# Sea Change Burlingame
# Proposed Sea Level Rise Adaptation Strategies
# Update to City Council

December 2nd, 2019

ESA 50 YEARS 1969-2019

Sea Change Burlingame

CLIMATE READY SAN MATEO COUNTY

# Meeting Agenda

- Overview
- Project Process
- Key Findings
- Next Steps

# Strategy Selection Process

# Project Milestones

**June**

- **Task 2,** Stakeholder Outreach Plan
- **Task 3,** Decision Making Framework
- **Task 4**, Risk and Vulnerability Assessment

**July**

- Technical Advisory Committee Meeting – **7/10**
- Stakeholder Meeting – **7/10**

**August**

**October**

- 2nd Technical Advisory Committee Meeting – **10/16**
- Community Meeting (50 people in attendance) – **10/16**
- **Task 5,** Identify and Screen Adaptation Strategies
- **Task 6,** Advance and Illustrate 3 Concepts

**November**

- **Task 7,** Road Map and Next Steps

# Takeaways

1. Burlingame's shoreline is **at risk from SLR**, particularly starting at **100-year/ 1% flood**
2. Burlingame will need to decide what to protect and to what level
3. Adaptation strategies recommended for Burlingame include **raising levees** at low points, **managing creeks** and sediment, and **maintaining flood walls**
4. Next steps include **feasibility and hydrology studies** to develop more fine-tuned understandings of how to **implement solutions**

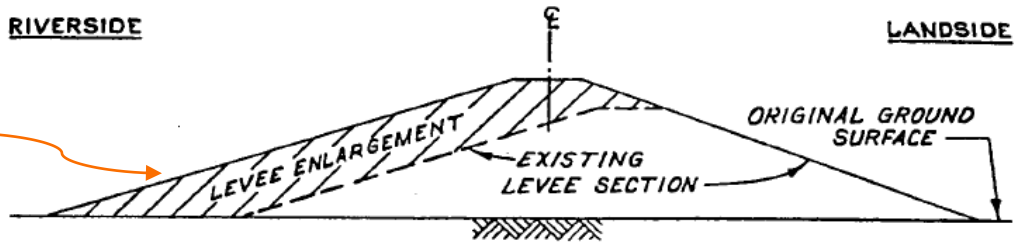
# Vulnerability Assessment Conclusions

- 1% Annual Chance Flood expected to flood:
  - Hwy 101 and adjacent neighborhoods, west of Broadway
  - Areas adjacent to Burlingame Lagoon
- 1% Annual Chance Flood + 3.3' SLR expected to expand flood area to portion of Caltrain tracks
- Bay shoreline and Creek levees are the most likely pathway for flood waters
- Results suggest significant flooding could occur at less than 100-year (1% annual chance) flood event


