# DRAFT WATERFRONT ADAPTATION STRATEGIES

## Mission Creek / Mission Bay Community Meeting

November 2, 2022

# WELCOME

## What to expect

- Intros
- 45 min Presentation with Polls – we want to hear from you!
- 30 min Q&A – through the Chat or the “Raise Your Hand” function

# VIDEO TO INTRODUCE DRAFT WATERFRONT ADAPTATION STRATEGIES

# FRIENDLY REMINDERS

- Keep your device on mute unless you are speaking
- Use the Chat function for quick feedback or to comment
- Use the “Raise Your Hand” function to indicate a request to speak
- Try not to talk over others
- Give each other time to gathers thoughts and comment before jumping in

# TODAY'S AGENDA

## Presentation Overview

- Understanding the Risks
  - *What we're facing*
- Waterfront Resilience Program
  - *What we're doing*
- Community Priorities
  - *What we've heard*
- Range of Possibilities
  - *What we're considering*
- Draft Waterfront Adaptation Strategies in Mission Creek / Mission Bay
- Next Steps
- Q&A

# LAND ACKNOWLEDGEMENT

The Port of San Francisco acknowledges that we are on the ***unceded ancestral homeland of the Ramaytush Ohlone*** who are the original inhabitants of the San Francisco Peninsula.

As the indigenous stewards of this land and in accordance with their traditions, the Ramaytush Ohlone have never ceded, lost nor forgotten their responsibilities as the ***caretakers of this place***, as well as for all peoples who reside in their traditional territory.

As guests, we recognize that we benefit from living and working on their traditional homeland.

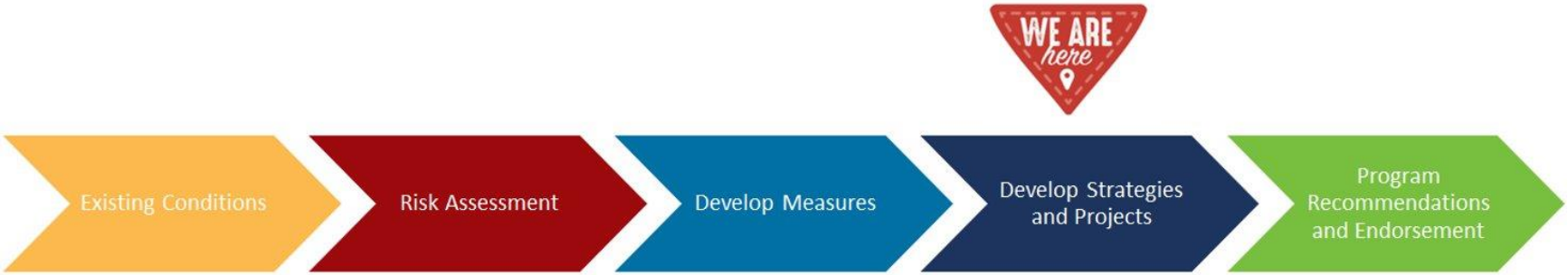
We wish to ***pay our respects*** by acknowledging the Ancestors, Elders and Relatives of the Ramaytush Community and by ***affirming their sovereign rights as First Peoples.***

# POLL QUESTION #1

**What part of the Mission Creek / Mission Bay waterfront do you visit most often?**

# DRAFT WATERFRONT ADAPTATION STRATEGIES

## Presentation Overview




The Port of San Francisco has developed seven high-level Draft Waterfront Adaptation Strategies through a collaborative interagency process and over five years of public engagement.

The draft Strategies are ready for public feedback, with a goal of reaching a Draft Waterfront Adaptation Plan by Summer 2023.

# DRAFT WATERFRONT ADAPTATION STRATEGIES

Port-led, City of San Francisco Agencies, and USACE Partnered in Development Process

# SAN FRANCISCO WATERFRONT COASTAL FLOOD STUDY

The Port and U.S. Army Corps of Engineers (USACE) are conducting a **waterfront coastal flood study** for San Francisco, which could result in **significant federal funding for flood risk reduction.**

This funding could also **improve shoreline stability** where USACE would fund coastal flood defenses and **provide other community benefits** that are part of a cost-effective plan. The Port and City have goals to further improve seismic resilience and provide other community benefits that will not be eligible for USACE funding.

# Understanding the Risks

*What We're Facing*

PORT OF SAN FRANCISCO

Waterfront Resilience Program

# CLIMATE CHANGE HAS GLOBAL IMPACTS

## Including Here In San Francisco


Puerto Rico, September 2022 / Alejandro Granadillo/AP


Alaska, September 2022 / adn.com


Florida, September 2022 / NYTimes.com


The New-York Times

An Earthquake in Japan Speaks to a Sea Wall in San Francisco

The challenges of climate change are everywhere but maybe no more so than in coastal cities that face dual threats of seismic activity and rising seas.


San Francisco Chronicle

S.F.'s Embarcadero needs to be raised as much as 7 feet to prepare for sea level rise, city says

# RISING TO THE CHALLENGE

San Francisco Faces Urgent Seismic, Coastal, and Inland Flood Risks Today

## SEISMIC RISKS

San Francisco, 1906

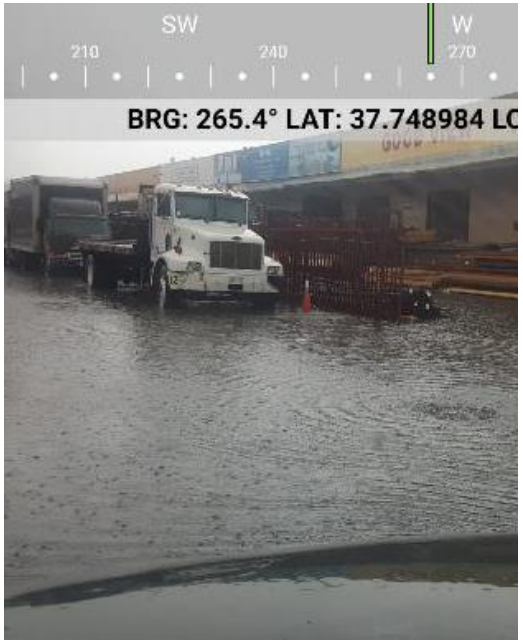
Marina, 1989

## COASTAL FLOODING

Recology

The Embarcadero

## INLAND FLOODING

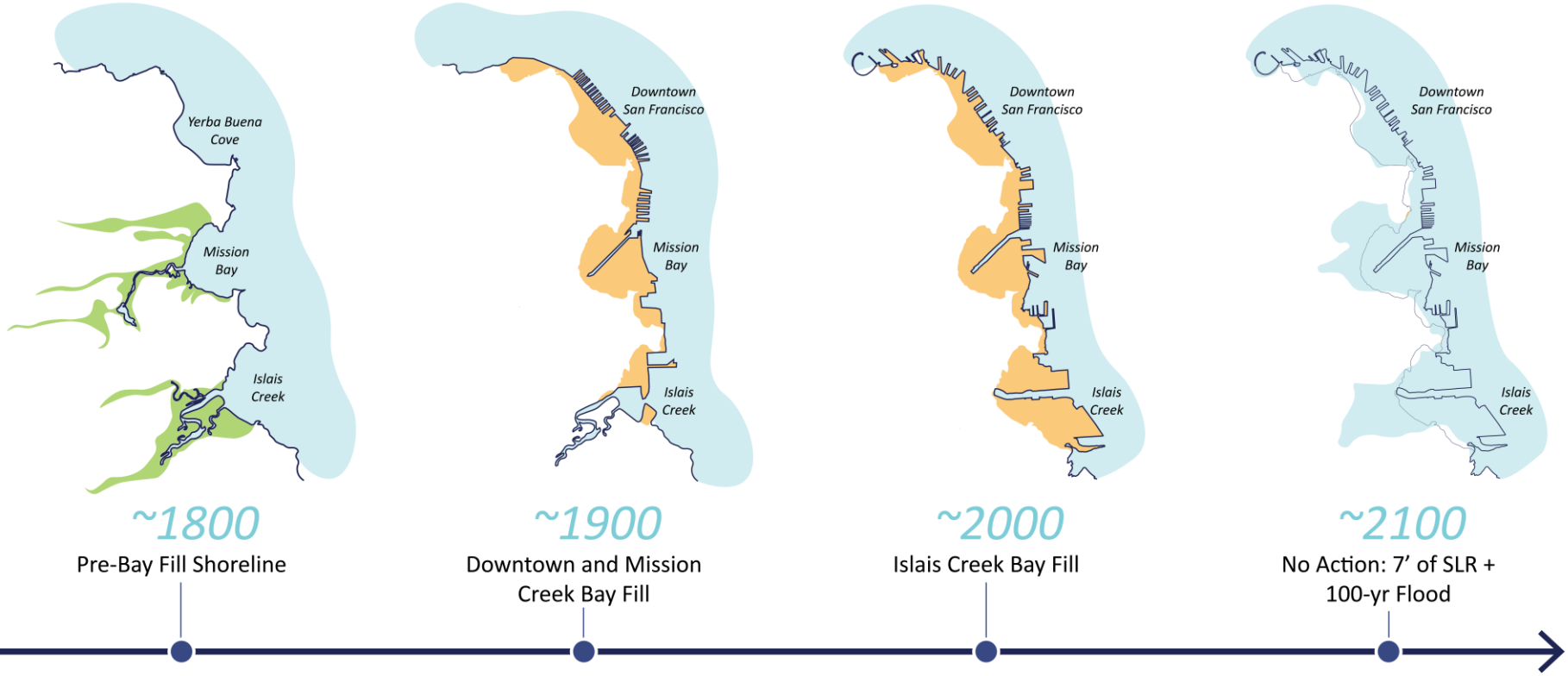



Islais Creek outfall and Marin St.

PORT OF SAN FRANCISCO

# HISTORIC SHORELINE + BAY FILL

From the 1800s




**~1800**
Pre-Bay Fill Shoreline

**~1900**
Downtown and Mission Creek Bay Fill

**~2000**
Islais Creek Bay Fill

**~2100**
No Action: 7' of SLR + 100-yr Flood

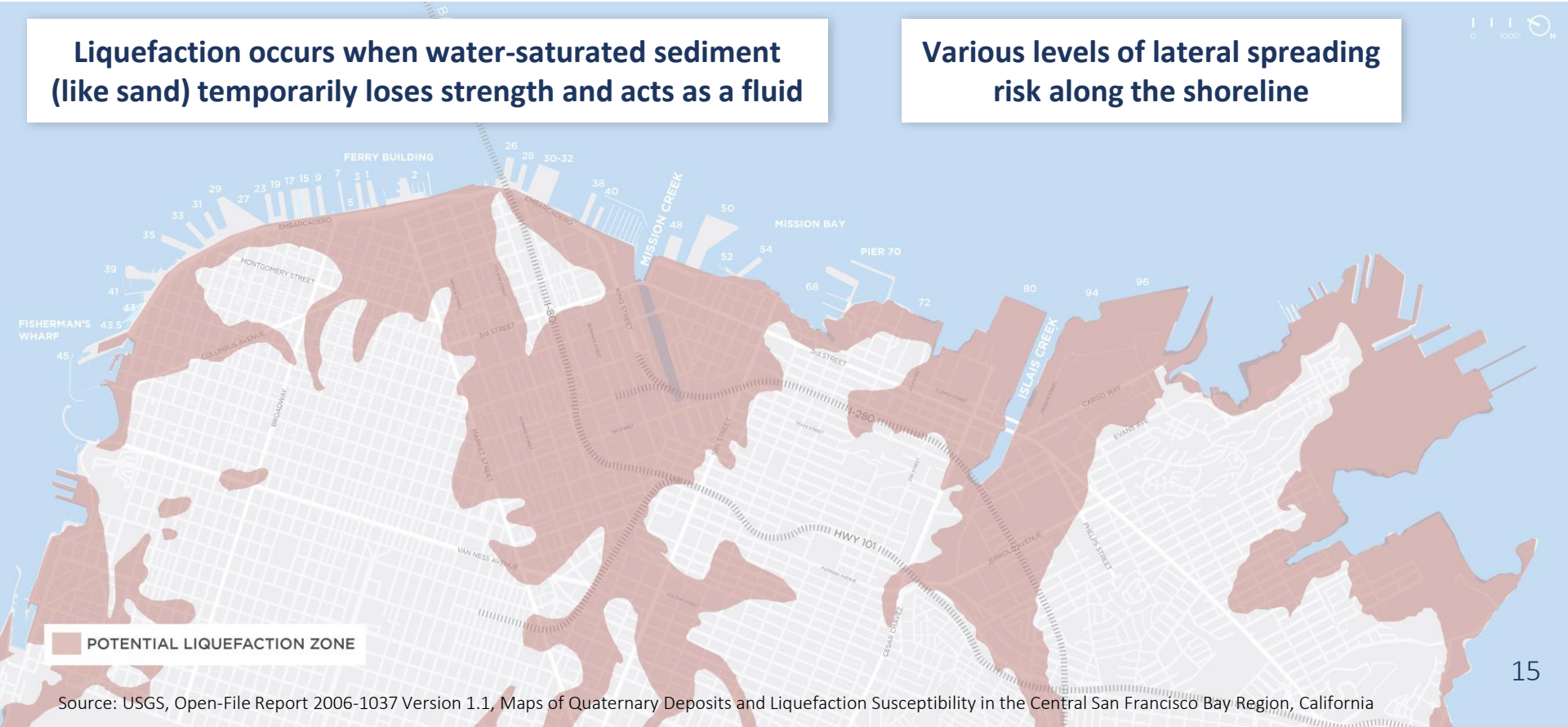
**Marsh** **Bay Fill**

# WATERFRONT WIDE EARTHQUAKE HAZARDS

## Very High Earthquake “Liquefaction” Risk

**Liquefaction occurs when water-saturated sediment (like sand) temporarily loses strength and acts as a fluid**

**Various levels of lateral spreading risk along the shoreline**

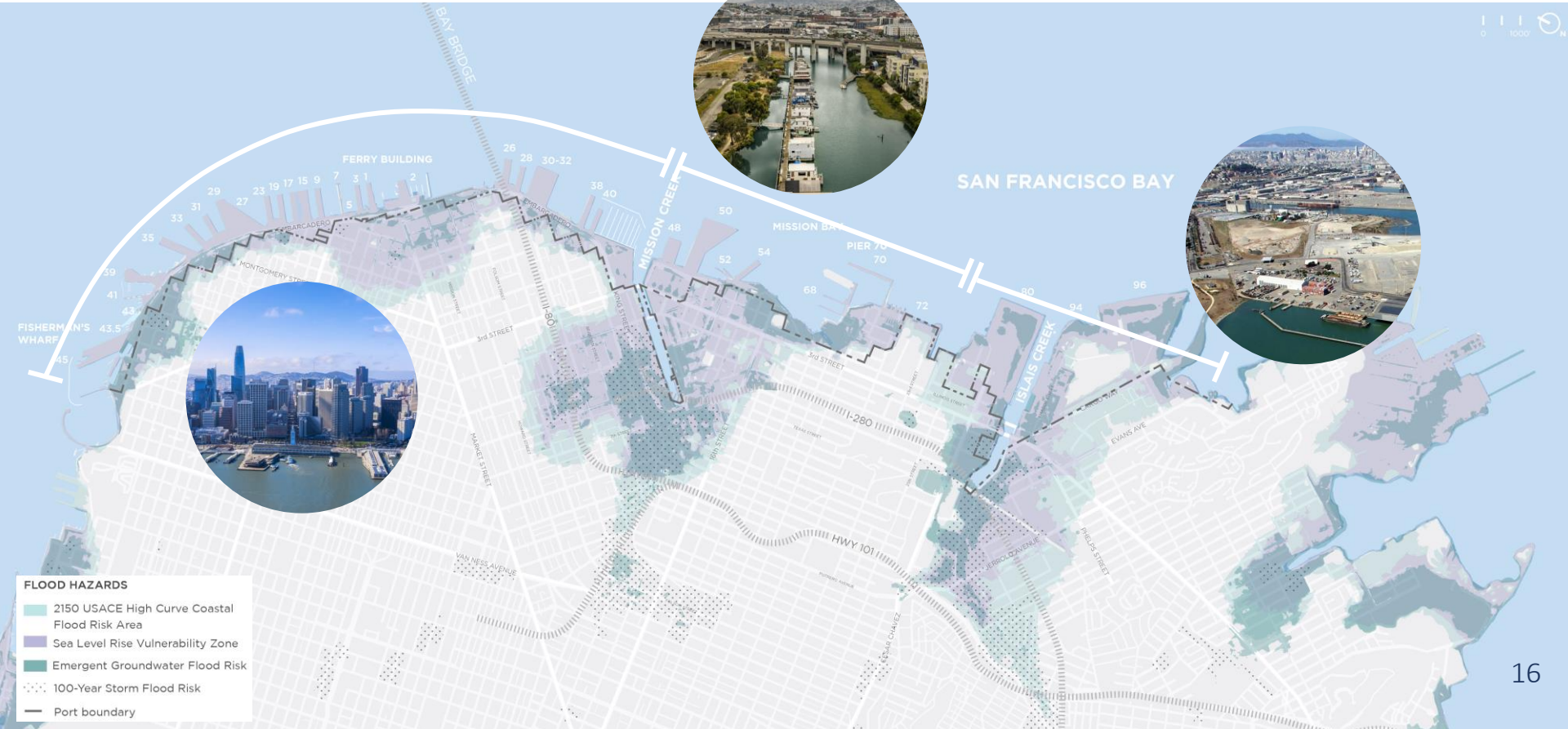




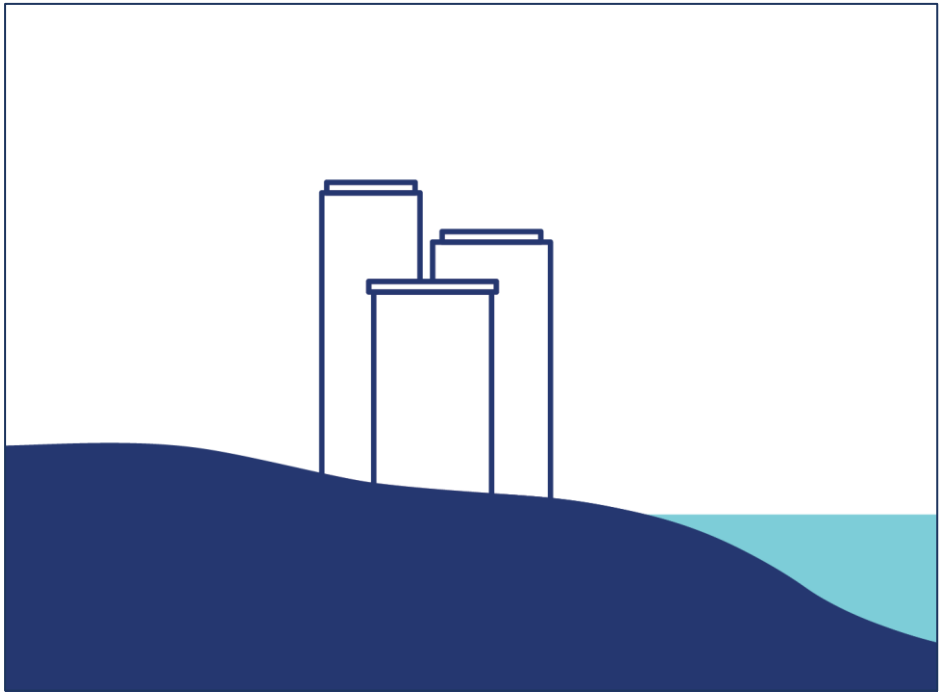

Source: USGS, Open-File Report 2006-1037 Version 1.1, Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California

