DRAFT

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

MODIFICATIONS TO THE OCEANSIDE HARBOR MAINTENANCE DREDGING SAN DIEGO COUNTY, CALIFORNIA

Department of the Army
Los Angeles District Corps of Engineers

December 2022

FINDING OF NO SIGNIFICANT IMPACT

MODIFICATIONS TO THE OCEANSIDE HARBOR MAINTENANCE DREDGING SAN DIEGO COUNTY, CALIFORNIA

The U.S. Army Corps of Engineers, Los Angeles District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Final Supplemental Environmental Assessment (SEA) dated **DATE OF SEA**, for Oceanside Harbor Maintenance Dredging evaluates modification to the proposed project that had previously been addressed in the July 2018 Final Environmental Assessment (EA), including the March 2022 Errata.

The Final SEA, incorporated herein by reference, evaluated various alternatives to maintain federally authorized channel configurations, and to restore and assure safe navigability within the harbor. The proposed project is the recommended plan and includes annual (all 2018 to June 2028) dredging of up to approximately 500,000 cubic yards of littoral drift material from the harbor, the exact amount to be determined by need and funding, by a cutterhead hydraulic pipeline dredge, or a mechanical clamshell dredge. Sediments dredged from the harbor are beneficially reused for beach nourishment. Dredged material would be placed on the beach or in the nearshore of Oceanside Beach, located south of the main Entrance Channel.

In addition to a "no action" plan, two structural alternatives (harbor modifications and the Recommended Plan) and one non-structural alternative (operational modifications) were considered. The harbor modifications and operational modifications alternatives were eliminated from consideration.

For all alternatives analyzed in detail, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Transportation	☒	☐	☐
Cultural resources	☒	☐	☐
Floodplains	☐	☐	☒

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☒	☐	☐
Navigation	☒	☐	☐
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Socioeconomics	☒	☐	☐
Environmental justice	☒	☐	☐
Soils	☐	☐	☒
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☒	☐	☐
Recreation Uses	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Environmental commitments as detailed in the Final SEA will be implemented, as appropriate, to minimize impacts.

Public review of the Draft SEA and FONSI was completed on **DATE DRAFT EA AND FONSI REVIEW PERIOD ENDED**. All comments submitted during the public review period were responded to in the Final SEA.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the recommended plan may affect but is not likely to adversely affect the following federally listed species: western snowy plover. The U.S. Fish and Wildlife Service (FWS) concurred with the USACE's determination on ________. The USACE determined that the project would have no effect on green sea turtle.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the USACE determined that no historic properties would be affected. SHPO concurred with the USACE's determination on DATE.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with the section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix B of the SEA.

A water quality certification pursuant to section 401 of the Clean Water Act was obtained from the San Diego Regional Water Quality Control Board. All conditions of the water quality certification will be implemented to minimize adverse impacts to water quality, including any modifications resulting from proposed changes to the project.

The California Coastal Commission concurred with the USACE's negative determination with the California Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 on DATE. All conditions of the negative determination shall be implemented in order to minimize adverse impacts to the coastal zone, including any modifications resulting from proposed changes to the project.

The USACE has determined that the recommended plan would not result in a substantial, adverse impact to Essential Fish Habitat (EFH). The USACE consulted with the National Marine Fisheries Service in accordance with supplemental consultation requirements. The USACE used the NEPA process to initiate EFH consultation with the National Marine Fisheries Service (NMFS) on February 26, 2018. On April 6, 2018, NMFS completed its analysis and provided EFH conservation recommendations. Results of consultation with the NMFS can be found in Appendix G of the Final Environmental Assessment. NMFS determined that "the proposed project includes conservation measures to avoid or minimize impacts to EFH" and did not propose any additional conservation recommendations.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives and coordination with appropriate agencies and officials has been completed. Based on this Final SEA, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