Source: OCOF

# Raise Levees

Regulatory constraints for wet side fill

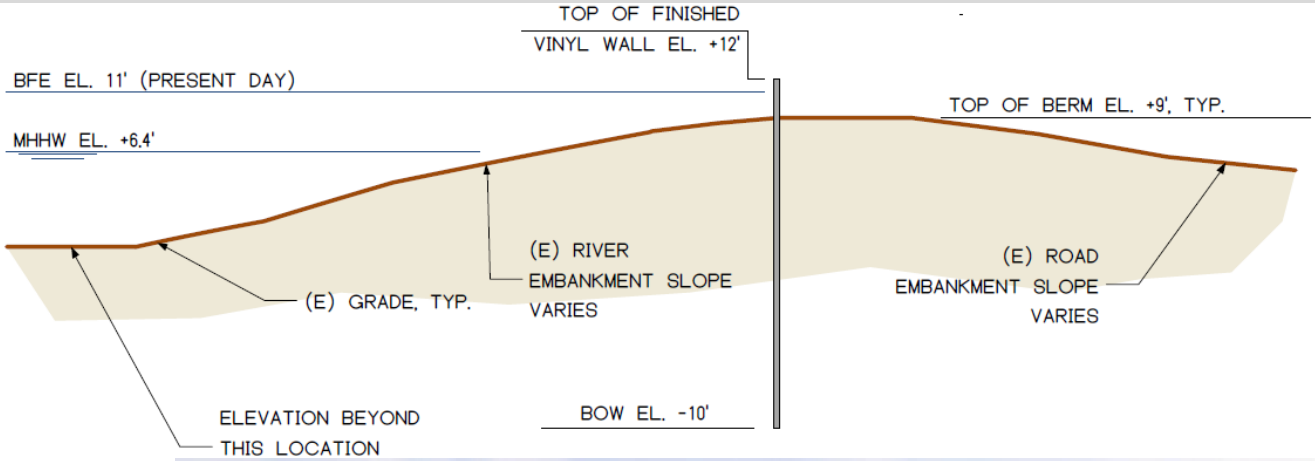



Source: USACE (2000), Rebecca Nelson

# Install Sheet Pile Floodwalls

## Vinyl Sheet Pile Floodwall

*(Max. 3 feet above grade)*



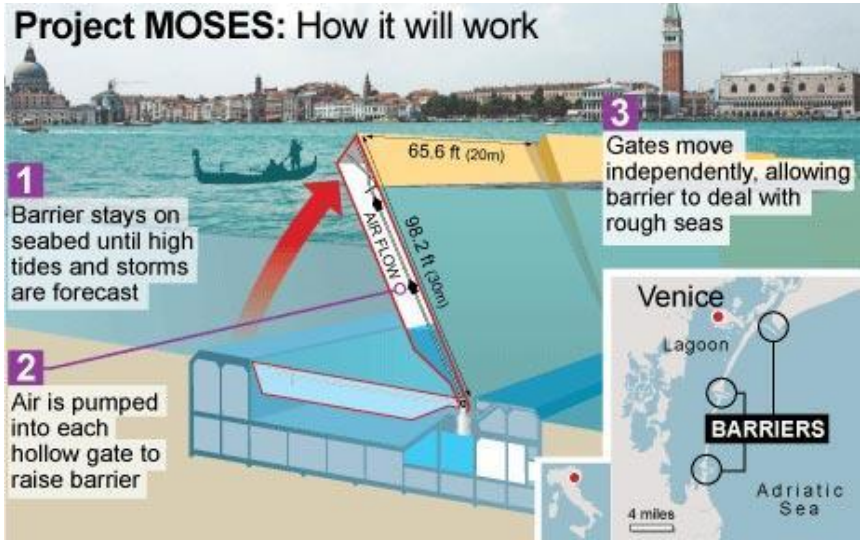

## Steel Sheet Pile Floodwall

*(6+ feet above grade)*

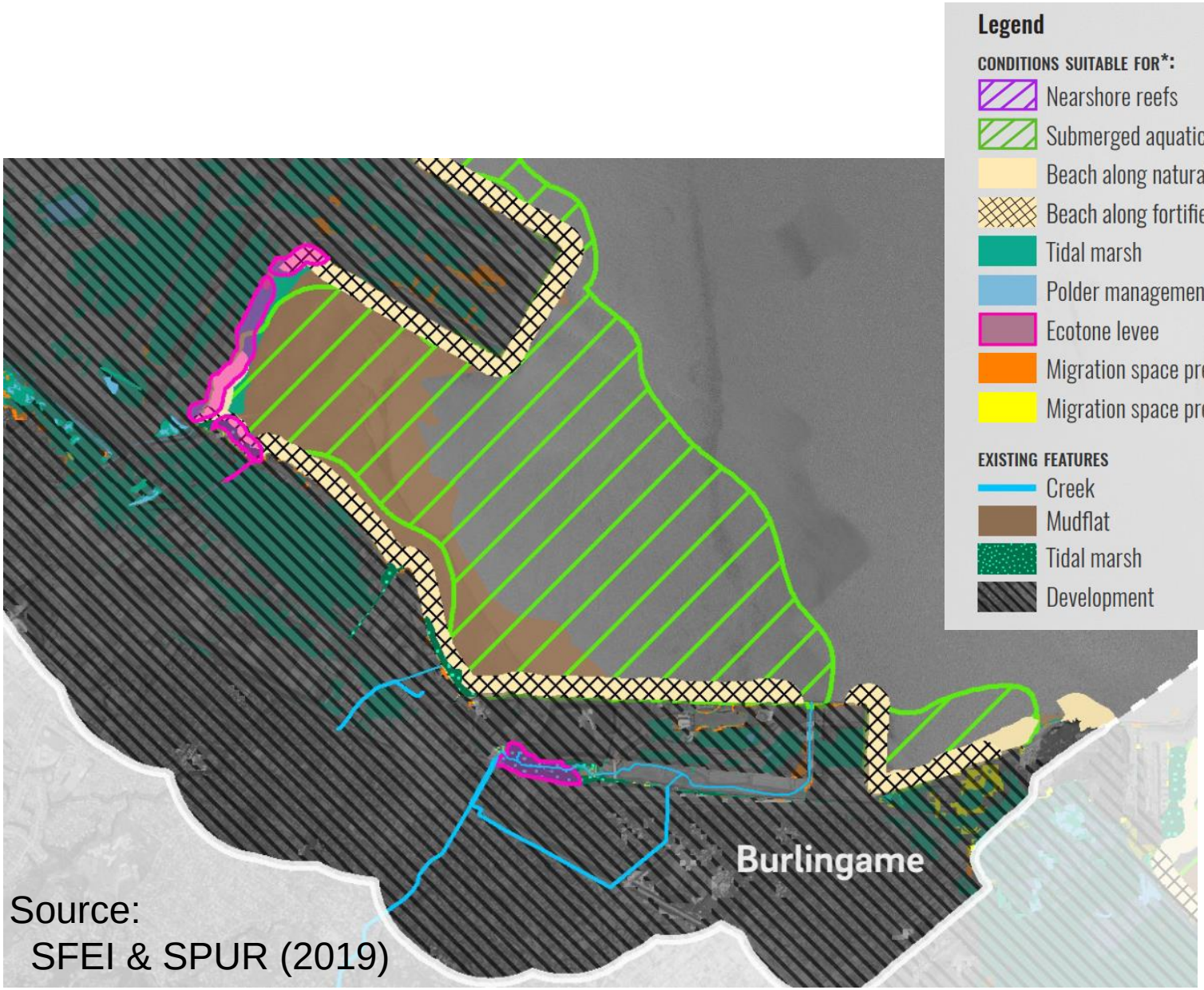
# Tide Gates and Active Barriers

## Palo Alto Flood Basin


## Venice, Italy

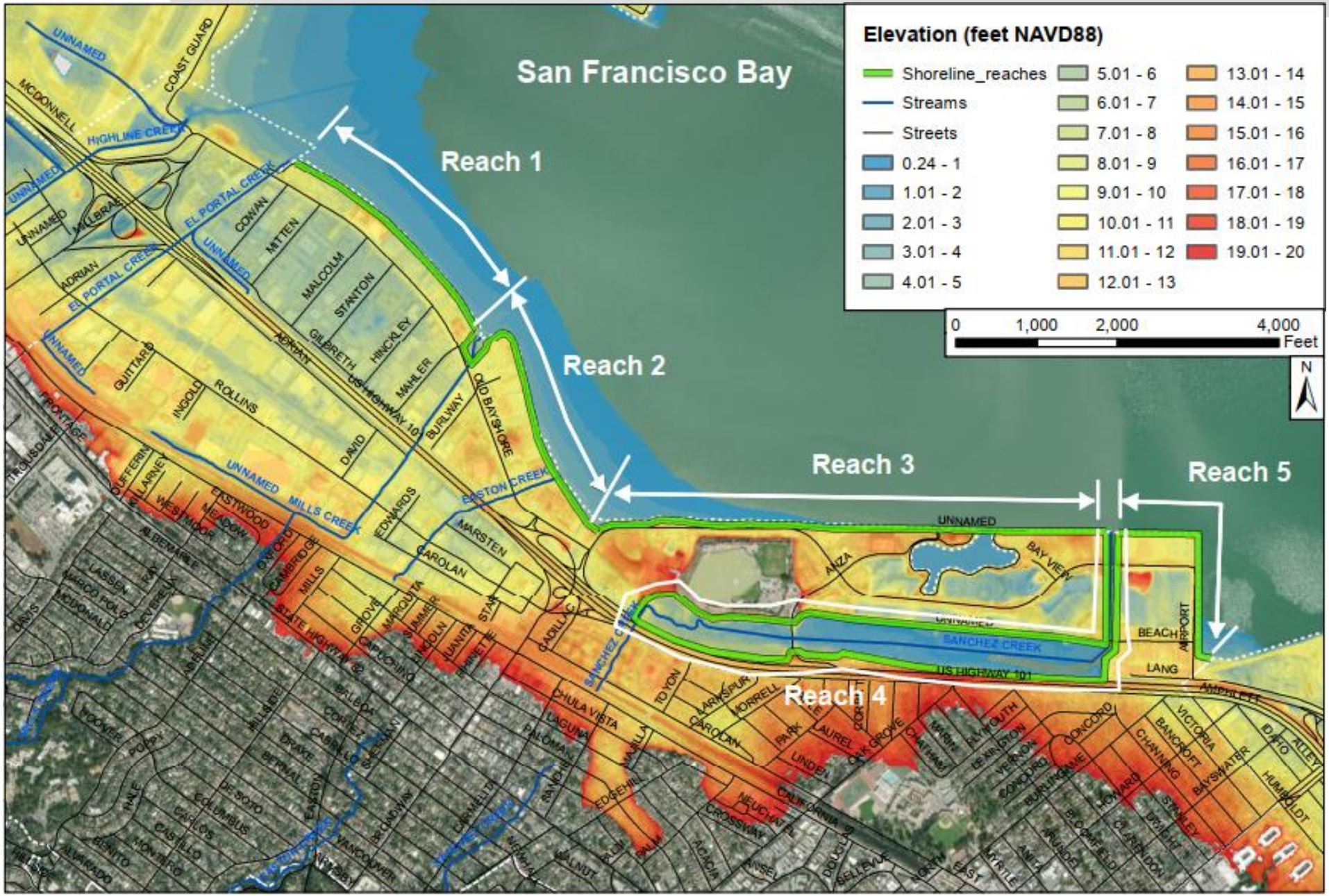


