



# More 'atmospheric river' storms to sweep across California after days of rain and floods



Floodwaters cover most of Pajaro Valley, Calif.

## Weather tracker: San Francisco has second rainiest day on record

*Matt Hills (Metdesk)*

Floods hit California as 'atmospheric river' conveyor belt of tropical air moves through - with another such event forecast for this week



Cars partially submerged on a flooded road after heavy rains in San

THE WALL STREET JOURNAL.

California Storms Destroy a Wharf and Threaten a Way of Life in KQED Inform. Inspire. Involve.

Locals hope to rebuild before summer increases

News Politics Science Education Housing Immigration Criminal Justice Silicon Valley Forum Mor

## East Palo Alto Searches for Storm Recovery Money, and a Long-Term Flooding Fix

By Ezra David Romero Feb 1 Save Article

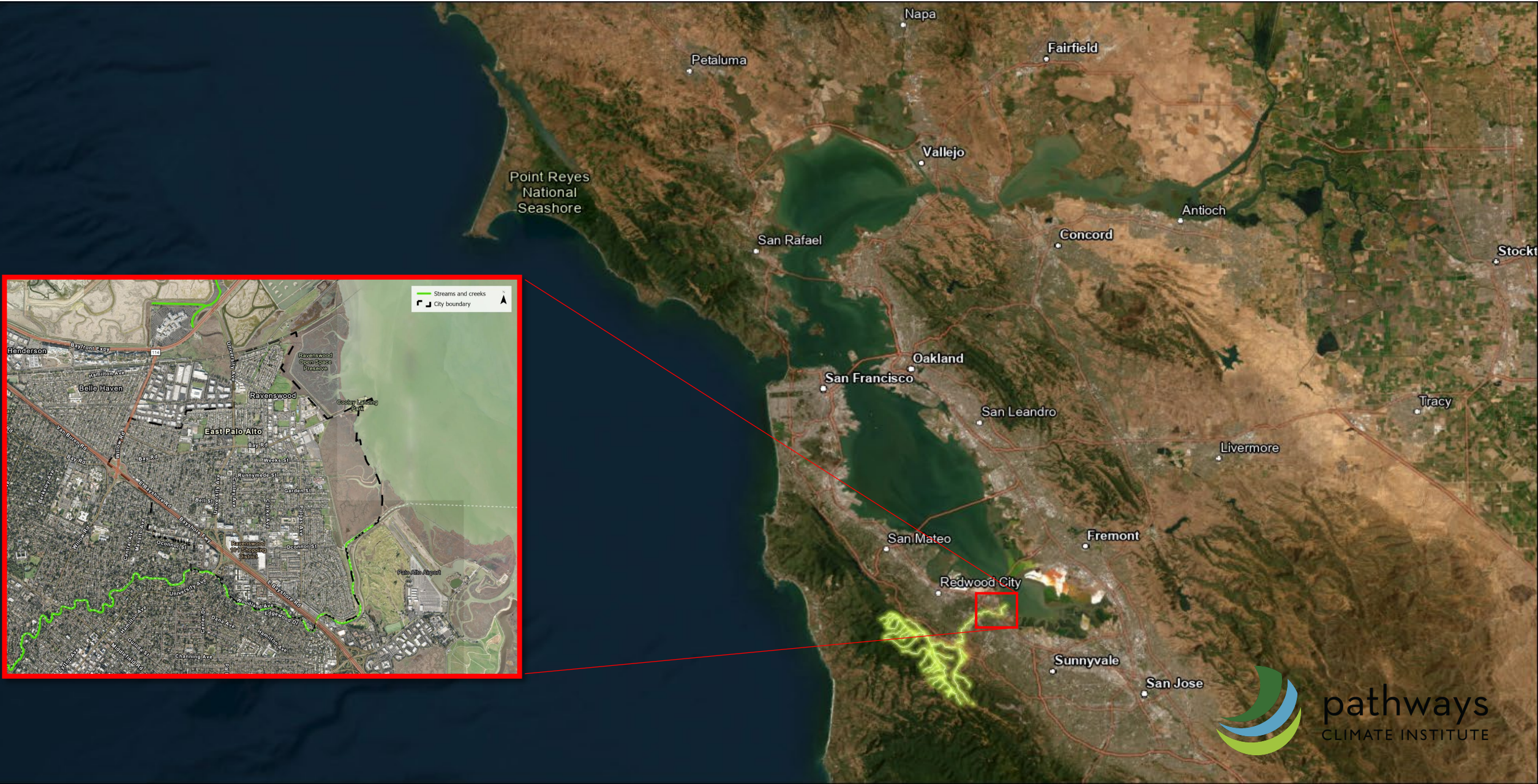


Members of the San José Conservation Corps pile sandbags along the San Francisquito Creek in East Palo Alto on Jan. 4, 2023. The creek spilled over its bank and into a nearby community during the storm on Dec. 31. (Beth LaBerge/KQED)

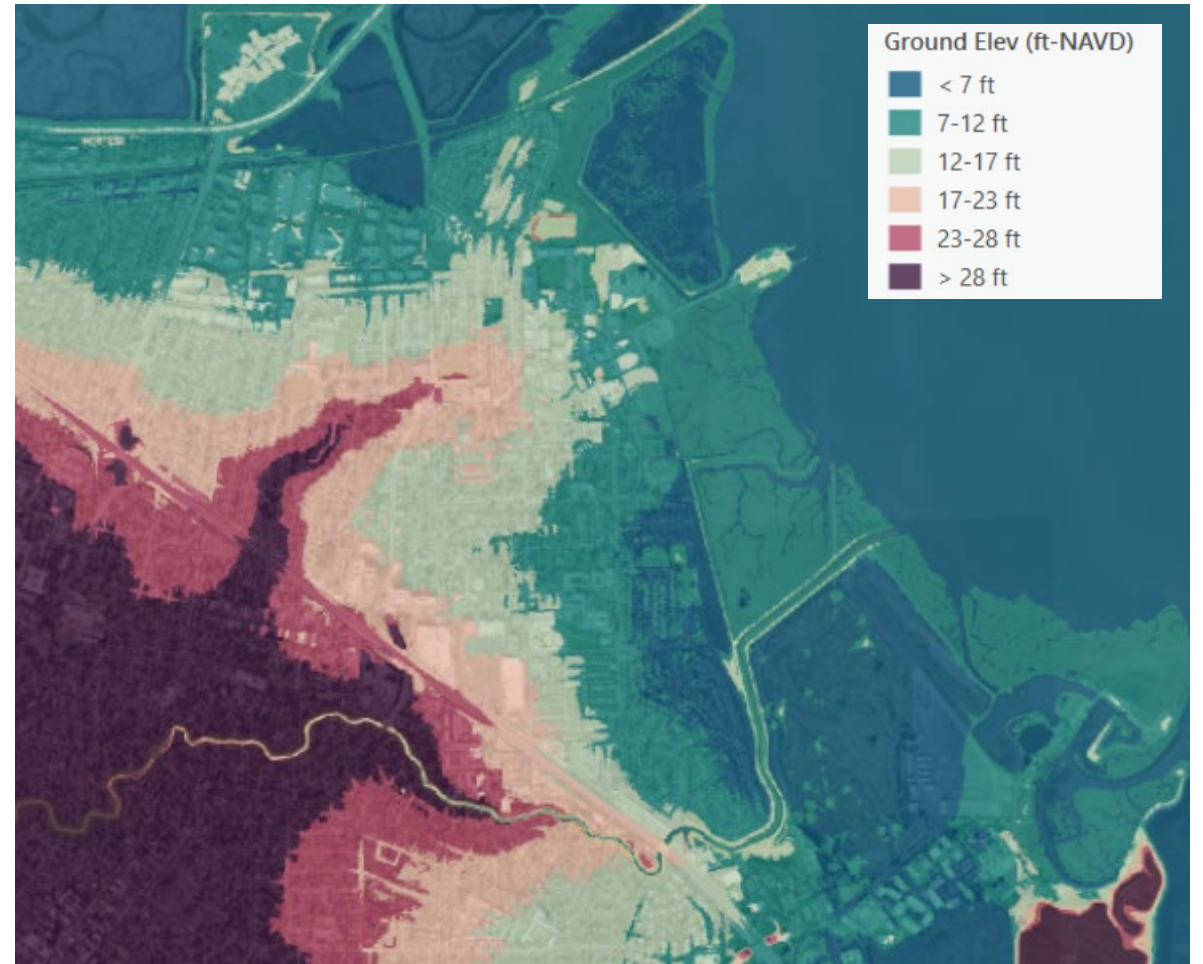
# Our time together today

- Context Setting Presentations (~30 min)
  - Coastal, groundwater, precipitation, and riverine flooding modeling and science
  - Introduction to our model community, East Palo Alto
  - Community perspectives from East Palo Alto
- World Café Discussion (~60 min)