__________________________	________________________________
Date	Julie A. Balten Colonel, Corps of Engineers Commanding

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1.0 INTRODUCTION

This document supplements the U.S. Army Corps of Engineers' (USACE) 2018 Final Environmental Assessment (EA) for Oceanside Harbor Maintenance Dredging. Proposed modification to dredging and beach operations are being made to improve construction activities and to improve long-term maintenance of dredge benefits. The 2018 Final EA analyzed the no action alternative, two structural alternatives (harbor modifications and the Recommended Plan) and one non-structural alternative (operational modifications). The harbor modifications and operational modifications alternatives were eliminated from consideration. The selected plan was the Proposed Action. On July 13, 2018, the USACE's Los Angeles District Engineer signed a Finding of No Significant Impact (FONSI). Since that time, modifications to the Proposed Action activities have occurred. In addition to the physical modifications discussed in Section 1.1.2 below, the current maintenance dredging program would be extended to spring 2028 to match up to the expiration date of the Water Quality Certification issued for the project by the San Diego Regional Water Quality Control Board (14 Jun 2028).

The purpose and scope of this Supplemental Environmental Assessment (SEA) are limited to potential impacts that may occur as a result of those changes.

1.1 Proposed Action

1.1.1 Location. The proposed project is located in San Diego County (Figure 1) and consists of maintenance dredging of the federal navigation channels (Figure 2) in Oceanside Harbor.

1.1.2 Summary of Changes from the Final Environmental Assessment

Additional equipment and pipeline storage areas and transportation corridors are proposed on Harbor Beach as shown on Figure 3. The staging area located in the mouth of the San Lis Rey River (adjacent to the North Coast Village Apartments would be retained along with the restrictions on use specified in the Final Environmental Assessment (USACE 2018). Current water quality best management measures (Section 5.2) applied for on beach storage and beach operations shall apply to these areas as well.

It is also proposed to deepen the advanced maintenance portions of the Entrance Channel to a newly authorized depth of -30 ft MLLW from the previously authorized depth of -25 ft MLLW. The entire Entrance Channel is considered to be an advanced maintenance area. Only a portion of this area is proposed for deepening to -30 ft MLLW. It is shown on Figure 2 with the new depth of -30 shown in the hexagon. All other Proposed Action elements remain the same as the 2018 Final EA (USACE, 2018) and are not addressed in this SEA. This increased depth was authorized by the South Pacific Division of the U.S. Army Corps of Engineers in accordance with Engineering Regulation, 1130-2-520, Navigation and Dredging Operations and Maintenance Policies, U.S. Army Corps of Engineers, 29 Nov 1996, by memo dated 26 Mar 2021. All dredge areas, including advanced maintenance dredging, includes a two-foot overdepth allowance.

1.1.3 Proposed Action. The Proposed Action as modified includes the following:

The Proposed Action is shown in Figure 2. The plan provides for maintaining the depth of the entrance channel and inner harbor at -25 ft and -20 ft MLLW, respectively, with a portion of the Entrance Channel dredged to -30 ft MLLW as advanced maintenance dredging. Dredged material would be placed on the beach or in the near shore of Oceanside Beach, located south of the main Entrance Channel.

Sediments placed by hydraulic cutterhead dredge require a pipeline from the dredge to the placement location along Oceanside Beach. The beach in front of the North Coast Village is generally too badly eroded to allow a pipeline corridor and must be renourished most years. This site is included as part of the beach placement area. A single onshore placement area is proposed, starting at the northern boundary of the North Coast Village and extending to Wisconsin Avenue, or, alternatively, nearshore placement (Figure 1). Sand would be placed within the onshore placement area as needed to restore eroded beach areas until dredging is completed. Nourishment in the vicinity of the North Coast Village would be the first placement area, if needed, to route the pipeline past the North Coast Village to areas further south within the onshore placement area. Dredge material quantities for the area maximizes to approximately 500,000 cubic yards/year. Equipment and pipeline storage areas and transportation corridors would occur on Harbor Beach as shown in Figure 3.

The maintenance dredging cycle would be extended to June 2028 to match the expiration date for the Clean Water Act Section 401 Water Quality Certification issued by the San Diego Regional Water Quality Control Board, assuming no major change to environmental conditions at Oceanside Harbor that would warrant further environmental documentation. Prior to each three-year dredge contract cycle, appropriate review of the proposed site and the dredged materials would be evaluated to ensure compliance with the Inland Testing Manual requirements. Past sampling has shown only clean sands in the harbor channels. In the absence of any event contaminating harbor sediments, prior results have been accepted by the Southern California Dredged Material Management Team (SC-DMMT) for each three-year contract period. Prior to the start of the succeeding contract periods either a Tier I assessment will be conducted to evaluate potential changes, or a new sediment sampling program will be conducted, as appropriate.