# COASTAL AND INLAND FLOOD RISK

## Different Geographic Impacts

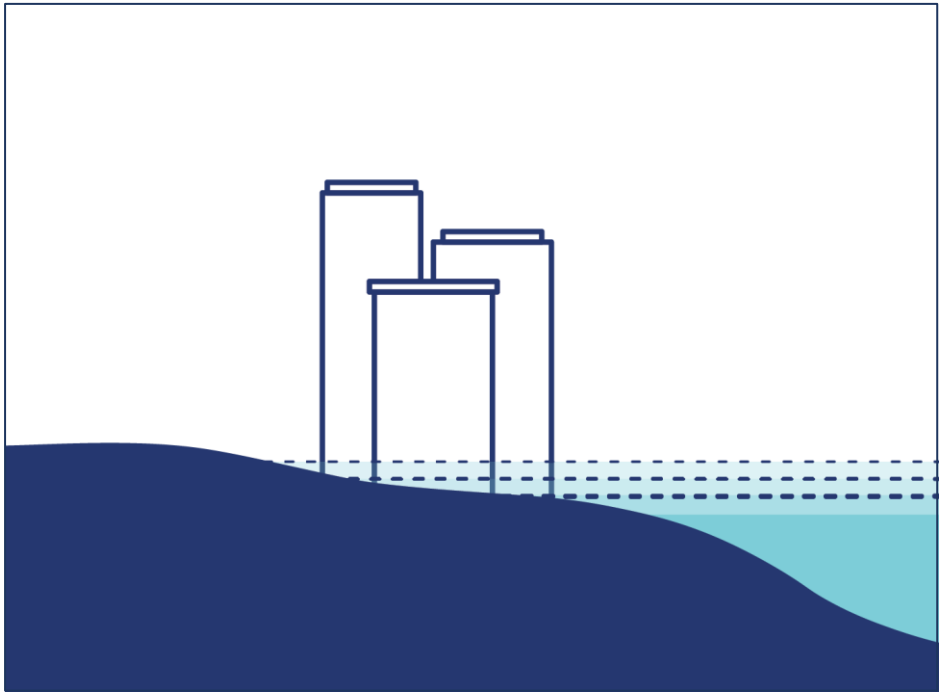


# COASTAL AND INLAND FLOODING



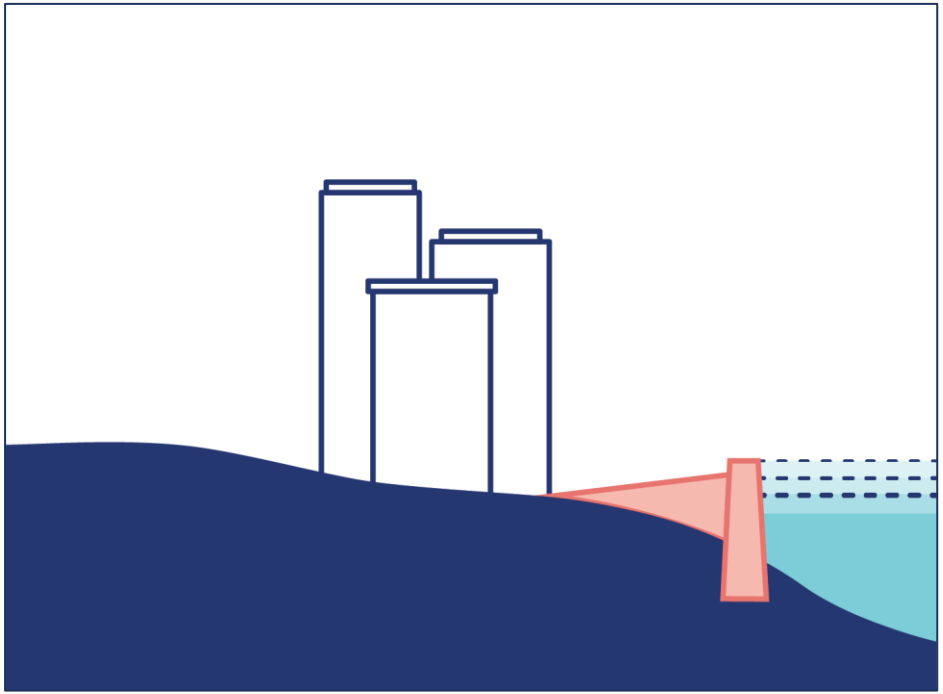
Existing conditions

# COASTAL AND INLAND FLOOD RISK



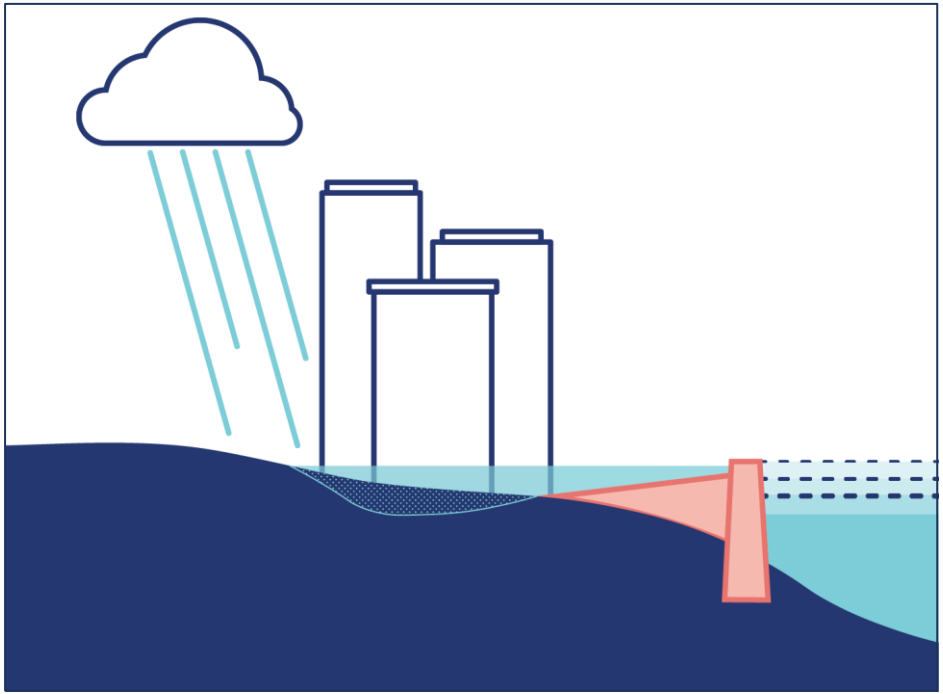
Sea levels rise

# COASTAL AND INLAND FLOOD RISK



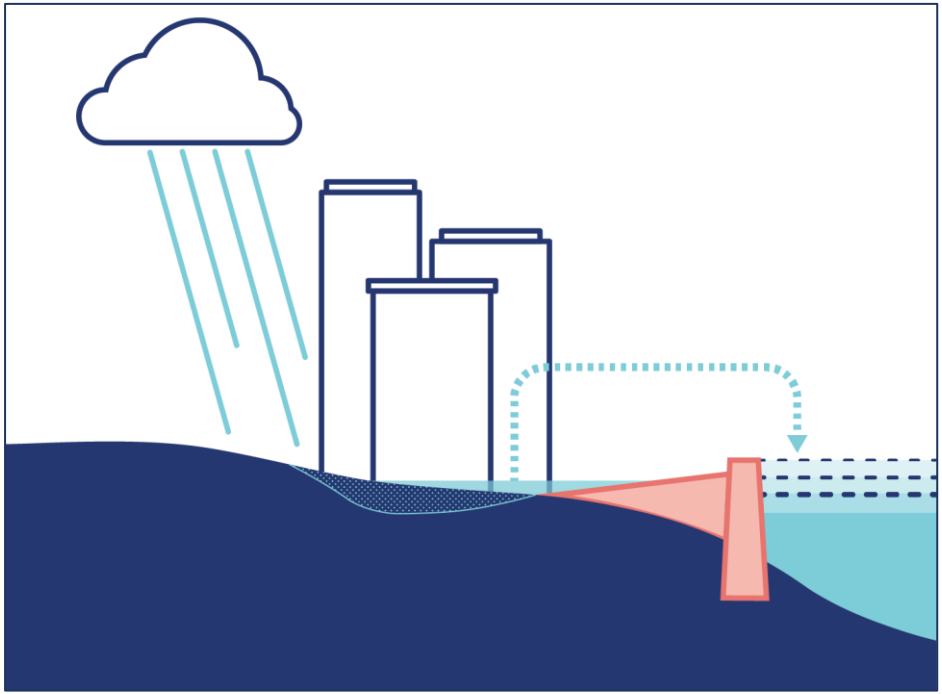
**Raise shoreline to defend against sea level rise**

# COASTAL AND INLAND FLOOD RISK



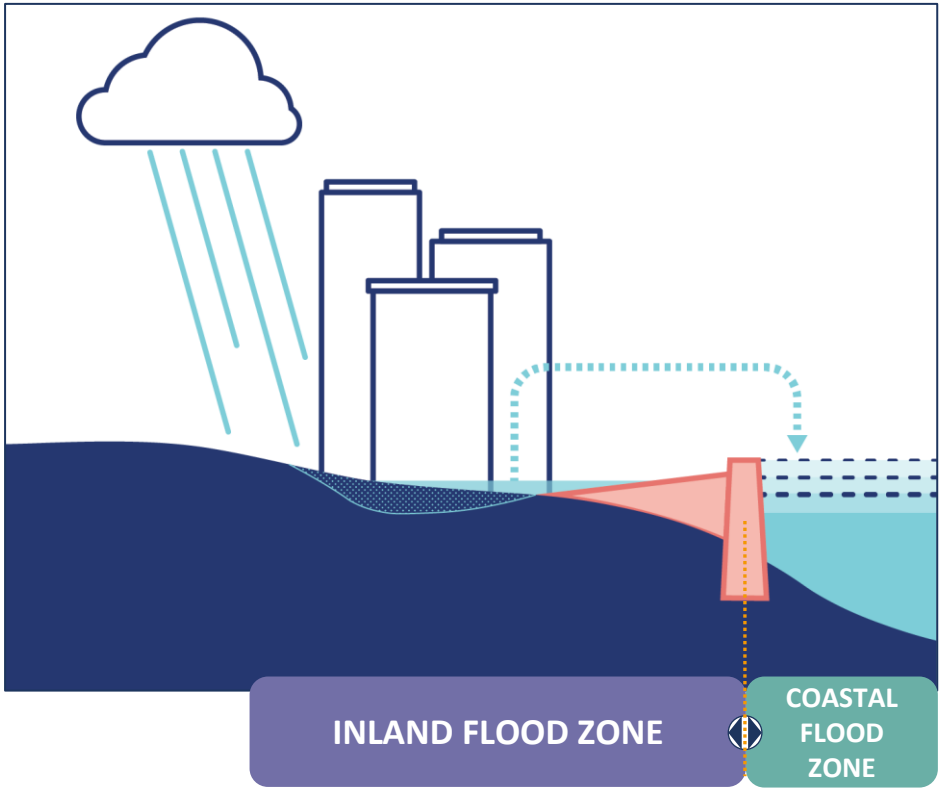
**Groundwater and stormwater flooding behind raised shoreline**

# COASTAL AND INLAND FLOOD RISK



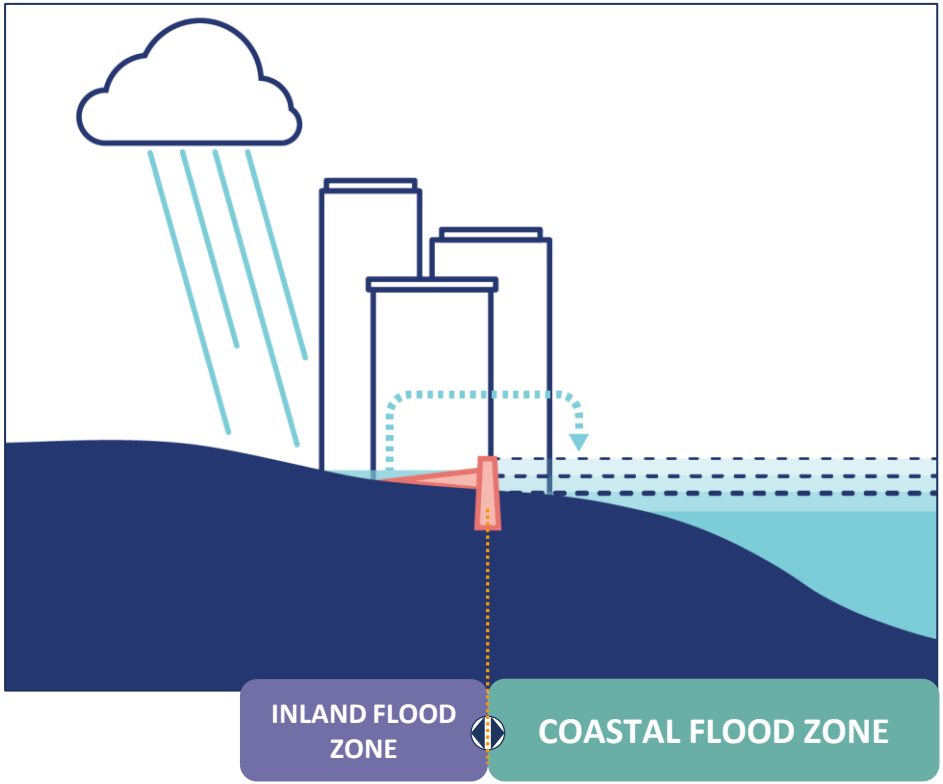
**Pumping reduces flooding behind raised shoreline**

# COASTAL AND INLAND FLOOD RISK




**Two related forms of flooding**

# COASTAL AND INLAND FLOOD RISK




**Shift based on the location of flood protection**

Any solution endorsed by the City of San Francisco will aim to address **all three risks:**
seismic risks, coastal flooding and inland flooding.

# POLL QUESTION #2

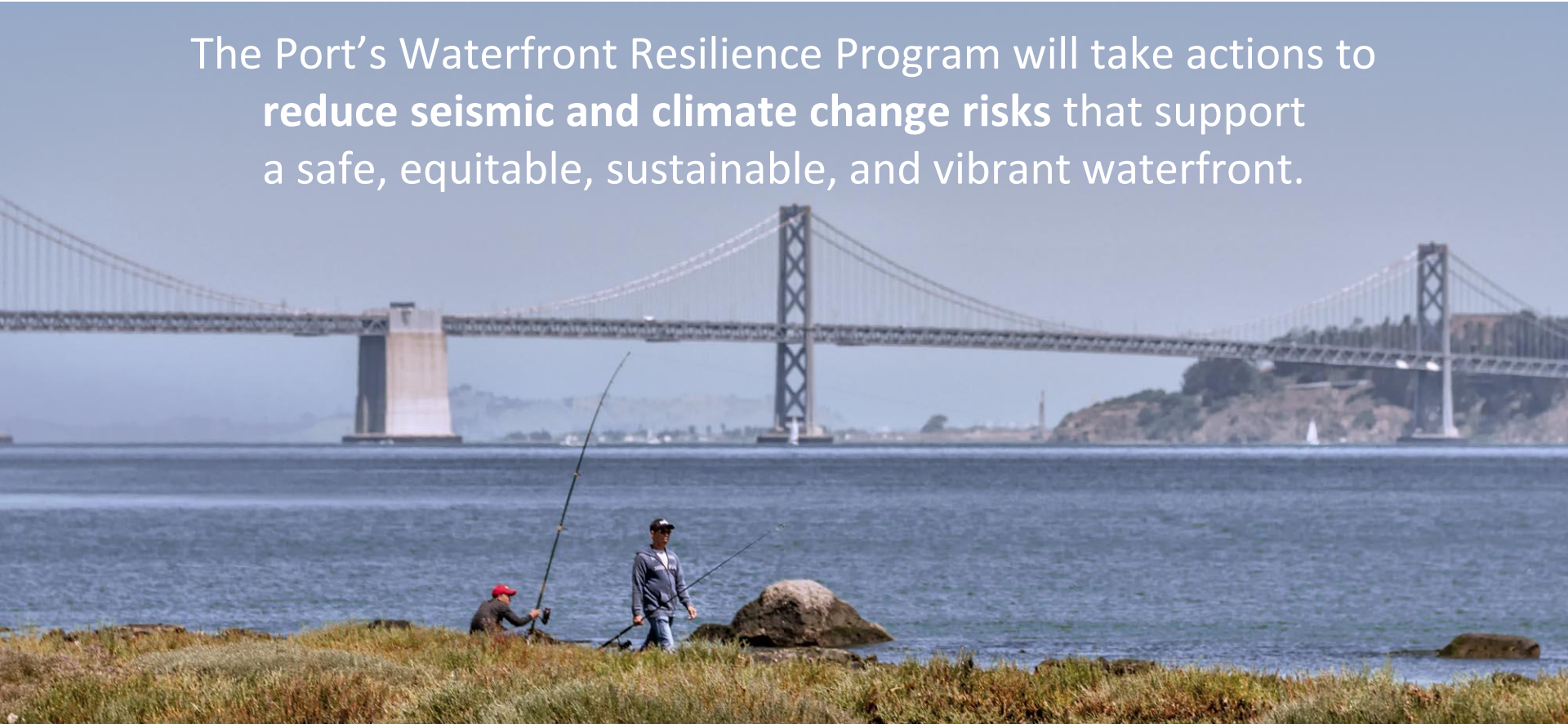
**What impact from Sea Level Rise and inland flooding concerns you the most if you had to choose one?**

# Waterfront Resilience Program

*What We're Doing*

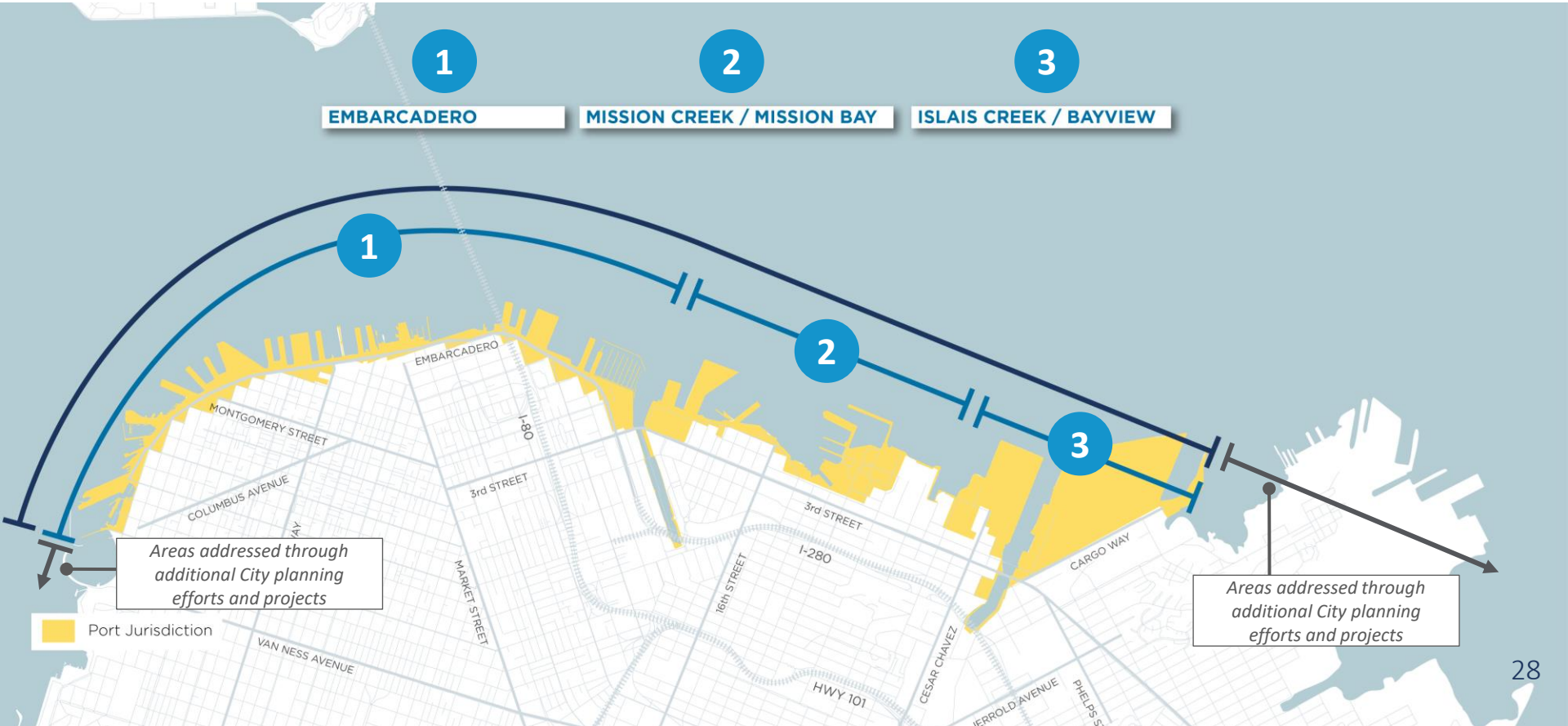
# WATERFRONT RESILIENCE PROGRAM VISION STATEMENT

Affirmed through Robust Community Engagement



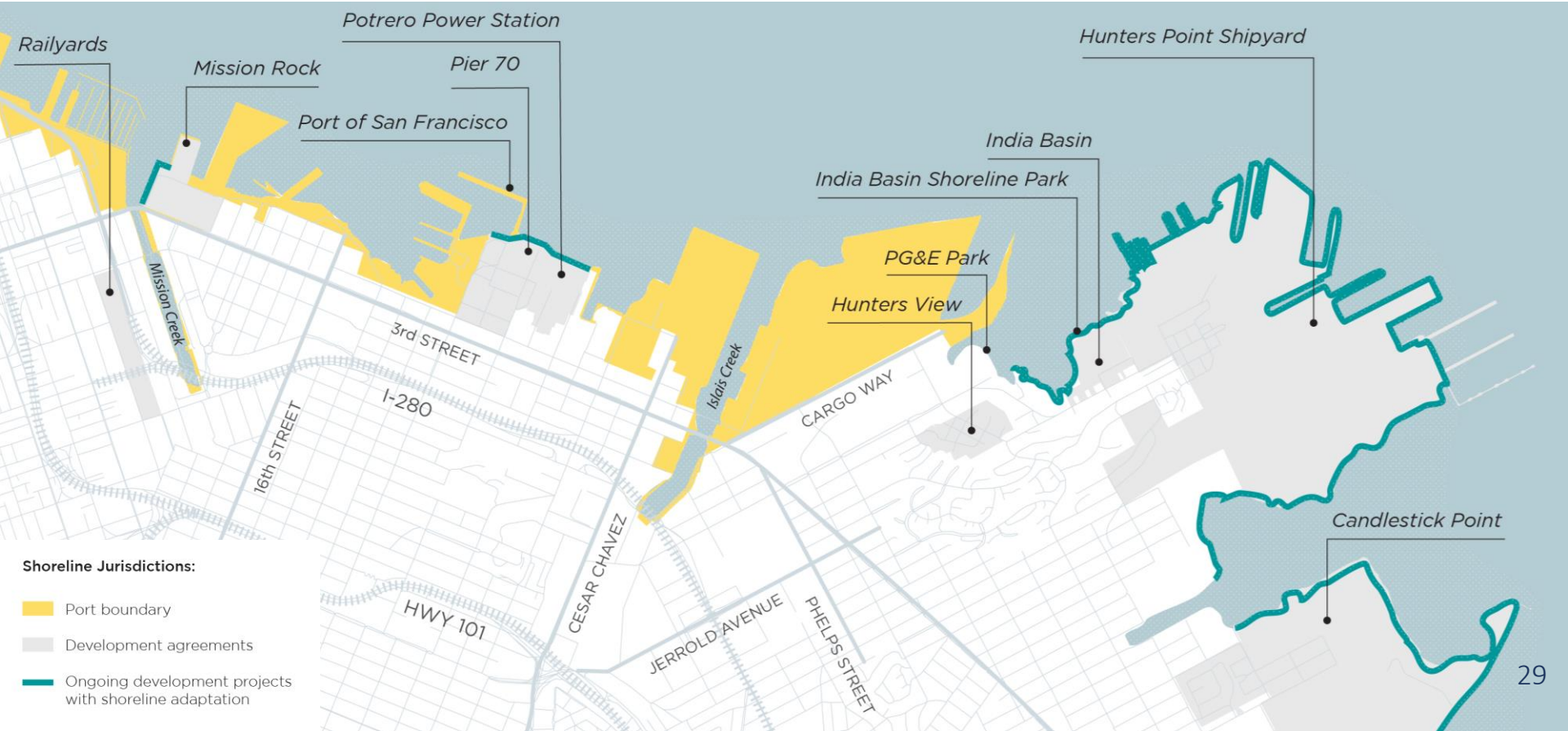
# PROGRAM AREA

## Focus is Conceptual-Level Strategies Within the Port's Jurisdiction



# OTHER CITY ADAPTATION PROJECTS

## Outside Port jurisdiction



# Community Priorities

*What We've Heard*

# DRAFT WATERFRONT ADAPTATION STRATEGIES

## Community Input Helped Define the WRP

1. **Focus on life safety & emergency response**

2. **Prioritize assets most loved by the community and most important to the city**

3. **Put people first**
   Assets and services most prioritized: housing, disaster recovery facilities, utilities, transportation and businesses


PORT OF SAN FRANCISCO

# WHAT WE HEARD

## Spotlight on the Mission Creek / Mission Bay Waterfront

- Key community-prioritized assets include: the Giants ballpark, water and public space access, the environment
- We heard the importance of prioritizing homes, including low-income housing
- Environmental issues were highlighted, including Mission Creek as an ecological and open space asset
- We also heard how it vital it is to reach youth via our public engagement effort

# NATURE BASED SOLUTIONS

## Prioritize Nature and Healing the Bay



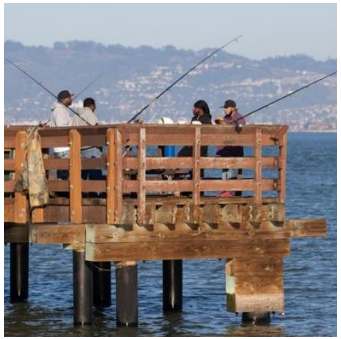



# PUBLIC SPACES

## Expand Open Spaces and the City's Connection to the Waterfront









# EQUITY

## Center Racial and Social Equity and Environmental Justice



# Range of Possible Solutions

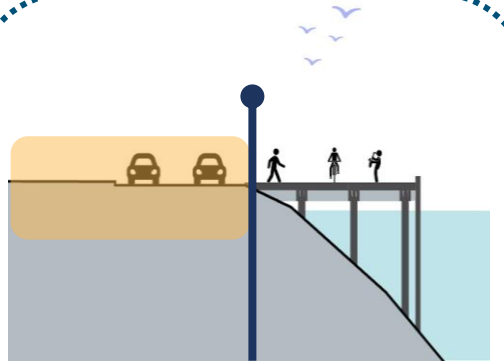
*What We're Considering*

PORT OF SAN FRANCISCO

Waterfront Resilience Program

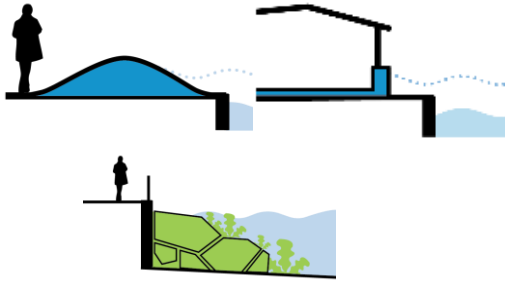
# DRAFT WATERFRONT ADAPTATION STRATEGIES

Key Components



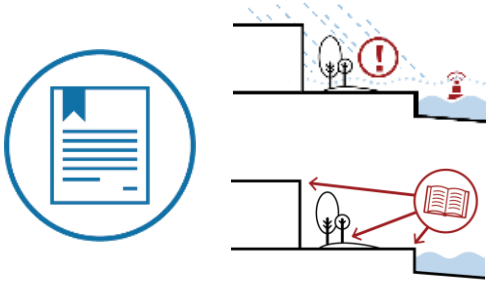
**Coastal Flood Defense Location + Height**

*And area of elevation change*



**Physical Changes**

*Such as earthquake-resilient berms, floodproofing, and nature-based features*



**Policy Changes**

*Such as resilient codes, warning systems, and land use changes*

# USACE SAN FRANCISCO WATERFRONT COASTAL FLOOD STUDY

Driving Questions

***What if...***
we **did not adapt** to mitigate the risks?

***What if...***
we adapted by **floodproofing** and **moving** buildings and assets, *without* coastal flood structures?

