Of the very small number who are planning construction or development, the Eden Landing project was mentioned several times, and general, smaller repairs to homes and buildings in the area.

5. **Do you have future plans to begin any significant construction or development projects?**

   Almost all participants stated they do not have any construction or development plans in the future. Of the few who do have plans, home repairs and remodels were the primary project listed.

6. **Are you aware of rising sea level in the San Francisco Bay?**

   Approximately 75% of those surveyed are aware of the rising sea level in the San Francisco Bay.

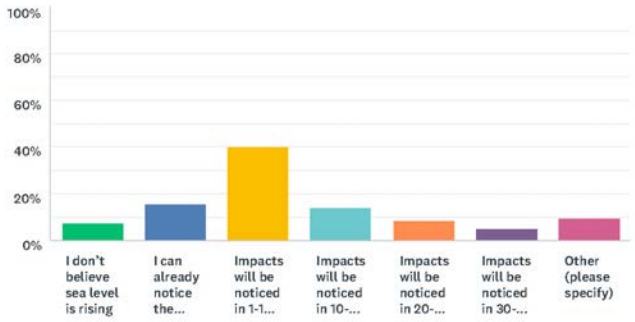



7. **Related to sea level rise, what types of threats or impacts to property or people do you know about, if any?**

   The most common concerns around sea level rise in the Bay Area were flooding and erosion. Another concern was loss of habitat for wildlife in the area. Specific concerns were damages to homes and potential loss of shoreline trails and recreation. Some surveyed were concerned but were unsure what the effects of sea level rise will be. A small number of those surveyed felt that any effects of sea level rise will not affect humanity right now, but will affect those in future generations. A very small percentage do not feel global warming is a real threat.

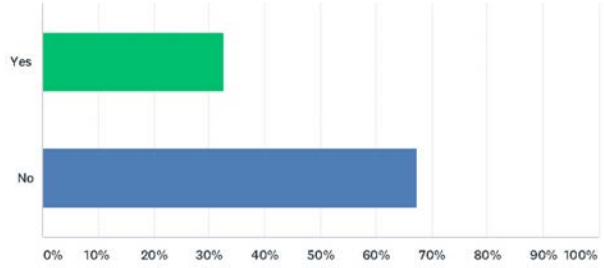
8. **When, if ever, do you think there will be a noticeable impact on the Hayward shoreline caused by sea level rise?**

   More than one third of those surveyed believe sea level rise will affect the Hayward Shoreline in the next one to ten years. A smaller portion of those surveyed felt that they already notice the effects of sea level rise. About a quarter of those surveyed feel that the impacts on the Hayward Shoreline will be seen in 10-30 years. A small number (10%) of those surveyed are somewhat concerned but do not know what the effects will be. A very small number of those surveyed (about 7%) do not believe in sea level rise.

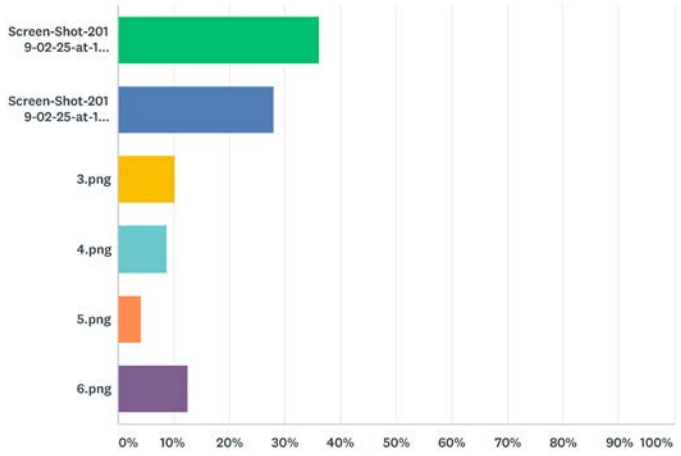



9. **Are you aware of any infrastructure in this area (such as levees, tide gates, pump stations) to help reduce flooding?**

   The majority of those surveyed are not aware of any infrastructure that helps reduce flooding.

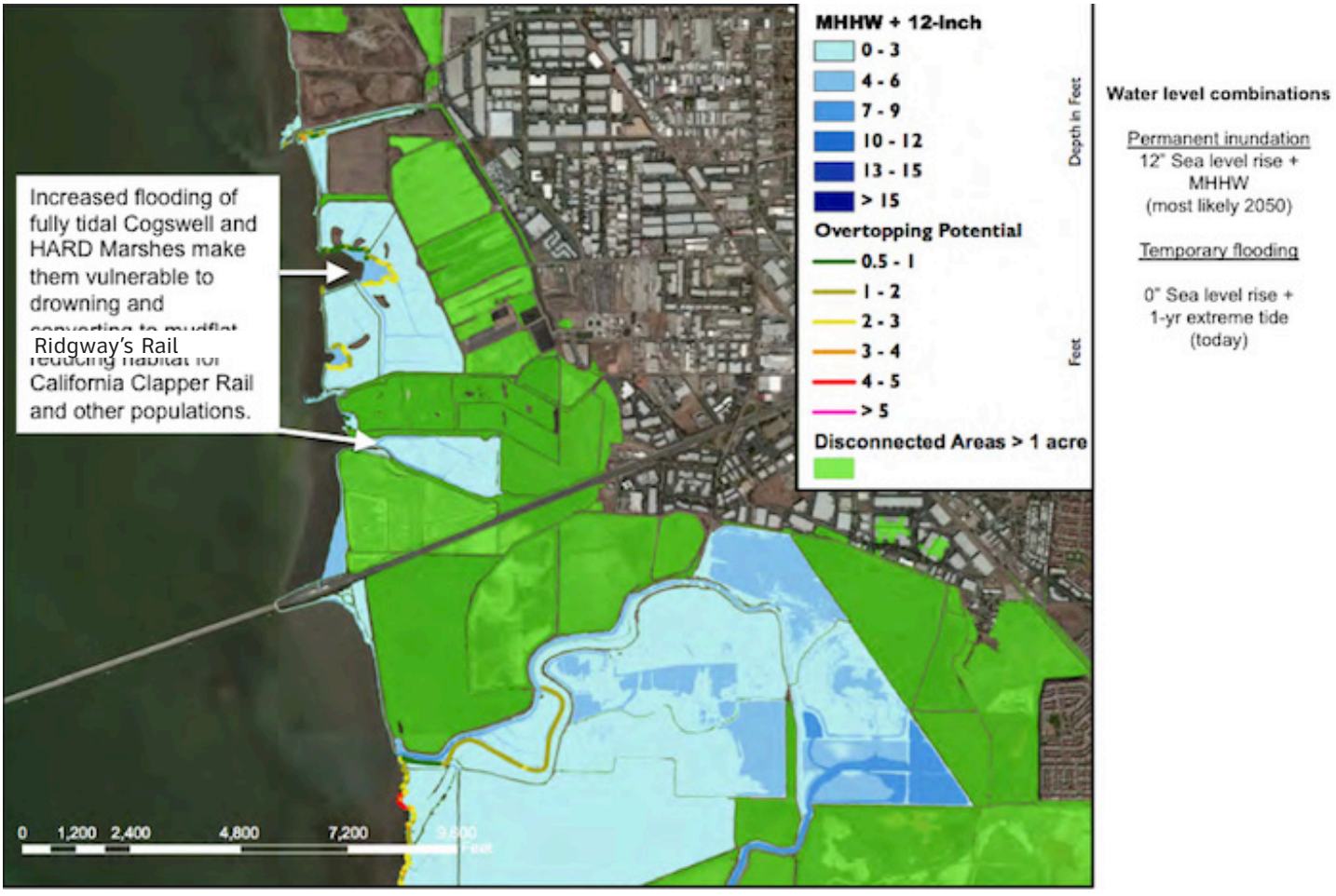


1. **Hayward Shoreline Sea Level Rise: The San Francisco Bay Conservation and Development Commission has performed scientific computer modeling of sea level rise as part of its "Adapting to Rising Tides" program. Hypothetically, if nothing else is done to protect against flooding, the following scenarios are possible. Note that the green areas are "disconnected" low lying areas that are protected from flooding by some natural or man-made feature. Blue are flooded areas at various depths of water. Which scenario would become a problem for you?**




The majority of those surveyed said that scenario one or two would affect them the most.

The most-mentioned concern of those surveyed was flooding and the subsequent loss of homes, Bay Trails, and other recreational activities, along with poor water quality and damage to waste water facilities. Frequently mentioned was loss of habitat and reduction of biodiversity in the area. Also mentioned was the loss of commuter routes and bridge access. A fair number of participants stated that they would feel sad if the scenario came to pass and the situation is generally upsetting.

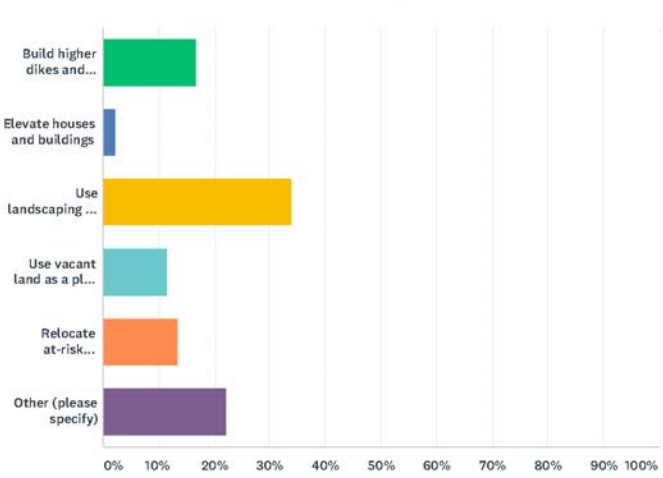


2. **The computer modeling shows that at a sea level rise of two feet, most of the Hayward Regional Shoreline will be under half a foot of water if nothing is done to protect the shoreline from flooding. How do you feel about that?**

   Almost all those surveyed expressed worry, concern, sadness, and fear over the potential of the Hayward Regional Shoreline being inundated with two feet of water. Some surveyed made strong urges for legislators to act now and asked how community members can help. A very small minority stated that they do not believe this to be true or possible.

3. **What do you think should be done to help reduce the impact of sea level rise?**

   Over one third of participants think that using landscaping would be a good way to help reduce the impact of sea level rise, and a fair amount (nearly 20%) believe building dikes would be helpful. Equal numbers of people believe planners could either relocate at-risk infrastructure to higher ground, or that using vacant land as a place to "store" excess floodwater would be best. A fair number of participants commented that "all of the above" might work and suggest to stop building structures in the wetlands. Policy changes were frequently mentioned in the comments. A minority group feels that sea level rise is not worth fighting and might be a lie.




4. **Would you like to speak with someone about your responses on additional thoughts you might have? If so, please provide your contact information and someone will be in touch.**

   Approximately 100 people would like to have a follow up regarding this survey and left their email and/or phone number.

# STAKEHOLDER WORKSHOP #1

05/16/19

# STAKEHOLDER WORKSHOP #1

## HAYWARD SHORELINE INTERPRETIVE CENTER, 05/16/19

## ATTENDANCE

- Damon Golubics (COH)
- Aimee Kerr (COH)
- Erik Pearson (COH)
- Sandra Hamlat (EBRPD)
- Devan Reiff (EBRPD)
- Matt Graul (EBRPD)
- Mark Taylor (EBRPD)
- Rohin Saleh (ACFCD)
- Ned Lyke (HASPA)
- Miguel Cardenas (ACMAD)
- Philip Gordon
- Todd Hallenbeck (BCDC)
- Erika Castillo (ACMAD)
- Jackie Zipkin (EBDA)
- Minane Jameson (HARD)
- Joseph Huston (ACMAD)
- Jackie Bestellion (Ohlone)
- Debbie Hernandez (HARD)
- Evelyn Commier (HARD)
- Adrienne De Ponte (HARD)
- Hank Ackerman (ACFCD)
- Pat Gudoa (Ohlone)
- Allen Bestellion (Ohlone)
- Shalini Kannah (SCC)
- Jeremy Lowe (SFEI)
- Nans Voron (SCAPE)
- Gena Wirth (SCAPE)
- Gena Morgis (SCAPE)
- Jess Guinto (SCAPE)
- Mary Kimball (Arcadis)
- Rebeca Gomez (Arcadis)
- Sybil Hatch (Convey)
- Shelby Tramel (Convey)

## AGENDA

1. 6:15 Sign In/ Attendee Arrival
2. 6:30 Design Team Presentation
3. 7:00 Breakout Session
4. 8:00 Report Back/ Next Steps

## NOTES:

Workshop #1 engaged various stakeholders along the Hayward Regional Shoreline to review existing conditions research assembled by the project team. Breakout sessions were organized into three groups: ecology, infrastructure, and recreation to reflect key elements along the shoreline.

**ECOLOGY** - *ex. Are there opportunities for the Master Plan to not only protect built assets, but enhance ecology along the shoreline?*

Aspirations:

- Many site-specific studies have already been done for the area and are useful to draw from, including a study on Triangle marsh.
- Good tidal flow is needed to prevent mosquitoes on the shoreline, breaching marshes to tidal flow stops mosquito problem.

Opportunities:

- The shoreline has more kinds of habitats in a small area than all the rest of the bay. Though small, it is complex.
- It is important to plan for endangered species habitat but also maintain current habitat, planned retreat must be coordinated to not lose current like the nesting islands in Hayward Marsh.
- Study on Triangle Marsh, restored in 1980s, used to have bad mosquito problem because of lack of tidal flow.
- Frank's dump only high tide refuge for endangered birds.

Challenges:

- Three endangered birds found on shoreline: Ridgway's rail, snowy plover, least tern.
- Triangle marsh protects landfill behind it, which is unlined and susceptible to bay inundation.
- Twenty two species of mosquitoes in Alameda county.

**INFRASTRUCTURE** - *ex. What infrastructural assets are most at risk from sea level rise?*

Aspirations:

- To better manage wastewater effluent to rehabilitate the marsh for habitat and improve the health of the marsh. Proper closure and restoration of existing waste water treatment ponds.
- To configure the hayward shoreline marshes such that upstream properties are removed from the FEMA flood plains.

Opportunities:

- ACFCD is willing to work with HASPA on local solutions and support shoreline resiliency. We need to work jointly to balance flood control and restoration.
- Potential opportunities to utilize reclaimed waste water. For instance, the Bay is currently enriched with nitrogen and an opportunity is to use the wetlands to filter for nitrogen.
- ACFCD is developing strategies at nearby outfall channels to address sea level rise. ACFCD may need to introduce tide gates and pump stations at the outfalls.
- Beautification of existing shoreline protection systems to make them more attractive and safer.

Challenges:

- Very complicated hydrology under existing conditions; under sea level rise and climate change conditions it will become even more complex with many interdependencies.
- There are landfills that the county needs to have access to in order to maintain the infrastructure per Regional Water Quality Control Board (RWQCB) requirements.
- Any shoreline strategy will have major implications for many stakeholders.
- Hayward shoreline is on the windward side of the Bay and is subject to wave action. Any unprotected shoreline will be subject to additional erosion.

**RECREATION** - *ex. Are there other Bay Trail alignments that can facilitate the same recreational experience while mitigating the impacts of SLR?*

Aspirations:

- Bay Trail is very important, and we should protect what's there currently.
- More passive recreation.
- Raising the Bay Trail would be great, but also very expensive.
- Bay Trail is seen as a way to get people out of the car. A good way to commute by bike.
- Very important to see water along the Bay Trail.

Opportunities:

- New connectivity; more access points to the shoreline, such as connector bridges.
- Have any added infrastructure be multi-functional. For example, a horizontal levee with the Bay Trail on top.
- An idea to pilot a horizontal levee in the area of the salt ponds.
- Activities at the shoreline: biking, hiking, camping, fishing, bird watching, kayaking, golfing.
- Who visits the shoreline? Runn ers, cyclists, and college classes all use the Bay Trail.
- Hayward is very diverse. Visitors from South Korea, Japan, etc. come to model what is being done there.
- People don't want additions that draw more people to the shoreline. They like the current foot/cycling traffic as is.
- Educational opportunities: Some sort of kiosk or educational center in every section of the shoreline.

Challenges:

- Funding and permitting.

# STAKEHOLDER INTERVIEWS

**09/17/19 - 09/18/19**

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 17, 2019 |
| Location: | ACFCD Office |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Damon Golubics; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Rebeca Gomez-Gonzalez, Mary Kimball; Convey: Sybil Hatch; Alameda County Flood Control District: Rohin Saleh, Hank Ackerman |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

**02 Inundation Map Review**

- Rebeca Gomez (RG) presented the three SLR scenarios.
    - MHHW + any SLR scenario (2', 4', 7')
    - Provided an explanation of the depth to groundwater
- Rohin (RS) agreed that it was good to err on the conservative side.
- RG noted that this mapping exercise used stillwater level and not the FEMA 100-year model which includes wind and wave.
- RH felt that the modeling exercise was extremely successful to understand the impacts of water.

**03 Project Goals**

- RS asked if there was a funding expectation for the project.
- GW indicated that the project team is thinking about near-term, medium-term, and future project scenarios.
- Hank (HA) requested that the project team call Frank's Dump, Alameda County Flood Control District Sediment Recycling Site.
- Nans noted that the project goals are intended to be flexible and adaptable, but not relying on words like protect and maintain.
    - RS agreed with the conceptual outlook, but felt that they would need to adjust based off of evaluating the various alternatives.

- Understanding the threshold between what can be addressed at a local/county level vs the regional level is extremely important to understand.
- RS noted that it's most important to determine where a line of protection would be within the shoreline.
    - Identify what needs to be protected.
- GW indicated that this is something the team is currently working on.
    - The team will make some initial proposals about what is being protected.
    - SH and RS indicated that putting a price tag on some of these protective measures (e.g., protecting the oxidation ponds and telling the water treatment facility that they need to pay 5 million dollars (50%) for the project) would help to identify what needs to be saved.
- RS noted that using the MHHW as a starting point for modeling purposes does not accurately capture the effects of water.
- RS noted that there is a need to determine the joint probability of the combined event would be.
    - The combination used so far of MHHW with the fluvial event (100 year storm) has been incorrect.
    - King tide has proven to be more accurate for representing existing conditions.
        - The difference between king tide vs. MHHW is a 1.5'-2' difference.
- GW noted that the team is not currently developing a masterplan but rather a series of strategies that can be implemented.
- RS noted that looking at a 5' SLR scenario had a multi-billion dollar price tag for a solution that addresses SLR, but not groundwater. It also does not account for any land buyouts.
    - RS noted that ACFCD cannot plan for any SLR scenarios greater than 2'.
        - At that point, it becomes a regional or subregional issue.
- RS indicated that it would be helpful to identify the threshold at which it is no longer feasible to develop a city-level approach to SLR.
- GW asked Rohin what types of improvements he would do in a 2' SLR scenario.
    - Introducing pump stations
    - Tide control gates
- RS noted that he can provide a detailed study of outflow rates along the various creeks.

- SH mentioned the pump station study that RS developed recently which shows the data for all pump stations county-wide.
- RS noted that one of the larger challenges is the canals on site:
    - Either take a wall on either side of the channels
    - Provide pumps for the water systems that feed into the channels for when water levels are high
- NV clarified that it seems to be cheaper to locate the control structure as close as possible to the line of protection.
    - RS agreed with this.
- RS indicated that he is evaluating all tide gates against SLR to understand if they will effectively address the new conditions.
- GW asked if a pond would be helpful in addition to pump stations.
    - RS indicated that it would be extremely helpful. Improved storage is always helpful.
- RG asked if it's helpful to store further upstream to capture more fluvial water.
    - RS indicated that it could be very beneficial.
- GW asked if the properties adjacent to the Hayward Shoreline could be bought out and converted to storage ponds.
- HA noted that such an approach would require a pump station.
- GW asked if there were upstream communities that could provide upstream storage.
    - RS indicated that it was possible along San Lorenzo, in Don Castro.
    - RS noted that the best location would be closer to the Bay.
- GW asked if ACFCD has looked at connecting the channels with the wetlands around them.
    - On a smaller scale than at Alameda Creek.
- RS noted that it's been explored in smaller locations like Bockman Creek.
    - Water quality has been a major issue, with salinity being too high in certain locations.
- HA indicated that the airport might be doing a mitigation project along Sulphur Creek.

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 18, 2019 |
| Location: | Bay Trail Office |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Erik Pearson; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Rebeca Gomez-Gonzalez; San Francisco Estuary Institute (Bay Trail): Lee Huo |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

- Nans (NV) provided an introduction to the project.
    - Noted that the design team is currently identifying goals and strategies for the masterplan.
    - Indicated that it would be helpful to have Lee review the SLR maps that have been done as part of Task 2.

**02 Bay Trail Discussion**

- Lee indicated that there is a preference for hard surfaces for the Bay Trail, but understands that the trail on the top of levees can often be a soft, DG-type surface.
- Lee noted that the main goal for Bay Trail is promoting bike and pedestrian travel along the perimeter of the shoreline.
    - Bluewater experience is always better, but if there is an experience that moves through wetlands to provide variation that is also acceptable.
    - LH noted that BCDC recommended moving the Bay Trail inland of the infrastructure within the Hayward area.
    - LH indicated that some of the challenges are the balance of natural resources vs. trails.
        - From a political perspective, organizations like the Audubon can be challenging due to conflicting views from the Bay Trail's mission.

        - LH indicated that the two sides are moving apart but that it seems imperative to bring together the recreation vs. resources groups to prevent future issues on a regional scale.
- LH indicated that the continuity of the Bay Trail is critical to the success of the program.
    - RGG asked if there is any precedent where there are use restrictions along certain lengths of the Bay Trail.
        - Lee noted that it runs slightly counter to the Bay Trail mission of open access.
- LH indicated that the Bay Trail is extremely interested in incorporating rest/comfort stations every two miles.
    - Gena (GW) asked if it would be preferable to have the masterplan incorporate rest stations into the project.
    - LH noted that it would be great to have some kind of rest station.
- GW asked if there could be certain moments where a Bay Trail spur trail is located within the Hayward Shoreline Masterplan area to facilitate bluewater experiences for an inland trail.
    - LH noted that he would like to review the design but it could be an option.
- LH noted that there are three main North-South trails in the Bay area.
    - Bay Area Ridge Trail
        - Follows the ridgeline around the bay and provides a more rural/wild experience.
    - Bay Trail
        - LH wondered if the Bay Trail could have spurs that connect to the Bay Area Ridge Trail
    - East Bay Greenway
- LH inquired about the planning horizon for the East Bay Greenway.
    - NV indicated that the team was looking at near, medium and long term time horizons.
- Lee noted that he is open to the future location of the BayTrail but ensure that it has connectivity/continuity with the larger Bay Trail and fulfills the need for bike and pedestrian experience.
- GW indicated that there was some benefit to having a diversity of experiences throughout the Hayward Shoreline Masterplan area.
    - LH agreed that the diversity of experiences (wood bridges, marshes, uplands, etc.) is one of the strongest features of the area.

- Erik (EP) inquired about the formal approval process for a Bay Trail relocation.
    - LH noted that the Bay Trail would need approval from the managing organizations (e.g., East Bay Regional Parks District).
        - Could be as general as approval of a masterplan or resolution from a deciding body.
- LH inquired how the design team intended to develop the plan.
    - GW indicated that the plan is flexible, but the near term scenario could require design within the next few years.
    - EP noted that the project's adoption as a plan would require going through the CEQA process.
- NV inquired how frequently Bay Trail would like to be updated on the project's progress.
    - LH would like to be engaged, but preferred to be involved once a series of proposals are developed.
- GW inquired if there was a minimum recommended elevation for the Bay Trail vis-à-vis sea level rise (SLR).
- LH noted that there was not a minimum, but it is something that is starting to be considered.
- LH indicated that he would share the East Bay Regional Parks Bay Trail Resilience Study with the design team.

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| Mtg Date: | September 18, 2019 |
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| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Erik Pearson; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Rebeca Gomez-Gonzalez, Mary Kimball; San Francisco Bay Conservation and Development Commission (BCDC): Todd Hallenbeck, Dana Brechtald, Jessica Fain |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

## 01 Introduction

## 02 Goals and Policies

- Gena introduced the work on Goals and Policies for the project
    - Wanted to receive feedback from BCDC on these goals and ensure that they align with BCDC's understanding of the area
- TH noted that it was good that SCAPE included recreational opportunities as part of the goal. This will be an aspect of the project that BCDC will look very closely at.
- Dana (DB) noted that none of the meeting representatives were from the regulatory side of BCDC, but that an introduction could be provided.
    - DB indicated that it would be good to maintain regional and neighborhood connections.
- BCDC could be a platform for helping to share the results of the study with other groups throughout the Bay area.
- GW noted that the goal is to develop a set of strategies for the immediate, near and long term time horizons.
- DB noted that the ART program (ART Bay Area) is developing a plan to have a guidance manual to get strategies approved. Policy planning, capacity building type of work.
    - SFEI and Point Blue recently published a similar document from their work in Marin County.

- GW asked if BCDC could share experiences from their work on the ART process.
    - DB: Everything is done through a working group and developed a set of evaluation criteria that was applied for the project.
- GW described the stakeholder engagement that is being done for the Hayward project.
- TH noted that one of the issues in the past has been a lack of community engagement.
- GW agreed that it's been challenging to find an organization that represents the industrial businesses along the shoreline.
- JF asked the team how the strategies will respond to the three different scenarios.
    - Nans (NV) noted that the team is first trying to identify what all of the strategies are before a coherent strategy is developed for each of the scenarios.
- Adaptation Catalogue: BCDC is collecting and tagging the various strategies and defining them by larger categories (along with a financing section):
    - Adapt
    - Retreat
    - Protect
- TH noted that the catalogue doesn't address issues like groundwater emergence, but would be very interested in seeing what the Hayward team comes up with in the realm.
- TH asked if the Hayward team could share the methodology for studying the groundwater emergence.
- GW noted that we could share the memo that was developed which described the methodology.

