

Adapting to Rising Tides

BAY AREA

Stormwater

Asset Description

Stormwater management systems include drains that collect urban runoff and underground pipes that convey flows either by gravity or by pumping to a discharge or outlet location, such as an outfall or flood control channel. Low-lying storm drains contribute to current flooding issues through tidal backup, lack of maintenance, and debris buildup.

Stormwater systems are uniquely financed, maintained, and operated by local governments. Data and information available—such as system condition, elevation of inlets and outfalls—vary largely among municipalities and sites, and many stormwater systems are not mapped at all.



King Tide in Sausalito, 2017



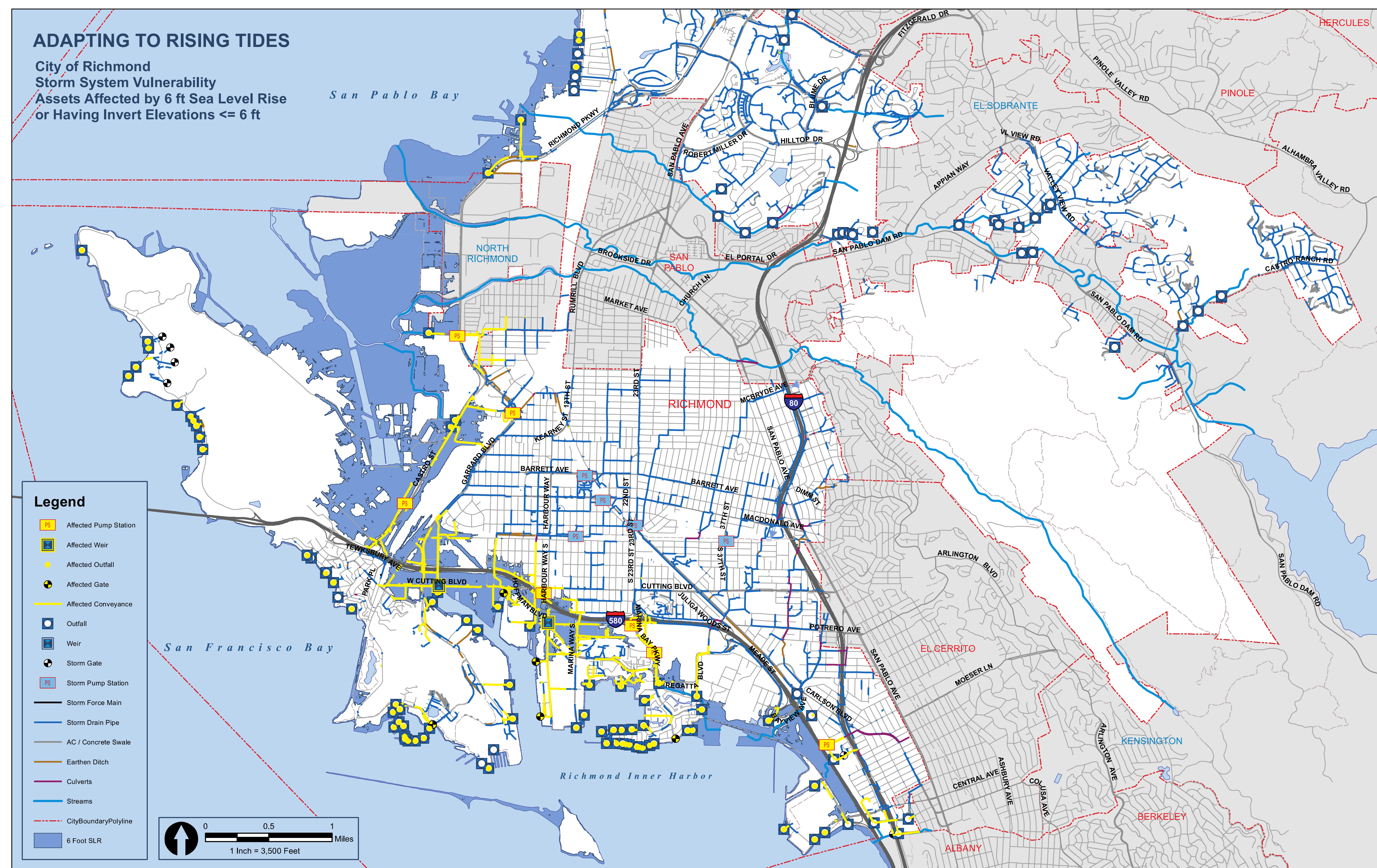
Walnut Creek, Contra Costa County

Approach

Since stormwater is a local issue with regional implications, we will support city and county managing agencies with an issue paper, case studies and adaptation responses. We will assess flood control infrastructure that drains into the Bay including creeks, culverts, and channels.

For local governments with detailed data, we will conduct a local analysis similar to the City of Richmond Stormwater component of the ART Contra Costa County Project (map on right):

