

A photograph of a flooded residential street. In the foreground, a white SUV is partially submerged in water. To the right, a modern two-story house with large windows and a balcony is visible. In the background, a marina with many sailboats is visible under a clear blue sky. The water is calm, reflecting the sky and the buildings. Two ducks are swimming in the water. The overall scene illustrates the impact of sea level rise on coastal communities.

SEA LEVEL RISE

Kate Hagemann,
Climate Adaptation & Resilience Planner
City of San Rafael, California



San Rafael,
California

WITH WATER LEVELS 12 INCHES ABOVE HIGH TIDE

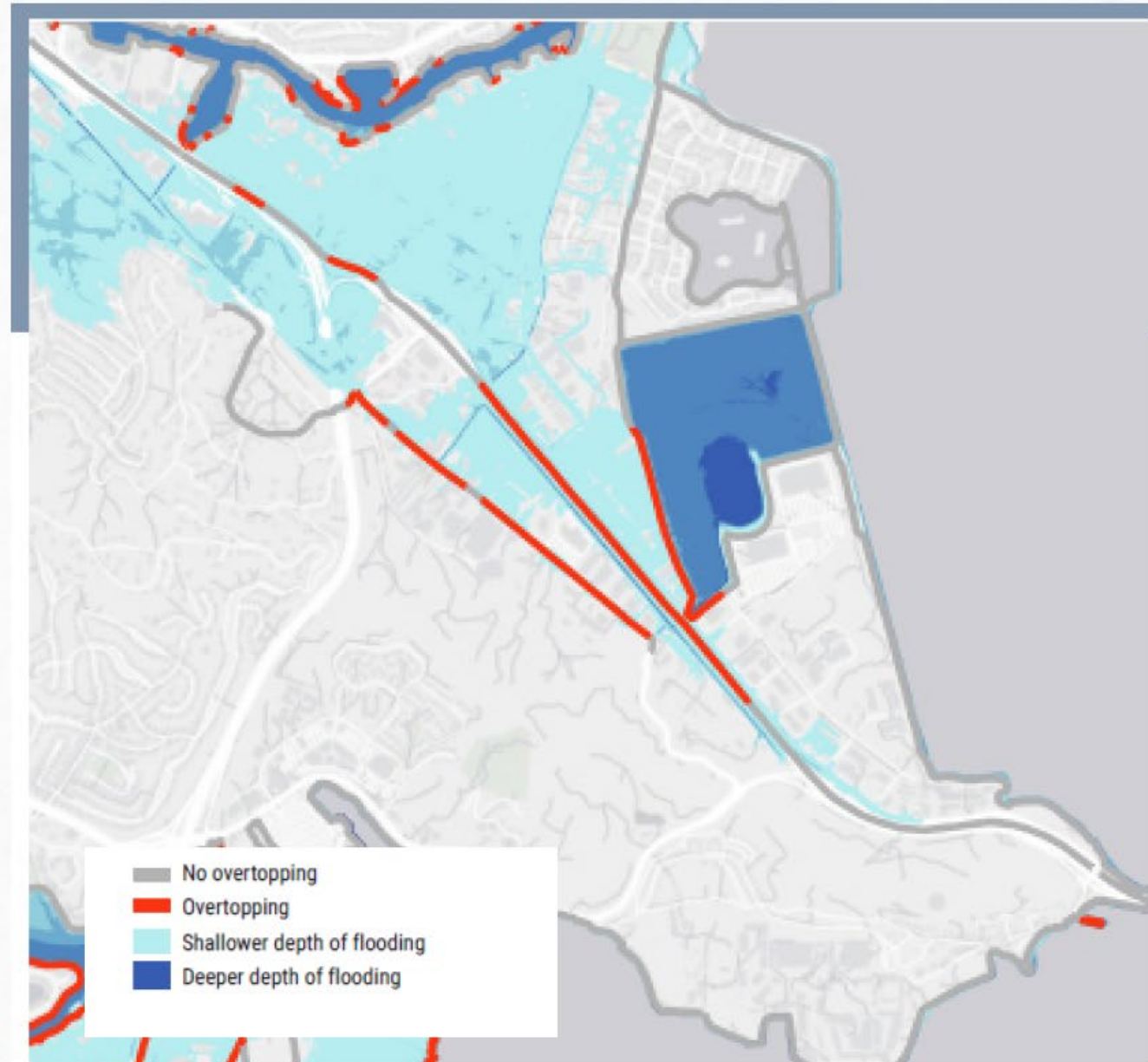
SEA LEVEL RISE

BCDC
Vulnerability
study

2020

Assesses existing flood risk and risk that includes SLR, developed reasonable SLR adaptations, evaluate measures and characterize costs & benefits

"This [area] has the highest proportion of people flooded at early water levels of the 30 [areas] throughout the region"



