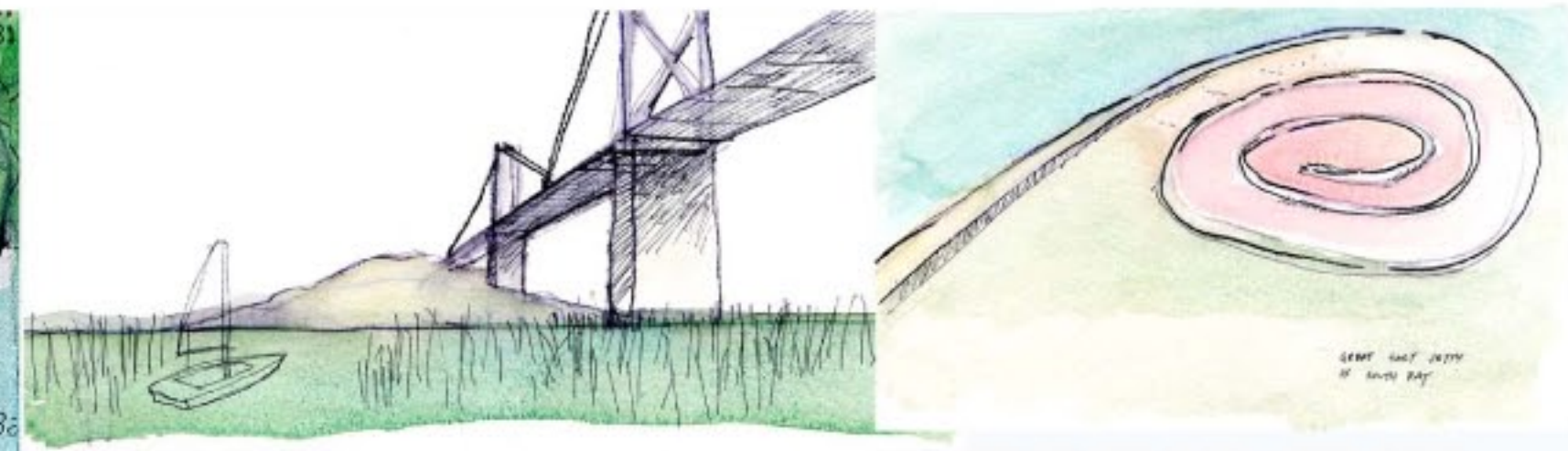
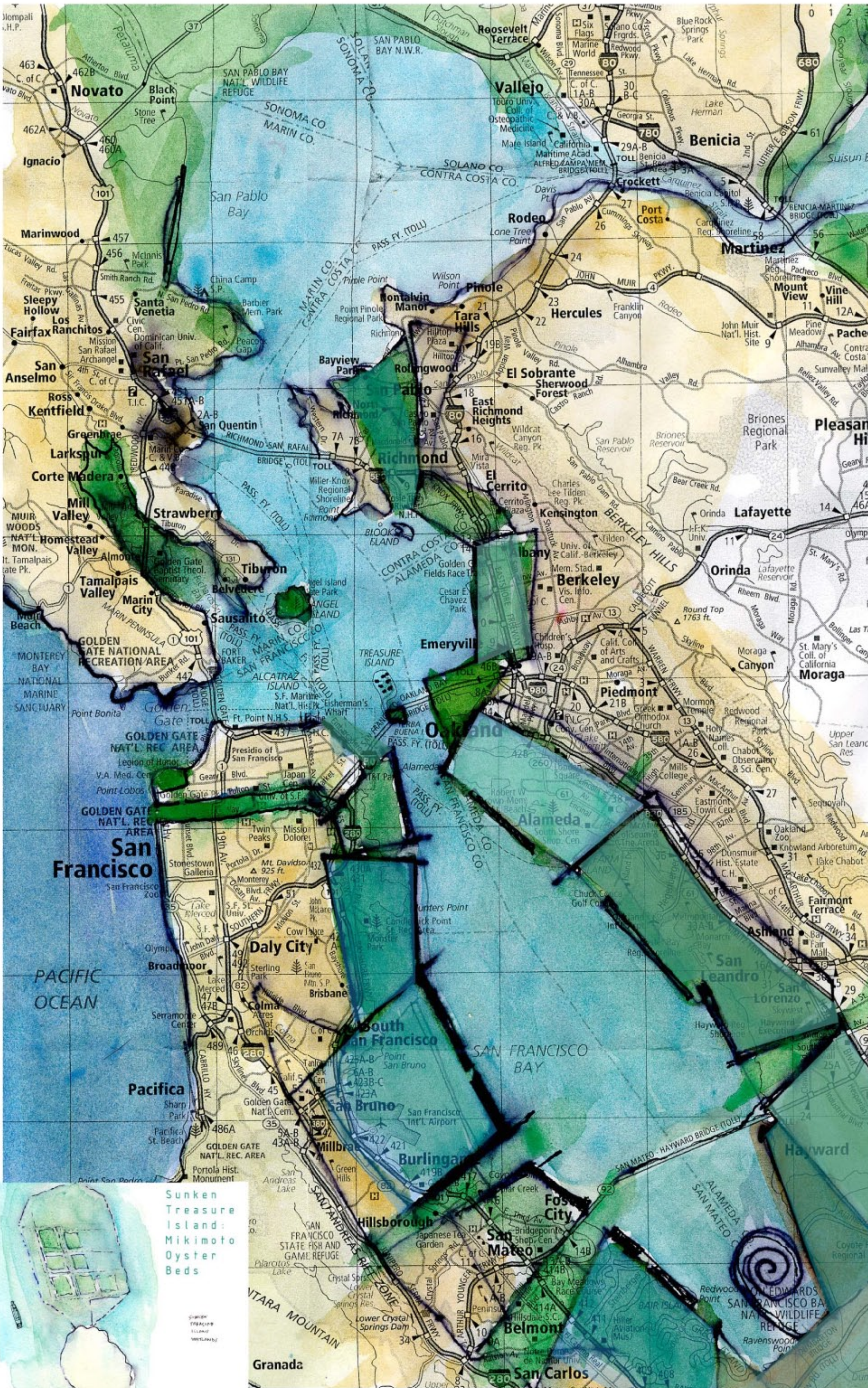