- Identified vulnerabilities and consequences for stormwater assets, including collection devices, manholes, outfalls, pump stations, storm gates, weirs
- 842 of 7,282 potentially affected by, or have elevation below, sea level rise of six feet above mean higher high water
- Assets with the highest percentages of risk include outfalls (58%), storm gates (56%), and pump stations (58%)



Tidal Creeks and Flood Control Channels

Asset Description

As sea level rises, new and prolonged flooding will not only occur along the San Francisco Bay shoreline, but also along creeks and channels that connect and drain to the Bay. Sea level rise will exacerbate this riverine flooding because rising tides will progressively reduce the capacity of tidal creeks and flood control channels to discharge riverine flows, as high creeks meet a high Bay leaving nowhere for the water to go.

Approach

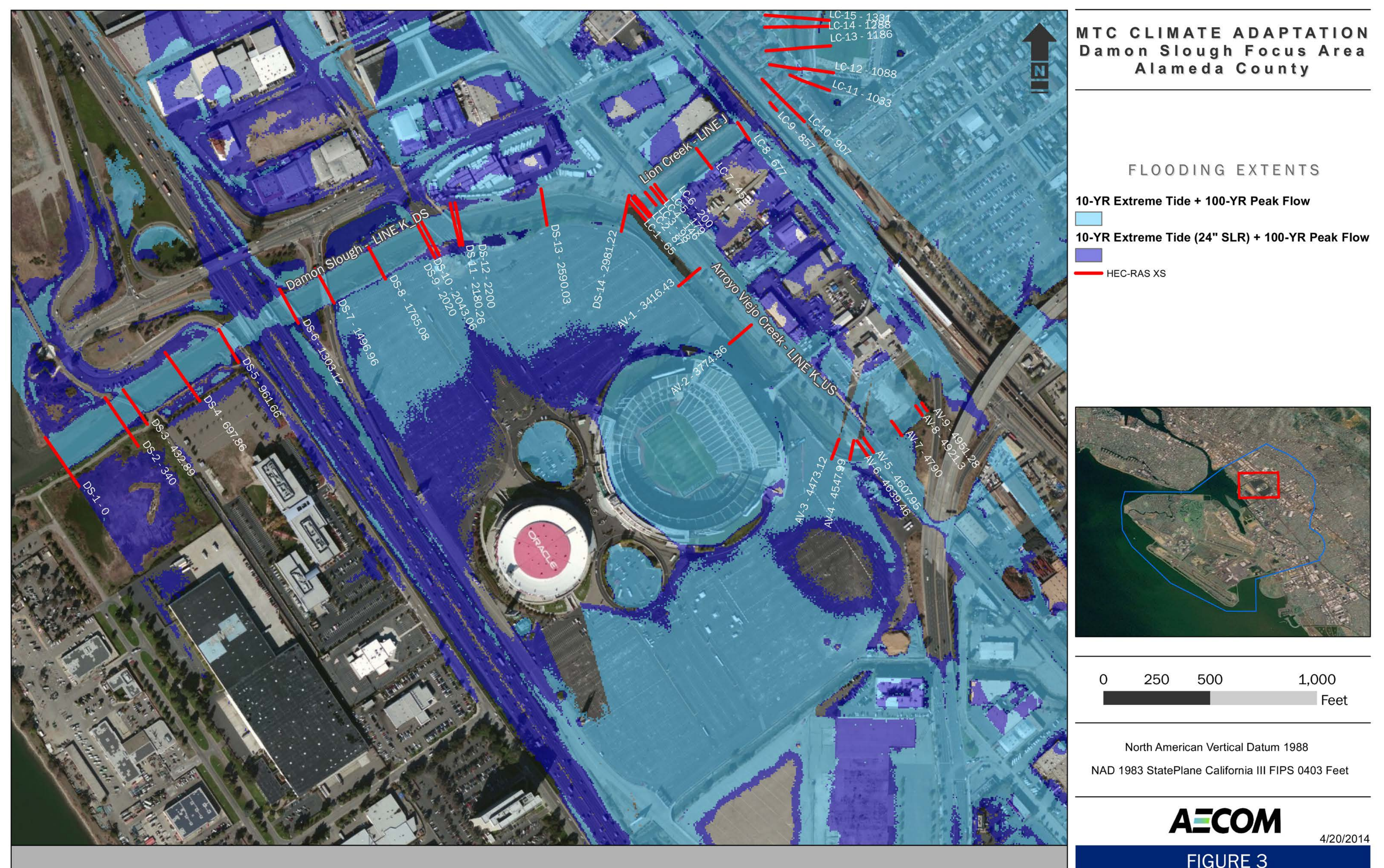
In 2015, the ART Program developed a protocol and guidance for how to assess the vulnerability of tidal creeks and flood control channels to sea level rise. This project is known as the *Head of Tide* project.