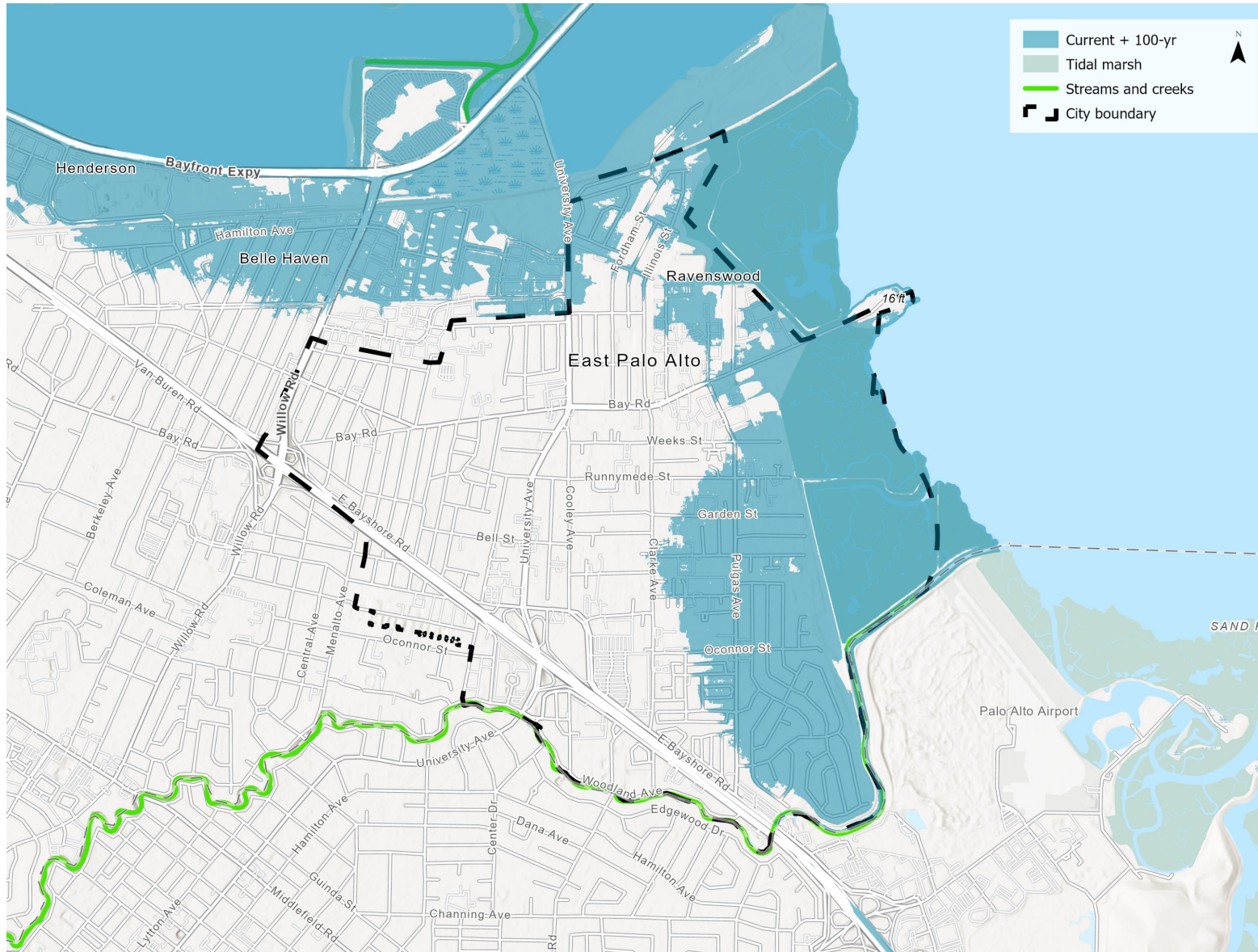
# East Palo Alto



# Topography



# Coastal Flooding

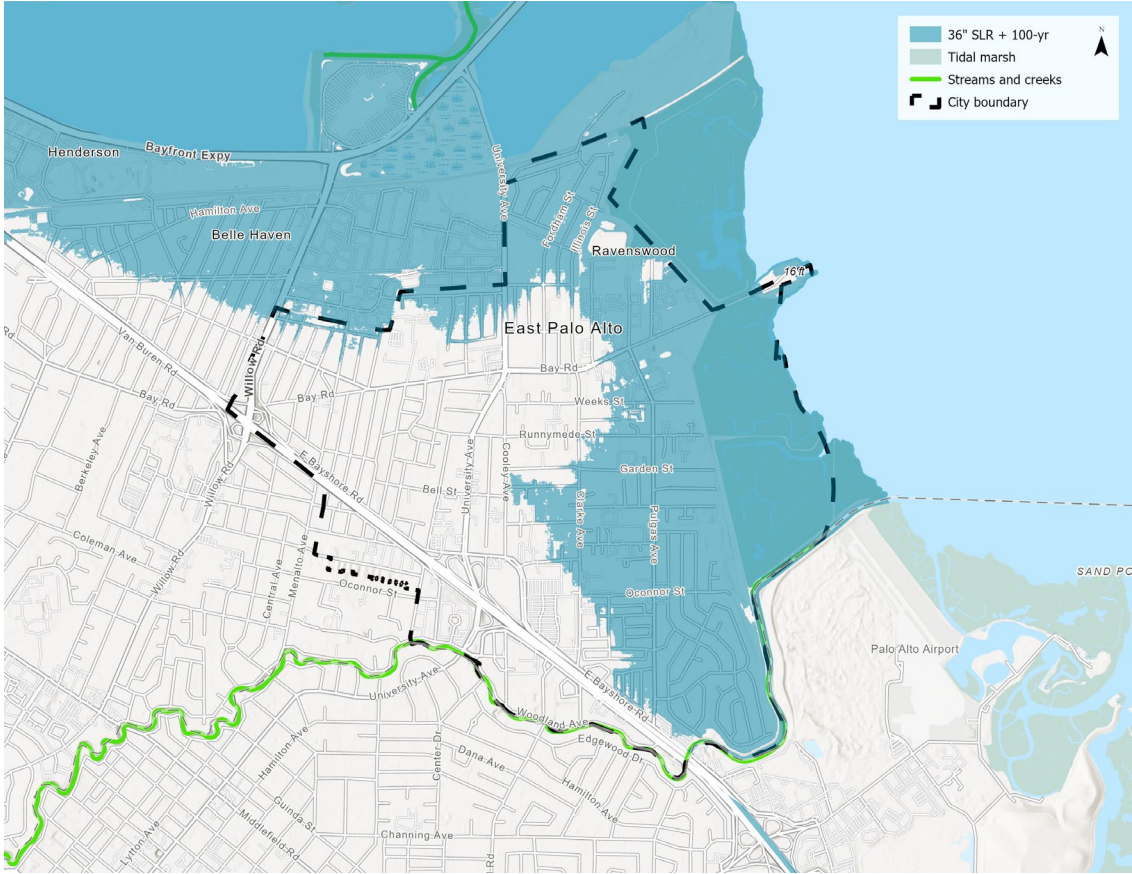


# +3 feet Sea Level Rise

## Permanent Inundation (SLR + Daily High Tides)

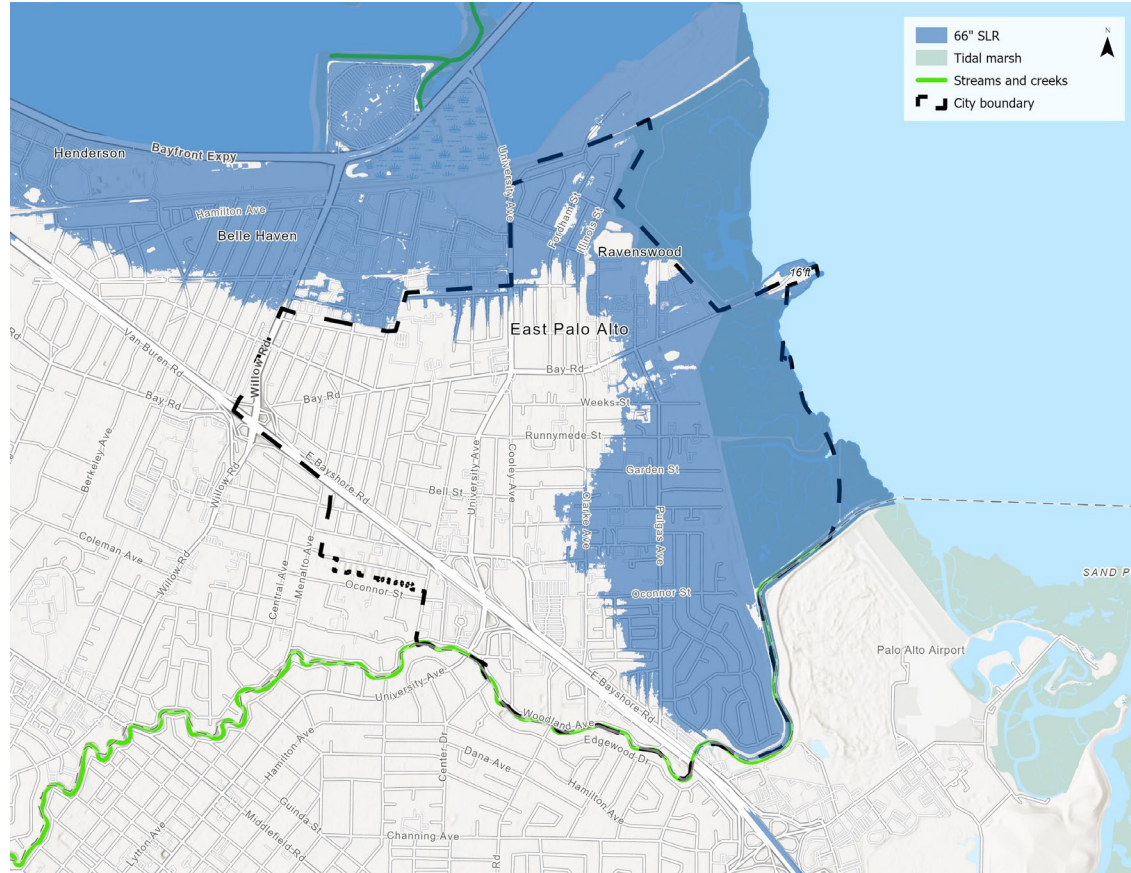


## Temporary Flooding (SLR + 100-year Storm Surge)

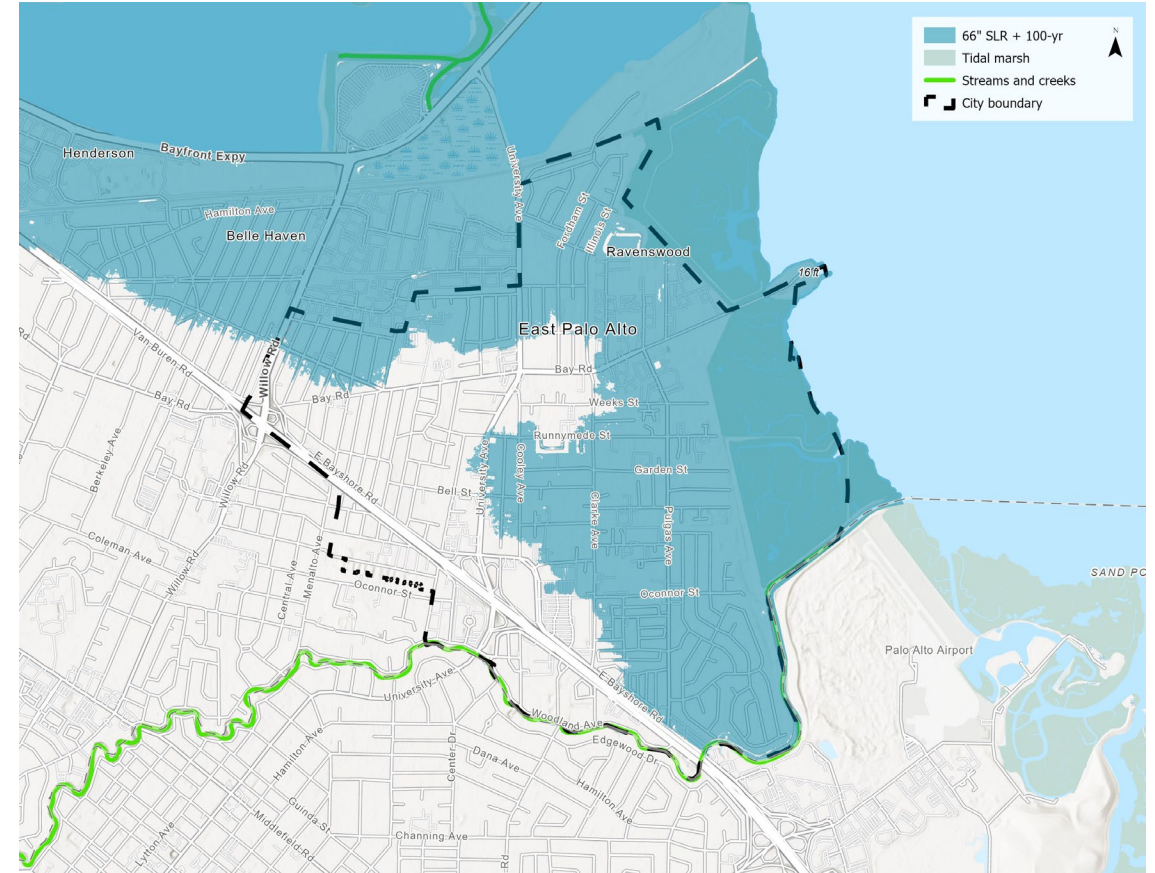


# +5.5 feet Sea Level Rise

## Permanent Inundation (SLR + Daily High Tides)



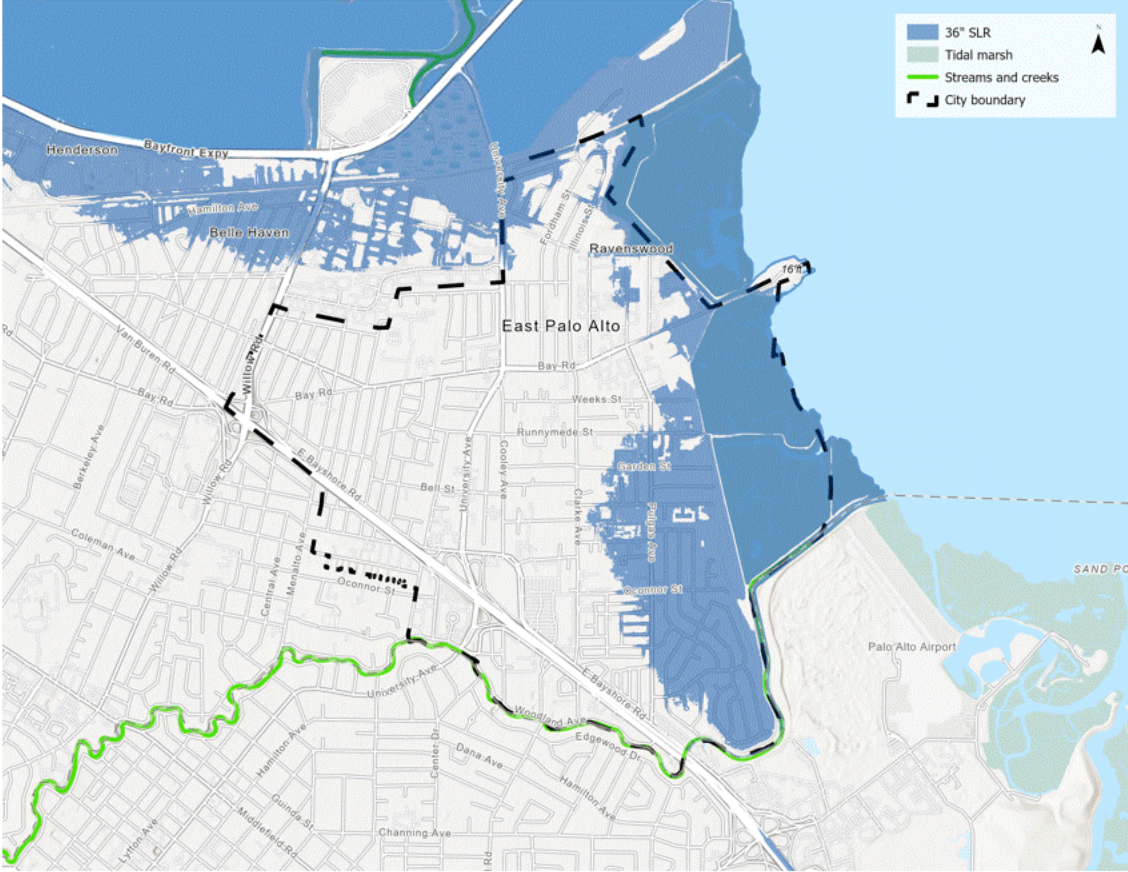
## Temporary Flooding (SLR + 100-year Storm Surge)



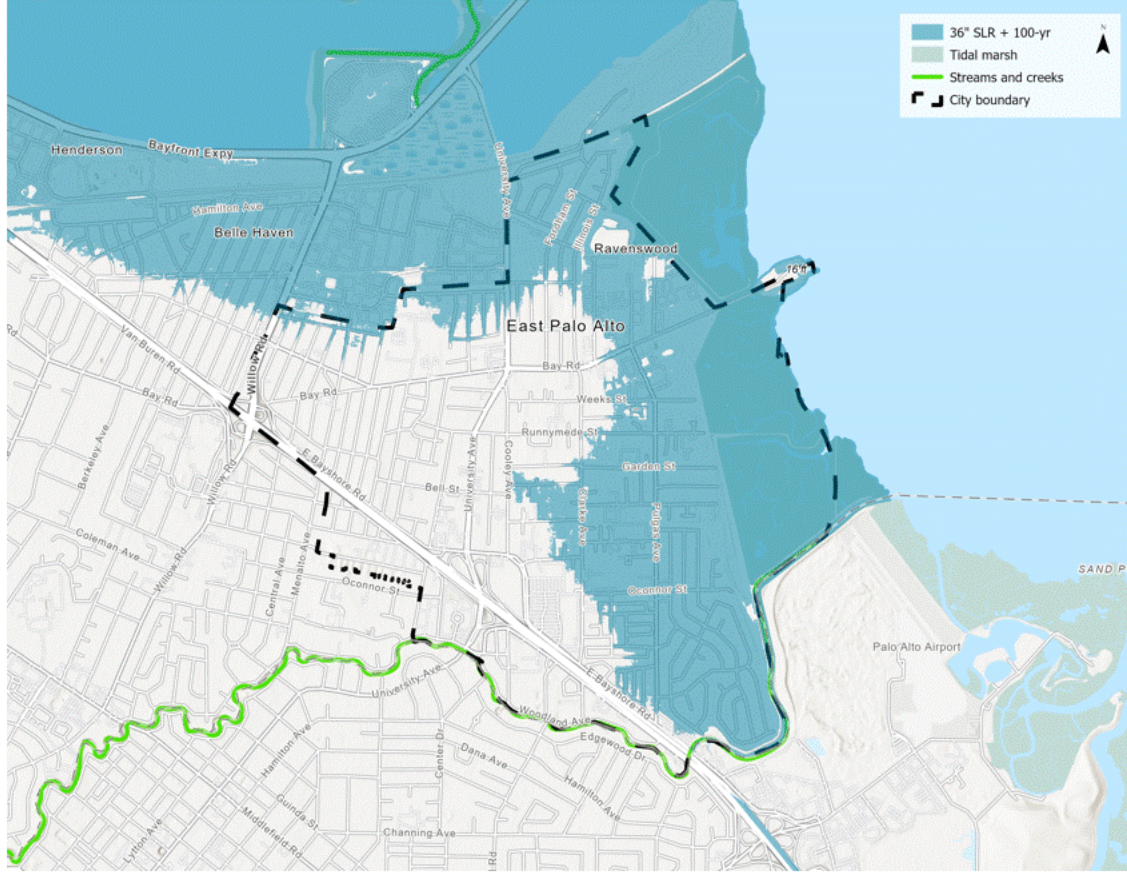


# +3 feet Sea Level Rise

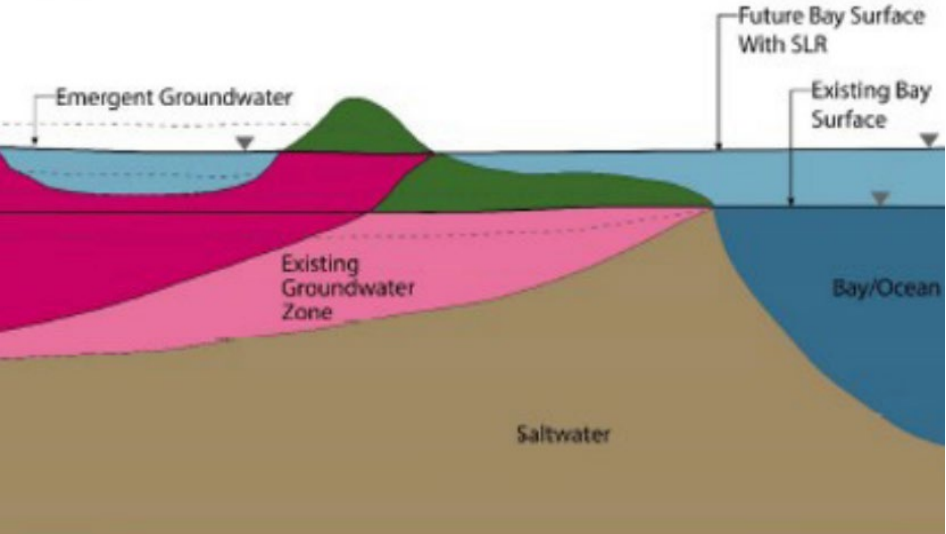
## Permanent Inundation (SLR + Daily High Tides)



