

# Deer Island Basin Complex Tidal Wetland Restoration Project SFBRA AC Meeting



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Senior Engineer  
Marin DPW Flood  
Control

February 10, 2023

*\* With an interlude on  
SLR levees*



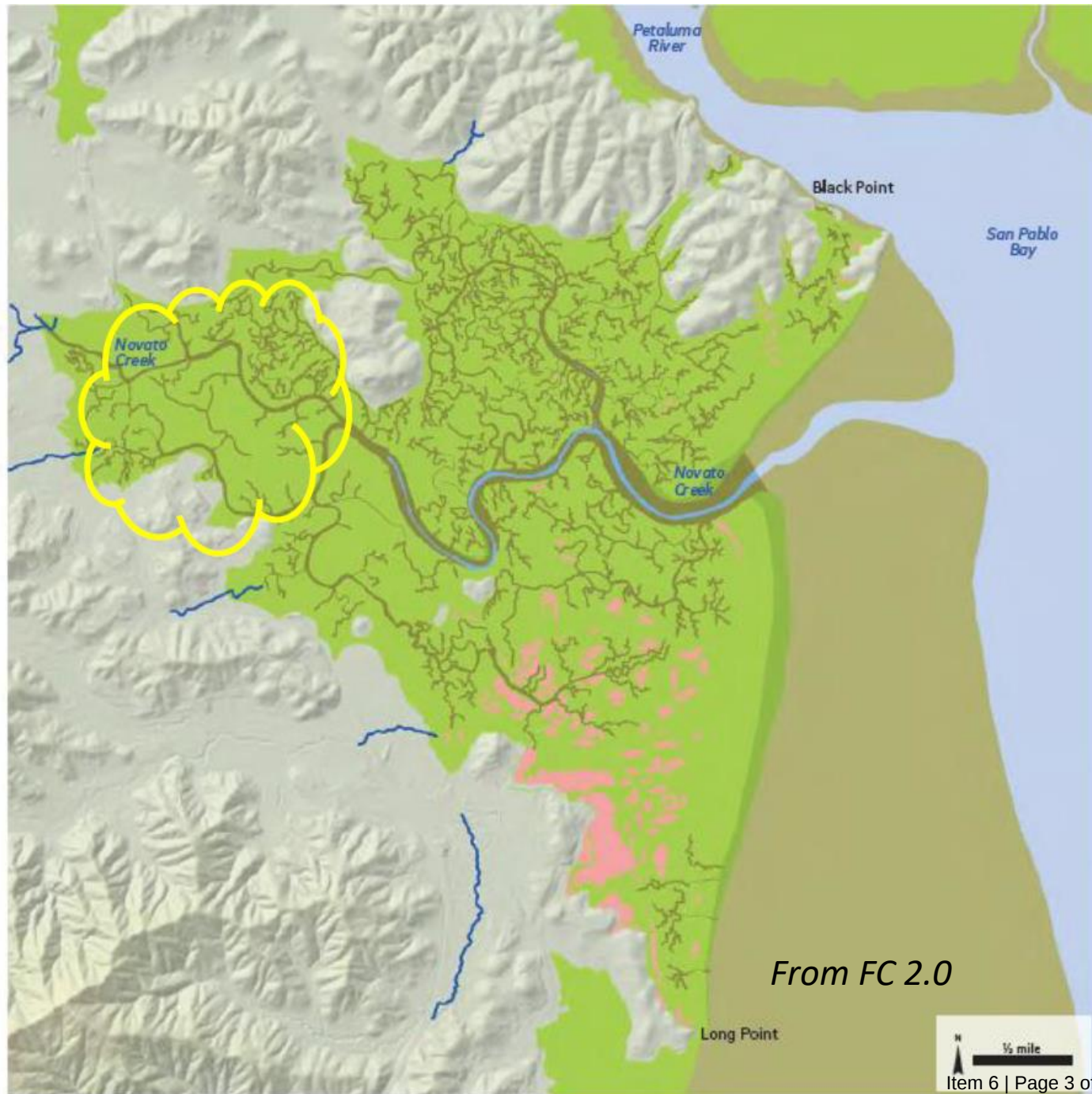
# Novato Creek Baylands

Approx 1,000 Acres  
of former diked  
Baylands

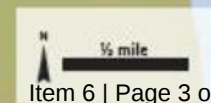
Major roads and  
utilities protected by  
unengineered and  
vulnerable levee  
system

Legacy of older  
development





*From FC 2.0*





WHERE'S NOVATO CREEK?—Flooded over just like many parts of Novato Friday when the storm had subsided sufficiently to permit a Com-

