2017 Marine Foundation Removal
BCDC Commission Briefing

San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

April 19, 2018

Introductions

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Agenda

- Summary of 2017 Pier Demolition Results
  - Dismantling Progress
  - Impact Avoidance Strategy
  - Environmental Monitoring Results
- Next Phase of Project
  - Pier Retention

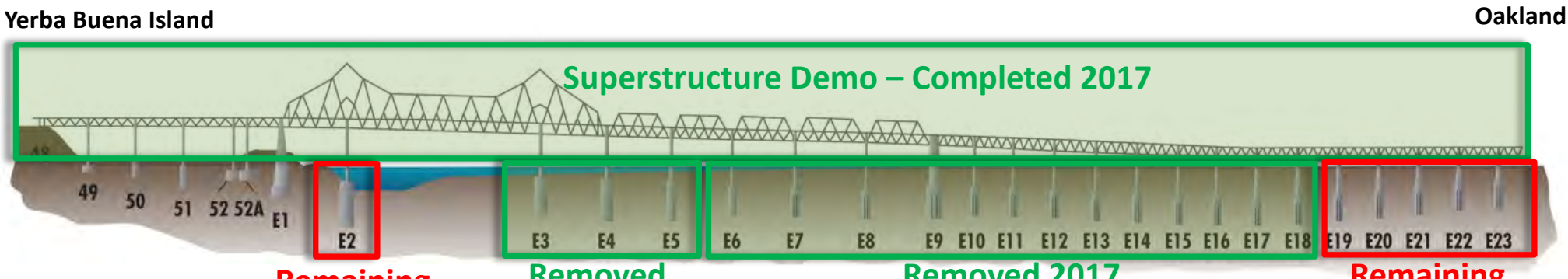
Our Partners

Photo Credit: Caltrans 2017

Implosion Permits and Authorizations

- USACE – Letters of Modification
- RWQCB – SWPPP Amendment Acceptance
- NOAA Marine Mammals – Incidental Harassment Authorization
- NOAA Fisheries – Biological Opinion
- BCDC – Permit Amendments
- CDFW – Incidental Take Permit Amendment
- USFWS – MBTA Misc. Permit

SFOBB Dismantling Project Update



LOCATION	WORK SUMMARY
• Superstructure	Removal Completed 2017
• Piers E3 - E5	Removed in 2015 and 2016
• Piers E6 - E18	Removed in 2017
• Piers E2, E19-E23	Next Phase of Project

Marine Foundation Removal BCDC Permit 2001.008

Amendment No. Forty-one:

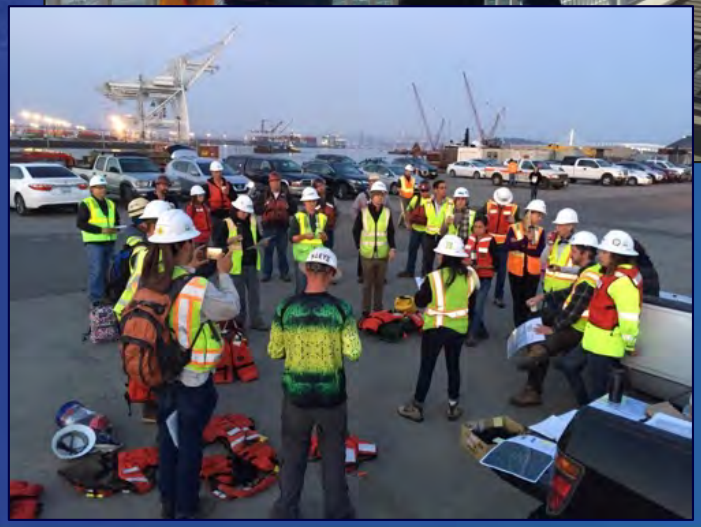
- Authorized removal of Piers E4 to E18 via controlled blasting,
- Authorized placement of some demolition debris (28,210 cubic yards) within the footprint of former piers;
- Conditions required minimization measures, monitoring and reporting; and
- Conditions required a presentation to the Commission