## Temporary Flooding (SLR + 100-year Storm Surge)



# Rising Groundwater



Increased infiltration into sewer pipelines



Contaminant remobilization



Flooding of basements and below grade structures



Foundation and structural damage



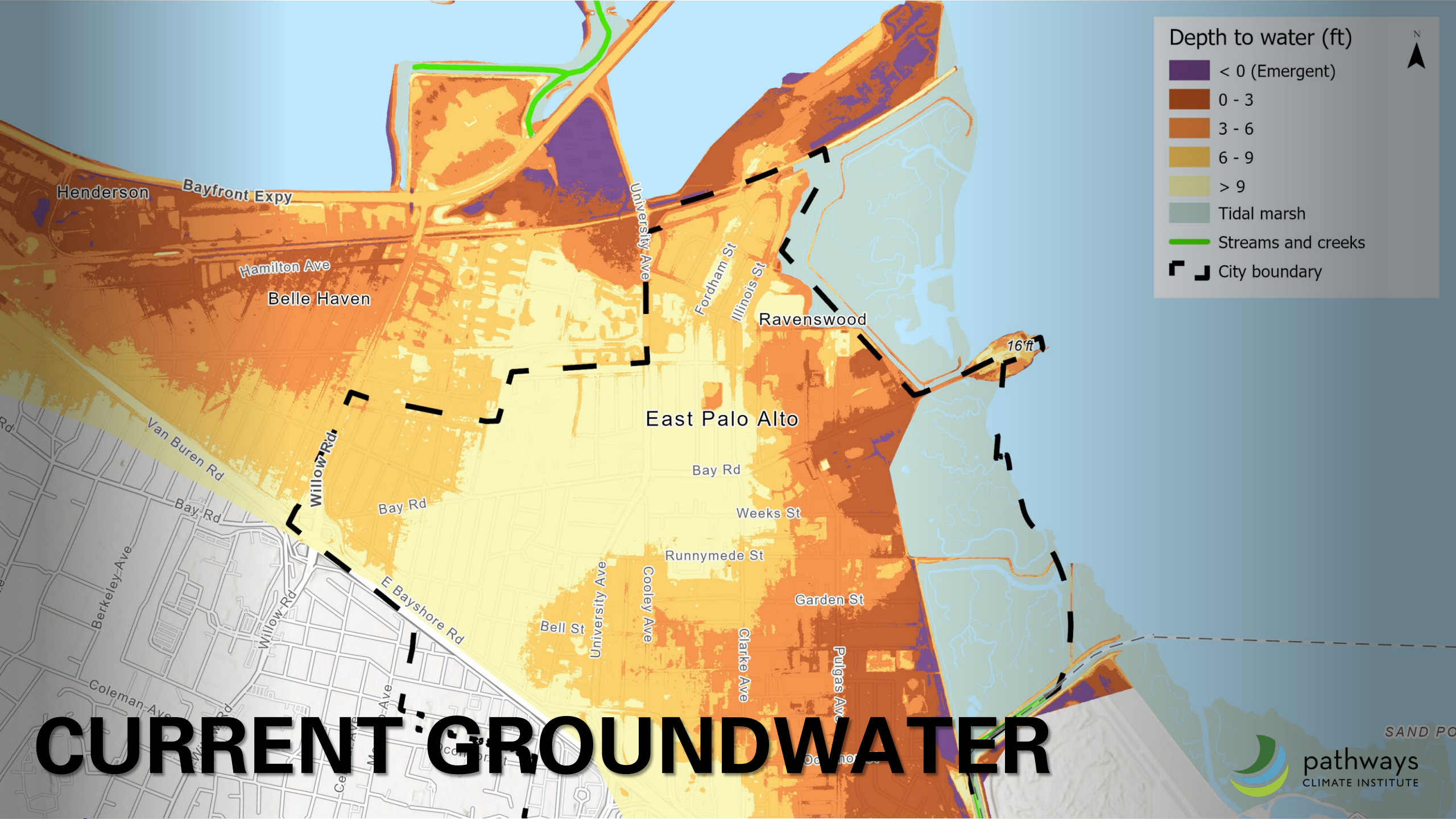
Uplift of residential structures and smaller buildings



Roadway damage (cracking, buckling, sink holes)



Emergent groundwater flooding (above ground)



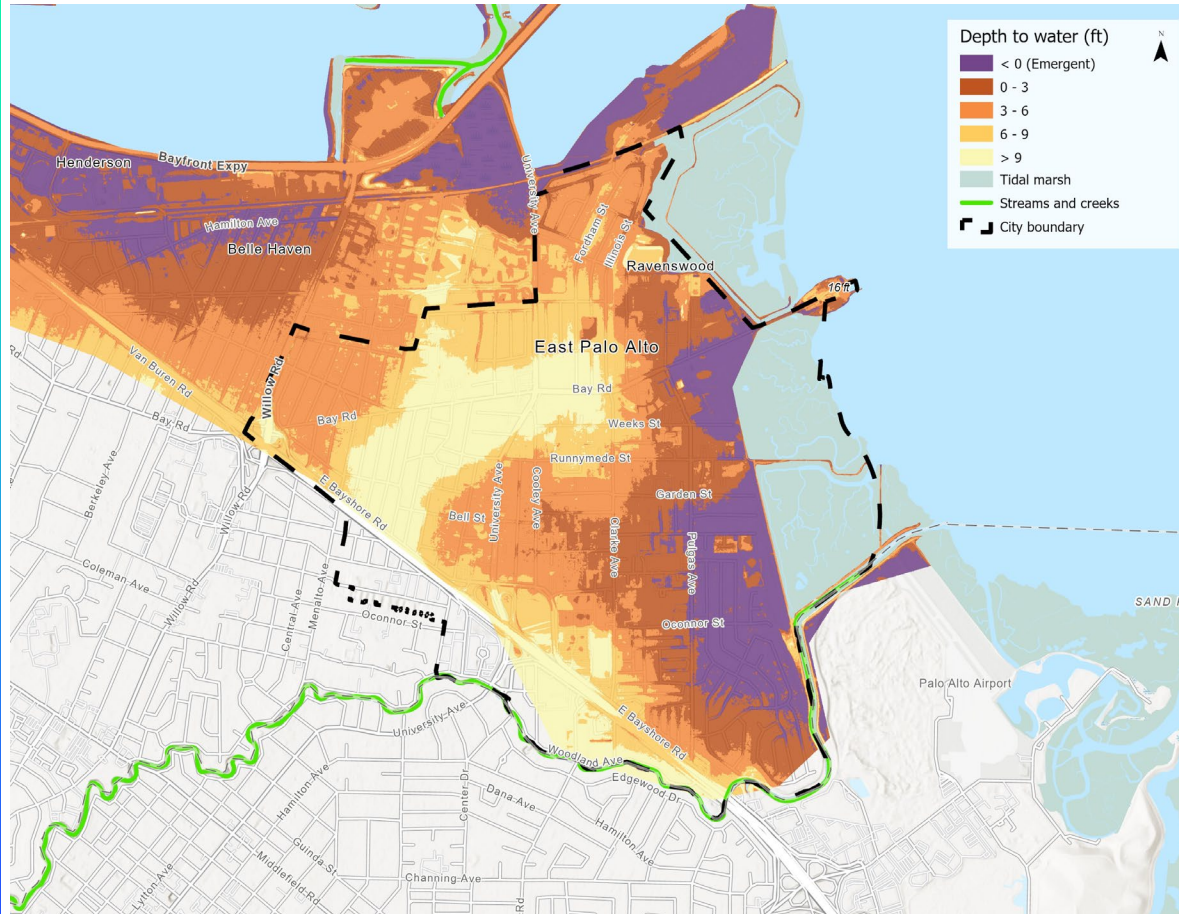
Depth to water (ft)

- <math>< 0</math> (Emergent)
- 0 - 3
- 3 - 6
- 6 - 9
- > 9
- Tidal marsh
- Streams and creeks
- City boundary

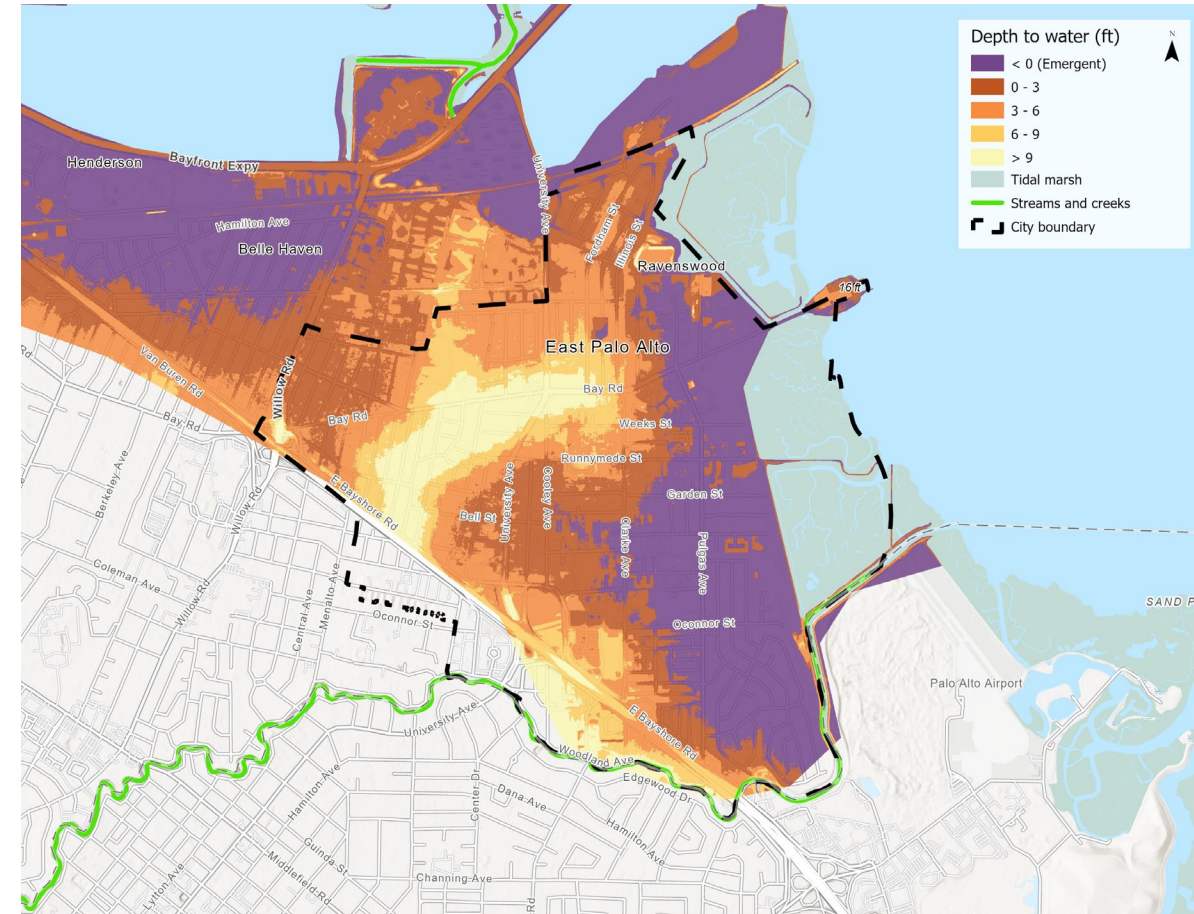
# CURRENT GROUNDWATER

# Groundwater

## + 3 feet SLR



## + 5.5 feet SLR



# Extreme Rainfall



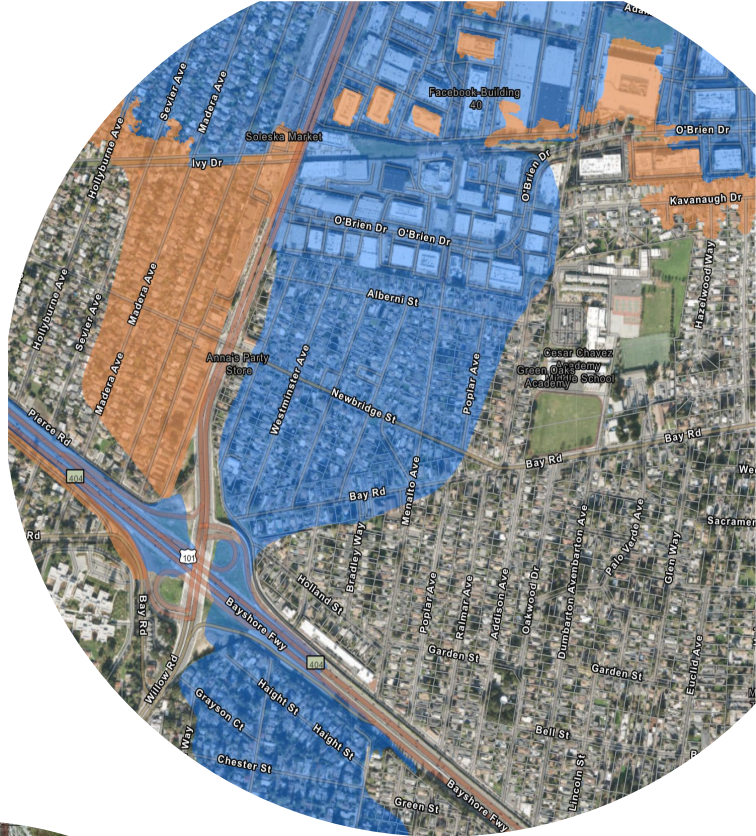
Increased frequency of creek overtopping