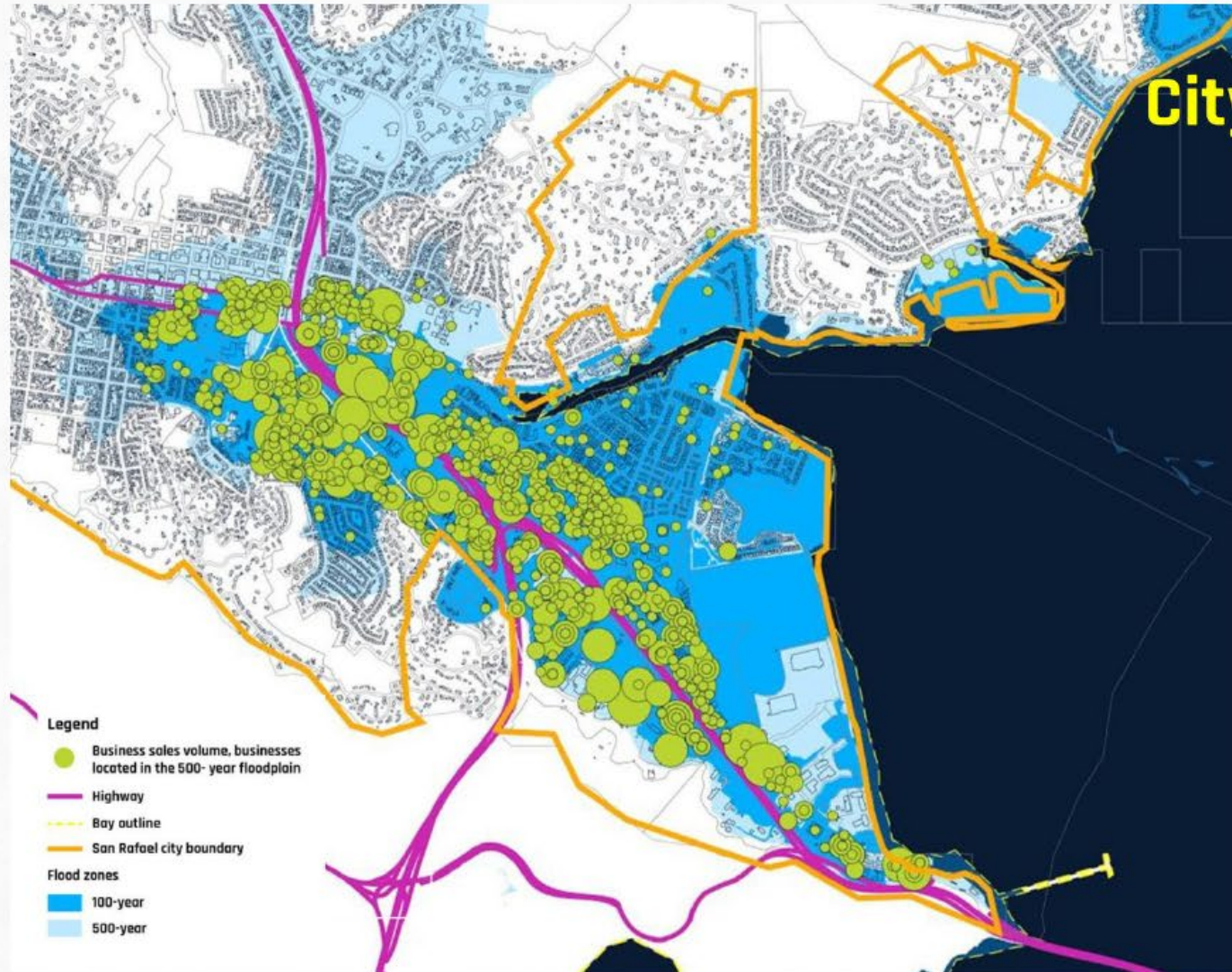
SEA LEVEL RISE



Resilient by Design

2018

Design competition, emphasized innovation, and also included analysis of risk



City of San Rafael

ASSETS AT RISK
500-year event

5,423
residential units

12,826
jobs

\$3.95 B
land value

\$2.95 B
business revenue



Sea levels have already
risen 8 inches





FLOOD DEPTHS IN FEET
2040
MHHW 7.87 ft

San Francisco Bay



+ 4.5 ft flooding





high ground



low ground



high ground



