

San Elijo Lagoon Restoration Project



**DESIGN AND DREDGING OF THE
SAN ELIJO LAGOON RESTORATION PROJECT**

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WEDA Dredging Summit '21: 6/16/21

San Elijo Lagoon Ecological Reserve Boundaries



Impacts to Lagoon

Encroachment by infrastructure (Roads, Rail, and Walkways) constrains the lagoon

- 1887 Railroad Built
- 1901 Highway 101 built
- 1965 Interstate 5 built
- 1980'S East Basin Causeway built

There are 4 miles of infrastructure that cross the lagoon



Other Impacts Compounded the Effect to SEL

- Sewage Discharge (Solarization ponds discharge)
- Dams
- Urban Drool
- Rapid Urbanization and Impervious Surfaces
- No Management of the Inlet

San Elijo Lagoon Project: Multiple Benefits

This project was designed to be beneficial in the long-term and address historic impairments



Address infrastructure constraints



Stabilize habitat conversion



Enhance public access



Stabilize inlet and improve tidal and freshwater exchange



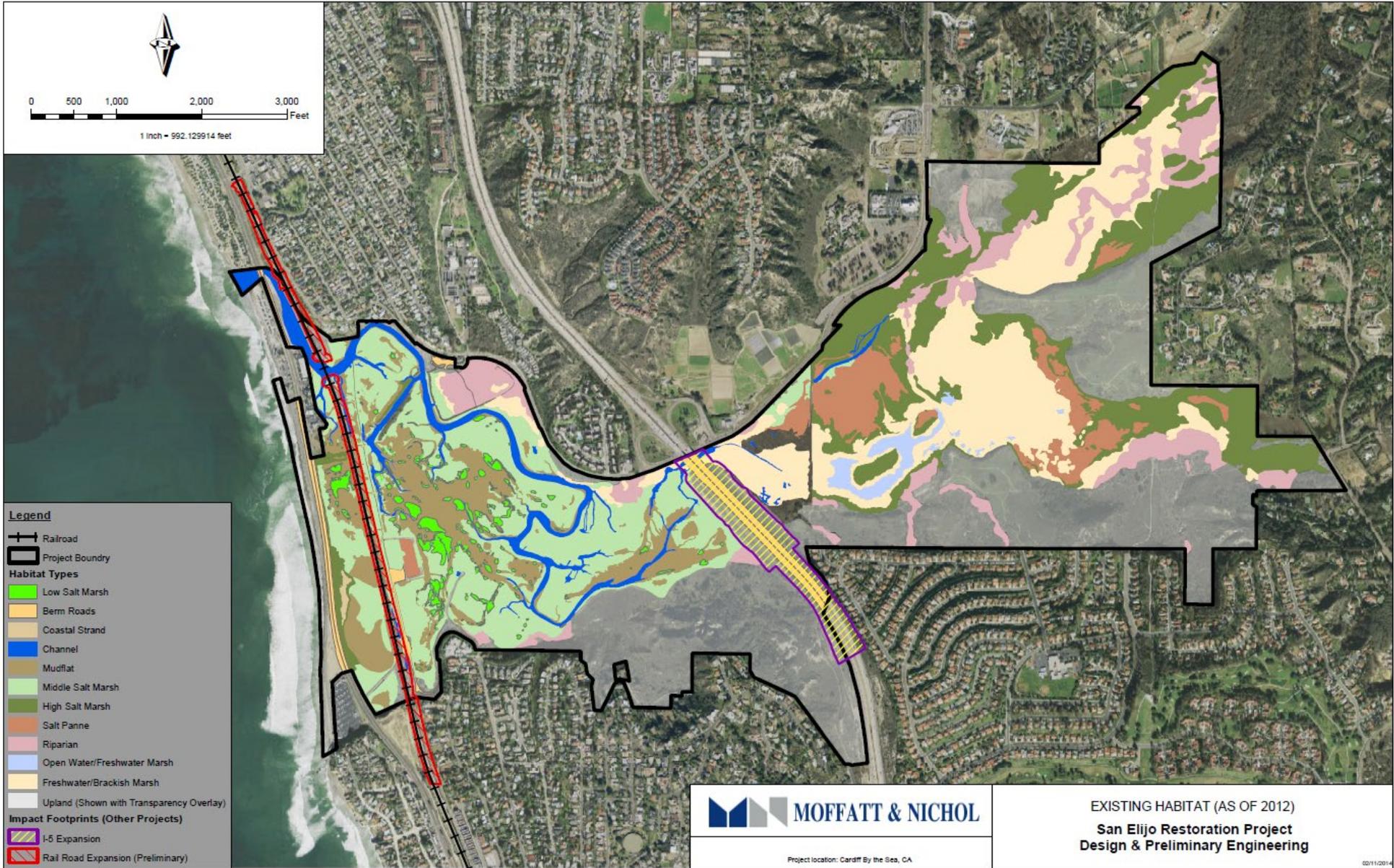
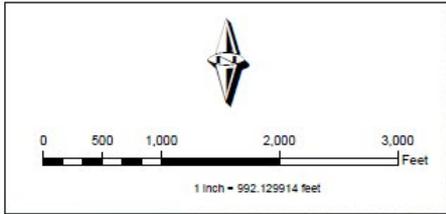
Improve water quality and address vector concerns