**03 Strategies for the Hayward Shoreline**

- GW introduced a few of the strategies that are being considered for the Shoreline.
    - Maintenance permits
    - Ecological enhancements to the shoreline which are habitat friendly but reduce erosion (Gravel beach)
    - The concept of ecotone or transition levees
- DB asked if the sediment issue has come up in other conversations.
    - BCDC noted that an introduction to Brenda from BCDC could be made to open up the conversation about sediment in the area.
- BCDC is currently working on a plan called Fill for Habitat.

    - A more stringent standard that allows filling which can benefit habitats.
    - Encourages more green shoreline strategies and slightly addresses techniques for sediment placement.
- Erik (EP) asked if a levee be widened to protect habitat behind it?
    - JF noted that she wasn't sure but could look into it.
- JF noted that a staff report on this was published on the BCDC website in June and will be voted on in October.
    - GW: Would it be approved immediately?
        - It would have to go through state review and then ultimately to NOAA.
- DB noted that there's an environmental justice plan being voted on two weeks after the other study.
- GW asked if there were precedent projects that will be easier to permit following the approval of the plan.
    - JF noted that the bay fill project was the most obvious one.
- GW asked which agency would be best to approach with gravel beach type solutions to discuss.
    - JF indicated BCDC to be the appropriate agency.
- TH noted that the Bay Plan amendment provides more emphasis on monitoring than previous plans.

**04 BRRIT**

- JF provided a general introduction of the BRRIT.
- DB indicated that we could set up a call with BCDC to discuss further.
- BCDC is also working on a financing paper that will be available later, including an analysis of grants that are available for adaptation strategies.
    - Indicates the type of project and which phase these grants would be available for.

**05 Closing Questions**

- GW asked if BCDC knew of examples of retreat in the bay area.
    - JF: There are specific asset relocations but no planning level work.
- GW asked if BCDC could share precedent examples of industrial areas that are being confronted with SLR.
    - Maybe Bayview
    - SF Planning
    - Contra Costa Shoreline
- Mary asked about regional planning efforts.

**06 Next Steps**

- Marin report
- Adaptation options
- Email intro BRRIT team
- Brenda email (GW to CC Dana)
- Will point to similar planning processes and forward Task 2 report once it's finished.

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 18, 2019 |
| Location: | Hayward City Hall |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Damon Golubics, Erik Pearson; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Mary Kimball; CalTrans: Dick Fahey, William Velasco |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

- Nans (NV) provided an introduction to the project.
    - Noted that the design team is currently identifying goals and strategies for the masterplan.

**02 Inundation Maps**

- DF asked how the team decided on the 2', 4' and 7' intervals.
    - GW indicated that we felt it was a good indication of short, medium and long term SLR.
    - DF agreed that this approach makes sense.
- GW opened up the conversation to CalTrans to discuss the bridge approach and if CalTrans has any plans for the bridge approach.
    - DF responded that the projects are more reactive than proactive due to the nature of existing funding streams.
    - There isn't a department-wide strategy.
- NV asked if there were any tools, plans or strategies that Dick might recommend for this area.
    - DF indicated that there was consensus around the need for more study of the hydrologic conditions around the bridge approach.
- GW noted that it could be useful to identify what levels of protection are currently being provided by the Hayward Shoreline.
- GW noted that one of the team's concerns is how the bridge work is communicated.
- GW asked if there were other studies that could be relevant (Dumbarton).

    - DF responded that the project there is more concerned with public outreach, especially with disadvantaged communities.
- DG asked about the status of Highway 37.
- GW asked if there were any other CalTrans assets in the project area that were under consideration.
    - DF indicated that he could loop back with the CalTrans asset manager and see what would be within the project area.
- GW asked if there was any updated datasets for the bridge.
    - Volume data
    - Topographic information
- GW asked what typically happens when there is local flooding on the bridge.
    - DF noted that the planning team from CalTrans typically learns of these events from their maintenance teams.
    - GW mentioned that 511 might be able to provide a tracked dataset
- DG asked if CalTrans was planning on making the bridge more bike and pedestrian friendly.
    - DF indicated that he would be able to share the bay-wide bike plan with the team.
- GW asked what's the estimated design life of the bridge.
    - DF responded that most of the bridges are designed for 75-100 years.
- DF indicated that a list of adaptation strategies and potential stakeholders would be helpful to see.

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 18, 2019 |
| Location: | Hayward City Hall |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Damon Golubics, Erik Pearson; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Mary Kimball; Hayward Public Works: David Donovan, Alex Ameri, Jan Lee |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

- Gena Wirth (GW) introduced the project.

**02 SLR Maps**

- Alex (AA) asked what the time horizon would be for the various SLR scenarios and how the team determined 2', 4', and 7' intervals.
    - GW responded that it was determined in part by Adapting to Rising Tides and Alameda County Flood Control's intervals.
        - The design team will not assign a specific date to the specified intervals.
- AA wanted to make it clear that he is extremely interested in the topic and the mapping research that the team performed.
- AA asked what strategies are being considered for this area.
    - Levees?
    - GW indicated that a levee could help with seawater, but it will not address the groundwater emergence.
- Jan (JL) asked whether these inundation maps would be available for review.
    - GW agreed to make them available once Arcadis finalized them.
- AA asked if a time range could be developed for the various SLR intervals.
    - GW responded that the team isn't comfortable indicating at the moment what those would be, but the team could come back to DPW with a range of time scenarios.

**03 Public Works' Plans**

- AA indicated that the wastewater treatment plant is one of the most expensive assets that the city owns.
    - Replacement value is half a billion dollars.
    - The areas slated for development (e.g., managing the amount of nutrients in the water, 60-80mm dollar cost) are currently downstream of the existing facilities.
- GW asked if Hayward had discussed moving the treatment plant?
    - AA noted that it has not been discussed as the plant needs to be at the lowest point in the system.
- AA noted that all new construction is located outside of the 100-year flood zone.
    - Most new construction systems cannot exceed 2060 (40 year lifespan).
- GW noted that one of the questions the design team is around the existing oxidation ponds and whether there are any plans for them.
    - AA noted that currently they have a levee around the ponds and have a 200 million gallons capacity.
        - David (DD) noted that the solar panels are located on a slightly filled section.
        - There is a change to the JPA and the importance of the oxidation ponds is diminishing.
- GW asked if there were other plans being considered for that space.
- AA indicated that the only plans are for additional fill and expanding solar panels.
    - The solar panels are on piles.
    - DD asked when the LIDAR data was taken because some of the ponds around the solar panels have been lifted in recent years.
- GW asked if Public Works would be open to entertaining sketch ideas for the storage ponds?
    - AA noted that Public Works is looking at a nearshore discharge solution through Cogswell Marsh.
        - Less energy intensive
    - GW asked if a treatment wetland or pond would be required to accomplish this?
    - AA indicated that a more environmentally friendly solution than a concrete structure is preferred.

    - GW asked if Public Works would consider something like a large-scale horizontal levee?
    - AA responded that it would be a natural-based system.
    - AA noted that the Hayward Marsh has had issues with the EBDA effluent treatment.
        - GW noted that Hayward's EBDA treatment will be limited.
        - AA indicated that that was not presently possible because 17 mgd are required in the Hayward Marsh by Union Sanitary.
        - Union Sanitary would be the best source of information here.
        - AA noted that the EBDA JPA is expiring by the end of this year and the contributing members are trying to come to a 20-year agreement and use that time to find an alternative to the EBDA system.
- GW asked if there were any strategies the design team should consider?
    - AA noted that the idea of moving any of DPW's assets is not feasible
        - The outlook will be to adapt vs. retreat
- AA noted that waste in the landfills is from 1933-1974.
    - Covered in a clay top and vegetated by Hayward DPW.
    - Hayward purchased the landfill from Waste Management, and the Sanitary District will pump the leachate back to the treatment facility, clean it, and pump it back out.
    - The water that comes back from the landfill is relatively clean due to the prevalence of water
- The City of Hayward City Council is extremely concerned with doing the right thing environmentally.
- GW asked if the energy center was a key asset:
    - AA noted that it was built in 2013 with a 30 year useful life.
    - There is less of a need to run the energy center due to shifting energy preferences.
    - This energy center is more costly to run it because it is not on a backbone gas transmission pipeline.
    - AA noted that it is currently being run at 40% of initial capacity estimates.
    - AA felt that it is one of the last gas powerplants that will ever be built in California.
    - After 30 years, the site will likely be decommissioned and deconstructed.

    - GW asked if there was a land use plan for once that was decommissioned.
        - AA noted that it's on sanitary district land so it will be taken back for that purpose.
- GW asked if there would ever be an alignment of the Bay Trail that could move over the landfill.
    - AA agreed that such an alignment would be fantastic for passive uses.

**04 Roadways**

- Cabot Boulevard was just expanded into the plant
- The idea is to do a full interchange at Cabot and Whitesall
- AA indicated that the roadbed was raised along the approach

**05 Industrial Group**

- Public Works will look to see if there is anyone with the Chamber of Commerce that can be consulted.

06 Next Steps

- AA requested copies of the SLR maps
- GW indicated that the team will share maps with all stakeholders once they are updated to indicate no data areas.

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 17, 2019 |
| Location: | Hayward City Hall |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Damon Golubics; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Rebeca Gomez-Gonzalez; South Bay Salt Ponds (SBSP): Dave Halsing |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

- Gena Wirth (GW) introduced the project:
  - Which representatives are part of HASPA.
  - A brief description of the project's intention of developing a long-term vision for Hayward shoreline and adapting to SLR
- Nans Voron (NV) provided additional project context:
  - Described the work done as part of the Background Report (Task 1).
  - Described Arcadis' work on the inundation maps for Task 2.
  - Noted that the team is developing adaptation and design strategies for the Hayward Shoreline.
- Dave Halsing (DH) provided an introduction and description of his past work experience on Oro Loma and various properties within the Hayward Shoreline Masterplan project area.

**02 South Bay Salt Pond Discussion**

- GW asked if there has been any planning for sea level rise (SLR) at South Bay Salt Ponds (SBSP).
  - DH indicated that the project has no legal responsibility for providing additional flood control beyond existing levels of protection.
  - DH noted that the Eden Landing Ecological Reserve (ELER) Phase I and II projects have been framed as maintaining or improving existing levels of flood protection.

        - Levees at the urban edge, a mid-complex levee and the outboard levee have been raised to create a redundant system that is able to last over time.
            - DH noted that this has been the general approach with Valley Water and San Mateo County Flood Control District.
            - The approach by SBSP has been to develop partnerships with the flood protection agencies.
    - DH noted that SLR protection is an externality for the project as it is primarily focused on the following goals:
        - Improve habitats
        - Maintain or improve flood control
        - Create more resilient landscapes
    - DH noted that during the CEQA process, it was questioned how SBSP would be maintained vis-à-vis sea level rise.
        - SBSP's response was that it wasn't directly considered as part of the project, and that the responsibility rested primarily with adjacent landowners.
        - Damon Golubics (DG) asked if the parties responsible for this question were satisfied by SBSP's response.
            - DH indicated that there have been no legal challenges due to this.
    - NV asked if there is a desire to have the marshes adapt to SLR.
        - DH indicated that the project was designing transition slopes as part of the project, and extensive modeling has been performed to satisfy Alameda County Flood Control District.
    - GW noted that SBSP's strategies seem to have two purposes:
        - Provide protection to the community
        - Provide adaptation strategies (ecosystem adaptation) that benefit the environment, wetland, etc.
    - DH noted that the adaptive management plan has defined much of the project:
        - Example: If target numbers for plover breeding pairs are not met, the plan is adjusted to achieve the targets.
        - The project has used flood control structures as a way of achieving management flexibility while allowing for strategies to evolve over time.

- GW asked if SBSP has considered a 4 foot SLR scenario and the impact on the managed ponds.
    - DH indicated that he was unaware of any formal studies on habitat management relative to such scenarios.
    - DH assumed that in a 4 foot SLR scenario, ACFCD would likely raise the levees on the property and take precedent over managed habitats.
        - DH noted that it was possible for the ACFCD to take properties within SBSP should it be required for flood protection.
- GW asked if SBSP had any FEMA-certified levees within SBSP.
    - The outboard levee in Phase II is FEMA-certified but the other levees are not.
    - GW asked how the mid-complex levee was being classified.
        - DH noted that there are many engineered levees throughout the site and the mid-complex met such a standard. However, it was not a FEMA-certified levee.
    - GW asked if the levees are being designed to allow for future raising.
        - DH indicated that they were.
- DH noted that it has been increasingly difficult to get soil for construction projects.
    - Other shoreline projects are beginning to buy soil from quarries.
    - DH speculated that rip rap and concrete could become preferred solutions due to cost, convenience and timing.
    - NV asked if dredge materials have been considered.
        - DH noted that it was studied in the Environmental Impact Report (EIR) for SBSP.
    - DH indicated that the project is analyzing subsidence rates to ensure that the project is matching historical subsidence.
    - DH noted that there are significant financial, organizational and regulatory hurdles involved with slurrying sediment into the ponds.
        - Noted that mudflat seeding could be a potential idea.
- DH provided insight into the regulatory/permitting process.
    - Noted BRRIT has been developing a new process for projects, and recommended setting up a meeting to discuss the Hayward Shoreline Masterplan.
- DH noted that Phase II permitting took approx. 18 months.
    - DH indicated that there are expedited permits.
    - Expedited biological permits but only for restoration projects.

        - If the project has any flood protection benefits, goals, etc. it doesn't qualify.
- GW asked if DH had experience with maintenance permits.
    - DH indicated that California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife (USFW) has 5 year permits for operations and maintenance.
- GW asked how the SBSP's levee elevations were determined.
    - DH noted that a combination of HECRAS and MIKE flood modeling to determine necessary protection levels.

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# MINUTES

| | |
|---|---|
| Date: | September 27, 2019 |
| Mtg Date: | September 17, 2019 |
| Location: | Hayward City Hall |
| Topic: | Task 4 Stakeholder Interview |
| Attendees: | City of Hayward: Damon Golubics; SCAPE: Gena Wirth, Nans Voron, Tim Clark; Arcadis: Rebeca Gomez-Gonzalez; San Francisco Estuary Institute (SFEI): Jeremy Lowe, Letitia Grenier |
| Contact: | Nans Voron |
| Doc'd by: | Tim Clark |
| Re: | Hayward Shoreline Masterplan – Task 4 Stakeholder Interview |

**01 Introduction**

- Gena Wirth (GW) introduced the project.

**02 Adaptation Strategies Discussion**

- The team discussed numerous strategies for protecting the outboard levee:
    - Gravel beaches
    - Fascines
        - Jeremy Lowe (JL) indicated that it could be an alternative for the ponds at the southern end of the Hayward Shoreline Masterplan project area.
    - Living Breakwaters
        - JL noted that where the oysters would be best suited from a habitat perspective would be too far offshore to provide sufficient wave protection.
        - However, JL noted that the oyster beds could facilitate increased sedimentation.
    - Mudflat/Marsh Feeding
        - JL indicated that it would be very energy and resource intensive to pump sediment from the bay into the site.
            - Noted that one potential source could be the San Leandro Marina sediment storage area.

        - JL suggested that sediment could be delivered via the rail line at the northern boundary of the Hayward Shoreline Masterplan project area.
    - San Lorenzo Creek
        - JL and LG noted that mudflat deltas form at the mouth of creeks throughout San Francisco Bay.
            - SFEI indicated that this could be a worthwhile strategy to recreate.
- LG raised holistic questions to the project team:
    - Is the intention to maintain a wide marsh on the site?
    - How can the marshes maximize ecological value?
    - Can wastewater create gradients within the marsh?
- NV indicated that the third option was being considered. NV also indicated that one of the goals was to enhance wetlands and shift away from the idea of maintenance.
    - NV suggested that it might imply that the shoreline moves back, but it could allow for transition of wetlands on the inland edge.
    - LG noted that some of the conversations for the project could address total area of wetlands, and some could focus on quality of the wetlands.
- NV noted that the project's current phase was focused on considering all strategies.
- LG indicated that what might be most helpful is determining how ecological thinking might guide the principals of the project:
    - Maximize habitat heterogeneity
    - Design ecological conditions that could offset acreage loss
- NV indicated that the team was considering three scenarios in addition to the do-nothing scenario:
    - Full protection scenario
    - Ecologically focused scenario
    - Recreationally focused scenario
- LG indicated that it would be important to consider radial connectivity (towards the uplands) for the project.

# STAKEHOLDER WORKSHOP #2

10/28/19

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# MINUTES

| | |
|---|---|
| Date: | November 1, 2019 |
| Mtg Date: | October 28, 2019 |
| Location: | Hayward Shoreline Interpretive Center |
| Topic: | Stakeholder Meeting 2 |
| Attendees: | SCAPE: Nans Voron, Gena Wirth, Nick Shannon, Tim Clark; H.A.R.D.: Adrienne De Ponte, Louis Andrade; EBRPD: Sandra Hamlat, Matt Graul, Mark Taylor; City of Hayward: David Donovan; SCC: Laura Cholodenko; ACFCWD: Frank Codd; SBSPRP: Dave Halsing; ACMAD: Ben Rusmisel; |
| Contact: | Nans Voron |
| Doc'd by: | Nick Shannon, Michelle Kicherer |
| Re: | Hayward Shoreline Masterplan – Stakeholder Meeting |

## 01 Introduction

- Since we last met
    - Completed background report
    - Completed SLR and groundwater emergence maps
    - Site visits and stakeholder interviews
    - TAC Design Charrette, which informed information present at the meeting
    - Shore Tour (about 30 members of the public)
- Timeline and schedule
    - ena provided an update of the project schedule
        - Focused on design strategies for this meeting, evaluating the different types
        - Will develop design alternatives for the master plan and present in mid-January 2020
- ena provided a summary of the SLR and groundwater emergence map analysis
- ena presented the project goals and policy considerations

- The group divided into three breakout stations in different rooms, organized into the themes of engineered, ecological, and policy strategies
    - ena reiterated that these options were drawn for discussion purposes only- the design team is by no means tied to any option. In addition, the options are generally arranged from small to large

**02 Engineered Design Strategies**

- Ecotone Levee
    - Consider utility corridor protection, possibly change alignment to go through Oro Loma marsh along the transmission lines
    - Oro Loma Ecotone Levee Study - 20% of 12 MD treated with 2 -3 mile of levee
    - EBRPD asked if this would provide protection for the railroad tracks and pipelines east of the tracks.
    - In Sacramento, they have been doing this for years and their levee system has no agency that will handle it.
    - Have to consider P&E and other agencies, as well as the utilities that run through the area. Responsibilities and requests
        - What does P&E want to do?
        - There is a jet fuel line, electrical lines, high pressure 36" natural gas line, etc.
        - May do in stages, phased over time
    - A question arose around if an ecotone levee provides benefit or extends habitat.
- Levee Improvements
    - For 4' scenario, may need to improve levees in front of Cogswell and add a tide gate
    - Difficult to build levees in certain environments because levees weren't built to flood control standards
    - Materials and sediment might be difficult to transport
- Tide ates + Water Control Structures
    - Public Works is concerned about the loss of oxidation ponds
- Wastewater Treatment Plant Adaptation

- Endangered species habitat would be lost if you discharge into Oro Loma marsh
    - EBRPD questioned what to do about the habitat at Oro Loma Marsh- how do we plan to protect those species? To do so we'd have to control how much water is going in and out
- Short term you may lose some habitats
- Water board permit is difficult for horizontal levee discharge
- In Petaluma they have a marsh that acts like a park (reenline). In terms of water treatment needs, not sure if this is possible.
    - David doesn't see the water board or EPA getting on board with the reenline (walkable area) idea
    - Need more case studies to show how mild they are and beneficial
- Nearshore discharge would be less likely than maintaining EBDA pipeline
- Hayward is one of the only WWTP that can do wet weather discharge
- Open effluent channel along Oxidation ponds, transition from chlorine to treated / chlorine-free ponds
- Option 3 creates habitat issues - can treat all the water, but limits on pipeline
- Questions arose about the tide water coming in
- Potential to use as an education feature
- 2 pipes, large flow coming through
    - Palo Alto was the first area to try seeing how much water you can put through these types of pipes
    - They use reverse osmosis which makes water into brackish marsh
    - Treated osmosis water goes to San Jose, mostly
    - Want to bring that concentrate and try it through slope
    - Pump to the top of the slope (which is better than pumping it through Fremont, San Leandro; and cheaper)

    - If the pipeline is overloaded at Hayward Treatment Plant, what would we do?
        - We put a lot of water into the pond- estimate 300 mil gallons (EBMUD)
- Flood Storage
    - Everyone seemed quite worried about losing flood storage capacity
    - The golf course area used some fill, not as much available as used to be
    - Could we use SkyWest to hold water, etc.
- roundwater
    - Ellen at SFEI noted that with the more levees and walls you build, the more groundwater you have
    - Diked ponds / stormwater ponds needed for groundwater storage
    - Pumping out-highly contaminated areas requires additional treatment
    - If more stormwater impacts upstream, reveals combined impacts of groundwater and SLR flooding downstream
    - How will clay-lined oxidation ponds respond to groundwater emergence?
- Cost and Feasibility
    - Commodities are going to keep costing more
    - At the treatment plant we've picked up the better part of 10 feet; a lot of fill to make fire roads etc. but we can't use that type of fill in a marsh because of the quality needed for marshes
    - Fill: where would it come from? Where would fill be stored and staged to use? Quality tested?
    - The acquisition of fill seems to be an area of big concern
    - Hazard Mitigation Funds for infrastructure projects
        - Create habitat to offset infrastructure mitigation. E.g. horizontal levee + marsh restoration. Potentially tap into large amounts of money through FEMA

**03 Ecological Design Strategies**

- Marsh and Mudflat Migration Planning
    - Connect Sulphur Creek to Skywest, since it would be hard to connect tidal flows under the rail tracks and high pressure gas line
- Fine Sediment Augmentation
    - Daphney Hash, ACFCD, would know about Don Castro pipeline
    - Network of pipes in marshes? As opposed to spraying from one pipe
    - Power for pumping sediment slurry from deep water navigation channel is very expensive!
    - Need a booster pump every 1-2 miles
    - Reference Dredge Reuse Feasibility Study for costs, Moffat and Nichol
- Tidal Marsh Restoration
    - Utilize oxidation ponds for wet weather equalization, open others up to tidal marsh restoration
- Diked Pond Management
    - Think about creating a riparian corridor at Skywest olf Course
- Tributary Connection to Baylands
    - This is beneficial for marsh health from an ecological standpoint, but won't do much for flood protection or SLR adaptation- not an adaptation strategy, per say
- Fine and Coarse rain Beaches
    - Any of these would need spits, groins, or jetties to help trap sediment – like hayward and Johnson landing
- Ecosystem Enhancements
    - State of Estuary Conference- SMHM isn't really using upland transition zone. They are swimming around and staying put, due to predators or maybe competitors.
    - May be better to provide localized shelters? Small trellis- like structure for mice.
    - What will the agencies allow us to do if the habitats are essentially gone (ex: pickleweed all covered, etc.)

**04 Policy Design Strategies**

- Managed Retreat
    - More managed retreat and mitigation planning
    - Can we make sure the design solution doesn't prevent retreat in 50-100 years?
- Public Access + The Bay Trail
    - The "blue water experience" is artificial and overrated
    - Seems like you'd do all 3 options in some combo or sequence over time
    - Keep a link to the Interpretive Center with any Bay Trail realignment

**05 Final Comments and Questions**

- Louis expressed the desire to maintain a link to the Interpretive Center in all Bay Trail adaptation plans, as long as its current location and uses remain
- David noted that SCAPE has a lot of great ideas on the table

**06 Key Takeaways**

- Broad interest in the **time frame** of these strategies and the **combination of multiple strategies.**
- Need to define **what infrastructure is critical** and what is more adaptable to define adaptation strategies and **priorities.**
- Pair strategies together for **multi-benefit projects**, may be easier to secure funding as well.
- All strategy options from small to large seem like they can be **phased over time**- may end up doing them all, but in different time frames.
- Strategies should **anticipate combined impacts** of groundwater emergence, SLR, and upland stormwater- plan for additional future uncertainty.
- There is interest in **managed retreat**, but consensus that it may not be ready to be implemented yet. Should design the masterplan to not prevent this from happening in the future.

- This is a **community effort** and can't be done alone. Agencies should work together. When do projects become more of a **regional issue**? And who is responsible for implementing, and maintaining?
- Need for **local stakeholders** and **public** to **provide feedback** on the design and structure

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# STAKEHOLDER MEETINGS

**01/08/20 - 01/10/20**

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# MINUTES

| | |
|---|---|
| Date: | January 8, 2020 |
| Location: | 399 Elmhurst St, Hayward, CA |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | ACFCD [Rohin Saleh, Hank Ackerman] |
| | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | EBRPD [Matt Graul, Chantal Alatorre, Mark Taylor] |
| | City of Hayward [Taylor Richard] |
| | H.A.R.D. [Adrienne De Ponte] |
| Doc'd by: | Nick Shannon |
| Re: | **ACFCD- Adaptation Strategies Discussion** |

Action Items noted in red.

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

Alameda County Landfill

- Ownership
    - Hank noted that the county purchased most of the landfill. HARD is going to quitclaim the piece of land they own to the county, which the general manager at HARD is fine with
    - Mark noted that they will have to change the license agreement, since EBRPD maintains the Bay Trail, under an operating agreement with HARD
        - Hank noted they will likely give EBRPD an easement
- Future Plans
    - They attempted to put a 5 MGW solar plant on the landfill 4-5 years ago. They still intend to use the landfill for a solar plant.