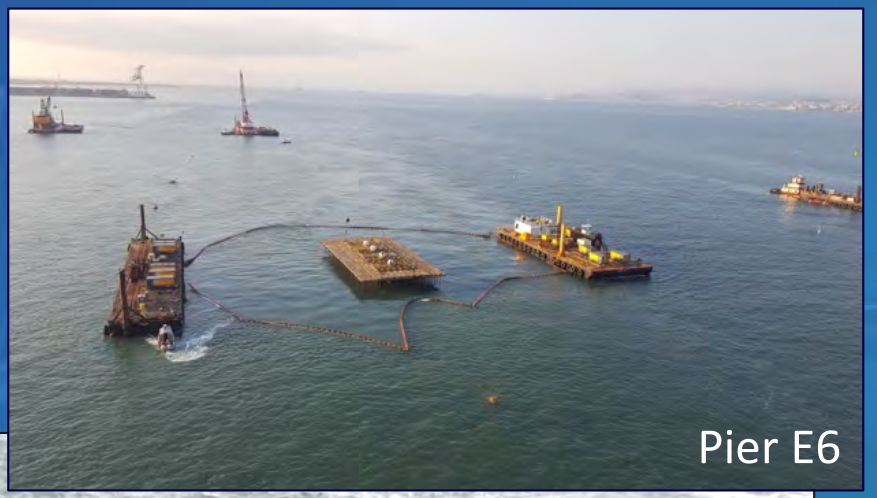
Current Status

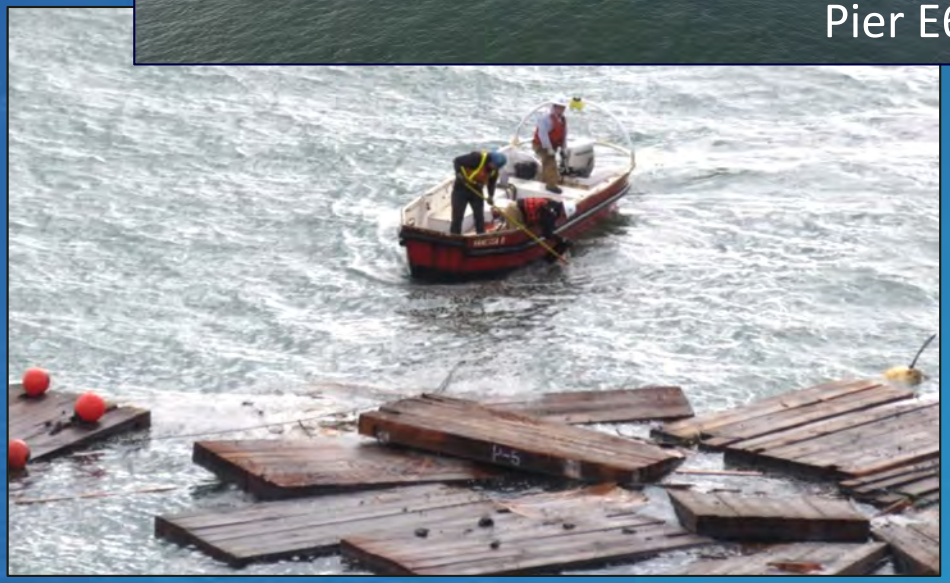
Status:

- Piers E4 to E18 removed
- Debris removal and site restoration complete
- Piers E4 and E5 briefing to Commission June 1, 2017
- Piers E6 to E18 results report transmitted to BCDC March 28, 2018
- Briefing to Commission April 19, 2018
- Next phase to address remaining piers in process

Summary of 2017 Pier Demolition Results







Key Impact Avoidance and Minimization Strategy

- Seasonal window of implosions (September 1 to November 30)
- Blast attenuation system (BAS)
- Blast plan design
- Bird deterrence
- Robust monitoring program


Pier E3

2017 Implosion Schedule

Blast Event	Pier(s)	2017 Implosion Date	Official Blast Time
1	E7 + E8	September 2	10:36 a.m.
2	E6	September 16	10:00 a.m.
3	E9 + E10	September 30	9:23 a.m.
4	E11 + E12 + E13	October 14	8:51 a.m.
5	E14 + E15 + E16	October 28	7:49 a.m.
6	E17 + E18	November 11	7:27 a.m.

Pier Removal Process

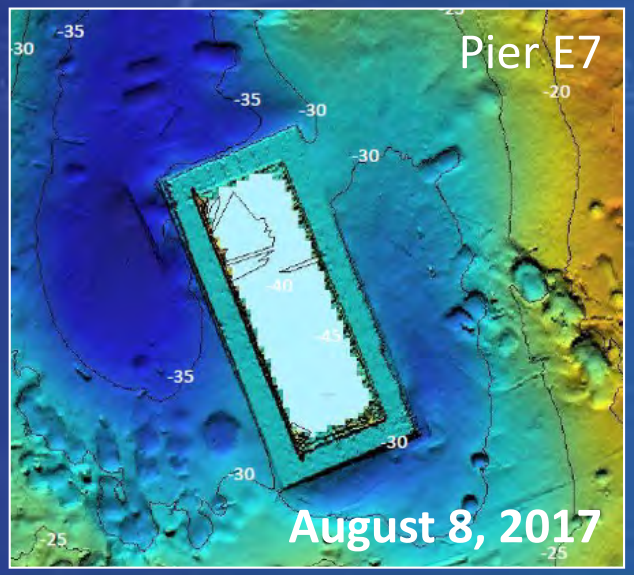
- Above water portions mechanically removed
  - Wire-saw cutting, hoe-ram
- Drilling and loading of charges
- Implosion of underwater portions