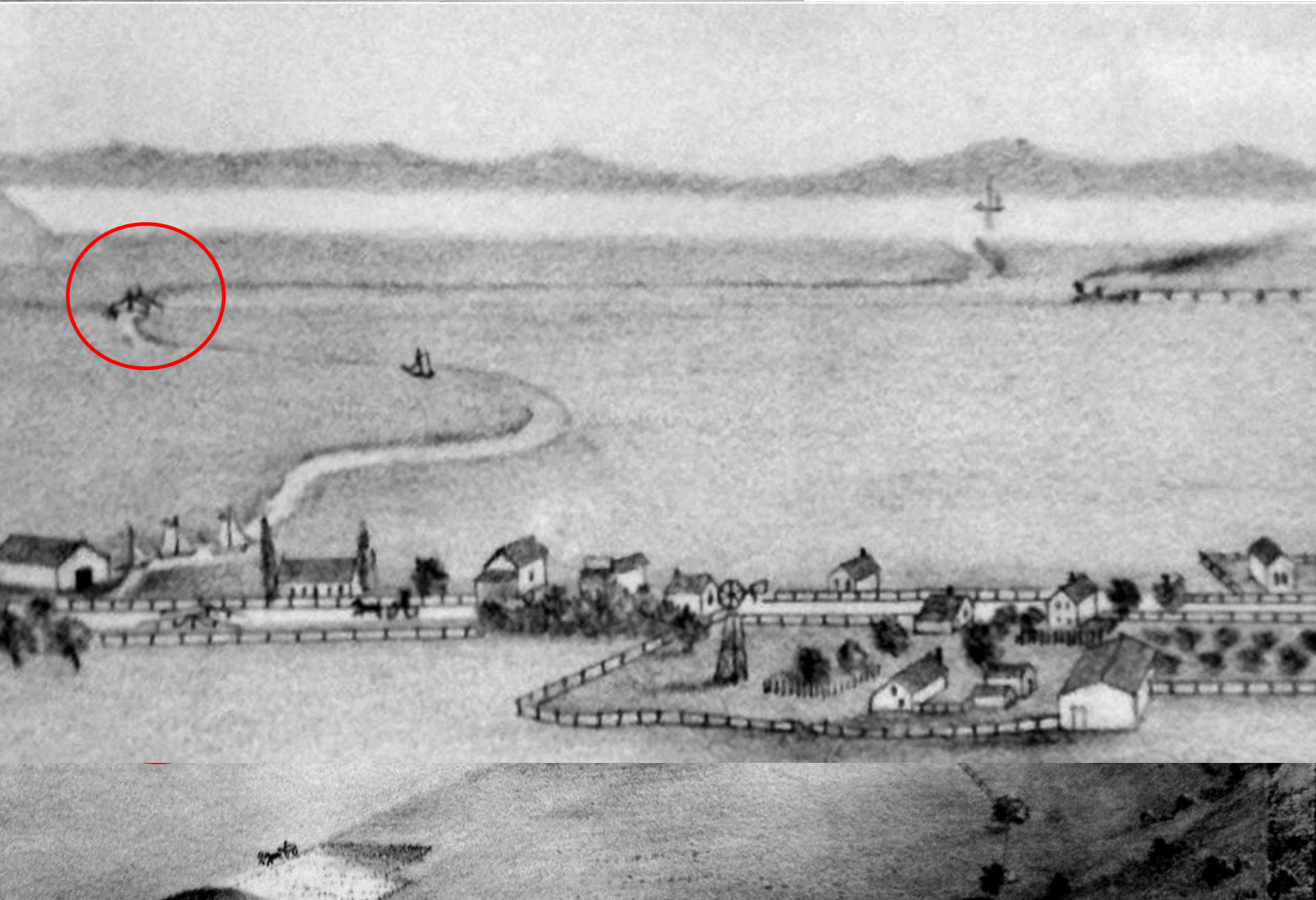
modore Air Service photo plane to take the air for the first time. I Photographer Bob Hax got this shot from a plane piloted by 6 Page 4 of 26

Feb, 1923. Wreck at Novato below the Rudoff Cheese Factory. Source: Novato Historical Museum