low ground



Spinnaker & Baypoint

Building land

downtown

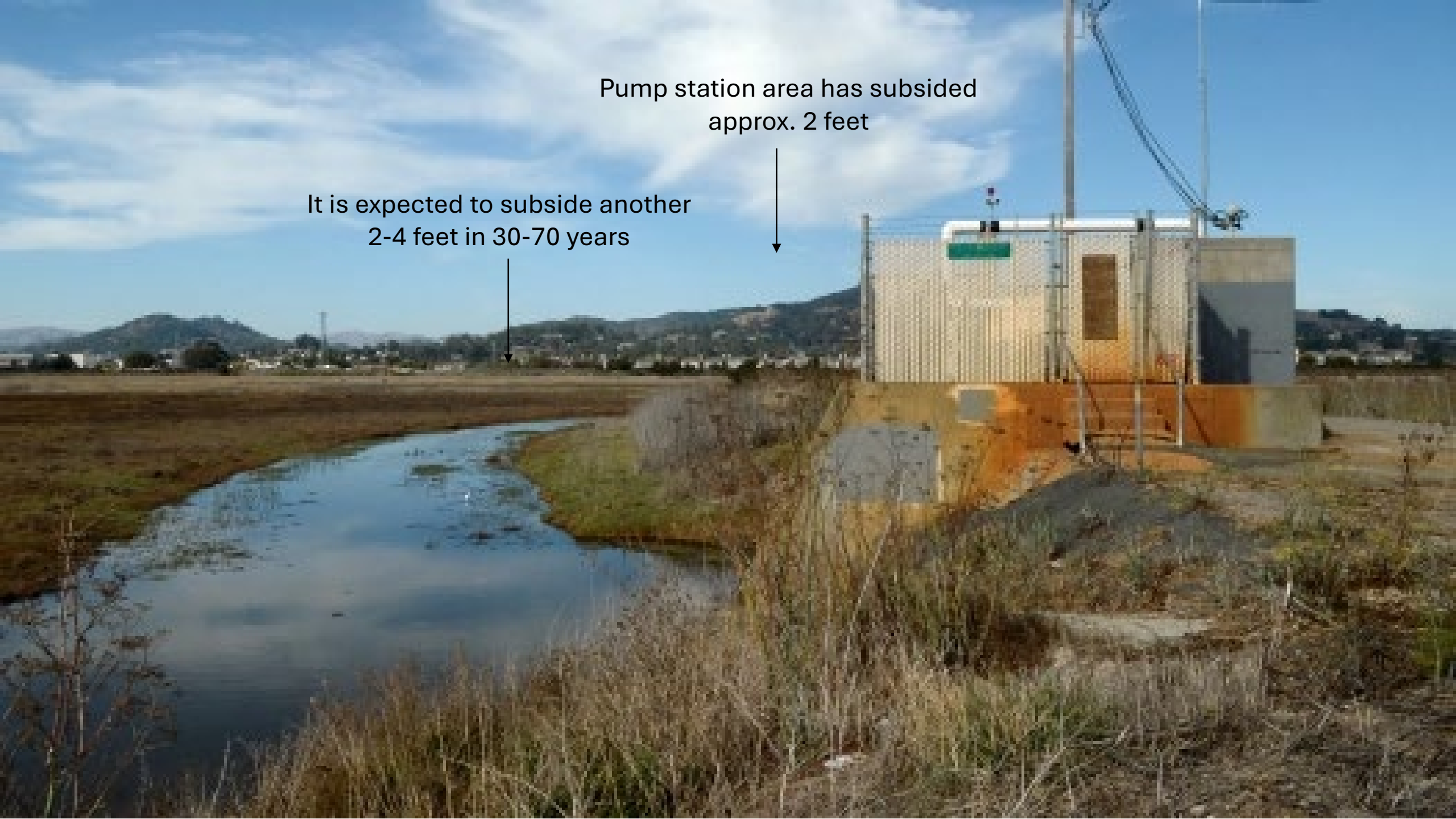


Building land



“Much of the fill was placed haphazardly at varying elevations and consisted of dredged material, refuse, building rubble, and quarried material. Because of the soft underlying bay mud, this fill has settled to varying degrees, further complicating the drainage of the diked areas and increasing the impacts of flooding” – US Army Corps (1992)