***What if...***
we address flooding at **a lower rate** of sea level rise?

***What if...***
we address flooding **at a higher rate** of sea level rise, as recommended by **CA and SF guidance**?

# USACE SAN FRANCSICO WATERFRONT COASTAL FLOOD STUDY

Draft Waterfront Adaptation Strategies

***What if...***
we **did not adapt** to mitigate the risks?

**STRATEGY A**

***What if...***
we adapted by **floodproofing** and **moving** buildings and assets, *without* coastal flood structures?

**STRATEGY B**

***What if...***
we address flooding at **a lower rate** of sea level rise?

**STRATEGY C**

**STRATEGY D**

***What if...***
we address flooding **at a higher rate** of sea level rise, as recommended by **CA and SF guidance**?

**STRATEGY E**

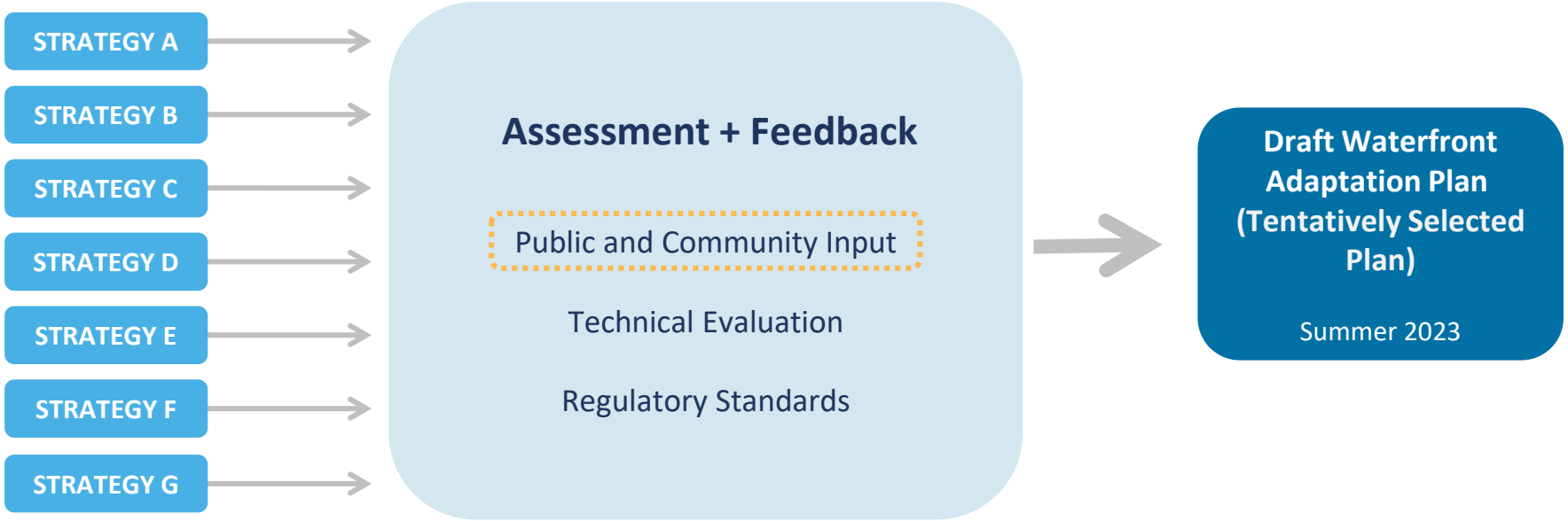
**STRATEGY F**

**STRATEGY G**

PORT OF SAN FRANCISCO

# THE ROLE OF COMMUNITY FEEDBACK

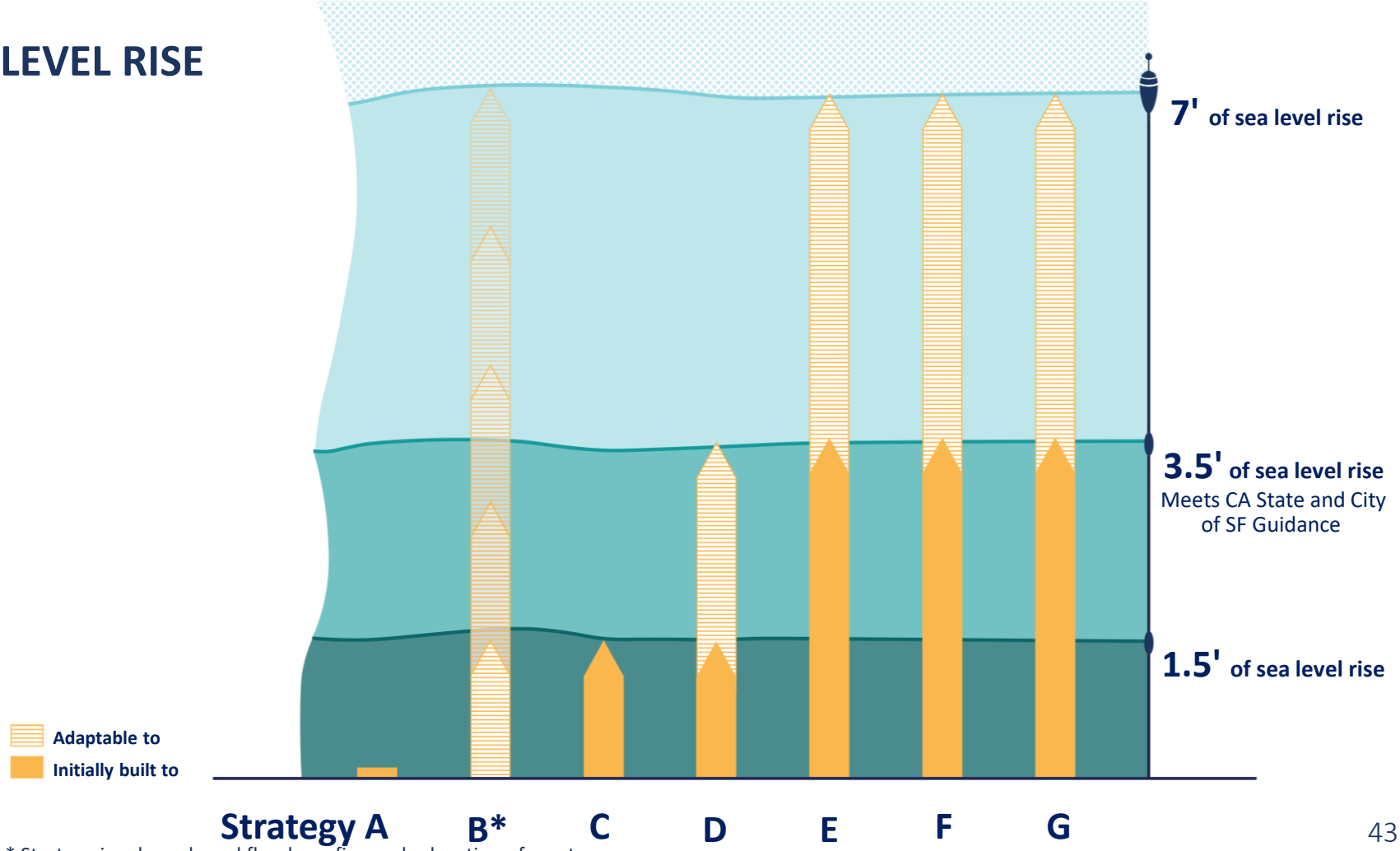
## Pathway to the Draft Waterfront Adaptation Plan



# Draft Waterfront Adaptation Strategies

# TIME HORIZONS

# SEA LEVEL RISE




* Strategy involves phased floodproofing and relocation of assets

# USACE SAN FRANCISCO WATERFRONT COASTAL FLOOD STUDY

Focused on Strategies A-D

***What if...***
we **did not adapt** to mitigate the risks?

**STRATEGY A**

***What if...***
we adapted by **floodproofing** and **moving** buildings and assets, *without* coastal flood structures?

**STRATEGY B**

***What if...***
we address flooding at **a lower rate** of sea level rise?

**STRATEGY C**

**STRATEGY D**

***What if...***
we address flooding **at a higher rate** of sea level rise, as recommended by **CA and SF guidance**?

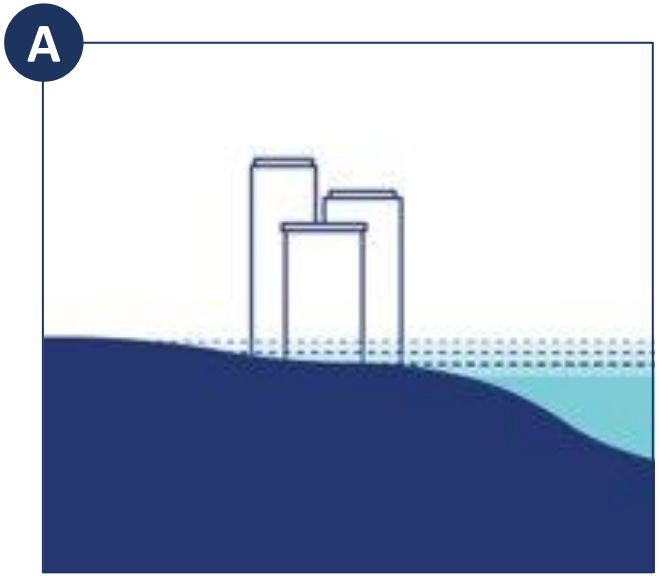
**STRATEGY E**

**STRATEGY F**

**STRATEGY G**

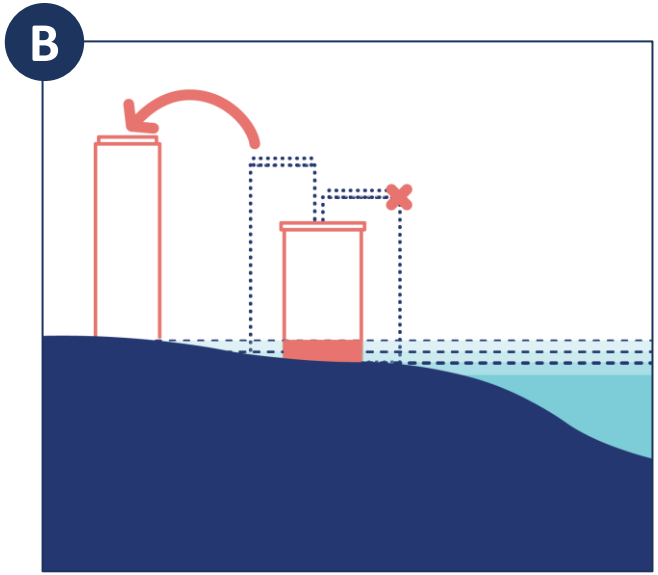
PORT OF SAN FRANCISCO

# STRATEGY A – NO ACTION




**This strategy takes no actions to reduce flood risks beyond projects that are already approved**

# STRATEGY B – NONSTRUCTURAL OPTION

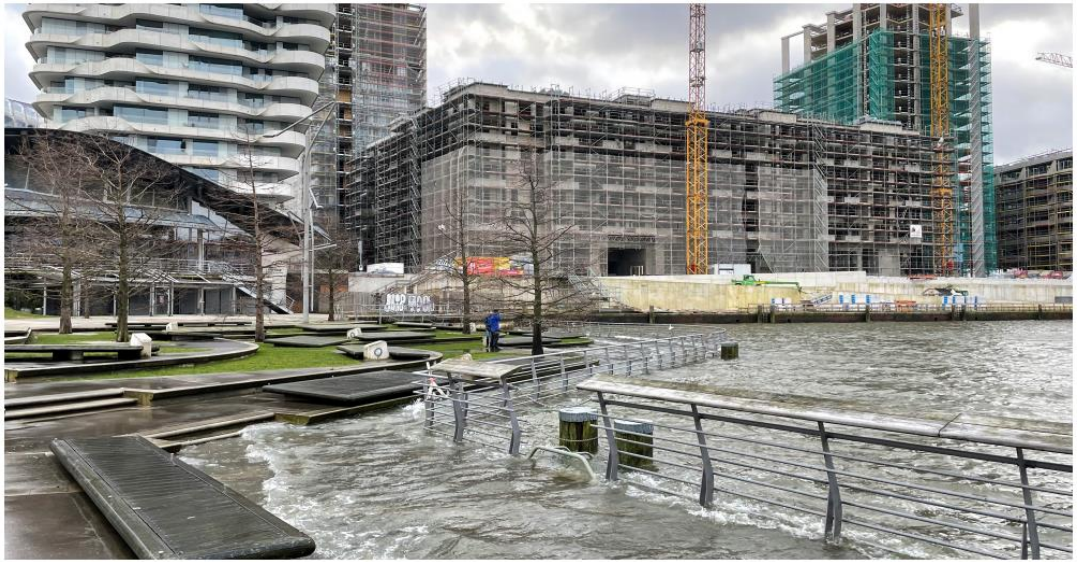



**Moves people and assets away from the risk, uses nonstructural measures (such as floodproofing) to reduce risks, and allows water to go where it wants rather than constructing traditional structural solutions**

# STRATEGY B – NONSTRUCTURAL OPTION

Examples

- **Floodproofing**
- **Raising structure in place**
- **Floodable spaces**
- **Buyouts**
- **Warning systems**