Overwhelmed sewer system and street flooding



Larger flood extents and deeper floodwaters

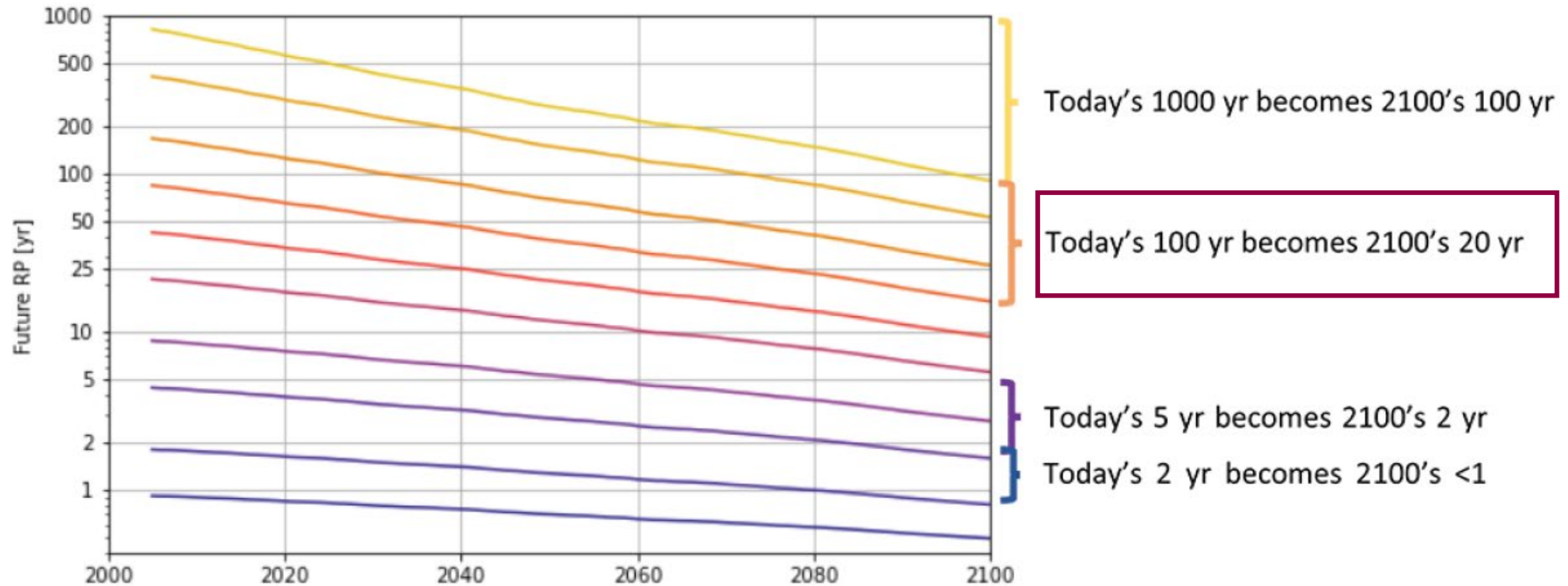


# Extreme Rainfall

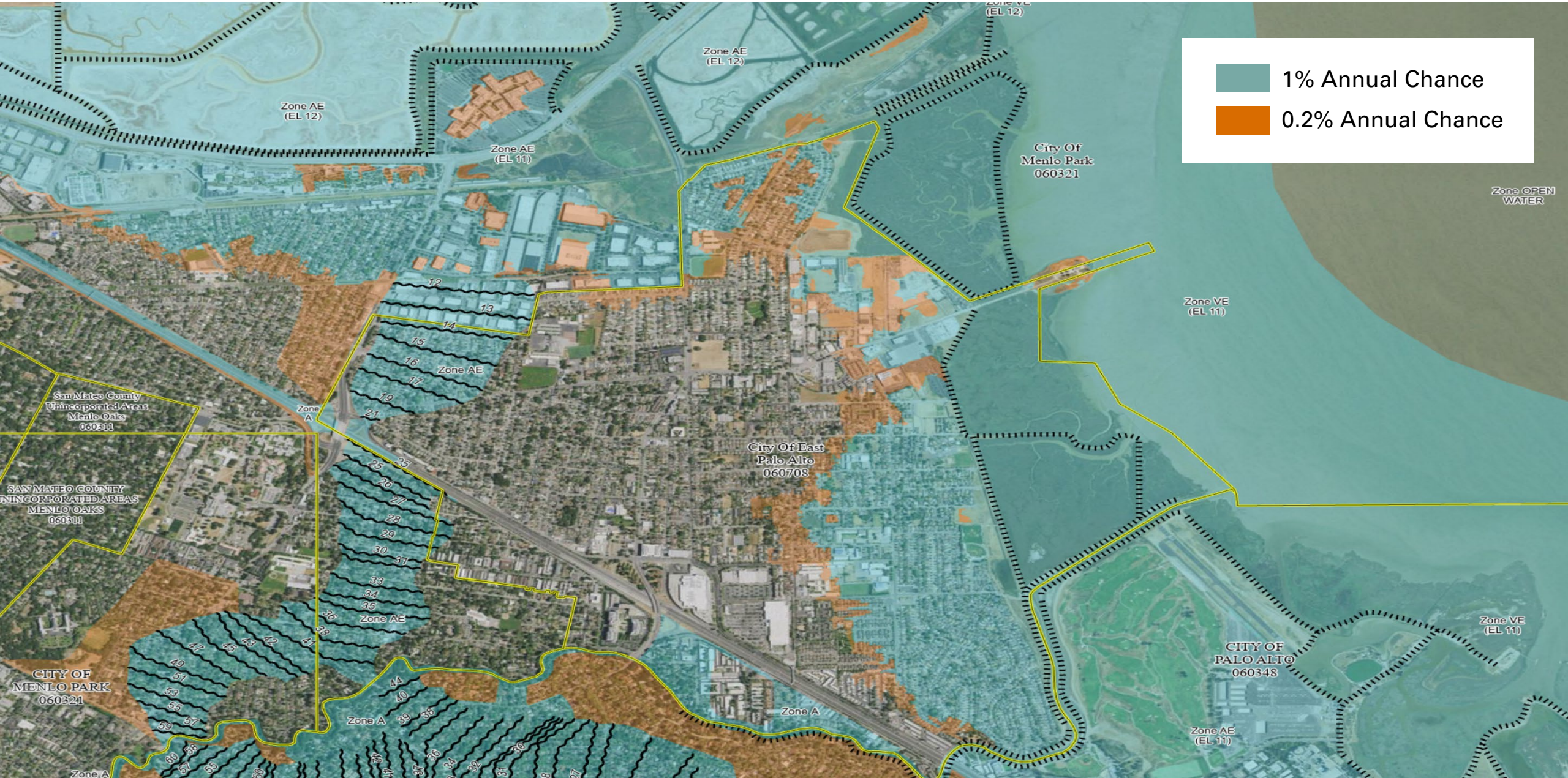


Frequency	Duration	2050	2100
10yr	3-hr	+22%	+57%
	24-hr	+18%	+41%
100yr	3-hr	+26%	+67%
	24-hr	+22%	+51%

# Extreme Rainfall



# Riverine Flooding



- 1% Annual Chance
- 0.2% Annual Chance

Zone AE (EL 12)

Zone AE (EL 12)

Zone VE (EL 12)

Zone AE (EL 11)

City Of Menlo Park 060321

Zone OPEN WATER

Zone VE (EL 11)

San Mateo County Unincorporated Areas Menlo Oaks 060311

City Of East Palo Alto 060708

SAN MATEO COUNTY UNINCORPORATED AREAS MENLO OAKS 060311

Zone A

CITY OF PALO ALTO 060348

Zone VE (EL 11)

CITY OF MENLO PARK 060321

Zone A

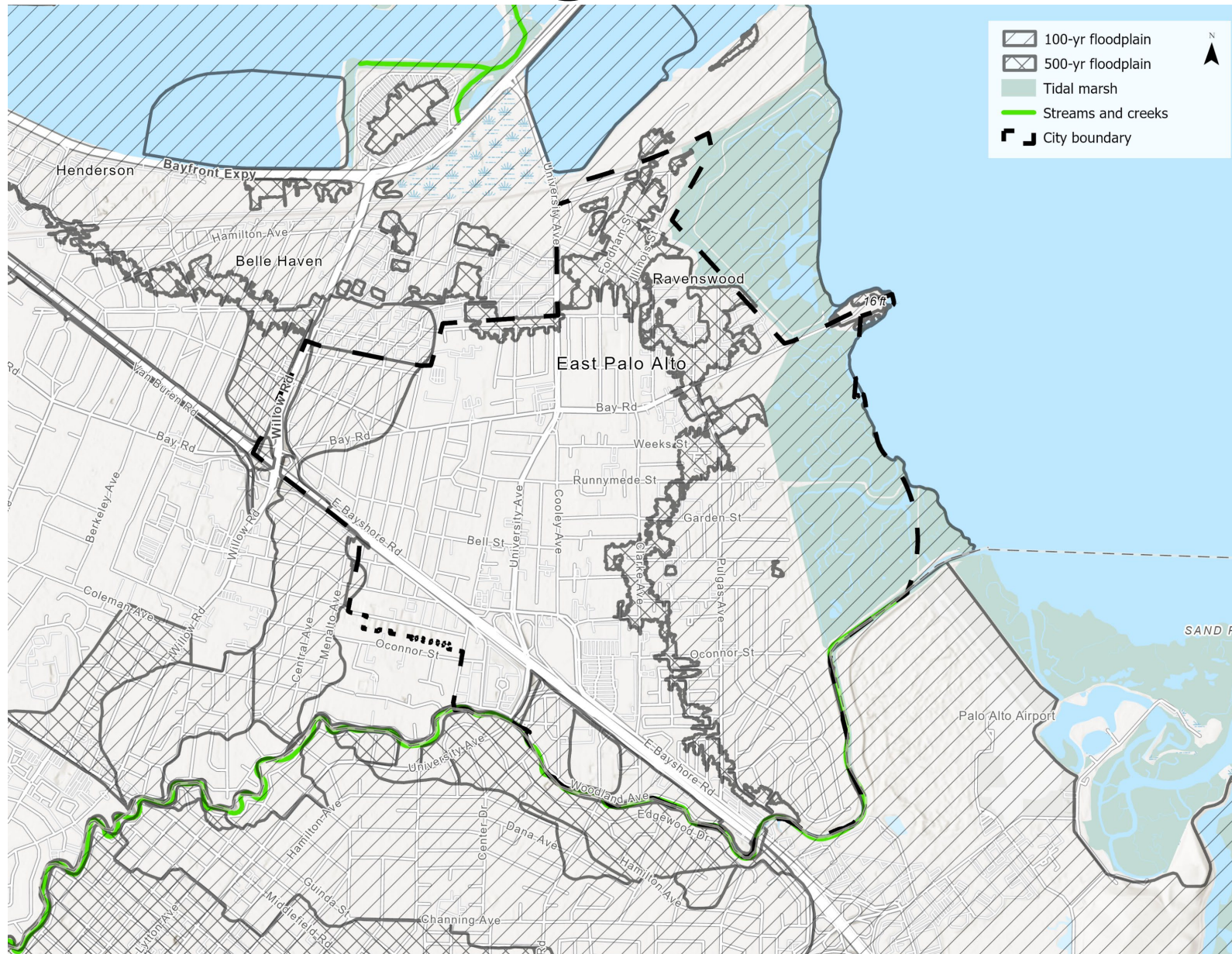
Zone A

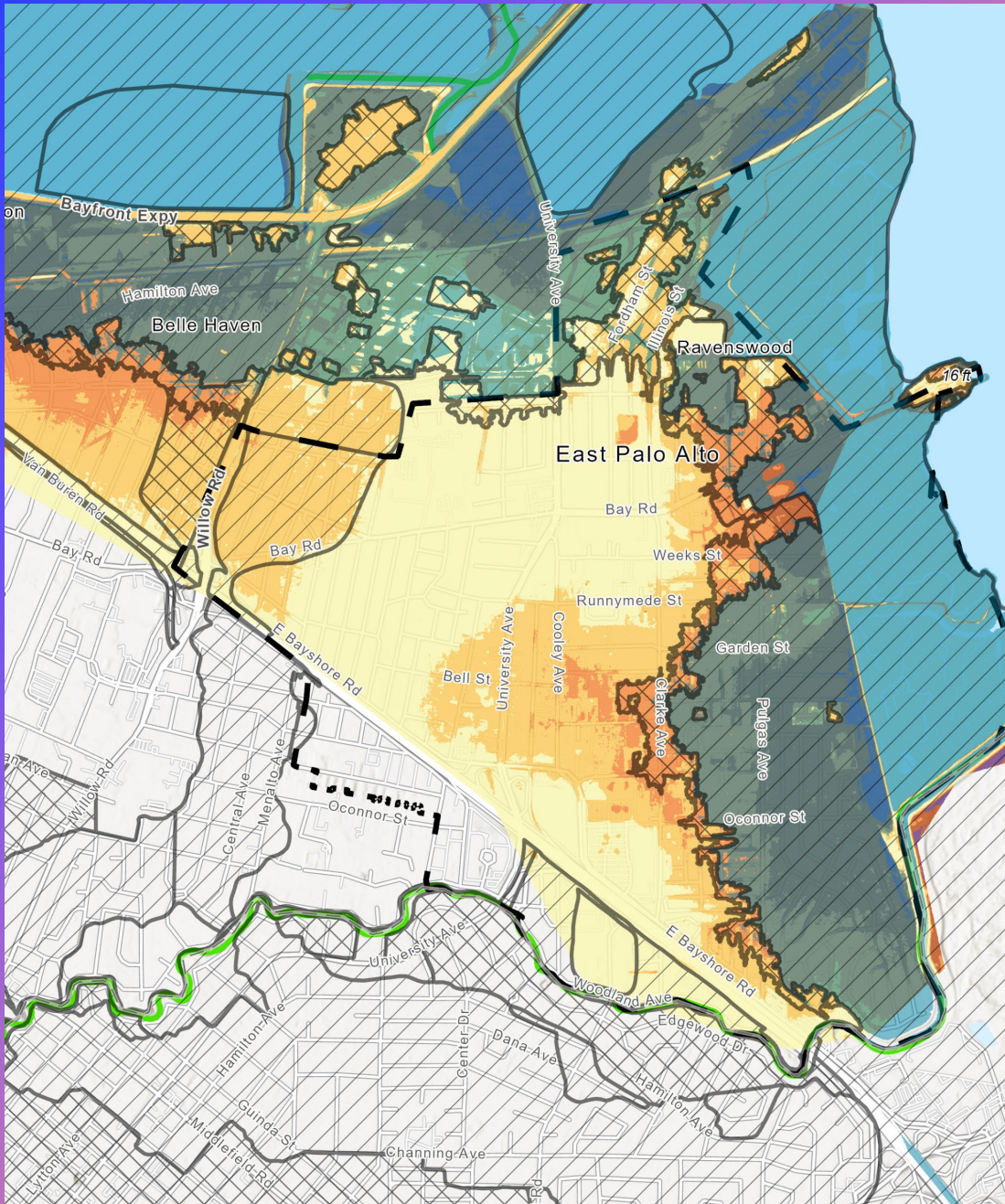
Zone AE (EL 11)

