Colorado Lagoon Restoration Program: Where Dredging and Mitigation Banking Meet

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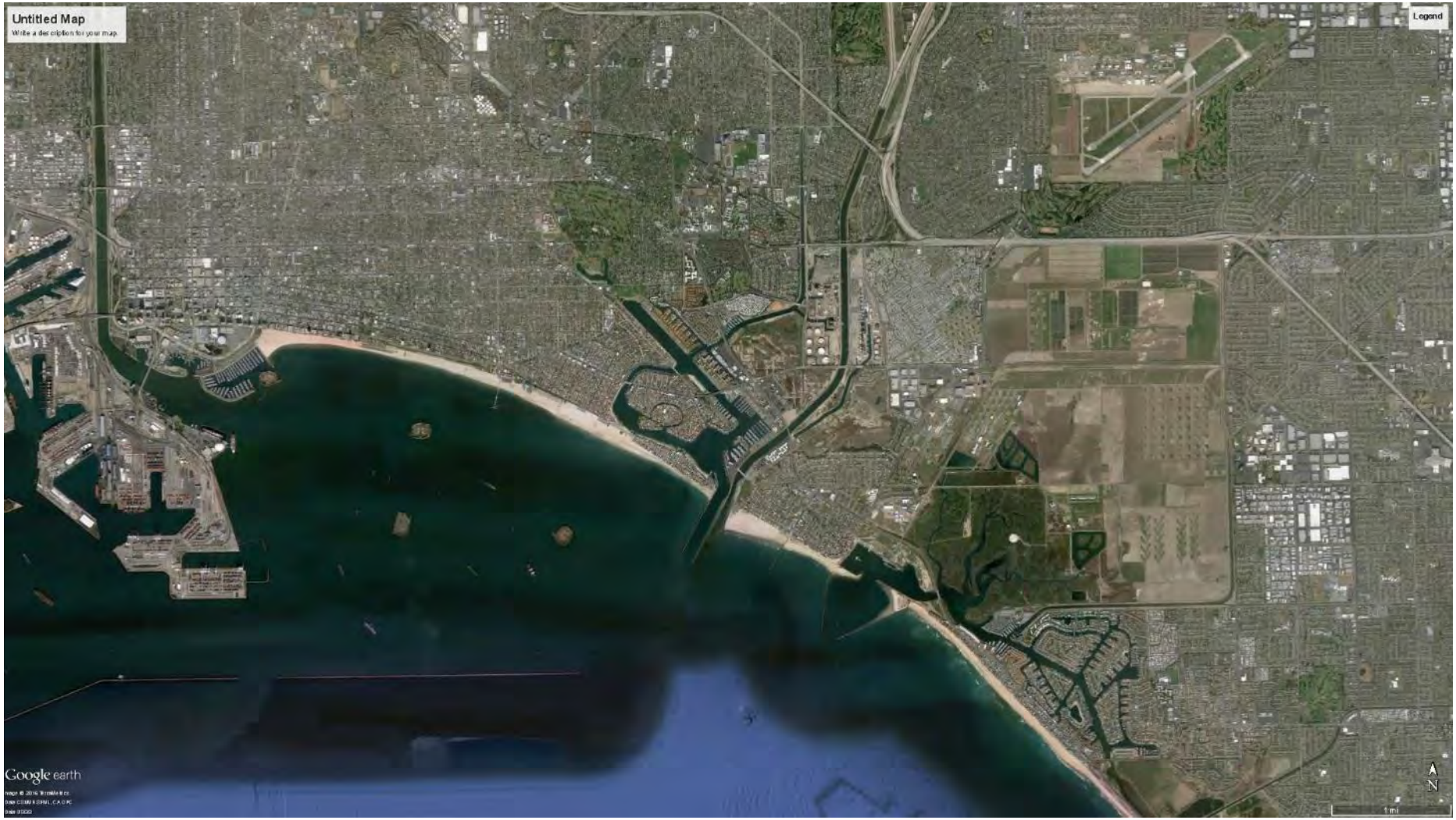
- Partners
  - Tidal Influence
  - Everest International Consultants
  - AECOM
  - AHBE Landscape Design
- Contractors
  - LA Engineering
  - Dixon Marine Services