Project Design



Pre-Construction Conditions



Legend

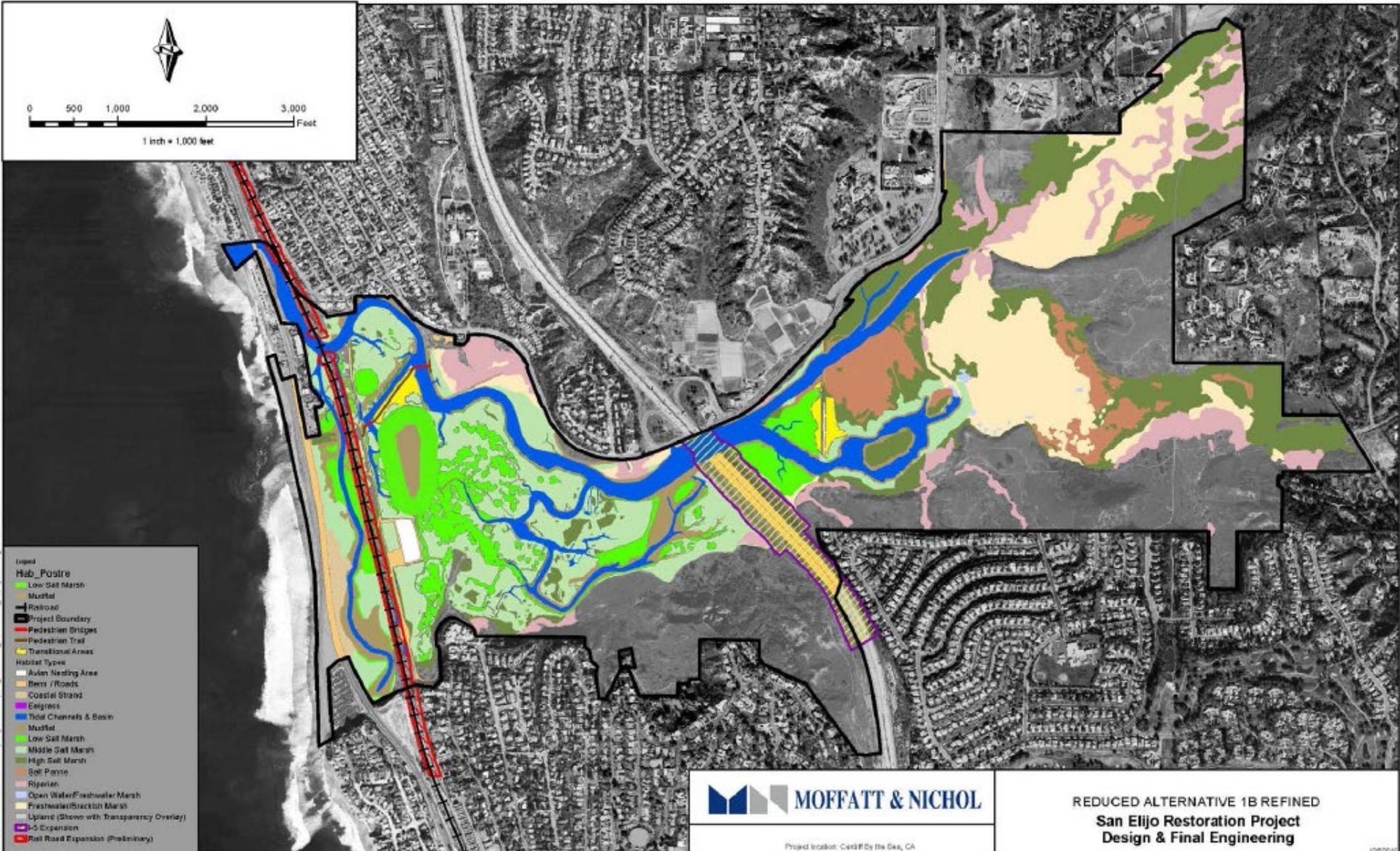
- Railroad
- Project Boundary
- Habitat Types**
- Low Salt Marsh
- Berm Roads
- Coastal Strand
- Channel
- Mudflat
- Middle Salt Marsh
- High Salt Marsh
- Salt Panne
- Riparian
- Open Water/Freshwater Marsh
- Freshwater/Brackish Marsh
- Upland (Shown with Transparency Overlay)
- Impact Footprints (Other Projects)**
- I-5 Expansion
- Rail Road Expansion (Preliminary)