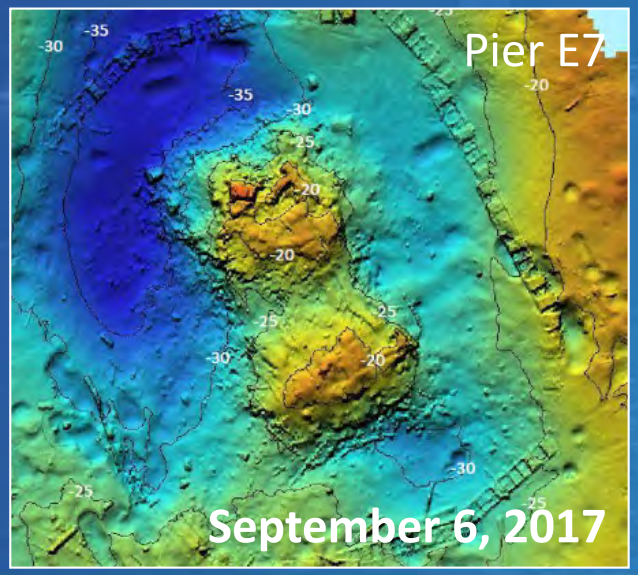

Piers E14, E15, E16

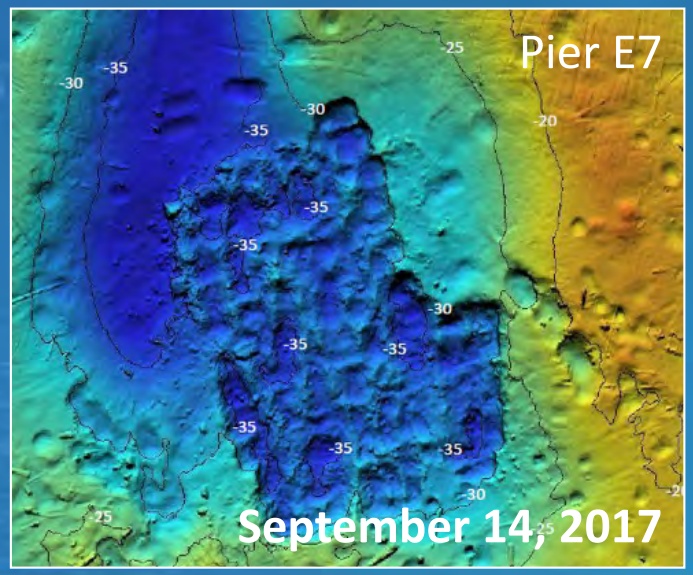
Blast Event Video

Post Blast Clean-Up

- Rubble removed to debris removal limit.
- Clean-up verified with bathymetry surveys
- Completed by November 30, 2017
- ~28,210 cubic yards authorized for in-situ (E4 to E18)
- ~24,180 cubic yards placed in-situ (E4 to E18)







Monitoring Efforts

- Hydroacoustic Monitoring
- Avian Monitoring/Bird Predation Monitoring
- Fish Monitoring
- Marine Mammal Monitoring
- Water Quality Monitoring


Piers E11, E12, E13

Fisheries Monitoring

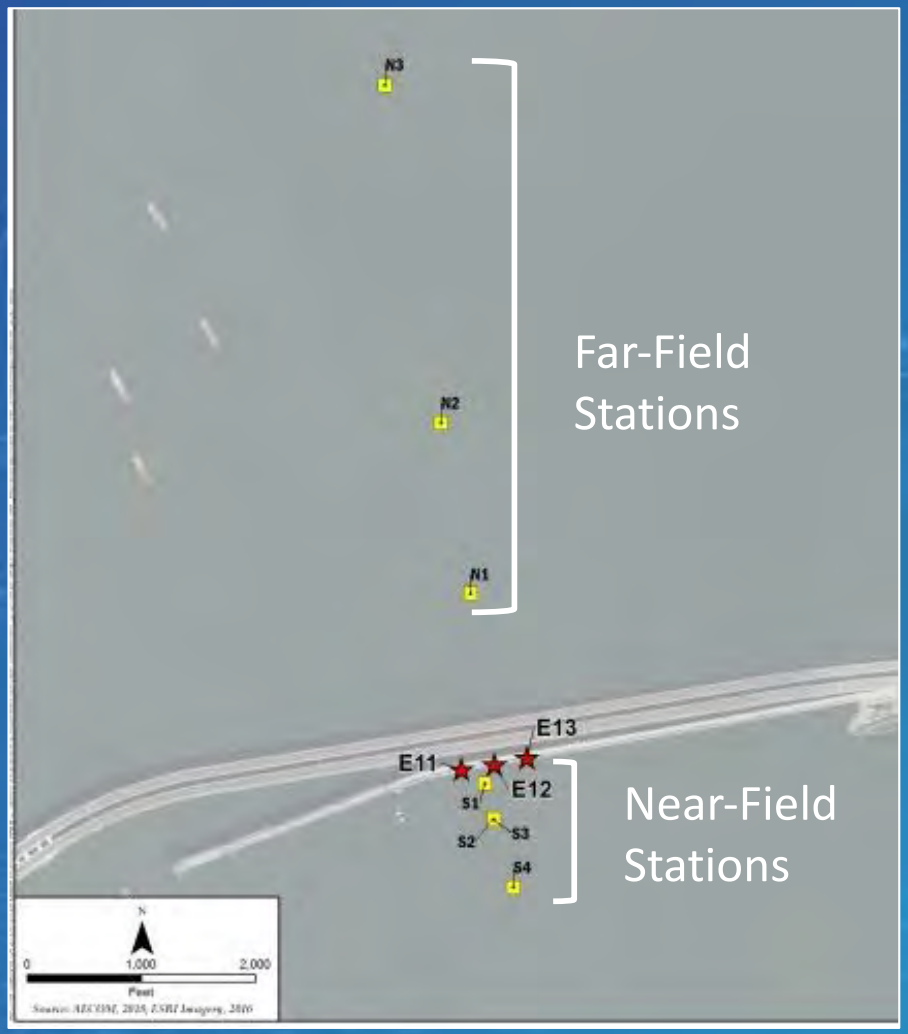
- Fish Salvage – No FESA, CESA fish collected
- Hydroacoustic Monitoring
- Fish Assemblage Survey