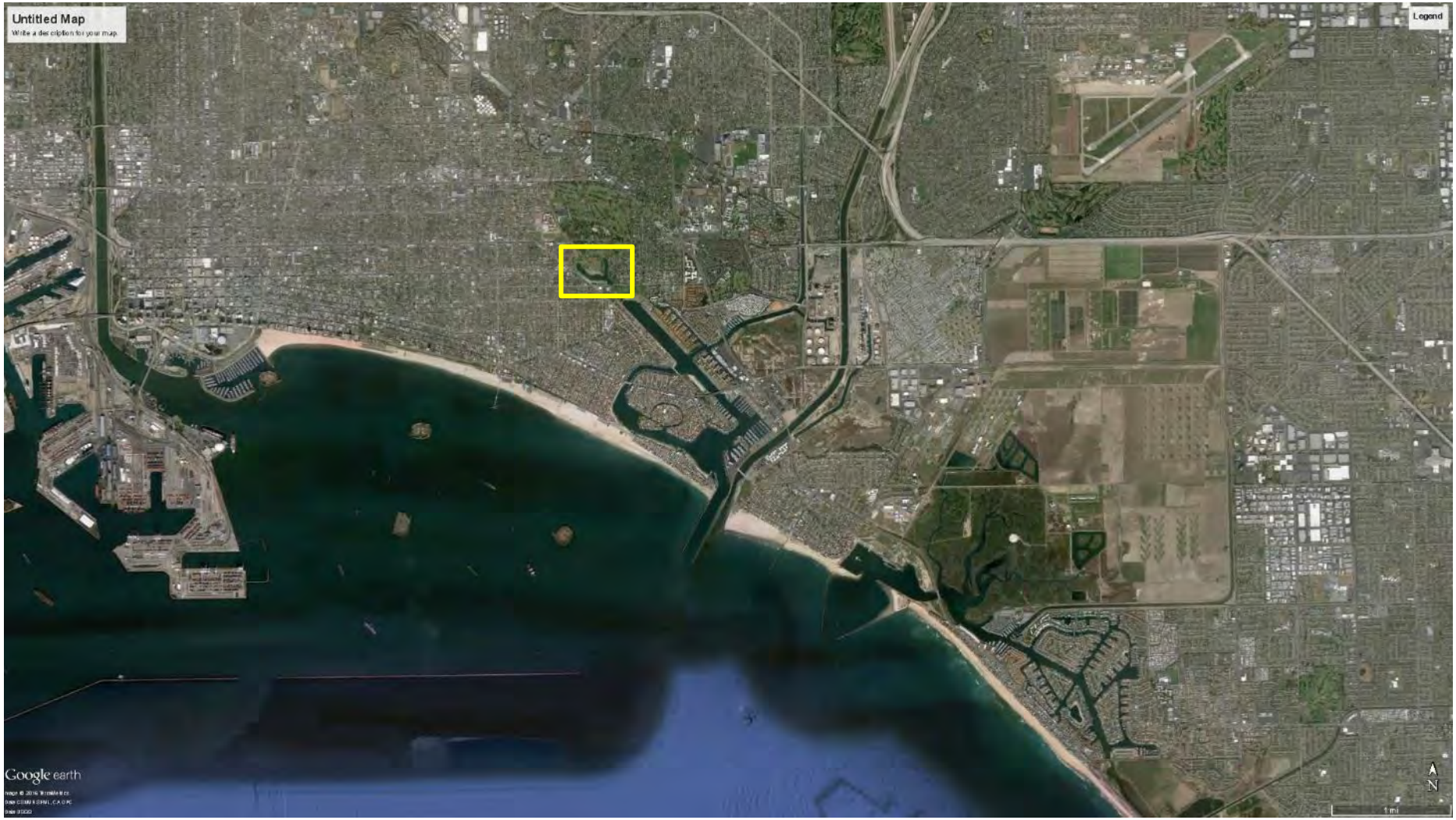
Presentation Outline

- Project Overview
- Site History
- Project Phases
- Mitigation Banking
- Next Steps