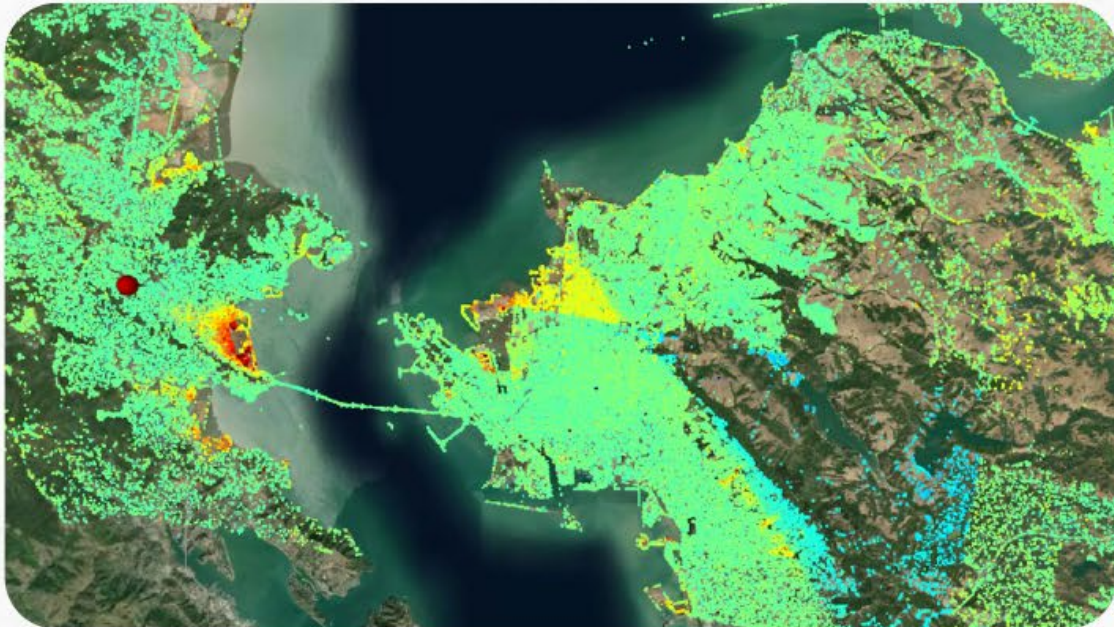


Pump station area has subsided
approx. 2 feet

It is expected to subside another
2-4 feet in 30-70 years

SEA LEVEL RISE

SUBSIDENCE



6 in

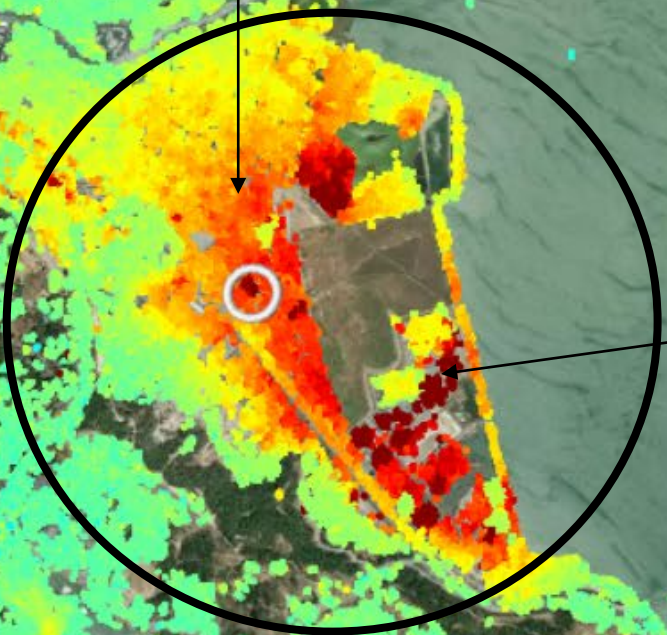
subsidence

Fastest in the Bay area, some areas
