City of Newport Beach Rhine Channel Remediation

Presented by
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The Rhine Channel, Lower Newport Bay

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History of the Rhine Channel

- Historical uses
  - 1940 to 1950 – Mine sweepers, sub chasers and rescue boats
  - Newport Plating Facility
  - Cannery
  - Boatyards

The Rhine Channel in 1966

The Cannery in 1966

The Rhine Channel Today

- Current uses
  - Residential
  - Private boating
  - Commercial/restaurants
  - Remaining boatyards

Sediments

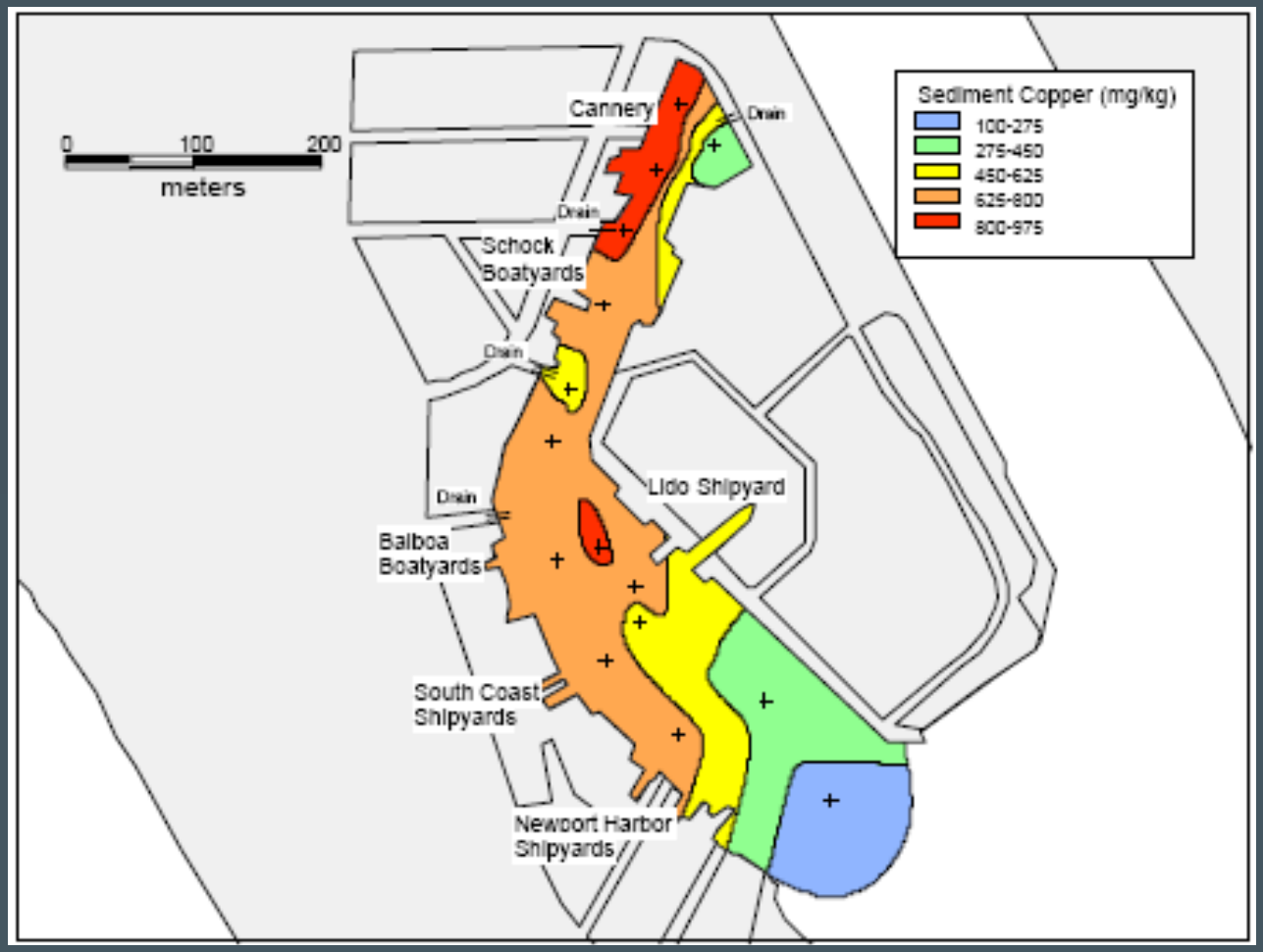
- In 1996, Newport Bay was included as an impaired water body on the Clean Water Act 303(d) list.
- The Rhine Channel has been identified as a contributor to Bay-wide contamination.
  - Metals, pesticides, PAHs, PCBs