Colorado Lagoon Location



Colorado Lagoon Location



Colorado Lagoon Location

Colorado Lagoon Ecosystem Restoration

- Multi-phased program
  - Remove/isolate contaminated sediments for TMDL compliance
  - Reduce future stormwater inputs
  - Remove and replace non-native vegetation
  - Create a habitat mitigation bank for current and future City of Long Beach projects
  - Construct open-channel connection to Marine Stadium in Alamitos Bay
  - Re-develop recreational facilities within Marina Vista Park

Phase 1 – Sediment Removal

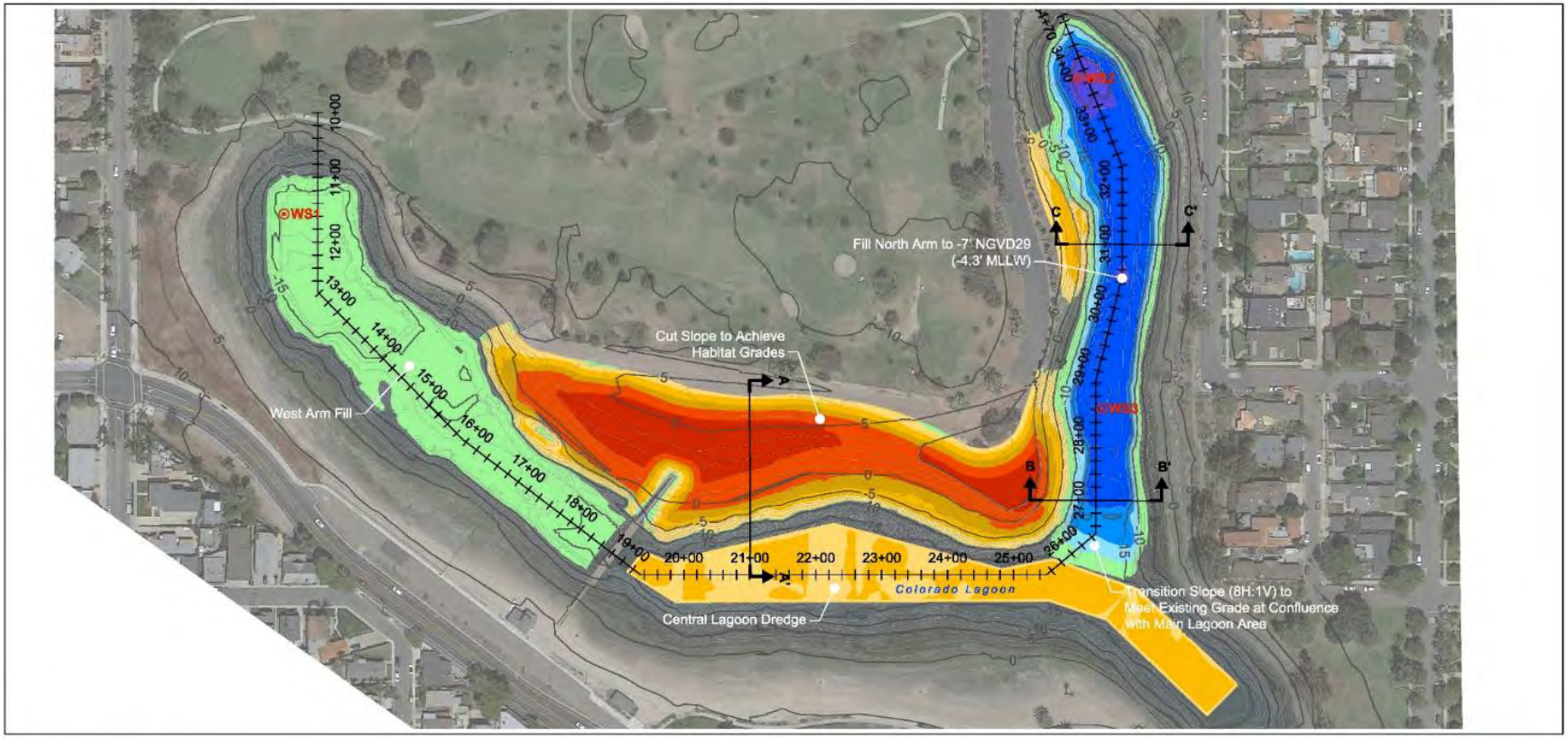
Phase 1 – Termino Avenue Drain

Phase 1 – Culvert Cleaning