    - Hank expressed that the county does not want to use the site for any recreation
    - Gena noted there are potential co-benefits associated with erosion control on the landfill edges and Bay Trail protection.
- Capping
    - Hank noted they still have to cap the landfill. This involves filling the northeast portion and removing / filling the concrete canoe.
        - They will not fill the landfill higher than it already is today.
    - Mark noted that the HARD section along the Bay Trail has a liner
    - Hank noted they have a licensing agreement with LMI to cap the landfill as they are able to. The county does not have the funds for all of the fill at once and they will do it as they can. (multi-million dollar project)
- Bay Trail Segment
    - Hank indicated he imagines they will raise the roads to the N and S of the landfill, as well as the Bay Trail, as sea levels rise
    - Mark noted the Bay Trail has been raised a few times already
    - The elevation of the Bay Trail over time could be a viable erosion control strategy

Rohin noted that it is difficult to evaluate the strategies when you don't have a frame of reference.

- In terms of frequency, you have to evaluate how often water will get into an area, which will change the strategy. 7' (MHW) vs. 9' (King Tide) changes the strategy.
- Rohin requested to associate the plan with the elevation *and* frequency of tidal inundation
- Gena noted that we have developed these options based on tying back to daily tidal flooding with the various SLR scenarios

Design Flood Elevations

- Flood control is interested in how far you will go to provide a level of protection
    - For FEMA certification, elevation has to be at least 2' above existing 100 year event

    - Flood control has to meet the minimum FEMA flood protection for any project, and be adaptable to sea level rise.
    - Hank noted that wave runup will be higher in shallower areas
- Rohin noted that as a frame of reference, flexibility and adaptability is a key issue. We all have to be on the same page to make sure the projects fit together and are designed to the same elevations and level of flood protection.
- Mark asked if flood control is looking at flood control storage or raising levees
    - Hank noted that Rohin is analyzing the past 50 years of records. They can't build enough pumps to get the water through a flood protection levee. A critical issue is where you get the land for the ponds to hold the water as it's being pumped out.
- Adrienne and Matt brought up looking at SLR across the Bay at a regional scale and the coordination between agencies.
    - ACFCD is a part of CHARG, which is thinking about the larger discussion around regional coordination.
- Gena asked if flood control has a recommendation for the level of protection
    - Rohin noted that they are evaluating that question now.

Don Castro Sediment

- Gena noted that it is imperative to have any tidal restoration project raise the pond as high as possible before restoration. Is there a possibility to pair the Hayward Marsh restoration with the Don Castro sediment pipeline?
    - Hank noted they are trying to find the money to proceed with the project, but they need a grant.
    - Hydraulic dredging and pumping (around $12 million) is cheaper than trucking (around $24 million)
- Hank noted the possibility of getting an agreement to get infrastructure in place on access roads, then bring in pumps and dredging equipment when needed.
- Matt noted it depends on the timeline where you take the sediment- 10 years down the line, Oro Loma Marsh may need the sediment
- Rohin noted it is cheaper to dredge into the creek, then pump further downstream.

- Hank noted they may be able to do this in the concrete lined portion, not the natural creek

General discussion

- Mark asked about plans for the tide gate at Bockman and if they would need the extra storage space.
  - Rohin explained that the storage capacity in the channel is negligible.
  - Rohin noted they are looking at moving the tide gate at Bockman inland because it will get inundated with SLR. However, if Oro Loma marsh was muted, they wouldn't have as much of a problem with its current location.
- Rohin noted that with inundation, metered wetlands are ideal
  - Gena noted that chambering is good for tidal action, however we know from SFEI that it is not a recommended strategy, as it cuts off ponds from sediment and impacts marsh health negatively
  - Mark noted there may be a combination of strategies- keep the wetlands tidal as long as you can, then mute them later on

Next Steps & Questions

- Rohin noted they would like to work jointly with the City and HASPA. One of the main drivers is cost.
- Rohin noted that some of the scenarios look very probable
- Rohin noted that flood control is working with Arcadis to model the upland stormwater flow for infrastructure improvements.
  - In a month or so ACFCD will be able to share a draft of the data.

## 03 ACTION

- *ACFCD to share the upland stormwater flow modeling with SCAPE once it is ready in a month or so*
- *SCAPE to review the master plan alternatives with ACFCD once they are developed (March-April)*

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# MINUTES

| | |
|---|---|
| Date: | January 8, 2020 |
| Location: | 1099 E St, Hayward, CA |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | H.A.R.D. [Adrienne De Ponte, Rick Hatcher, Minane Jameson, Paul McCreary, Jim Wheeler, Jacqui Diaz, Debbie Hernandez]<br>SCAPE [Gena Wirth, Nans Voron, Nick Shannon]<br>EBRPD [Mark Taylor]<br>City of Hayward [Damon Golubics, Taylor Richard] |
| Doc'd by: | Nick Shannon |
| Re: | **H.A.R.D.- Adaptation Strategies Discussion** |

Action Items noted in red.

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

Review of Adaptation Strategies

- Paul noted they are currently finishing the final CD's of the second phase of reconstruction of San Lorenzo Community Center Park

Hayward Shoreline Interpretive Center Relocation

- Rick noted it seems like the main concern is access, are they weighted?
    - Nans indicated that once we start to combine the strategies, we will pair these options with the raising of roads, etc.
- Jim noted that the barge is the coolest idea
- Jacqui noted that the key is transportation. Everything is going to be inundated, and it is so close to the CalTrans highway that will be fixed.
    - Tying into the CalTrans improvements, and raising key access points, could be a potential path forward

- Jacqui noted she attended a SBSP presentation and asked if there is any tie-in with this project
    - Gena noted we have met with Dave Halsing and he has been a part of the discussion
- Minane noted she is thinking in terms of more near-term, 30 years. She would like to see more of a big-picture outlook of what the broader climate will be (precipitation, temperature)
- Rick indicated the direction of a 3-tiered approach, to prioritize programming first:
    - Existing plan and site location, ramifications, costs and programming
    - Smaller location sites to program the entire region
    - Existing projects and improvements to address access
- Gena noted this seems like a useful next step, to analyze the options based on the 3 alternatives
- Nans brought up the idea of phasing. Up to 2' SLR, the building may be used as-is, but to start thinking of a more permanent location option with longer-term projects.
- The constellation idea of the Interpretive Center program was brought up as a way to have satellite / mobile locations for programming along the entire shoreline
    - Jim noted it would be interesting to magnify the diversity of the unique shoreline environments and pilots/satellites
- Minane noted that the CCC won't fund improvements in high risk areas. What types of funding will be available? Based on the level of protection, etc.
    - Rely on the master plan to go to the agencies to go after a grant
- Adrienne asked if you can legally convert or abandon habitat
    - Mark noted if you look at it long-term, or other habitat, they may support it on the bigger scope
- Adrienne asked if there are any mitigation obligations in perpetuity for the HARD Marsh
    - HARD to look into any mitigation obligations
    - Matt noted it may be possible to relocate mitigation

Next Steps & Questions

- Minane expressed that there are a lot of options and that she is counting on the design team; the Board will decide on the money. It does feel harder than expected. Would appreciate any cost indications (4x as much as another option, based on our experience). Numbers will be very important
- Gena indicated that the current thinking, phasing, and timeline may be more important. It is a vision guidance document, not a bid package

03 ACTION

- *HARD to look into any mitigation obligations for HARD Marsh*
- *SCAPE to review the master plan alternatives with HARD once they are developed (March-April)*

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# MINUTES

| | |
|---|---|
| Date: | January 9, 2020 |
| Location: | 111 Grand Ave, Oakland, CA |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | CalTrans [Dick Fahey, Hans, Khai Shoon Leong, William Velasco, Albert] |
| | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | EBRPD [Matt Graul, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard] |
| Doc'd by: | Nick Shannon |
| Re: | **CalTrans- Adaptation Strategies Discussion** |

Action Items noted in red.

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

San Mateo Bridge Landing

- Hans asked if the team is looking at raising the whole bridge
    - Nans noted that for this master plan, we are only talking about the mile stretch between the toll booth and Clawiter road (about a 1 mile stretch)
    - Gena noted that any ideas we think of on this end of the bridge will likely have to coordinate with the western landing
- Dick asked if the floating bridge in Seattle is on a lake
    - Nans confirmed it is. In the Bay, the tidal range is a lot bigger
- Dick noted that they have an internal SLR task force in the district with representatives from all key functional areas. He sent the draft package out to everyone in the task force. From a planning perspective, they have branches doing long range planning. (Transportation concept reports) They do like to see

all of the concerns and options and will likely fold what we do into the concept report. From a planning perspective, this is fine.

- Khai noted that in option 1 and 2, the bathtub effects aren't as big of a problem. SR-44 built flood walls with underground storage and one pump station. Drainage issues aren't as big of a con.
    - If groundwater was emerging, flood walls/levees wouldn't be an option since you can't keep the roadway at that elevation anymore. Purely talking about surface flow, these strategies aren't a problem for creating a bathtub effect.
    - Khai noted there have only been some subsurface drainage improvements to deal with groundwater thusfar.
- Options 3,4, and 5 are more challenging since they change the current alignment.
- Khai noted that for option 3, you may be able to do in the same alignment. They have done it before. If you take 2 lanes, build an embankment, and keep doing that. It would require a lot of public outreach to have people take alternative routes.
- Dick asked if you could construct option 4 while maintain the current alignment
    - Khai indicated you might not want to, since you will have things falling down from construction regardless.
- Gena asked how CalTrans would elevate the road.
    - Khai noted that maintenance may prefer its current alignment.
- Hans noted that CalTrans is going to remove the toll booths and make it all electronic
- Dick noted he didn't get any comments from maintenance
- Gena noted that Interpretive Center upgrades would need to be highly coordinated with any CalTrans improvements.
    - Nans indicated that in the levee scenario, building a levee on top may provide road access to the center. There is interest in creating synergies across agencies to create co-benefits across projects
- Gena asked if CalTrans uses the maintenance access roads to the North of SR-92.

    - Dick mentioned he can check with the maintenance/bridge inspection teams
- Gena noted to double check elevation of the rest of the bridge W of the toll booth. LIDAR data usually doesn't account for bridges.
    - Dick noted that this happens a lot with their SLR maps.

Next Steps & Questions

- Gena noted that partnerships could begin to emerge now to create projects and apply for grant funding, etc. and asked how CalTrans would like to see the bridge approach represented in these alternatives.
    - Dick noted that from a planning perspective, since there isn't funding and it's not an implementation plan, he doesn't have a problem showing multiple alternatives and options
    - Khai indicated it's more likely if you put down the options clearly, the public expects it to happen. Don't put anything too specific down.
    - Gena noted that the preferred alternative may state: adaptation required, further study required by CalTrans, and indicate a fuzzy zone, while stating the pros/cons of multiple options.
        - Dick noted that this approach seems quite reasonable.
    - Hans noted that if the CalTrans team feels any options aren't feasible, we should discard those options.
        - Dick noted he can do further internal outreach to get feedback.
    - Dick requested an updated presentation to describe and display the options to share.
        - Gena noted we can share a curated selection of slides now, and in early March we will share the combined alternatives for review. Stakeholders will get to see the alternatives first.
    - Gena noted that the three options may be: causeway, another with a levee on the north side with interpretive center access, and one showing the bare minimum. All 3 could be carried forward as a fuzzy hatch in the proposal.
        - Dick noted that this sounds reasonable

03 ACTION

- *CalTrans to check with maintenance/bridge inspection about use of the maintenance access roads to the north of SR-92 bridge landing.*
- *CalTrans to circulate adaptation strategies to their internal team to get feedback on the feasibility of the options.*
- *SCAPE to review the master plan alternatives with CalTrans once they are developed (March-April)*

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# MINUTES

Date: January 9, 2020

Location: 2655 Grant Ave, San Lorenzo, CA

Topic: Hayward Shoreline Master Plan

Attendees: EBDA [Ian Wren, Jacqueline Zipkin]
Oro Loma [Jason Warner]
SCAPE [Gena Wirth, Nans Voron, Nick Shannon]
SFEI [Jeremy Lowe]
SFEP [Heidi Nutters]
EPA [Luisa Valiela]
HARD [Adrienne De Ponte]
EBRPD [Matt Graul, Mark Taylor]
City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard]

Doc'd by: Nick Shannon

Re: **EBDA/Oro Loma WWTP- Adaptation Strategies Discussion**

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

- Jackie will be used as a point person for any document sharing moving forward.

Adaptation Strategies

- Luisa asked if there are any subtidal design features in any of the strategies
    - NV indicated that any oyster reefs have to be far offshore, they may subside, and are not a huge priority but the team is looking at subtidal design strategies as well. The just may not provide as much erosion reduction being so offshore.
    - Matt noted that subtidal elements may not be standalone features on their own but they would likely be more of an add-on to other projects

Ecotone Levee

- Ian noted that the former oxidation ponds being considered for shallow water treatment. Option 2 of the ecotone levee aligns with their ideas.
- Jackie noted that they also have a grant to look at the oxidation ponds and evaluate the feasibility of a portion of the ponds as seasonal wetlands and/or wetland treatment function during the dry season
    - Nans noted that we do have this option under WWTP adaptation strategies
- Nans asked if Oro Loma is looking at isolated perimeter protection
    - Jason noted that their view is, being so far out in the marsh, it is hard to do a horizontal levee around the treatment plant. The sludge ponds are more debatable and have a lot more room to have a natural levee system.
    - Gena asked if there is opportunity to relocate the sludge pond function?
        - Jason indicated that many plants don't have them, so there are alternatives.
    - Gena asked if there are overlaps between 1st mile project and these options.
        - Jackie noted they haven't decided where the project should go yet.
        - Jason noted the expectation is that it is along the rail corridor
    - Nans noted that we can't tie back along Bockman, and have to go north of the project area in ecotone levee #3.
    - Gena noted that another consideration at Bockman is a breach and levee break to enhance marsh salinity/freshwater gradient.

Transforming Shorelines First Mile Project

- Jackie noted they are in the very early stages of the First Mile project. It is funded through an EPA grant to do design and permitting of a horizontal levee. The exact length and location is to be determined.
    - Jackie confirmed it is in generally the area we have been showing

  - The idea is to advance the concept from the EBDA/Oro Loma perspective
  - They intend to issue an RFP in the next month or so for a design consultant
- Jackie noted that it would treat a very small amount of wastewater, based on the demonstration project. Part of the grant will be to define how much is feasible to treat in this area. There isn't a scenario where all of EBDA's wastewater could be treated through these features
- Adrienne asked about freshwater impacts to the gradient and ecology
  - Nick and Jeremy noted that the idea of the horizontal levee is to provide a transition zone with native upland vegetation. This wet meadow condition historically occurred throughout the Bay and provided a freshwater seep that created a brackish zone. Jeremy indicated that the freshwater seepage over the slope actually inhibits the growth of invasive species.
  - Jeremy noted that the horizontal levee started out as an enhancement to marsh restoration projects in the South Bay, as part of a transition zone to buffer storm surge.
  - There is a problem with habitat conversion, extending fill into existing marshes. This is a question BRRIT is having to deal with.
  - Jason will send Adrienne a list of plants used at the Oro Loma demonstration project.
- Mark indicated that the levee cross section would be different for fresh/salt water plants
  - Ian noted that you could incorporate a clay cap for long-term migration with SLR where you can't get freshwater
- A mitigation project for the Port of Oakland on the northeast corner of Oro Loma Marsh was raised as a concern
  - A conservation easement may be in place. Would a marsh / ecotone levee impact this?
- Ian noted that a paper is being released soon on the water question, and what slope you'd need to maximize treatment.

- Ian noted that EBDA is also working with SFEI to assess potential for nature-based WWTP solutions regionally across the 37 plants in the Bay

Levee Improvements

- Gena noted that flood control indicated they will support large-scale levee improvement projects that are certified by FEMA
- Jeremy reiterated that it would likely require separating the FEMA certified engineered levee and that on one slope would be the seepage slope. It would be relatively short, and you could separate the uses with an impermeable membrane to stop water from seeping down into the slope of the flood risk management levee. Questions have arose around how to certify/engineer the levee.
    - Jason indicated that at the back of the horizontal levee would be a FEMA certified levee. You wouldn't built a horizontal levee without one

Wastewater Treatment Adaptation

- Jason indicated that in 50 years from now, wastewater will be used to drink. You don't need an outlet for the water unless there is a good ecological reason.
- Jason brough up pumping 'urban drool' over the horizontal levee to enhance water quality before it enters the Bay. This polluted runoff may not be as feasible to drink and using the horizontal levee for treatment may be a more likely scenario.
- Jackie noted that the water board permit is not as difficult to obtain- may be the least of the problems. She is interested in case studies and opportunities. Other permits are more restrictive
    - Matt brough up problems with the NPDES permits
- Ian indicated that option 4 for WWTP Adaptation isn't an overly optimistic scenario

Diked Pond Management

- Gena noted that for the oxidation ponds, we are also looking at habitat relocation from Oliver Salt Ponds (which may be restored to marsh)

Next Steps & Questions

- Ian indicated to maintain the 1st mile as a more consistent option throughout. For the oxidation ponds, the options outline seem consistent, and allow for more flexibility.
- Jackie noted that in a few weeks, we could talk again about our thinking and get feedback on the preferred alternatives. Also to be sure to coordinate in the future to be sure the First Mile doesn't propose anything different.
- Jason indicated that our design team is driving, and they will build the project based on what we decide collectively.
- Jason indicated that at some point, the cost of levee per LF will make or break the decisions
- Jackie asked the best way to move the conversation forward.
    - Nans stated that we can share the Task 4 report with the adaptation strategies today. In early March, we will have initial alternatives, and that will be a good next point of contact. If we have questions, we will reach out in advance of that timeline.
    - Jackie reiterated that the interest is to advance what we collectively think is the best opportunity
- Matt noted that once we have the alternatives, they will share with their boards to get feedback and there will be an ongoing discussion during that time period
- Adrienne noted that interpretive trips, educational outreach, and public buy-in will be key in all of the strategies

## 03 ACTION

- *SCAPE to review the master plan alternatives with EBDA + Oro Loma once they are developed (March-April)*

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# MINUTES

| | |
|---|---|
| Date: | January 9, 2020 |
| Location: | 4901 Breakwater Ave, Hayward, CA |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | HASPA Board of Trustees [Al Mendall, Dennis Waespi, Minane Jameson] |
| | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | HARD [Adrienne De Ponte, Debbie Hernandez, Jacqui Diaz, Rick Hatcher] |
| | EBRPD [Mark Taylor, Chantal Alatorre, Matt Graul] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard] |
| Doc'd by: | Nick Shannon |
| Re: | **HASPA Board Meeting- Adaptation Strategies Presentation** |

Action Items noted in red.

## 01 SUMMARY

- Adaptation Strategies Presentation (schedule, since we last met, adaptation strategies, master plan assumptions)
- Next Steps & Questions

## 02 DISCUSSION

Fine and Coarse Grain Beaches

- Al asked if gravel beaches are as wide as a levee
    - Gena noted that they could be placed in front of a levee
    - Coarse gravel is more suited for the estuary condition and require less footprint.
- Minane asked about what size of rock would be used for the beaches
    - Gena noted that more fine-grained gravel would be likely. The final grain size would be determined based on wave action, containment structures, and design intent.
- Dennis noted that armoring the landfills- aesthetically, environmentally, leaching into the Bay? Have post-closure agreements.
    - Gena noted the potential of another option as risks increase. The question now is if gravel beaches are enough? Or to consider more

conventional techniques, such as raising the levee. But there are funding and partnership opportunities.

- Mary noted the con of replenishment aspect. Is there a life cycle / how far out do you forecast the design life of a beach?
    - Gena indicated it depends on the design life. Nobody knows that because it hasn't been piloted yet. It could be a short-term project that extends the lifecycle of a resource

Diked Pond Management

- Al noted that all of the diked salt ponds strike him as an unnatural state. These strategies should be thought of in a way that provides greater resiliency over time.
- Gena noted it is very practical and sustainable to retire salt pond habitat, move it to another portion of the site. The habitat is very important and historic.
    - Adrienne noted there is snowy plover habitat at Oliver Salt Ponds now, which is a threatened bird. It is also a CA designated historical landscape with historical remnants. HARD did a mitigation project in 2001.
    - Matt noted that if we did something like that, have a lot of great plover habitat in Hayward Marsh- have to coordinate and there may be tradeoffs.

Fine Sediment Augmentation

- Dennis brought up Lake Chabot and sediment management.
    - Matt noted that ACFCD said it would be around a $20-25 mil project for the Don Castro sediment pipeline. If you have the infrastructure in place, you can use it over time long-term, which is almost what we need.
    - Gena noted that this project may be a win-win-win for a grant project (flood control, ecosystem adaptation)
- Rick noted that in the natural ecosystems, that sediment is supposed to be going downstream.
- Al asked if it is possible to consider WWTP as a source of sediment

- Gena noted that may be a lot farther off, since the biosolids dissolve more easily in water and don't have the same mineral quality marshes need to adapt.

Ecotone Levee

- Dennis asked if there would be some level of protection in the front, which would eliminate the Bay Trail
  - Nans clarified that this would not necessarily be the case.

Tide Gates & Water Control Structures

- Nans clarified that these options are not mutually exclusive

Wastewater Treatment Adaptation

- Al asked if these options can accrete sediment
- A concern about keeping a wet transition zone was brought up- it does create mosquito habitat. Willow, riparian issues.
  - Nans noted that the plant palette selection may help
  - They are monitoring at Oro Loma, but there are mosquito issues
  - As the land subsides, more breeding happens in those areas. You need a monitoring plan
- Mark noted that the Oro Loma pilot is full of almost all invasives
- Gena noted that we will be editing the last 2 diagrams to reflect the solar fields and biosolids ponds, to maintain those uses.

Land Elevation

- Nans clarified this is not recommend in a large-scale, but more of a planning or zoning overlay.
  - The land would may be elevated 2-7'

San Mateo Bridge Landing

- Damon noted that CalTrans was amenable to all 5 options.
- Gena noted it is unlikely CalTrans will support a single option, but we may designate a zone for bridge adaptation.
- The causeway is the most expensive, but most ecologically beneficial.

Public Access & the Bay Trail

- Mark asked if we would you want to go around the oxidation ponds with the trail.
    - Gena agreed. SCAPE will update that diagram.

Hayward Shoreline Interpretive Center Relocation

- Remaining lifetime on structure?
    - Adrienne noted that the structure is fine, we just don't know how long it will take to be inundated.
    - Gena noted that we don't have any structural analysis/architect reports. The next step would be to analyze structure to define critical points of decision.
    - It was constructed in 1986 and all utilities are underground and inundated frequently.

Closing Comments

- Al is pleased to see the change in scenario thinking… initial A and C are impractical. He likes the idea of having natural projects near the Bay and moving levees / engineered solutions back.
    - Inland ecotone levees with effluent discharge is at top of the list- expensive but it does a lot of good, opens up potential funders of projects. Hopes this is part of a couple of the alternatives
    - Skywest as water retention basin seem like an unrealistic possibility?
        - Erik noted that public works has concern about it as well.
    - Would be nice if one of those three options was a low-budget option. There are no dollar figures on any of this, which has to be fixed. Give an order of magnitude. It is essential to make a high-level decision on what is feasible.
    - For the TAC team and as a policy and decision maker, it is not going to be useful without any costs associated.
- Dennis noted that he likes the nature-based solutions, and ecotone levee.
    - Love the idea of sediment, makes a lot of sense.
    - Concerned with the Bay Trail. Relieved to think they would leave Bay trail in place to maintain blue water experience (very important, especially in the south Bay). Keep it in until it washes away.

    - Agrees with Al- we have to figure out the ability to get grants and permitting.
- Gena clarified that we will think about alternatives over time, when projects have to be phased, and identify partners and larger effort projects versus major expense projects. Because of the feedback we've gotten, all of the alternatives require large infrastructure investments and are costly.
- Minane agrees with Al and Dennis- keep natural assets, aesthetics, support wildlife, and the Bay Trail.
    - Couldn't help with choosing an option, but relies on those who know in choosing a way to handle this. It gives hope that we do have options, hopes we have them in 10-20 years down the line.
- Rick noted the responsibility as a leading agency in the area to deal with these issues. There is now a wealth of information and there needs to be a hybrid, phased approach. It is a 30-50 year process, but we have a place to start.
    - Program first for what the needs are.
    - Include outside agencies and areas outside the study area
- Al noted he sees this as a 20-30 year time frame
    - Gena noted that the time range is fluid, depending on the level of risk associated to each asset. We are looking at 4' SLR but will identify projects that need to happen with 2'.
        - Al noted that we have more time than he thought
- It may be reasonable to keep Managed Retreat in the plan, then state the projects you might not have to do, which would be valuable information
- Mark noted there will have to be a considerable amount of coordination between agencies and adjacent cities
- Matt noted the potential reuse of stormwater over the ecotone slope to treat water before it enters the Bay

## 03 ACTION

- *SCAPE to present the master plan alternatives at the next HASPA Meeting on April 9.*

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# MINUTES

| | |
|---|---|
| Date: | January 9, 2020 |
| Location: | 3700 Enterprise Ave, Hayward, CA |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | Hayward Public Works [David Donovan, Jan Lee] |
| | CalPine / Russell City Energy Center [Cameron White] |
| | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | HARD [Adrienne De Ponte] |
| | EBRPD [Mark Taylor] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Public Works / CalPine Russel City Energy Center- Adaptation Strategies Discussion** |

Action Items noted in red.

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

Diked Pond Management

- David brought up stormwater detention show in these options, and that as a wastewater storage pond, the water is technically unchlorinated and can't meet permits for full discharge. Since it's not fully treated, they have to still chlorinate and dechlorinate.
    - He'd like to maintain the ponds for this function
- You can't call it habitat per say, since it's not managed for species. There is a lot of water foul on the islands, and they are providing habitat, just opportunistically.