*Highway 37 January 27, 2019*

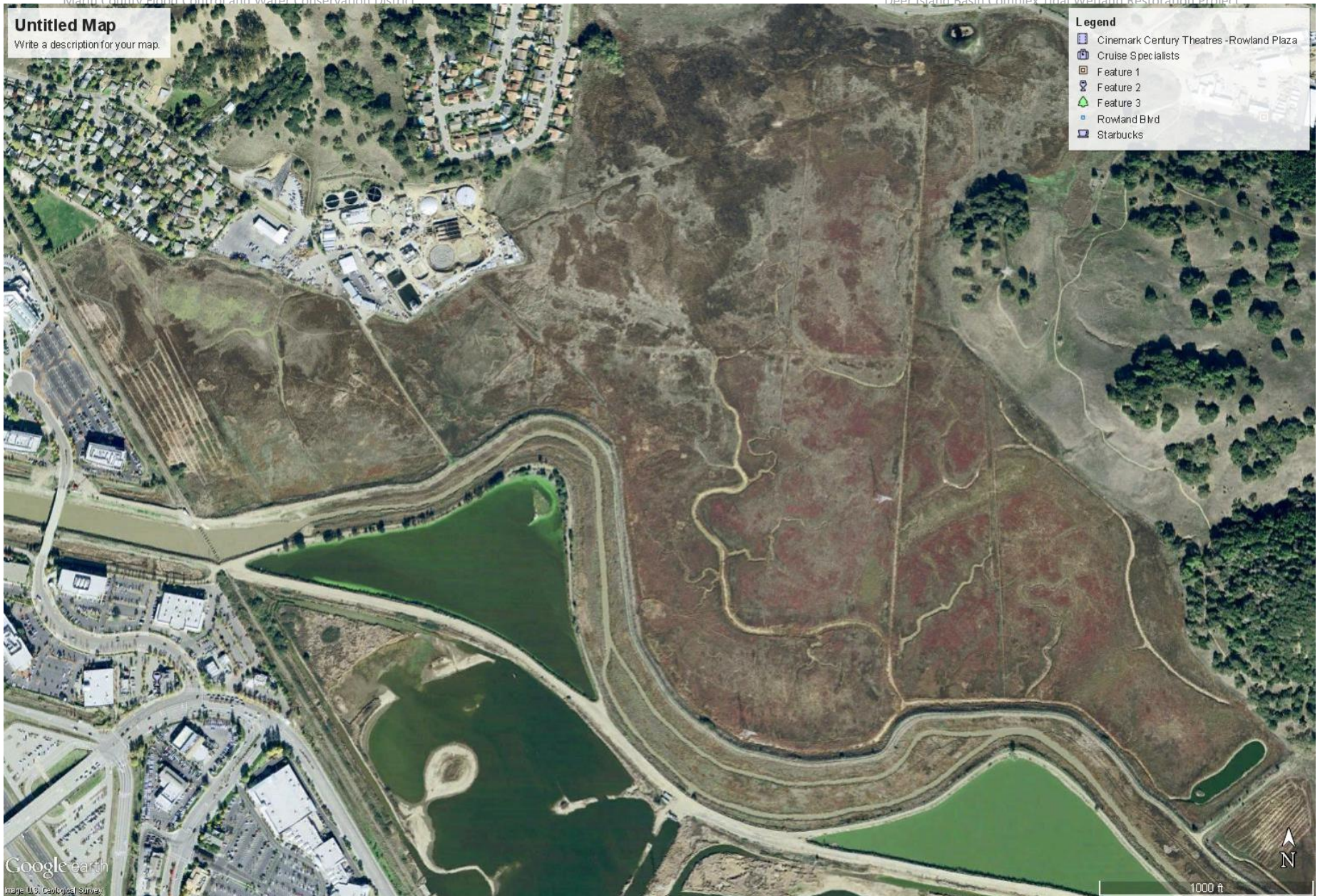


Circa 1870s? Lithograph of the valley floor of Rancho Novato by Smith Elliott .

Source: Marin History Museum

## Novato Creek Today (downstream of tracks)





# Duck Bill Pond Site Conditions



# Heron's Beak Pond



# Novato Creek

Looking across Novato Creek Tidal Marsh



Looking across Novato Creek to Heron's Beak Po



## Known Sensitive Species

- **California Ridgway's Rail** – No recent detections, low-quality suitable habitat along Novato Creek channel
- **California Black Rail** – No recent detections, marginally suitable habitat along Novato Creek channel
- **SMHM** – No recent detections, low-quality habitat along Novato Creek channel and within Deer Island Basin
- **Steelhead** – present in Novato Creek
- **Western Pond Turtle** –
  - Suitable habitat and documented presence in Duck Bill Pond
  - No suitable habitat in Heron's Beak Pond, Lynwood Basin, Novato Creek channel, or Deer Island Basin