subsided 6 inches in a decade

downtown



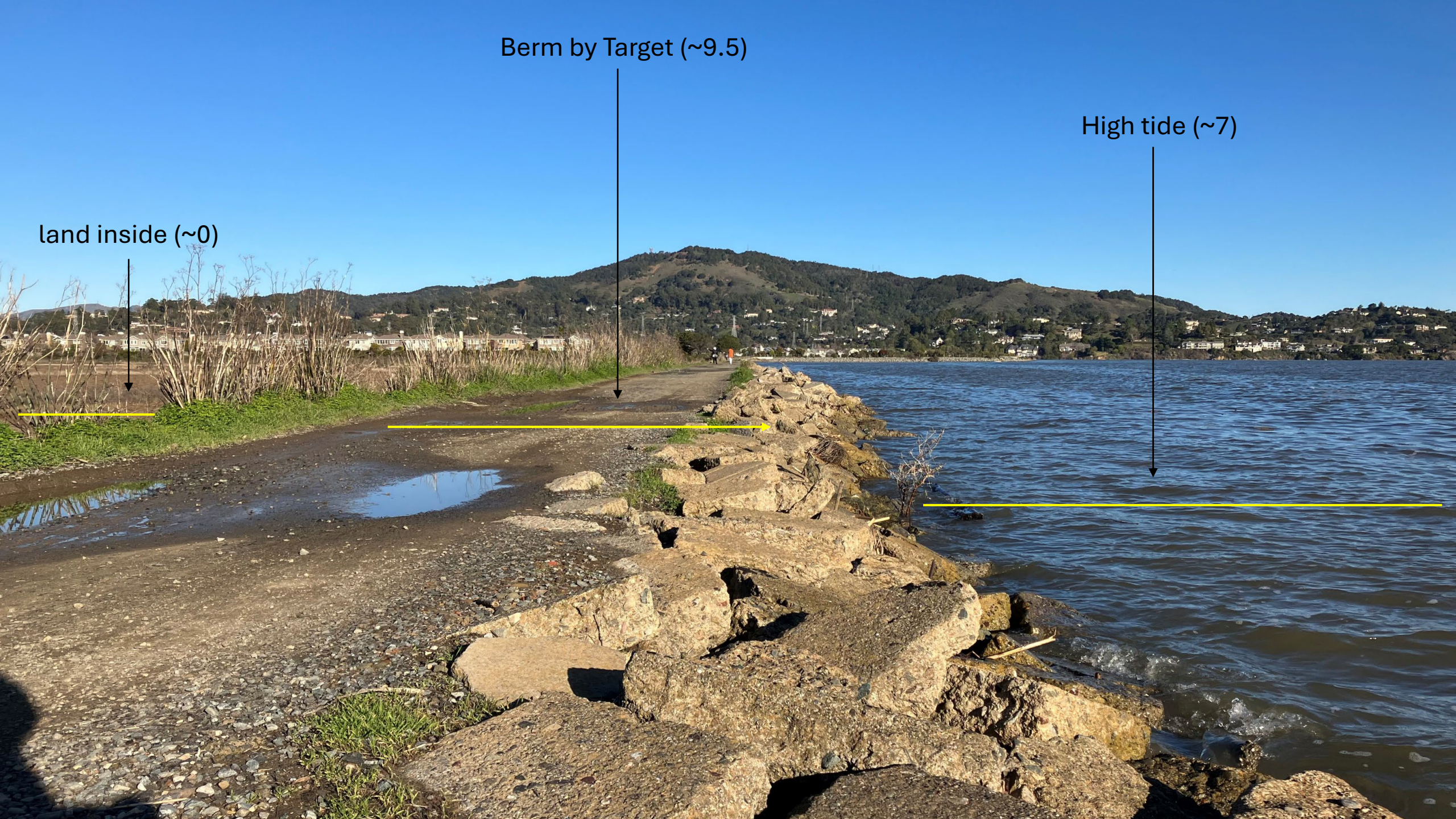
Canal



This area subsided (went down) at a rate of ~8 inches/decade



Live
Contributors



land inside (~0)



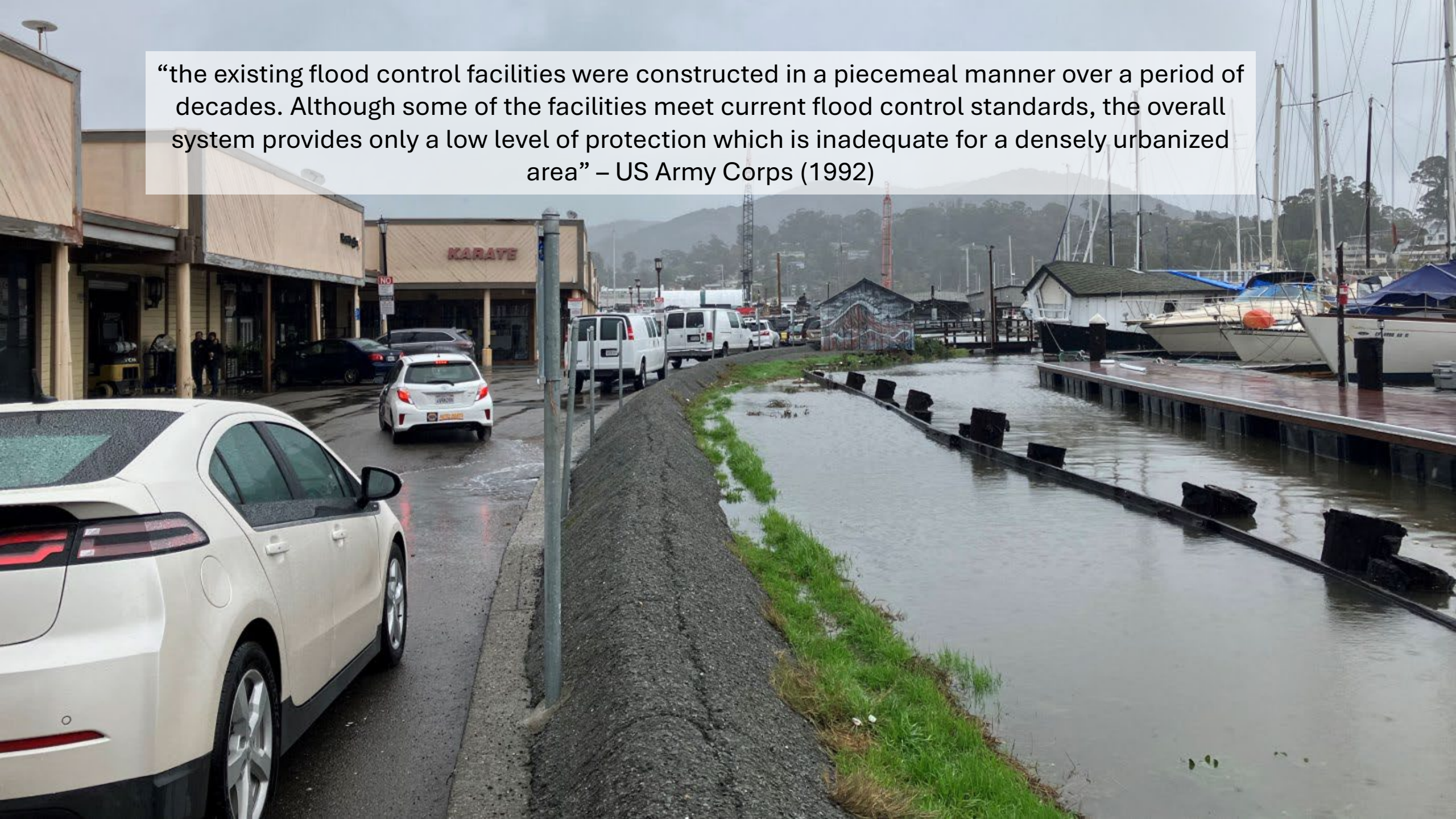
Berm by Target (~9.5)