- Jan noted that the amount of space needed varies depending on their needs- sometimes there is more flow, sometimes less and the volume varies year to year.
    - Jan noted she sees a dramatic reduction based on the diagrams
    - Nans noted that these options may pair with levee raising to maintain the capacity.
- JL noted that based on a new agreement with EBDA, they can only discharge 35-15 MGPD, so they need more storage capacity
    - The reduction of discharge into the EBDA pipeline from the Hayward WWTP indicates that other cities now have more EBDA discharge capacity.
- 500 million gallons is the current discharge capacity. Need to maintain this at a bare minimum.
- Today, they have small pumps (water levels up to 5', can take back to 2' deep). Then the plant relies on evaporation, then there are mosquito issues with standing water.
- David noted that they have to get to a certain depth until they bring it back to the system.
- Mark asked if the ponds are only used for wastewater, and not flood control
    - David confirmed. Their permits only cover the wastewater treatment uses. They can't manage other water, since it has different contaminants.
- David and Jan don't prefer any of the options, besides 1, which would maintain their current uses

Ecotone Levee

- Jan likes option 2 or 3 to preserve the oxidation ponds.
- Cameron confirmed CalPine isn't moving. It is currently out of flood plain and raised higher than the Hayward WWTP
- David noted that for stormwater, there are roughly 4 or 5 4-5' diameter pipes, and his guess is that they're pushing a decent flow.

    - David questioned if the oxidation ponds are even viable for the amount of water they need to control? They are wiling to be a team player, just wondering if there is feasible capacity
- David noted that if the EBDA pipeline is decommissioned, they would try to have ALL of effluent discharged locally. They originally discharged into Line A. In support of a treatment marsh then discharge into the Bay
- David raised a concern around putting oyster beds in the Bay- if they are there the permits would not allow near shore discharge.
    - Nans noted that the feasibility of oyster reefs may be hard, and subside or sink into the mudflats.
- David indicated support for a horizontal levee and near shore discharge.
- Mark noted that that water will be a lot more valuable (drinking water, etc) in the future in 40-50 years.
- Jan noted that If EBDA can continue, it is the cheapest option around.

Oxidation Ponds

- The ponds were used in their JPA agreement with EBDA. Now with the new agreement, they have to regulate their own flow to give EBDA pipe capacity
- David indicated they are not able to give up ponds during storm surge, if the levees were to overtop. Anything put in the pipes, they need to meet the permits- if Bay water gets into the ponds, they can't treat it under current permits.
- David noted that they are clay lined ponds and groundwater emergence isn't as much of a problem.
- David noted they are not opposed to getting rid of the oxidation ponds, but it depends on EBDA.
- David noted that they get up to 1"/day of evaporation from the ponds and they generally do add in flow to them regularly, opening up the flow nightly.
- Nans indicated that the real opportunity is if EBDA was decommissioned, they would generally not need the use of the ponds as much.
    - David confirmed, if they are equipped to do near shore discharge
- David indicated that ecotone levees can get submerged/flooded and easily drain to be used for nutrient removal soon after

Wastewater Treatment Operations

- David noted that at their current level of treatment, they can treat the entire flow during storm events, before it gets to the ponds.
    - After tertiary treatment, where more nutrient removal occurs, which is still non-potable, then they can do near shore discharge
- The plant would need 100 mil of upgrades to do full nutrient removal, and upgrade another 50 mil for near shore discharge
- David noted that if you put water back into the aquifer, it has to meet potable standards. Their plant would have to be larger in size to do so.

CalPine / Russell City Energy Center

- Cameron noted that the design life of the plant is 30 years, but it is not uncommon for them to go to 40/50 years. It was built in 2013 and is now one of the most important power plants in northern CA.
    - Natural Gas power plant fed by a pipeline that comes in
    - Taps into the larger pipeline along the rail and comes in along Depot Road.

Conclusions

- Need to maintain all of the functions, and storage capacity. Varies on the micoclimates, if there are larger storms, will have to store more.
- David noted that the plant goes offline for a few days during strong storm events to open up more capacity in EBDA pipeline for other treatment plants to evacuate their systems
- In the future, it comes down to a combination of building additional infrastructure, adding additional storage, and needing more flexibility.
- David noted that in their current operations, the ponds are off limits. If it becomes cheaper to get current operations off of the plant, that story may change.
- It all comes to tradeoffs / cost-benefits, and the ability to maintain core functions

03 ACTION

- *SCAPE to review the master plan alternatives with Public Works + CalPine once they are developed (March-April)*
- *SCAPE to invite Alex to the stakeholder meeting in March*

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# MINUTES

| | |
|---|---|
| Date: | January 10, 2020 |
| Location: | BCDC Office |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | BCDC [Jessica Fain, Dana Brechwald, Anniken Lydon, Walt Deppe, Julia] |
| | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | EBRPD [Matt Graul, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Taylor Richard] |
| Doc'd by: | Nick Shannon |
| Re: | **BCDC- Adaptation Strategies Discussion** |

Action Items noted in red.

## 01 SUMMARY

- Project Update (schedule, since we last met, master plan assumptions)
- Review of Adaptation Strategies
- Next Steps & Questions

## 02 DISCUSSION

Fine and Coarse Grain Beaches

- Anniken asked about longshore transport in this area. Through BRITT, there is a proposal for a cobble beach that has a system of 5 groins set up. They have to find a way to show the beach utilizes the min. amount of fill you need for that form of protection, since there is no modeling of wave attenuation from the oyster reefs proposed.
    - If SCAPE wants more information, we could contact the Port of SF- this cobble beach at Heron's Head Marsh is now an active project in India Basin.
    - Herons head isn't talking about material replenishment. However, Anniken thinks they will get a significant amount of longshore transport. Anniken noted that there is a seeding feature upstream in transport that would replenish the beach over time, but there are no plans to actively replenish that amount in the future. Crown beach is on

a 20-year cycle nourishment cycle- they truck sand back to elbow of the beach.

- Gena noted that this project is at the master plan level and we will likely not get to that level of detail yet to know any further detail on the long shore transport conditions.
- Anniken: Beaches do provide more habitat and BCDC does have an active application for them. It is on the table and they do consider it in the policies.
- Anniken posed concerns about a beach cutting off water and sediment flows into the marsh. Nans noted that the channels would be maintained. Anniken reiterated to make sure the flow is maintained to the marsh.
- Walt noted there is a provision in the new fill for habitat policy for fill for these types of habitat projects.
- Gena questioned whether BCDC would have a preference for using gravel beaches in front of natural or built assets.
    - Anniken noted that it seems like if you place the beaches in front of the existing levees, it wouldn't impact the existing marsh habitat. However, you would be impacting mudflats in both cases. Anniken doesn't think they would have a preference for beaches in front of natural vs. built assets.
- Gena noted that because the erosion performance of beaches is somewhat unknown, our team may study using them in front of natural assets where they naturally used to occur. However, we may still test them in front of Oro Loma to study their performance for future applications in front of built assets.
- Walt reiterated that understanding the properties that impact longshore transport will impact where to site the beaches. It would be ideal to locate them where it might help you learn something.
- Anniken noted that the biggest issues are how many groin structures you have to use and whether you need to be constantly moving the sand. If it happens at a fine scale if you will have a lot of them. Fill for gravel is viewed more positively than fill for a groin structure.
    - Incorporating a reef-type rock or structures in the groin itself so the groin is providing some type of habitat is beneficial from a regulatory

perspective. Scouring into riprap to create microtexture. This would help make the fill serve habitat purposes.

- Walt asked whether we are considering fine or coarse grain beaches. Gena noted that this will likely require more analysis and that the master plan will likely keep it open to allow for flexibility. Further analysis would inform the grain size if this becomes a project that moves forward.
    - Walt noted that we will need a substantial coastal engineering analysis and to think about possibilities for public access.

Tidal Marsh Restoration

- Walt asked if Oliver Salt Ponds is an active salt pond. Gena clarified that they are not but they do hold active habitat sites for breeding shorebirds.
- Anniken asked if there will be a combination of these strategies. Gena noted that we are about to move into that phase and that we will come back for further discussion once the alternatives are developed.

Fine Sediment Augmentation

- Walt noted that his gut reaction is that sediment from a more direct upland pipeline may be more suitable to minimize that amount of fill and lessen impacts to the mudflats.
- Gena noted that this is not a strategy we expect to implement today, but maybe 20 or so years in the future.
- Walt noted that it also depends on matching the sediment type.
- Anniken: potentially a thin-layer placement study by USACE. Her understanding the study is just a planning document and they do not have any money for implementation. Sediment is a precious resource. If you know only a percentage is going to make it on the mudflats, it may not be as positive. If you can show that a greater portion of the sediment is going on the mudflats/marshes, it is more likely.
    - There have been studies and modeling around placing sediment in marsh channels, but only a small amount makes its way on the marsh itself
    - To get placement, you need a barge involved placing it there, or a pipeline

- Gena asked if there are any recommendations on how to sustain marshes over time, since it is a pretty dire situation with SLR.
    - Walt stated that marshes are still important as buffer zones for inland communities. There could be creative about thinking about the sediment system holistically- concrete flood control channels, ways to enhance the amount of sediment brought from upland sources.
    - Gena noted there are no significant sediment sources in these channels. However, we are still looking to connect them into diked baylands.
    - Matt noted that there may be more water quality benefits to the Bay through connecting the channels, and marsh nourishment.
- Gena asked about upland nourishment. Anniken noted that Brenda is a good person to talk to about this. Her team will be working on it, especially with dredge material / thin-layer placement.
- Gena asked about how the Hayward Shoreline marshes are viewed in relation to other sites that could use more material. Anniken noted she don't have answer to that necessarily but it is a great question. There is only a finite amount of dredge material. Today the dredge program doesn't view one site better than any others and that it may become more project proponent driven- maximizing the marsh protection benefits from beneficial reuse projects. There will be so much need in the future and it will come down to prioritization.
- Anniken asked if the stakeholders have noted any marshes to prioritize? Maybe adding more marshes you can't sustain is counterintuitive. Gena responded that we have been advised by SFEI that the most sustainable thing you can do is to restore diked baylands to marsh so those ponds can accrete over time. Otherwise they will keep subsiding and be unfeasible to maintain. As much as possible, we should let the systems convert, but they may not necessarily accrete at the pace you may hope.

Ecotone Levee

- Gena noted that the main questions we have about ecotone levees is habitat conversion and the scale of strategy.

- Anniken noted that BCDC does have policies that talk about transition zones. Habitat impacts are more of an Issue for the resource agencies. Depending on where you place the fill, it may not be in BCDC's jurisdiction.
    - If it is in a tidally influenced marsh, it is in their jurisdiction.
- Anniken noted it is nice to see the idea of pulling back the line of protection to create a layered system. If you have any drowning of marsh, you do have some space but recognize there is a back stop where you can't migrate any furter. They do have policies that are in line with this.
- Walt reiterated the jurisdictional question is big for these options. If you are not in a tidally influenced wetland, the shoreline band jurisdiction may easier from a regulatory standpoint, but BCDC will still look at impacts to species of tidal marshes that still use other wetlands. Alignment that is out of the BCDC jurisdiction may be easier.. Anniken noted that if it is necessary, and you can show it is the minimum amount of fill necessary, it may be preferable in their jurisdiction if it creates a better project. It will just require more justification. She would hate to see it not serve the purpose to avoid potential regulatory impacts.
- Walt brought up that when SLR gets past 2-4', what do you do after that? Think about if you need extra room in the back for future lifting.
    - BCDC's policies for climate change state that projects have to be resilient to mid century SLR (2050). Shoreline protection is based on the life of project. You have to show adaptability, and a suite of adaptation options for 2100.
    - Med-high risk level with high emissions.
        - **2050:** 1.9' SLR + 100 year storm
        - **2100:** 6.9' SLR + 100 year storm
    - For landfills, you will want to use a higher risk scenario
    - Look at ocean protection guidance.

Wastewater Treatment Adaptation

- Walt noted that for the oxidation pond, they don't know the jurisdiction of them. May be in the shoreline band.

- Anniken noted that BRITT has 3 projects proposing partial treatment of wastewater, under a different jurisdiction than the water board. Would have to look at history of land use in the area to know what jurisdiction is.
- Walt noted that if you look at section 66610 McAtter-Petris Act, on website, you can see what the jurisdiction is and what trigger it.
- Anniken noted that even if the water board doesn't issue a water quality for the project, they may still issue NPDES permit. EBDA has one for their outflow. The City of San Leandro is going to do their own NPDES permit acquired by the water board for discharge.

Public Access & the Bay Trail

- Option 2 is the most preferred. If you build an interior system, don't abandon the existing alignment until it is compromised.
- Walt reiterated that maintaining even a spur trail out the Bay is important. Access to gravel beaches may be feasible and good to think about. Gena brought up the habitat tradeoff. Walt did state BCDC has some policies that talk about the balance of public access / habitat benefits.
- Anniken noted that the preference is not to immediately build something inland- a phased step back is preferable to maintain connections to water for the greatest extent.

Hayward Shoreline Interpretive Center Relocation

- Gena noted the competing goals of the center, being close to the Bay and its vulnerability.
- Walt noted that presumably the building has a permit if it was built in 1986. It likely had public access requirements associated with it.
    - BCDC to check if the Interpretive Center has a permit or not and circle back with SCAPE
- Walt noted that if there was a feasible option to adapt in place, it may be best. They would have to look at findings of how it made it allowable where it is.
- Anniken noted that especially if it requires public access, adapting where it is would be ideal. If it is infeasible as is, you'd have to show why and relocate.
- Walt indicated that one of the main tenants of BCDC is maximum feasible public access along the entire shoreline.

- It is easier to update permit is current location, depending on the feasibility of updating.
- Gena noted that a recommendation that comes out of this master plan will likely be to look at a feasibility study of the building structure.
- Walt noted that if it was to be relocated, it may be in the BCDC shoreline jurisdiction, if close to a marsh.
- Gena noted that it does have access to full range of ecosystems Anniken noted the in-Bay experience and that there is a particular footprint of the building, and shading. A barge would be permanent fill that would have a larger footprint, which the resource agencies may not be favor.
- Walt noted that iff it's in the Bay jurisdiction, look at what kind of fill it is- solid, floating, pile supported, cantilevered. If there are new impacts for any type of fill, BCDC will look for mitigation to offset that or minimize it. Priorities are to avoid, minimize, then compensate.

Next Steps

- Walt noted that once we get to the design alternatives, it will be a good opportunity to give feedback based on policies. It would be good to go to Design Review Board (looks at public access projects for larger permits) to give a briefing down the line, to see initial reactions to concepts and avoid headaches down the line.
- Anniken emphasized to think about monitoring for pilot projects to show their efficacy. Especially if you are planning to implement on a larger scale. It will be valuable to go to BCDC with that analysis in hand.
- Anniken indicated we should meet with BCDC's BRITT to get feedback. Some of the members heard about this.
    - Best to go to that group once we have the 3 alternatives.
    - Anniken stated that these strategies are valuable, even without alternatives. They are seeing projects with these design strategies. It would be useful to go to BRITT at both stages- adaptation strategies and design alternatives.
        - Anniken will go to BRITT members to see which path forward would be best.

- USFWS has a Tidal Marsh recovery program that may show what areas of marsh should be maintained. Unclear whether it is for existing marshes / new restoration. Val is their representative and helped create the plan

03 ACTION

- *BCDC to check if the Hayward Shoreline Interpretive Center has a permit or not and circle back with SCAPE*
- *BCDC to check with BRITT about a meeting to get their feedback on the adaptation strategies and/or design alternatives*
- *SCAPE to review the master plan alternatives with BCDC once they are developed (March-April)*
- *SCAPE to present to the BCDC Design Review Board once the master plan is developed further*

# STAKEHOLDER WORKSHOP #3

**04/08/20 - 04/13/20**

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# MINUTES

| | |
|---|---|
| Date: | April 8, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | BCDC [Walt Deppe (permit analyst), Jessica Fain (planning director), Dana Brechwald (ART program manager), Dan Hossfeld (ART), Andrea Gaffney (Bay Development Design Analyst), Todd Hallenbeck] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Erik Pearson, Taylor Richard] |
| | Arcadis [Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- BCDC** |

## 01 ACTION ITEMS

- *BCDC to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*
- *SCAPE to follow up with Brenda Goeden to talk about sediment management*
- *SCAPE to create a map of BCDC's jurisdictional boundaries*

02 MEETING MINUTES

*Introduction*

- Gena provided an overview of the Master Plan Assumptions and where we are in the process
- Nans presented an overview of the three Design Alternatives

*Design Alternatives Comments*

- Walt indicated that in Alt #1, cutting Oro Loma Marsh in half will be pretty difficult to approve due to regulatory challenges of cutting an existing tidal marsh in half
- Walt indicated a preference for a hybrid between alts #2 and #3, which may be easier from a regulatory standpoint
- Walt reminded the team of BCDC's climate change policies that state projects have to be resilient to mid-century and adaptable to end of century
    - Anything being protected by a line of protection has to be resilient up to 2075
    - Adaptable to 6.9' SLR by 2100
- Dana commented that Foster City has a 6.6 mi levee improvement project where they have maxed out the loading capacity of the levees in their current locations. They are also constrained by existing roads that prevent lateral expansion of levees
    - Dana brought up the idea of the levee alignment having the capacity to increase in elevation over time, which is something BCDC would like to see being more adaptable in the future
- Jurisdictional analysis – look at for existing constraints
- Walt asked the team to map BCDC's jurisdiction- the Bay and shoreline band, salt ponds, managed wetland areas, etc.
    - Use section 66610 of the McAtter-Petris Act.
    - SCAPE to work with Walt to create a BCDC jurisdiction map
    - If marshes are not currently open to tidal circulation, they may be more in shoreline band jurisdiction.

    - If marshes are muted now with tide gate barrier, where they lie in BCDC's jurisdiction depends on if existing tide gate was there when BCDC was created- it may not be in the Bay jurisdiction.
- Walt asked about the structure for permitting, which depends on phasing. There could be a combination of projects into a master permit of all the projects that will come eventually, or it could be a section by section permit process.
    - Nans indicated that we have not gotten to that level of detail yet, but will identify further permitting considerations in the analysis of the preferred alternative, along with implementable projects and phasing
- Nans asked about how to evaluate habitat types- if you lose habitat behind line of protection?
    - Gena expressed the importance of a diversity of ecosystems
- Andrea expressed curiosity about why it was discounted to have wetlands on Bay side in alt #1. If you assume you will maintain as wetlands, that brings up the question of fill and how you will get that sediment locally.
    - Gena noted that we are exploring sediment management and will layer that into the preferred alternative. There are some potential sources, e.g. Don Castro Dam and an upland sediment pipeline.
    - Walt suggested to have a conversation with Brenda.
    - SCAPE to reach out to Brenda to talk about sediment
- Andrea asked if alt #1 preserves the most diversity in landscapes. And if you bring the line of protection further inland, does it create a homogenous shoreline with adaptive management?
    - Nans indicated that this is a correct assumption
- New fill for habitat policies- value of new habitat?
- Walt brought up that besides habitat value, BCDC also has water surface area and volume policies.
    - In alt #3, further study would be needed of a barrier proposal before the water circulation plan is accepted. Before a barrier is adopted in the future, you would be required to re-plan all of affected shoreline and water area. This would require a large study about the new barrier- a study that determines *how doing that would affect water circulation in the entire Bay,* not just impacts to the local wetlands.

- Andrea brought up public access. In the SBSP Shoreline Project, they are assuming the concept of a bigger Bay and restoring managed wetlands and ponds to tidal action. Part of that includes the Bay Trail moving inland. The Bay Trail goal is to be as close to water as possible, but if water edge is moving inland, then in that concept it's okay to move the Bay Trail. It just must maintain a relationship to the water's edge.
    - Nans indicated that in all 3 alternatives, we are aligning the Bay Trail with line of protection, with a small exception in alt #2
    - Andrea noted to think about where you're adding elevation, maintaining connection to and across, and where there may be opportunities to expand connection points.
- Dana expressed interest in the phasing aspect and when projects are triggered
    - Gena noted that a few projects may be triggered first, such as Oliver Salt Ponds, which are quite vulnerable on the Bay's edge. An ecotone levee may have partnering triggers to implement in Bay water, and gravel beaches may be piloted first.
    - Matt added that some agencies may take projects on their own
- Jessica expressed that the project is exemplary work and just the types of projects that they would like to see happening around the Bay

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# MINUTES

| | |
|---|---|
| Date: | April 8, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | CalTrans [William Velasco, Dick Fahey] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard, Jack Steinmann] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Kevin Clinch] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- CalTrans** |

## 01 ACTION ITEMS

- *CalTrans to send any additional comments on the Draft Design Alternatives Report by **Friday, May 1st***
- *Dick and William to circulate the Draft Design Alternatives Report to the other functional units at CalTrans and consolidate their feedback*
- *Dick and William to request additional information from the maintenance and inspection teams about any maintenance / access considerations or constraints for SCAPE to incorporate in the Master Plan*
- *SCAPE to add a statement to the Master Plan Assumptions that any CalTrans improvements will not necessarily align with a line of protection that is part of the Master Plan. The two will likely have different time frames and will not be dependent on one another.*
- *SCAPE to let William know if any time extensions are anticipated regarding the project schedule.*

02 MEETING MINUTES

*Introduction*

- Gena provided an update of where we are in the master planning process
    - Over the next couple of weeks, the team is soliciting feedback from a variety of stakeholders, clients, and the HASPA Board. This will culminate in the selection of a preferred alternative by mid-May
    - Between mid-May and September, we will refine and iterate the preferred alternative, analyze over different time frames, and look further into funding and implementation.
- Nans provided an overview of the Master Plan assumptions
    - Design elevations are being used for planning purposes only, as a tool for the master plan analysis. Any projects that come out of this effort will have to go through a full engineering and cost-benefit analysis.
- The three Design Alternatives are mostly based upon where the line of protection lies

*Design Alternatives Comments*

- Dick noted that he appreciates the overview and the comment that the assumption that the line of protection and SR-92 options do not rely on one another
    - Dick requested for this statement to be put in the document so it's clear that any highway improvement projects would not occur at the same time as flood protection infrastructure that is part of the Master Plan- there is no guarantee that they will occur at the same time.
    - SCAPE to add this statement to the Master Plan
- SR-92 Options
    - Dick asked if it is possible to do a causeway in option 1 and 2.
        - Nans responded that yes, it is possible. You may not get as much benefit as in option 3, since there is less fully tidal marsh to connect to.
- Dick indicated he likes the idea of a causeway for its multi-benefits. It's hard to consider though with planning and funding challenges.

    - For this process, it's good to consider all the options. Beyond a planning stage, CalTrans won't have a preference for one alternative over another.
- Gena commented that in the preferred alternative and final Master Plan, we will note the need to allow for future flexibility with any CalTrans improvements
- William expressed that the other functional units at CalTrans should be involved- they will reach out to get their comments.
- William indicated to make sure the maintenance and inspection folk will be able to function after the project is implemented.
    - William and Dick to reach out to maintenance and bridge inspection teams about any maintenance / access considerations or constraints for SCAPE to incorporate in the Master Plan
- William noted that the end user should also be involved in the planning.
- William suggested that if we encounter any issues with meeting the project deadline, CalTrans may be flexible in this new normal. SCAPE should let William know in advance if any adjustments to the project schedule are anticipated.
    - Nans indicated that since there was some flexibility in the project schedule, we do not anticipate this need and will do our best to keep the current timeline. However, if things do change, SCAPE will let William know if any time extensions are needed in advance.

Note from Kevin-

**Dick made a good comment about maintenance. Caltrans Maintenance holds a lot of sway. That said, the maintenance considerations / access should be the same as the existing bridge. It will be interesting to hear their views.**

**It occurred to me during the call that, regarding SR 92, the levee option is the easiest to adapt to higher water levels should this occur. The causeway would, of course, be very difficult to raise once in place. Do you know the roadway elevation of the existing bridge?**

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# MINUTES

| | |
|---|---|
| Date: | April 8, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | Oro Loma [Jason Warner] |
| | EBDA [Jackie Zipkin, Ian Wren (independent consultant)] |
| | SFEP [Heidi Nutters] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Erik Pearson, Taylor Richard] |
| | Arcadis [Kevin Clinch] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- EBDA/Oro Loma/SFEP** |

## 01 ACTION ITEMS

- *EBDA, Oro Loma, and SFEP to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*

02 MEETING MINUTES

*Introduction*

- Gena provided an overview of the Master Plan Assumptions and where we are in the process
- Nans presented an overview of the three Design Alternatives

*Design Alternative Comments*

- Jason noted that he understands the tradeoffs in between
- Jackie asked about the projected time horizon
    - Nans noted that we are looking at a 4' SLR scenario, which is estimated to be around 2070/2080 based on state guidance.
    - We are driving the project more on the SLR elevation and decision making process needed when that occurs
- Heidi asked about the understanding behind the alignment in Oro Loma Marsh in alt #1
    - Nans indicated that it is the cheapest, and we don't know how Oro Loma will adapt or transform with the rate of SLR and availability of sediment so the idea is to maintain diversity of habitat types.
- Jackie asked if we assume there is no more discharge into Hayward Marsh from the Hayward WWTP.
    - NV confirmed that is our current assumption
- Jackie indicated that EBDA is waiting on this project for the preferred alignment for the First Mile project.
    - They were assuming the inboard alignment near the rail corridor in high level planning but other alignments could work. They would just have to change the infrastructure and associated flow rates.
        - There is a recycled water pipeline near the rail corridor they were thinking of tapping into to get the wastewater source to the horizontal levee.
    - Jackie indicated that they would use the First Mile project to flush out the details and design around HASPA preferred alternative
- Ian commented that it would be strange to have FEMA levee through an industrial park

- Jason brought up a presentation at CASA to protect another WWTP, which consisted of $2 bil of infrastructure and a seawall to ring plant.
    - Jason indicated the possibly of single digit millions to protect Oro Loma in place with sheet piles. If they were in a pinch and needed a single solution, it would work.
- Jackie noted that she likes alt #3 for the Hayward area.
    - A horizontal levee and freshwater treatment for wet weather storage in winter. She was imagining alt #3 but can't speak for the City folk.
- Jackie noted that the idea of having EBDA fully decommissioned is not likely in alt #3. There will be future need for brine discharge, potable recycling, etc. The use of pipeline may change.
    - SCAPE to re-word the con in alt #3
- Jackie noted that Oro Loma moved to local discharge for wet weather. It is a reasonable assumption for Hayward WWTP.
    - Oro Loma is trading 10 days of wet weather discharge for nutrient upgrades.
- Ian brought up another San Leandro plant seeking a shallow discharge option. Didn't think treatment wetland in alt #3 is incompatible with current conditions.
- Jackie noted that in concept for near-term, it seems feasible to use treatment wetland for wet weather storage in winter and a treatment marsh in the summer.
    - Gena indicated this is a phasing opportunity for possible early implementation
- Ian brought up issues in alt #1 and #2 with the resource agencies. BCDC and CDFW are critical agencies.
    - Jason indicated that CDFW is the most problematic. If alt #3 is an option, alt #2 won't be an option. Alt #1 is such a big change, even if there are good reasons to do that, there is no way they would approve it when there is the other alternative on the table.
    - Jason indicated that there is only one feasible option from a permitting standpoint- the alignment near the rail corridor, which would be the least impactful.
- Ian noted that #3 is most viable because of the impacts to the SMHM Preserve,

    - A FEMA levee at the most hardened edge, leaves more options Bayward side of that alignment. If you put it too far out, you limit your options.
    - Might be able to protect oxidation ponds with a non-FEMA levee
- Jason- standalone FEMA levee, in front of that is the ecotone levee. Reduces energy in front of FEMA, smaller cross section.
- Jackie indicated that flood control is a concern. The ecotone levee habitat would be washed out by wave action.
- Mark Taylor noted that if a horizontal levee is not built of heavy clay, wind and waves are going to tear it apart. If it is built out of sandy loam, it will be torn apart.
    - Jason noted that the idea was to have something built outboard of the ecotone slope to reduce wave action
    - Mark commented that EBRPD is looking at alt #1 to protect the above and below ground PG&E lines.
        - Matt agreed and stated that there may be more impacts on inland alignment. Alt #2 and #3 will still fill in the Bay near the railroad. You may have more fill by railroad tracks since there aren't existing berms to connect to.
- Ian noted to test BCDC's appetite for adding a larger intervention.
- Jason would support alt #1, but his pragmatic intuition would say it's not possible.
    - Matt noted that for long term marsh protection, alt #1 may be favorable.
    - Mark echoed that from a habitat standpoint, they may want to keep as much muted marsh as they can, otherwise it would just transition to mudflat.