# Project Goals and Objectives

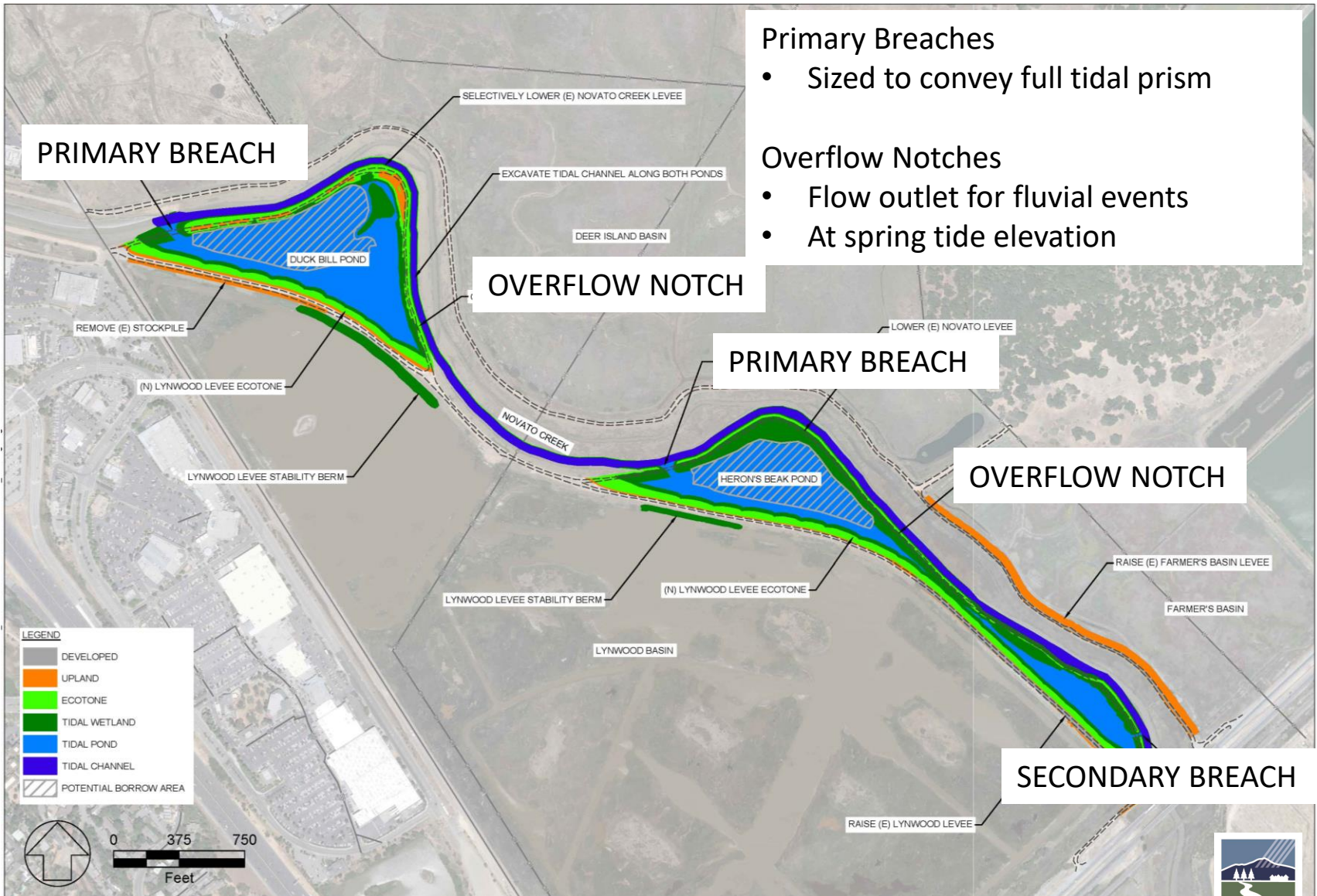
1. Restore floodplain and tidal connectivity, and tidal wetland habitats;
2. Enhance ecological functions within baylands habitats along/adjacent to Novato Creek;
3. Preserve and improve habitat conditions that support special status species known to occur, currently and/or historically, within Novato Creek and associated tidal marshes;
4. Contribute to long term flood control goals and sea level rise resiliency for the lower Novato Creek Baylands; and
5. Protect critical infrastructure located within and adjacent to the project area (including Hwy 37) to maintain current levels of flood protection and maintenance access.

# Phased Restoration Approach

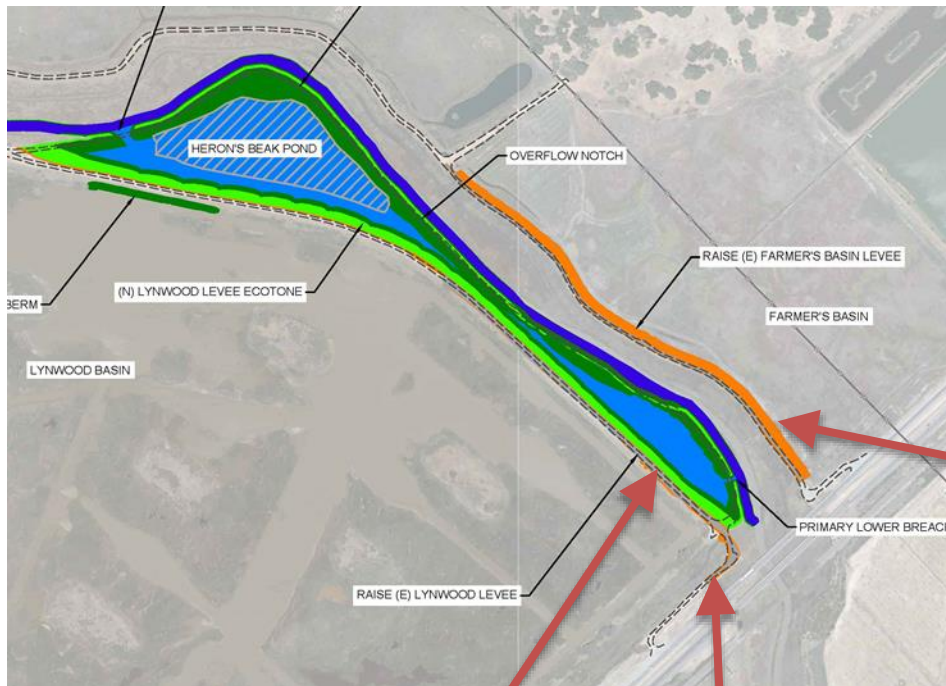
- **Bird Ponds First**
  - Initiate tidal scour with increased tidal prism along Novato Creek
  - Allow time to advance planning and design for the larger Deer Island Basin
- **Deer Island Basin**
  - Implementation Approach:
    - Sequenced Restoration
    - Full Restoration
  - Restore the southern half to begin sedimentation to grades suitable for marsh restoration vegetation and add tidal prism for creek expansion to geomorphic grades – likely over 10 to 20 years
  - Limit the magnitude of potential temporary flood impacts
  - Provide time to relocate critical wastewater infrastructure, or allow for tidal flooding subject to NSD approval,
  - Allow for HWY 37 issue/solutions to catch up