Sediments

- The Rhine Channel has been targeted as a priority for cleanup by the Regional Water Quality Control Board (RWQCB).
- Without action by the City of Newport Beach, the RWQCB would issue a Cleanup and Abatement Order (CAO).

Sediment Characterization (2005)

Spatial Distribution of Copper



Pattern of Surface Copper Concentration in the Rhine Channel

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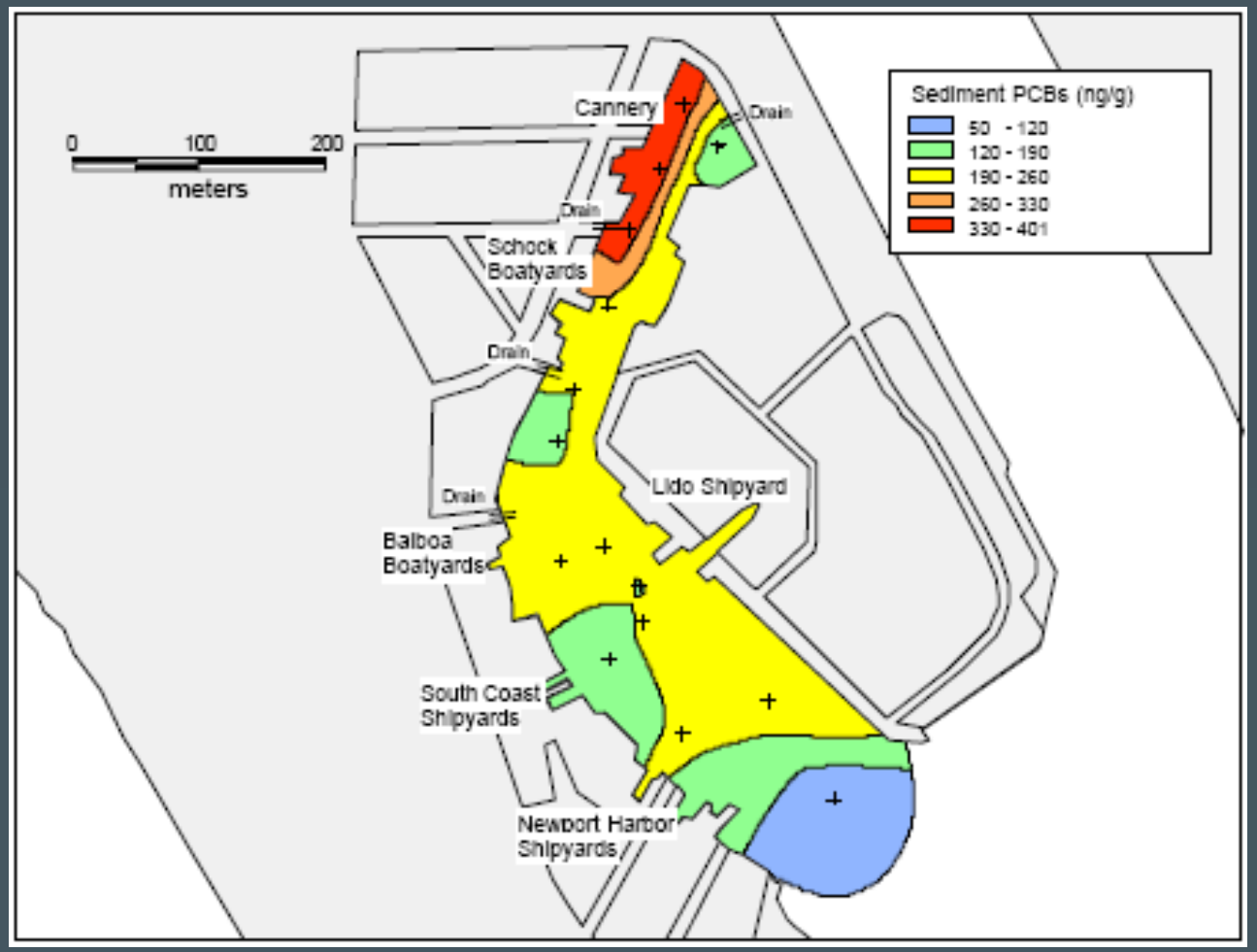
Spatial Distribution of PCBs