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# MINUTES

| | |
|---|---|
| Date: | April 8, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | SPSP [Dave Halsing] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Erik Pearson, Taylor Richard] |
| | Arcadis [Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- SBSP** |

## 01 ACTION ITEMS

- *Dave to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*

02 MEETING MINUTES

*Design Alternative Comments*

- Dave noted that the report was very well organized and visually striking. The pros/cons seemed good and nothing obvious was left out.
- Dave indicated that alt #2 is better place to start since there is room for future retreat if needed. It doesn't overly commit to outer edge version and does a little more to balance competing needs. The idea of having more flexibility later is favorable.
    - For the Bay Trail, the idea of having it on a levee on high ground on edge of Bay seems untenable. It may not be as realistic to hold on to that everywhere.
- Dave noted that he is not weighting all pros/cons the same in his head. The blue water experience of the Bay won't be where it is now.
- Dave expressed that stormwater management is a big thing in alt #3
    - Ecosystems at Bay are used to fluctuating stormwater.
    - Like to avoid where possible, the NOLA situation where you must pump constantly.
- Salt Pond Stormwater Detention
    - Dave brought up a precedent in Ravenswood- the cities of Menlo park and Redwood city are implementing something similar on 35 acres of dry salt panes
        - During high tide and slough, there is nowhere for water to go and it floods the neighborhood. They are incorporating a connection to draw water to the managed ponds in advance. They then let the water out when tide goes back.
        - This is the same hydraulic idea. In most places, you don't need a lot of capacity to take the peak off.
        - Having a good water quality management and monitoring plan was key for the Water Board and they laid out recommendations.
- Dave recommends getting in front of regulators early and to follow their recommendations, which will lead to easier permitting and implementation later

    - BRITT is aiming to do this
- Dave expressed concern over the extent of gravel beaches
    - Gena noted that we are trying to address the risk and threats, which are quite pervasive. Gravel beaches may be a strategy to slow erosion on marsh edge.
    - Prioritize beaches where you need protection- landfill, added protection at Cogswell breach
- Cutting Oro Loma Marsh in half in alt #1- 'risk splitting' habitat
    - Dave indicated that yes, it could be done.
    - There are examples of highly functional muted marshes at New Chicago Marsh in the South Bay.
        - NWR, right next to educational center in Alviso.
        - A breach is maintained for managed ponds Bayward of the marsh.
        - It is good habitat and the wildlife really likes it. This may be a strategy to keep habitat for endangered species to successfully use for more decades. As compared to creating a broad swath natural-ish marsh, but with SLR, you maybe can't have both in one spot.
        - Dave noted that he sees the value of risk 'splitting'
    - The fill of the levee alignment would be easier to permit since there is less total fill. It is worth talking through.
    - Dave indicated that he would worry less about Army Corps, and more about the wildlife management agencies, since it would convert habitat in a different way.
    - If it's muted tidal, it is easier to just leave gate at one elevation. Eden landing.
    - It is easier to build on top of something existing, e.g. the existing access berms in the middle of Oro Loma Marsh
- Nick asked if Dave has any lessons learned from ecotone levee projects in the South Bay
    - Dave noted he sees great benefit for wastewater treatment

    - For the Mountainview and A8 ponds, they got their transition zones permitted with minimal difficulty by making the case that all of it is a conversion of one water US to another and not necessarily a loss.
        - Everywhere they were breaching or lowering a levee, it was creating new waters, letting water in. And it is only a temporal loss of water- as SLR occurs, it is going to be waters again. Just had to do the math.
    - Water boards – no net loss of wetlands or waters — is the trickiest part to get around (executive order)
- Dave concluded that he liked our process of stepping back from single stakeholder to look at every piece of it

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# MINUTES

| | |
|---|---|
| Date: | April 9, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | Bay Trail [Lee Huo] |
| | EBRPD [Mark Taylor, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard, Jack Steinmann] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- Bay Trail** |

## 01 ACTION ITEMS

- *Bay Trail to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*
- *SCAPE to increase clarity in representation of the Bay Trail in the preferred Master Plan maps*

02 MEETING MINUTES

*Design Alternatives Comments*

- Lee noted a few bigger picture positive aspects of the alternatives
    - The statement about how any proposed alignments would be move incrementally as the need arises
    - Maintaining a connection to the Interpretive Center
- Lee expressed that prioritizing blue water experience and alt #1 is the favorite. Alt #3 is not ideal. However, we don't know what SLR will look like when that happens.
- Lee noted that the Bay Trail described as recreational alignment. This is true for its utility in this area. However, Lee has been out there in public engagement events and people do use this alignment as commute to work and for stress relief.
    - Lee suggested to consider the transportation aspect of the Bay Trail- it is never ideal because the alignment lies primarily on levee tops. It is not the best situation for road cyclists in this area due to the rough path material.
        - For funding- big picture, consider transportation benefits. Most of the Bay Trail funding is coming from transportation funds.
    - Lee asked if the Bay Trail will be paved / resilient to erosion
        - Nans stated that we don't know the path material and may not get to that level of detail in this Master Plan, however we may provide recommendations in the final report. We do know there is a need for maintenance access.
    - Lee suggested that if the trail could be more hardscape, it presents opportunities to make the argument for transportation funding.
    - Lee asked about the trail alignment for the Interpretive Center link in alt #2.
        - Lee sees value in how its current alignment, and other 2 alignments maintain the relationship to the Interpretive Center. There is value when you don't have to backtrack, which provides an easier level of engagement.
    - Lee indicated he really likes the landfill relocation of Interpretive Center

    - Lee expressed concerns over no blue water experience with alt #2 and #3
        - #3 is least desirable. You retreat as far as you can, but also about a lot of uses.
- Lee asked about the bridge on pile structure and where it would be located
    - Nans noted that it would be the entire section (L shape) that pulls off from the ecotone levee alignment
    - Lee noted that it is expensive to build and maintain this type of structure over time. However, it is a really good idea. People like traveling through this area because of that diversity of trail experiences- crossing bridges over mudflats and sloughs.
- Lee requested to add a con of trail proximity to the railroad. It may become a negative experience
    - SCAPE to add this statement to the cons
    - Mark noted that during daylight, the trains run every hour / hour and a half between freight and passenger trains. They are quick and noisy.
- Lee indicated that in the maps where the alternatives combine everything, the new Bay Trail alignments disappear, since it runs along similar lines and because of color.
    - SCAPE to increase clarity in representation of the Bay Trail in the preferred Master Plan maps
- Lee also noted that it is not clear what alignments are existing and going to be removed
    - SCAPE to clarify and refine with the preferred alternative
- Lee asked about next steps and how the document will be used moving forward
    - Nans noted that we are using these alternatives to collect feedback from a variety of stakeholders. We will also simplify and share with members of the public and create an evaluation matrix to rank the different alternatives to come up with a preferred alternative.

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# MINUTES

| | |
|---|---|
| Date: | April 9, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | CDFW [Conrad Jones, Marcia Grefsrud] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard, Jack Steinmann] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Kevin Clinch] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- CDFW** |

## 01 ACTION ITEMS

- *CDFW to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*
- *Conrad and Marcia to send SCAPE contacts of CDFW staff who deal with tidal species*
- *SCAPE to reach out to Water Board to solicit feedback*

02 MEETING MINUTES

*Introduction*

- Gena provided an overview of the Master Plan Assumptions and where we are in the process
- Nans presented an overview of the three Design Alternatives

*Design Alternative Comments*

- Conrad expressed a few concerns
    - Sheet piling in various configurations- adjacent to the landfill bordering existing or new tidal marsh.
        - If it is SMHM habitat, protecting upland areas with sheet piling will isolate the SMHM from any refugia
    - Remaining saltwater marsh
        - Protecting infrastructure with raised levees, but marshes are subject to 4' SLR, so we won't have marsh It may be open water up to the existing, restored / improved levees, which will have significantly less function with wave runup
        - Marsh and ecosystem adaptation over time- sediment management. It is overwhelming with the scope of efforts needed to address the issue.
- Think about providing the transition zone on the inboard side of the levees, as they have done in Eden Landing ponds 1 and 2. It could break up wave runup and provide transition habitat where needed.
    - Conrad noted that transition zones are important for erosion and wildlife benefits.
    - They are most beneficial if they go to upland. If you have a road, predators can come and go.
    - If they can be isolated islands with a channel or wetland on one side, that's great.
- Restoring hydrological connectivity to south of SR-92
    - Conrad noted that he likes the idea in concept.
    - There is concern for how in a broad picture it is a good thing in Eden Landing since they don't have the infrastructure in place to

accommodate increased flows effectively. The habitat restoration happening, and this would present additional impacts to their flood infrastructure.

- Conrad expressed concern over the historic breach at Cogswell, which will be worse with SLR
    - Nans noted that we have indicated a gravel beach to slow erosion
    - Conrad noted that something is better than nothing. A gravel beach could help accrete more sediment.
    - Based on the base flows, Conrad's impression is that a reduction in size and armoring will help limit further expansion.
- Marcia stated that she is involved with permitting for flood protected species and does not work in tidal zones, since they are fully protected. They take avoidance measures.
    - Marcia expressed concern over raising levees or floodwalls to protect areas behind it, does that leave the current tidal marsh unprotected?
- Nans asked about Alt #1 and Marsh Conversion- can Marcia and Conrad identify the right people to contact?
    - Marcia and Conrad to connect with CDFW contacts on tidal species
    - Conrad noted that John Crouse works for him and is not a regulator
- Matt noted we are looking at how to improve future operations- 1,5,10 years down the line. The base conditions will be different, so we need to look at the marshes and habitat value from a different lens.
- Marcia suggested to reach out to the Water Board and that we may get a call from Brian Wines
    - SCAPE to reach out to the Water Board to solicit feedback

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# MINUTES

| | |
|---|---|
| Date: | April 9, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Nans Voron, Nick Shannon] |
| | EBRPD [Mark Taylor] |
| | Mosquito Abatement [Erika Castillo, Joseph Huston] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard, Jack Steinmann] |
| | Arcadis [Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- Mosquito Abatement** |

## 01 ACTION ITEMS

- *ACMAD to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*

02 MEETING MINUTES

*Design Alternatives Comments*

- Erika noted that they have reviewed the report on their end.
- Joe indicated that from a mosquito abatement perspective, at the moment they would lean towards the north end as shown in alt #1, and the south part as shown in alt #2.
    - With alt #1, the line needs to be maintained with the PG&E lines. Front being fully tidal, back as muted tidal behooves us. Were involved in transitioning habitat before. There are minor issues with mosquitoes- issue with back eastern part of marsh
    - The three landfills are buttressed off with all projects
- Joe anticipates difficulty in alt #3 for mosquito abatement.
    - Biggest thing is to have access by foot or truck. Keep access and make sure areas not landlocked
    - Alt #3 creates more homogenous environments, yet today this strip of shoreline has most diverse habitat environment. Muted to tidal to salt ponds to seasonal. The structure in the oxidation ponds looks problematic.
    - Joe noted that they operate their regions with habitat diversity in mind. Access is main thing, but the background of those sources- diversity of species and habitat- is important.
- Alt #1 and #2 have more diversity and maintain habitats.
    - The segment across Oro Loma is good for 2 habitats.
        - The Bay side is not much mosquito wise
        - Back half is similar to what's there now.
    - Joe asked if this would keep the breach at Sulphur creek open
        - Nans indicated that the assumption is to maintain breach
- Joe stressed that the key is control-
    - Existing ditch work they did with heavy equipment really helps control mosquitos - make sure tidal flow comes in and out.
    - Ditch maintenance is also key- keep this in consideration. The back of Oro Loma is kind of muted anyway except for specific high tide events that bring water into those problem areas. Normal tides not an issue.

- Ecotone levees
    - Joe- contingent on access and maintenance
    - Treated water with filtering vegetation is not much of a problem
    - The problem is standing water- one species of mosquito is associated with bulrush and tules.
    - To the south, in Hayward Marsh, they implemented a big bulrush removal project.
    - The maintenance regimes need constant tweaks. Try to anticipate the need for money to change the planting palette and mitigate if there are any future issues.
- Joe noted that there are 22 mosquito species in the county, and each has their own type of breeding source.
    - Frank's East fills with rainwater, which is problematic. They have to treat upward of 8 to 10 more times with a virus vector, for a 15 mile traveling mosquito.
    - Modifying Frank's East to controlled, fully tidal, or stormwater storage with overflow as needed drop water out quickly, is preferable.
    - The vegetation on the shallow fringes of the oxidation ponds have been an issue in the past.
    - The smaller triangular pond north of the oxidation ponds encounters a lot of breeding since it is full of junk and difficult to navigate.
- Mosquitos don't tend to breed in open water at large volumes with wind flow- they concentrate on the shallower edges.
- Nick asked about lessons learned from the Oro Loma demonstration project
    - ACMAD did not have any initial involvement.
    - Long term maintenance plans are key.
    - Pampas grass and willows taken over- at certain times they hold significant amounts of water, which is problematic from mosquito standpoint.
- Erika noted that the mosquitos lay eggs in the water, then when it floods, they hatch out.
- Ecotone Levee Slope

    - Erika noted that due to the nature of a 1:30 ratio, pockets and puddles will form. For mosquito control, they recommend a 2:1 slope. Steep sides, without pockets.
        - Nans noted that we don't anticipate much puddling on Bay side- it may be flooded twice a day.
        - We are showing a shallow slope on the tidally influenced side, and the inland slope to the muted marsh is steeper.
            - Erika and Joe confirmed this approach
            - Joe noted that the tidal side would have a salt-tolerant palette of Salicornia disticulous, which is super salt tolerant. The more gradual slope is not as problematic with tidal flushing.
            - There should be contingencies to fill areas that sink.
    - A lot of horizontal levees shown are new, and they need to ensure access to the spots to inspect and treat. There is a problem with access to the point of levees in alt #3.
- Nick asked about predator roosting on the ecotone levees
    - Joe noted that harriers will hunt regardless. There is a [air of peregrine falcons south in the project area.
    - Most of ecotones, if they're not super densely vegetated, are not as problematic.
    - There is a decent fox population, and there definitely need to be control measures as well.
    - With enough salinity, the palette is limited.
- Joe stressed the importance of access and all-weather roads for maintenance and safety vehicles.
- Joe stressed the importance of long-term maintenance plans, ditch work.
- Nans expressed that we will reach out and reconvene throughout process

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# MINUTES

| | |
|---|---|
| Date: | April 9, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | Public Works [David Donovan, Alex Ameri, Pamela Svrdlin] |
| | EBRPD [Mark Taylor, Matt Graul] |
| | EBDA [Jackie Zipkin] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard, Jack Steinmann] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Tim Hare] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- Public Works** |

## 01 ACTION ITEMS

- *Public Works to send any additional comments on the Draft Design Alternatives Report by Friday, May 1st*
- *Feel free to mark up the document and add notes to indicate preferences, new opportunities, changes, or further considerations. You can send us a pdf mark up or a scan of handwritten notes.*
- *Public Works to discuss the option of underground stormwater storage at Skywest Golf Course*
- *SCAPE to add a statement to the Master Plan Assumptions that the Hayward WWTP nutrient removal upgrade is anticipated to be in place by 2025.*

02 MEETING MINUTES

*Introduction*

- Gena provided an overview of the Master Plan Assumptions and where we are in the process
- Nans presented an overview of the three Design Alternatives

*Design Alternatives Comments*

- Alex asked if alt #1 would prevent the City from doing local discharge
    - Nans clarified that it would not, and that local discharge is part of the options
    - Gena added that if we propose discharge at oxidation ponds, would need a breakwater at Cogswell Marsh to prevent wave runup and further erosion
    - Jackie noted that an ecotone levee would be discharge for only a portion of Hayward flow, so there would still be a need to allow for an additional outfall nearby, or continued discharge to EBDA
    - Alex indicated that the plan is not to discharge all of their dry weather flow since they are planning to use some for recycled water. There is importance for wet weather flow because of timing and volume, you need to maintain something to discharge all of that additional water.
- Alex asked about what you gain moving the FEMA levee east of the oxidation ponds
    - Nans responded that it is a shorter alignment for the line of protection, which does get pretty expensive
    - Alex asked about the option of moving the line of protection into the ponds and what the benefits are
        - Nans responded that the benefits are that you don't fill in Cogswell Marsh, and it is further away from the marsh breach and less vulnerable to erosion from open water.
- Alex asked about the risk of flooding without a FEMA levee
    - Nans clarified that FEMA certification helps reduce flood insurance costs. The levee elevation depends on the level of protection the City wants to design for.

    - Nans brought up that it may not be worth investing that money without the insurance benefits
    - Gena noted that we can also analyze this level of risk without impacting communities behind. The two projects may happen at different time frames- FEMA levee and levee to protect the oxidation ponds.
    - Nans asked what the adverse risk scenario is- protect from daily tidal elevation or storm surge?
    - Jackie noted that the use of the treatment wetland can be seasonal, and used during the summer. You can then continue to use wet weather storage in winter. This doesn't have the same negative effects as far as storm surge is concerned.
- Alex expressed interest in thinking of other uses for other parts of oxidation ponds. The solar field only has a life of 30 years. The City may have other plans for property.
- Alex indicated that alt #1 has more potential but they are not closing the door to the other options. Some of the benefits he sees:
    - Completely protecting the oxidation ponds
    - Continued use of wet weather storage sites
    - Allow for different uses of oxidation ponds
    - Not a lot of other major differences as far as the City is concerned, but they are more concerned with the treatment plant
- Jackie noted that this doesn't preclude a portion of the ponds from being a treatment wetland
- Damon indicated that the City hasn't gotten into nitty gritty of each option and they are still considering them all. Alt #1 is looking pretty good.
- Jackie brought up a con of the options with the ecotone levee by oxidation ponds that states that the treatment level the plant is providing may not be good for endangered species habitat in the marsh.
    - The Hayward plant is planning upgrades for nutrient removal
    - Nans clarified that these pros/cons were assumed for the current existing condition.
- Alex noted that the requirement is to have the nutrient upgrade in place by 2024/2025 at the latest.

    - SCAPE to add this statement to the assumptions
- In alt #3, does it make sense to do the nutrient upgrades now?
    - Jackie noted that the understanding is that the nutrient upgrade would only treat half of the plant's flow.
        - A treatment wetland could treat the stream that is not going through the upgraded process
        - To go to a treatment wetland, need to remove ammonia first and they will have that step with the upgrade
        - The two could work together to reduce the requirement for the upgrade, or reduce need for future additional upgrades. This is something they will study with the grant.
- David indicated he has a very similar feeling to what everyone has said. He likes alt #1. You can always build up larger walls, or make them deeper.
    - Nans indicated that in alt 1, we would need to come up with significant intervention to find a way to reduce wave action at the levee edges
    - Between #1 and #2, the plant is protected in both situations
- Erik brought up that we are having cost estimates prepared, which will help with decision making process.
    - Tim noted that Arcadis has put together a lot of costs to form this very high level estimate. It is not very precise, but they feel comfortable with most of the components. It will be enough to compare each alternative to each other to see strengths. Some fixed costs, such as pump stations, may be consistent- since each alternative is treating relatively the same volume.
- Alex brought up that alt #2 proposes more sheet pile
    - Nans confirmed. Each alternative moves the tide gates further inland, which requires more protection on the landfill edges that are exposed to the Bay
- Mark does the alignment in Oro Loma change?
- Nans brought up using the golf course as stormwater storage
    - We understand, based on FAA regulations, that surface ponds out of the question. However, we would like to still consider underground storage,

since we do anticipate a large need for stormwater detention in these scenarios.

- Alex expressed that this is an interesting question. The City has concentrated on evaluating the appropriateness of surface water storage on the property and it's very clear that it is not acceptable.
  - The City has looked into underground potable water storage in other locations and the thing that stopped them from proceeding was the cost.
  - The City will need to have internal discussions before providing feedback on this question
  - Alex and Public Works to discuss the option of underground stormwater storage at Skywest Golf Course

- Gena noted that this is a vision plan that shall be used as a long-term vision tool for planning purposes.
- Alex asked if there was any feedback from Oro Loma about the options
  - Jackie noted that Jason didn't have a strong preference over whether Oro Loma was protected by the line of protection or not. If it comes down to it, they will just put up sheet pile.
- Alex requested a summary of action plans and timeline
  - Nans noted that SCAPE will send around thank you email with next steps and timeline.

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# MINUTES

| | |
|---|---|
| Date: | April 13, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan Draft Design Alternatives |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | ACFCD [Hank Ackerman] |
| | EBRPD [Mark Taylor, Matt Graul, Chantal Alatorre] |
| | City of Hayward [Damon Golubics, Erik Pearson, Taylor Richard] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- ACFCD** |

## 01 ACTION ITEMS

- *ACFCD to send any additional comments on the Draft Design Alternatives Report by **Friday, May 1st***
- *Hank to share design peak flow data for all flood control channel outfalls in the study area (Bockman Channel, Sulphur Creek, Line A, Line E, Line F) by Friday, 04/17*
- *Hank to share updated LIDAR data of the project area*

02 MEETING MINUTES

*Introduction*

- Nans provided an overview of the Master Plan Assumptions, where we are in the process, and presented an overview of the three Design Alternatives

*Design Alternative #1*

- Hank asked if the SR-92 ramp would be low and flooded
    - Nans noted that were are looking at a variety of options and that any SR-92 improvements are not dependent on the line of protection identified in the Master Plan alternatives
- Hank questioned both ends of the levee tie-backs and expressed concern that they would be pushing water on other people
    - Hank indicated that you would have to put something on the south side of SR-92 or raise SR-92 to act as a levee
    - At north end you would have to do a similar thing on the opposite levee to prevent flooding of the subdivision, and take it up to the point where the slough goes into the wetland
    - Gena asked if there are any levee plans for these other places, since they are out of our study area
        - Hank noted that you can't build the levee without mitigating water from pushing onto something else
- Hank noticed that for the pump stations, we may not have enough area for detention. There would have to be huge pump stations to accommodate all of the flow. And if there were any power outages, you would have bad flooding.
    - Nans indicated that the pump stations right now are being planned with back up power, etc.
        - Mary confirmed and asked if there was any direction ACFC could give on the flows they would need to accommodate
    - Hank is not sure if the outfalls in this area are included in the study Arcadis is doing
    - Mary indicated we are looking at pump stations that are not necessarily handling the 100 year capacity, and asked what else you would have to do to manage increased flow

        - Hank noted that we'd still have to design for the 100 year. He's not talking about a 100 year storm against a 100 year tide, but instead looking at MHHW for the SLR scenario.
            - Take MHHW of the existing condition and throw on amount of SLR you are projecting, and that is how high the pumps would have to lift the water
            - Nans confirmed this would be 4' SLR on top of the existing MHHW, and management of the 100 year storm flows inland of the line of protection
    - Nans asked if the sites of stormwater detention would help decrease scale of pump station
        - Hank indicated that if stormwater could flow into the marsh upstream, it would relieve pressure off the pump station. It would just have to pump longer for the water that returns back into the channel after the storm
            - There is not a place to store water in Line A

*Design Alternative #2*

- Hank noted that when you  move pump stations further inland, you lose storage capacity when they are closer to the Bay.
    - The pumps stations have to pump to the same elevation, but the area behind them in the channel itself can add to the storage capacity (not a lot, but it could push water back upstream if the pump stations are further inland)

*Design Alternative #3*

- Hank asked about the treatment wetland and how water will it get into it from the other side of the red line
    - Nans noted that we are assuming through a pipeline that goes through or on top of the levee
    - Nans confirmed that this is still a treatment pond for Hayward WWTP
- Hank asked where you'd get storage for the pump stations in this option
    - Hank asked about the elevation of Oro Loma Marsh

        - Potential to have pipes that allow water to flow out between the railroad and the pump station, with tide gates, so you don't have to pump as much water. However, it may be the same elevation as the Bay.
        - Possibility of creating a pond adjacent to the channel. May have some environmental mitigation costs from working in marshland though.
- Not sure if Frank's East is part of the actual dump site. If so, it can't be used for stormwater storage.
    - There is marsh in Frank's West. The perimeter of dump site is high- you could connect a levee on the south side and raise the Bay Trail, then use that marsh as a storage basin, with tide gates that drain out as the tide goes out.
- Gena asked, with having no storage capacity in Alt #3, does Hank prefer 1 or 2?
    - Hank indicated that it is critical to have a large enough area to store at least some water, since a pump station can fail
- Mary confirmed that Arcadis is considering the the pump station capacity in relation to the amount of stormwater detention space that is provided in each alternative
    - Hank noted that they are looking at the **design peak flows** for each of the flood control channel outfalls and will share the data by Friday, 04/17.
- Hank brought up the fact that with SLR, there is going to be dead storage in the channels. With lower tide, it won't drain as much, so the volume in the channel and how fast to get it out will be critical
    - Nans asked if the pump station could you drain the dead storage
        - Hank confirmed
- Hank noted that before you come up with a max elevation to build levees to, to think about the surrounding areas and height of levees that would impact them.
    - The City of Oakland, with 3' SLR, has water start to come up through the ground. Without harming Oakland, we wouldn't be able to build beyond 3'. May go 3.5' down here.