1.1.4 Updated Timing of Project. Dredging evaluated by this SEA would cease by June 2028, to match the expiration date for the Clean Water Act Section 401 Water Quality Certification issued by the San Diego Regional Water Quality Control Board. Dredging would continue to be performed primarily in the spring of each year with allowances for additional dredging as needed as was done in 2020 with dredging in both March and September due to covid-related issues. Multi-dredge events in a year may also be triggered by unusual sedimentation in the harbor entrance making navigation unsafe outside the normal spring dredge cycle.

1.1.5 Construction Equipment. Dredging and beach and near shore placement most likely would be done by cutterhead suction dredge with placement via hydraulic pipeline. Near shore placement may also be done by clamshell dredge into scows.

1.1.6 Project Authorization. The Rivers and Harbors Act of 1899, as amended in 1965 (House Document 76, PL 89-298) authorized the USACE to maintain channel depths in Oceanside Harbor.

1.2 Supplemental Environmental Assessment Process

This document has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321-4347); the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508)[1]; and the USACE's NEPA Regulations (33 CFR Part 230).

The SEA process follows a series of prescribed steps. The first, scoping, was completed in February 2021 to solicit comments from federal, state, and local agencies. The Draft SEA, the second step, is circulated for a 30-day review to concerned agencies, organizations, and the interested public, during which interested parties may express their views concerning changes to the Proposed Action. The next step requires preparation of a Final SEA that incorporates and responds to comments received. The Final SEA will be furnished to all who commented on the Draft and be made available to others upon request. The final step is preparing a FONSI; if it is determined the federal action will not have a significant effect on the quality of the human environment. If it is determined the federal action will have a significant effect on the quality of the human environment, an environmental impact statement must be prepared.

1.3 Relationship to Environmental Protection Statutes, Plans, and Other Requirements

The USACE is required to comply with all pertinent federal laws and regulations; compliance is summarized in Table 1.

[1] The new NEPA regulations issued by CEQ apply to NEPA processes begun after 14 Sep 2020, but federal agencies have discretion to apply the new NEPA regulations to on-going NEPA processes or proceed to apply the prior CEQ regulations. The NEPA process in this instance started before 14 Sep 2020, and the USACE has decided to proceed to apply the prior CEQ regulations.

Table 1. Summary of Environmental Compliance

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq., as amended; Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-1508) and USACE NEPA Implementing Regulations at 33 CFR Part 230 and guidance	The SEA will be completed and circulated for public review. Upon review of the Final SEA, the District Engineer will either issue a FONSI or require preparation of an EIS.
Clean Air Act, 42 U.S.C. 7401 et seq	Some of the contractor equipment (ancillary equipment/diesel engines for tugboats and/or crew boats; dredging equipment) may be subject to the requirement of obtaining an Air Pollution Control District Permit to Operate. The total direct and indirect emissions from the federal action are below applicability rates. Therefore, a conformity determination is not required.
Section 404 of the Clean Water Act, 33 U.S.C. 1344, USACE regulations at 33 CFR Part 336, and USEPA 404(b)(1) Guidelines at 40 CFR Part 230	A section 404(b)(1) analysis (Appendix B) has been prepared for the proposed discharges of dredged or fill material within waters of the U.S.
Section 401 of the Clean Water Act, 33 U.S.C. 1341	A Section 401 Water Quality Certification has been received from the California Regional Water Quality Control Board, San Diego Region. A request will be made to modify the Water Quality Certification to meet changes to the project.
Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 403	Not applicable.
Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq; National Oceanic and Atmospheric Administration Federal Consistency Regulation with Approved Coastal Management Program Regulations at 15 CFR Part 930	A Negative Determination (ND) was prepared by the USACE, and concurrence received from the California Coastal Commission. Consultation will be re-initiated to address changes to the project and confirmation requested that the ND is still applicable.
Section 7 of the Endangered Species Act of 1973, 16 U.S.C. 1536 and implementing regulations at 50 CFR Part 402	The USACE determined that the recommended plan may affect but is not likely to adversely affect western snowy plover. Informal consultation with the USFWS is pending. Project modifications are not expected to result in changes to the current monitoring and avoidance efforts. The Corps has determined there would be no effect to green sea turtles.
Migratory Bird Treaty Act, 16 U.S.C. 703-711	The USACE has determined that no species protected by the Migratory Bird Treaty Act will be impacted.
Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1413	Not applicable.
Marine Mammal Protection Act, 16 U.S.C. 1361 et seq	The USACE has determined that no species of marine mammal would be impacted.
Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1855(b) and implementing regulations at 50 CFR 600.905-930.	The USACE has determined that this project, as modified, would not result in a substantial, adverse impact to Essential Fish Habitat (EFH). The USACE will use the NEPA review process to fulfill the Supplemental EFH supplemental consultation requirements. A request will be made to NMFS to reinitiate consultation to address changes to the project.
Section 106 of the National Historic Preservation Act (NHPA; 54 U.S.C. 3000100 et seq.) and implementing regulations at 36 CFR 800)	In accordance with Section 106 of the NHPA, the Corps has determined that the periodic maintenance of the Oceanside Harbor channels meets the definition of an undertaking as defined at 36 CFR 800.16(y). The Corps has further determined that it is the type of activity that does not have the potential to cause effects to historic properties. Consultation with the SHPO will be conducted for the extra depth proposed for a portion of the Entrance Channel advanced maintenance area. Documentation is included in Appendix C.