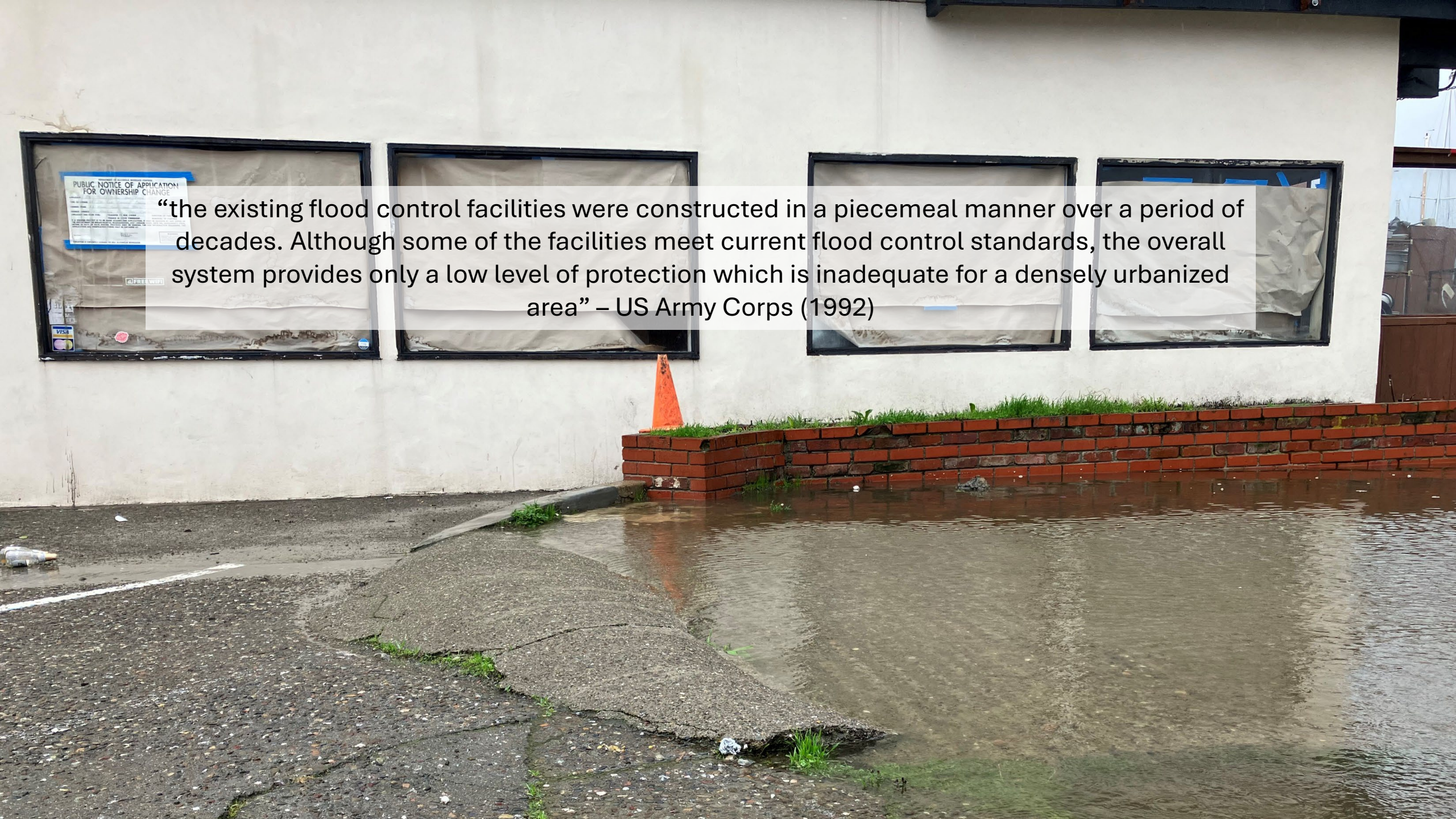


High tide (~7)



“the existing flood control facilities were constructed in a piecemeal manner over a period of decades. Although some of the facilities meet current flood control standards, the overall system provides only a low level of protection which is inadequate for a densely urbanized area” – US Army Corps (1992)





“the existing flood control facilities were constructed in a piecemeal manner over a period of decades. Although some of the facilities meet current flood control standards, the overall system provides only a low level of protection which is inadequate for a densely urbanized area” – US Army Corps (1992)



Population density = 66,000/sq mile

Informational text on a display board, likely providing details about the location or the mural's theme.