SUBMERGENCE TO EMERGENCE: 2209 INTERIM REPORT OF THE ESTUARINE DEVELOPMENT AUTHORITY (EDA)



EMBARCADERO WETLANDS
TERRACONCRETE LEVEE
GREAT SOUTH BAY SALT SPIRAL, ARTIST UNKNOWN
EDA-10675-INTERIM REPORT-DRAFT
INTRODUCTION: LOOKING BACK

By 2209 the San Francisco Bay is surrounded by a belt of green wetlands. An estuarine boundary divides the urban environment from the bay. Natural jetties project from the land into the bay and provide opportunities for citizens to engage in recreational and commercial activities. How did we withdraw from the bay shore? What inspired the development of the estuarine boundary?

At first glance, one would not expect the citizens of 2009 to consider withdrawing from the shore. Thousands of acres of developed property was built to the waters edge. Commercial and recreational activities exploited the bay. Industrial contaminants plagued the bay, fresh water demands altered the tidal zones and over-fishing depleted schools of salmon, crabs, oysters, and anchovies. For 150 years an attitude of exploitation dramatically changed San Francisco Bay. The greenbelt that we are familiar with had it's origins in the response to climate change.

By 2009 most were aware that climate change was a significant and real problem for civilization. Weather patterns were changing and measurable changes to sea levels were apparent. Climate models predicted a 5 foot change in mean sea level for San Francisco Bay. Realization of global sea level rise started to influence development patterns. Shoreline development along the bay was stalled and became costly. Environmentalists objected to large fill projects, insurance companies were concerned with flood risk, and liquefaction risks required expensive structural systems. The San Francisco Bay Conservation and Development Commission published maps that indicated areas of the bay that were at risk of flooding.