Fish Salvage

- Four boats: 2 outside debris boom; 2 inside debris boom
- Fish collected after each blast range 3 to 777 individuals (973 total cumulative)
  - Pier E6 outlier (629 anchovies collected)
  - Most prevalent species were brown rockfish and surfperch (excluding northern anchovy)
  - No FESA- or CESA-listed species observed or collected

Hydroacoustic Monitoring

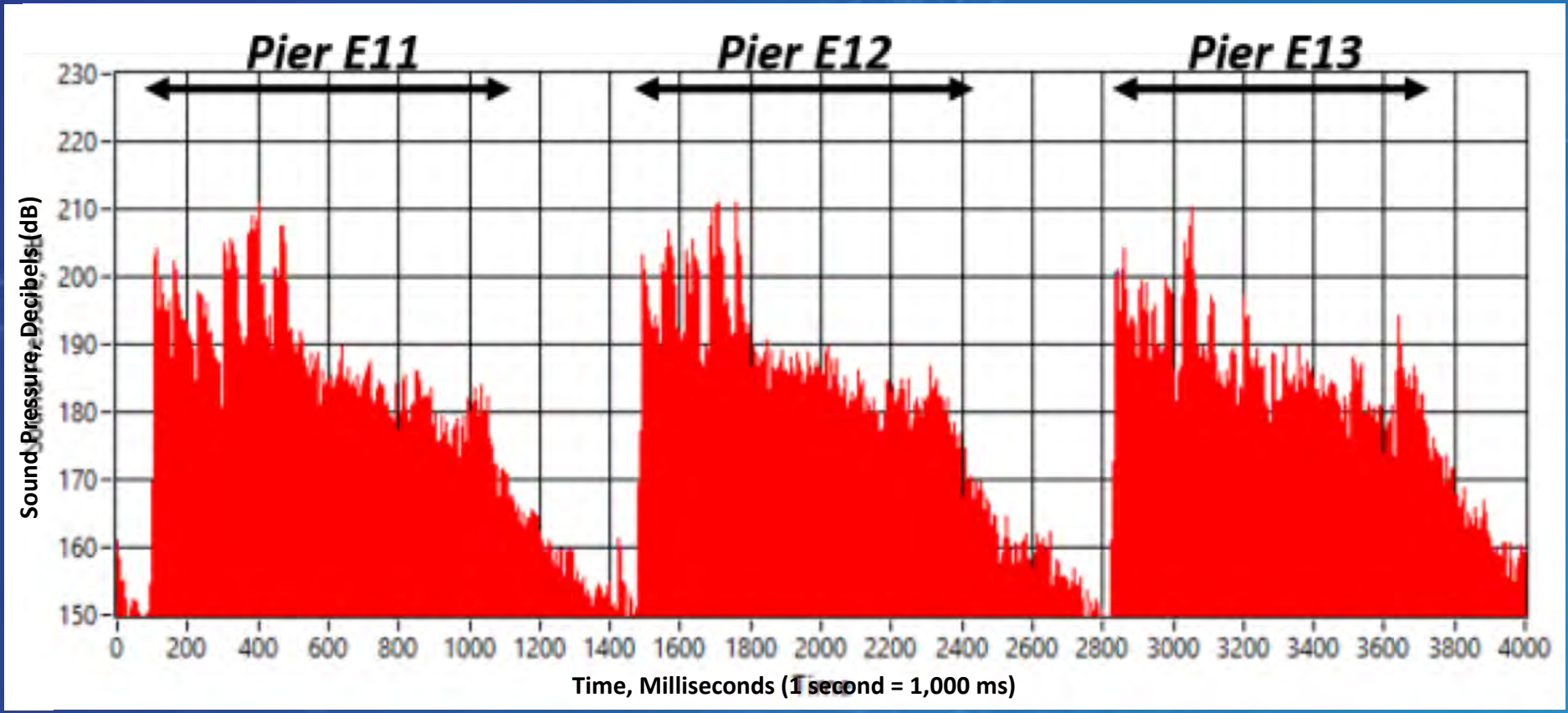
- Near-field monitoring all 6 controlled blast events within 1,100 feet
- Far-field monitoring on 4 of 6 controlled blast events from 1,500 to 6,000 feet



Example monitoring array (Piers E11-E13)

Hydroacoustic Monitoring

Example Sound Pressure Signatures at 500 feet (Piers E11-E13)
Half second between pier implosions