# Nature-based Solutions

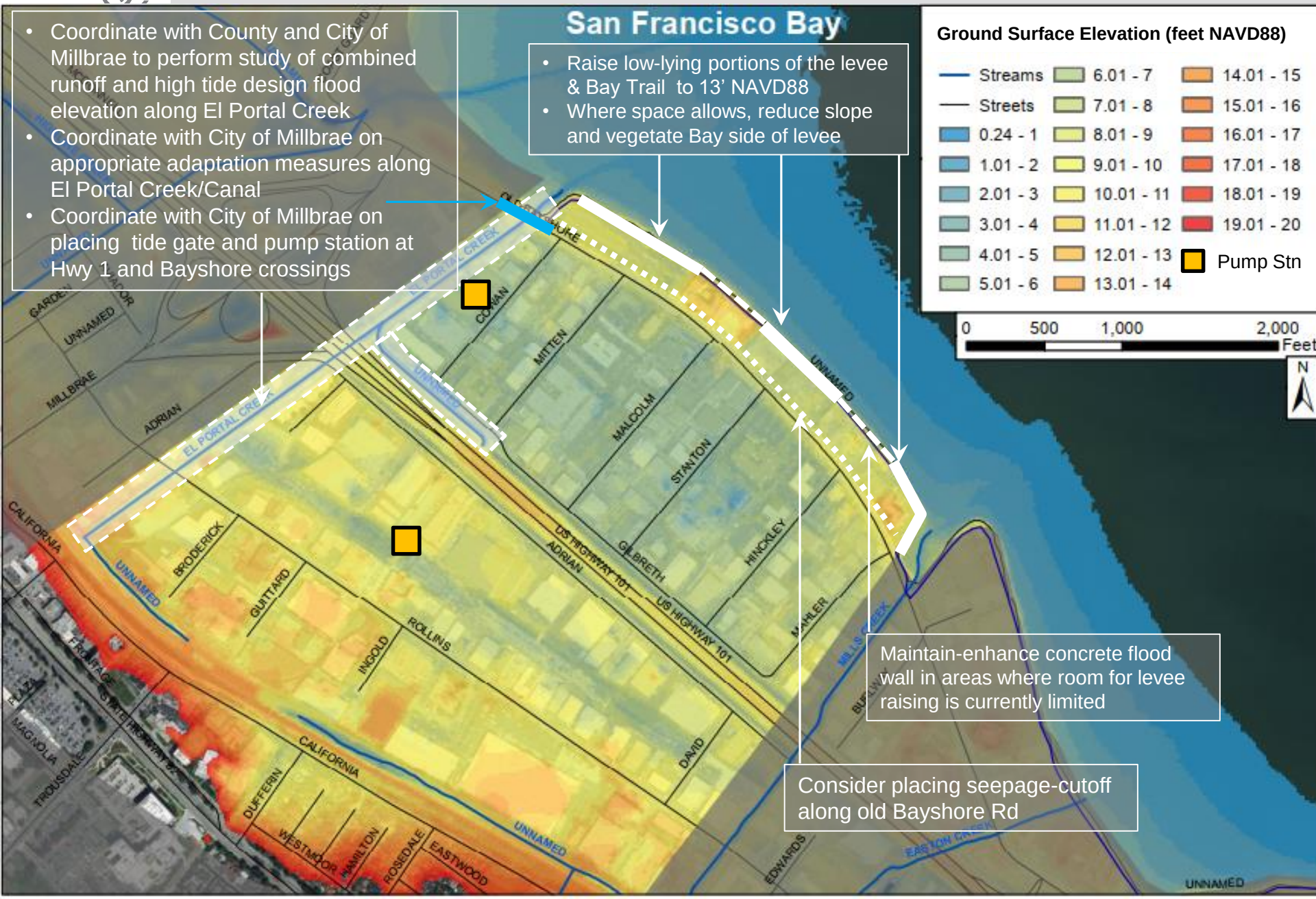



Source:
SFEI & SPUR (2019)

# Burlingame Shoreline Reaches



# Reach 1



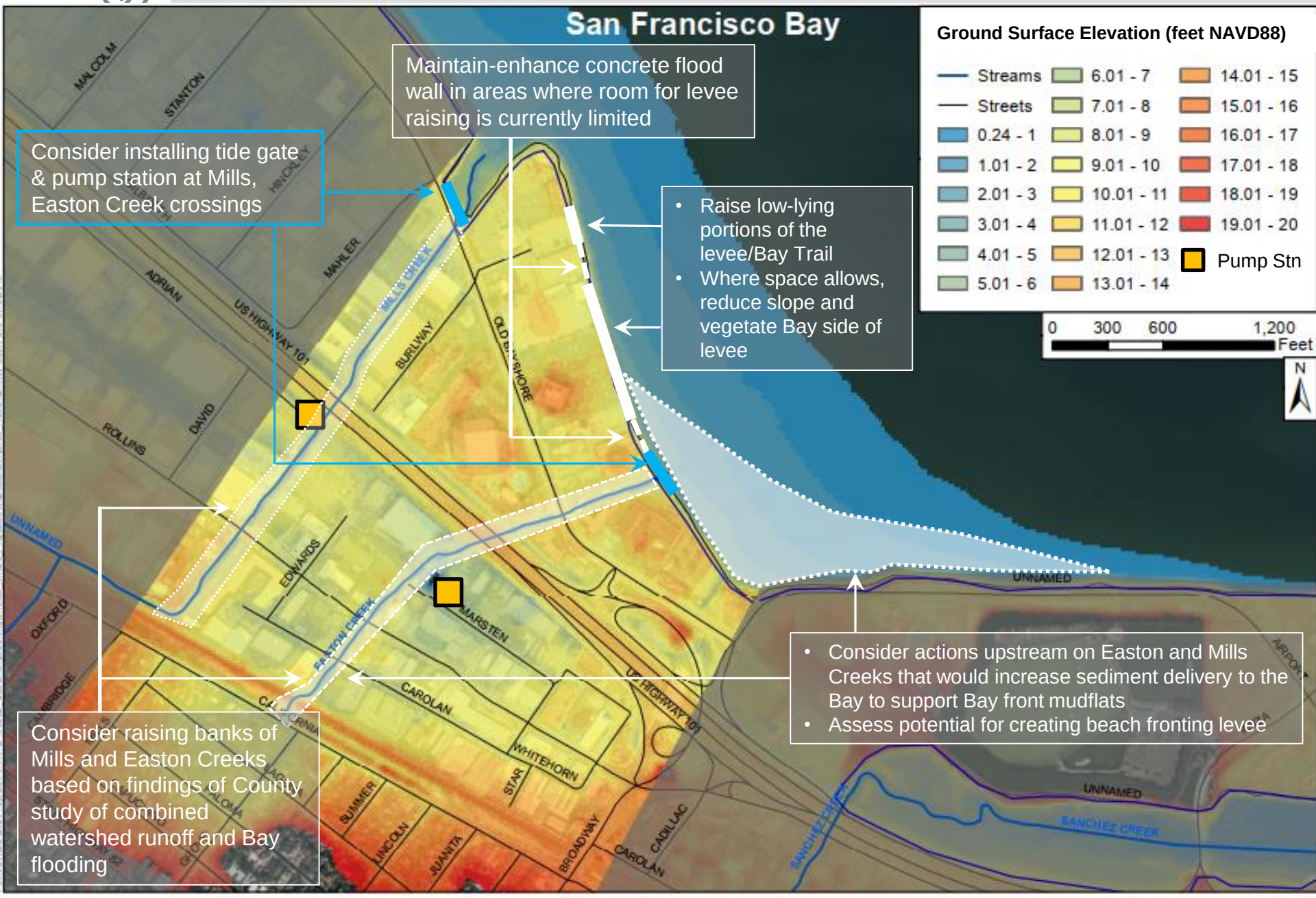

- Coordinate with County and City of Millbrae to perform study of combined runoff and high tide design flood elevation along El Portal Creek
- Coordinate with City of Millbrae on appropriate adaptation measures along El Portal Creek/Canal
- Coordinate with City of Millbrae on placing tide gate and pump station at Hwy 1 and Bayshore crossings