Pattern of Surface PCB concentration in the Rhine Channel

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Feasibility Study Evaluation

- Conducted by Anchor QEA for City/Orange County Coast-keeper in 2005.
- Determined capping not feasible.
- Range of feasible options considered:
  - Alternative 1: No action (baseline only)
  - Alternative 2: Dredging/landfill disposal
  - Alternative 3: Dredging/offsite confined disposal facility (CDF)
  - Alternative 4: Dredging/confined aquatic disposal (CAD)

Feasibility Study Conclusion

- Range of feasible options:
  - Alternative 1: No action (baseline only)
  - Alternative 2: Dredging/landfill disposal
  - Alternative 3: Dredging/offsite confined disposal facility (CDF)
  - Alternative 4: Dredging/confined aquatic disposal (CAD)

Feasibility Study Implementation

- Dredge and disposal at offsite CDF (i.e., Port Fill) selected as preferred alternative but no fill site available at time.
- City began development process for in-harbor CAD facility including geotechnical evaluations to consider potential locations.
- 2010 POLB Middle Harbor Fill Site opened for 3rd Party material.
- Early 2011 Rhine Channel material selected for disposal in fill site.
- CAD cell development suspended for fill disposal.

Middle Harbor Fill Site, POLB

Planning and Design Considerations

- What thickness of sediment needs to be removed?
- How much contaminated material can be removed without adversely affecting adjoining docks, seawalls, etc.?
- How can dredging be accomplished around or beneath floating structures?
- How to move all the boats and work without affecting the local businesses?