12,000+ people

3,000+ housing units

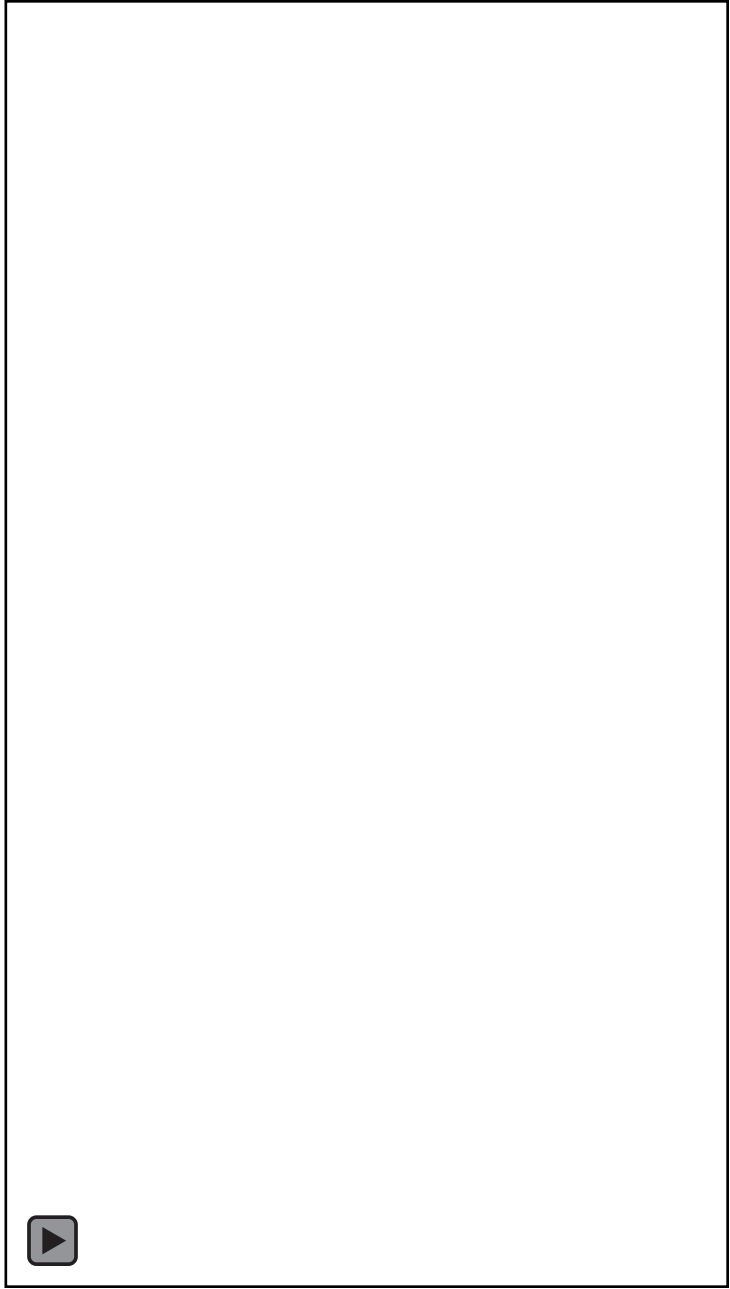
12,000+ jobs













DISCUSSION

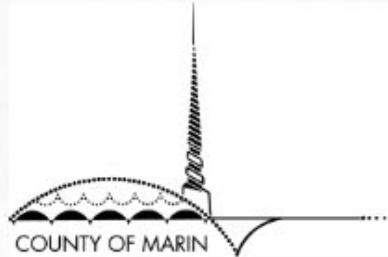
Extra slides

SEA LEVEL RISE

CURRENT GRANT

collaborative

Multicultural Center of Marin, Canal Alliance, and County of Marin are project partners



MULTICULTURAL
CENTER OF MARIN

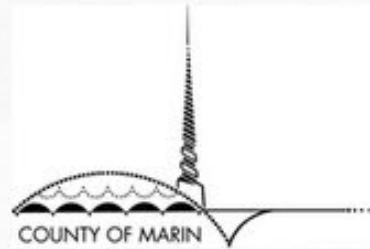


SEA LEVEL RISE

NEW GRANT

CA Office of Policy & Research

Just announced - an additional \$644,000 to support adaptation planning



MULTICULTURAL
CENTER OF MARIN

downtown

RANCHO

SAN PEDRO, SANTA

Sec. 33.

Sec. 34.

Sec. 35.

Sec. 36.

Sec. 31.

Sec. 32.

East San Rafael

TOWN
SAN RAFAEL

Sec. 4.

Sec. 3.

Sec. 2.

Sec. 1.

Sec. 6.

RANCHO

PUNTA

T. 1. N. R. 6. W.

Sec. 10.

QUENTIN

Sec. 9.

Sec. 10.

Sec. 11.