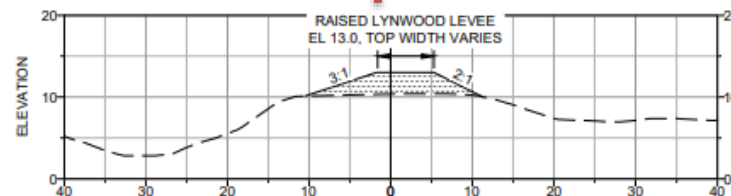
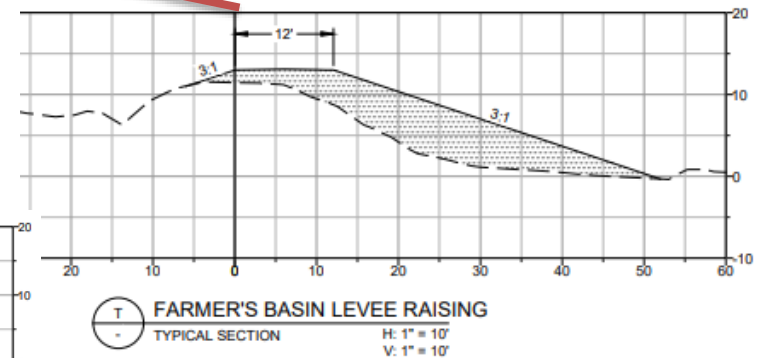
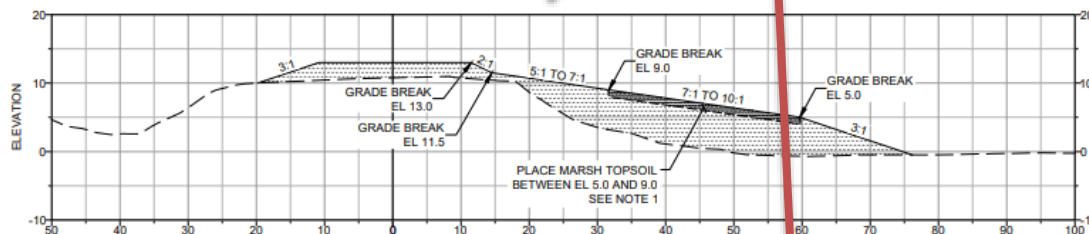
# Bird Ponds Restoration – Breach Locations



# Bird Ponds Restoration – Raise Levees 1-2 feet



- Lynwood Levee
  - Along southern Heron's Beak Pond and Hwy 37 Bridge
- Farmer's Basin Levee



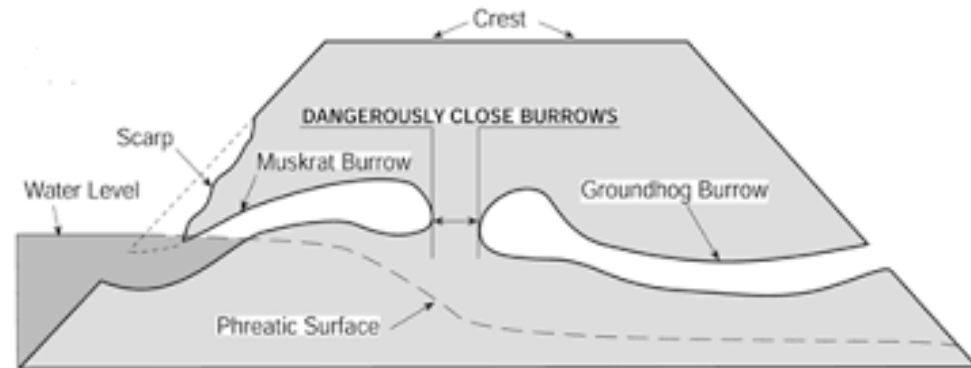
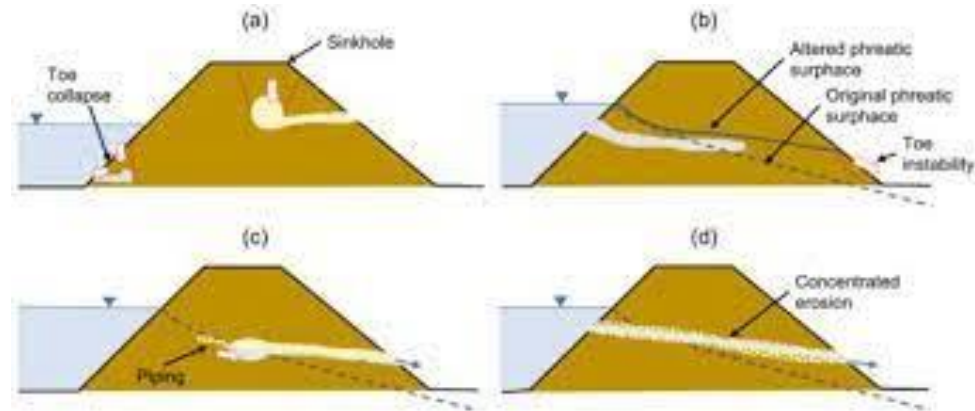
## Technical Interlude: Fun Facts About Levees