Depth of Dredging

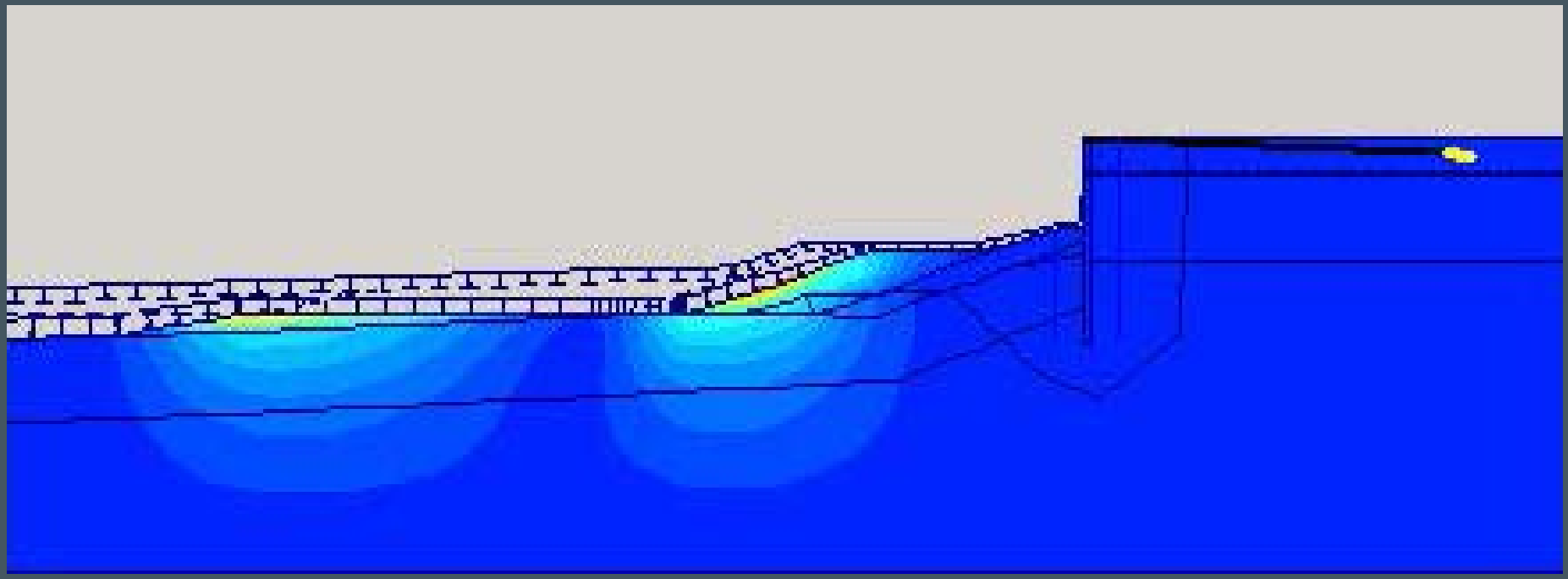
Evaluating Existing Conditions

- Sediment probes
- Compilation of previously existing data and as-built information
- Geotechnical explorations [in-water borings, on-land cone penetrometer tests (CPTs)]
- Probing of seawall embedment depths
- Impact-echo testing of guide piles
- Reconnaissance of dock and guide pile conditions

Analyzing Dredging Setback Distance

- Anticipate side slopes 3H:1V to 4H:1V
- Rough evaluation indicated 25 to 30 foot offset from seawall
- Force-balance equilibrium/factors of safety
- Finite element modeling (PLAXIS) code used to compare results of different offsets

Example Results – Varying Dredging Distance From Wall



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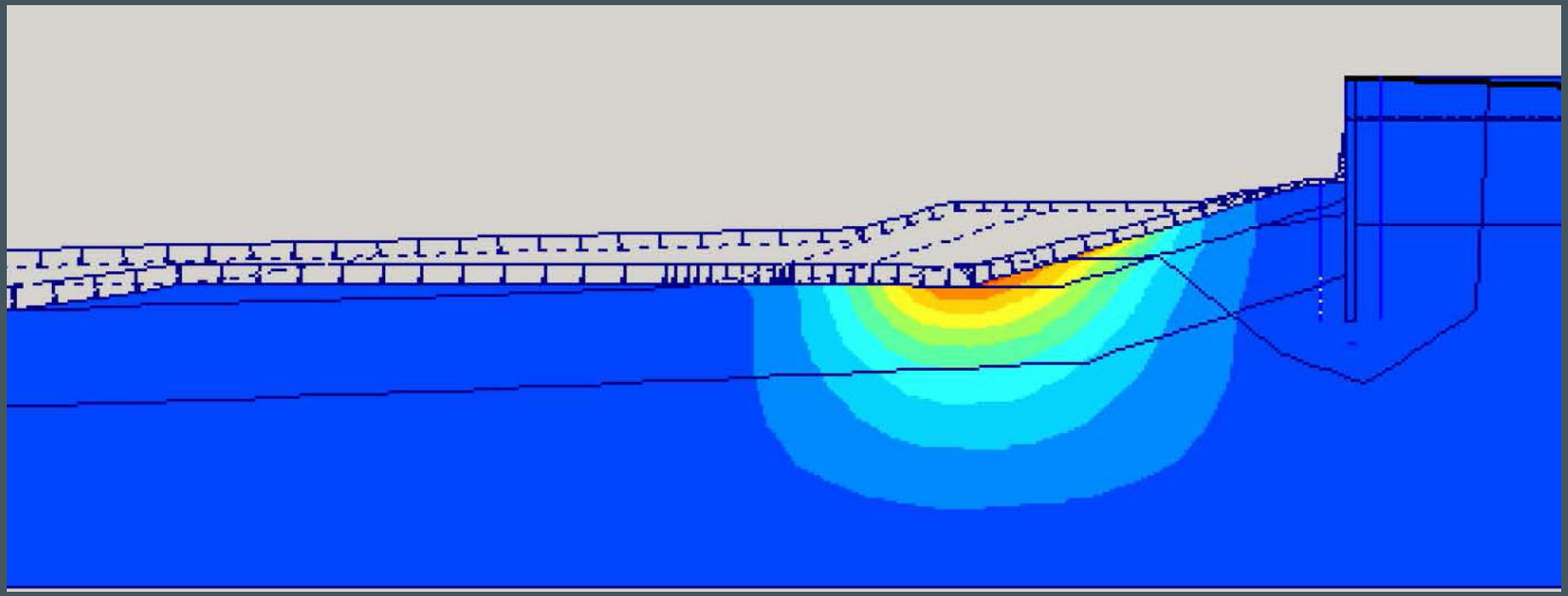