MOFFATT & NICHOL

Project location: Cardiff By the Sea, CA

EXISTING HABITAT (AS OF 2012)
San Elijo Restoration Project
 Design & Preliminary Engineering

Chosen Project – Modified Alt 1b refined

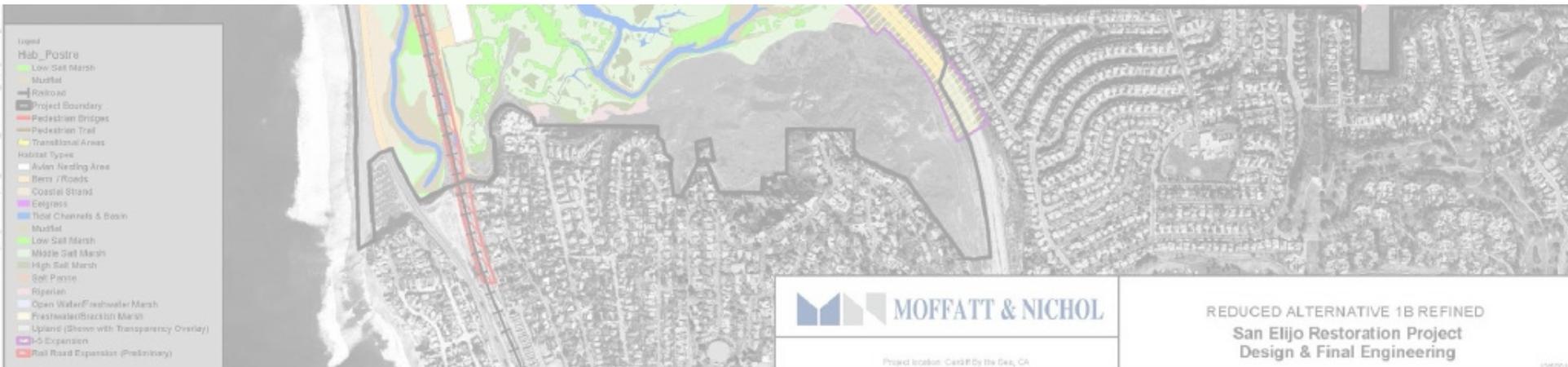


Chosen Project – Modified Alt 1b refined



Tidal Range and Muting under Pre- and Predicted Post-Construction Conditions

Project	Tidal Range (ft)				
	Open Ocean	Inlet	West Basin	Central Basin	East Basin
Pre-Construction	7.97	4.56	3.99	3.85	3.76
Post-Construction	7.97	6.97	5.77	5.30	5.30



Design Considerations

1. Dig an Over-Dredge Pit for fine-grained lagoon material
2. Opportunistic Sediment Placement
3. Dig Channels and Back-Fill the O-D Pit
4. Fill to Create Transitional Habitat



**Nature
Collective**

CONNECT. EXPERIENCE. PROTECT.