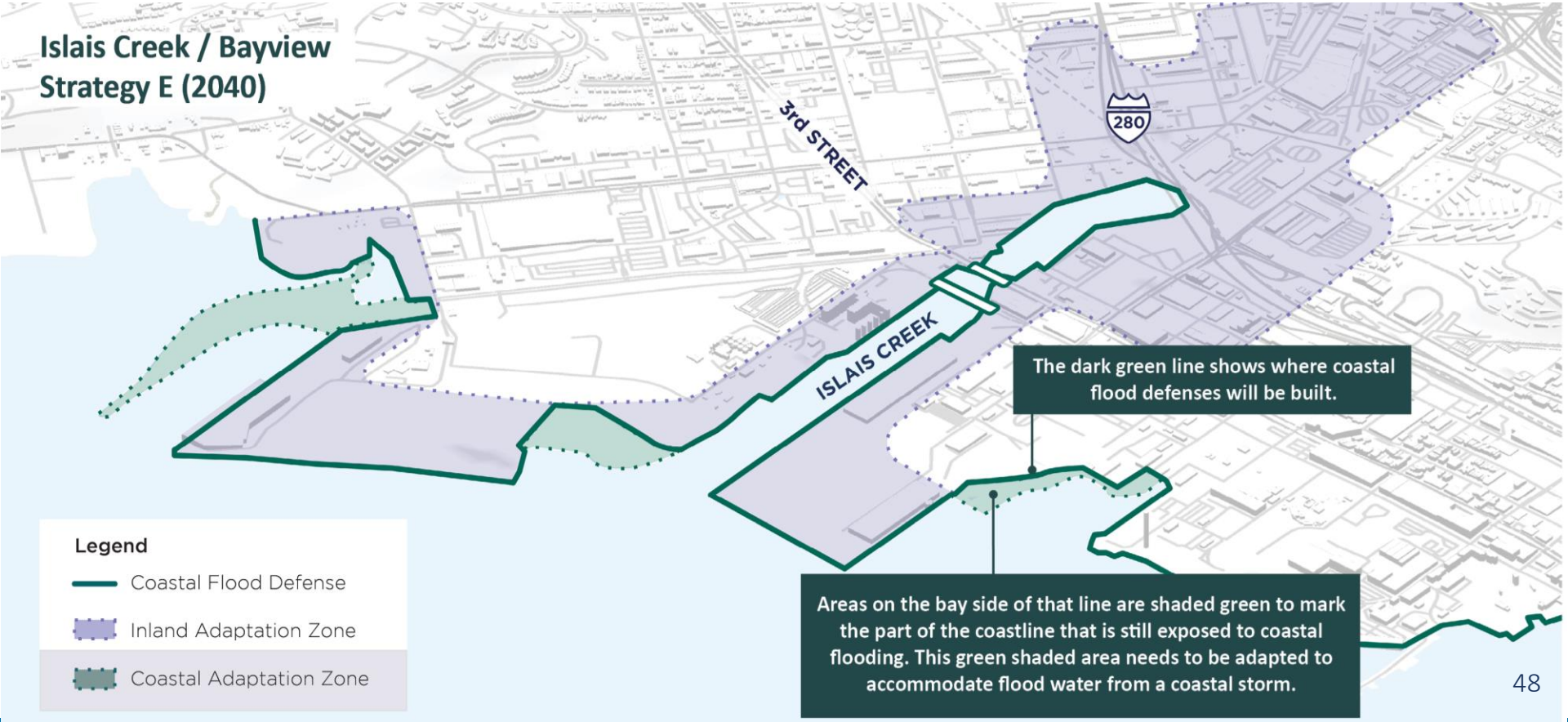

# Draft Strategies in Mission Creek / Mission Bay

PORT OF SAN FRANCISCO

Waterfront Resilience Program

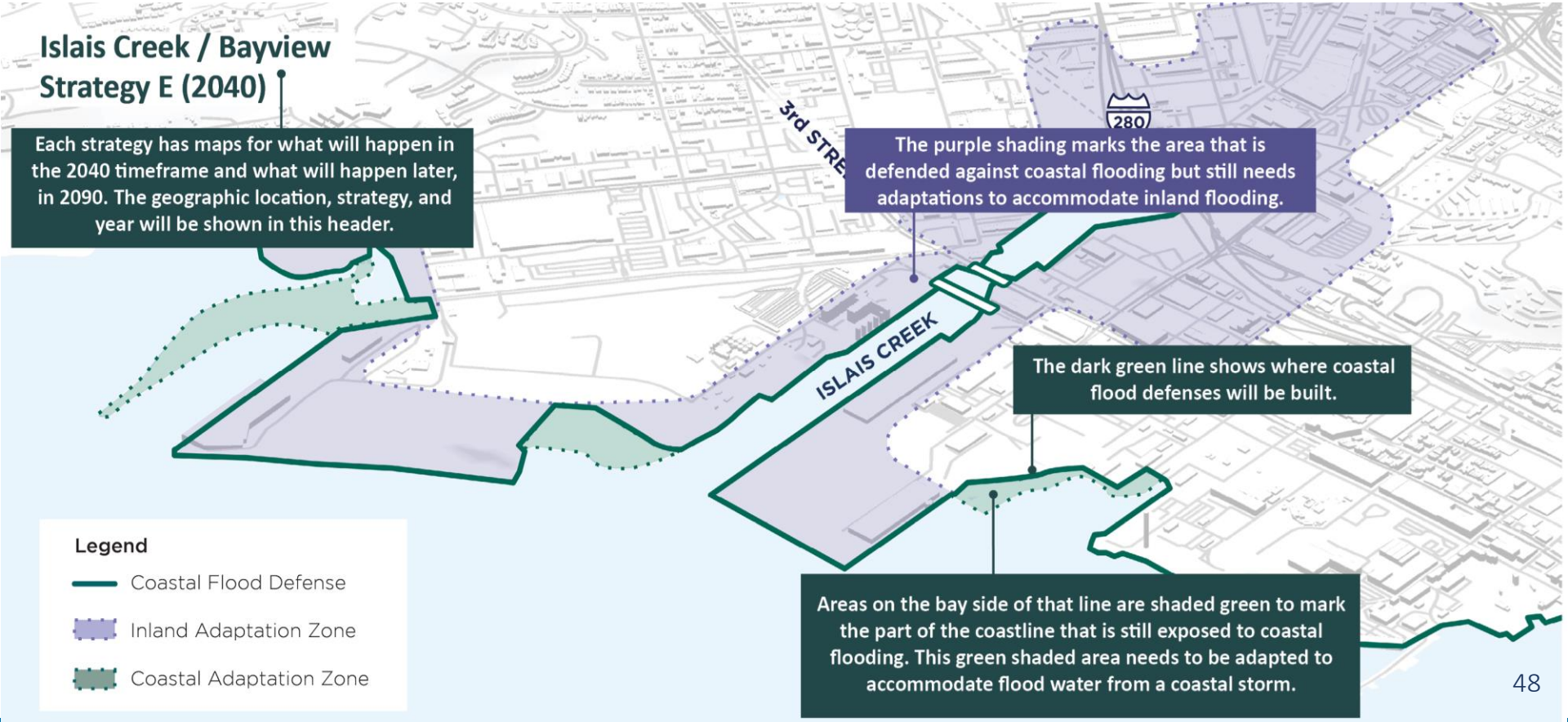
# ORIENTATION TO THE MAPS

# ORIENTATION TO THE MAPS

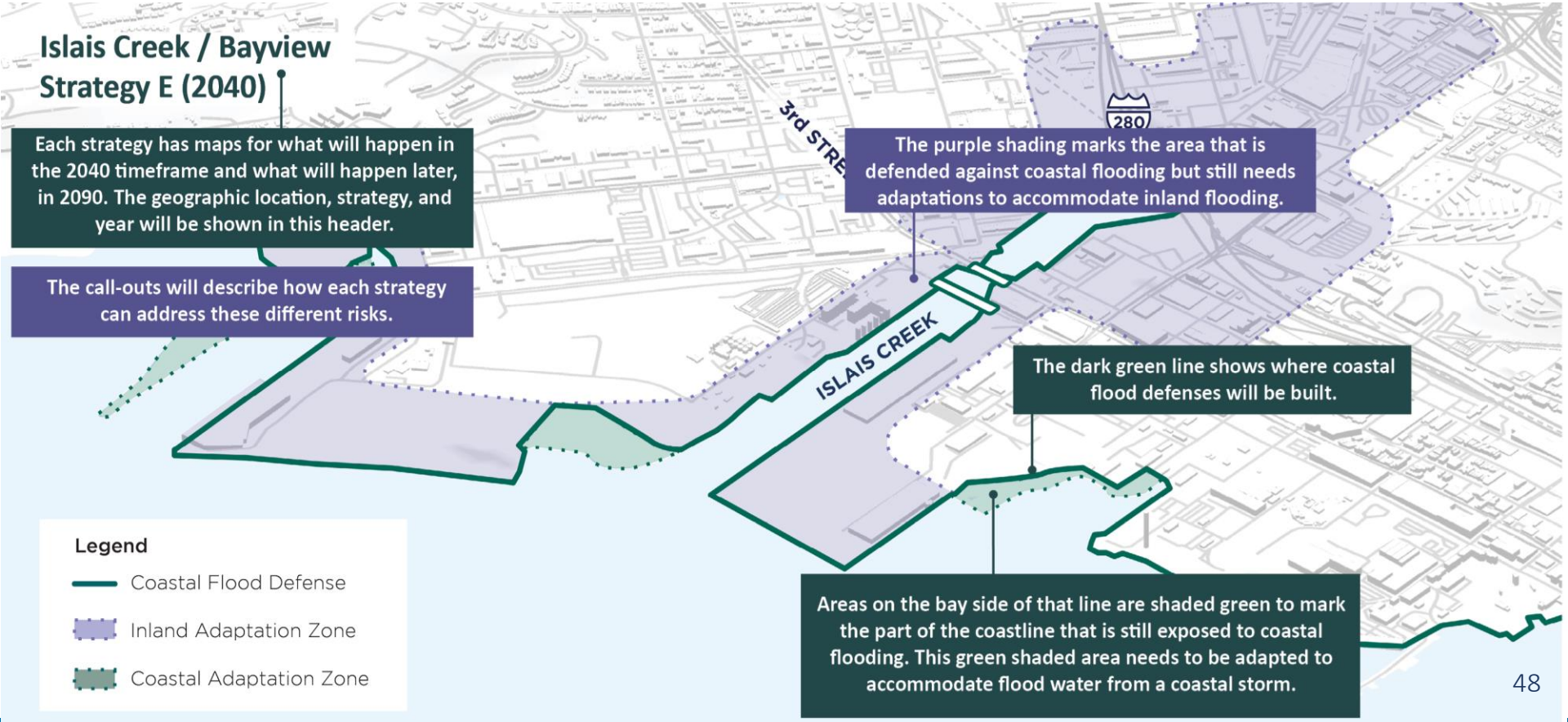


# ORIENTATION TO THE MAPS

# ORIENTATION TO THE MAPS



# ORIENTATION TO THE MAPS

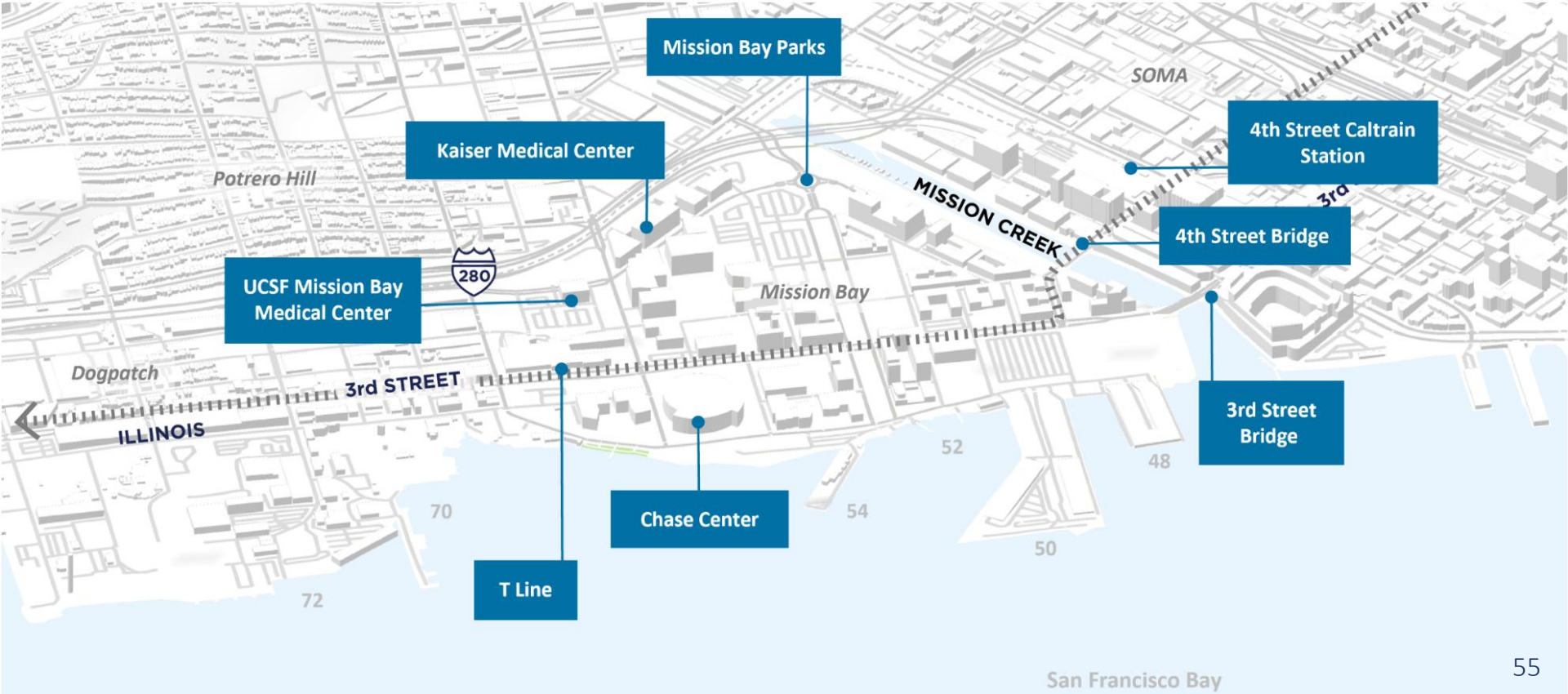


# MISSION CREEK / MISSION BAY

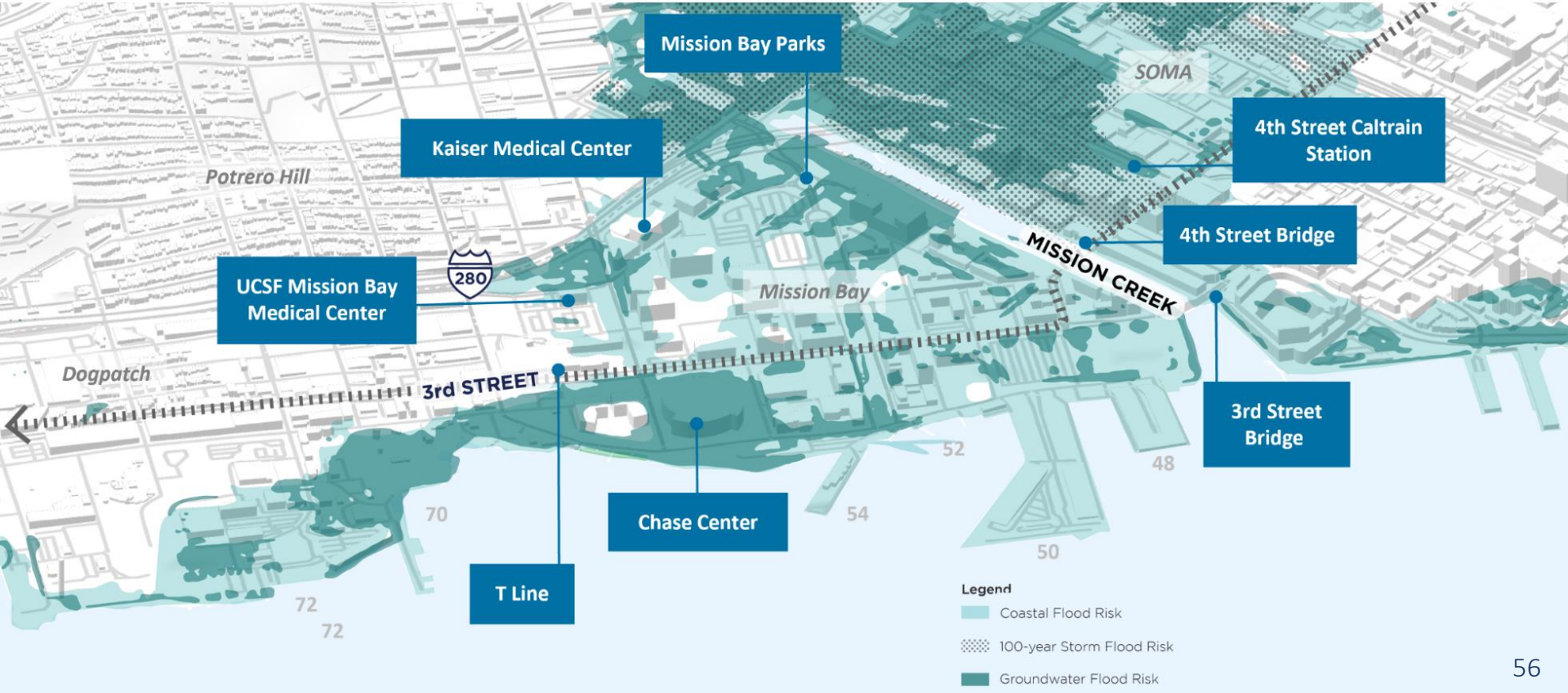
## Geographic Context

- New, high density residential, businesses and medical district
- Low-lying development subject to coastal and inland flooding
- Challenging to adapt because of limited undeveloped space
- Separated sewer system from the rest of the City

# MISSION CREEK / MISSION BAY



# MISSION CREEK / MISSION BAY



# USACE SAN FRANCISCO WATERFRONT COASTAL FLOOD STUDY

Focused on Strategies A-D

***What if...***
we **did not adapt** to mitigate the risks?

**STRATEGY A**

***What if...***
we adapted by **floodproofing** and **moving** buildings and assets, *without* coastal flood structures?

**STRATEGY B**

***What if...***
we address flooding at **a lower rate** of sea level rise?

**STRATEGY C**

**STRATEGY D**

***What if...***
we address flooding **at a higher rate** of sea level rise, as recommended by **CA and SF guidance**?

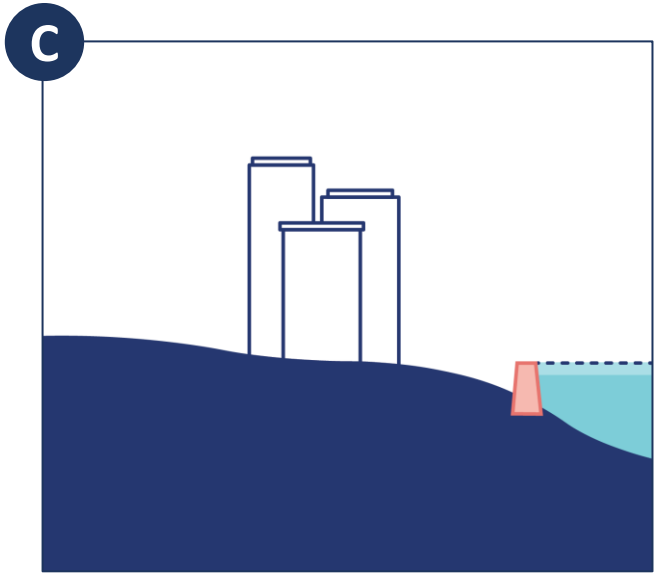
**STRATEGY E**

**STRATEGY F**

**STRATEGY G**

PORT OF SAN FRANCISCO

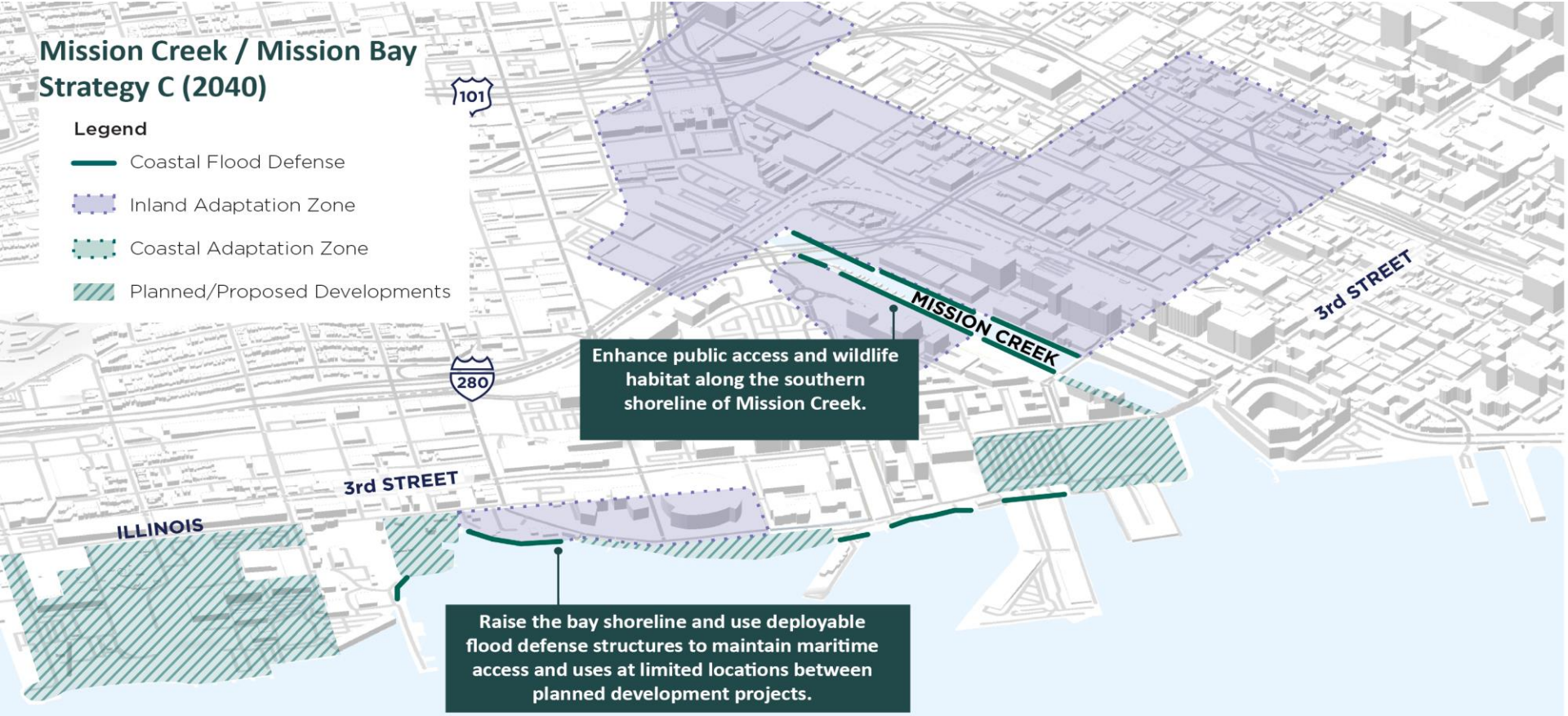
# STRATEGY C – LOWER SEA LEVEL RISE



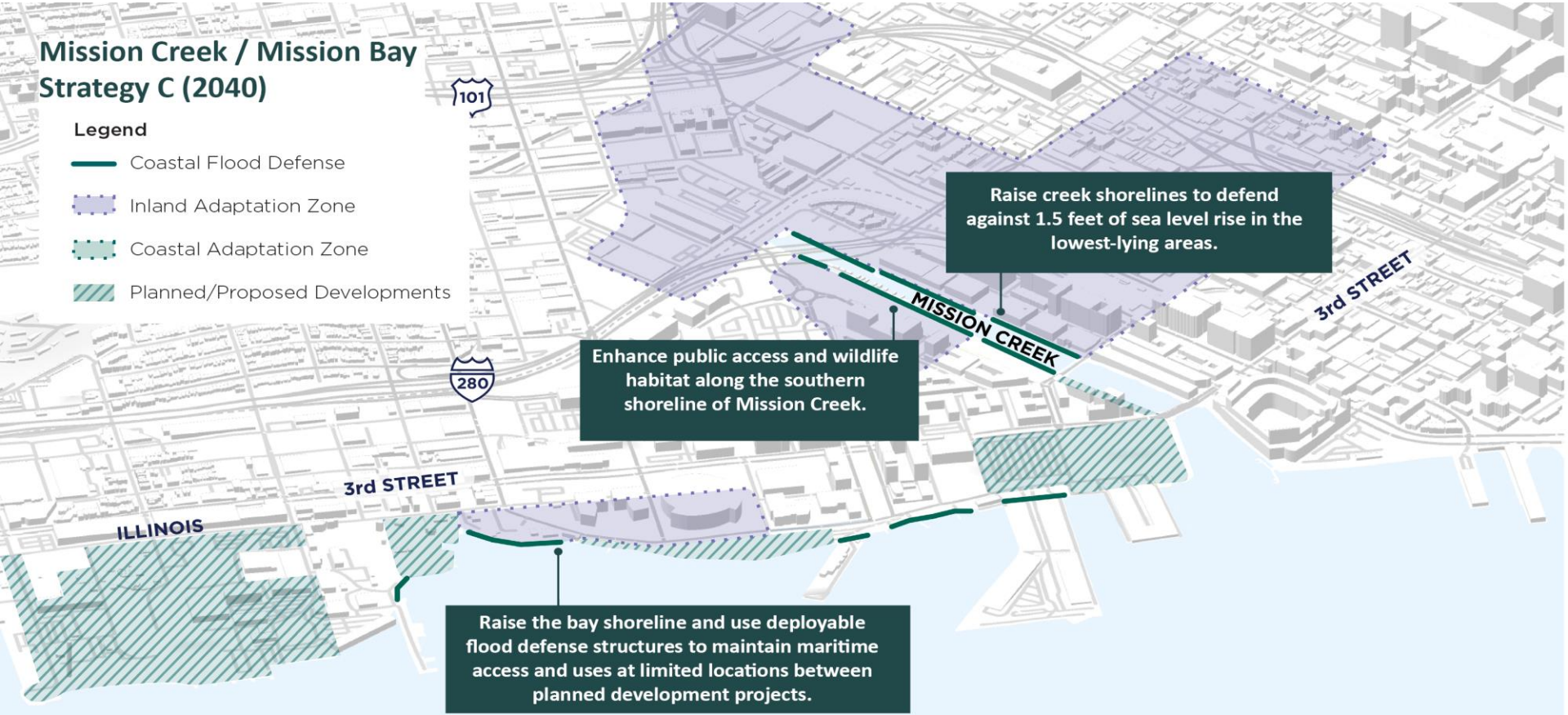

**Adapts the shoreline to withstand 1.5’ of sea level rise by 2040 using a combination of structural and nonstructural measures**