Executive Order 11593: Protection and Enhancement of the Cultural Environment, May 13, 1971	Not applicable.
Executive Order 12898, Environmental Justice in Minority and Low-Income Populations	There would be no impacts resulting from the Proposed Action, as modified, that would result in disproportionately high and adverse impacts to minority and low-income communities.

2 – HISTORY AND PURPOSE

2.1 Description of Project Area

Since 1965, maintenance dredging has been performed routinely, based on 12-to-24-month cycles. Refer to Table 2 for past dredging events dating back to 2004, which has occurred every year. On average, 240,000 cubic yards (cy) have been removed annually ranging from a low of 179,100 cy in 2011 to a high of 435,200 cy in 2017.

The Oceanside Harbor complex, which encompasses approximately 215 acres, is located north of the city of Oceanside and south of Camp Pendleton Marine Corps Base, 35 miles north of San Diego, in San Diego County, California (Figure 1). The harbor was built in various stages from 1942 to 1960. The harbor's breakwater and south jetty form the Entrance Channel. The entrance channel splits to form the Oceanside Channel, which leads to a small craft harbor, and the Del Mar Channel, which leads to Camp Pendleton's Del Mar Boat Basin (Figures 1 and 2).

In 1990, the U.S. Army Corps of Engineers (USACE) completed an Environmental Assessment (EA) to address maintenance dredging; the EA was prepared to address an annual dredging cycle over a six-year program life. A Finding of No Significant Impact (FONSI) was signed with the condition that if environmental conditions significantly changed during the six-year time period, supplemental National Environmental Policy Act (NEPA) documentation would be required prior to the next dredge event. In 1994, the USACE prepared, coordinated, and circulated a new EA for maintenance dredging activities at Oceanside Harbor for a six-year period (1994-2000). A FONSI was signed on August 25, 1994. A new EA for ten years of maintenance dredging at Oceanside Harbor was prepared, coordinated, and circulated. A FONSI was signed on August 28, 2000. . A new EA for seven years of maintenance dredging at Oceanside Harbor was prepared, coordinated, and circulated. A FONSI was signed on May 16, 2012. A new EA for eight years of maintenance dredging (fall 2018 to 2025) was prepared, coordinated, and circulated. A FONSI was signed on July 13, 2018.

This SEA extends evaluates extending the duration of the current maintenance dredging program to June 2028, to match the expiration date for the Clean Water Act Section 401 Water Quality Certification issued by the San Diego Regional Water Quality Control Board.

Sediments were sampled and tested in 2017 and again in 2022 to determine suitability for beach or near shore placement. Determinations were made by the USACE and presented to the Southern California Dredged Material Management Team (SC-DMMT) for review and concurrence. Refer to Appendix F for a discussion of results.