Hydroacoustic Monitoring Results to Fish Criteria

Piers	Distance to Criteria/Threshold		
	Peak Pressure 206 dB (feet)	cSEL, ≥ 2 grams 187 dB (feet)	cSEL, < 2 grams 183 dB (feet)
PERMIT LIMIT	**1,165**	**889**	**1,230**
E7, E8	312	334	450
E6	320	312	421
E9, E10	687	635	858
E11, E12, E13	730	839	1,132
E14, E15, E16	650	711	960
E17, E18	461	339	457

Fish Assemblage Survey

- Pre-Blast Sonar
  - Two sonar passes were made at approx. 500 and 750 feet around each pier approximately 4 hours prior to each event.
  - Very few areas of fish assemblages were noted in survey areas
  - Correlation difficult to see when compared to post-blast salvage

Avian Monitoring

- Monitored 30 min prior to blasts; bird strike counts were performed post-blast
- Sound cannons flushed birds prior to blasts. Drone used when cannons were ineffective
- No take of avian species occurred
- Bird predation (bird strikes) was considered low for all implosions

Marine Mammals Monitoring

- A minimum of 10 NOAA-approved observers at each blast event
- Marine Mammal Center stranding team on site
  - Stranding surveys conducted for 3-days after each blast event

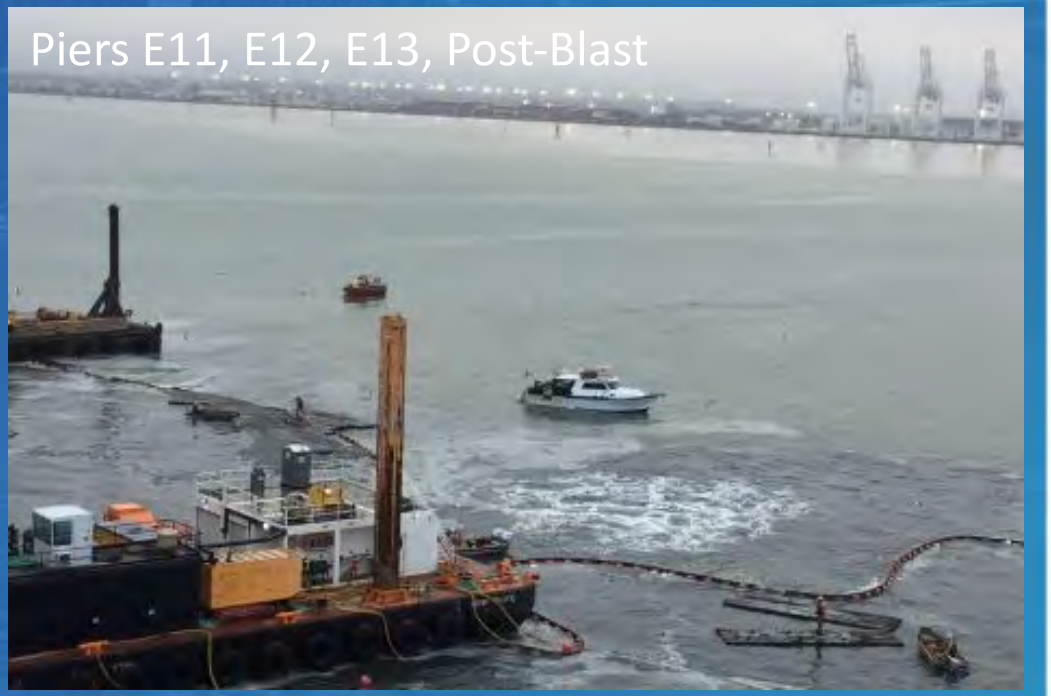
Marine Mammal Monitoring Results

- Level A vs Level B
- No animals in exclusion zones during blasts
- No stranded animals observed
- No permanent injury authorized or observed

	Parameter	Count by Species					
		Harbor Seal	Sea Lion	Elephant Seal	Harbor Porpoise	Bottlenose Dolphin	Northern Fur Seal
	Authorized Level B Take: Behavioral	66	18	6	18	6	6
	Authorized Level B Take: TTS	48	12	3	9	3	3
2017 Events	**Actual Level B Take: Behavioral**	**9**	**0**	**0**	**0**	**0**	**0**
	Actual Level B Take: TTS	**19**	**0**	**0**	**3**	**0**	**0**

Water Quality & Sediment Monitoring

- 2017 Monitoring Methods:
  - Fixed buoy monitoring
  - Barge mounted sondes
  - Dynamic plume mapping
  - Static plume tracking
  - Eelgrass ESA monitoring
  - Sediment Assessment