The ART Bay Area project aims to prioritize tidal creeks and flood control channels throughout the region to determine the highest needs for additional modelling of combined flood event scenarios based on consequences to adjacent assets.

The ART team will draw upon previous regional projects focused on creeks and channels including:

- ART Oakland/Alameda Resilience Study--Oakland Coliseum/Damon Slough
- Flood Control 2.0 (SFBJV, BCDC, SFEI, SFEP)
- Head of Tide (BCDC, SFEI)
- Completed creek and channel vulnerability studies and assessments

ART Vulnerability Assessment Example: Oakland Coliseum Site



MTC CLIMATE ADAPTATION
Damon Slough Focus Area
Alameda County

FLOODING EXTENTS

- 10-YR Extreme Tide + 100-YR Peak Flow
- 10-YR Extreme Tide (24" SLR) + 100-YR Peak Flow
- HEC-RAS XS

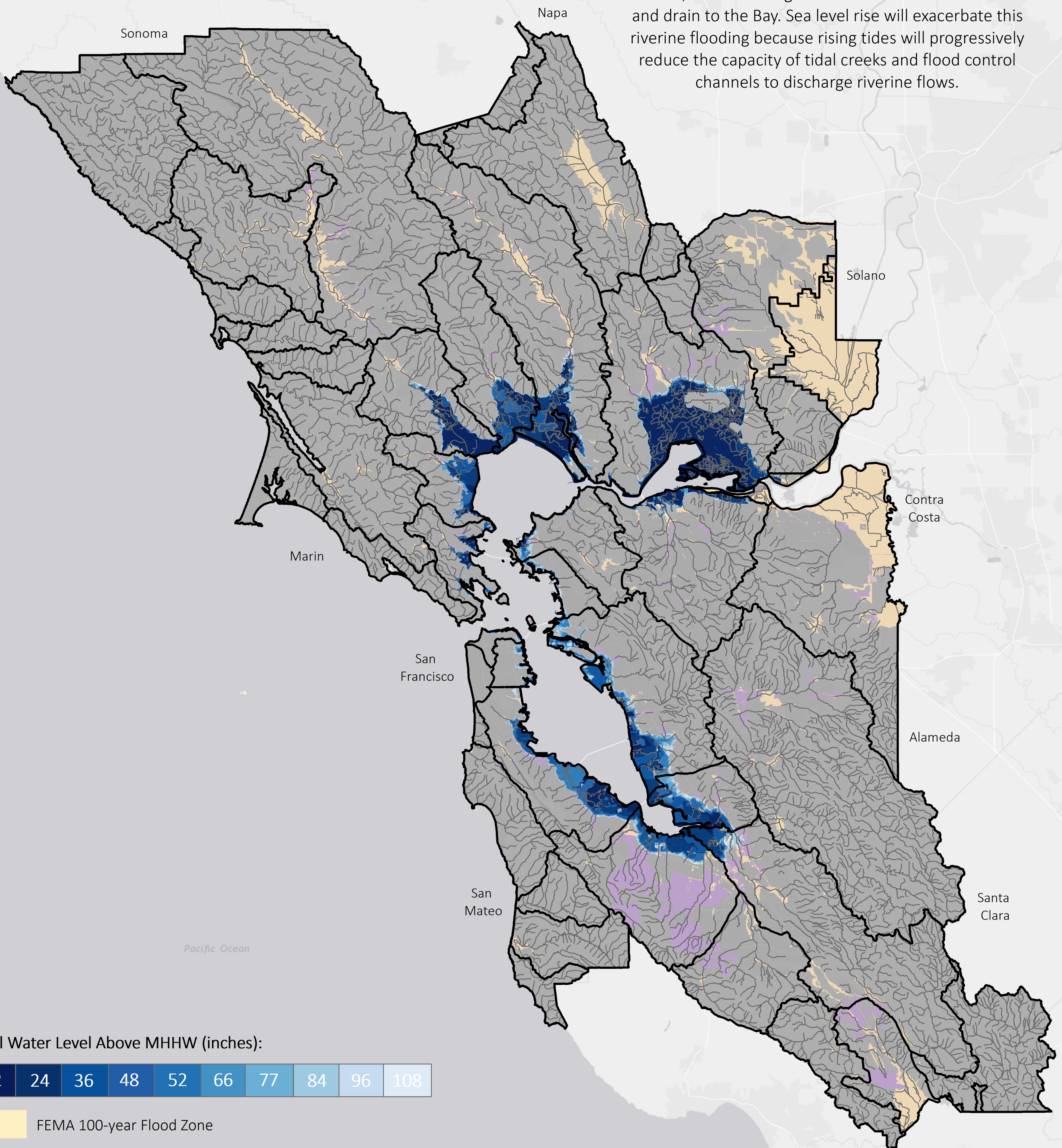
0 250 500 1,000
Feet

North American Vertical Datum 1988