In early 2012 The Estuarine Development Authority (EDA) was established to address the property issues that would arise. The vision of the EDA was to change the relationship with the natural environment. Rather than a relationship of control and exploitation citizens would embrace and nurture the bay. The EDA's most difficult task was control and manage the withdrawal of the urban environment away from the bay. The estuarine boundary and the bay itself would protect the urban environment from rising tides, storm surges and floods. Their first strategy was to prevent development on undeveloped shore. As a result large sections of the bay were closed to development or re-development. Portions of Alameda Island and Treasure Island were closed. Private developers could fund wetland restoration projects on these islands and receive offset credits for new developments above the flood zone.

The next, more controversial, phase required the designation and identification of public and private lands that were subject to eventual flooding. Properties that did not face flooding until 2060 would be protected by new boundary wetlands. Any property that was below the estimated 2060 mean high tide would be protected by new temporary levee systems and were placed under a 20 year relocation program.

In the final phase the land was restored to boundary wetlands. The temporary levees were breached or over-topped and the land behind the levees, between the bay and the urban environment, became wetlands. As rising tides levels expanded the bay the area of land that became part of the estuary expanded with it. The objective of the relocation program was to prevent costly protection systems. Rather than create permanent levees and pumping systems throughout the bay area, urban activities were moved above the future tide levels before catastrophic floods occurred. The estuarine boundary was developed over 60 years with a phased transition from developed urban lands to undeveloped natural wetlands.

- Phase 1. Protect undeveloped areas subject to inundation from development.
- Phase 2. Identify properties that are subject to inundation and begin construction of sandbar levees to protect shoreline properties.
- Phase 3. Removal of properties behind the levees.
- Phase 4. Development of wetlands behind the levees and breach levees. Return shore line to the bay.

The central element of our solution is a combination of non-permanent levee system, phase withdrawal from the shore, and restoration of natural boundary conditions - the wetlands.

How is this different than the standard levee solution? A standard levee is construction with an indefinite lifespan. Our levees are intended to last 20 to 30 years just long enough to relocate the urban property in the flood zone. The shorter lifespan requires a shorter levee. Once the property behind the level is relocated they can be breached, allowing the land behind to be returned to the bay. The reduced height results in a levee that uses only 75% of the material. Material used to create the levees may in part be taken from the protected area (as this will be returned to the bay anyway).