- Raise low-lying portions of the levee & Bay Trail to 13' NAVD88
- Where space allows, reduce slope and vegetate Bay side of levee

Maintain-enhance concrete flood wall in areas where room for levee raising is currently limited

Consider placing seepage-cutoff along old Bayshore Rd

# Reach 2


San Francisco Bay
Maintain-enhance concrete flood wall in areas where room for levee raising is currently limited
Consider installing tide gate & pump station at Mills, Easton Creek crossings
• Raise low-lying portions of the levee/Bay Trail
• Where space allows, reduce slope and vegetate Bay side of levee
• Consider actions upstream on Easton and Mills Creeks that would increase sediment delivery to the Bay to support Bay front mudflats
• Assess potential for creating beach fronting levee
Consider raising banks of Mills and Easton Creeks based on findings of County study of combined watershed runoff and Bay flooding
Ground Surface Elevation (feet NAVD88)
Streams
Streets
0.24 - 1
1.01 - 2
2.01 - 3
3.01 - 4
4.01 - 5
5.01 - 6
6.01 - 7
7.01 - 8
8.01 - 9
9.01 - 10
10.01 - 11
11.01 - 12
12.01 - 13
13.01 - 14
14.01 - 15
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19.01 - 20
Pump Stn
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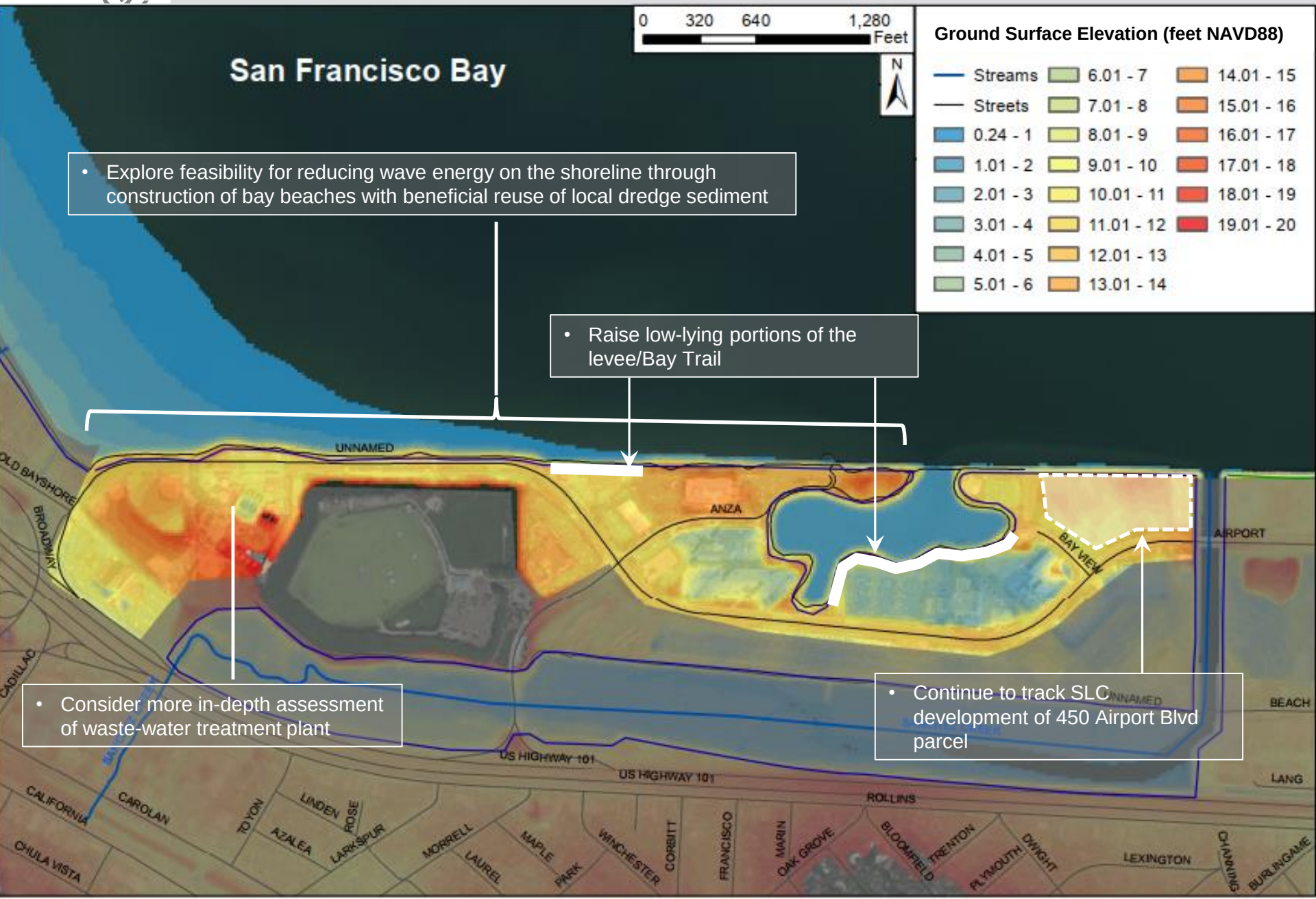
Feet
N
MALCOLM
STANTON
ADRIAN
MAHLER
US HIGHWAY 101
MILLS CREEK
BURLWAY
OLD BAYSHORE
ROLLINS
DAVID
EDNAFDS
EASTON CREEK
MARSTEN
CAROLAN
WHITEHORN
STAR
SUMMER
LINCOLN
JUANITA
BROADWAY
CADILLAC
UNNAMED
OXFORD
SANCHEZ CREEK