    - In the south Bay, San Jose, the elevation is more around 4.5'. All around the bay, there will be a maximum elevation to build to without impacting the rest of the Bay. Providing maximum protection without doing serious harm in Oakland, or even in Hayward too.
    - Hank stressed to look at the life span and planning horizon of levee projects– think about this in the advancement of these strategies
- Hank suggested to build a wide enough base for the levees to be flexible in the future.
    - Hank expressed concern over building a levee, since in the interim you could cause issue to someone else. It may have to be a federal or state project since it would have to be built in a short window of time as a single project, and some cities may not be able to afford it.
    - Hank added that having the plan ready is a good thing
    - Hank noted that Rohin has looked at locations around the Bay with King Tide, and there are low points that would have to be brought up. Any time you cutoff areas for water to flood into, you bring up issues.
- Hank noted that he will sit down with Rohin to discuss the draft report.
- Hank noted that Rohin just had the coastal area LIDAR updated a year ago, which would be a lot more accurate
    - Nans confirmed that SCAPE has been using LIDAR data from 2010.
    - Hank to share the updated LIDAR for the project area

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# MINUTES

| | |
|---|---|
| Date: | May 5, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | USFWS [Dan Welsh] |
| | EBRPD [Mark Taylor, Chantal Alatorre, Doug Bell] |
| | City of Hayward [Taylor Richard] |
| | Arcadis [Lee Miles, Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- USFWS** |

## 01 ACTION ITEMS

- *USFWS to **send additional written comments** on the Draft Design Alternatives Report **before 05/26***
- *SCAPE to send USFWS the Existing Conditions Report*

02 MEETING MINUTES

- Dan from USFWS is the Deputy Field Supervisor in the Bay-Delta USFWS office
    - Steve, who was unable to join this call, is on Dan's staff
- Gena provided an update of where we are in the master plan process
- Nans provided an overview of the three Design Alternatives

***Design Alternatives***

- Dan indicated that the team is on the right track to balance competing needs. He realizes that it is a long-term planning effort.
- Dan is looking forward to continued coordination with USFWS
    - There is quite a bit of salt marsh habitat that is used by federally endangered species (SMHM, Ridgway Rail, migratory bird species)
- Dan indicated that Alt 1 gives him the most concern from bisecting existing marshes in half. He indicated a preference for Alt 2 or 3, at face value.
- Dan noted that USFWS involvement is typically triggered under the Federal Endangered Species Act or Fish and Wildlife Coordination Act
    - This depends on the federal nexus and if the project is permitted or funded by a federal agency
    - Dan asked if the team anticipate direct USACE involvement in funding and construction, and stated that USACE would need to consult with USFWS if so.
    - Dan noted that if there is no federal nexus, USFWS would still be involved through Section 10 under the ESA
    - The Fish and Wildlife Coordination Act looks at overall habitat, not necessarily just endangered species
- Gena asked if Dan had any thoughts about Alt 1, specifically where the levee cuts Oro Loma Marsh in half
    - Dan indicated that they would need to look at details of the habitat value Oro Loma Marsh is currently providing, and what it would provide under this alternative. The biologists would have to get into the details.
- Nans asked about USFWS's approach to SLR
    - Dan noted that they consider SLR for the planning of their managed areas and in their consultation with federal agencies

    - The goal is long-term preservation, conservation of the listed species
    - They look at where the habitat will be in the future, and the quality of that habitat
- Gena brought up the idea of 'risk splitting'- there will be winners and losers for the wildlife in each alternative. Mudflats will benefit, and shorebirds, but it may not be a great benefit for the rail and harvest mouse that use the marshes
    - Dan noted to plan for right quality and connectivity of habitats for the listed species. He doesn't know if bisecting the marsh is the right thing to do to accomplish that
- Dan asked if USACE has committed to anything at this point
    - Nans noted that there are no formal commitments at this time. We are still identifying funding mechanisms and partners and are looking at a variety of projects and partners
    - Dan noted that USFWS would look to USACE to fund their involvement at a later stage
- Nans explained the idea of the Salinas Swap, and moving the salt pond habitat further inland and restoring Oliver Salt Ponds to tidal marsh
    - Dan indicated that the concept seems worth considering- are the salt ponds used by the snowy plover?
        - Doug noted that the plover don't use them for breeding, but may use the ponds for foraging
        - The plover nesting colony is located in Hayward Marsh
        - Doug noted that south of SR-92 in Eden Landing, there are snowy plover restorated habitats. In conjunction with the nesting in Hayward Marsh, there are 2 areas are a focal point for the listed species
    - Doug noted that they are looking to maintain this habitat with SLR, while being faced with emergency repairs on outboard levees. It is a challenge to balance all of it
- Dan indicated that the balance between preservation of infrastructure, ecosystems, and public access is important
- Mark Taylor noted that in Alt 1, it may preserve some habitat for SMHM and Clapper Rail

- Dan noted that the marsh management plan for Hayward Marsh should protect the habitat short and long term
    - Dan asked EBRPD to keep USFWS in the loop with the Hayward Marsh plan

***Next Steps***

- Dan asked if USFW is expected to provide formal input by a certain time at this stage
    - Nans noted that we are requesting written feedback in the next three weeks. This is not for an agency review, but will be used to help select the Preferred Alternative.
    - USFWS to provide written comments before 05/26
    - SCAPE to share existing conditions report
        - USFWS Biologists to reference the document upon review of the Alternatives
    - This stage of the project is an important benchmark in the project to define the vision for the Hayward Shoreline
    - This will be the first point of feedback but certainly not the last.
    - Formal feedback on the endangered species impacts will be coordinated in greater detail at a later time, with a potential federal nexus

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# MINUTES

| | |
|---|---|
| Date: | May 8, 2020 |
| Location: | Conference Call |
| Topic: | Hayward Shoreline Master Plan |
| Attendees: | SCAPE [Gena Wirth, Nans Voron, Nick Shannon] |
| | BCDC [Brenda Goeden] |
| | EBRPD [Mark Taylor, Chantal Alatorre] |
| | City of Hayward [Taylor Richard, Damon Golubics] |
| | HARD [Adrienne De Ponte] |
| | Arcadis [Lee Miles, Mary Kimball] |
| Doc'd by: | Nick Shannon |
| Re: | **Hayward Shoreline Master Plan- Sediment Management** |

## 01 ACTION ITEMS

- *Brenda to send any additional comments in BCDC's compiled comments this week*

02 MEETING MINUTES

- Brenda is the sediment program manager for BCDC. She is primarily focused on dredging, sand mining, and beneficial reuse, as well as overall sediment management for the Bay as a whole

***Design Alternatives***

- Brenda asked about the existing conditions of the shoreline
    - Mark noted that, from his observations, the shoreline has lost 3-3.5' of outboard marsh annually. The most accumulation is at the San Lorenzo Creek delta, north of the project area
- Brenda noted the East Bay's shoreline challenges- strong wave climate churns up sediment and it may not deposit as much in the marshes.
- Brenda stressed that the whole East Bay is an alluvial fan, and the creeks are important.
- Brenda indicated that moving the Bay Trail back is probably a good idea
- Brenda expressed concern over gravel beaches on mudflats; it may impede sediment transport to the marshes.
    - Brenda referenced a Jessie Lacey study about sediment transport in the North Bay- more sediment may actually move to the marshes in the dry season/summer, and not as much during the wet season/storms.
    - Recent research shows that the sediment moves out of tributaries and creates a reservoir near shore, where it becomes a storage situation. Then, over time with wave action, it moves into the marshes
    - Brenda noted that there are many unknowns about sediment transport to the marshes, and this is something they want to research further
    - SCAPE to think about the language around gravel beaches- they would still allow sediment to flow in, but are necessary to reduce edge erosion

***Sediment Strategies***

- Brenda brought up a few ideas around getting more sediment into the marshes
    - Look at Dams and Reservoirs
        - San Lorenzo Creek was brought up before- sluicing
        - How to move sediment out of these areas, into lower areas?

        - Don Castro dam project- sediment pipeline- is something to consider
    - Thin-layer placement, as in Seal Beach.
    - Strategic placement framework- these concepts have been laid out but not tested yet in the Bay
        - There is a proposal with the USACE to test some of these concepts
    - Beneficial reuse of dredge material- direct placement
        - 80% water / 20% sediment
        - Costs a lot of money
        - Broad mudflats in front of the side require a lot of management to move the slurry to sites
    - Berms, or physical structures to break down the wind/wave fetch on site- opening up to the Bay
        - Berms are decent structures in the marsh, but they do provide predator access
        - Sonoma Baylands- concerns about predator access
        - Topographic diversity- good for habitat and refugia
        - Hamilton Wetlands
            - Berms isolated 85% compaction
            - Topo change helps attenuate waves and helps sediment fall out
        - Mark noted that the berms in Oro Loma Marsh were relatively easy to build
        - Breach from the channels, not the Bay, due to erosion impacts
    - Widening the creek? Allow more sediment into the marshes
        - Corte Madera reference
            - 50% trapping of sediment from the Bay below HOT
        - Sulphur Creek
        - The Bay is an estuary and there is tidal and fluvial interfaces- water and sediment moves both ways
        - Brenda raised concern around tide gates- they trap sediment and limit the exchange of both

        - Is there a way to bring sediment trapped at the Bay into the marsh?
    - Small channels – capture sediment coming down from the creek / conduits for Bay sediment to come into the site
        - Mark noted a flood control issue at Line A- they had to dredge so often due to the Bay sediment clogging the channel, before the new tide gates
        - Most of the sediment comes from the Bay
    - Peter Bay / Arthur Feinstein- 200 acre proposal of a sand berm
        - Offshore where there was a historic beach
        - Reduce the need for beach nourishment
        - Sets up a lagoon
        - Wind collapses the berm, and it turns into a beach
- Brenda noted that we are at an interesting point in time- just barely learning how to move sediment beyond direct placement. We know how to do direct placement, but it costs a lot of money.
    - At Inner Bair Island, they used construction fill to raise the elevation of the diked ponds and got the fill virtually for free from construction waste (trucking it in)
        - SBSP put out an ACE bid with a similar assumption, but it will now cost $$, and the costs were flipped.
    - There are a lot of permits coming in for office buildings along the Bay's edge and they are all elevating the land, which requires sediment, which is expensive

***Pilot Projects***

- Brenda raised concern over pilot projects being too small- if they aren't big enough, you can't see the results. However, if they are big and they fail, you have to be sure you are able to deal with that
- BCDC is looking to show that you are using the minimum amount of fill necessary –
    - State this assumption per project in the project cut sheets
- Gena noted some potential pilots:

  - Gravel Beaches
  - Sand Berm concept
  - Channel modifications / widening / additional breaches

***Next Steps***

- Gena brought up the idea of management and monitoring- the Master Plan may be set up to pilot some of these concepts once they are permitted, and allow HASPA to be the first in line with the framework to do so
  - Test one round with USACE proposal- maybe there is funding
  - We do need to start testing these concepts soon
  - Set up HASPA to be able to codify this approach, and not be too specific about it
- Brenda agreed, and clarified that we are not proposing permitting action now, but are bringing the regulators along so they are aware of what we want to do in the future
  - Triggers- to cause the team to take action
  - Monitoring is important to identify the triggers
  - In the meantime, projects will start that will support future projects once the trigger hits
  - Use lessons learned from other pilots
- Brenda brought up BCDC's special area plans as a reference to this type of framework
- Adrienne supports the idea of triggers, and actionable items
- As you monitor and manage, you bring the regulators along the way
- Brenda brought up the idea of groundwater, which adds more buoyancy to things further inland

# ONLINE PUBLIC FORUM #1

**05/18/20 - 06/26/20**

# ONLINE PUBLIC FORUM COMMENTS

**Jewell Spalding**

Dear Hon. Members of the Hayward Area Shoreline Planning Agency:

This is on behalf of the Sierra Club in response to the request for comments on the Hayward Shoreline Adaptation Master Plan dated June 4, 2020. These comments are preliminary and based on our limited time to review these different proposals. We of course reserve our entitlement to modify these comments or supplement them as we are able to further study these proposals and/or as additional information is disclosed.

Climate change adaptation is going to be an ecologically important challenge for at least the coming century. The Master Plan notes that one project goal is to "create a resilient shoreline for people and ecology." A second goal is to "reduce risk to critical infrastructure and built assets. While we hope that both of these goals can be achieved, our main focus is to maximize protection of the valuable ecological resources and threatened/endangered species that depend on the shoreline of the Bay

In the Master Plan draft, each of the three response categories offers certain strategies that will assist with the stated ecology goal. For example, all seven of the "Nature Based Strategies" can potentially help protect species that live along the Bay shoreline and the Sierra Club heartily endorses these.

Moving to the second general category "Engineered Strategies," from our perspective vertical seawalls, standard levees and revetments all entail serious ecological threats. These structures are totally inappropriate for Hayward since there is a lot of precious marshland along the Bay. Many many plant and animal species, including some threatened and endangered species, would be damaged by the vertical concrete or piled up seawalls. These types of structures undermine tidal marshes and the species that depend on these. They also present structural erosion problems, "scour" in front of the sea wall, . especially in major storms.

The Master Plan draft does have one "engineered strategy" that appears to be promising: the ecotone levee. This "horizontal levee" works to achieve "a gradual blending between communities across a broad area" (www.ec010gical.wordpress.com/2014 ). These long, gradually sloping(1:30 slope rather than 1:1 slope), partly underwater levees mimic the natural topography of the shoreline and are consistent with habitat restoration. The ecotone levee supposedly will help avoid loss of the rare wetland habitat and the species that depend on that habitat along the Hayward shoreline. Ecotone levees are still experimental. The city of Palo Alto and the Oro Loma Sanitary District have shown some success with them. The Oro Loma Horizontal Levee Project, just north of Hayward, provides a good model for the Hayward Water Treatment facility, since Oro Loma is currently testing the abilities of various mixes of native plants and sediments "to treat wastewater flowing through the levee from the holding basin" (https://oroloma.org/wp-content/uploads/STB-Oro-Loma-Report_11.13.17.pdf )

Turning to the third general category, "Non-Structural Strategies," in our view,"managed retreat" will eventually need to be a central part of Hayward's overall shoreline adaptation plan. Starting perhaps 25-30 years from now, certain "built assets and infrastructure" will need to be rebuilt elsewhere as sea level rises by two feet, four feet, then possibly seven feet. While managed retreat is not something we argue for in the near term, we foresee that it will become the primary strategy in the longer term, given groundwater emergence and storm surge levels.

Finally, the different alternatives discuss that mitigation measures may be necessary depending upon the proposed strategy. Any mitigation measures must be viewed in the totality of the circumstances concerning sea level rise that we will experience. By way of example, one mitigation that is discussed is mitigation for loss of salt marsh harvest mouse habitat. Yet, there is no discussion of where and how such habitat could found or created as a mitigation site in the context that the Bay will experience a rise in sea levels that will eliminate existing salt marsh harvest habitat. Consequently, proposed mitigation measures should be analyzed as to their practicality given the overall rise in the Bay's water level.

The above paragraphs delineate our view of the Shoreline Master Plan draft three general categories of response. Overall, we emphasize the importance of preserving animal/plant marshland habitat on the shoreline; the ecotone levee is clearly the best plan to achieve this objective. We have two questions that we would like to see more fully addressed in coming Master Plan drafts. These are discussed below.

Question 1: Slide #12 of the Master Plan presents maps showing three "Design Alternatives" for placement of levees: "Closer to the Bay," "Down the Middle," and "Further Inland," Would these (very linear looking) boundaries allow for an ecotone levee approach? What are the climate change/sea level rise conditions in which each of these boundary alternatives would be adopted? Or would each of the three boundaries be implemented over time, as sea levels rise? (Or will HASPA take the best available science and try to settle on just one of these three boundaries as the right one to use long term?)

Question 2: What specific plan will be made for Sulphur Creek, which has an outlet in the middle of the shoreline area . What specifically will be done to restore Sulphur Creek to its pre-industrial form?

Thank you for your attention to our position on the Hayward Shoreline Master Plan draft, and to our questions concerning certain aspects of the Plan. We look forward to further development of the Plan to maximize its shoreline habitat conservation and restoration commitments. Please make sure to provide us notice on the further developments of this Plan which can be directed to our Chapter Director Minda Berbeco at the address below.

Sincerely,

Jewell Spalding
Southern Alameda County Group,
San Francisco Bay Chapter
Sierra Club
CC: Minda Berbeco, Chapter Director
Damon Golubics, HASPA staff contact

**Zalak Trivedi**

Thank you for sharing this information and for eliciting feedback! It is exciting to see the stakeholders come together and make a plan for a future that both reduces risk and preserves the unique ecology of this area.

In my opinion, the Design Alternative #2 (Down the middle) provides the best preservation of ecology while keeping it diverse. This is very exciting to me. I always enjoy the different plants, birds and other critters when I take a walk there. I feel it important to preserve this joy for future generations.

As mentioned above, the ecology preservation and maintaining its natural biodiversity is very important to me.

**Phil E. Gordon/Pat Gordon**

Comments are directed at the five initial ASSUMPTIONS of the proposed Hayward Shoreline Adaptation Master Plan,in which I include general references to my preferences. I do think that no one municipality will successfully accomplish their adjustment goals, without all Bay Area "neighbors" mutually agreeing in knowledgeable cooperation.

1st. Preserve and enhance the Ecologic Features ["components" = more ecological]. [There will be a need to accommodate vulnerabilities of ecosystem components; especially any known or as yet unknown factors]. [Funding any research to close the gaps in ecologic assessments should be planned for].

2nd. Consider creative alternative or modifications of the Elements of the "Urban Fabric": remaining as status quo may be somewhat less tenuous.

3rd. Education (such as found in the work of the successful Hayward Shoreline Interpretive Center) should help in conveying the broad understanding this plan and the needed adjustments, especially any adaptations to ensure an healthy ecosystem, along with meaningful protections (or modifications) of private assets.

4th. Non-structural strategies, once agreed on, should, thereafter, be an integral part of any ongoing adaptations (or future changes) - even those non-imminent.

5th. Long-term planning must address and communicate to all stakeholders at large

Phil E. Gordon, Hayward, ALA Co., California.
Member: Hayward Shoreline Advocates
and Ohlone Audubon Society

As the plan has stated, there is a mixture of elements. Elements that safely offer protection and perpetuation to existing ecosystems and citizens' peace of mind regarding their assets and (even in the impending turmoil we currently face) should be selected, incorporated and presented to all of us.

Thank you!

**Erika Crawford**

I have brought my daughter to nature programs at the Interpretive Center for the last two years. This is one of our favorite places in town. The master plan should protect the marsh habit and focus on sustaining the ecosystem here.

I preferred Alternative 2 because it sounds like it would reduce negative impact to the existing marsh habitat, and it sounds like it would help expand the habitat with additional marsh restoration.

**Laurie J Price**

Dear Board Executive Committee, HASPA,

This letter pertains to the Hayward Shoreline Adaptation Master Plan, dated June 4, 2020. I include both feedback and several questions about the current draft. First, I want to say that I am pleased that this planning for climate change adaptation is going forward in Hayward and elsewhere. Climate change and sea level rise will only become more serious problems in future decades; the California coast and the San Francisco Bay shoreline are precious and maybe with this type of planning we can avoid the worst kinds of damage.

The Master Plan states that one central goal is to "reduce risk to critical infrastructure and built assets" While built assets are one consideration, in my view we need to give the highest priority to another stated goal: protecting the ecology of the area. Many plant and animal species depend on Bay shoreline habitats; these include some species that are threatened or endangered. This shoreline cannot be replaced somewhere else.

The seven "Nature Based Strategies" identified in the Master Plan seem on the surface to be positive interventions for the protection of our natural resources. However, in future drafts it would be helpful to have information about the specific impacts of these strategies on birds and other Bay shoreline species.

The second category of response,"Engineered Strategies," includes several approaches that should be avoided in my view. Vertical seawalls and revetments undermine tidal habitats; these structures will threaten rather than assist in preservation of native plants and animals. While still a bit experimental, the ecotone levee is the best of the "engineered" options. These long, gradually sloping, partly underwater levees mimic the natural shoreline. As with the Oro Loma project to the north, an ecotone levee might work well with Hayward's wastewater treatment plant, while also preserving important habitat. Now to a few brief questions regarding the Master Plan.

The June 4 Master Plan provides maps showing three "Design Alternatives" for levee placement: "Closer to the Bay," "Down the Middle," and "Further Inland," How can these (linear looking) boundaries be employed with an ecotone levee approach?

A second question. What are the precise climate change/sea level rise conditions in which each of these three boundary alternatives would be adopted? Does HASPA intend to settle on just one of these three boundaries? Or do these three boundaries represent a menu of options to implement sequentially, based on actual climate change impacts in the area?

Finally, a technical request: is it possible to get higher resolution maps in future Master Plan power points? I found the street names and other text impossible to read in the June 4 draft, requiring further research.

Thank you for your attention to this letter of feedback.

Laurie J Price Ph.D. MPH

**Hayward Resident**

Ecotone levees should be implemented.

NO vertical seawalls, revetments.

**Robin McCoy**

I believe that the Master Plan should be directed to keeping the shoreline area as natural as possible. It should be directed toward preserving the habitat for native species. Seawalls and other engineered devices should be limited as much as possible as they tend to have many unintended consequences (such as diverting water elsewhere). I like to hike on the shoreline and while I would like to preserve hiking trails I am willing to sacrifice these to maintain the habitat. As sea levels continue to rise it is important to have buffers between the sea and human areas. While presently no one seems willing to make the hard decisions of moving human infrastructure back it will soon be made for us. We should be looking forward to adapt our areas to what the shoreline is becoming not trying to engineer our way back to what was (and won't ever be again). Let's put our money into saving the habitat NOT just preserving "human" areas. Thanks for your time.

I don't like alternative #1 at all, Alternative #2 is ok but I think I prefer Alternative #3.

**Michael Quenneville**

Please make an area for skateboarding including a few ledges, stairs or flat rails. Something similar to what was done in Greenwood park. Skaters are gonna skate regardless of weather it's condoned or not. Thank you very much.

**Laura Mattos**

The Master plan and implementation should cover the most comprehensive innovations possible as SEA LEVEL rise is inevitable. While doing the most will be costly now, the future will be aided with less destruction and upheaval of repeated alterations. It eems to me that some infrastructure should be moved in the initial phase rather than numerous times in the next 100 tears. I notice you are not addressing places such as Eden Shores that is built in a "wetland" area.

Definitely Nature Based Strategies with increased tidal marsh habitat along with some moving

of facilities and structures now. Not doing it from the beginning will result in further destruction of property and higher costs.

**Bubba Manzo**

Implementing a system that strays away from developing on, near, or around marsh land. Absorption rates are drastically reduced when coastal areas are zoned for industrial use. We have plenty of industrial buildings, blacktop, even a power plant next to, or literally on our wetlands that are in danger of flooding during a storm serge.

Businesses need to realize they're staying there will cost them great loss in the future should we see sea level rise beyond 4ft in the next 50 years.

Design 3: Further inland makes the most sense. These complicated, natural systems are the best shot we have at mitigating the negative effects of climate change. I believe we should run a second alternative flood lever along the train tracks all the way down.

**Myles McClain**

I live in the Longwood/ West Winton neighborhood. Id love to see a shoreline that allows continued access to the walk and bike paths along our hayward shoreline. I believe marshland will be the most effective and the most eco-friendly plan for our shoreline.

**Elizabeth Munoz**

I think it should achieve as much protection as possible by taking it back to where it was before we messed with it. I like the redundancy in the master plan!

I like the line of protection from design alternative #1, but with the restoration of tidal habitats as described in alternative #2. Either way, thank you very much for your time and energy on this!

**Stephanie Shell**

I have no comments on the technical issues. I'm just glad to see that there is a plan being made by all of these agencies, instead of just waiting until something bad happens. Thank you!

**Edward Lyke**

My relationship to the Shoreline was multi-faceted as I was a marine biologist and invertebrate zoologist at CSU Hayward for many years and routinely used the Shoreline for class field trips, student/faculty research projects, and mitigation projects. I was very involved in the planning of Cogswell Marsh and the Shoreline Interpretive Center. In addition I was for many years the Chairman of HASCAC and as such was integral in all the discussions, planning, programs/brochures and the original Master Plan for the Hayward Shoreline. I worked closely with many people at EBRPD, HARD, the City of Hayward, school districts and the environmental community to bring to fruition the Shoreline as we know it today. However, it has been almost two decades since I as so active on the shoreline and I find myself sort of "out-of-the-loop" on current ecological and environmental management practices; it is hard to be getting 'old'!

I am pleased to to see the development of these Design Alternatives as a part of planning for the future of the Shoreline, particularly in conjunction with the inevitable rise in sea level and other concomitant changes in our world in response to climate change. HASPA should be congratulated for taking a lead in the Bay Area in planning for these issues.