Construction



Complex Project Site



I-5 Improvements

Lagoon Restoration

Railroad Improvements

Cardiff Beach Placement

SEJPA



Sensitive Species

Western Snowy Plover



Light-footed Ridgway's Rail



California Least Tern



Southwestern Willow Flycatcher



Belding's Savannah Sparrow



Constricted Limits of Disturbance



Water Level Control

- Lock Water Low (+1' NAVD88) for up to 3 Months for Grading
- Open Rest of Lagoon to Tidal Flushing
- Impacts to Fish and Invertebrates in Locked Area



Water Level Control

- Locked at +4.1' NAVD88 for Dredging
- Opened Once each Month During Spring Tides to Restore Flushing
- Impacts to Water Quality and Food Chain



Successful Construction 2017-2020

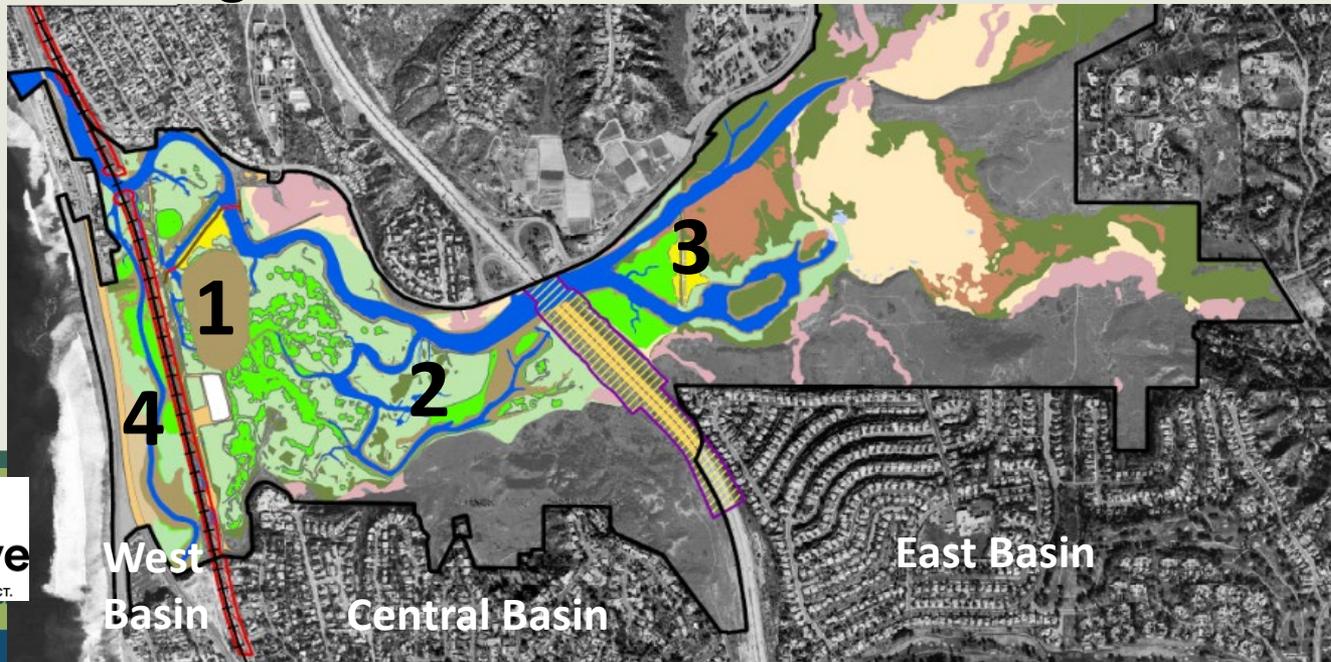


Project Site and Phasing

Construction Initiated in December 2017

1. OD Pit and Beaches Done by July 2018
2. Central Basin in 2018-19
3. East Basin in 2018-19
4. West Basin Work in 2019

Complete Work August 2020



CM/GC Process

- Construction Optimizations
 - Limits of disturbance
 - Phasing
 - Refugia
- Flexible Schedule
 - Save time
 - Maintain phasing and refugia at any one time