# Reach 3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San Francisco Bay
Ground Surface Elevation (feet NAVD88)
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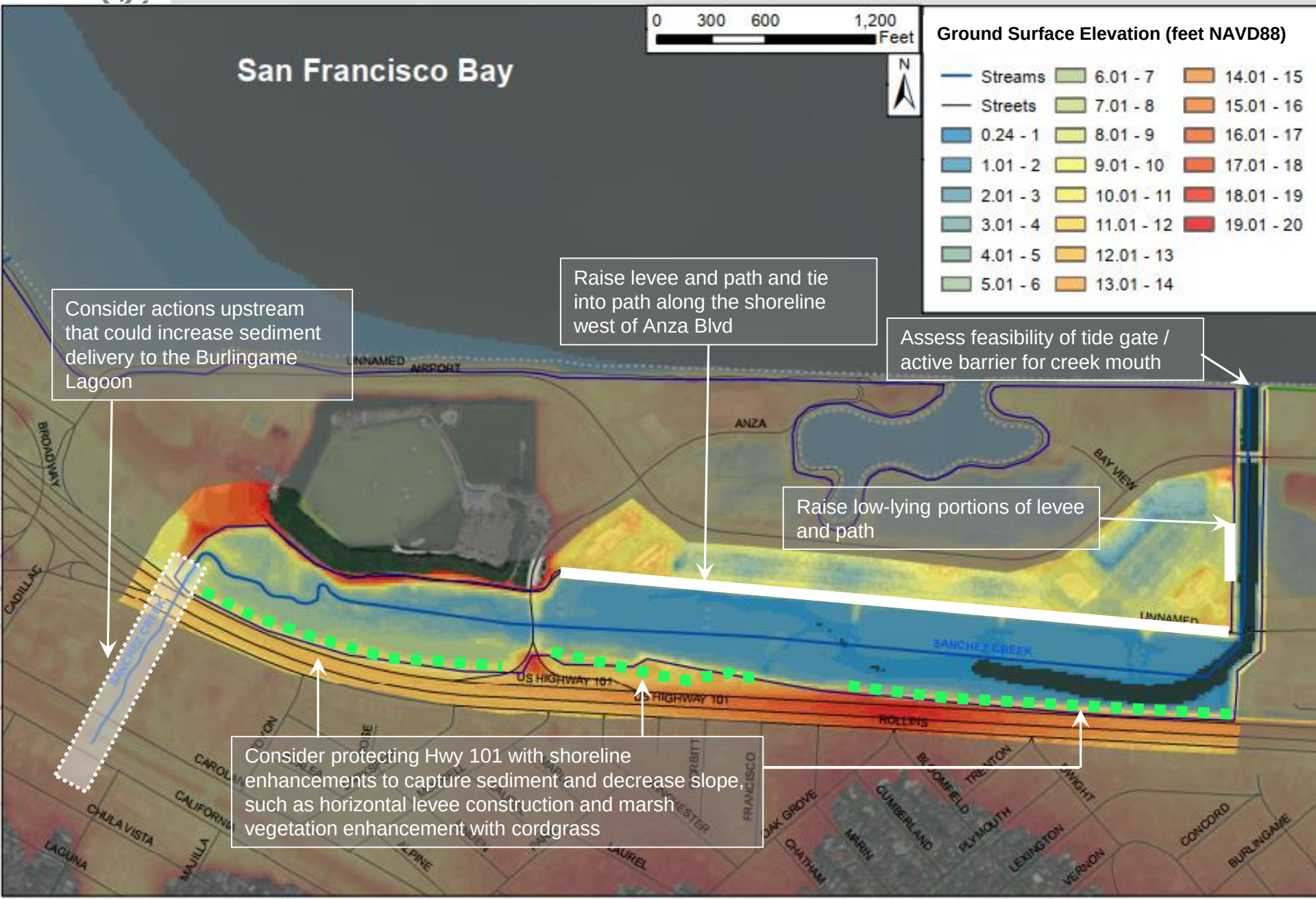
19.01 - 20
• Explore feasibility for reducing wave energy on the shoreline through construction of bay beaches with beneficial reuse of local dredge sediment
• Raise low-lying portions of the levee/Bay Trail
• Consider more in-depth assessment of waste-water treatment plant
• Continue to track SLC development of 450 Airport Blvd parcel
UNNAMED
ANZA
BAY VIEW
AIRPORT
OLD BAYSHORE
BROADWAY
CADILLAC
US HIGHWAY 101
US HIGHWAY 101
ROLLINS
BEACH
LANG
CALIFORNIA
CAROLAN
TOYON
LINDEN
ROSE
AZALEA
LARKSPUR
MORRELL
LAUREL
MAPLE
PARK
WINCHESTER
CORBITT
FRANCISCO
MARIN
OAK GROVE
BLOOMFIELD
TRENTON
PLYMOUTH
DWIGHT
LEXINGTON
CHANNING
BURLINGAME
CHULA VISTA

# Reach 4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San Francisco Bay
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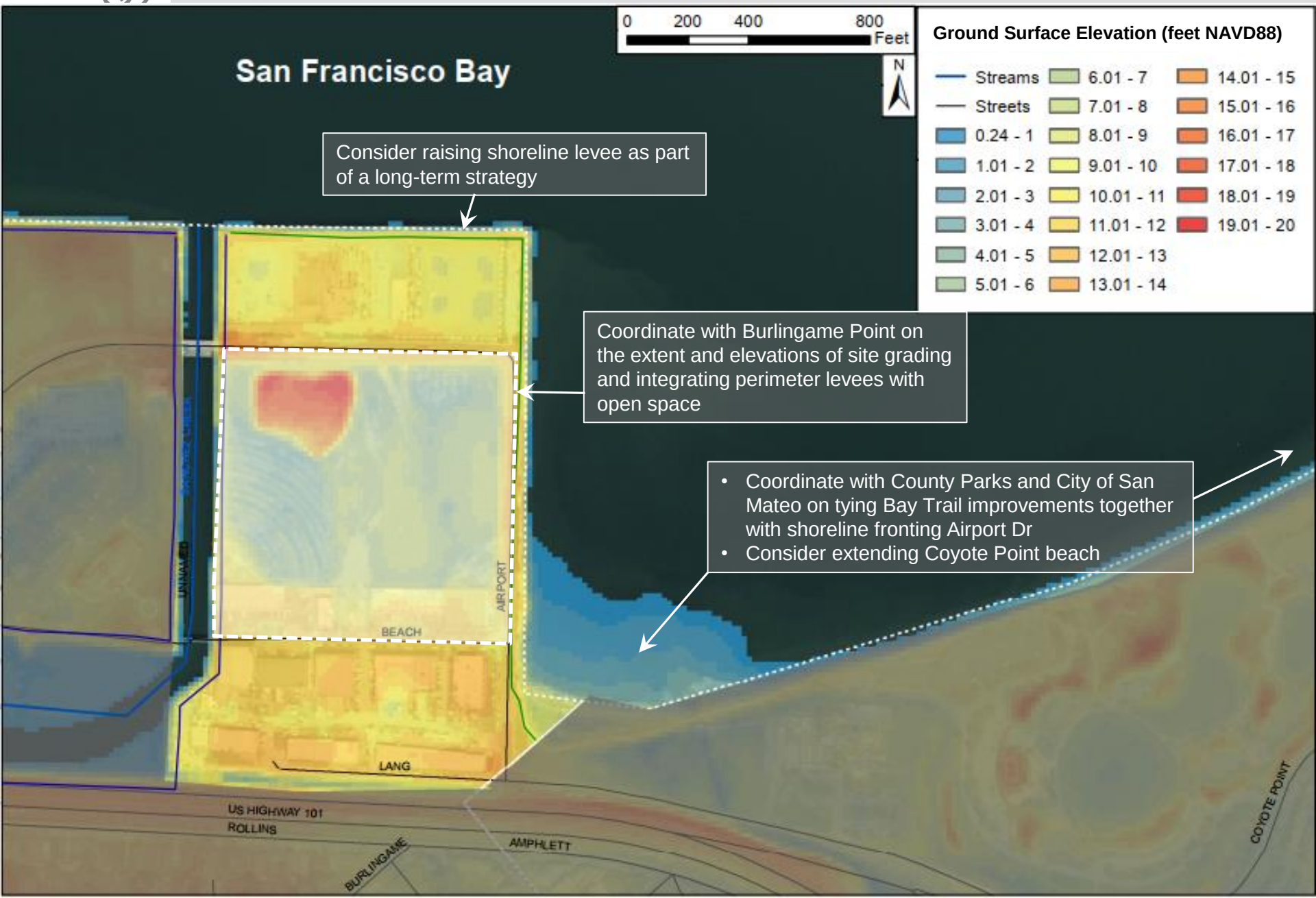
18.01 - 19
19.01 - 20
Consider actions upstream that could increase sediment delivery to the Burlingame Lagoon
Raise levee and path and tie into path along the shoreline west of Anza Blvd
Assess feasibility of tide gate / active barrier for creek mouth
Raise low-lying portions of levee and path
Consider protecting Hwy 101 with shoreline enhancements to capture sediment and decrease slope, such as horizontal levee construction and marsh vegetation enhancement with cordgrass
UNNAMED AIRPORT
ANZA
BAY VIEW
BROADWAY
CADILLAC
SANCHEZ CREEK
US HIGHWAY 101
ROLLINS
CHULA VISTA
LAGUNA
CONCORD
BURLINGAME