# STRATEGY C – LOWER SEA LEVEL RISE

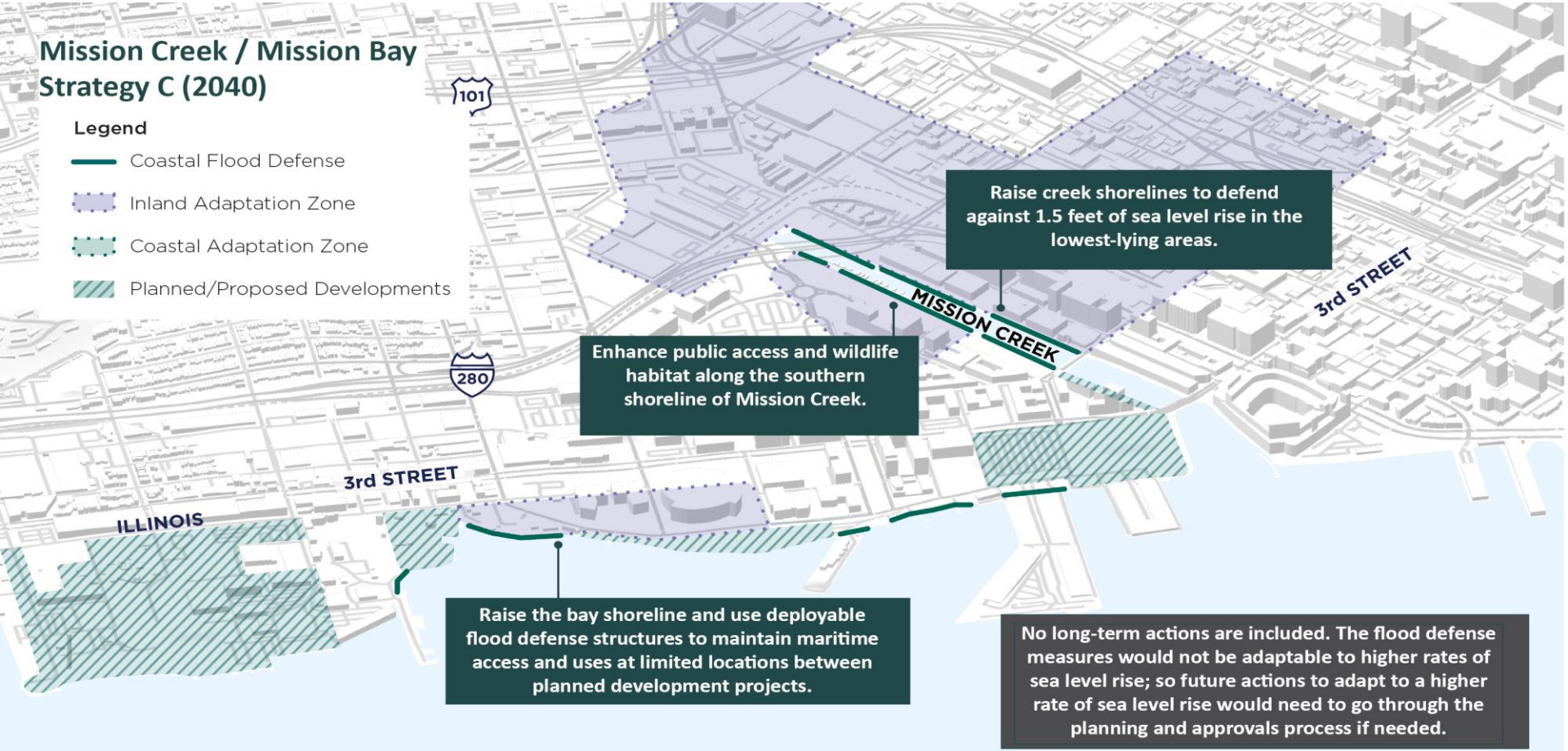
# STRATEGY C – LOWER SEA LEVEL RISE



# STRATEGY C – LOWER SEA LEVEL RISE



# STRATEGY C – LOWER SEA LEVEL RISE




NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

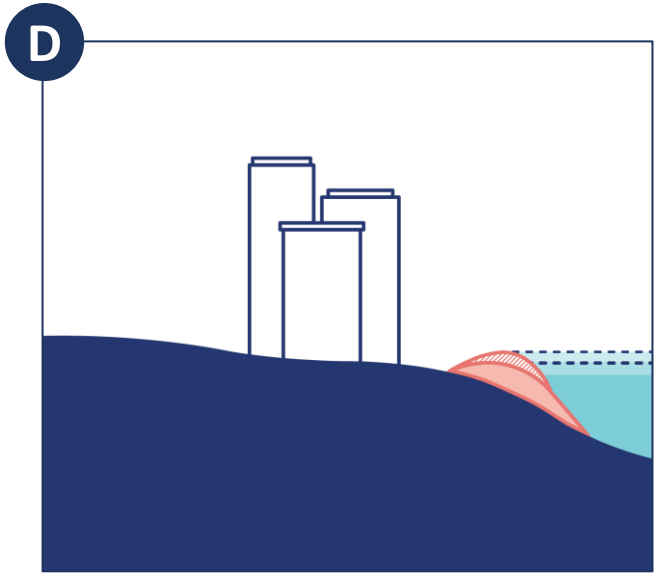
# A NOTE ABOUT POLLS

- Temperature Check
- Not a Vote
- Optional

# POLL QUESTION #3

**Strategy C would cost less by making smaller improvements than other options but assumes a lower rate of sea level rise (and does not include any seismic improvements). Do you support this approach?**

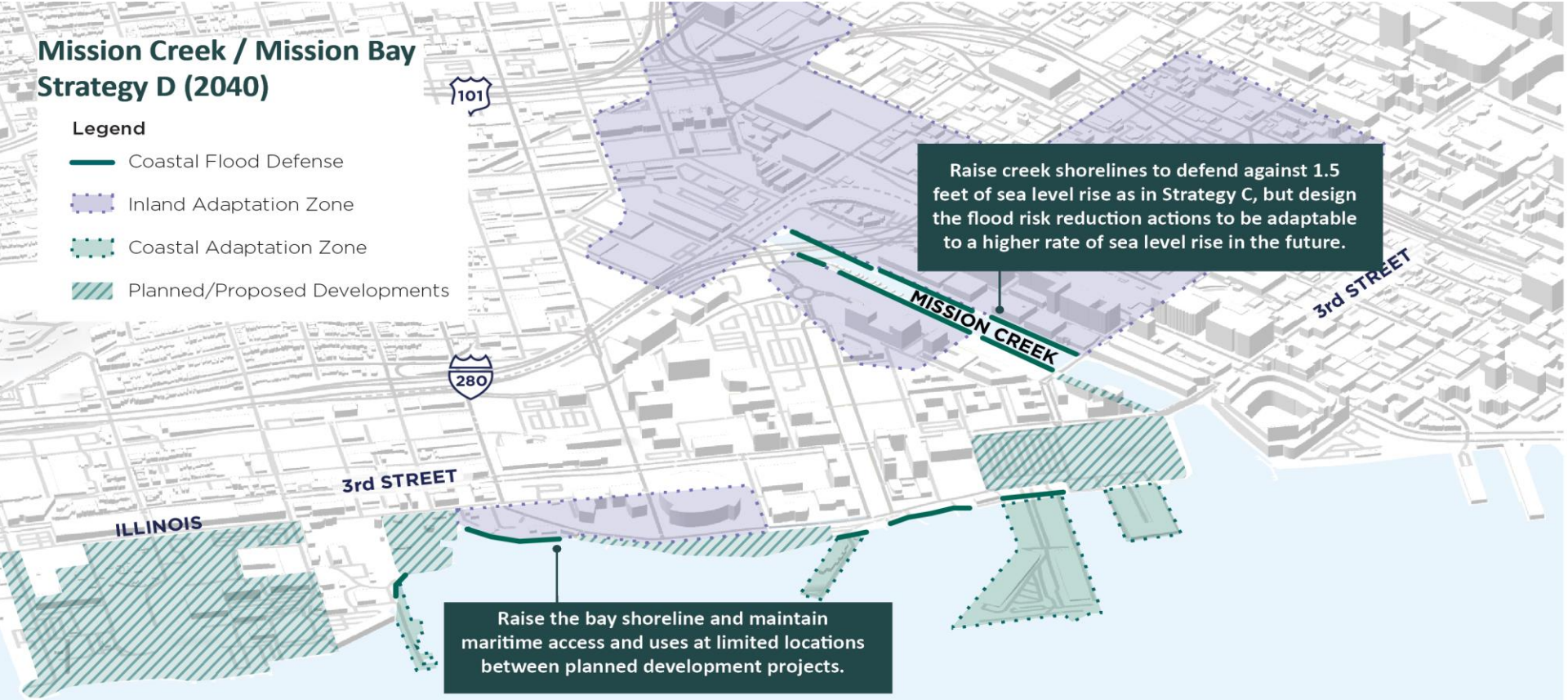
# STRATEGY D – LOWER SEA LEVEL RISE – ADAPTABLE



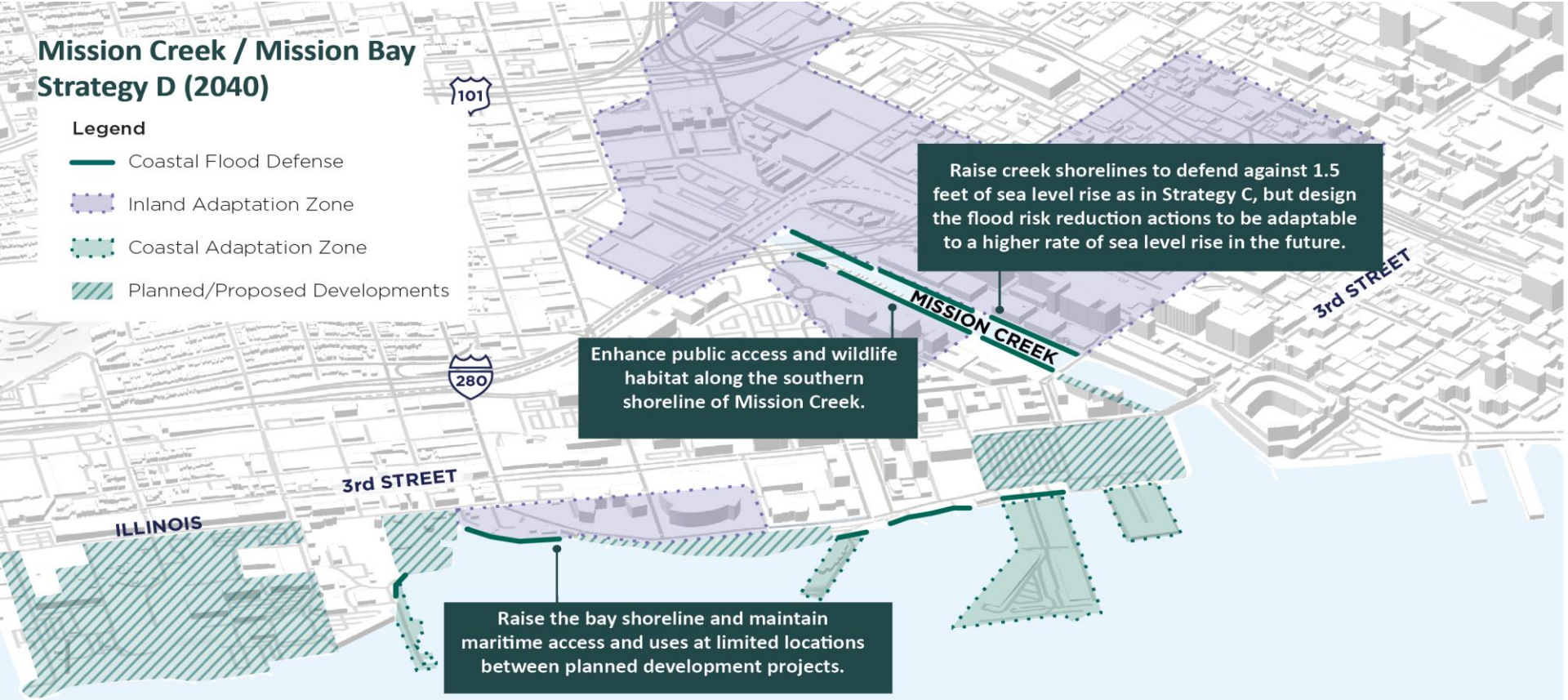

**Adapts the shoreline to withstand 1.5’ of sea level rise by 2040, with the possibility of building higher by 2090**

# STRATEGY D – LOWER SEA LEVEL RISE – ADAPTABLE

# STRATEGY D – LOWER SEA LEVEL RISE – ADAPTABLE



# STRATEGY D – LOWER SEA LEVEL RISE – ADAPTABLE



# STRATEGY D – LOWER SEA LEVEL RISE – ADAPTABLE

# POLL QUESTION #4

**Strategy D would cost less by making smaller improvements than other options but assumes a lower rate of sea level rise. It would be designed to be adaptable to higher sea level rise in the future and includes some seismic improvements. Do you support this approach?**

# USACE SAN FRANCSICO WATERFRONT COASTAL FLOOD STUDY

Focused on Strategies E, F, and G

***What if...***
we **did not adapt** to mitigate the risks?

**STRATEGY A**

***What if...***
we adapted by **floodproofing** and **moving** buildings and assets, *without* coastal flood structures?

**STRATEGY B**

***What if...***
we address flooding at **a lower rate** of sea level rise?

**STRATEGY C**

**STRATEGY D**

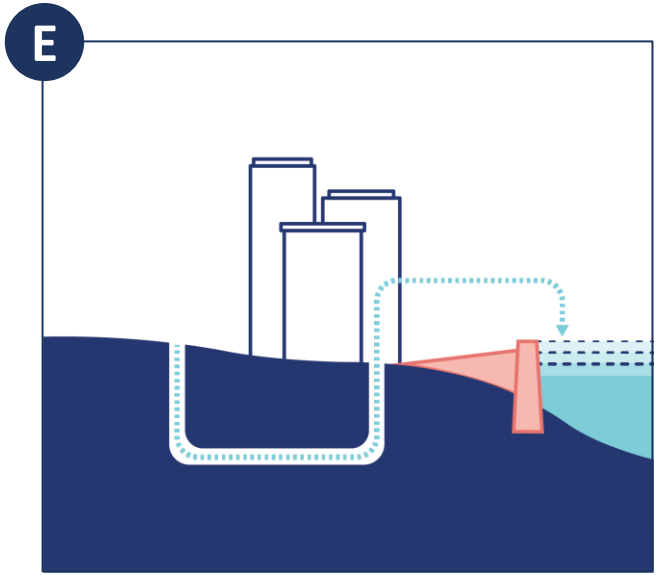
***What if...***
we address flooding **at a higher rate** of sea level rise, as recommended by **CA and SF guidance**?

**STRATEGY E**

**STRATEGY F**

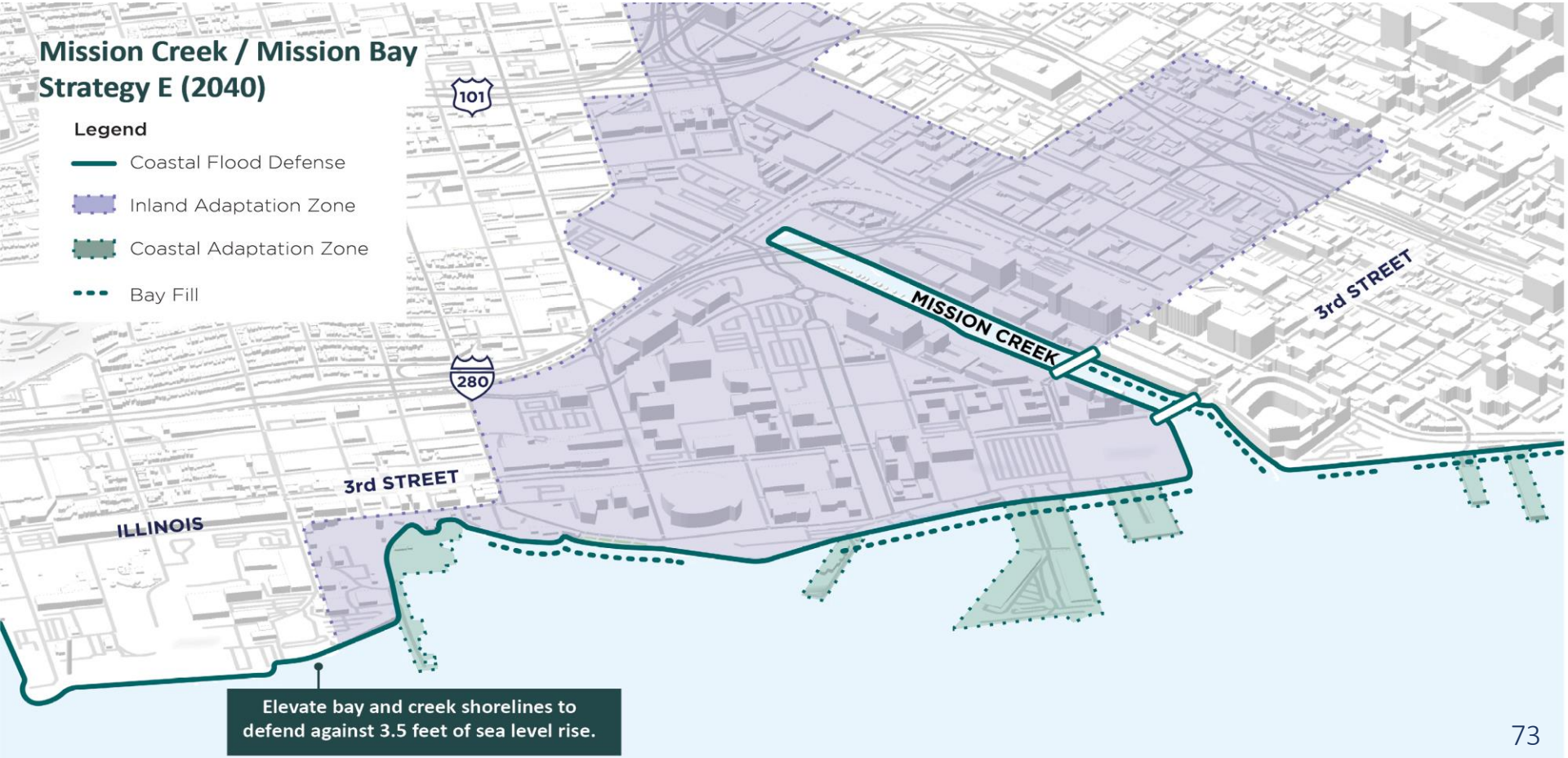
**STRATEGY G**

# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE




**Preserves a waterfront that looks and functions much as it does today by adapting the shoreline**

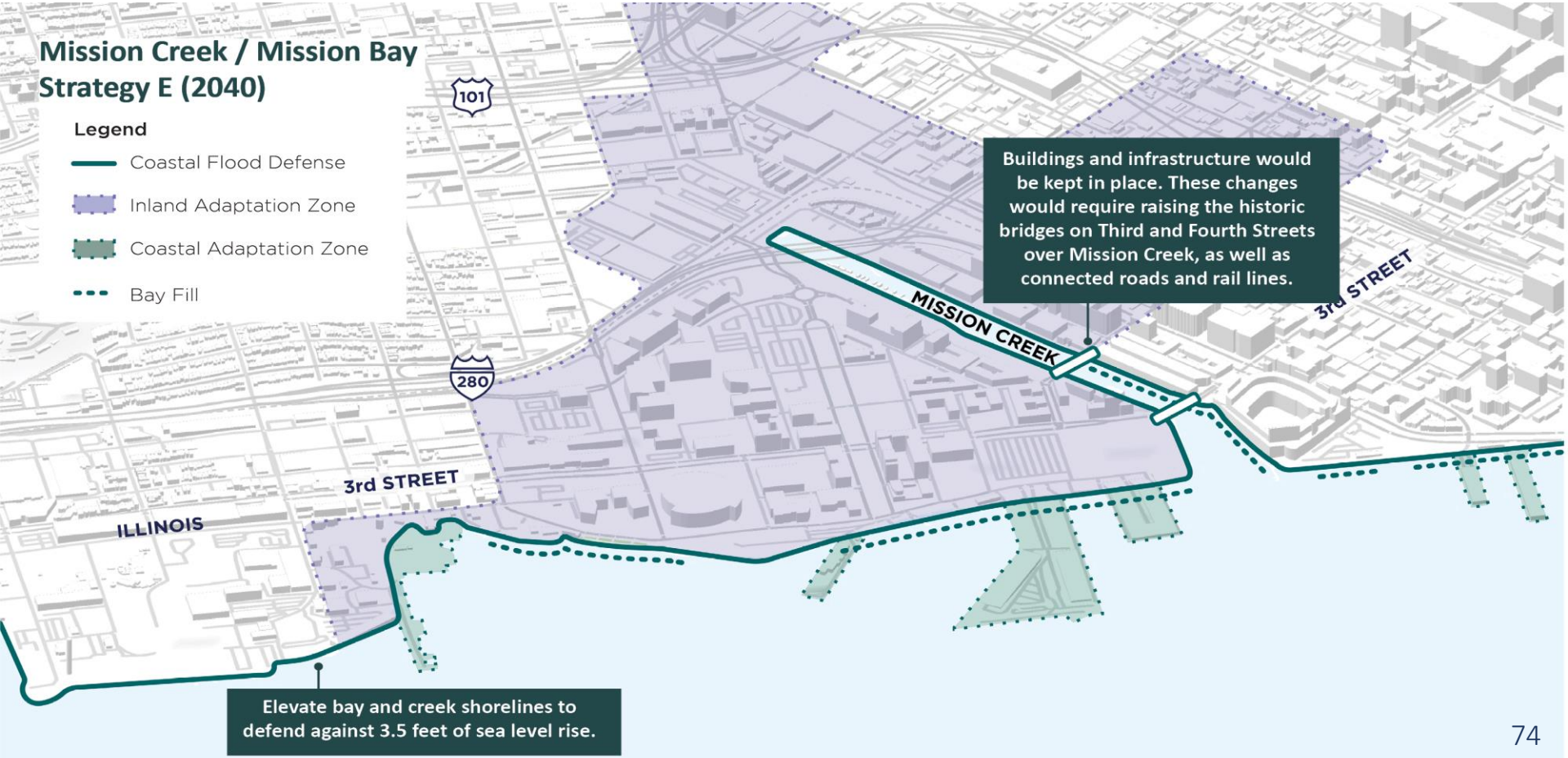
# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE



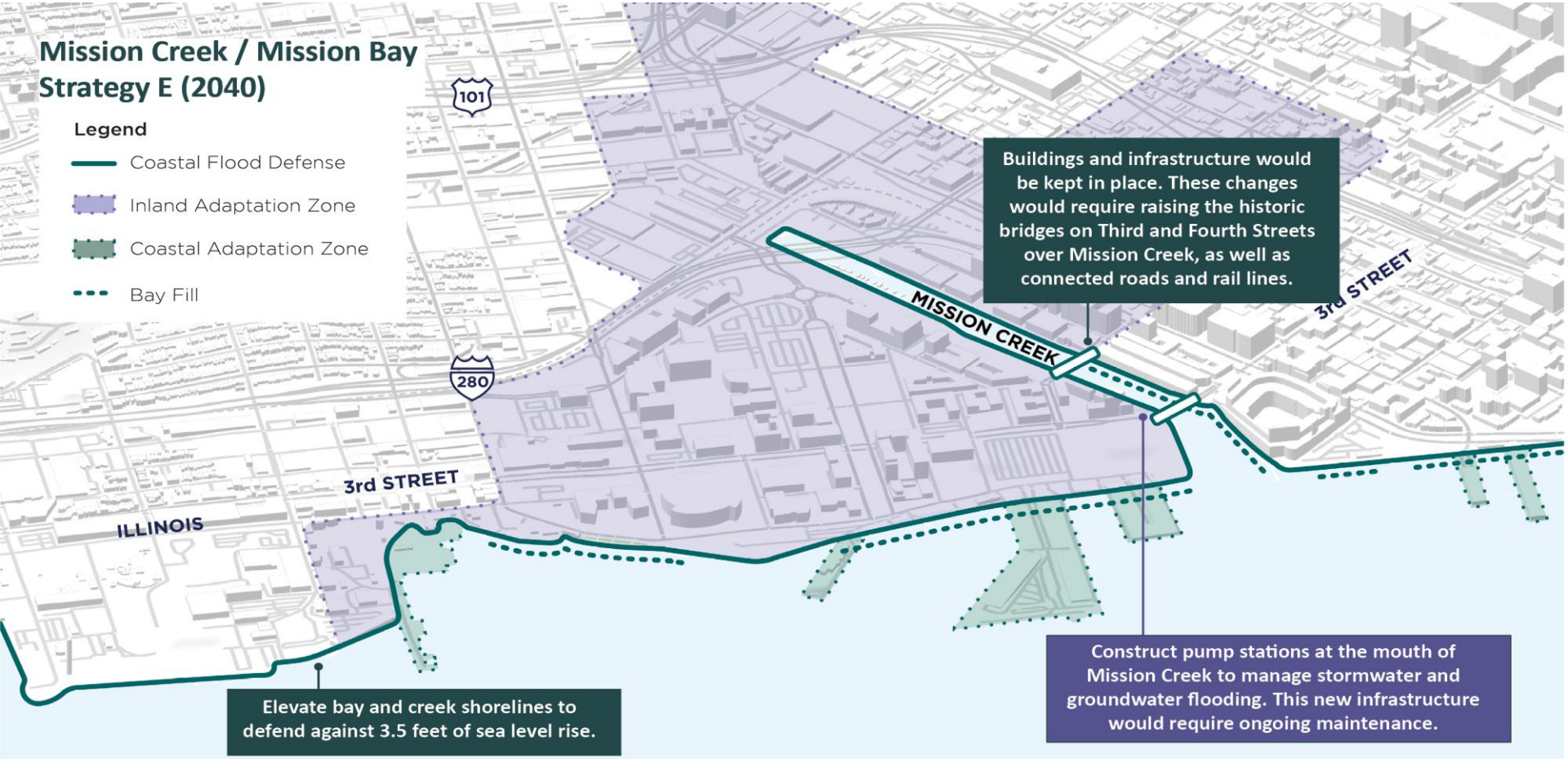



NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE

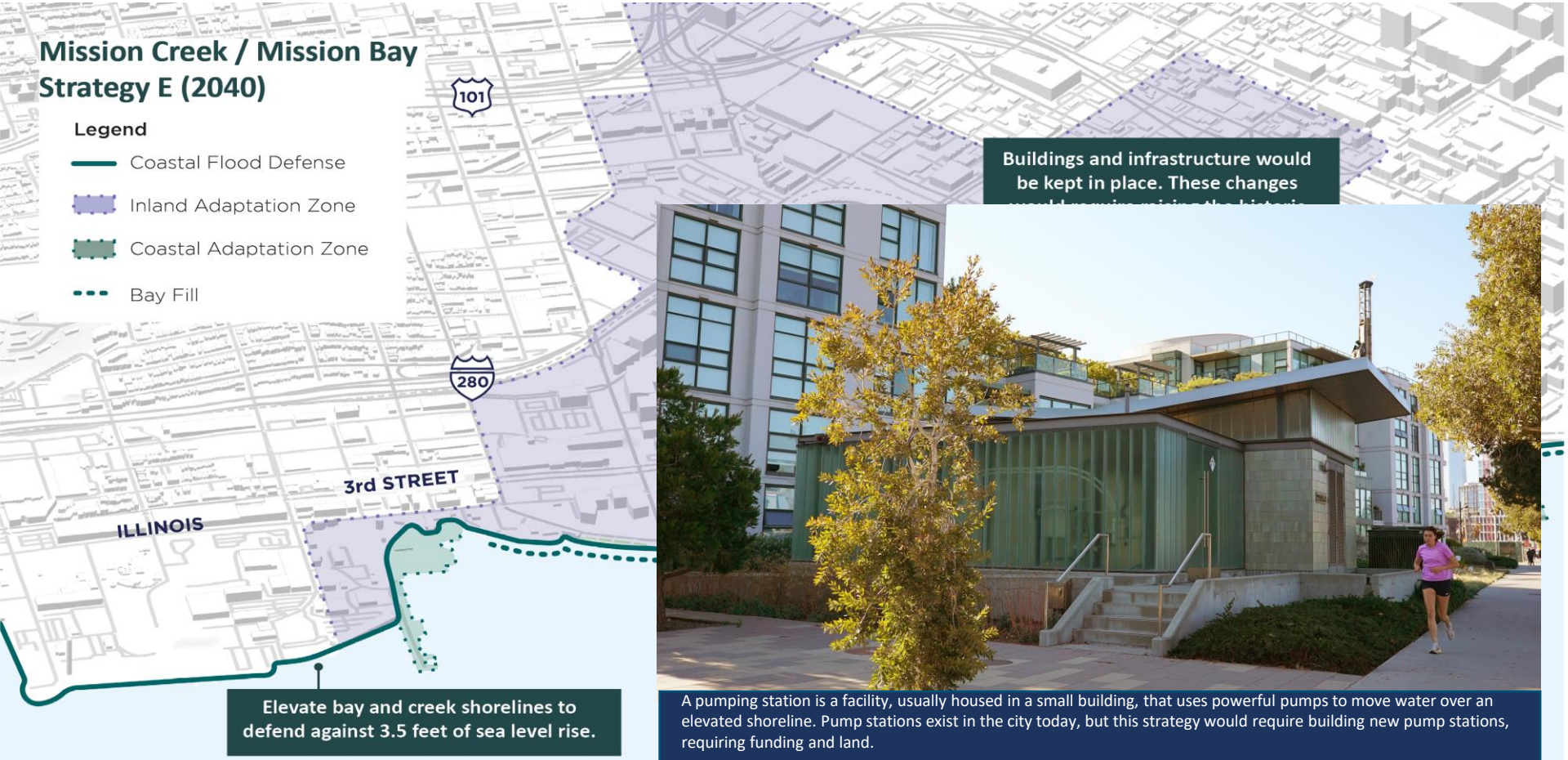


# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE




NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE



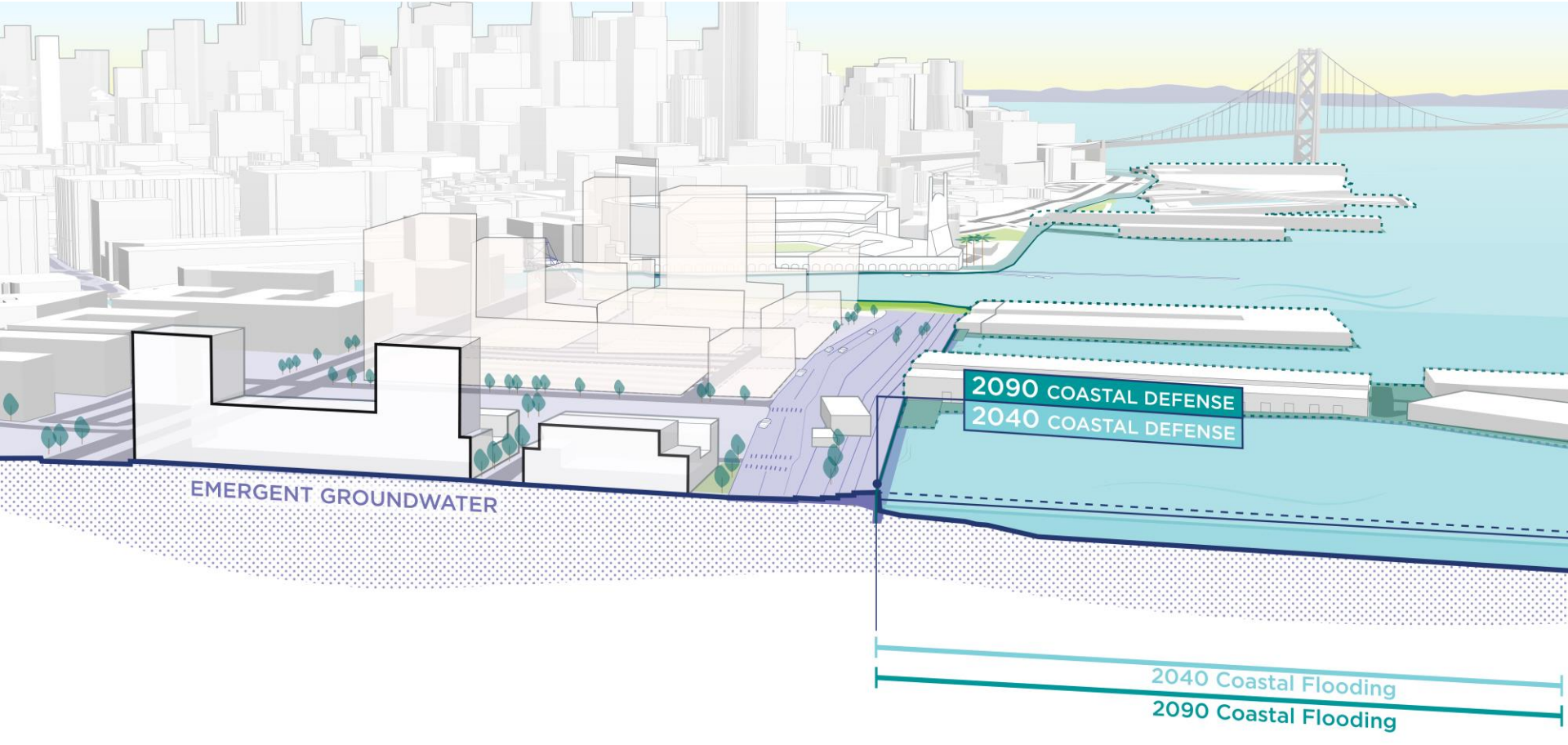

A pumping station is a facility, usually housed in a small building, that uses powerful pumps to move water over an elevated shoreline. Pump stations exist in the city today, but this strategy would require building new pump stations, requiring funding and land.

NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE

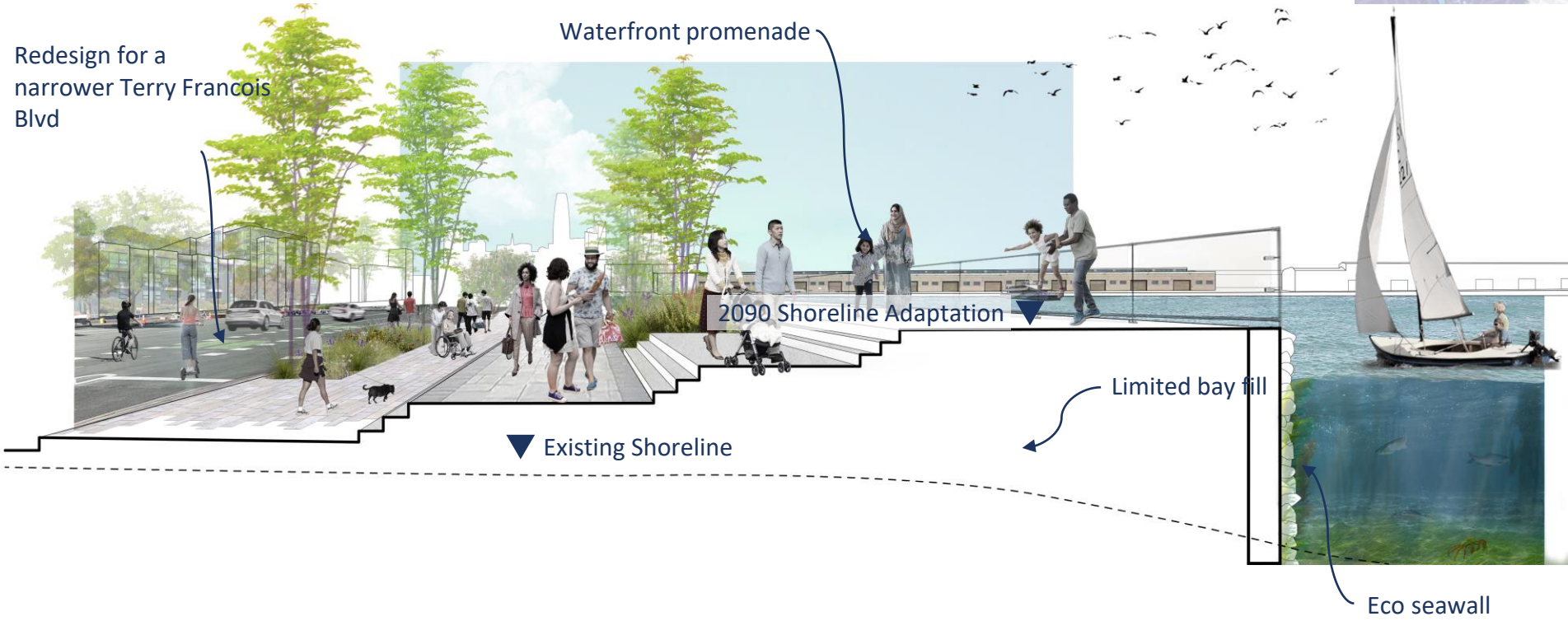
# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE

# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE



# STRATEGY E – HIGHER SEA LEVEL RISE – HOLD THE LINE

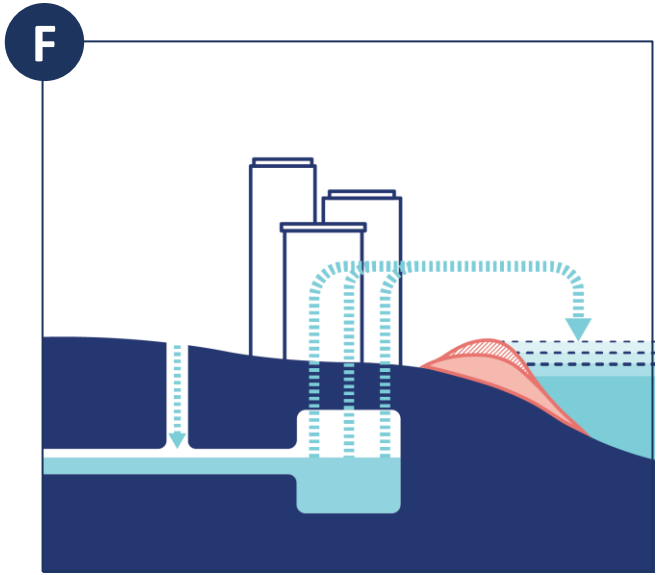
## Mission Creek / Mission Bay in 2090

# POLL QUESTION #5

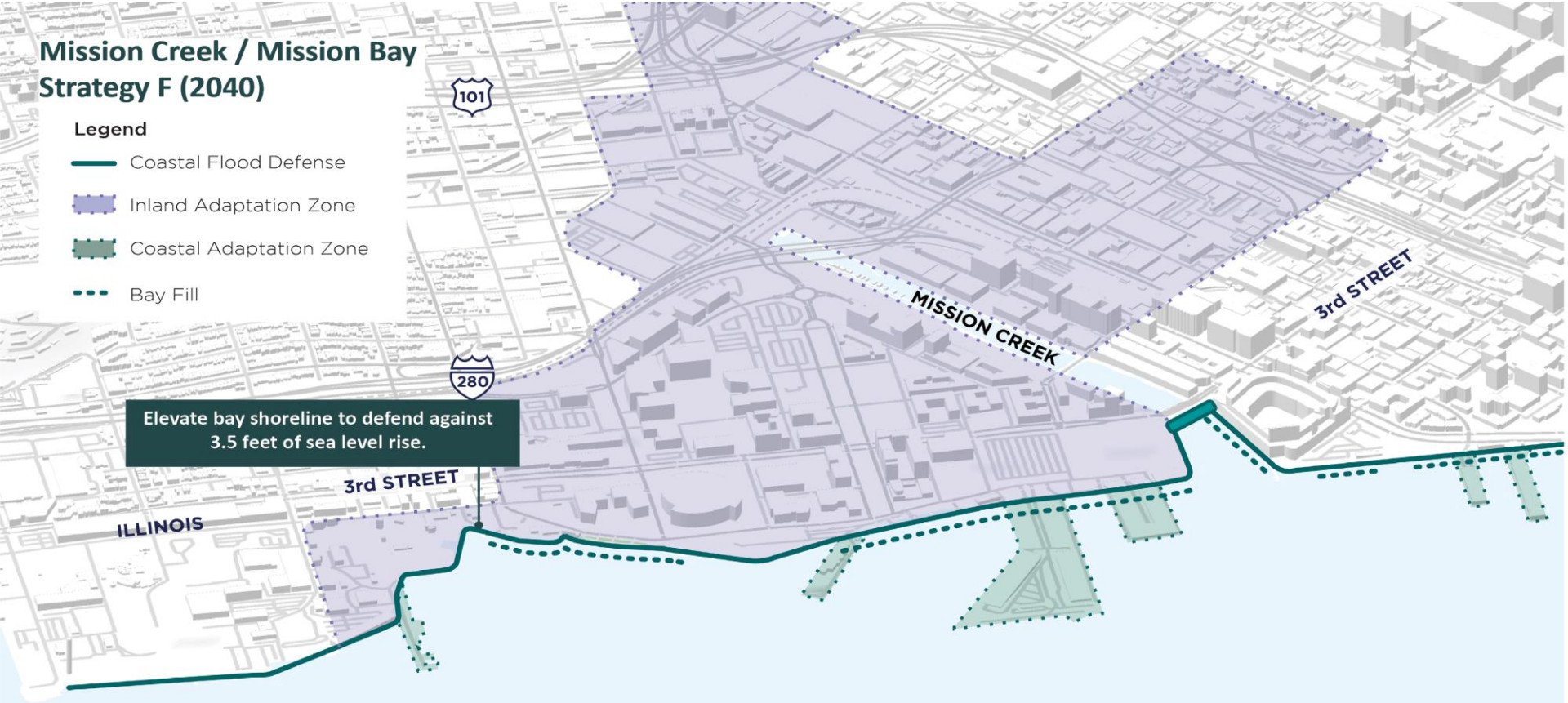
**Strategy E would preserve the current shoreline, streets, and buildings along the Mission Bay waterfront as close as possible to how they are today but would require a redesign of Terry Francois Boulevard and significant pumping infrastructure to manage stormwater and groundwater to reduce flooding within the city. Does this feel like the right priority?**

# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER

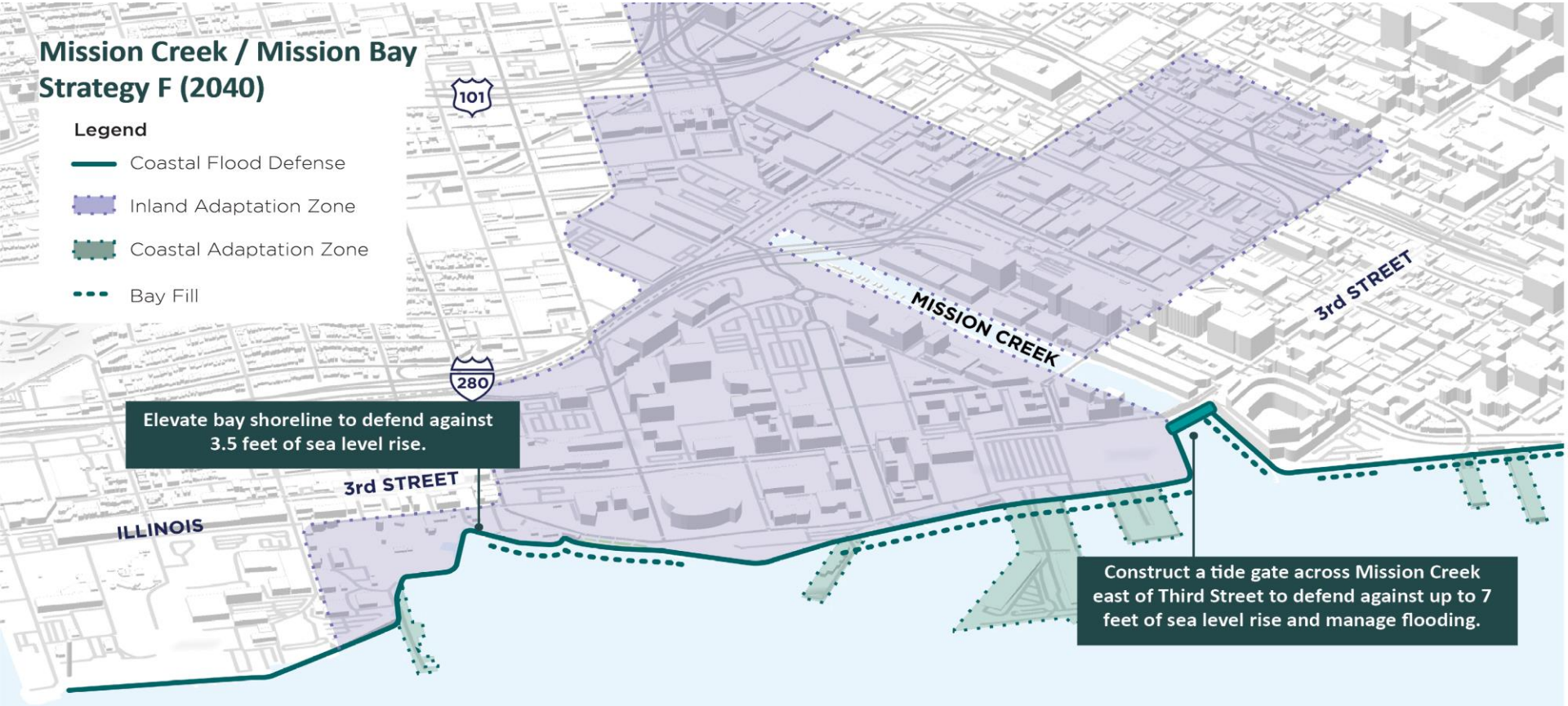



**Creates an active system for managing flooding by heavily relying on machinery**

# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER



# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER






NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

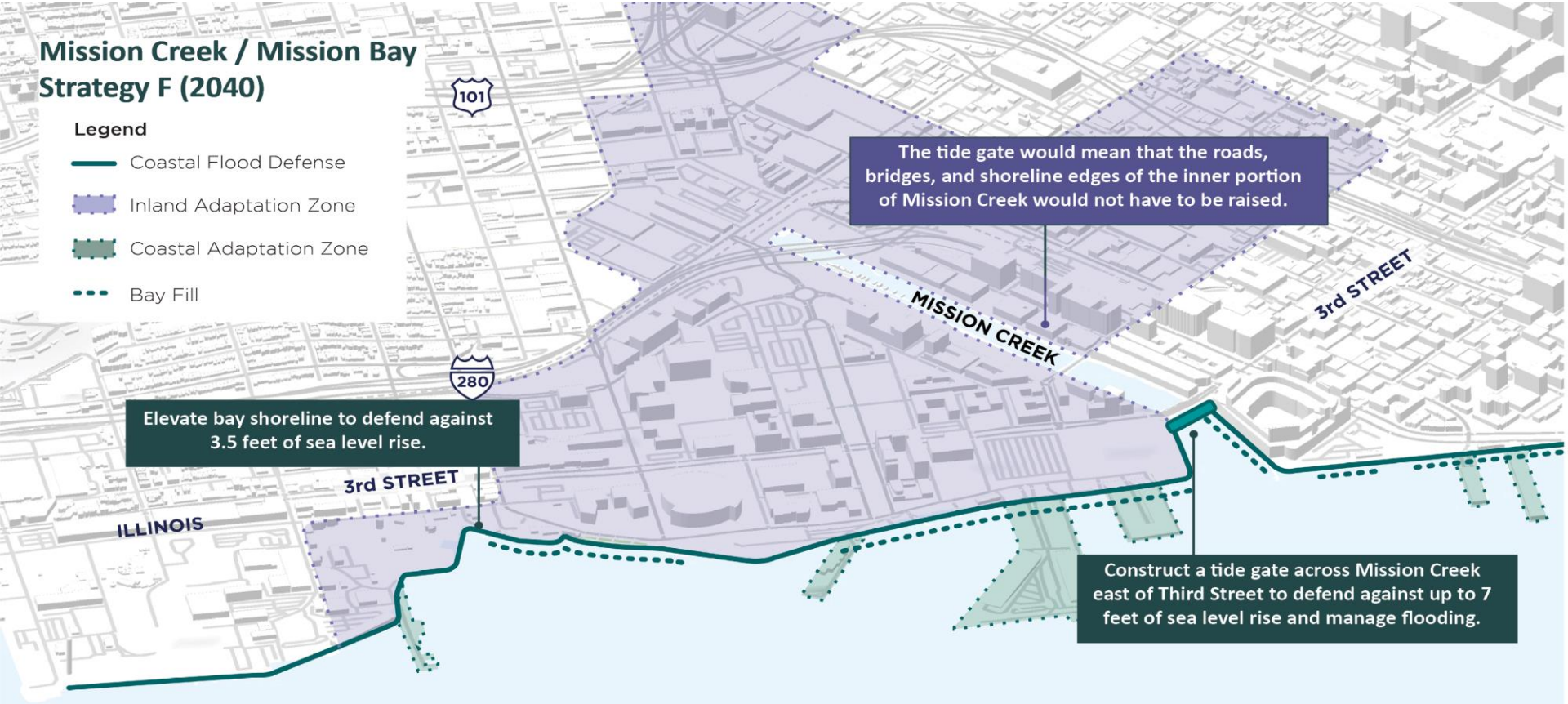
# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER




A tide gate is a structure across a waterway that can be closed to reduce flood risk during storm events or extreme high tides.

NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

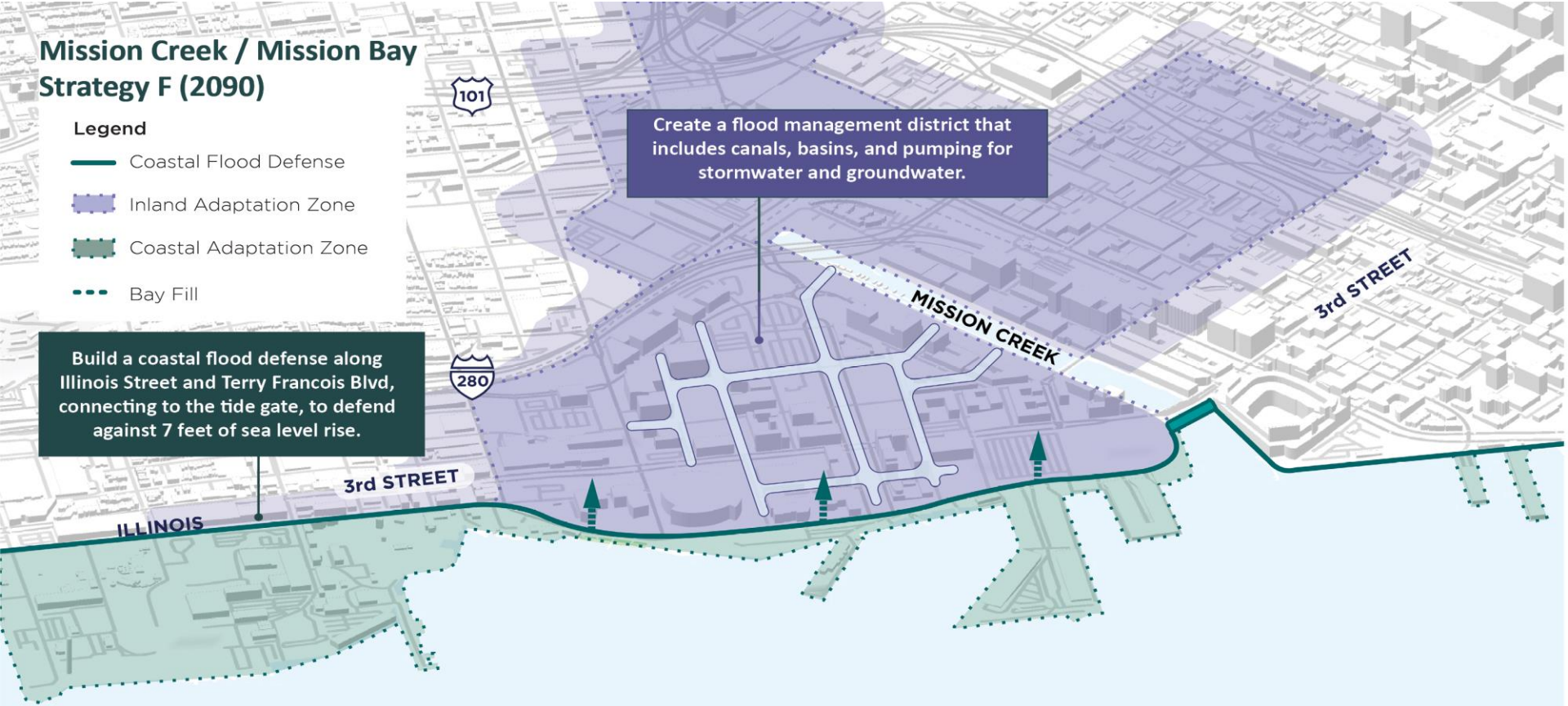
# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER



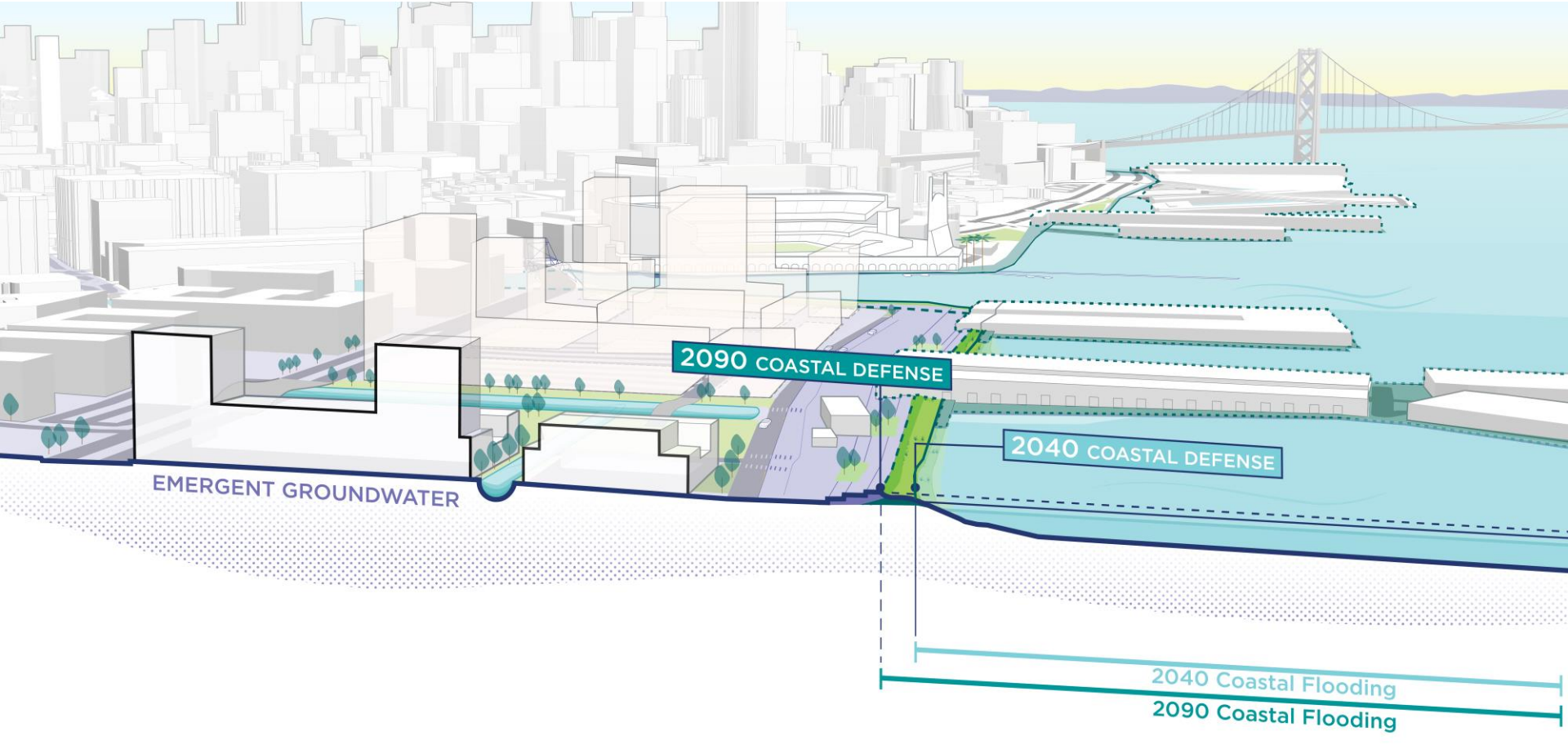
# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER


NOTE: ALL DRAWINGS FOR FEASIBILITY STUDY ONLY. NOT A PROPOSED DESIGN.

# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER

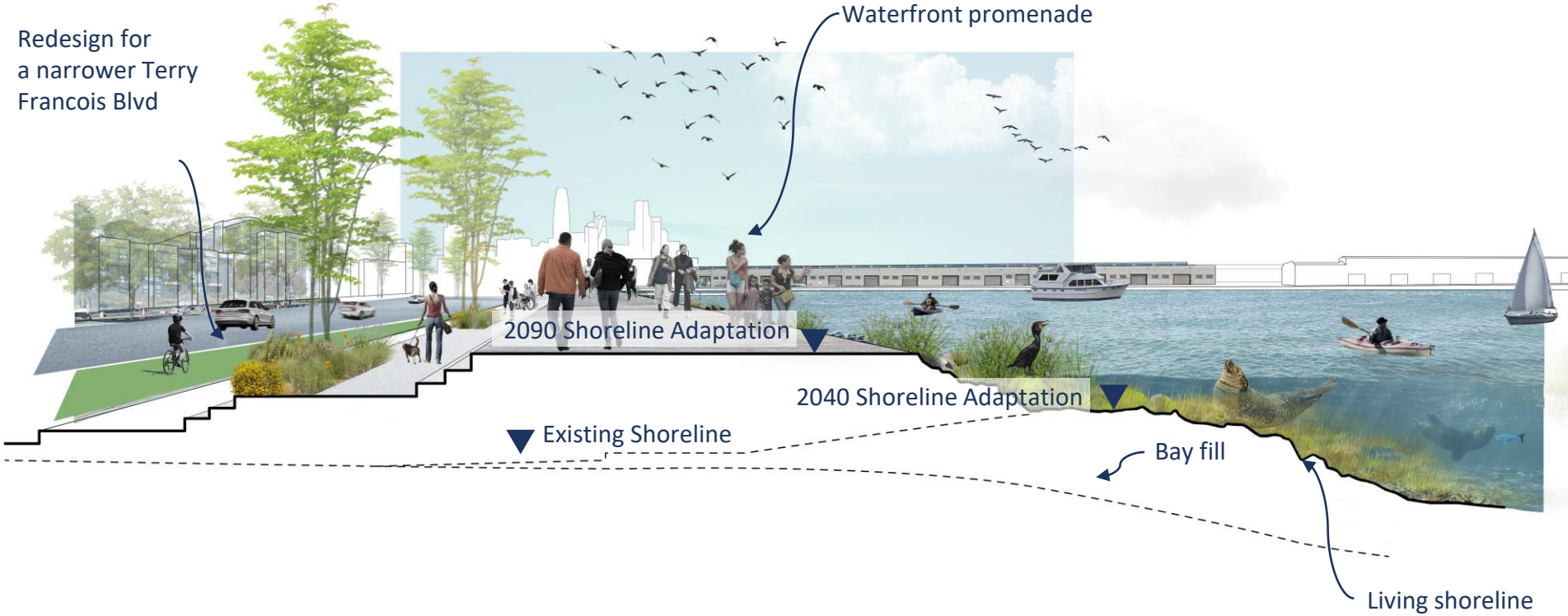


# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER



# STRATEGY F – HIGHER SEA LEVEL RISE – MANAGE THE WATER

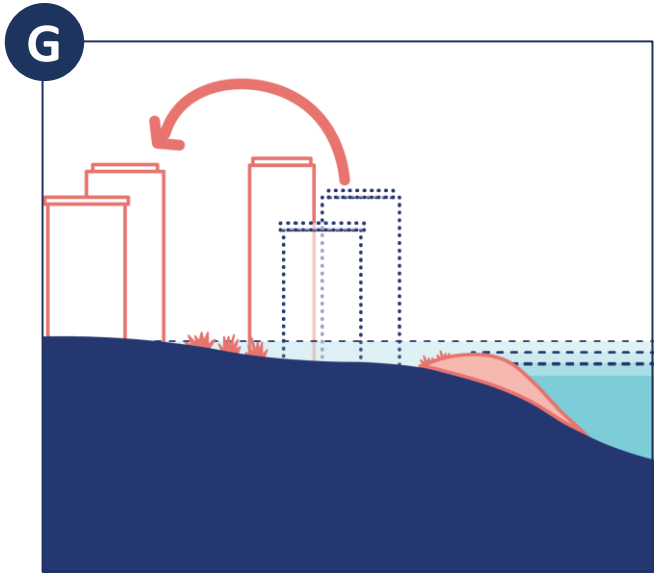
## Mission Creek / Mission Bay in 2090

# POLL QUESTION #6

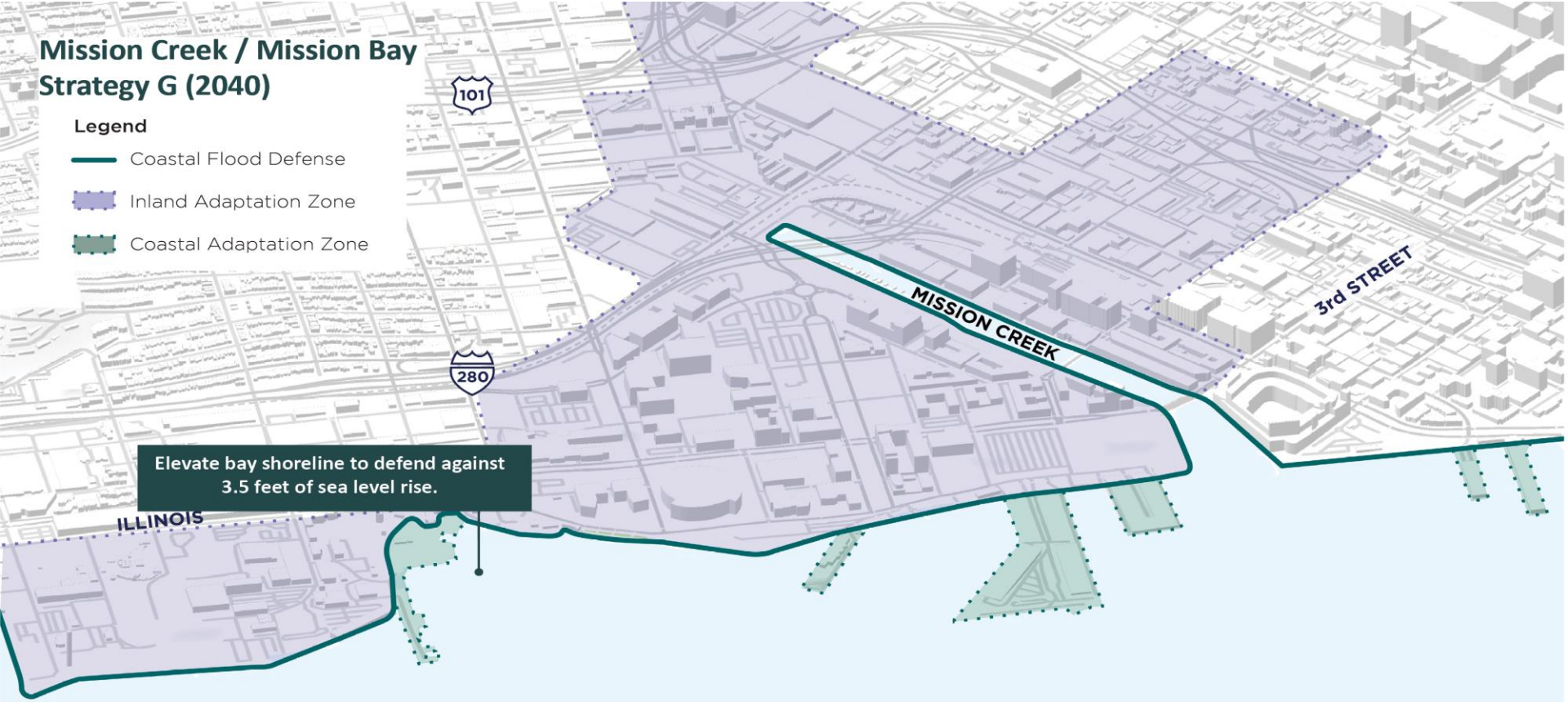
**Strategy F would include tide gates across Islais Creek in the 2040 timeframe which would manage flood water and limit changes needed to inland roads and bridges but would limit opportunities for habitat and Bay ecology in the creeks. How do you feel about this?**

# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS




**Advances shoreline adaptation while working with natural inland flooding patterns to floodproof some buildings and infrastructure and move others away from the highest risk areas**

# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

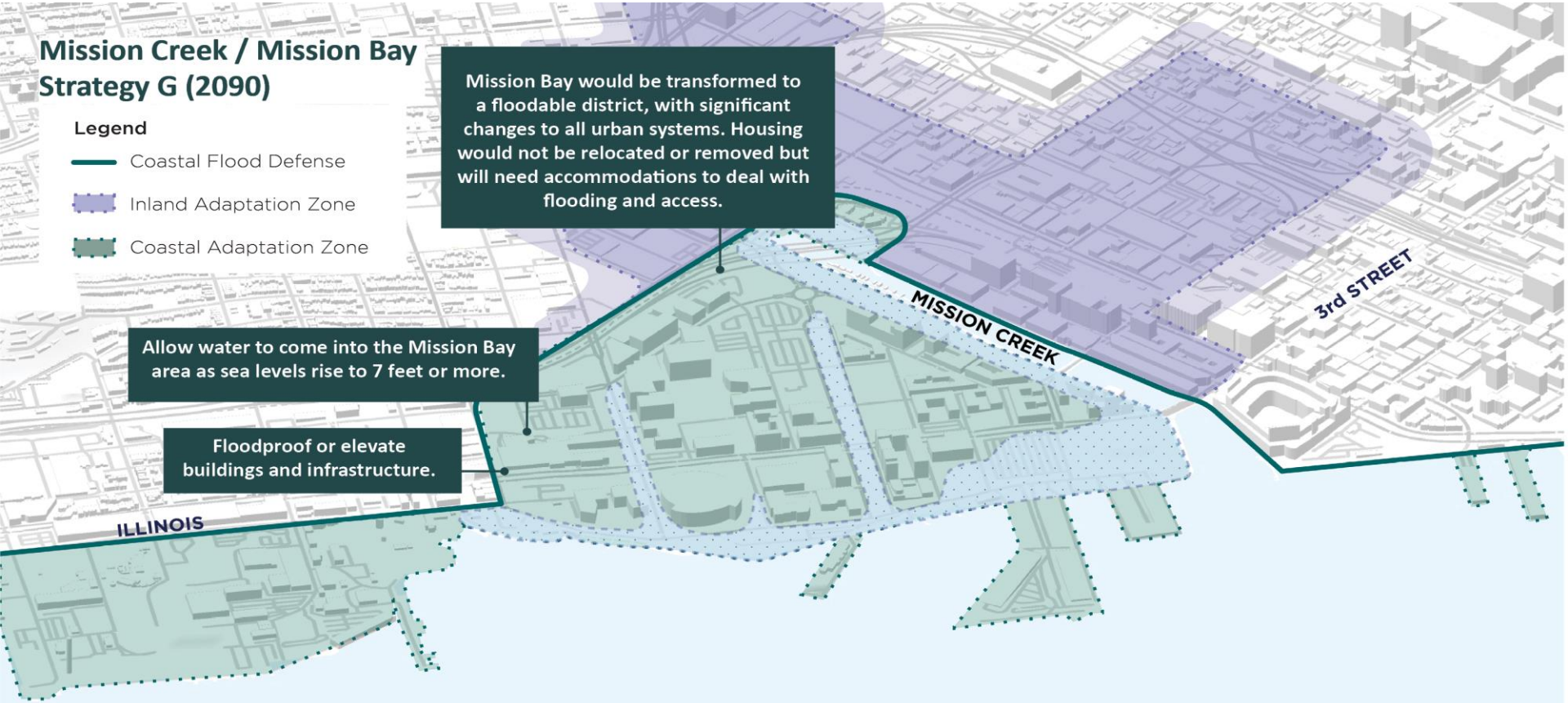


# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

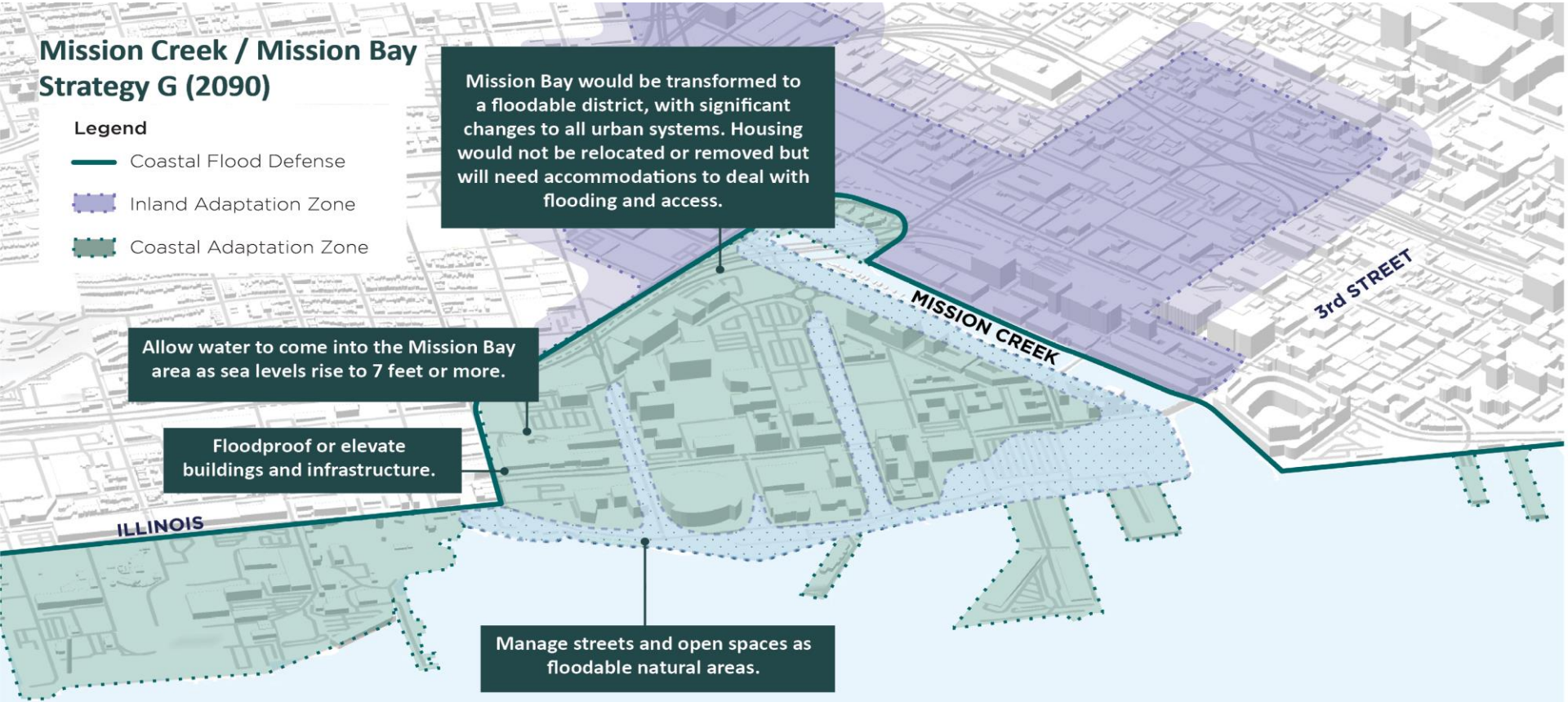
# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