Zone A



# Riverine Flooding





# Combined Hazards



Coastal Flooding with Sea Level Rise



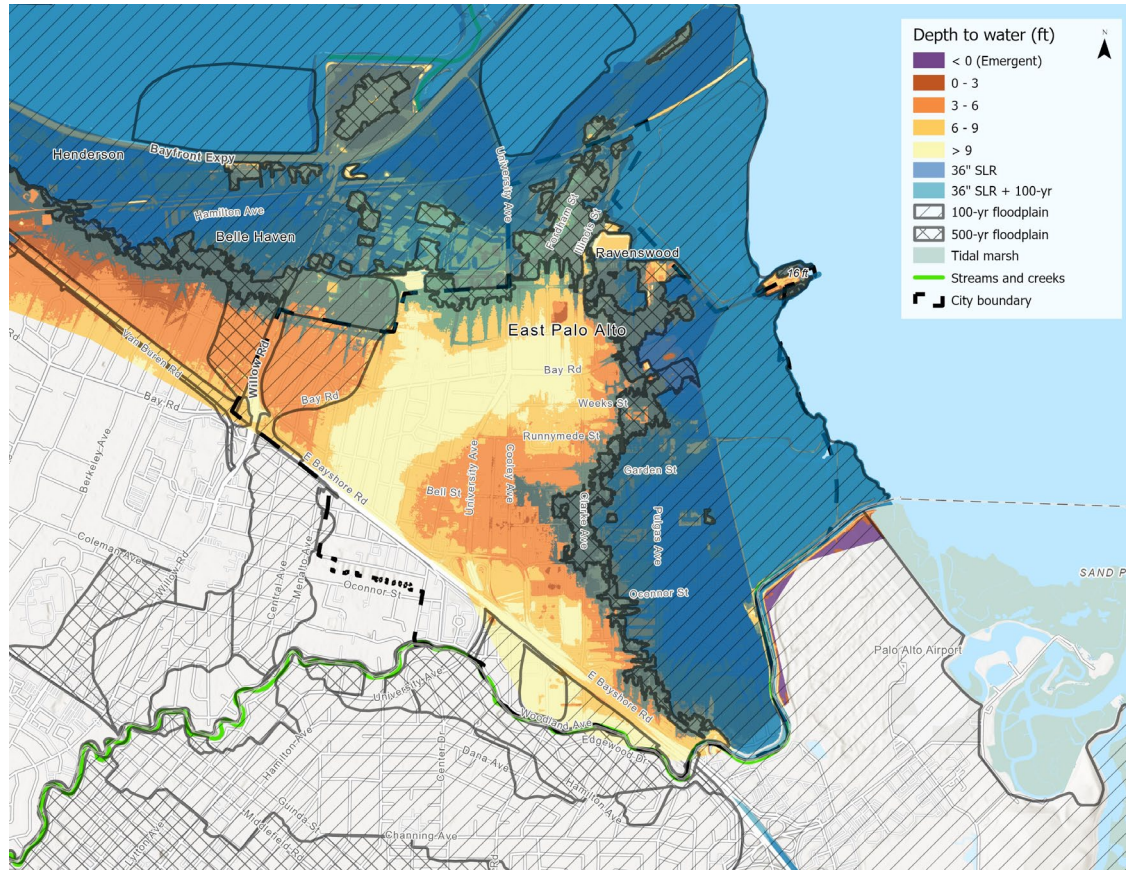
Shallow and Emergent Groundwater with Sea Level Rise



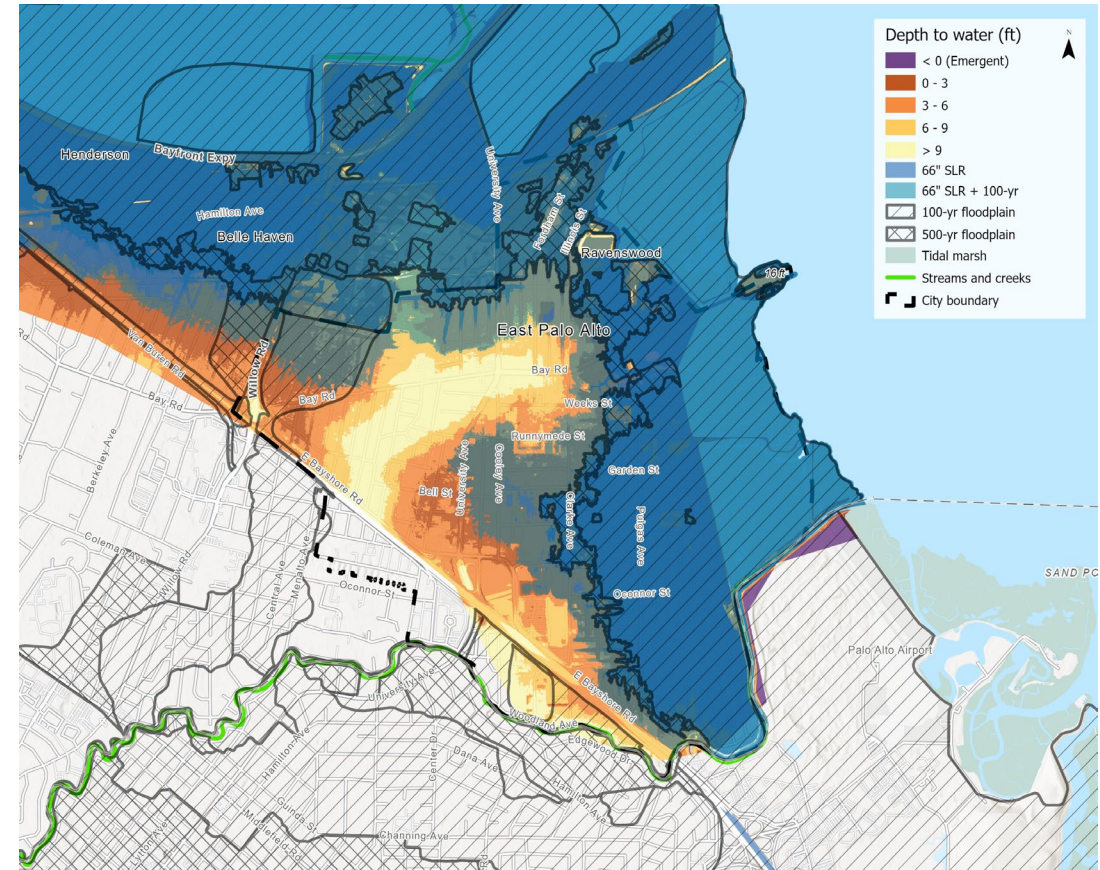
Riverine and Stormwater Flooding

# Combined Hazards

+ 3 feet SLR



+ 5.5 feet SLR



# Data Access (Bay Area)

- Coastal Flooding (BCDC Adapting to Rising Tides)
  - <https://www.adaptingtorisingtides.org/maps-and-data/>
- Increased Precipitation
  - <https://sfpuc.org/about-us/reports/san-francisco-bay-area-precipitation-warmer-world>
- Rising Groundwater
  - <https://www.sfei.org/projects/shallow-groundwater-response-sea-level-rise>



# Nuestra Casa

OF EAST PALO ALTO



Rosa Nelson, Water Justice Coordinator  
Sarah Atkinson, SPUR Resilience Policy Manager



# San Mateo County Hazard Risk

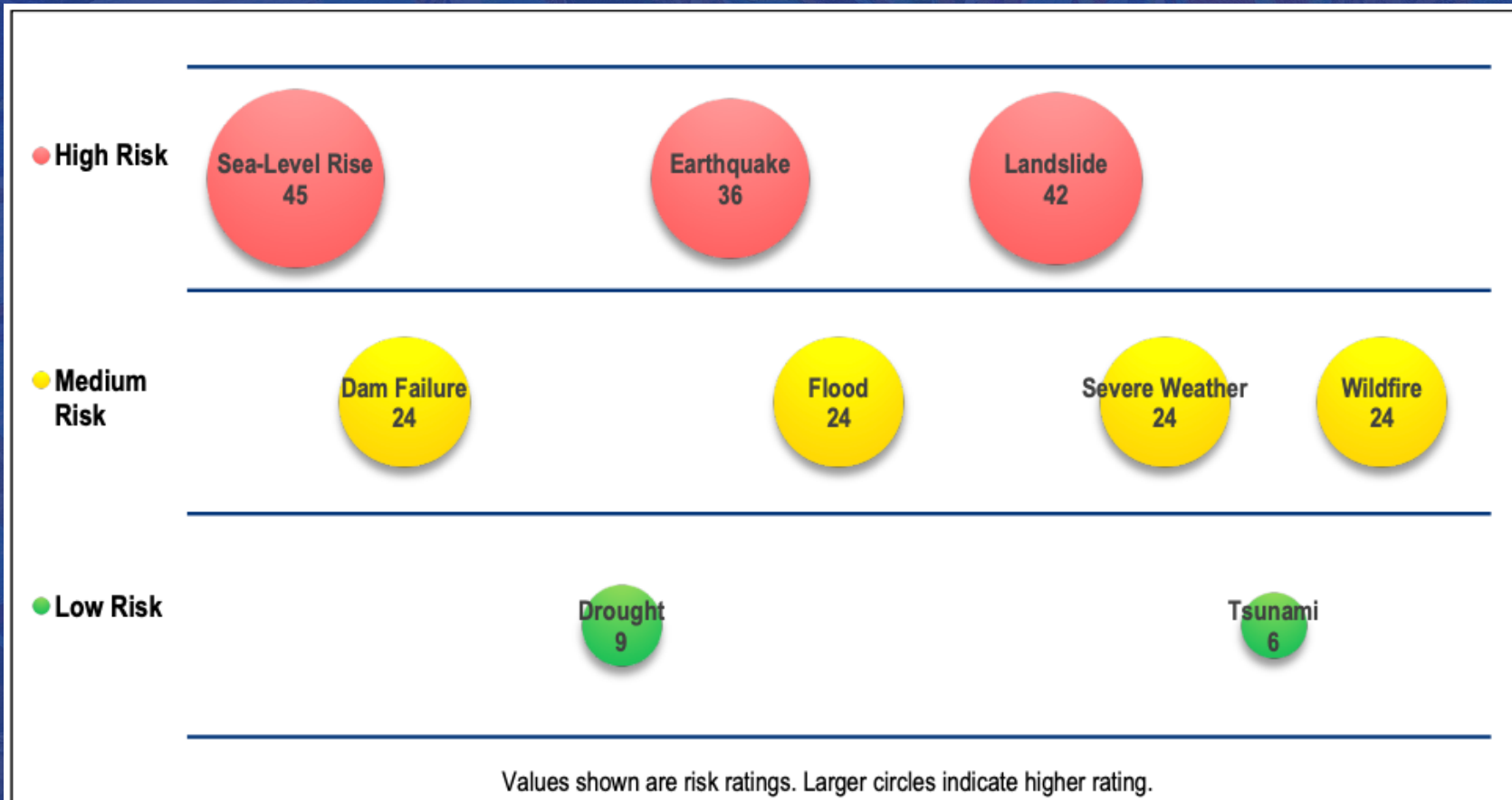


Figure ES-1. Countywide Hazard Risk Rating (Baseline)