# Reach 5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San Francisco Bay
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Streams
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18.01 - 19
19.01 - 20
Consider raising shoreline levee as part of a long-term strategy
Coordinate with Burlingame Point on the extent and elevations of site grading and integrating perimeter levees with open space
• Coordinate with County Parks and City of San Mateo on tying Bay Trail improvements together with shoreline fronting Airport Dr
• Consider extending Coyote Point beach
BEACH
AIRPORT
LANG
US HIGHWAY 101
ROLLINS
BURLINGAME
AMPHLETT
COYOTE POINT

# Summary

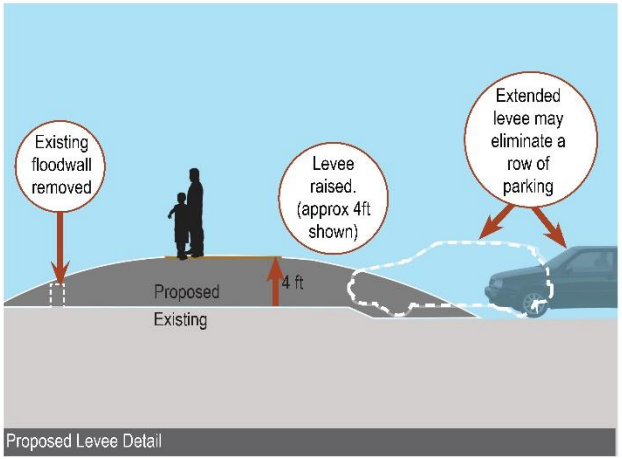
- Raising the shoreline in Reaches 1 and 2 (from Millbrae boundary to Broadway) would have substantial benefits.
- In the short-term, raising the shoreline will likely require a combination of raising or building new levees and improving existing flood walls.
- Aesthetic and recreational impacts of raising the shoreline can be mitigated by integrating the Bay Trail on the improved shoreline.
- Raising the shoreline should be combined with a similar effort raising low-lying portions of the banks of El Portal, Mills, and Easton Creeks.
- Just offshore along parts of Reaches 2, 3, and 5, there are opportunities to create or enhance Bay habitats (e.g. ‘living shorelines’). Where feasible, they should be combined with an improved flood barrier system along the shoreline.