Phase 2 Lagoon Challenges

- No import or export of materials from site
- City recycling requirements
- Ongoing mitigation bank discussions
- Golf course runoff management
- TMDL compliance
- Community expectations

Phase 2B – Lagoon Restoration



SOURCES:
1. Drawing prepared from topographic survey conducted by Bill Carr Surveys, Inc. dated April 1, 2014.
2. Moffatt & Nichol CAD drawing "TOPO_POST DREDGE".

HORIZONTAL DATUM: California State Plane Zone 5, NAD83, Feet.
VERTICAL DATUM: NGVD29, Feet.

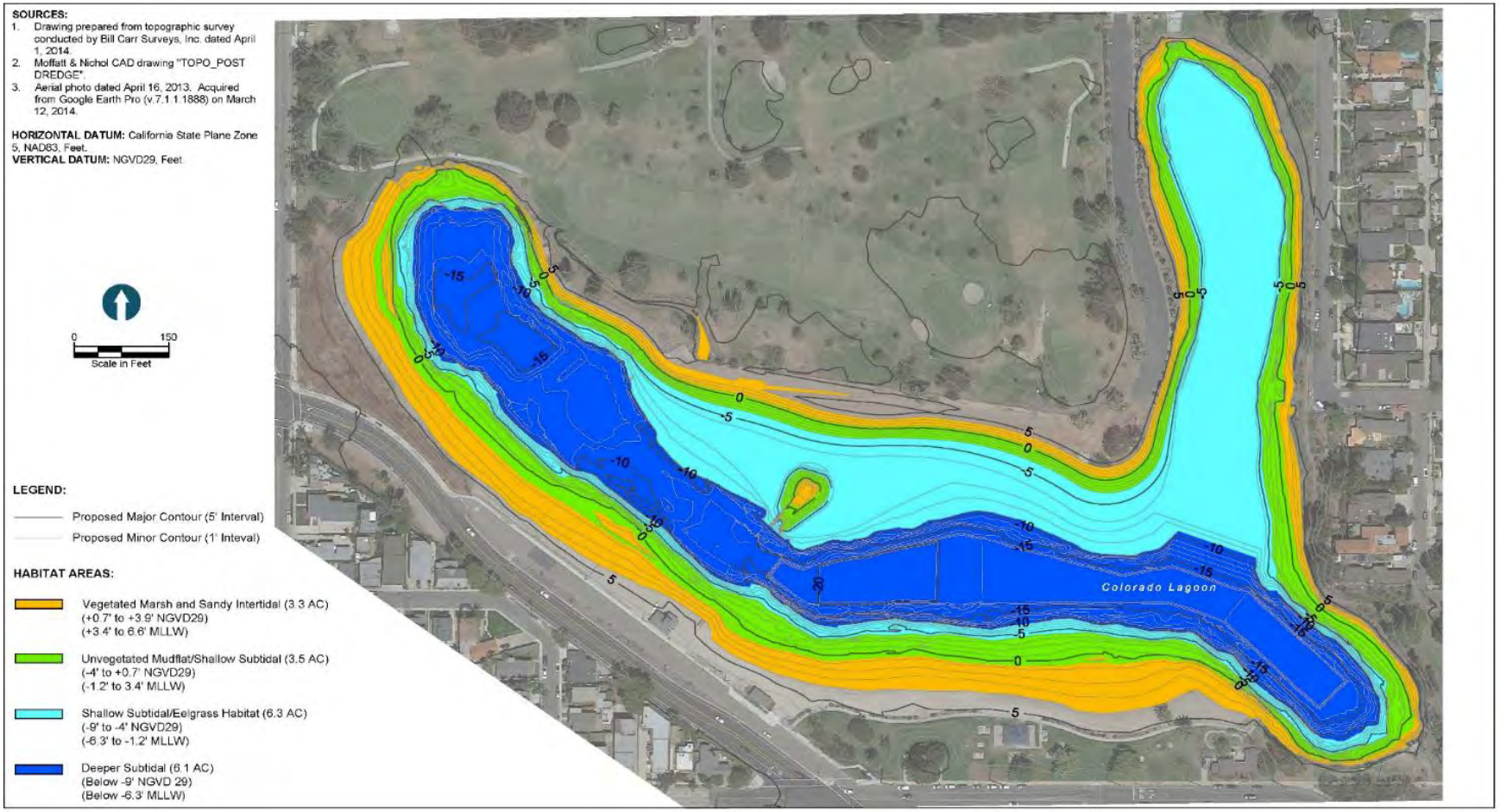
LEGEND:
- Existing Major Contour (5' Interval)
- Existing Minor Contour (1' Inteval)
- Water Sample Location