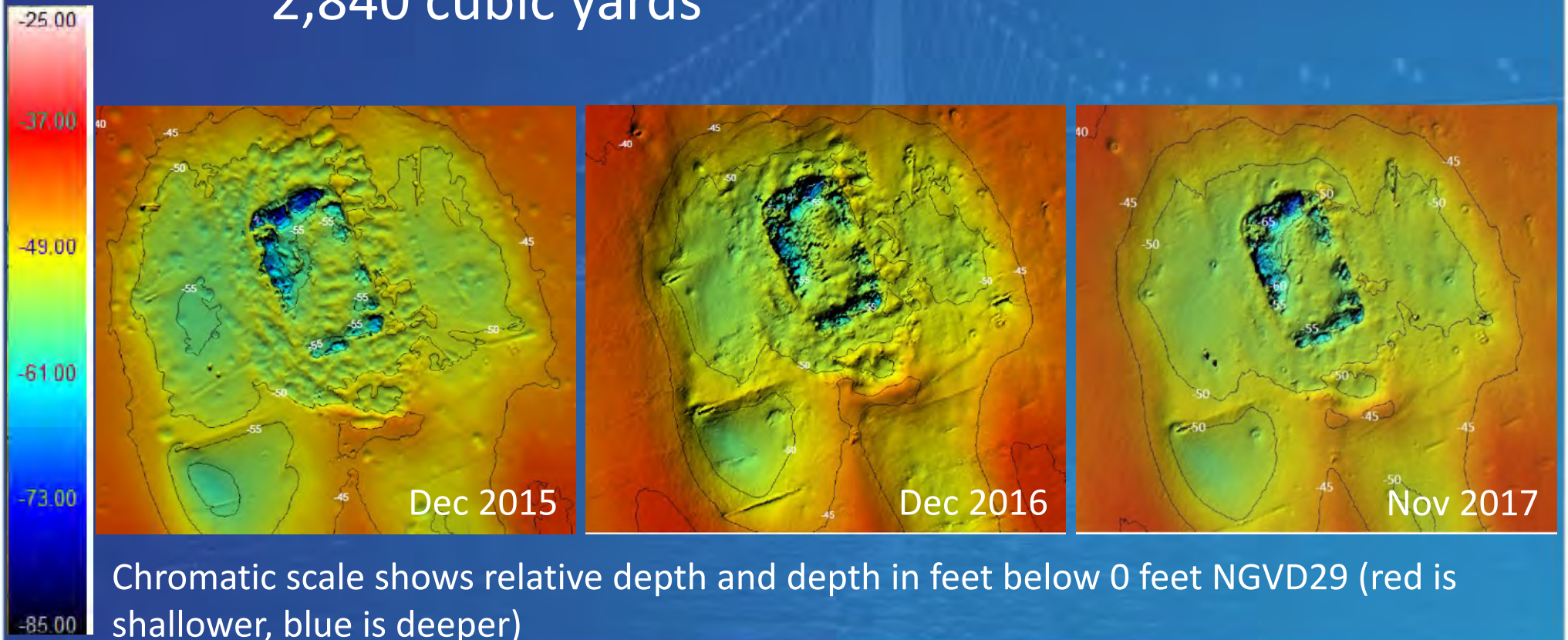

Piers E11, E12, E13, Post-Blast

Water Quality & Sediment Monitoring

- Slightly elevated pH
  - To background levels (3.5 hrs)
- Elevated turbidity
  - To background levels (3.5 hrs)
- Eelgrass monitoring:
  - No changes from background
- Sediment:
  - Metals consistent with Regional Monitoring Program

2017 Pier E3 Infill Monitoring

- Net gain in sediment from 2015 to 2017 of 2,840 cubic yards

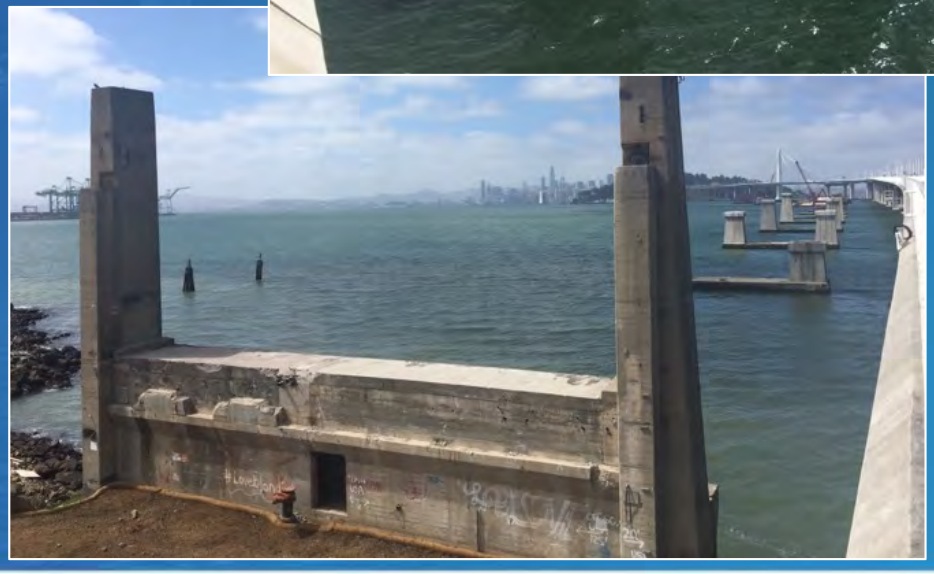


Chromatic scale shows relative depth and depth in feet below 0 feet NGVD29 (red is shallower, blue is deeper)