# Levee

## SEA CHANGE
## BURLINGAME ADAPTATION
Floodwall removed and replaced with levee



Existing



Proposed Levee Detail

Proposed

# Levee to Floodwall Transition

## SEA CHANGE
## BURLINGAME ADAPTATION
Floodwall transition to levee



Existing

Transition from Levee to Floodwall Detail

Proposed

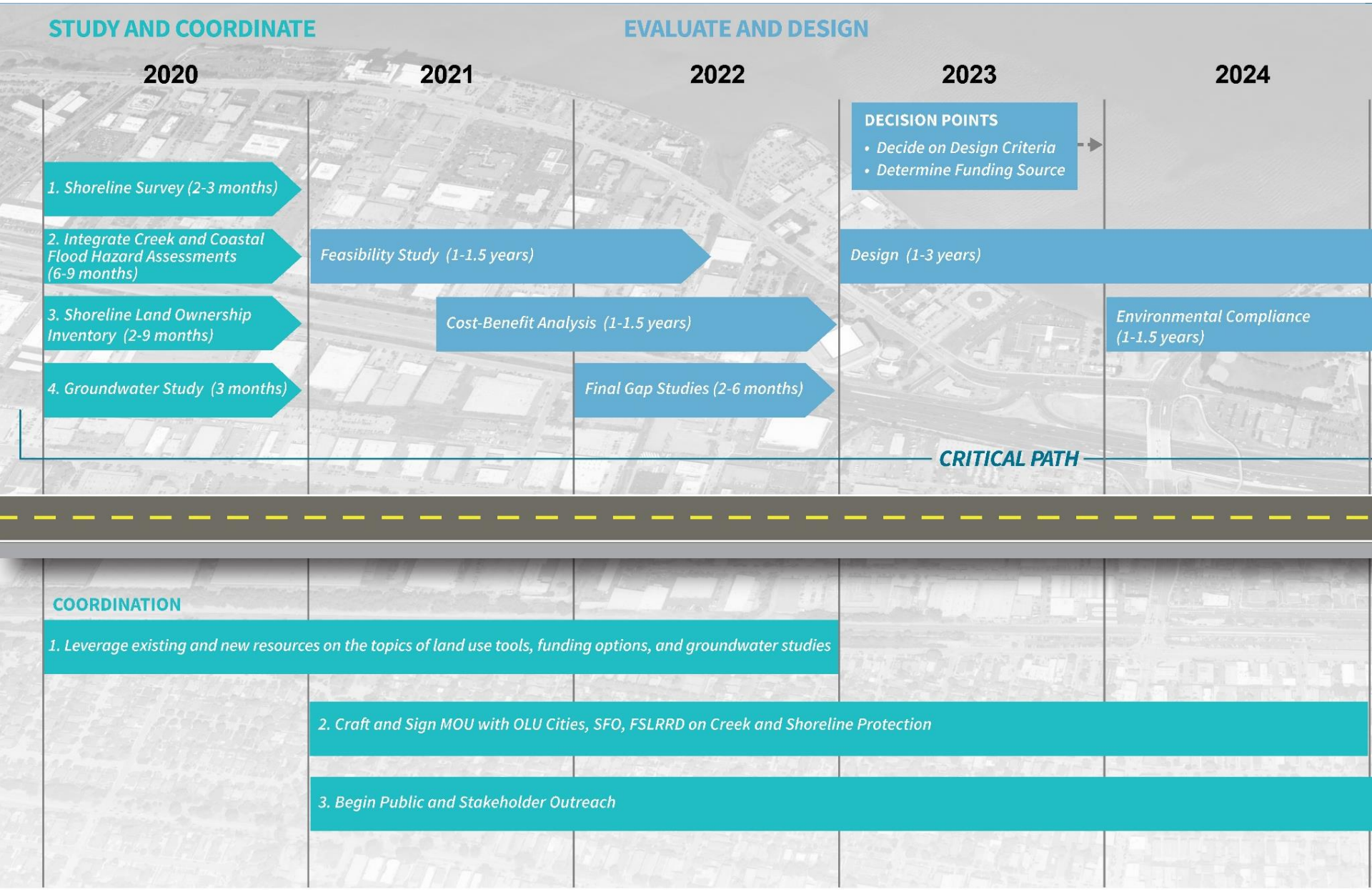
# Coarse Beach

SEA CHANGE
BURLINGAME ADAPTATION
Nature Based Solutions

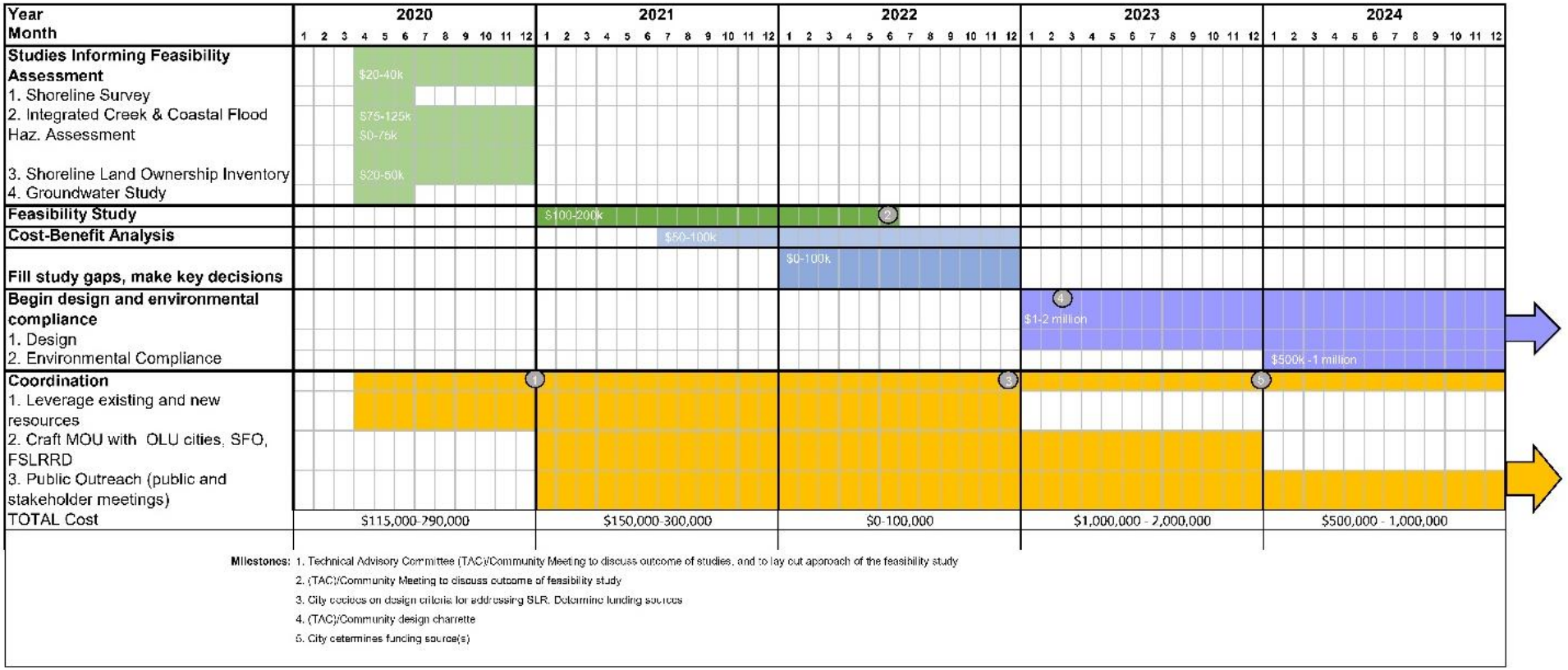

Existing


Proposed

# Next Steps – 5-Year Work Plan



# 5-year Work Plan with Costs



# Beyond 5 years

- **5-15 Years**
  - Complete Design & Environmental Review
  - Decide on and Implement Priority Projects
- **15-30 Years**
  - Implement Full Adaptation Strategy
  - Continue to make improvements to raise shoreline
  - Raise creek levees
  - Participate in regional efforts
  - Plan for realignment of buildings in footprint of levee

Sea Change Burlingame

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# Thank you

# Extra Slides

# Project Progress & Deliverables

- March
  - Task 2, Strategic Outreach Plan - Draft
  - Task 3, Decision Making Framework - Draft
  - Task 4, Risk and Vulnerability Assessment - Draft
- June
  - Task 3, Decision Making Framework – Final
  - Task 4, Risk and Vulnerability Assessment - Final
  - Task 5, Identify and Screen Adaptation Strategies – Draft
- July
  - **TAC and Stakeholder Meeting – July 10th**
- August
  - Task 5, Identify and Screen Adaptation Strategies – Final