# San Mateo County Hazard Risk

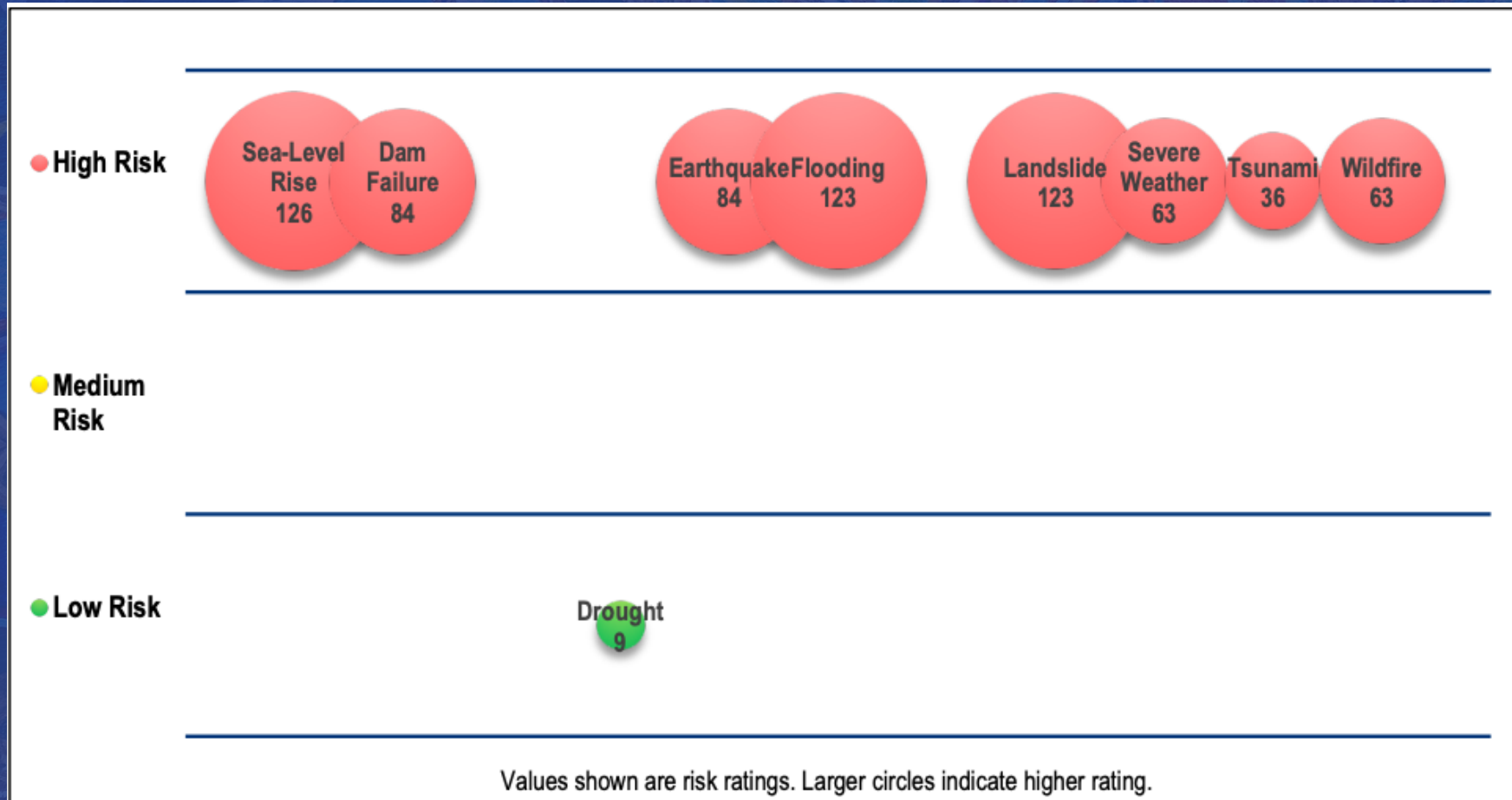


Figure ES-2. Countywide Hazard Risk Rating (Equity Lens)

# Social Vulnerability San Mateo County

Source: 2021 County of San Mateo  
Multijurisdictional Local Hazard Mitigation  
Plan (LHMP)

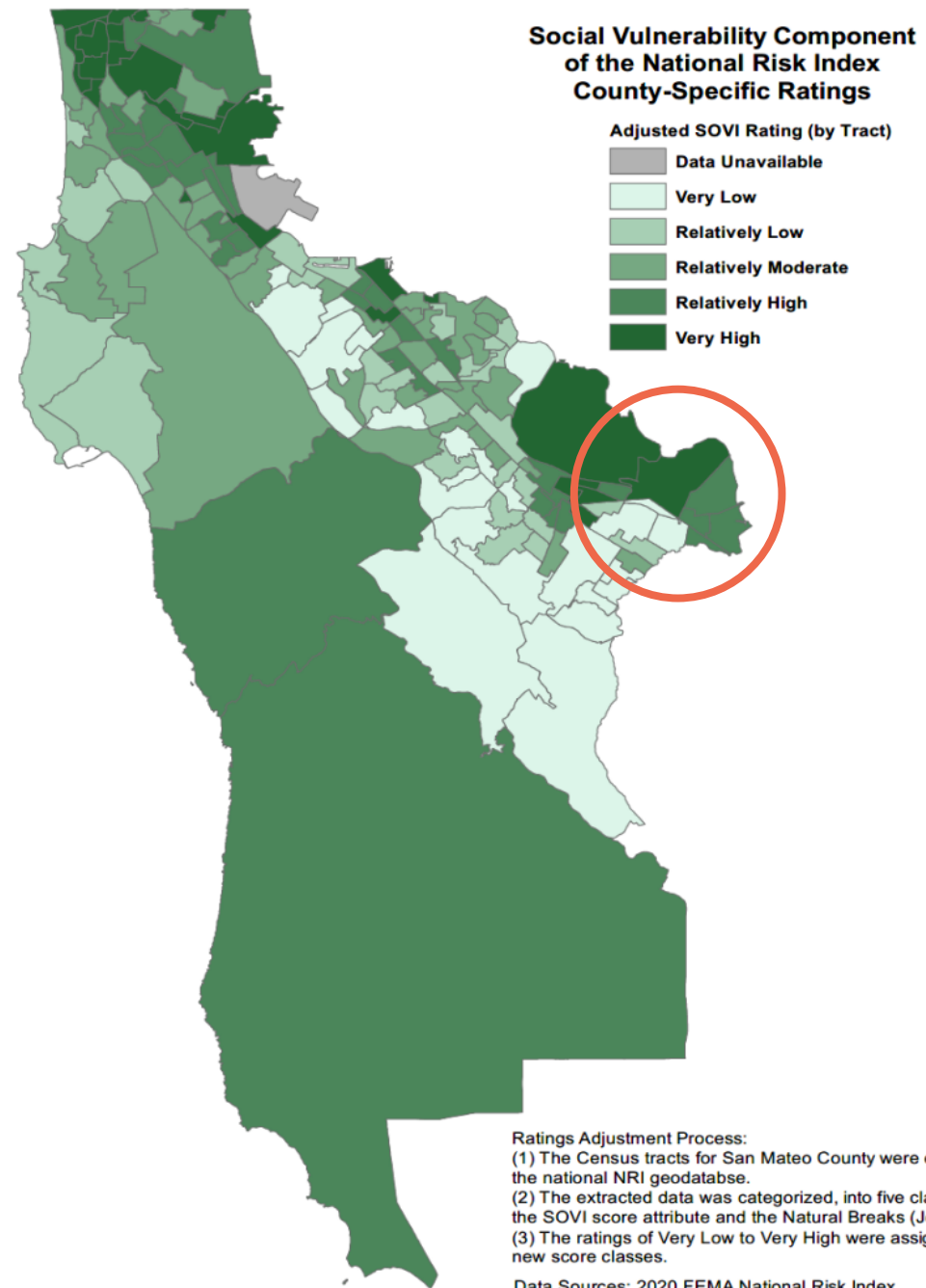


Figure 7-1. SoVI Map for San Mateo County



# Extreme Heat San Mateo County

Source: 2021 County of San Mateo Multijurisdictional Local Hazard Mitigation Plan (LHMP)

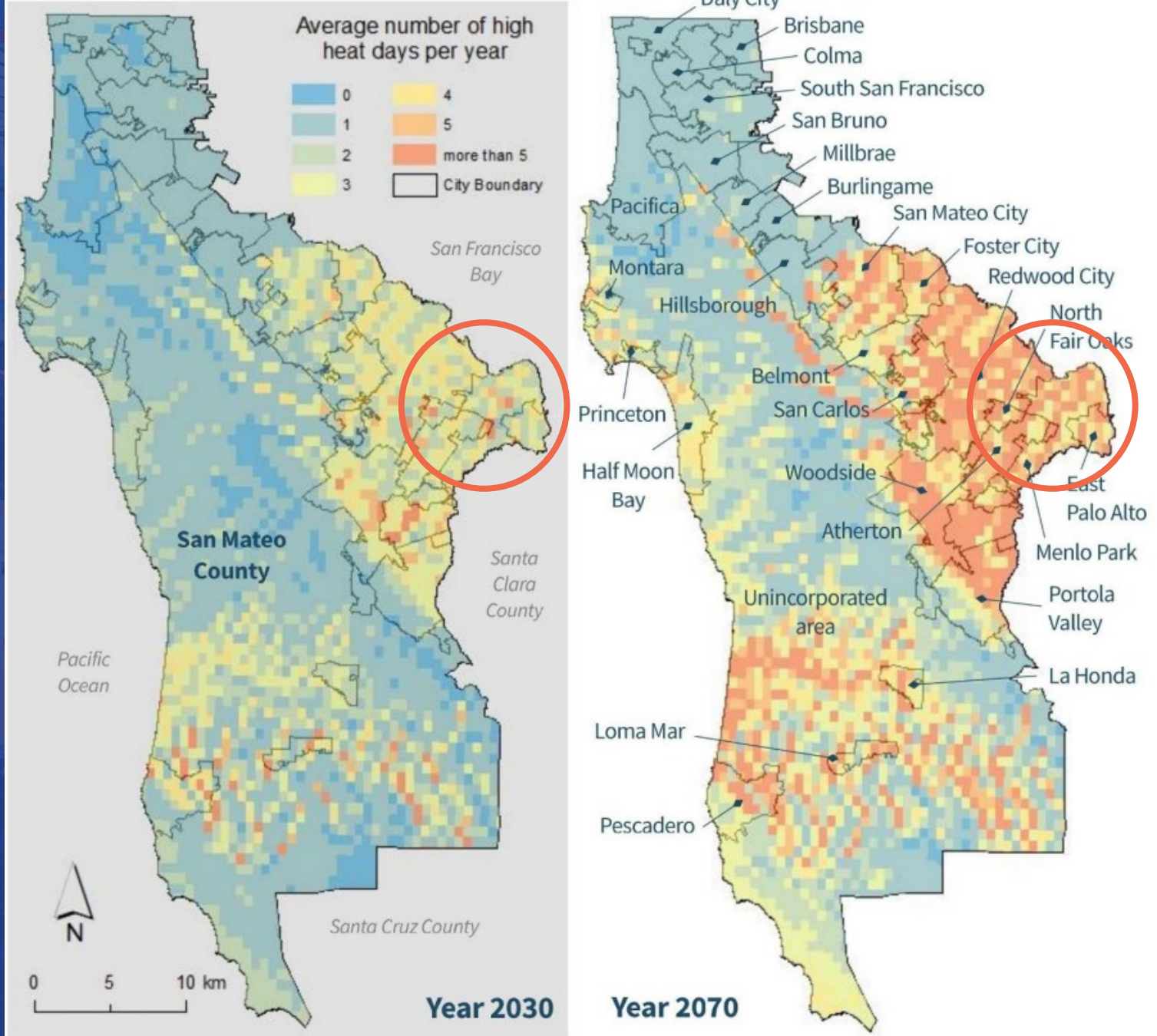


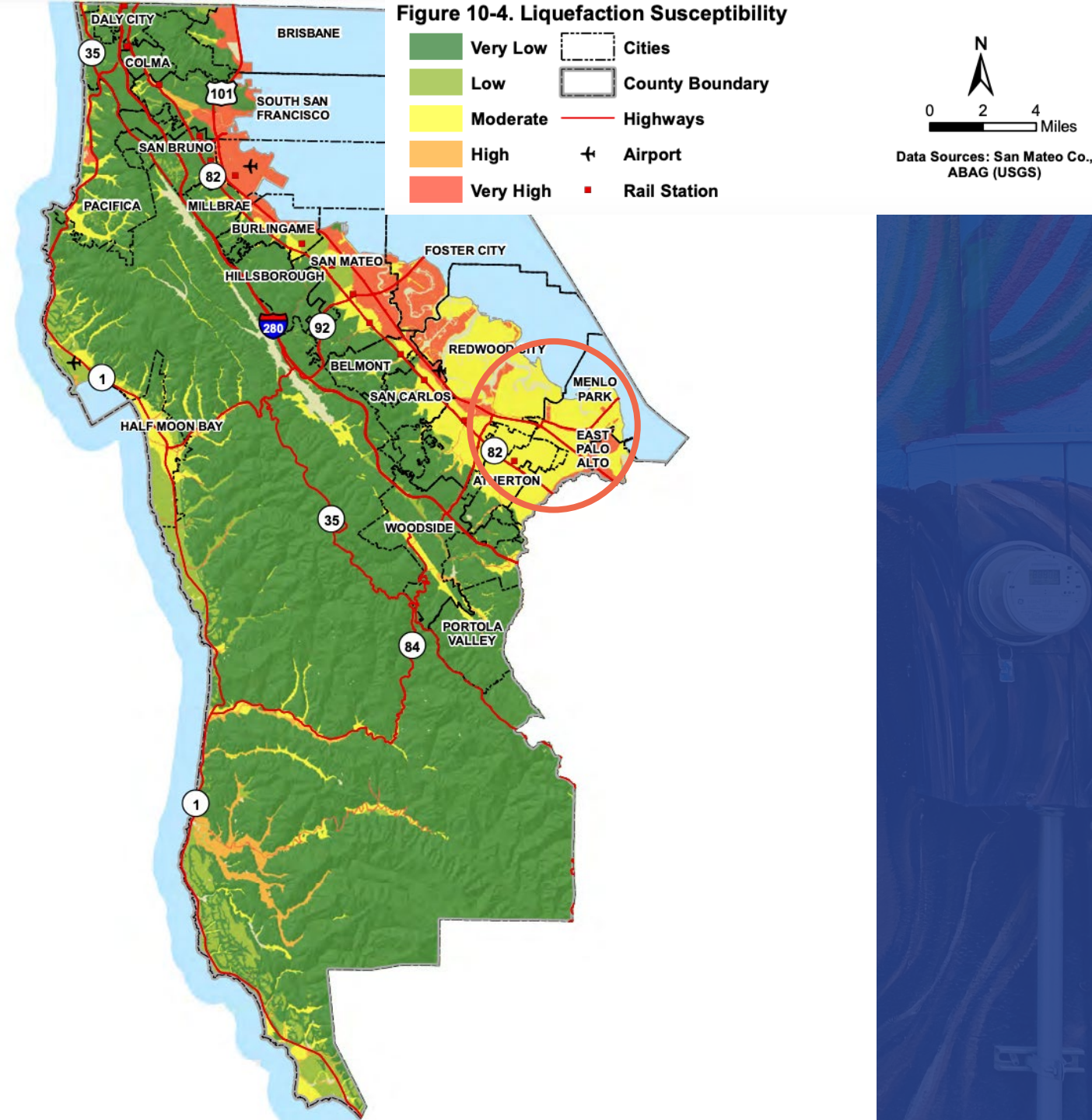
Figure 14-5. Extreme Heat Projections for San Mateo County

# Liquefaction Risk San Mateo County

Liquefaction:

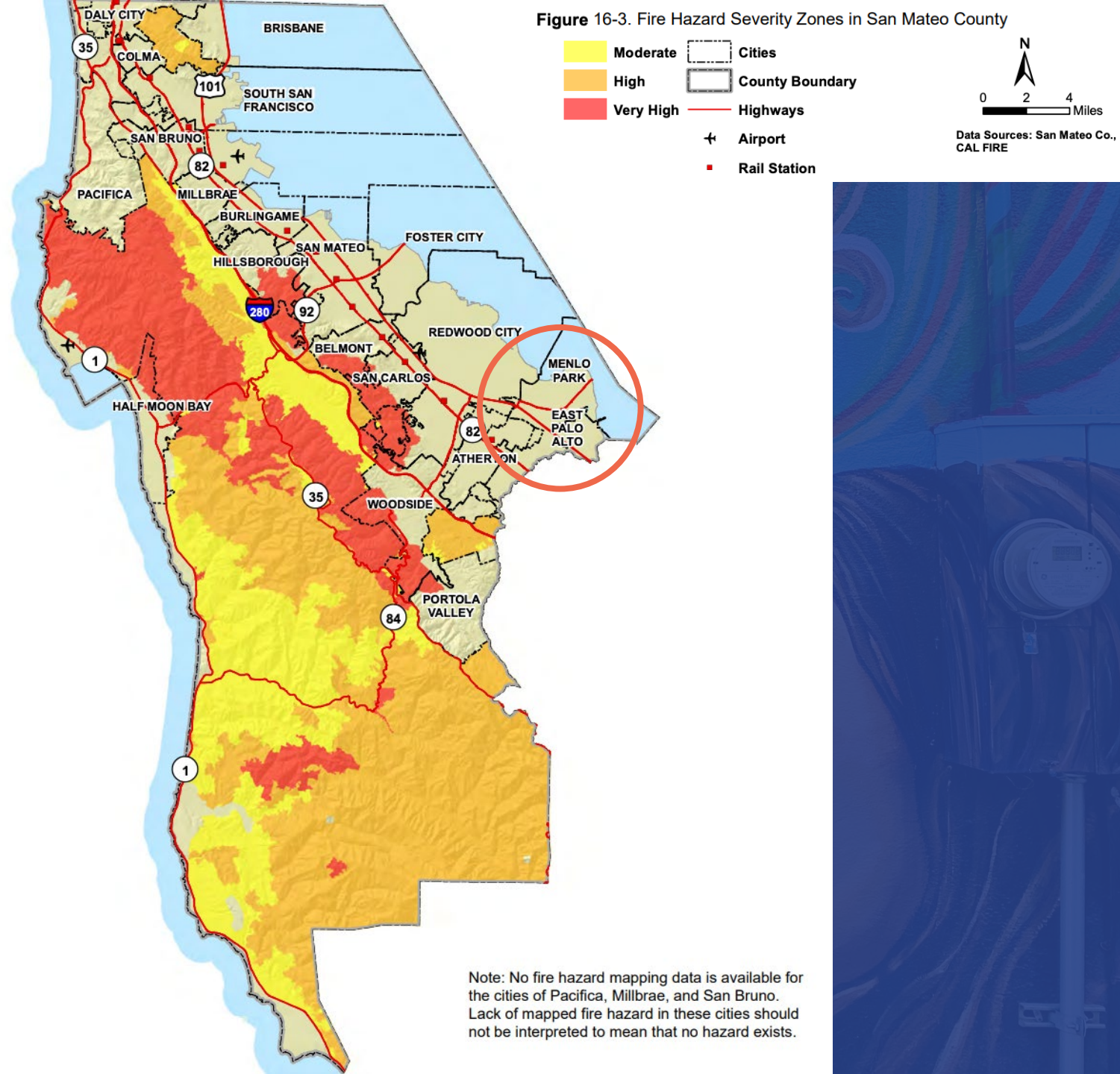
When loosely packed, saturated soils lose strength & act like a liquid in response to strong ground shaking, disrupting building foundations & infrastructure.

Source: 2021 County of San Mateo  
Multijurisdictional Local Hazard  
Mitigation Plan (LHMP)



# Fire Hazard San Mateo County

Source: 2021 County of San Mateo Multijurisdictional Local Hazard Mitigation Plan (LHMP)



East Palo Alto



Menlo Park

Palo Alto

East Palo Alto



# Vulnerable Social Systems

East Palo Alto

San Mateo County

58%

Hispanic/Latinx

24%

\*5-year ACS 2022

26%

Percent households making less than 30% of AMI

13%

17%

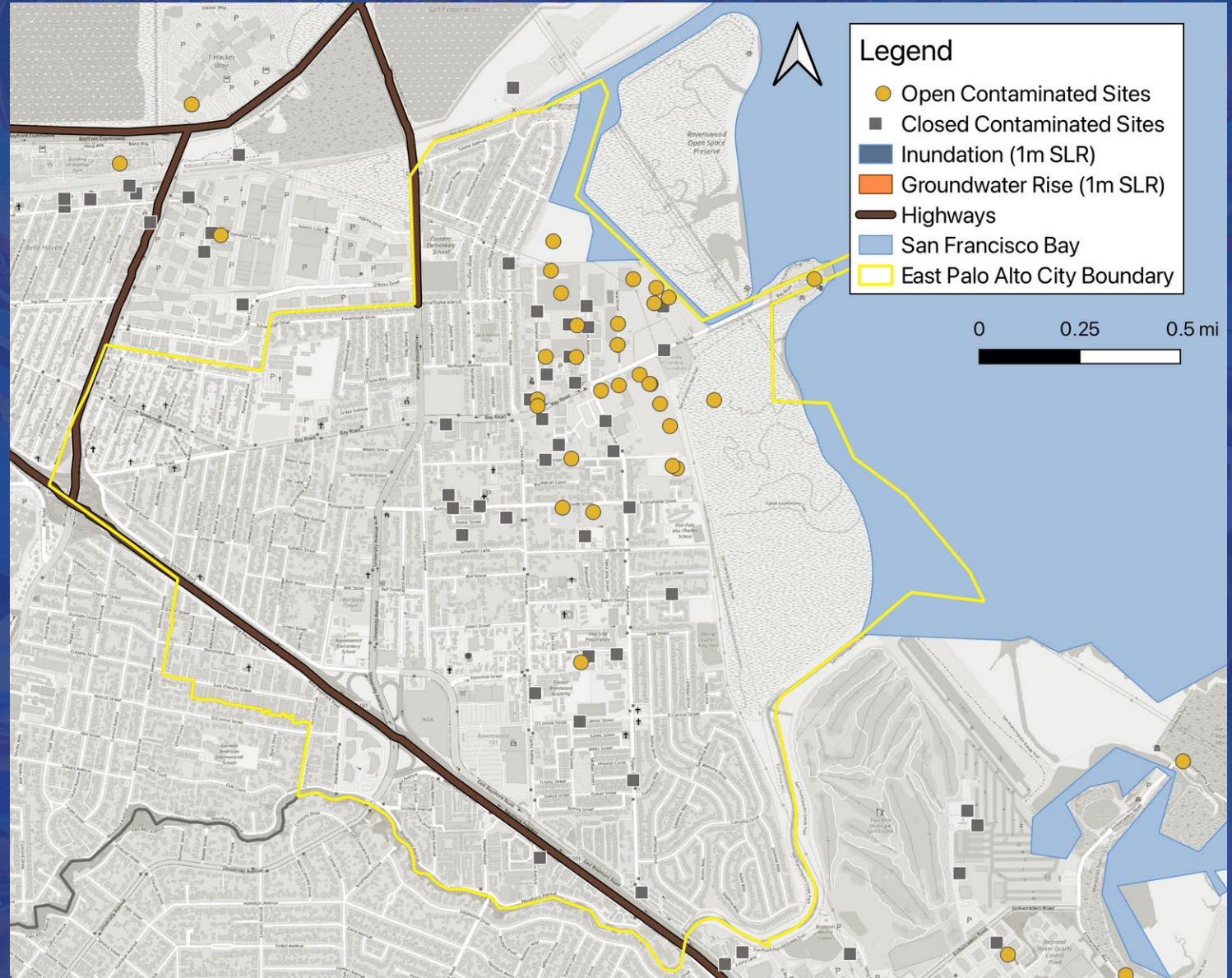
Percent households making more than 100% of AMI

49%

\*\*Housing Needs Report: East Palo Alto 2021

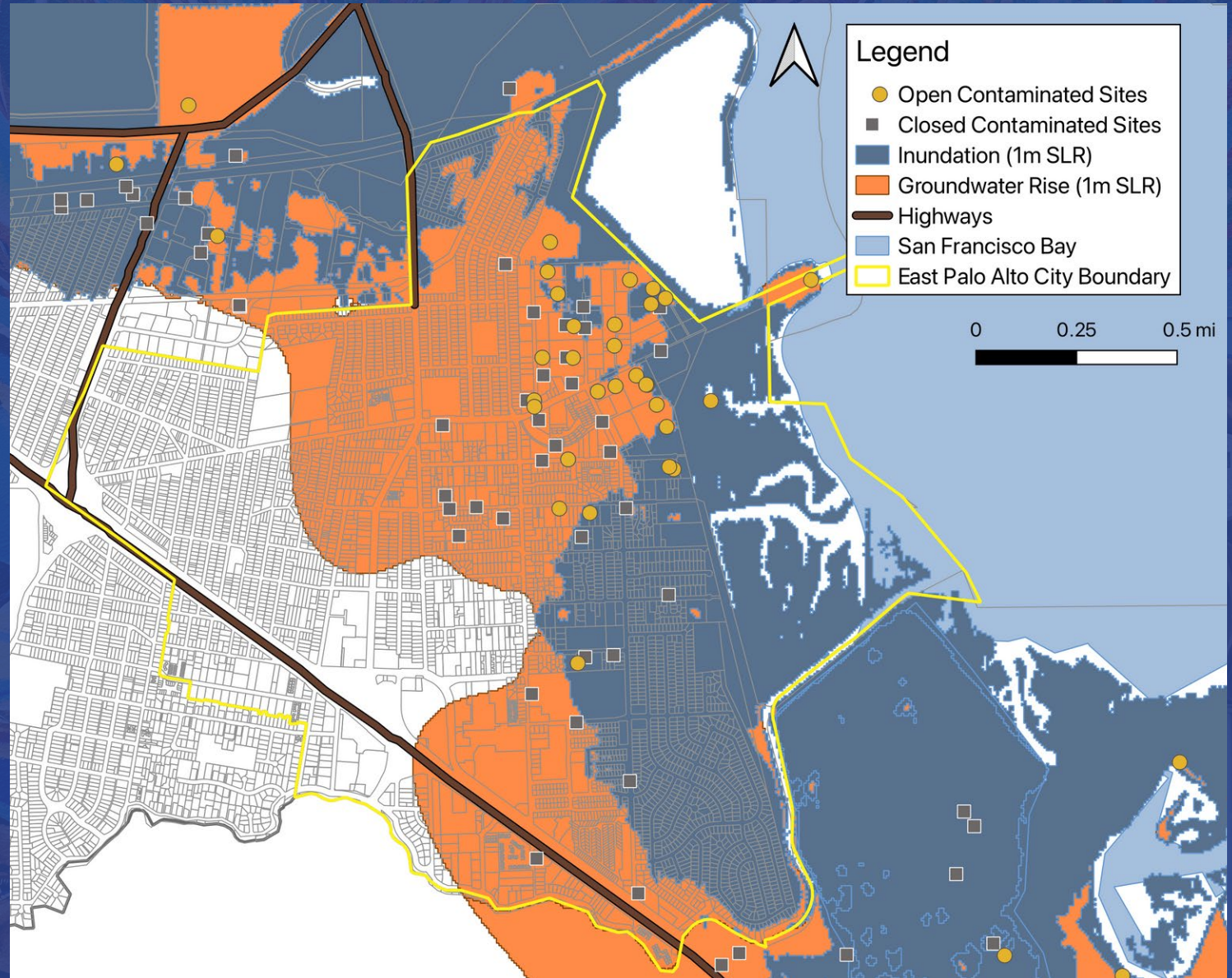
# Contaminated Sites in East Palo Alto

Data Source: Hill, K., Hirschfeld, D., Lindquist, C., Cook, F., & Warner, S. (2023). Sea level rise, groundwater rise, and contaminated sites in the San Francisco Bay Area, and Superfund Sites in the contiguous United States. Dryad.



# Contaminated Sites & Future Flooding in East Palo Alto

Data Source: Hill, K., Hirschfeld, D., Lindquist, C., Cook, F., & Warner, S. (2023). Sea level rise, groundwater rise, and contaminated sites in the San Francisco Bay Area, and Superfund Sites in the contiguous United States. Dryad.