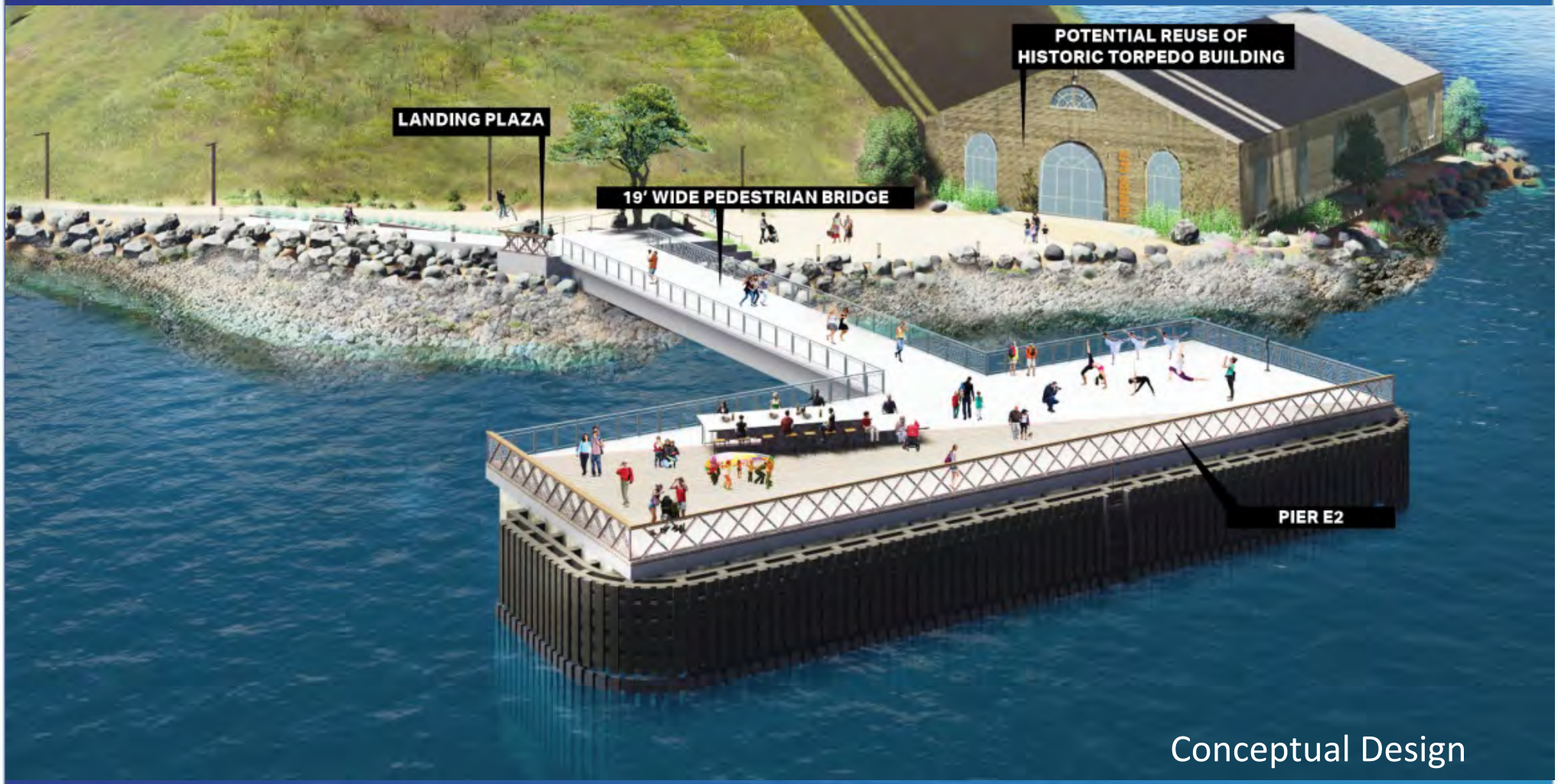
Next Phase: Pier Retention

Overview of Pier Retention Phase

- Pier Retention:
  - YBI (New Structure to Pier E2)
  - Oakland Touchdown (New Structure on Piers E21-E23)
- Demolition (Piers E19-E20)