While all three Design Alternatives have elements that recommend them I find myself leaning to a Hybrid of those proposed in Design II and III. Sea level rise is going to take place, it is going to be greater than perhaps we expect, and it is necessary to make plans for the very long term consequences. While this Master Plan is looking forward for close to 100 years, that should be the minimum for projecting changes in the marsh systems, the wastewater treatment facilities, the public access, and the protective levees and other infrastructure elements of the Shoreline and the surrounding business and residential communities. Design III has a larger footprint for ecological restoration, in particular the enhancement of the tidal marshes that will be critical for the ecosystem. I am particularly supportive of eventually moving the HARD Interpretive Center to higher ground on the Winton Ave landfill area. With careful planning the costs could be managed and would, in all probability, not be more than what would be needed to protect and/or float the building at the current site.

I look forward to reading about the Preferred Master Plan. I suspect it will be a very comprehensive document and critical for the planning and implementation of the many aspects and elements of the Shoreline.

Thank you all for your efforts.

**Philip Fay**

Clean water should be a much higher priority than presented in Alternatives #2 and #3.

I would like to see better protection of our waste water treatment plants from Alternative #1 (closer to the bay) incorporated into the more middle of the road approach of Alternative #2 (down the middle).

**Rudell O'Neal**

I do not live nor work along the shoreline. Nevertheless, I am concerned about the natural preservation of it. I applaud Hayward trying to act in advance. I believe a combination of man made and natural preservation efforts  hold the solution.

Where feasible, use natural measures to allow for marsh and flood planes. Where essential to protect vital infrastructure, use engineered methods.

**Hannah Grgich**

Having only briefly familiarized myself with this project, my preference would be that we retain as much of the existing marsh habitat as is possible. This comes from both an interest in environmental diversity and as a community member, the marshes are a good way to to connect with nature and an engaging educational experience for people of all ages. I realize that we should safely maintain vital infrastructure, but I am not terribly sympathetic to industrial/business in the area, as I feel they might be able to relocate or self-finance solutions if they wish to retain their location.

I would like to see an adaptive management plan, and retaining as much ecosystem diversity as possible.

**Karla Werning**

I both use the Hayward airport and walk with my dog by the shoreline. It is important to us to preserve both. The natural marsh areas are critically important in any plan. Do not reduce, diminish, damage the marsh habitat!

We should probably stop building close to the bay. Some built upon areas  be eventually be lost.

The least damage to natural areas:
streams, marshes, wetlands.

**Lawrence Danos**

These plans are certainly worth looking at and deciding on a worst case scenario protection plan. In my vision sea level rise would probably be a slow process reaching about one foot higher than today's mean sea level by 2050. The rate of rise would increase for the next 50 years to about three more feet by 2100. Thereafter, it's a wilder guess how much higher the rise could be. This plan feels good for at least until 2075 according to my vision, and hopefully would accommodate the tidal highs and lows. Those homes nearest the marsh areas  face problems during winter storms.

The combination of all the elements are going to be needed. It's a matter of placing things like revetments and berms in the right places. I understand adaptive management techniques will be built into the maintenance plan. Re-aligning on an as-needed basis will certainly be key to success. Thanks for allosing public input into this important planning process.

**Timothy Devine**

Wildlife, habitat, and ecosystems
should be given top priority

Anything that promotes reconnection of natural landscapes and waterways; And, discourages development of any kind.

**Mickey Souza**

Wouldn't it be better if we had done more before we will have to spend $$$$ to mitigate these rising seas? Has anybody done chemical change predictions for the water that will be encroaching the wetlands/habitats?

Added considerations:

If gas lines are also in need of relocation, remember that California has a goal for electrification (vs. fossil fuel heating) phasing out fossil fuels by 2045. https://www.sacbee.com/news/politics-government/capitol-alert/article218128485.html

Not sure after reading the proposals, but are you are considering solar distributed systems rather than try to salvage old PG&E distribution poles?

**Captain**

I live in Castro Valley. please let the seas rise, I look forward to Castro Valley being beach front property. I'll build a dock for my boat and sail the 7 seas. I can't wait.

Can you send me some plans for my new dock.

**Mickey Souza**

Wouldn't it be better if we had done more before we will have to spend $$$$ to mitigate these rising seas? Has anybody done chemical change predictions for the water that will be encroaching the wetlands/habitats?

Added considerations:

If gas lines are also in need of relocation, remember that California has a goal for electrification (vs. fossil fuel heating) phasing out fossil fuels by 2045. https://www.sacbee.com/news/politics-government/capitol-alert/article218128485.html

Not sure after reading the proposals, but are you are considering solar distributed systems rather than try to salvage old PG&E distribution poles?

**Yvonne Dardenne**

I don't know enough to comment here. I just want to go on record as an advocate for protecting and preserving natural environment - for all creatures - animals, humans, vegetation.

The nature-based approaches seek to enhance protective ecological features of the shoreline

NATURE-BASED STRATEGIES
Fine and Coarse Grain Beaches
Tidal Marsh Restoration
Diked Pond Management
Fine Sediment Augmentation
Tributary Connection to Baylands
Reefs and Living Breakwaters
Eelgrass Restoration

**Michael Jaeger**

We are the managers of Barrington Business Park or 2534-2655 Barrington Court, Bldgs A, B & C. Bldgs B & C are set along Frank's East and we are certainly concerned of sea level rise over the long term. We think a main goal of the Master Plan should be to protect the City's infrastructure and improvements from inundation, including the commercial and other buildings along its shoreline, while also protecting the natural shoreline habitats and recreational enjoyment of the shoreline areas. We strongly prefer design alternative #3 as it protects Barrington Court from inundation with a longer more comprehensive flood protection levee along this important commercial and industrial corridor, and it also provides a larger natural shoreline habitat area. Possibly there could be transition areas within this larger shoreline habitat areas to allow for retention of more shallower tidal marshes in interior sections as sea level rises.

*Flood protection levee along the east side of Frank's East so to protect our commercial facilities and the vibrancy of the commercial area. We are willing to also work with the City and all related agencies to assist in achieving this goal. Pls let us know how we can help and what we can do to assist. Best regards.

**Debra Lewis**

Please keep and create more natural habitat for the birds and smaller wild creatures. Don't allow direct public access to these areas. I have seen what direct public access does: my favorite wild areas in Hayward and Castro Valley have been destroyed by new generations which, sadly, have many members who enjoy destruction and distribute masses of litter at an insane rate. Just look at Ward Creek Day Camp or Lake Chabot; they are no longer parks; they are giant waste bins.

KEEP THE PUBLIC AWAY FROM THESE PLACES AND KEEP THE AREAS NATURAL! Do we need more catastrophes like the present virus?

I LOVE NATURE AND WILL THEREFORE STAY AWAY FROM IT.

KEEP THE MARSHES PROTECTED AND CREATE MORE OF THEM IF POSSIBLE.

**David Head**

That water won't be here for another 500 years. Hayward is skyrocketing to bankruptcy, and now you want to spend money on this?

**Clara DiBona**

I like the levees, tide gates and pumps that are in option 1. I think something needs to be done about the Hayward bridge, but not being a professional engineer, I am not sure what is both cost-effective and necessary. I am glad that a lot of thought has gone into this planning document, and that it incorporates the bay trail and nature center. When our son was younger we used the trail quite a bit.

Levees, tide gates, water pumps, revised bay trail and preserved nature center.

Ensure that the power plant and the Hayward Airport are protected.

**Alexis Ostarello**

Between us, my husband and I have 55 years of living in Hayward. We have enjoyed walks and bike rides on the trails near the shoreline over the years. When I think of Hayward, I often think of the Shoreline. To a city of over 150k people, natural resources and trails are important to balance out the urban and suburban concentrations

The nature-based strategies seem to be the most important. The environment does not have a voice in its own preservation, yet that is exactly what will be lost if we don't prioritize it. Infrastructure invariably decays over time, and public health and social initiatives will shift over time. We can use the Interpretive Center to educate our fellow citizens on the importance of putting nature first. It will not rebound if we don't act on its behalf.

**James McBride**

Please don’t waste your time. I have walked and ran the shoreline trail for more than 25 years. I pay attention to conditions. The water level is not rising.

**Maria Elena Byron**

I found it hard to read your 'designs'. The SLR projections maps seem to be cut off at SR 92 however there seems to be some part of the problem that could affect even the area where we live but since the map was cut off I couldn't tell how much. We are in the El Rancho Verde section of Fairway Park abutting the Chapel of the Chimes Cemetery. Can you answer whether or not under your premises we might be affected? Please reply to dbyron1339@aol.com
PS: I am an elderly person and I had to zoom the sizing of the maps 200-300 percent to find out that SR 92 was the cut off.

**Evelyn Cormier**

I have been involved off and on for more years than I can count. Initially I was bringing classes of first or second grade students to experience the shoreline from the time the building was built. Since then in various advisory or self initiated times I have been involved in the shoreline in order to preserve its unique and much needed site to help young and old understand what a unique and valuable site this is and needs to be preserved even in the face of sea level rise.

Ecotone levees should be used to the fullest extent possible to retain the natural setting of the shoreline. The planning needs to be coordinated with Eden Landing Ecological Reserve because that location is or will be faced with many of the same challenges without the built environment.

Ir is true that the constraints are indeed a challenge. The wetlands, marshes and building all have to be provided for in a way that provides the maximum amount of feaseable protection within the limits of funding.

The designs need to incorporate the features that preserve the open space the shoreline and its unique site as well as protecting the other assets along the shoreline using ecotone systems to the extent possible.

**Gerry Smith**

In general, I'm in favor of some combination of #2 and #3. My primary concern is making sure that we continue to have a rich marshland environment that continues to support wildlife. Although #3 reduces the complexity of environments, it does a good job of maintaining/enlarging the total amount of marshland environment. Perhaps, as further adaptation/mitigation occurs, we can restore some of the diversity?

As stated above, my primary concern is preserving as much of our marshland environment as possible, and also continuing to have the rich diversity of environments that we currently enjoy.

**Ashana khan**

For the shores, we should make high walls just like they have in flood zoned rivers. That should be good for all future water level rise as well.

**Cheryl Crone**

I am not going to pretend to say I understand your master plans or the environmental coastline issues. I just think you are missing an opportunity to do two things at once.

Additional idea:

Somehow you need to have this Plan include a revenue generator for the City of Hayward. A revenue stream larger than entrance or parking fees. I would like to see a ferry terminal, preferably with stops at SFO and downtown SF. And possibly connecting to the new Oakland As stadium and other existing ferry terminals.

Planning now for future Bay Area traffic needs is a good environmental decision. I hope this suggestion will be discussed and somehow incorporated into your plans.

Thank you for your time and service.

**Roberta dePonte-Jacobs**

I respect all who are studying this important issue. I do own a home in the "Jackson Triangle". My daughter and her family live there presently. I admit to know far too little to make an educated comment at this time but, I do want to suggest you folks remember the Hayward fault and the San Andreas fault. Our town is between the two fault lines. A big shake will challenge any catch basins, dykes etc. Therefore, I support the cost of including the investment into expert consultants in this regard. I am grateful that you are moving forward with evaluation and planning. A factor in choosing the lest expensive option is always the impact of the deeper water future potential. I support preparing for a 7' water increase and a large earthquake.

Thank you for asking us for input and for keeping us informed.

**Duane**

Global Warming/Climate Change is a political scam that is not worth wasting our money on. If it is happening there is nothing anyone can do about it, except to migrate like all species and humans have done for millions of years.

None - they all sound like boondoggles to enrich politicians and their cronies.

**Minane Jameson**

Thank you for this thoroughly studied report. I am currently a HASPA Trustee, so I care very much about the future of this site. It is an incredible area that is home to so much wildlife and a great place for people to enjoy nature and the views of the bay. The Bay Trail is ideal for recreation, but many people rely on it for traveling to their jobs.

I do not feel knowledgeable enough to decide which elements of the three Design Alternatives are a must and which can be eliminated or altered, but I do feel a good starting point would be to work with the second Design Alternative. I would defer to the experts to decide where to go from there.

Protecting habitat and recreation opportunities (the Bay Trail and the Interpretive Center) would be my top priority. Not all habitat can be saved, but I would prefer an option that can save most, especially any habitat that endangered species rely on. Relocating or rebuilding both the BT and IC will be necessary at some point, and I'd like to see that they are included in the final plan.

**Gerald Sannebeck**

No master plan. Don’t waste resources or time.

**Patrick Lannan**

I visit the shoreline at least three times a week.

I value retaining the shoreline as a recreation area, a place for education about the natural environment, and a place for sustaining a variety of ecosystems that support native plants and wildlife.

I recognize the challenges we face as climate change causes sea level rise. I suspect there will be more political will for funding to maintain transportation and utility infrastructure than there will be for parkland and habitat preservation. So, I favor a more substantial up-front investment in preservation of parkland and habitat.

I am surprised I did not see more effort to adapt infrastructure in the Hayward industrial park and to support greater tidal flow. I wonder if we could see roadways elevated over channels that work to manage tidal flow. I also see new construction in these neighborhoods. This seeks shortsighted. I would favor seeing a moratorium on new construction immediately adjacent to tidal marshes and parkland until we see a plan that sustains our current commitment to parkland, acre for acre.

I prefer the "close to the bay" scenario. I think it more likely that we will be able to retain parkland and diverse habitat if we have some of these areas behind a durable structure.

I am curious about the idea of sustaining land with "silting" and would like to hear about where we have seen this management strategy effectively deployed. I would like to see cost projections for this kind of management strategy so we can compare this approach to a durable barrier built close to the Bay.

**Dean Flatt**

I would suggest that we accept defeat and retreat from the areas at risk of flooding. Buildings have known, finite lifespans. No new construction in those areas at risk of flooding within the lifespan of proposed construction. Later when the land has lower value, purchase and reclaim the land for public use after existing construction reaches its end of life, either as protected wetlands or recreational area or some public use consistent with Mother Nature and not Man's will.

**Dave Pryor**

The whole thing is nonsense and the city should not waste any taxpayer dollars on any sort of contingency for rising water levels.

You realized that former president Obama just bought shoreline property don't you. This is illustrative of general non belief among all our so called leaders in "climate change".

**Carin High**

I agree whole heartedly with Council member Aisha Wahab's comments that the emphasis of the Master Plan should prioritize protection of habitat for wildlife. The City of Hayward has been very forward thinking in its vision of protecting its shoreline and should be commended for undertaking this process.

It is important to keep in mind that the Hayward Shoreline is not isolated from the rest of the shoreline, and that when considering the "diversity" of habitat to be maintained, one must also consider habitats that exist or are proposed to be created on adjacent lands (e.g. Eden Landing Ecological Preserve) and to also consider the costs and challenges of maintaining muted tidal marsh, especially as sea level rises. Therefore, when selecting an alternative consideration should be given to what is likely to be the most sustainable in the long-term. The ecotone levee alignment provided in the San Francisco Bay Shoreline Adaptation Atlas seems to most closely resemble the alignment of Alternative 3. I am glad to see SFEI is included on the design team for the Master Plan and hope their scientific expertise will help guide the selection of the preferred alternative.

I have only quickly scanned through the available documents, so I have missed discussions of impacts of all of the proposed alternatives on the federally listed threatened California Least Tern (LETE). I don’t

see the species listed under the pros and cons of any of the alternatives. Is it hoped or assumed the LETE will relocate to Alameda NAS or to the Eden Landing Ecological Reserve? My interest in the LETE colony at Hayward Shoreline stems from monitoring the nesting island for several summers and am aware that the Hayward site provided a positive contribution to successful LETE recruitment. I understand that trade-offs need to be considered especially when considering what is feasible and sustainable at this location, but there does need to be an assessment of the potential impacts to the LETE population.

As I mentioned above, I am leaning towards Alternative 3. Has any discussion been provided of how any of the proposed alternatives might be phased? Are there components that must be implemented before others? Such information might provide an insight as to whether or not certain elements might be held back to assess how the implementation is proceeding, whether or not sea levels are rising as anticipated, or to assess whether certain adaptive management techniques such as sediment augmentation are feasible for the Master Plan site?

I notice the plans include an area for solar fields. Has this feature been vetted by avian scientists? This location be inappropriate for such a land use as such a feature could be a hazard for migratory waterbirds. While I recognize the footprint of the area designated for a solar field is relatively small, the potential for waterbird collisions should be considered.

**Patricia Hunt**

If I understand your proposals, I prefer Design Alternative #1 (Closer to Bay). It appears that there would be less of a requirement for future sediment augmentation. I think the less of a requirement for future maintenance, the better. Administrations change and maintenance funding is generally one of the first things to be cut.

You also indicate that managing water levels behind the line of exclusion would be easier in this scenario.

I don't think bisecting the Salt Marsh Harvest Mouse preserve is a very good idea, and I doubt that US Fish & Wildlife would approve.

**Barry Abella**

Dear Planning Commission. I live within a couple of miles from the shoreline. I've been riding my bike along the shore for over a decade. It's like a piece of heaven on earth to me and is a jewel of the bay in my mind. I'm more inclined to support the closer to the bay and putting in the effort to keep the trail as close to the water as possible. Since the trail is already close to the bay, I would rather fight the sea level where it's at even if it means temporary closure to do so. One thing I enjoy about the hayward shoreline construction is that I can ride along the trail year around even during the winter due to the type of soil. Please keep any future design and soil such that it's usable year around i.e. not using clay levy like the trail at coyote hills going to the dumbarton. Additionally I feel it's important to have as wide a trail for wakers/riders etc to not get in each other's way. Lately with the increase in trail use do to the fake pandemic it's been challenging to co-exist with so many people on the trail. Another good thing to think about is the people who are fishing they tend to hang around the bridge and block the bridge so you might want to look at a platform for them.

**Elena Ufimtseva**

I am a Hayward resident and the Hayward shoreline is one of my favorite places to come for a run with my dogs, let them swim and have a good time.

I think the climate change of the shoreline adaptation is very important, as well as preservation of the recreational access, educational centers , bathrooms.

I would like to see more what will be done to the trail system, water access and water runoff cleaning and filtering.

The Hayward regional shoreline should have a recreational water access that can be organized in a way to prevent the shoreline destruction. The dedicated areas to launch the kayak or a paddle board, let the dogs take a swim will be of a great improvement.

**David Gehr**

I would think the best plan would be to restore and maintain the history of the shoreline. I visit the shoreline 2-3 times a week running and riding from HWy 92 to Marina Park also I regularly visit the Oliver salt flats and Coyote Hills. I'm hoping with whatever plan that is adopted would still allow us the ability to enjoy the trails and spectator views and environment that the shoreline provides.

**Steven Schoenberg**

I am a senior biologist with the U.S. Fish and Wildlife Service's Bay-Delta Office in Sacramento, which has authority over certain activities under our agency's jurisdiction in a service area that includes the location of the Master Plan.

The plan outlines a range of alternatives to preserve multiple beneficial uses in the face of climate change and associated sea level rise. We acknowledge that such planning is necessary. Among these uses

are the need to preserve, enhance, and/or restore habitat for fish and wildlife, including both listed species as well as other wildlife species of regional significance. The listed species in the planning area include Ridgway's rail, the salt marsh harvest mouse, California least tern, and western snowy plover. Concerns for these species and others include, but are not limited to, protecting habitat in the face of sea level rise, minimizing effects of any future construction and associated land use changes that result from elements of the plan alternatives, and ensuring the long term survival and recovery of populations.

The Service's involvement will arise when there is a federal nexus where federal funds or permits are issued to implement elements identified in the Plan. This occurs under the authorities of the Fish and Wildlife Coordination Act (FWCA) and Endangered Species Act (ESA). Under FWCA, this can include our participation in early planning when a lead Federal agency (e.g., Corps of Engineers) has identified and expressed an interest in developing a Federal project that includes elements in the Plan. We would also coordinate with other State, Federal, and local interests, and internally, to provide more specific recommendations regarding alternative preference, and project-specific conservation measures. Under Section 7 of the ESA, we review proposed actions for the effect on listed species during the consultation process, and provide as appropriate authorization for take, terms and conditions, and guidance on conservation measures you propose. Because our involvement under FWCA and ESA has not yet been initiated, it would be premature to comment on specifics at this time.

**Anne Cawood**

I would like to see as much of the wildlife habitat be restored to protect the shoreline and increased plantings for native plants for birds, bees and butterflies to protect the shoreline. I walk the shoreline area every week.

**Joseph DiDonato**

Tough decisions. What I would base my design on is what we cannot afford to lose. To that extent, I would prioritize the SMHM preserve and the eastern half of Oro Loma Marsh. On the latter I suggest either a protective barrier at the utility corridor or a significant amount of soil built up in the eastern half (if it will be subject to tidal inundation). The import of soil and the design of upland refugia within the SMHM preserve is also an alternative if that area is not behind a seawall. Mice will swim and climb vegetation during inundation so some vegetation that will remain above the MHHW could be planted in the mouse preserve. Salt ponds somewhere will be critical for plovers but that be achieved south of hwy 92.

The plan must be flexible and not stagnant and include possible options not currently available. Reclamation of the landfills and Frank's tract could do wonders for the overall complex and should be included as an option "if those areas become available in the future". I think the permit hurdles are initially challenging most agencies will see the benefits of a long range self-mitigating plan. The stakeholder group should include the Fed and State wildlife agencies, BCDC, the county agencies and utility companies, similar to what we formed under the Seasonal wetland Enhancement Committee of which I was the chair when we developed the plan for restoration of Oro Loma Marsh. If they are at the table initially, it'll make the permit process much easier.

**Pravin Balram**

I have lived in Hayward since the seventies and very much enjoy biking and walking its parks and trails.

I suggest as part of plan we create a pedestrian only waterfront promenade strictly for pedestrians and cyclists with a complement of park benches, etc and a public parking area on both the southern entrance at the Hayward Interpretive Center and northern entrance in San leandro.

We could charge a nominal fee for parking, and use the funds generated for the maintenance of the promenade, in addition keep strict operation hours from sunrise to sunset to discourage overnight parking and criminal activity.

I prefer design alternative 1, closer to the bay. (lets meet it head on now!!)

I do agree that this will create more of a burden to control the muted tides in the existing marsh land but with some science and technology we can create a series of automated locks that continuously monitor the Bays tidal ebb and flow and thus keep things from stagnating in any one area.

That said global sea level rise is a foregone conclusion and this be one of many losing battles with the forces of mother nature.

**Wade Winblad**

Most cities are located near a shore.

In Hayward, our shore is enjoyed by junk yards, stinking mud flats, and a very few hiker's that have the time to go out there.

We should have development just like San Leandro marina.
It's time to stop wasting our land.
A marina, restaurants, park space.

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July 7, 2020

Reply to: jewellspalding@mac.com

Hayward Area Shoreline Planning Agency
Board of Trustees
City of Hayward: Council Member Al Mendall
East Bay Regional Park District: Dennis Waespi
Hayward Area Recreation and Park District: Minane Jameson

Re: Comments on HASPA Shoreline Adaptation Master Plan

Dear Hon. Members of the Hayward Area Shoreline Planning Agency:

This is on behalf of the Sierra Club in response to the request for comments on the Hayward Shoreline Adaptation Master Plan dated June 4, 2020. These comments are preliminary and based on our limited time to review these different proposals. We of course reserve our entitlement to modify these comments or supplement them as we are able to further study these proposals and/or as additional information is disclosed.

Climate change adaptation is going to be an ecologically important challenge for at least the coming century. The Master Plan notes that one project goal is to "create a resilient shoreline for people and ecology." A second goal is to "reduce risk to critical infrastructure and built assets. While we hope that both of these goals can be achieved, our main focus is to maximize protection of the valuable ecological resources and threatened/endangered species that depend on the shoreline of the Bay

In the Master Plan draft, each of the three response categories offers certain strategies that will assist with the stated ecology goal. For example, all seven of the "Nature Based Strategies" can potentially help protect species that live along the Bay shoreline and the Sierra Club heartily endorses these.

Moving to the second general category "Engineered Strategies," from our perspective vertical seawalls, standard levees and revetments all entail serious ecological threats. These structures are totally inappropriate for Hayward since there is a lot of precious marshland along the Bay. Many many plant and animal species, including some threatened and endangered species, would be damaged by the vertical concrete or piled up seawalls. These types of structures undermine tidal marshes and the species that depend on these. They also present structural erosion problems, "scour" in front of the sea wall, . especially in major storms.

The Master Plan draft does have one "engineered strategy" that appears to be promising: the ecotone levee. This "horizontal levee" works to achieve "a gradual blending between communities across a broad area" (www.ec010gical.wordpress.com/2014 ). These long, gradually sloping(1:30 slope rather than 1:1 slope), partly underwater levees mimic the natural topography of the shoreline and are consistent with habitat restoration. The ecotone levee supposedly will help avoid loss of the rare wetland habitat and the species that depend on that habitat along the Hayward shoreline. Ecotone levees **are** still experimental. The city of Palo Alto and the Oro Loma Sanitary District have shown some success with them. The Oro Loma Horizontal Levee Project, just north of Hayward, provides a good model for the Hayward Water Treatment facility, since Oro Loma is currently testing the abilities of various mixes of native plants and sediments "to

treat wastewater flowing through the levee from the holding basin" (https://oroloma.org/wp-content/uploads/STB-Oro-Loma-Report_11.13.17.pdf )

Turning to the third general category, "Non-Structural Strategies," in our view,"managed retreat" will eventually need to be a central part of Hayward's overall shoreline adaptation plan. Starting perhaps 25-30 years from now, certain "built assets and infrastructure" will need to be rebuilt elsewhere as sea level rises by two feet, four feet, then possibly seven feet. While managed retreat is not something we argue for in the near term, we foresee that it will become the primary strategy in the longer term, given groundwater emergence and storm surge levels.