# La Comunidad

DE EAST PALO ALTO

Rosa Nelson, Water Justice Coordinator  
Nuestra Casa de East Palo Alto





# Nuestra Casa Our Programs



Promotoras  
& Community Outreach



Environmental  
Justice Academy



Food Rescue &  
Distribution

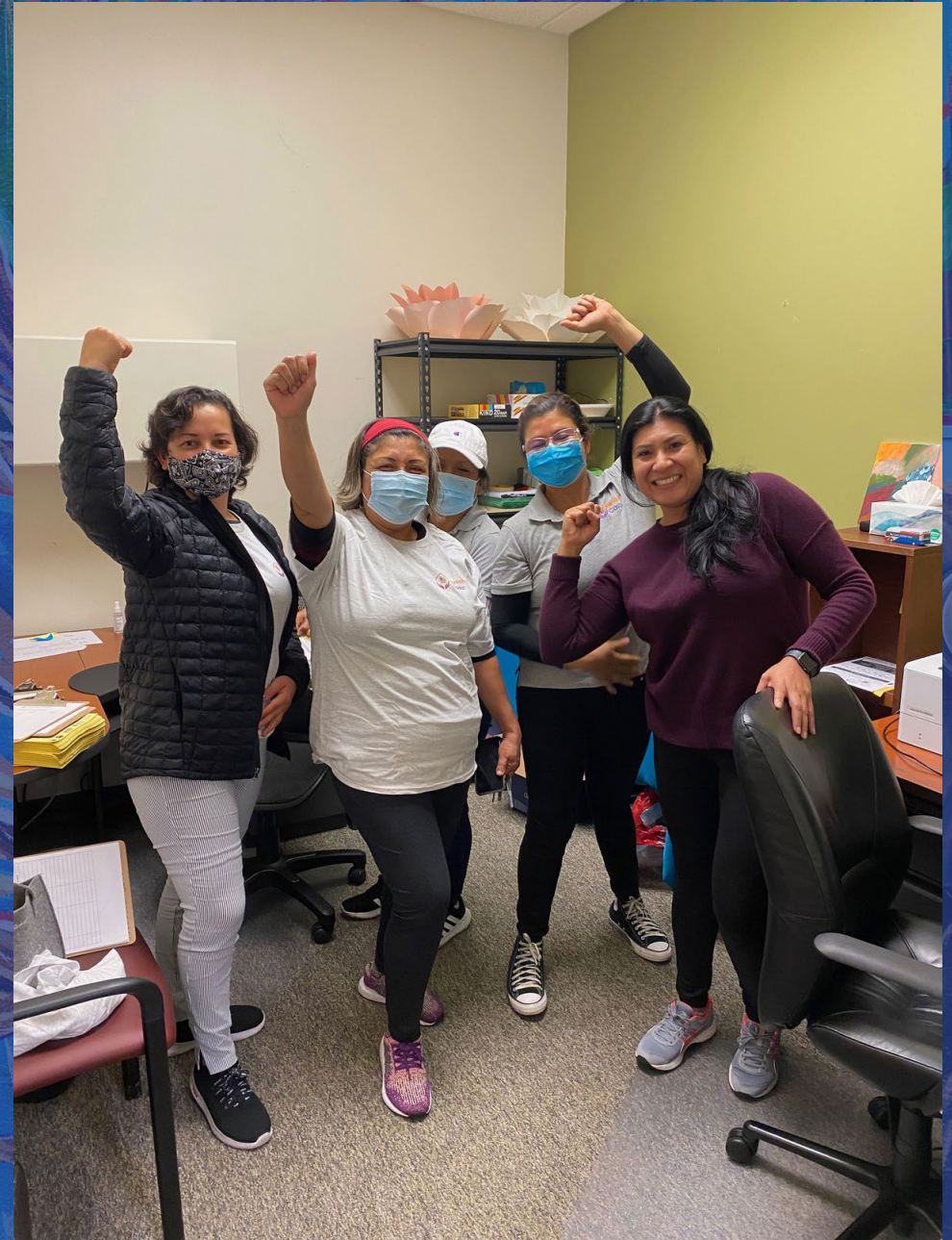


Water Justice Program

I have such pride that we can bring this information to the community. It is beautiful to be a part of this group... we are working to bring the gift of knowledge to everyone.

- Nuestra Casa Promotora

# Nada Sobre Nosotros Sin Nosotros



# Community Perspective

“I have two children that are autistic, I don't want to go outside when it is flooding because I need to think about them and what they need....if it was just me, I wouldn't care”

- EPA community member

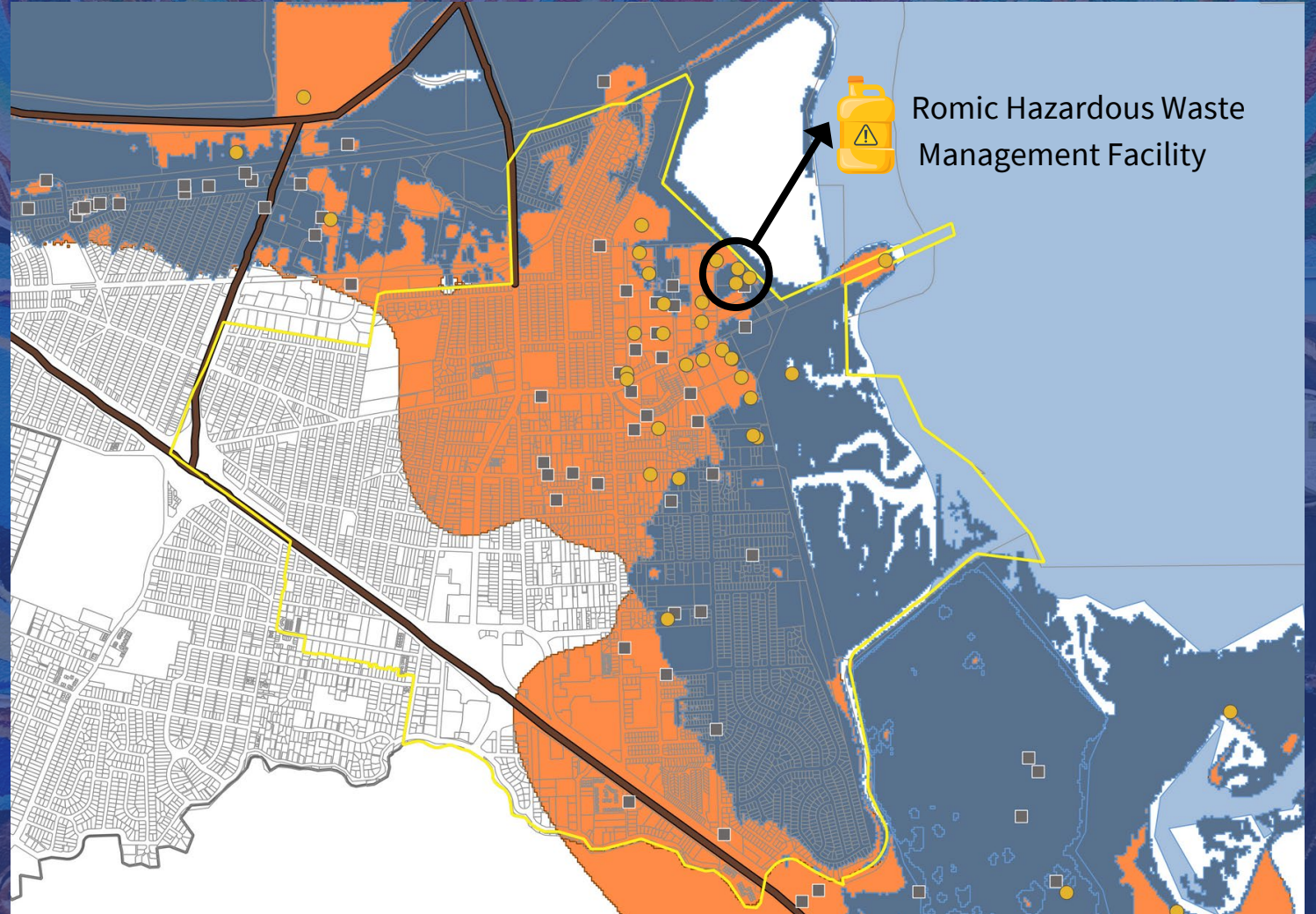
# Community Perspective

“ This is the first time I’ve seen it this bad...it affected a lot of families”

- EPA community member

# Community Perspective

"I do worry every now and again about Romic and other contaminated sites....Growing up we always drank bottled water because we heard the water is bad here. [It is one way] we try to eliminate the toxins."



# Equity on the Frontline



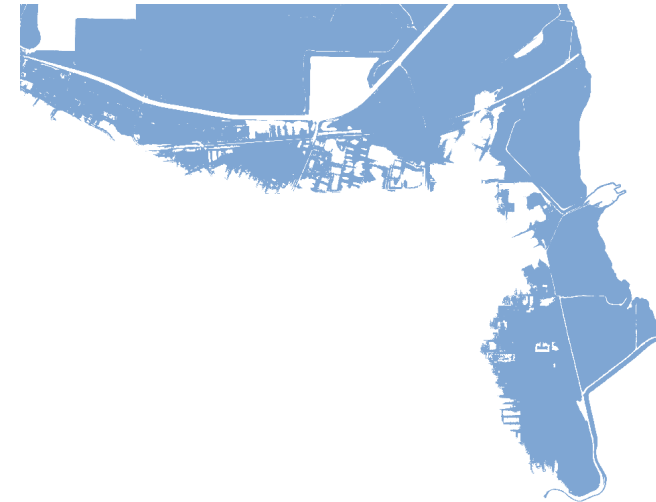
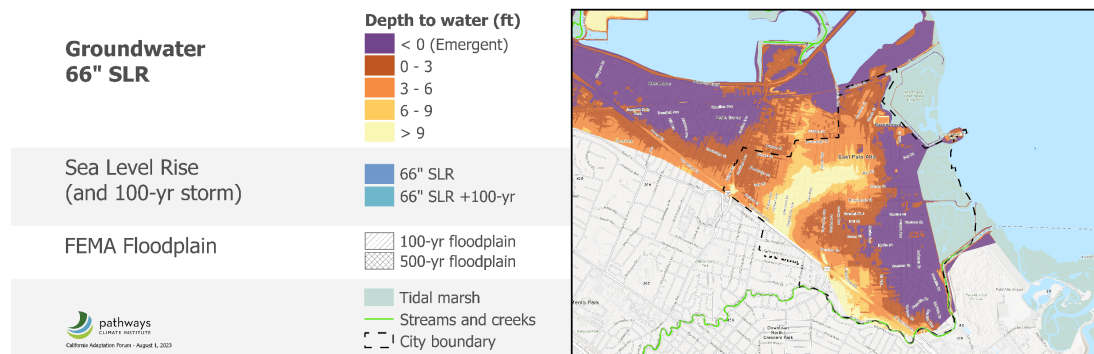
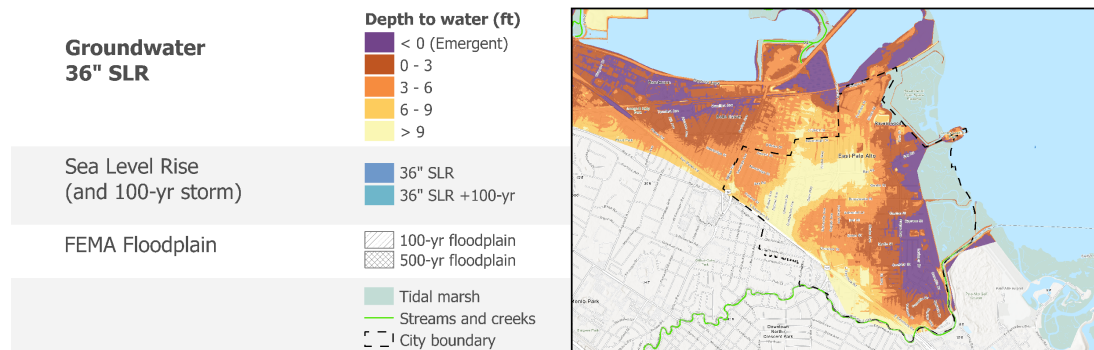
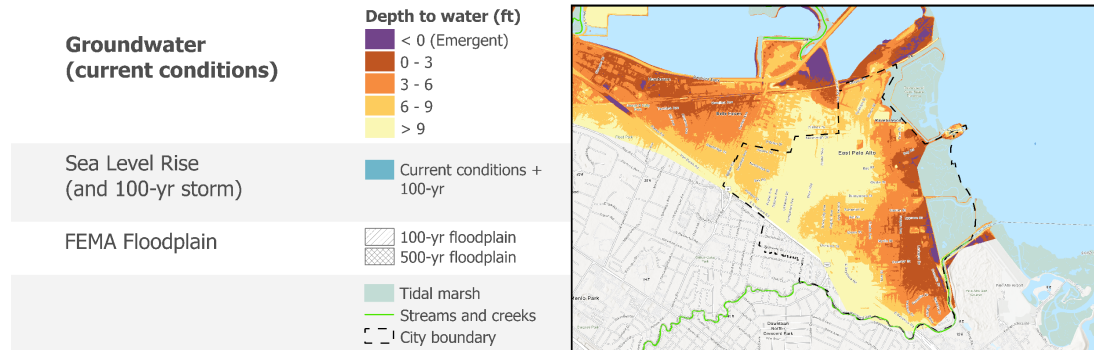
A close-up photograph of a hand pouring milk into a cup of coffee. The coffee has a latte art design on the surface. The background is blurred, showing a person's hand holding a spoon.

# World Cafe

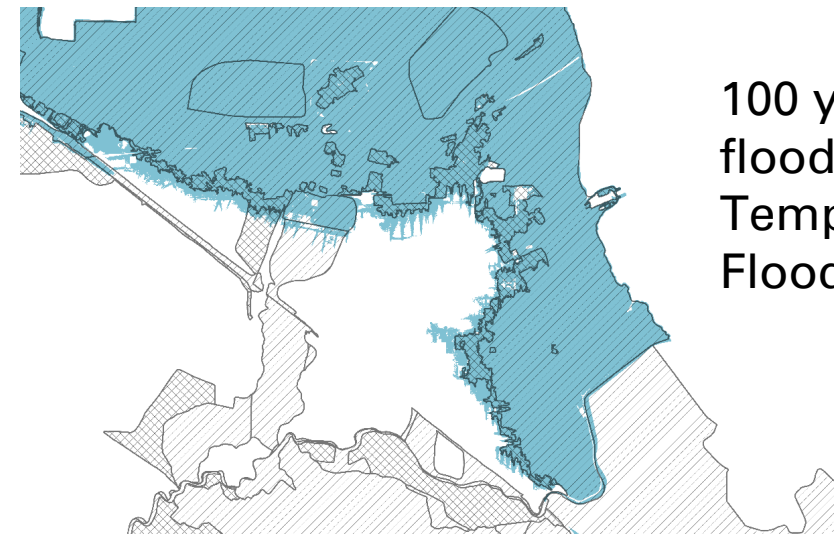
- Start where you are.
- Each table has a different question.
- After 10 minutes, rotate to the next table, and repeat...



# Analog, hands on GIS ...



Sea Level Rise – Permanent Inundation



100 year flooding – Temporary Flooding

# World Café Questions

**Table 1:** Does your community experience flooding hazards?

**Table 2:** How have you managed flood hazards through physical solutions, whether nature-based or grey infrastructure?

**Table 3:** How have you managed flood hazards through policy solutions?

**Table 4:** How have you included community engagement in your work?

**Table 5:** Have you had success in incorporating lived experience to support decision-making?



*Thank you!*

Sarah Atkinson: [satkinson@spur.org](mailto:satkinson@spur.org)

Juliette Finzi Hart: [juliette.hart@pathwaysclimate.com](mailto:juliette.hart@pathwaysclimate.com)

Mike Mak: [Michael.mak@pathwaysclimate.com](mailto:Michael.mak@pathwaysclimate.com)

Rosa Nelson: [rnelson@nuestracasa.org](mailto:rnelson@nuestracasa.org)