Sec. 12.

San Rafael Canal

SALE MAP
No. 8 of
SALT MARSH AND TIDE LANDS

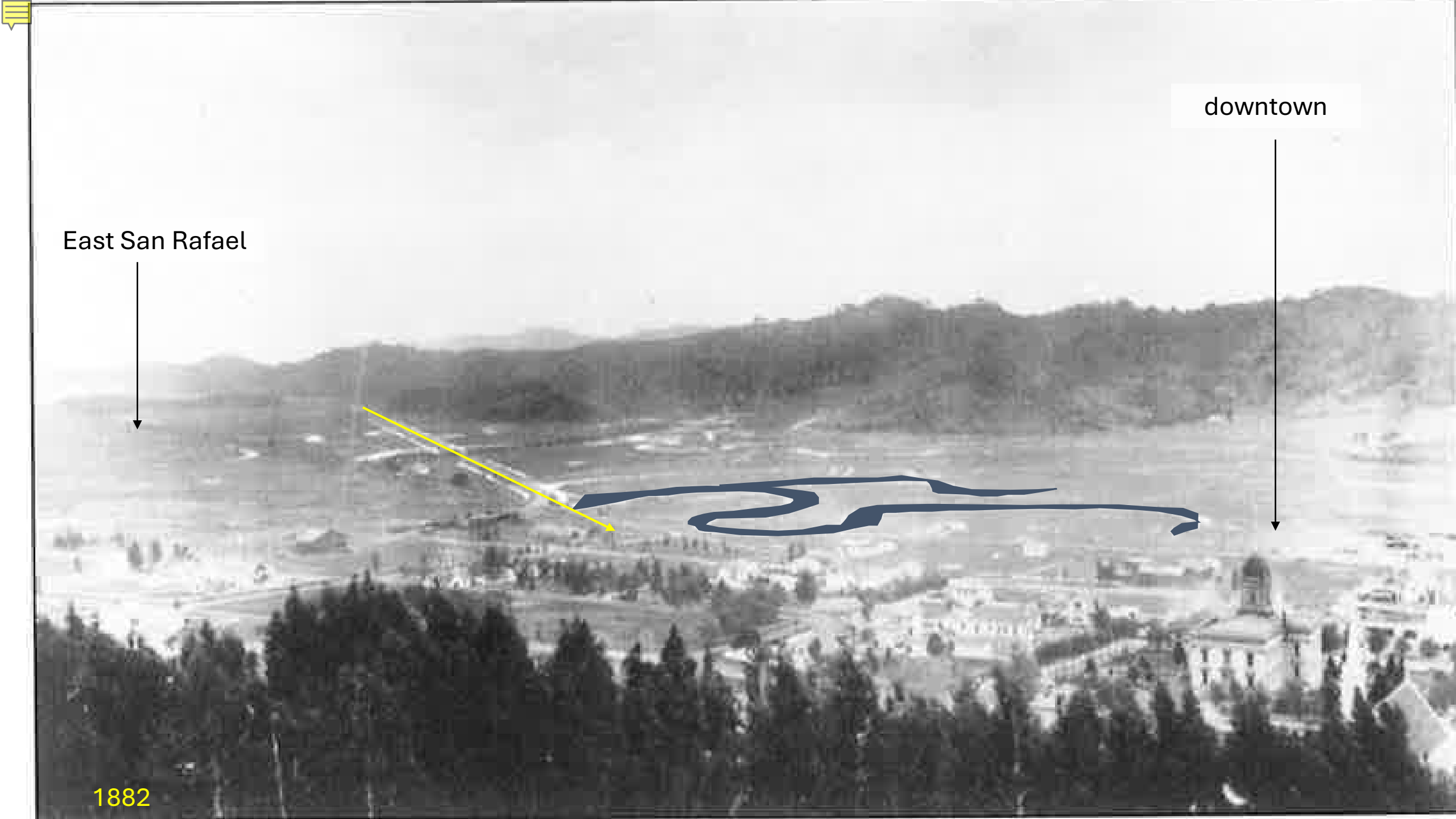
Situate in the
COUNTY OF MARIN,
STATE OF CALIFORNIA.

To be sold at Public Auction
by Order of the

BOARD OF TIDE LAND COMMISSIONERS

under and by virtue of the act entitled 'An Act supplementary to said amendments of an act entitled an act to survey and dispose of certain Salt Marsh and Tide Lands belonging to the State of California, approved March 23rd 1850, Chapter 100'





East San Rafael

downtown

1882

Canal

This area subsided (went down) at a rate of ~8 inches/decade

Legend across all datasets. Lin

-20

Map style controls: Checkered, Dots, Lines, InSAR default

Medium (-20 to 20)

InSAR default

Tools and Point Filters

Tools icon, Dots icon

Min: Max:

Disjoint



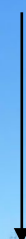
Water inside (~0)



Berm by Target (~9.5)



High tide (~7)





SEA LEVEL RISE

WHY



EQUITY



CLIMATE RISK