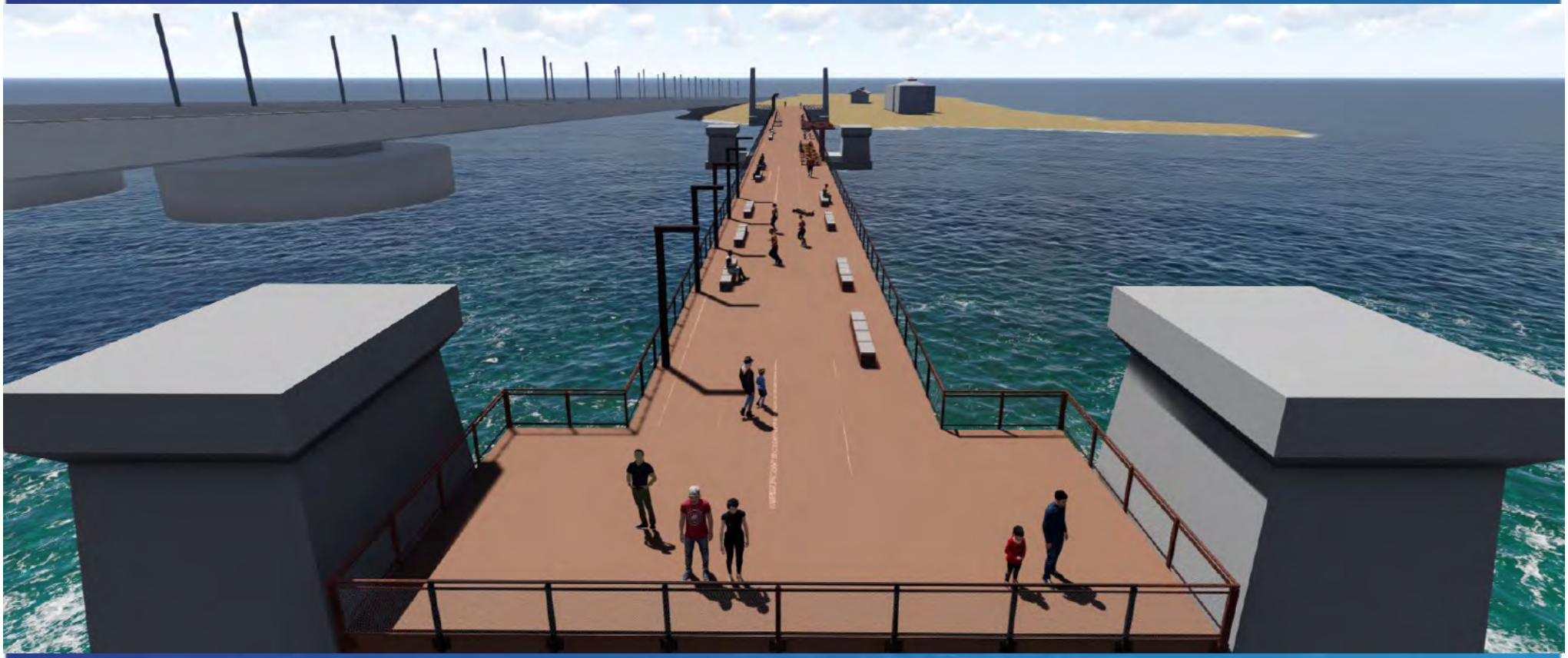


Pier E2 Public Access Concept



Conceptual Design

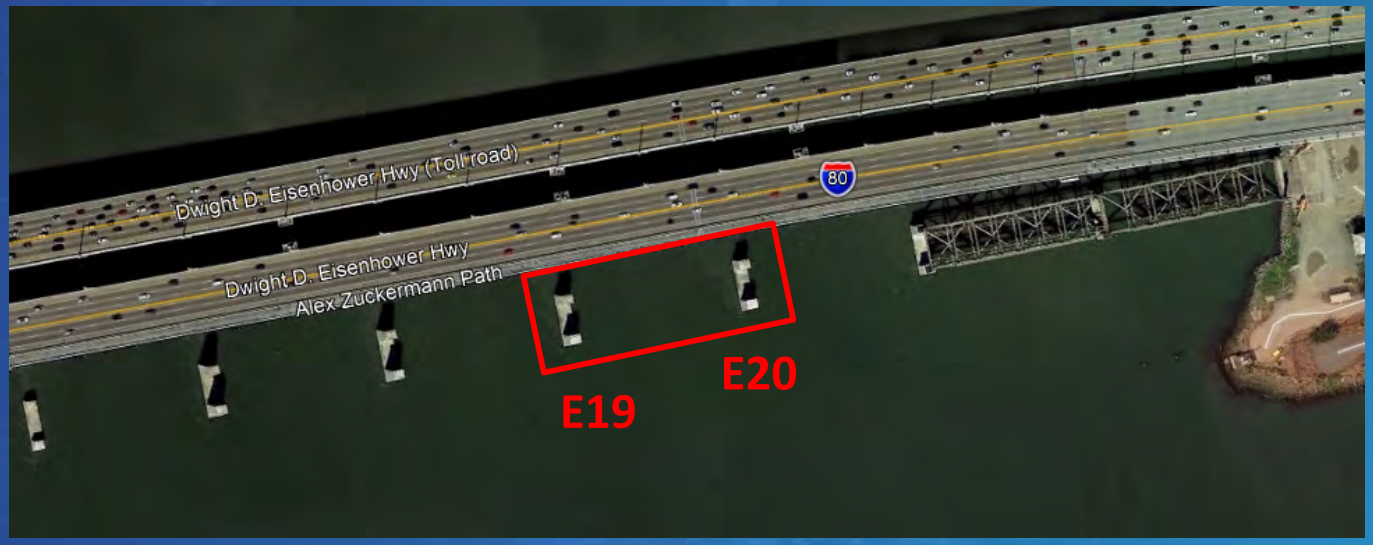
Piers E21 - E23 Public Access Concept



Conceptual Design

Pier Demolition – E19/E20

- Demolition using controlled implosions
  - Above water mechanical demolition
  - Below water implosion/ rubble removal
  - Monitoring resources following protocol implemented during 2017 blast events



Thank You