CUT AND FILL THICKNESS:

Cut (42,700 CY):	Fill (39,500 CY):
12.2' to 9'	0' to 3'
9' to 6'	3' to 6'
6' to 4'	6' to 9'
4' to 2'	9' to 12'
2' to 0'	12' to 14.8'

0 150
Scale in Feet

Phase 2B – Lagoon Restoration



Phase 2B – Lagoon Restoration

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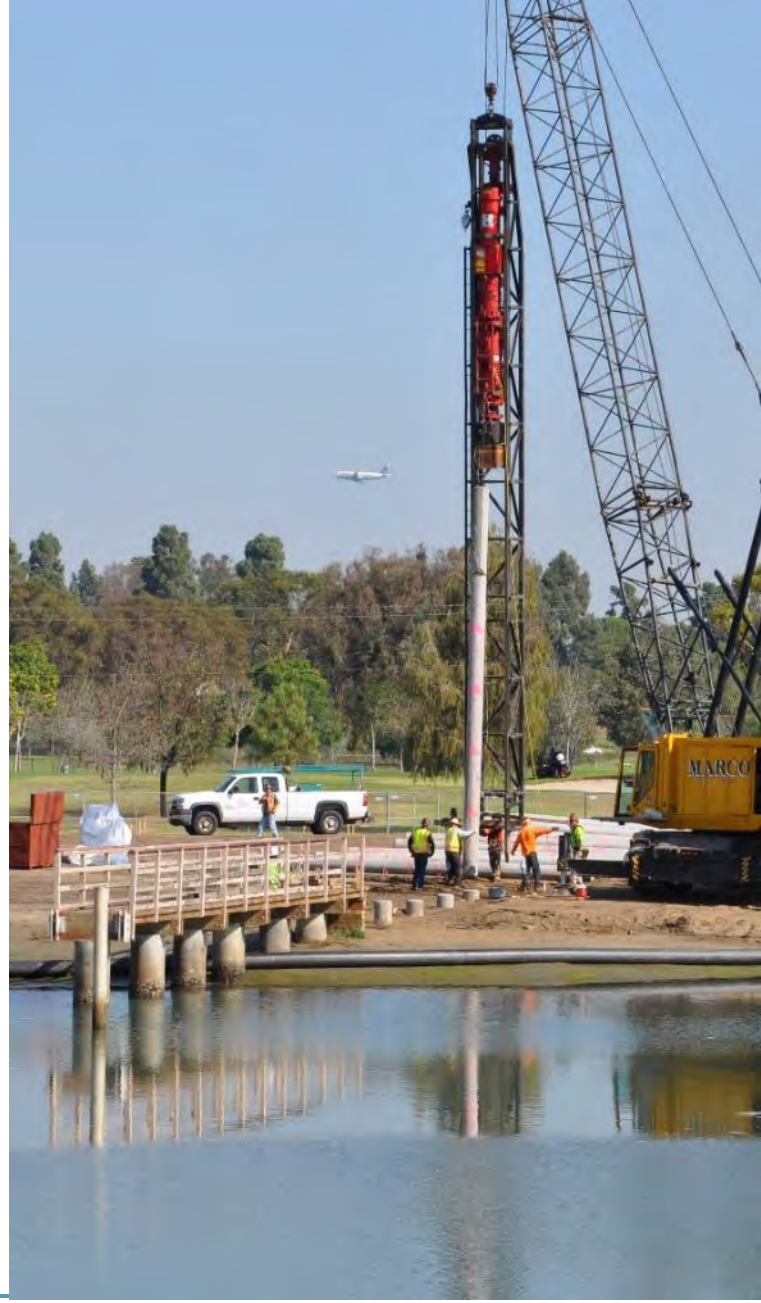
Dredge and Capping