2.2 Project Background Information

2.2.1 Project History

The Oceanside Harbor complex was constructed in 1942 for, and is used by, various commercial, private, and military users (Figure 1). See Table 2 for a summary of past dredging events.

2.2.2 Project Purpose and Need

In order to provide for the safety of vessels transiting the harbor, the USACE proposes to conduct routine maintenance efforts in Oceanside Harbor to re-establish authorized channel depths in Oceanside Harbor to support safe commercial, recreational, and military navigation operations in this harbor.

2.2.3 Future-Planned Projects

This SEA evaluates annual dredging through June 2028. After that, a new EA would be prepared evaluate continued maintenance dredging and disposal activities.

Table 2. Oceanside Harbor Dredging History.

Dredge Year	Channel(s) Dredged	Vol. Removed *(cubic yards)*	Dredge Method	Placement Location
2004	Entrance Oceanside	212,900 9,700	hydraulic cutterhead	Oceanside Beach
2005	Entrance Del Mar	262,000 3,000	hydraulic cutterhead	Oceanside Beach
2006	Entrance Oceanside Del Mar	204,800 6,200 16,600	hydraulic cutterhead	Oceanside Beach
2007	Entrance Oceanside Del Mar	122,000 7,000 58,000	hydraulic cutterhead	Oceanside Beach
2008	Entrance	240,000	hydraulic cutterhead	Oceanside Beach
2009	Entrance	227,500	hydraulic cutterhead	Oceanside Beach
2010	Entrance Oceanside	269,000 6,000	hydraulic cutterhead	Oceanside Beach
2011	Entrance Del Mar	166,000 13,100	hydraulic cutterhead	Oceanside Beach
2012	Entrance	244,400	hydraulic cutterhead	Oceanside Beach
2013	Entrance Del Mar	187,900 5,900	hydraulic cutterhead	Oceanside Beach Oceanside Beach
2014	Entrance	200,400	hydraulic cutterhead	Oceanside Beach
2015	Entrance	199,400	hydraulic cutterhead	Oceanside Beach
2016	Entrance Oceanside	208,500 36,700	hydraulic cutterhead	Oceanside Beach
2017	Entrance Oceanside Del Mar	416,300 7,100 11,800	hydraulic cutterhead	Oceanside Beach (North coast Village to Seagaze Dr.)
2018	Entrance	286,100	hydraulic cutterhead	Oceanside Beach
2019	Entrance Oceanside	225,176	hydraulic cutterhead	Oceanside Beach (North Coast Village to Pine Street)
2020 March	Entrance Del Mar	136,743 108,639	hydraulic cutterhead	Oceanside Beach (North Coast Village to Tyson Street Park)
2020 Sept*	Entrance	208,146	hydraulic cutterhead	Oceanside Beach (Oceanside Pier to Tyson Street Park)
2021	Entrance	313,945	hydraulic cutterhead	Oceanside Beach (North Coast Village to Mission Ave.)
2022	Entrance	250,557	hydraulic cutterhead	Oceanside Beach (North Coast Village to Mission Ave.)

* Emergency dredging of Entrance Channel as a result of incomplete dredging in the spring (shortened by COVID)

3.0 PROJECT ALTERNATIVES

3.1 Measures/Alternatives Considered

The USACE has considered the following measures and alternatives to meet primary goals of this project:

3.1.1 Operational Considerations: (Alternative 1)

Use of tides involves offloading a portion of a fully loaded vessel's cargo onto another, smaller vessel outside the harbor until the incoming vessel's draft has been reduced to the point where it can safely transit to the dock or use the tides to transit to the dock. As this harbor is used mainly for recreation, commercial and recreational fishing, and military operations, this alternative would result in safety hazards. Over time, a closure would be anticipated (similar to the no action); this alternative does not fulfill the needs of the project and has been dismissed from further consideration.

3.1.2 Harbor Modifications: (Alternative 2)

Harbor modification alternatives are based on different channel depth configurations than currently authorized. These alternatives have two separate but dependent components: depth and placement options.

Depth Configurations.