LEVEE-WETLAND SECTION/PLAN

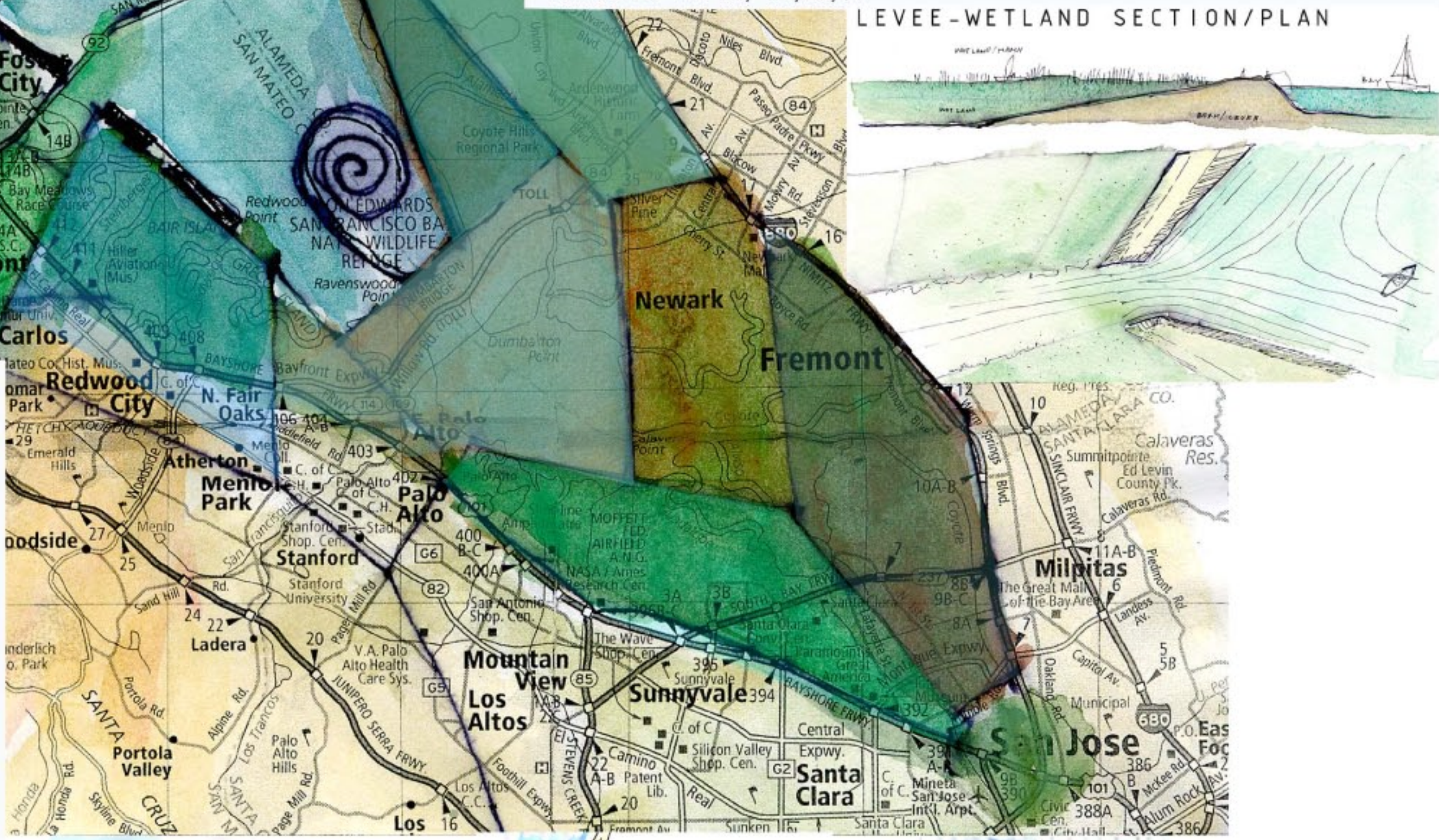


Excerpted from Dry Sierras: A California History of Climate Change (University of California Press 2187 pp. 79)

The rising sea level had been overall a very gradual process. 60 inches increase in mean sea level over 100 years was not something you noticed. One day you'd visit the shore and say, "I remember when I was a kid and the water was out there and you could walk along the beach. Now you can only do that during the spring low tide." But no one realized how rapidly sea level could change with the advent of the Super Storms.

In what is commonly called the Decade of Super Storms (2144-2157) the Bay Area experienced its first hurricane. Hurricane Conception hit San Francisco with record winds and surge. Treasure Island was sundered-- utterly washed away. Years later it would come to be called "Sunken Treasure Island", with the establishment of the phenomenal Mikimoto Oyster Fields over its broad avenues....

The Bay Area of today (2187) is very different from 2009. It is hard imagine what our ancestors were thinking as they pushed inhabitation and industry directly on the edge of bay, fouling their nest(and every other animal), destroying the fertile boundary conditions that we enjoy today. But the thinking changed, attitudes changed, and possibility of a continuous and thriving wetland bay edge from the Delta to the salt flats was embraced. Now population centers are concentrated around the Bay Area high speed ring rail system. The great concrete highways once called 101 and 880 that once ringed the bay have been dismantled. The boundary wetland is thriving and the bay is cleaner than it has been in 300 years. One can swim from sandbar levee to sandbar--straight down from Anuja's Beach in San Mateo to the Great Salt Spiral. But sea levels are beginning to drop and strategic ecologists estimate the boundary green belt might not be necessary by the end of the century. **The challenge emerges-- How do we protect this great inheritance so greatly bought and so rightly cherished?**



2009 In this sketch the conditions in 2009 are shown. A sea wall and fill has created flat urban zones. There are parking lots, industrial facilities and residential properties in areas that are certain to be flooded.
2035 Non-permanent levee have been constructed and the properties behind the levees are being relocated or deconstructed.
2050 Present Levees were breached and wetlands are established in once urban areas. Levees are in the process of erosion into sandbars