- Geotechs are conservative, won't add fill to un-engineered levee
  - Levees are living structures, require a lot of maintenance
  - Earthwork is almost always the most expensive part of any project of this type – finding suitable fill is difficult and can be expensive (sometimes you get lucky, usually not)
    - Local borrow is always much less expensive
  - Build levees from the bottom up
- ✓ Pop quiz – what is the most common non-storm failure mechanism for levees?

# Fun Facts About Levees

Answer- burrowing animals love levees

Why does this matter –  
because everyone is so excited about this idea of ecotone horizontal levees which adds vegetation and animal cover plus makes it much harder to inspect

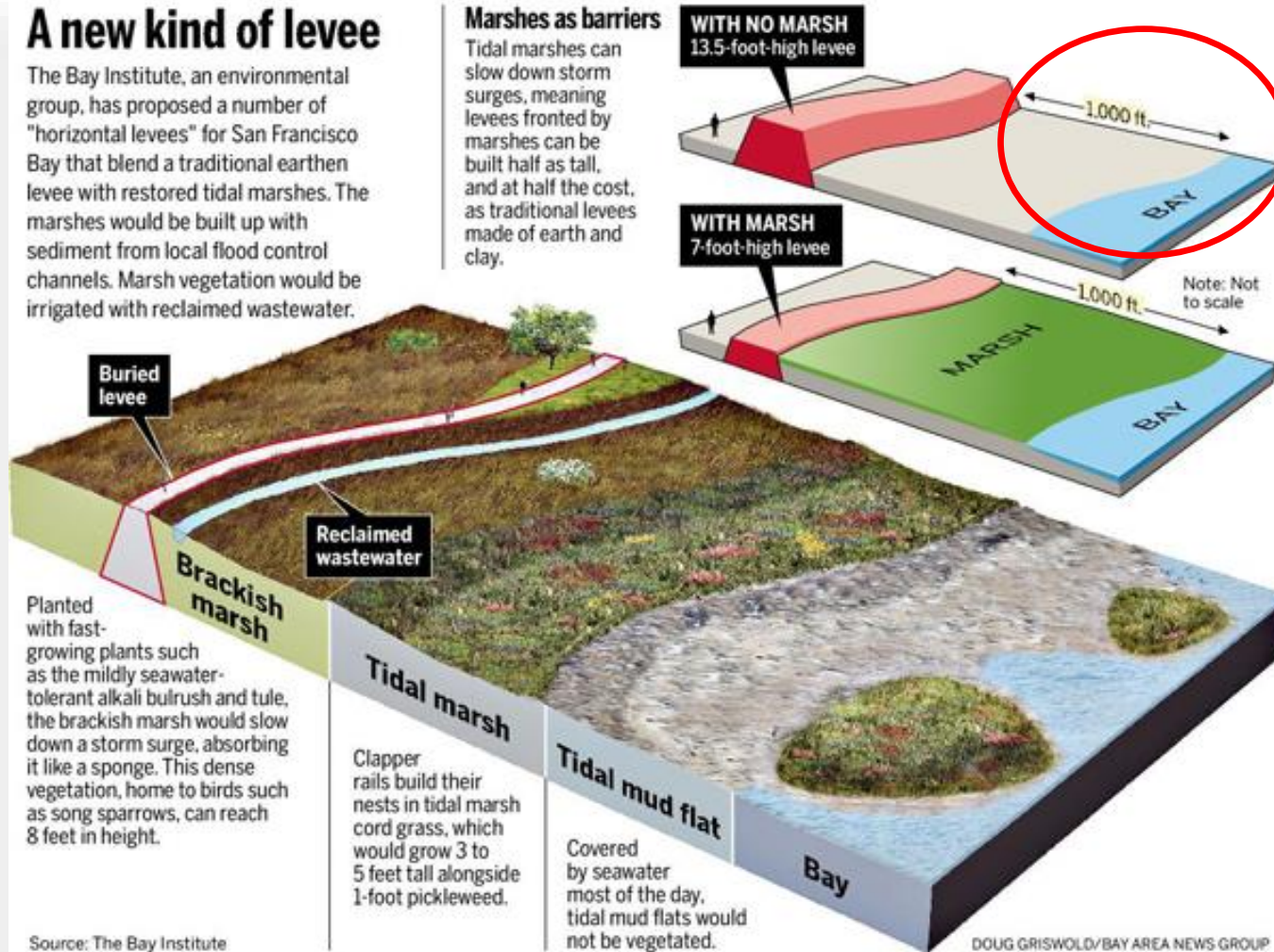


## A new kind of levee

The Bay Institute, an environmental group, has proposed a number of "horizontal levees" for San Francisco Bay that blend a traditional earthen levee with restored tidal marshes. The marshes would be built up with sediment from local flood control channels. Marsh vegetation would be irrigated with reclaimed wastewater.