Deeper depth options throughout the Harbor were originally explored in the 1989 Feasibility Report (USACE, 1989). The study optimized economic costs and environmental impacts against the needs for conducting maintenance dredging. The authorized depth was determined optimal for achieving the most efficient and economical vessel transit through the channel fully loaded. Thus, the proposed project is to re-establish the authorized channel depth in Oceanside Harbor. The authorized depth is -20 ft MILW. The Entrance Channel is maintained at a deeper depth to serve as a sand trap to catch littoral drift sands before they can move into the harbor entrance to limit navigational impacts in the harbor. As harbor uses are not expected to change from present conditions, vessel requirements are not predicted to change in the near future, and deeper dredge depth alternatives are not necessary.

Material Placement.

The only beneficial use identified for the dredged materials is beach nourishment. If dredged sediments are compatible with local beach materials based on physical and chemical considerations, beach nourishment is the most acceptable use for dredged materials. Beach nourishment activities are supported by resource agencies, including, but not limited to, USACE, U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), California Coastal Commission (CCC), California Regional Water Quality Control Board

(CRWQCB), California Department of Fish and Wildlife (CDFW), and the United States Fish and Wildlife Service (USFWS). Beach nourishment is generally considered feasible from an engineering practice and is economical. No other beneficial uses were proposed for the source material. If materials are not physically compatible, then they may be disposed at an offshore site, if suitable, or an upland or contained site, if not.

Grain Size Compatibility. The USACE's guidelines for sediment suitability for beach nourishment state that the percent of "fines" in a composite sediment sample from the dredge site must be within 10 percent of the percent of fines at the receiving beach to be suitable for beach nourishment. ("Fines" are the finer-grained sediments commonly referred to as silts or clays.) If the sediments are determined suitable, but are slightly finer than beach sediments, the USACE would likely place the materials in the near shore environment.

Sediment Chemistry Compatibility. Chemistry compatibility is assessed by comparing sediment quality at the proposed dredge area with applicable data sets, such as, the Long and Morgan (1990) and Long et al. (1995) data and EPA's RSL (Regional Screening Levels) and the State of California's CHHSL (California Human Health Screening Levels) for potential effects to humans. The proposed dredge materials have been determined to have levels of metals and/or organics that have been determined to not result in adverse impacts to the beach and near shore environments (including potential human impacts). Those dredge materials may be placed in the beach or near shore environment. Refer to Appendix F for results of sediment chemistry analysis.

Material Testing Results. The three proposed placement areas and the three dredge footprints are as follows:

A. Oceanside Beach onshore, north of Oceanside Pier (Transects A, B and C; Appendix F, Figure 6): The existing beach profiles at the north beach area is as follows: sediment here is composed of a composite weighted grain size average showing approximately 19% fines passing a U.S. no. 200 sieve. This is classified (according to United States Engineering Classification for Soils/Sediment) as silty sand, with most grain sizes in fine grained range and some amount of medium grained sizes of sand. The approximate sand content is about 81% sand overall.

B. Oceanside Beach onshore, south of Oceanside Pier (Transects D, E, and F; Appendix F): The existing beach profiles at the south beach area is as follows: sediment here is composed of a composite weighted grain size average showing approximately 13% fines passing a U.S. no. 200 sieve. This is classified also as silty sand, with most grain sizes in fine grained range and some amount of medium grained sizes of sand. The approximate sand content is about 87% sand overall.

C. Oceanside Beach Nearshore, south of Oceanside Pier: The existing beach profiles at the nearshore beach area is as follows: sediment here is composed of a composite weighted grain size average showing approximately 20% fines passing a U.S. no. 200 sieve. This is classified also as silty sand, with most grain sizes in fine grained range and some amount of medium grained sizes of sand. The approximate sand content is about 80% sand overall.