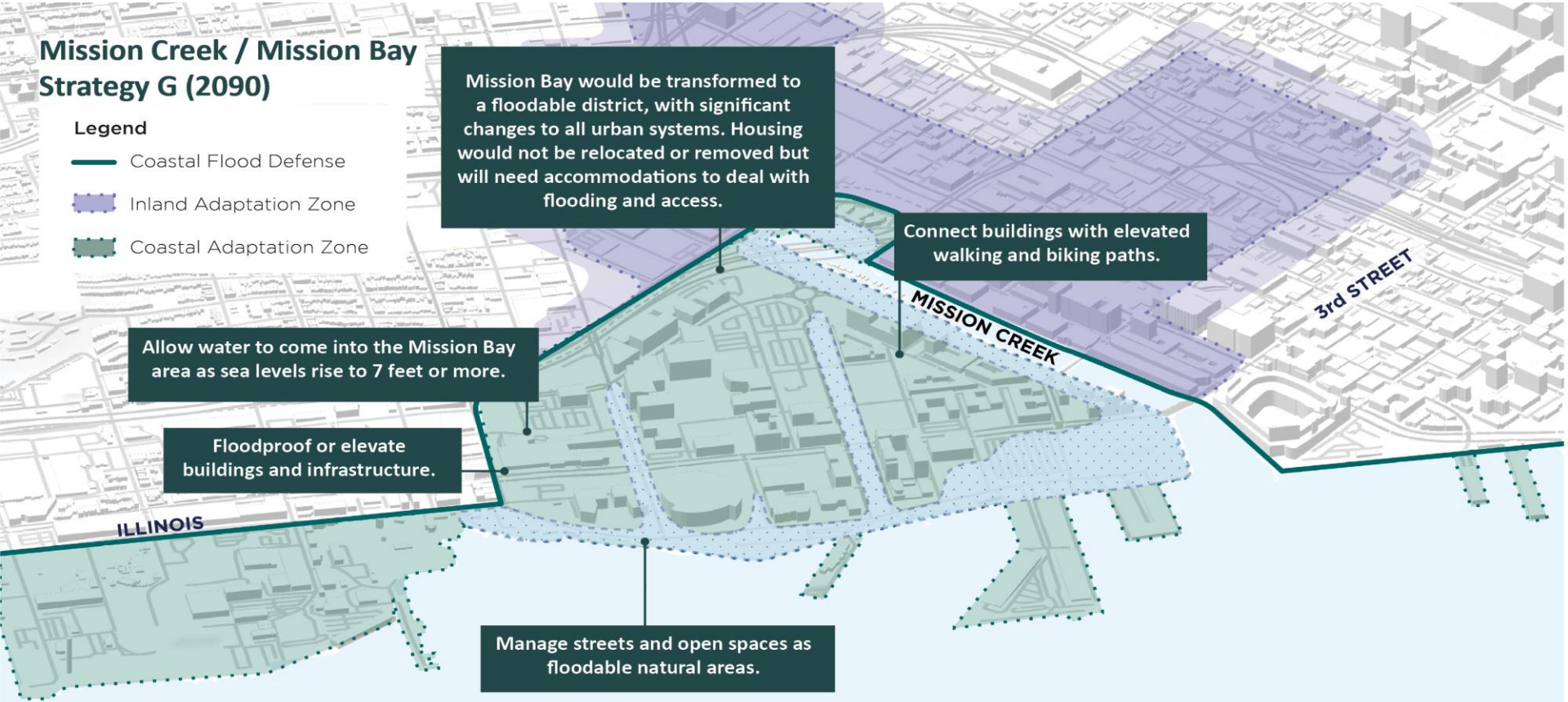
# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS



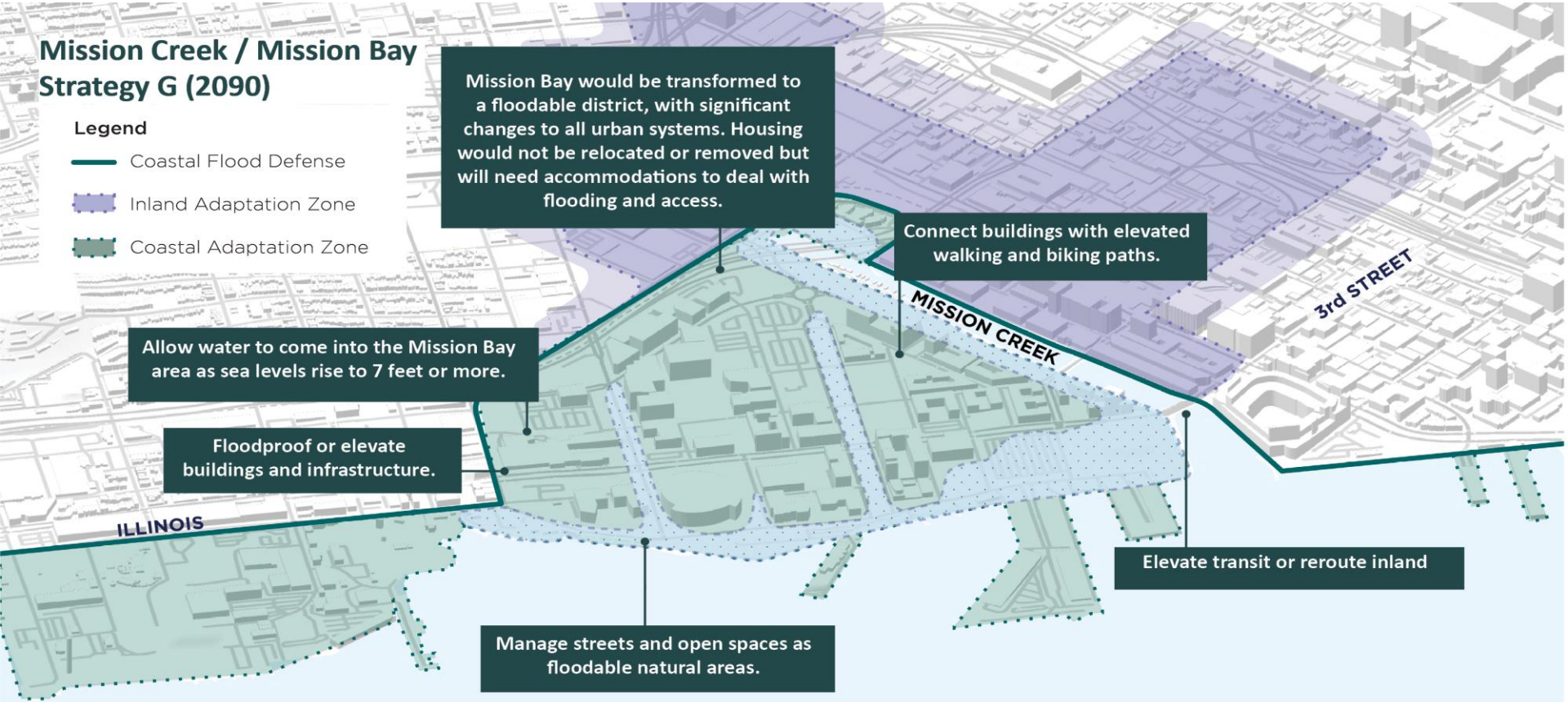
# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS



# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

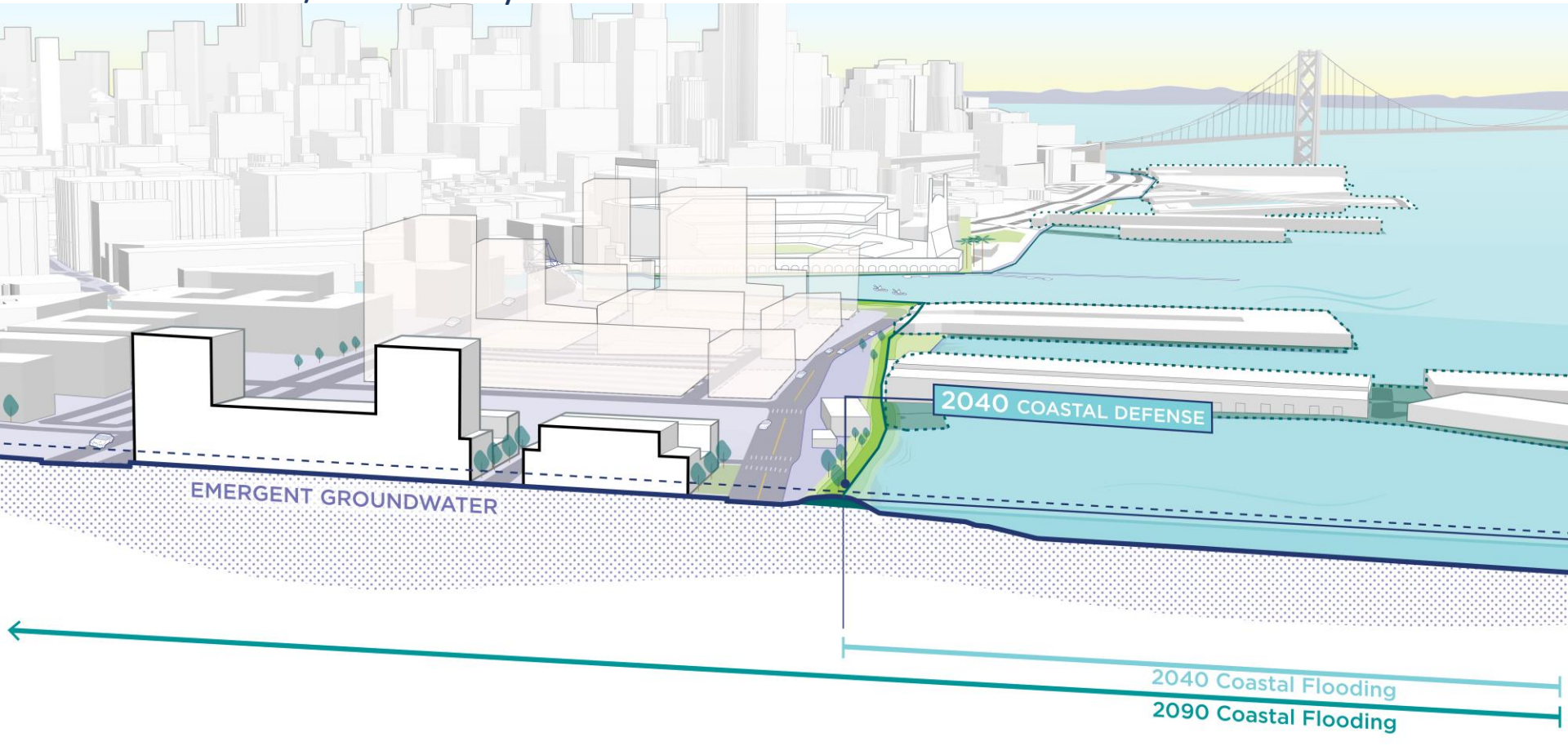


# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS



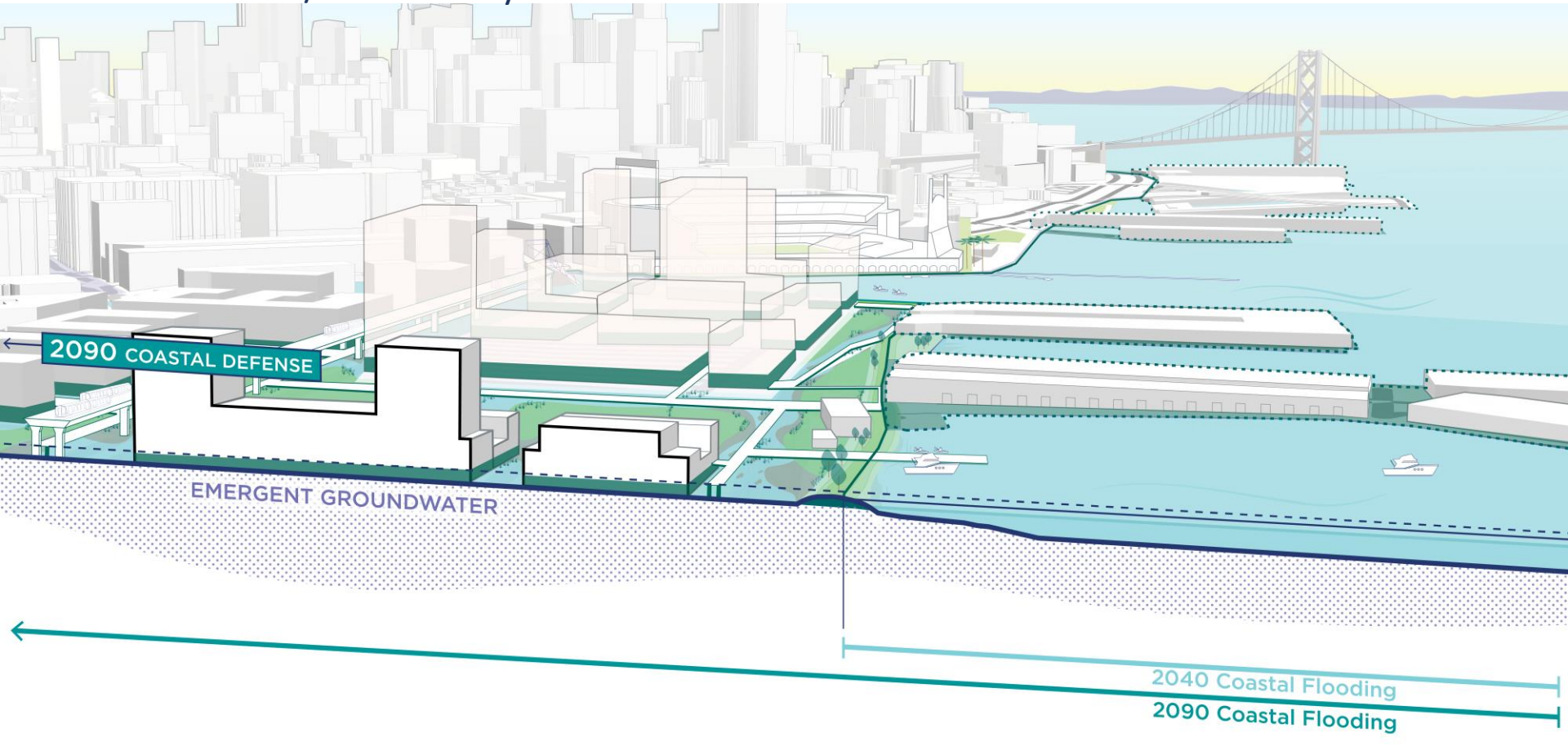
# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

Mission Creek / Mission Bay in 2040



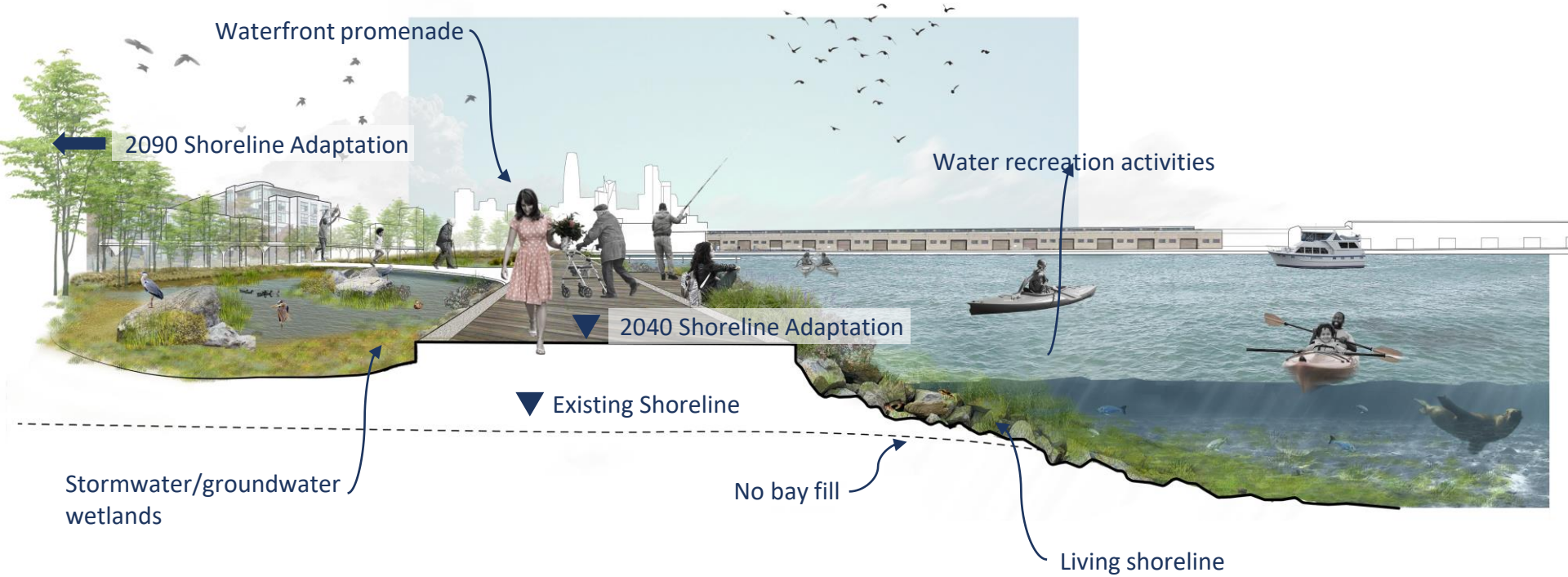
# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

Mission Creek / Mission Bay in 2090



# STRATEGY G – HIGHER SEA LEVEL RISE – ALIGN WITH WATERSHEDS

## Mission Creek / Mission Bay in 2090

# POLL QUESTION #7

**Strategy G prioritizes enhancing habitat and restoring watersheds but requires the most transformational change (like floodable streets and open spaces, elevated walkways, and changes to the transportation network). How do you feel about this?**

# POLL QUESTION #8

These strategies defend against flood risks but do so in different ways. All present big changes, but they also bring big **opportunities** for public benefits. Now that you've seen these strategies for **Mission Creek/Mission Bay**, please rank the following opportunities:

# Next Steps

PORT OF SAN FRANCISCO

Waterfront Resilience Program

# DRAFT WATERFRONT ADAPTATION STRATEGIES DEVELOPMENT SCHEDULE

# COMMUNITY ENGAGEMENT PLAN

| OCT | NOV | DEC | JAN |
|---|---|---|---|

- Materials Live on sfport.com/wrp
- Other Commission Meetings
- Community Workshops / Meetings
- In Person Outreach via Walking Tours and Waterfront Community Mixer
- Digital Engagement via StoryMaps
- Presentations to CACs, southern waterfront CBOs, etc.
- Focus Groups by Geography


# WHAT WE'VE HEARD SO FAR

- Summer Survey of over 1000 respondents
- Openness to exploring many kinds of adaptation approaches (including more transformative options)
- Desire to preserve and expand connections between the city and the waterfront
- Curiosity about feasibility, cost, and disruption impacts

# POLL QUESTION #9

**After this meeting how do you feel about these strategies and the work the Port and its federal and city partners are doing?**

# JOIN THE CONVERSATION

## Different Options for Engaging


- Join us at an upcoming geography specific meeting – online or in-person
  - Events weekly now through Dec 8
- Explore the online StoryMaps, digital storytelling and surveys
- Join us at the upcoming walking tour or in-person Community Mixer
- Full list of engagement opportunities: [www.sfport.com/wrp/our-waterfront](www.sfport.com/wrp/our-waterfront)

# Thank You

Luiz Barata | luiz.barata@sfport.com

PORT OF SAN FRANCISCO

Waterfront Resilience Program

# QUESTIONS & ANSWERS

- Type your question in the Chat box
- Use the "Raise Your Hand" button to ask a question off mute

# Thank You

Luiz Barata | luiz.barata@sfport.com

PORT OF SAN FRANCISCO

Waterfront Resilience Program