# Project Progress & Deliverables (cont.)

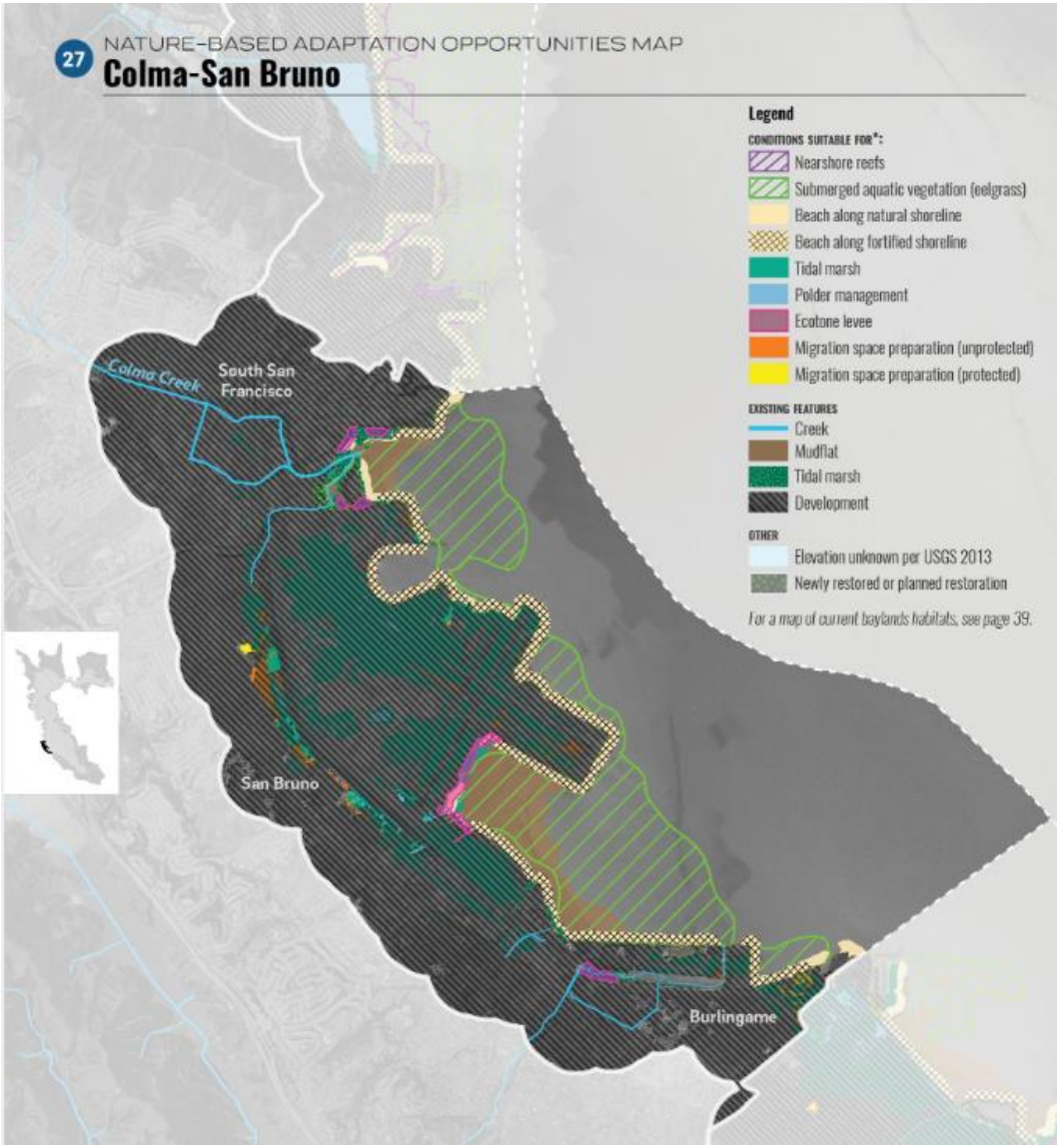
- October
  - Task 6, Advance and Illustrate 3 concepts – Draft
  - Task 6, Advance and Illustrate 3 Concepts – Final
  - Task 5, Identify and Screen Adaptation Strategies – Final
  - **TAC and Community Meeting – October 16th**
    - 50 members of the public in attendance
- November
  - Task 7, Road Map & Next Steps – Draft
  - Task 7, Road Map & Next Steps - Final

# 5-year Work Plan

- **2020**
  - **Complete background studies for Feasibility Study**
    - Shoreline Survey for Topography, Infrastructure Condition
    - Integrated Creek and Coastal Flood Hazards
    - Shoreline Land Ownership Inventory
    - Groundwater Study
  - **Leverage existing and emerging resources on key topic areas**
    - Land Use tools
    - Funding options
    - Regional Groundwater

# 5-year Work Plan

- **2021**
  - Complete Feasibility Study
  - Cost-Benefit Analysis
  - Craft and Sign MOU with Operational Landscape Unit partners (Millbrae, San Mateo, SFO, FSLRRD)
  - Begin public and stakeholder outreach
- **2022**
  - Complete any final gap studies that were not studied regionally

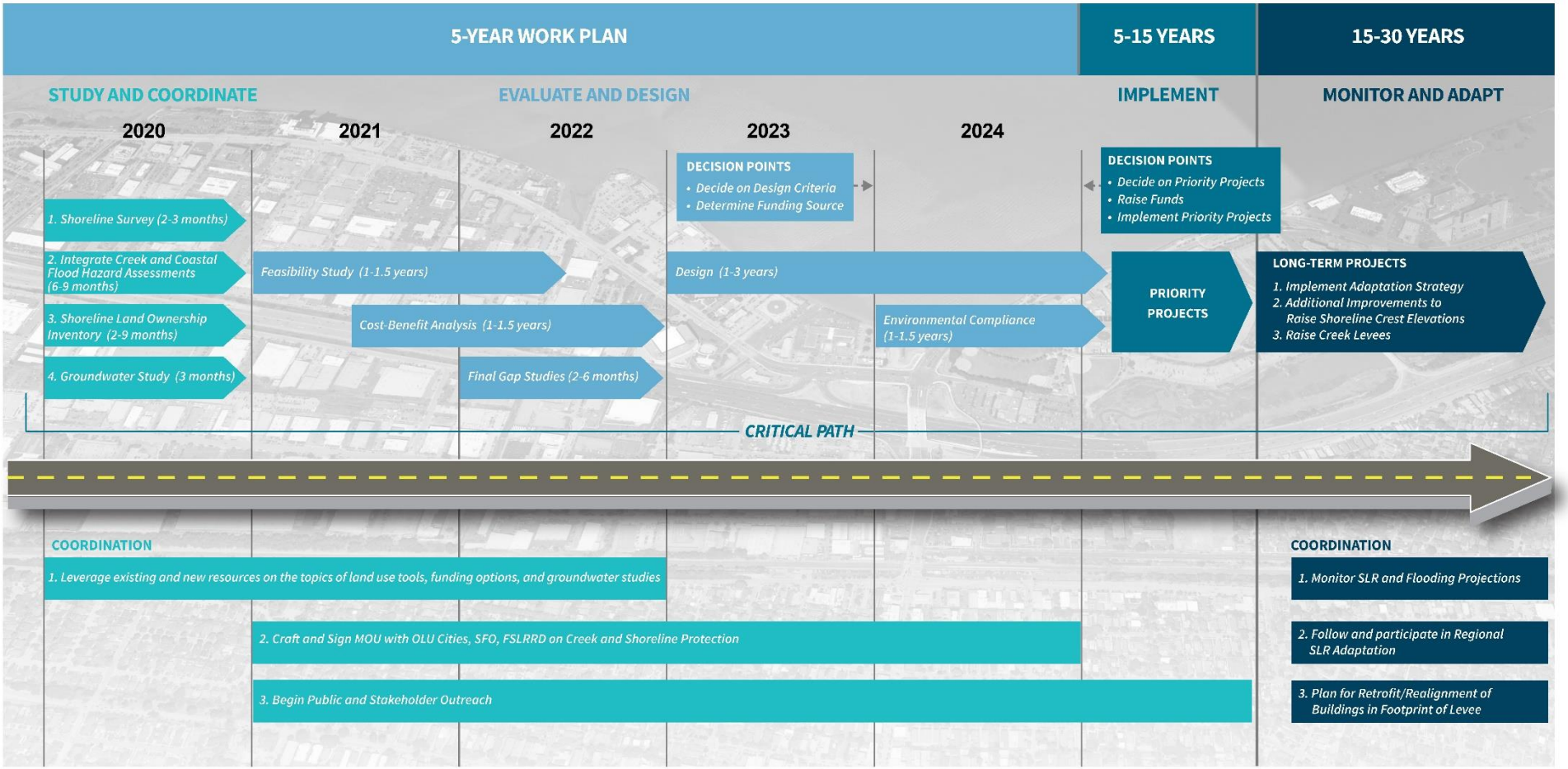


# 5-year Work Plan

- **2023**
  - Begin Design
  - Decide on design criteria
  - Determine funding source
  - Continue MOU agreement coordination
  - Continue public and stakeholder outreach
- **2024**
  - Continue Design
  - Begin Environmental Compliance
  - Continue public and stakeholder outreach

# Next Steps

## Burlingame Road Map to Sea-Level Rise Adaptation



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