### Marshes as barriers

Tidal marshes can slow down storm surges, meaning levees fronted by marshes can be built half as tall, and at half the cost, as traditional levees made of earth and clay.



Creating excellent habitat for burrowing animals

# Current Novato Bayland Levees



# Future SLR Levee Permitting Battles Coming to Your Bay

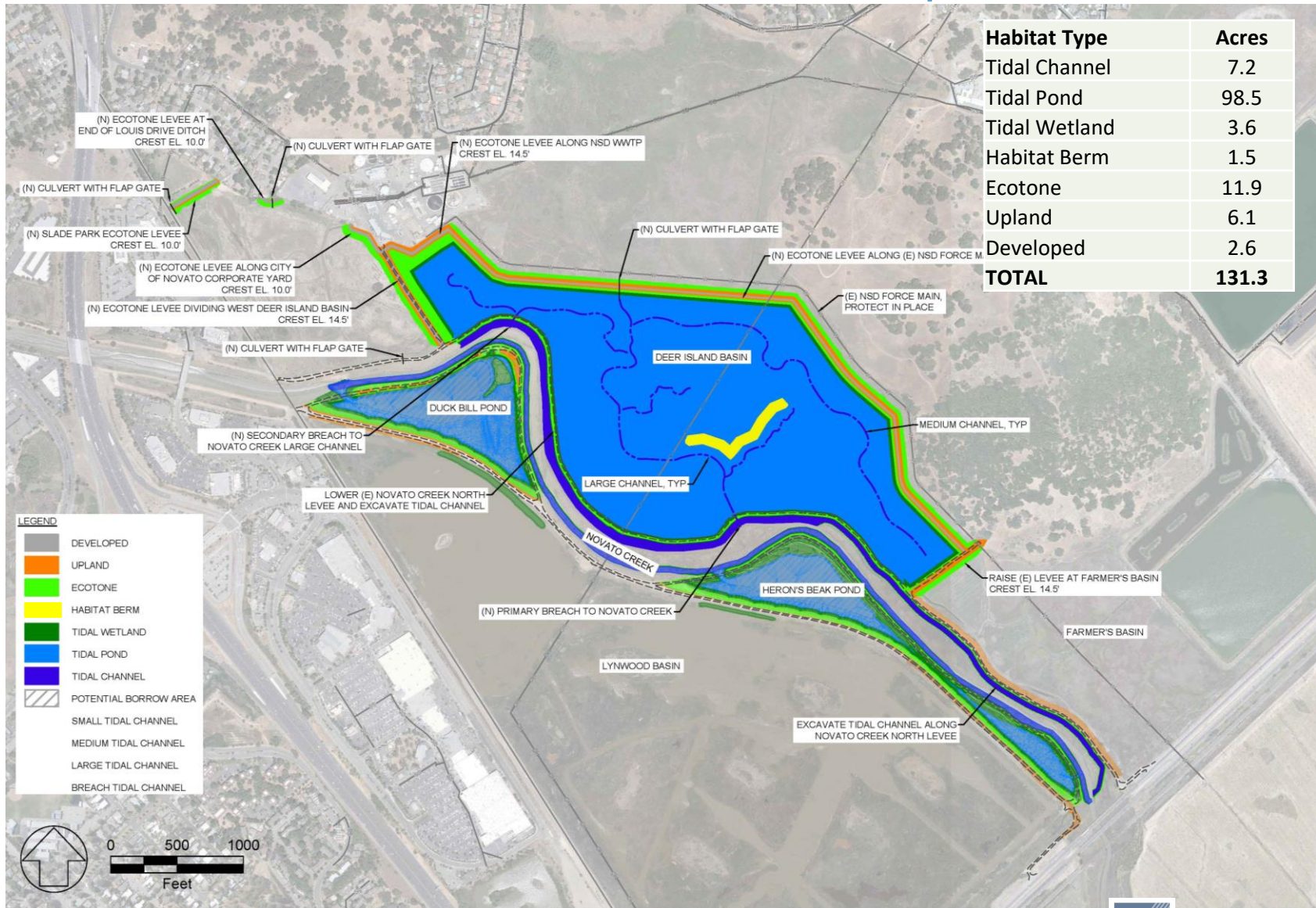
Need a lot of space...somewhere between say 200 and 600 feet is needed for a state of the science SLR levee