Finally, the different alternatives discuss that mitigation measures may be necessary depending upon the proposed strategy. Any mitigation measures must be viewed in the totality of the circumstances concerning sea level rise that we will experience. By way of example, one mitigation that is discussed is mitigation for loss of salt marsh harvest mouse habitat. Yet, there is no discussion of where and how such habitat could found or created as a mitigation site in the context that the Bay will experience a rise in sea levels that will eliminate existing salt marsh harvest habitat. Consequently, proposed mitigation measures should be analyzed as to their practicality given the overall rise in the Bay's water level.

The above paragraphs delineate our view of the Shoreline Master Plan draft three general categories of response. Overall, we emphasize the importance of preserving animal/plant marshland habitat on the shoreline; the ecotone levee is clearly the best plan to achieve this objective. We have two questions that we would like to see more fully addressed in coming Master Plan drafts. These are discussed below.

Question 1: Slide #12 of the Master Plan presents maps showing three "Design Alternatives" for placement of levees: "Closer to the Bay," "Down the Middle," and "Further Inland," Would these (very linear looking) boundaries allow for an ecotone levee approach? What are the climate change/sea level rise conditions in which each of these boundary alternatives would be adopted? Or would each of the three boundaries be implemented over time, as sea levels rise? (Or will HASPA take the best available science and try to settle on just one of these three boundaries as the right one to use long term?)

Question 2: What specific plan will be made for Sulphur Creek, which has an outlet in the middle of the shoreline area . What specifically will be done to restore Sulphur Creek to its pre-industrial form?

Thank you for your attention to our position on the Hayward Shoreline Master Plan draft, and to our questions concerning certain aspects of the Plan. We look forward to further development of the Plan to maximize its shoreline habitat conservation and restoration commitments. Please make sure to provide us notice on the further developments of this Plan which can be directed to our Chapter Director Minda Berbeco at the address below.

Sincerely,
*/s/Jewell Spalding*
Southern Alameda County Group,
San Francisco Bay Chapter
Sierra Club

CC: Minda Berbeco, Chapter Director, minda.berbeco@sierraclub.org
Damon Golubics, HASPA staff contact, damon.golubics@hayward-ca.gov

SAVE THE BAY

July 9, 2020

Hayward Area Shoreline Planning Agency
777 B Street
Hayward, CA 94541

Attn: Damon Golubics, Senior Planner

Dear HASPA Members:

We appreciate the opportunity to comment on the Hayward Regional Shoreline Master Plan alternatives. The Master Plan presents detailed alternatives and impressive analysis of pros and cons, providing a strong basis for decision making by the Agency, the City of Hayward, East Bay Regional Park District, and Hayward Area Recreation and Park District.

We provide the following comments on the alternatives analysis, understanding that the Agency's intention is to develop a hybrid preferred alternative:

Given the challenge and costs of making the changes to infrastructure that will be required, the development of a final alternative must recognize the reality of significant sea level rise through the middle of this century and beyond. Regrettably, the most prudent approach is for the Agency to adopt the higher sea level rise projections in current California state guidance, and should expect that those projections will continue to be revised upward.

Using higher sea level rise projections, to achieve maximum benefit to natural resources of the Bay and shoreline habitats, and maximum protection for infrastructure within and adjacent to the Hayward Area Shoreline, Alternative 3 must be the basis of the final plan. As the Master Plan notes, Alternative 3:

> will maximize ecological restoration along the shoreline and layer risk reduction infrastructure. This alternative prioritizes a larger extent of connected tidal habitat that is Bayward of the line of protection and incorporates ecological and risk reduction infrastructure along a wider extent of Baylands.

This alternative allows for creating of the largest expanse of tidal marsh habitat, and also presents the greatest opportunities for marsh migration and adaptive management to rising sea level. This alternative is also the safest way to plan for greater sea level rise without having to abandon or significantly revise this shoreline plan before it is fully implemented.


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SCAPE

We acknowledge that this alternative creates more costs for protecting and adapting existing infrastructure, or relocating infrastructure inland of the Line of Protection. Relocation of water treatment plants and reconfiguring CA-92 onto a causeway will be particularly costly. This alternative also identifies that some current public access, trails and existing habitat would be inundated by sea level rise and rising groundwater tables.

As this ambitious project advances, the City of Hayward and its partners must take into consideration the impacts all alternatives will have on communities of concern and to strive for equity of benefits. The inclusion of diverse voices in stakeholder processes will be crucial as this project moves forward, and best practices in this area suggest that funding be allocated for environmental justice advocates to be part of the process. There are additional best practices being identified in the many regional conversations taking place about how the Bay Area can plan and invest for more equitable climate adaptation and access to nature, including at the Bay Area Restoration Authority and the San Francisco Bay Joint Venture, as well as in BCDC's Bay Adapt and MTC's Plan Bay Area 2050 processes.

We urge those involved in this project to consider the emerging regional consensus that climate adaptation must be ecologically sound and equitable and make the Hayward Shoreline Master Plan process an example to hold up to others across the region.

David Lewis
Executive Director

**Mission Peak Conservancy Letter of Comment**

Comment on the Hayward Area Shoreline Planning Agency (HASPA) draft Master Plan:

Mission Peak Conservancy appreciates the opportunity to comment on the draft Master Plan for the Hayward Shoreline. The Shoreline Planning Agency (HASPA) and its partners, the Hayward Area Recreation District, the East Bay Regional Park District and the city of Hayward have brought in nationally-recognized technical experts to work with local groups, to address the interconnected challenges of sea-level rise. We are impressed by the scope and ambition of the technical solutions under consideration. When the planning process is completed, we expect that its methodology, stakeholder engagement, and technical solutions will be models for other regions to follow.

The planning area covers more than three square miles, fronting four miles of shoreline along San Francisco Bay. This encompasses environmentally-sensitive wetlands and salt ponds, recreational trails, critical infrastructure for energy generation and water treatment, and commercial, industrial and residential properties.

Mission Peak Conservancy focuses on protecting and expanding park access, multi-purpose trails, and linear parks. We recognize that the challenge of flooding and sea-level rise cuts across all elements of water-related uses. We see recreational access as essential for public health. We are also concerned with the disparate impact of sea-level rise, since it impacts vulnerable communities near the shore, and this could exacerbate social inequities. We recognize that the freshwater aquifers along the shore will face an existential threat, one that possibly cannot be mitigated. At the least, the threat to aquifers needs to be assessed and defined.

Given the regional scope of the Master Plan, implementation will require contributions from a wide range of funding sources. We see the biggest challenge as coordinating the government agencies, nonprofits organizations and private landowners. While each of the options under consideration carries a substantial price tag, approaching one billion dollars, sea-level rise appears inexorable within the next 50 to 100 years (four feet of rise). Thus, inaction would prove even more costly in the long run.

We would like to see better working relationships among the political jurisdictions and special-purpose agencies that have interests in this project. Given the political divisions, collaboration will not happen naturally. A balkanized set of conflicting responses, that only draws lines in the sand to stop the rising sea, will not bring about meaningful adaptation. Specifically, we would encourage HASPA to open discussions with the city of San Leandro and regional planning agencies such as Sea Change San Mateo County, the city of Union City, and the Don Edwards San Francisco Bay National Wildlife Refuge.

Because of our focus on trails, park access and non-motorized transportation, we appreciate the plan's commitment to protect trails where possible, and relocate them where necessary. The preservation or reconfiguration of the Bay Trail for public access and recreation should remain a top priority.

Traditionally, land use policies and environmental requirements have proscribed managed retreat, in favor of hard physical barriers instead. Given the high cost of armoring hundreds of miles of shoreline around San Francisco Bay, hard barriers will be limited to only the most critical facilities. Adaptation, managed retreat (reconfiguration) and resilience will be required for most localities, because permanent fixes are not possible. Construction of upstream facilities (e.g., dams and stream-bed alterations) that restrict the natural flow of sediment into the Bay will have to be regulated more strictly, and consideration should be given to reversing or deconstructing those facilities.

To conclude, we applaud the planning process that is now underway. We would encourage building better political links with neighboring agencies and regional planning organizations. Of necessity, adaptation must address cultural, educational, interpretive, political, legal, and social dimensions. The legal framework now in place, that protects property owners, water rights and environmental assets in their current configurations, needs to be reevaluated and reinterpreted from the perspective of resilience.

Sincerely,

Kelly Abreu

Mission Peak Conservancy

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# HAYWARD REGIONAL SHORELINE ADAPTATION MASTER PLAN

## FOR THE HAYWARD AREA SHORELINE PLANNING AGENCY (HASPA)

PART OF A JOINT POWERS AGREEMENT OF THE CITY OF HAYWARD, HAYWARD AREA RECREATION AND PARK DISTRICT, AND EAST BAY REGIONAL PARK DISTRICT

HAYWARD REGIONAL SHORELINE MASTER PLAN

# APPENDIX B
# COST ESTIMATE

SUBMITTED 10/02/2020

# DESIGN ALTERNATIVES COST ESTIMATE

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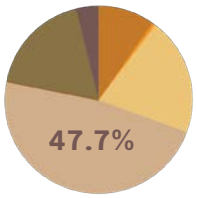
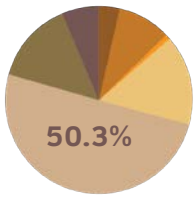
## SUMMARY



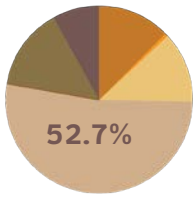

### #1: CLOSER TO THE BAY

| COST ITEM | | |
|---|---|---|
| Bay Trail | $956,741 | 0.2% |
| Erosion Protection | $42,376,154 | 9.6% |
| Interpretive Center | $3,180,000 | 0.7% |
| Line of Protection | $88,326,679 | 20.0% |
| Stormwater Management | $210,144,572 | 47.7% |
| Tidal Habitat | $79,033,609 | 17.9% |
| Wastewater Treatment | $16,922,500 | 3.8% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$440,940,300** | |




### #2: DOWN THE MIDDLE

| COST ITEM | | |
|---|---|---|
| Bay Trail | $20,957,444 | 3.7% |
| Erosion Protection | $51,297,654 | 9.1% |
| Interpretive Center | $4,750,000 | 0.8% |
| Line of Protection | $87,920,512 | 15.6% |
| Stormwater Management | $283,302,319 | 50.3% |
| Tidal Habitat | $79,415,646 | 14.1% |
| Wastewater Treatment | $35,031,500 | 6.2% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$562,675,100** | |




### #3: FURTHER INLAND

| COST ITEM | | |
|---|---|---|
| Bay Trail | $635,927 | 0.1% |
| Erosion Protection | $73,628,457 | 12.4% |
| Interpretive Center | $5,000,000 | 0.8% |
| Line of Protection | $71,731,813 | 12.0% |
| Stormwater Management | $314,120,048 | 52.7% |
| Tidal Habitat | $83,379,637 | 14.0% |
| Wastewater Treatment | $47,654,000 | 8.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$596,149,900** | |

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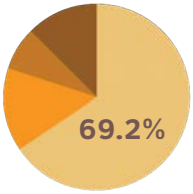
# DESIGN ALTERNATIVES COST ESTIMATE

## LINE OF PROTECTION

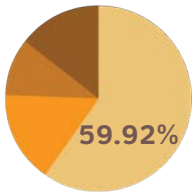
Flood Protection Levee, Ecotone Levee, Levee Raising (outboard of the LOP), Levee Raising (inland of the LOP)

### #1: CLOSER TO THE BAY



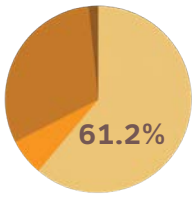

| COST ITEM | | |
|---|---|---|
| Flood Protection Levee | $57,917,632 | 69.2% |
| Ecotone Levee | $12,721,792 | 15.2% |
| Levee raising (outboard of LOP) | $6,779,376 | 8.1% |
| Levee raising (inland of LOP) | $10,880,480 | 13.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$83,696,000** | |

### #2: DOWN THE MIDDLE




| COST ITEM | | |
|---|---|---|
| Flood Protection Levee | $52,684,800 | 59.92% |
| Ecotone Levee | $13,815,980 | 15.71% |
| Levee raising (outboard of LOP) | $8,920,800 | 10.15% |
| Levee raising (inland of LOP) | $12,498,932 | 14.22% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$87,920,512** | |

### #3: FURTHER INLAND



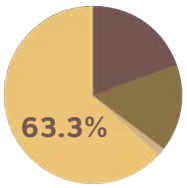

| COST ITEM | | |
|---|---|---|
| Flood Protection Levee | $43,864,800 | 61.2% |
| Ecotone Levee | $4,521,620 | 6.3% |
| Levee raising (outboard of LOP) | $22,188,600 | 30.9% |
| Levee raising (inland of LOP) | $1,156,793 | 1.6% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$71,731,813** | |

# DESIGN ALTERNATIVES COST ESTIMATE

## TIDAL HABITAT

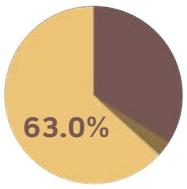
Tidal Marsh, Muted Tidal Marsh, New Muted Marsh Tide Gate, Sediment Augmentation

### #1: CLOSER TO THE BAY



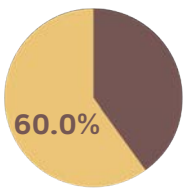

| COST ITEM | | |
|---|---|---|
| Tidal Marsh | $15,490,587 | 19.6% |
| Muted Tidal Marsh | $12,408,276 | 15.7% |
| New Muted Tidal Marsh Gate | $1,106,470 | 1.4% |
| Sediment Augmentation | $50,028,274 | 63.3% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$79,033,609** | |

### #2: DOWN THE MIDDLE




| COST ITEM | | |
|---|---|---|
| Tidal Marsh | $27,041,642 | 34.1% |
| Muted Tidal Marsh | $2,101,504 | 2.6% |
| New Muted Tidal Marsh Gate | $272,500 | 0.3% |
| Sediment Augmentation | $50,000,000 | 63.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$79,415,646** | |

### #3: FURTHER INLAND

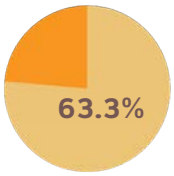



| COST ITEM | | |
|---|---|---|
| Tidal Marsh | $33,379,637 | 40.0% |
| Muted Tidal Marsh | $- | - |
| New Muted Tidal Marsh Gate | $- | - |
| Sediment Augmentation | $50,000,000 | 60.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$83,379,637** | |

# DESIGN ALTERNATIVES COST ESTIMATE

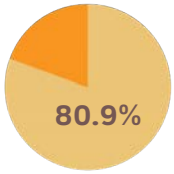
## EROSION PROTECTION

Erosion Control, Gravel Beach w/ headlands



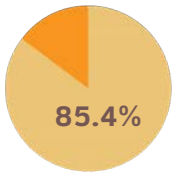

### #1: CLOSER TO THE BAY

| COST ITEM | | |
|---|---|---|
| Erosion Control | $32,480,000 | 63.3% |
| Gravel Beach with headlands | $9,896,154 | 19.3% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$42,376,154** | |




### #2: DOWN THE MIDDLE

| COST ITEM | | |
|---|---|---|
| Erosion Control | $41,401,500 | 80.9% |
| Gravel Beach with headlands | $9,896,154 | 19.3% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$51,297,654** | |




### #3: FURTHER INLAND

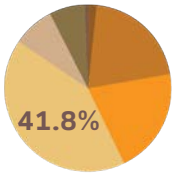
| COST ITEM | | |
|---|---|---|
| Erosion Control | $62,849,500 | 85.4% |
| Gravel Beach with headlands | $10,778,957 | 14.6% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$73,628,457** | |

# DESIGN ALTERNATIVES COST ESTIMATE

## STORMWATER MANAGEMENT

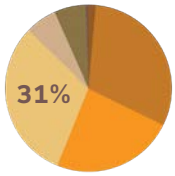
New Tide Gate, PS Bockman Channel, PS Sulfur Creek, PS Line A, PS Line F,
Salt Pond/Stormwater Retention, Groundwater Management

### #1: CLOSER TO THE BAY



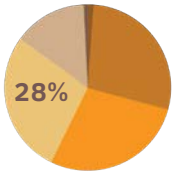

| COST ITEM | | |
|---|---|---|
| New Tide Gates | $3,945,800 | 1.9% |
| PS Bockman Channel | $43,147,778 | 20.5% |
| PS Sulfur Creek | $43,147,778 | 20.5% |
| PS Line A | $87,943,591 | 41.8% |
| PS Line F | $16,294,866 | 7.8% |
| Salt Pond/Stormwater Retention | $14,850,760 | 7.1% |
| Groundwater Management | $814,000 | 0.4% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$210,144,572** | |

### #2: DOWN THE MIDDLE




| COST ITEM | | |
|---|---|---|
| New Tide Gates | $3,945,800 | 1.4% |
| PS Bockman Channel | $87,943,591 | 31.0% |
| PS Sulfur Creek | $67,815,955 | 23.9% |
| PS Line A | $87,943,591 | 31.0% |
| PS Line F | $17,163,262 | 6.1% |
| Salt Pond/Stormwater Retention | $17,676,120 | 6.2% |
| Groundwater Management | $814,000 | 0.3% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$283,302,319** | |

### #3: FURTHER INLAND




| COST ITEM | | |
|---|---|---|
| New Tide Gates | $3,945,800 | 1.3% |
| PS Bockman Channel | $87,943,591 | 28.0% |
| PS Sulfur Creek | $87,943,591 | 28.0% |
| PS Line A | $87,943,591 | 28.0% |
| PS Line F | $43,971,795 | 14.0% |
| Salt Pond/Stormwater Retention | $1,557,680 | 0.5% |
| Groundwater Management | $814,000 | 0.3% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$314,120,048** | |

# DESIGN ALTERNATIVES COST ESTIMATE

## WASTEWATER TREATMENT

Freshwater Treatment Marsh, Horizontal Levee

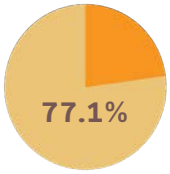
### #1: CLOSER TO THE BAY


| COST ITEM | | |
|---|---|---|
| Freshwater Treatment Marsh | $- | - |
| Horizontal Levee | $16,922,500 | 100.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$16,922,500** | |

### #2: DOWN THE MIDDLE


| COST ITEM | | |
|---|---|---|
| Freshwater Treatment Marsh | $- | - |
| Horizontal Levee | $35,031,500 | 100.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$35,031,500** | |

### #3: FURTHER INLAND




| COST ITEM | | |
|---|---|---|
| Freshwater Treatment Marsh | $10,890,000 | 22.9% |
| Horizontal Levee | $36,764,000 | 77.1% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$47,654,000** | |

# DESIGN ALTERNATIVES COST ESTIMATE

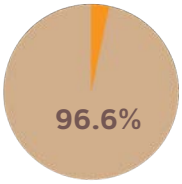
## BAY TRAIL

New Bay Trail (terrestrial surface prep), New Bay Trail (materials), New Bay Trail- bridge on piles

### #1: CLOSER TO THE BAY


| COST ITEM | | |
|---|---|---|
| New Bay Trail (terrestrial surface prep) | $- | - |
| New Bay Trail (terrestrial materials) | $956,741 | 100.0% |
| New Bay Trail- bridge on piles | $- | - |
| **TOTAL (WITHOUT CONTINGENCY)** | **$956,741** | |

### #2: DOWN THE MIDDLE




| COST ITEM | | |
|---|---|---|
| New Bay Trail (terrestrial surface prep) | $713,092 | 3.4% |
| New Bay Trail (terrestrial materials) | $- | - |
| New Bay Trail- bridge on piles | $20,244,352 | 96.6% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$20,957,444** | |

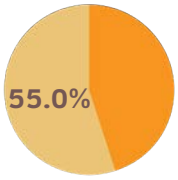
### #3: FURTHER INLAND


| COST ITEM | | |
|---|---|---|
| New Bay Trail (terrestrial surface prep) | $635,927 | 100.0% |
| New Bay Trail (terrestrial materials) | $- | - |
| New Bay Trail- bridge on piles | $- | - |
| **TOTAL (WITHOUT CONTINGENCY)** | **$635,927** | |

# DESIGN ALTERNATIVES COST ESTIMATE

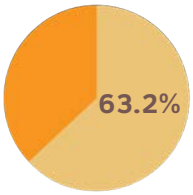
## HAYWARD SHORELINE INTERPRETIVE CENTER

Interpretive Center Alteration 1, Interpretive Center Alteration 2A, Interpretive Center Alteration 2B, Interpretive Center Alteration 3




### #1: CLOSER TO THE BAY

| COST ITEM | | |
|---|---|---|
| Protected in place | $1,430,000 | 45.0% |
| Renovations | $1,750,000 | 55.0% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$3,180,000** | |




### #2: DOWN THE MIDDLE

| COST ITEM | | |
|---|---|---|
| Current center on pilings | $3,000,000 | 63.2% |
| Renovations | $1,750,000 | 36.8% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$4,750,000** | |


### #3: FURTHER INLAND

| COST ITEM | | |
|---|---|---|
| Relocation | $5,000,000 | 100% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$5,000,000** | |

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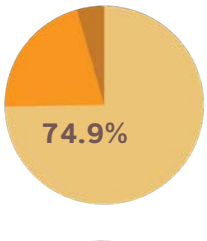
# PREFERRED ALTERNATIVE COST ESTIMATE

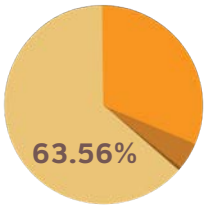
# PREFERRED ALTERNATIVE COST ESTIMATE

## LINE OF PROTECTION



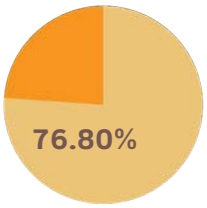

| COST ITEM | | |
|---|---|---|
| Flood Protection Levee | $78,290,800 | 74.9% |
| Ecotone Levee | $21,638,660 | 20.7% |
| Levee Raising (Salt marsh mouse preserve) | $4,627,426 | 4.4% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$104,556,900** | |

## TIDAL HABITAT



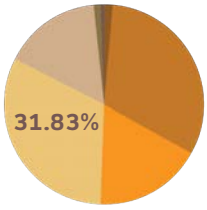

| COST ITEM | | |
|---|---|---|
| Tidal Marsh | $24,831,524 | 31.57% |
| Muted Tidal Marsh | $3,561,344 | 4.53% |
| New Muted Tidal Marsh Gate | $272,500 | 0.35% |
| Sediment Augmentation | $50,000,000 | 63.56% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$78,665,400** | |

## EROSION PROTECTION

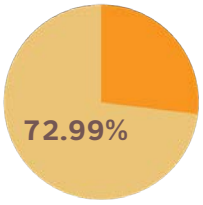



| COST ITEM | | |
|---|---|---|
| Erosion Control | $32,620,000 | 76.80% |
| Gravel Beach with headlands | $10,122,368 | 23.83% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$42,742,400** | |

## STORMWATER MANAGEMENT

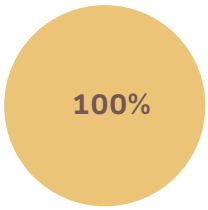



| COST ITEM | | |
|---|---|---|
| New Tide Gates | $3,945,800 | 1.43% |
| PS Bockman Channel | $87,943,591 | 31.83% |
| PS Sulfur Creek | $48,365,439 | 17.51% |
| PS Line A | $87,943,591 | 31.83% |
| PS Line F | $43,971,795 | 15.92% |
| Salt Pond/Stormwater Retention | $3,277,552 | 1.19% |
| Groundwater Management | $814,000 | 0.29% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$276,261,800** | |



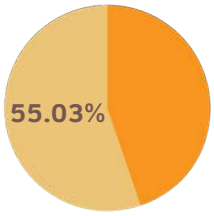

## WASTEWATER TREATMENT

| COST ITEM | | |
|---|---|---|
| Freshwater Treatment Marsh | $10,890,000 | 27.01% |
| Horizontal Levee | $29,424,500 | 72.99% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$40,314,500** | |




## BAY TRAIL

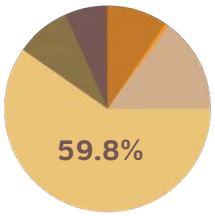
| COST ITEM | | |
|---|---|---|
| New Bay Trail (terrestrial surface prep) | $806,541 | 100% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$806,500** | |




## HAYWARD SHORELINE INTERPRETIVE CENTER

| COST ITEM | | |
|---|---|---|
| Protected in place | $1,430,000 | 44.97% |
| Renovations | $1,750,000 | 55.03% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$3,180,000** | |

# PREFERRED ALTERNATIVE COST ESTIMATE




## COST SUMMARY

| COST ITEM | | |
|---|---|---|
| Bay Trail | $806,541.00 | 0.2% |
| Erosion Protection | $42,742,368.38 | 9.3% |
| Interpretive Center | $3,180,000.00 | 0.7% |
| Line of Protection | $68,743,066.00 | 14.9% |
| Stormwater Management | $276,261,767.42 | 59.8% |
| Tidal Habitat | $40,575,864.33 | 8.8% |
| Wastewater Treatment | $29,424,500.00 | 6.4% |
| **TOTAL (WITHOUT CONTINGENCY)** | **$461,734,100** | |

## TOTAL

| COST ITEM | |
|---|---|
| **SUBTOTAL** | **$547,547,927** |
| DESIGN (10%) | $54,754,793 |
| MOBILIZATION (7%) | $38,328,355 |
| **TOTAL** | **$640,631,075** |
| CONTINGENCY (50%) | $320,315,537 |
| **TOTAL (WITH CONTINGENCY)** | **$960,946,600** |

## ANNUALIZED OPERATIONS & MAINTENANCE

| COST ITEM | LOW END | HIGH END |
|---|---|---|
| Bay Trail | $8,000 | $16,000 |
| Erosion Control | $427,000 | $854,000 |
| Interpretive Center | $64,000 | $96,000 |
| Line of Protection | $637,000 | $1,275,000 |
| Stormwater Management | $5,492,000 | $8,254,000 |
| Tidal Habitat | $299,000 | $596,000 |
| Wastewater Treatment | $806,000 | $1,210,000 |
| **TOTAL** | **$7,733,000** | **$12,301,000** |

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