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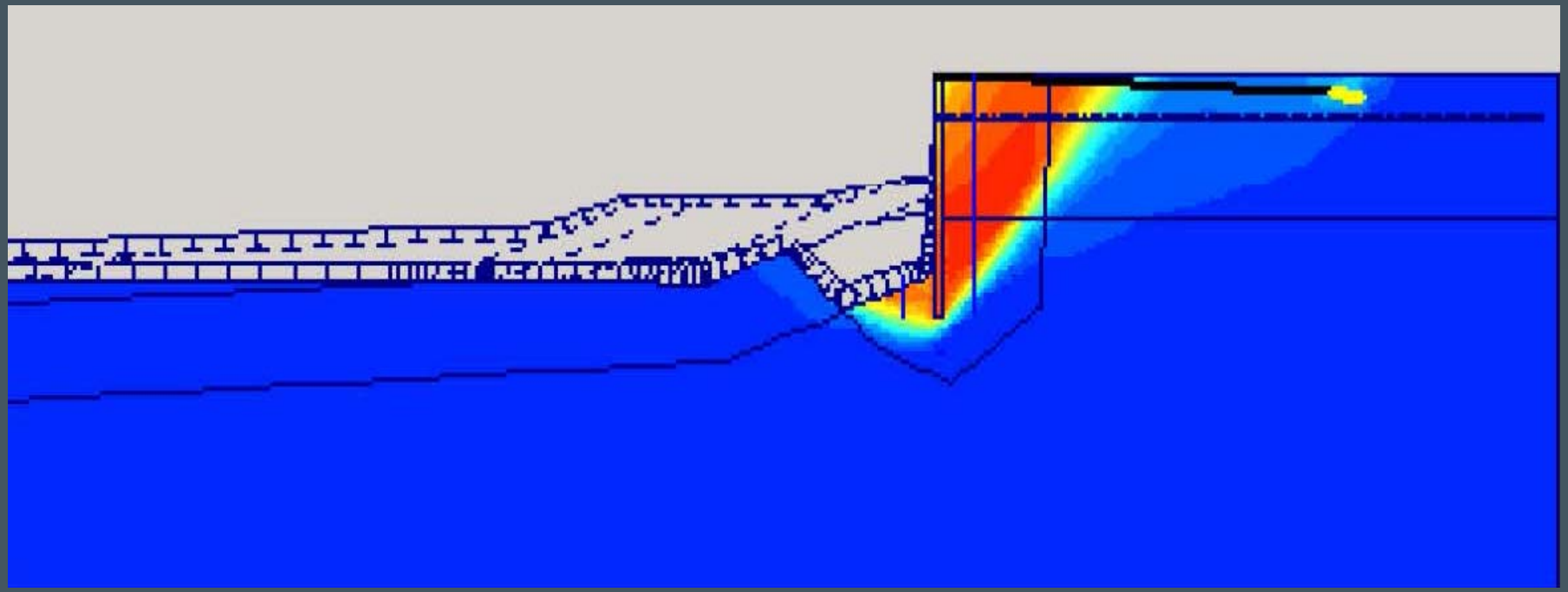
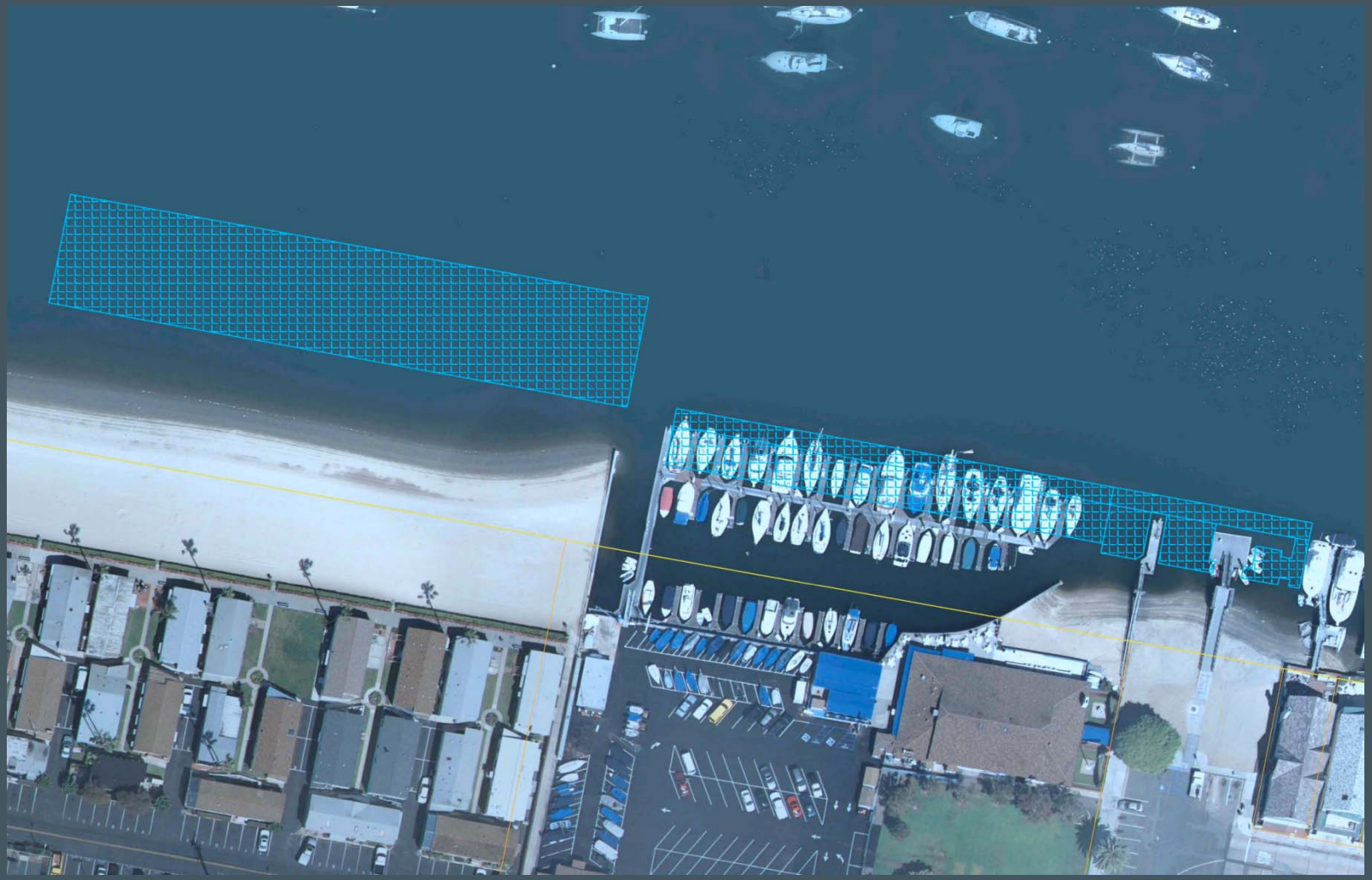