D. Area A Del Mar Channel: The existing sediment in this entire footprint is composed approximately of loose to medium dense, sub rounded to rounded Poorly Graded Sand with some Silt (SP-SM). Based on a composite weighted average of the entire footprint, this sediment is approximately 12% fines passing a U.S. no. 200 sieve, which amounts to an approximate sand content of 88%. One of the individual boreholes (OSHVC-17-A-02) sampled during the recent 2017 SAP sediment investigations contained fines of 47%, which is above the weighted average fines content for all three placement sites. The fines content in the rest of the boreholes (six out of seven) were all below this weighted average. Based on the composite weighted average analysis of the physical grain sizes, the entire sediment from Area A is compatible for all three placement sites. The area around borehole A-02 is of small volume (approximately 1,000 cubic yards) and is very small portion of the overall sediment to be dredged from this footprint which is very sandy in nature and thus will be very well mixed when dredged. Sediment from this footprint is therefore recommended to be placed at either of the three placement sites.

E. Area B Oceanside Channel: The existing sediment in this entire footprint is composed approximately of loose to medium dense, sub rounded to rounded Silty Sand (SM). Based on a composite weighted average of the entire footprint, this sediment is approximately 27% fines passing a U.S. no. 200 sieve, which amounts to an approximate sand content of 73%. Based on the composite weighted average analysis of the physical grain sizes, the entire sediment from Area B is compatible for the North Oceanside City Beach (north of Oceanside Pier) and Oceanside Beach Nearshore (South of the Pier) placement sites. It is just slightly not compatible for the Oceanside Beach (south of Oceanside Pier) placement site. The area around boreholes B-03 and B-04 is of small volume (approximately 3,000 cubic yards) and is very small portion of the overall sediment to be dredged from this footprint which is sandy in nature and thus will also be very well mixed when dredged. Sediment from this footprint is therefore recommended to be placed at the Oceanside Beach Nearshore or Oceanside Beach onshore (north of Oceanside Pier) placement sites. Sediment from around borehole B-04 is considered to be too fine for beach or nearshore placement and would not be dredged. The area is mostly at or below authorized depth, so this would not impact navigability. If future shoaling in this area requires dredging during the period covered by this EA, additional samples will be taken from the shoaled area and tested for grain size compatibility with the beach and nearshore areas. Chemical testing would only be done if a Tier 1 evaluation showed the need to conduct sediment chemistry analysis, e.g., if a spill or other event occurs in the harbor that could affect the suitability of the sediments for beach nourishment purposes. Excluding sediments from around Core B-04 from the suitability evaluation results in a determination that the remaining sediments are suitable for beach placement in the entire footprint as well as nearshore placement. This will be updated by results from the 2022 Sampling and Analysis Program.

F. Area C Entrance Channel: The existing sediment in this entire footprint is composed approximately of loose to medium dense, sub rounded to rounded Poorly Graded Sand with some Silt (SP-SM). Based on a composite weighted average of the entire footprint, this sediment is approximately 7% fines passing a U.S. no. 200 sieve, which amounts to an approximate sand content of 93%. All of the individual boreholes (OSHVC-17-C-01 and 07) sampled during the recent 2017 SAP sediment investigations contained very sandy sediment ranging from 5% to 10%, which is much above the weighted average fines content for all three placement sites. Based on the composite weighted average analysis of the physical grain sizes, the entire sediment from Area B is very sandy and very compatible for the North Oceanside City Beach (north of Oceanside Pier) and Oceanside Nearshore (South of the Pier) placement sites. Sediment from this footprint is therefore recommended to be placed at either of the two placement sites.

Dredgeability concerns will be minimal for this project. The majority of material to be dredged is composed of littoral sediment deposited within the past year or two in and adjacent to the entrance channel. Shoaled sediments located further from the entrance have typically been in place over five years but have not experienced significant consolidation. Relative densities are expected to be primarily loose and soft with some areas of medium dense and medium stiff.

Local Beaches. The preferred location for dredge materials is Oceanside Beach (Figure 4). Coastal erosion has become a great problem (Hamilton et. al., 1998), and nourishment would ensure that recreational and habitat (i.e., grunion spawning) uses of the beach would continue.

Upland and Contained Aquatic Disposal (CAD) Sites. No sites for upland disposal have been proposed to date. Because of high costs, physical restrictions, logistic problems with traffic/transportation and site selection, plus the high probability of incurring significant adverse impacts to the environment through permanent loss of littoral material, none of these alternatives were found to be feasible or appropriate. If future materials are found to be unacceptable for beach or near shore placement, material could be placed in the upland environment or in CAD sites. At this time, this alternative has been dismissed. In the event materials are unsuitable for beach or near shore placement, then additional NEPA documentation would be required to evaluate different upland, and/or CAD alternatives.