- Hydraulically dredged 10,000 cy Central Basin
- Hydraulically excavated 41,000 cy from shoreline to West and North Arms
- Average daily production between 500 and 1200 cy
- Dredge unit price ranged from $17 to $29/cy
- Total project cost is $3M



Phase 2B – Lagoon Restoration

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Phase 2B – Lagoon Restoration

Phase 2B – Lagoon Restoration

Phase 2B – Lagoon Restoration

Phase 2A – Open-Channel Connection

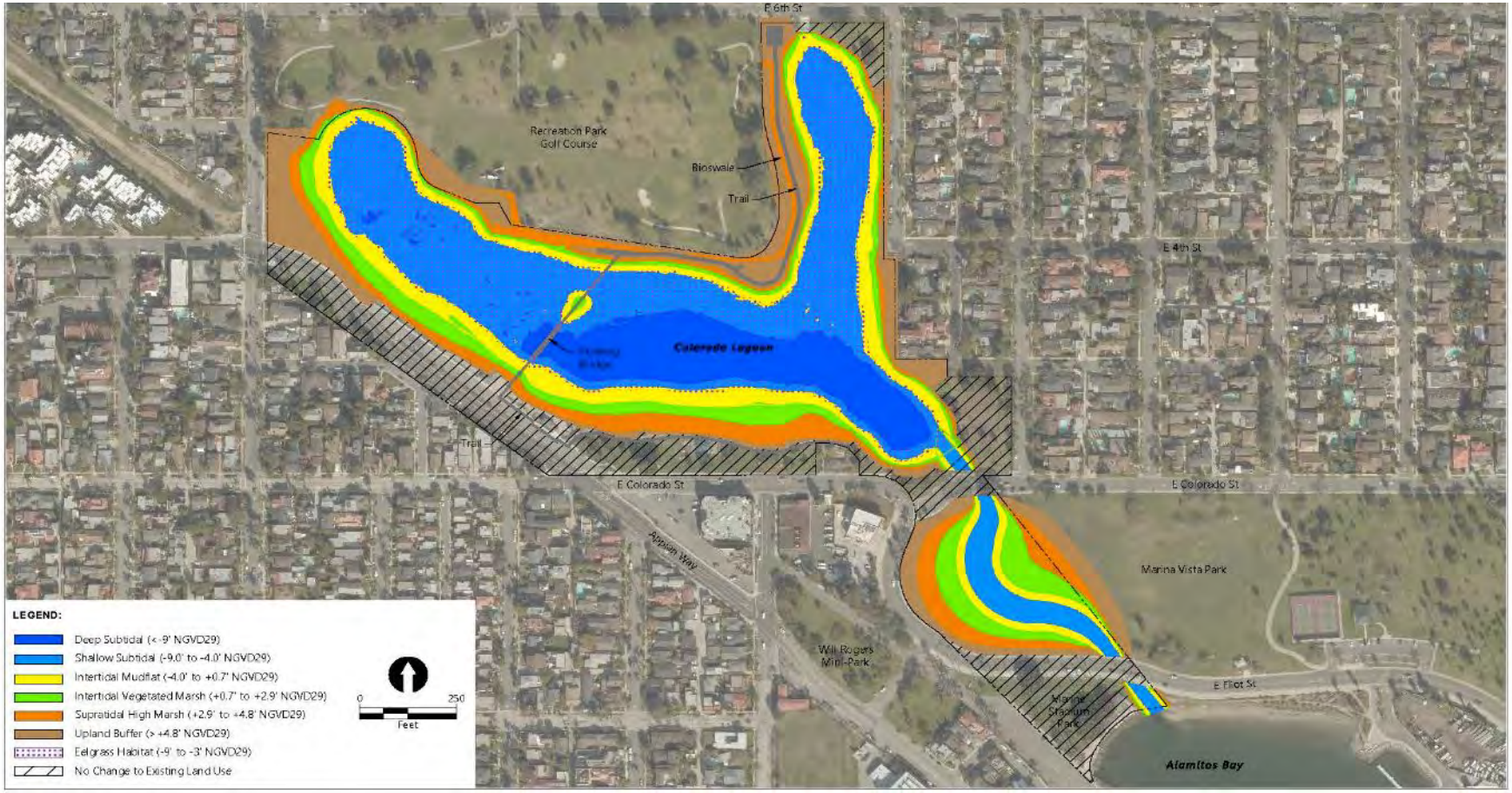
Phase 2A – Open-Channel Connection

Phase 2A – Open-Channel Project Overview

Phase 2A – Open-Channel Project Overview

Phase 2A – Open-Channel Project Overview

Mitigation Bank Credit Areas



Mitigation Bank Credits

Habitat Zone	Tidal Influence	Elevation Range		Habitat Type (Aquatic Resource)
		Feet NGVD29 Vertical Datum	Feet MLLW Vertical Datum	
Subtidal and intertidal	Below MHHW	<2.9	<5.5	Subtidal soft bottom, mudflat, low marsh, mid-marsh
Supratidal	Between MHHW and highest astronomical tide	2.9 to 4.8	5.5 to 7.4	High marsh, transitional marsh
Eelgrass	MLLW to deeper subtidal	-2.6 to -9.0	0 to -6.4	Subtidal eelgrass

- The City of Long Beach submitted the Bank Enabling Instrument (BEI) to the Interagency Review Team (IRT) on June 21, 2017
- BEI includes both Colorado Lagoon and the open channel
- IRT has 45-day period to review and approve the BEI
- Initial post-construction ecological monitoring of the lagoon is scheduled for August 2017

Mitigation Bank Credits

Mitigation Activity	Subtidal/ Intertidal Credits	Supratidal Credits	Eelgrass Credits
Establish tidal habitat by converting existing upland/grassy area to an open earthen channel via excavation and grading	221	0.83	0
Re-establish tidal habitat in lagoon by converting existing lagoon upland via increased high-tide inundation from the open channel	0	0.37	0
Rehabilitate existing lagoon tidal habitat via open-channel connection	9.33	1.05	0
Establish eelgrass in lagoon via fill and planting	0	0	8.10
Establish tidal habitat in lagoon by converting existing lagoon upland area via excavation and grading	0.72	0.54	0
Total	**12.26**	**2.79**	**8.10**

Project Summary

- Colorado Lagoon remediation complete
- Lagoon portion of mitigation bank complete
- Open-channel construction targeted for 2019
- Project completion estimated for summer 2021

Questions

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