Dredging

- 16" Cutter Suction-Dredge #10 (Ross Island)
 - 2x 900 HP diesel
 - 6000 cy/day, (Beach and nearby channel)
 - 3000 cy/day (Distant/tight geometry)
- 10" Cutter Suction-'Baracuda' dredge (Dixon)
 - 460 HP Diesel
 - 1,000 cy/day
 - Swinging Ladder



Dredging



**Nature
Collective**

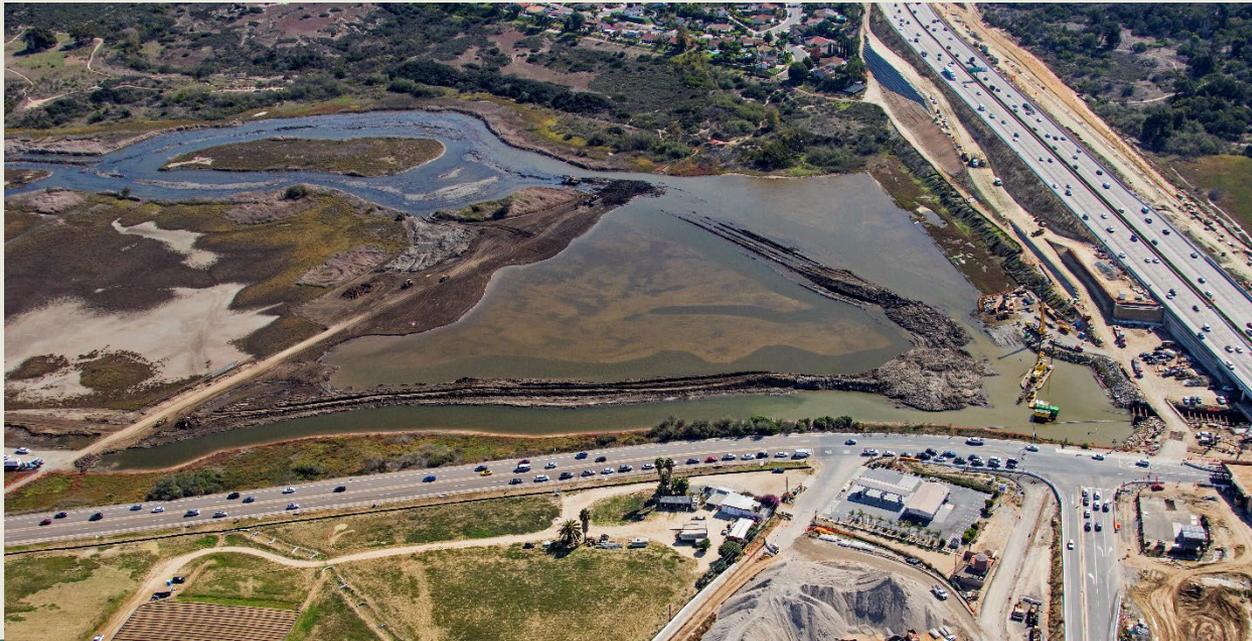
CONNECT. EXPERIENCE. PROTECT.

Beach Placement



Changes to Construction Means and Methods

- Dredging Was Original Approach
- Changed to be Combination of Wet and Dry Work
- More Environmentally Sensitive and Cost-Effective



Changes to Construction Means and Methods

- Marsh Masters Used to Transport Materials and Workers to the ESA Boundary for Fencing
- Amphibious Excavators Used for Channel Side Slopes and “Pre-Loading”
- Keeping Lagoon Water Low Initially Rather than High (Reversed from Pre-Construction Planning)
- Repeated Mowing of Habitat Vegetation Rather than One Clearing & Grubbing Period

Questions?

Designers:

- Moffatt & Nichol – Grading, Dredging, Beach Fill, Utilities, Phasing
- AECOM – Planting and Irrigation
- Nordby – Input on Overall Habitat Design
- Caltrans – CMGC Input for Optimizations

Project Funding and Ownership:

- Nature Collective (formerly San Elijo Lagoon Conservancy)
- SANDAG
- California State Coastal Conservancy