Build into the Bay? Good luck with that with permits plus building levees on soft soils adds \$\$\$ (One Shoreline may attempt)

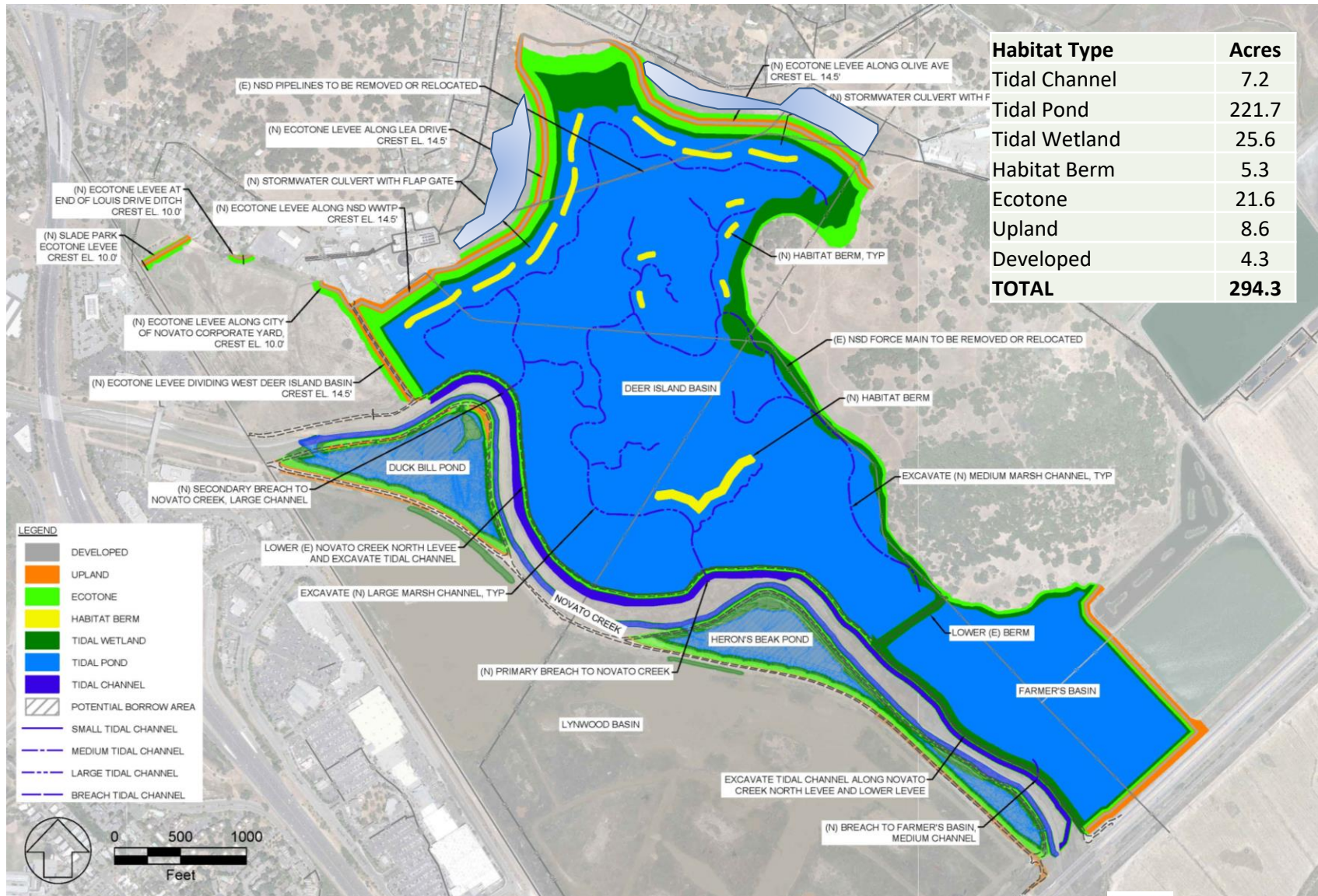
Behind levees are pumps and maintenance roads plus need power grid and generators if critical for flood protection – Its an entire levee system.

There are no NbS alts, fronting wetlands/beaches damp waves which is great and useful but doesn't stop SLR

# Back to Deer Island Basin: South DIB Proper



# Deer Island Basin: Full



## Schedule and Next Steps

- **Permit Applications for Bird Ponds**
  - Supporting Study preparation began April 2022 (USFWS BA, NMFS BA/EFH, Cultural Resources Survey)
  - BRRIT Permit Application - Mid 2023
- **CEQA for Bird Ponds and Deer Island Basin – South**
  - Public Draft CEQA - Summer 2023
- **Apply for SFBRA September 2023**
- **Shovel Ready November 2023**
- **Construct 2024? 2025?**

## Last AC Meeting for Me

- Been on the AC since the beginning as one of the few flood engineers
- As Bay moves into adaptation phase, now on the BCDC advisory committee for adaptation
- Learned a lot and enjoyed the interactions

Great experience, Hope to see everyone on the shoreline...