NAD 1983 StatePlane California III FIPS 0403 Feet

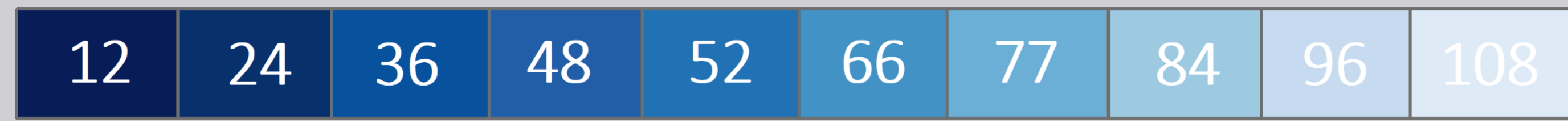
AECOM
4/20/2014
FIGURE 3

Tidal Creeks and Flood Control Channels

This map displays creeks and flood control channels and their corresponding watersheds throughout the 9-county Bay Area region. As sea level rises, new and prolonged flooding will not only occur along the San Francisco Bay shoreline, but also along creeks and channels that connect and drain to the Bay. Sea level rise will exacerbate this riverine flooding because rising tides will progressively reduce the capacity of tidal creeks and flood control channels to discharge riverine flows.



Total Water Level Above MHHW (inches):



- FEMA 100-year Flood Zone
- FEMA 500-year Flood Zone
- Watershed Boundaries
- National Hydrography Dataset

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC, AECOM; FEMA 2017; NHD 2017; ESRI