Dredge Design Overview

Other City Properties



Pile Replacement Plan

Vessel Relocation Plan

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Construction Overview

- Dutra selected as the general contractor
- Sediments removed using a barge mounted excavator (6 CY) and small (5.5 CY) clamshell
- Bottom dump scows ranging in size from 1200 to 2200 cubic yards
- Two tugs (in-harbor and transport to Port)
- Targeted production schedule of 1000-2000 cubic yards per day


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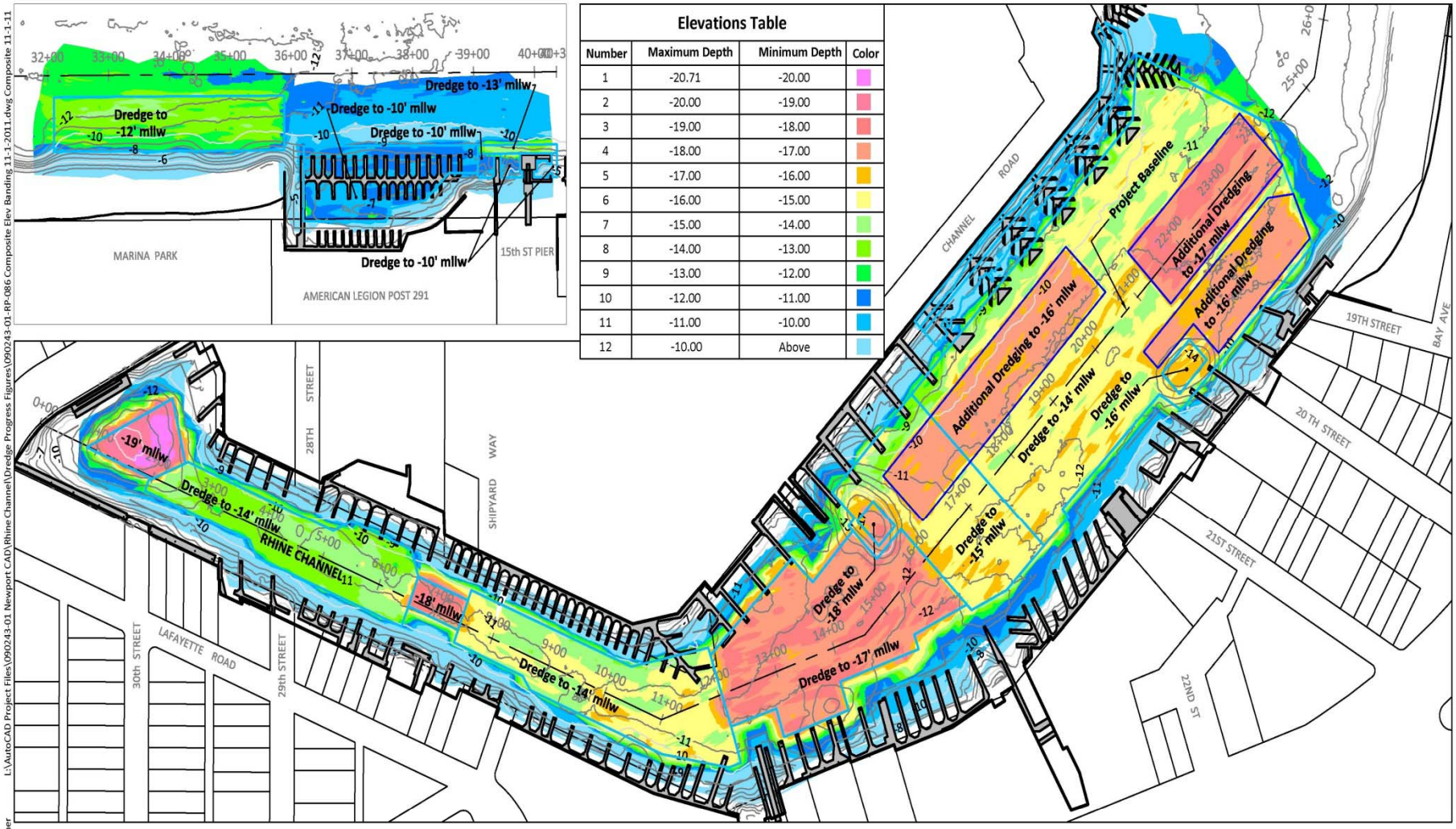

L:\AutoCAD Project Files\090243-01 Newport CAD\Rhine Channel\Dredge Progress Figures\090243-01-RP-086 Composite Elev Banding 11-1-2011.dwg Composite 11-1-11

Nov 01, 2011 3:21pm mpratschner

SOURCE: Drawing prepared from City of Newport Beach and ESRI basemaps, and all Dutra Surveys performed as of November 1, 2011.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83, feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:
Contours shown are from pre-dredge bathymetric survey conducted by Gahagan and Bryant Associates, Inc., on July 1, 2011.

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Figure 1
All Dredging Completed as of November 1, 2011
Rhine Channel Contaminated Sediment Cleanup

Construction Summary

- Construction initiated in July 2011 and completed in early December 2011
- Total volume of sediments removed was 89,000 cubic yards
- A total of 126 piles were replaced
- Total construction cost of $3.3 Million
- Confirmational sediment testing planned
- Water Board compliance sampling planned for Spring 2012

Lower Newport Bay Dredging

Questions?