Other Potential Uses. No other potential beneficial end uses have been identified for the dredged material to date. If future uses are identified, additional NEPA documentation may be prepared to incorporate these additional uses at that time.

Structural alternatives were determined to be unacceptable. Although this approach may provide long-term shoreline stabilization, it will not alleviate immediate concerns. Therefore, the three structural alternatives remain eliminated from further consideration as part of this project.

3.1.2 Modified Proposed Action Alternative (Alternative 3).

The modified proposed action is shown in Figures 2 & 4. The dredging plan provides for maintaining the depth of the Entrance Channel and inner harbor down to -25 ft and -20 ft MLLW, respectively, with a portion of the Entrance Channel dredged down to -30 ft MLLW as advanced maintenance dredging. Dredged material would be placed on the beach or in the nearshore of Oceanside Beach, located south of the main Entrance Channel as shown in Figure 4. Additional equipment and pipeline storage areas and transportation corridors are proposed on Harbor Beach as shown on Figure 3. Water quality best management measures applicable to beach storage would apply to these additional areas as well.

Sediments placed by hydraulic cutterhead dredge require a pipeline from the dredge to the placement location along Oceanside Beach. The beach in front of the North Coast Village is generally too badly eroded to allow a pipeline corridor and must be renourished most years. This site is included as part of the beach placement area. A single placement area is proposed, starting at the northern boundary of the North Coast Village and extending to Wisconsin Avenue (Figure 1). Sand would be placed within the placement area as needed to restore eroded beaches until dredging is completed. Nourishment in the vicinity of the North Coast Village will be the first placement area, if needed, to route the pipeline past the North Coast Village to placement areas further south. Dredge material quantities for the area maximizes to approximately 500,000 cubic yards/year.

The duration of the proposed action would extend to June 2028, to match the expiration date for the Clean Water Act Section 401 Water Quality Certification issued by the San Diego Regional Water Quality Control Board, assuming no major change to environmental conditions at Oceanside Harbor that would warrant further environmental documentation. Prior to each three-year dredge contract cycle, appropriate review of the proposed site and the dredged materials would be evaluated to ensure compliance with the Inland Testing Manual requirements. Past sampling has shown only clean sands in the harbor channels. In the absence of any event contaminating harbor sediments, prior results have been accepted by the SC-DMMT for each three-year contract period. Prior to the start of the succeeding contract periods either a Tier I assessment will be conducted to evaluate potential changes, or a new sediment sampling program will be conducted, as appropriate.

3.1.3 No Action Alternative

The No Action alternative is no modification to the proposed project. Under this alternative, the USACE would implement the Proposed Action as described in the 2018 Final EA. This alternative will be carried forward in the analysis for comparative purposes, pursuant with NEPA.

4.0 ENVIRONMENTAL INVENTORY AND CONSEQUENCES

The Affected Environment at the project site is generally as described in the 2018 Final EA (USACE, 2018). Significance criteria specified in the 2018 Final EA (USACE, 2018) remain the same. Consequences have been updated to reflect the proposed modifications.

4.1 Oceanography and Water Quality

4.1.1 Affected Environment

Oceanographic and water quality conditions in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018). A Sampling and Analysis Program was conducted in 2018, the material in the dredge areas have been determined to be clean, beach-compatible sand. This determination was presented to the Southern California Dredged Material Management Team (SC-DMMT) on March 28, 2018, who concurred with the suitability determination. The USACE is in the process of retesting all sediments in 2022 prior to dredging in 2023.

There has been no contaminant episode, such as a spill, that could impact sediment quality in the dredge prism. Therefore, it is expected that ongoing sediment sampling and testing will show that the sediments remain to be clean, sand suitable for beach nourishment on Oceanside Beach and/or the nearshore placement area.

4.1.2 Environmental Consequences

4.1.2.1 Significance Criteria

An impact to Oceanography and Water Quality will be considered significant if: the project results in the release of toxic substances that would be deleterious to human, fish, or plant life; the project results in substantial impairment to beneficial recreational use of the project site; or discharges create a pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code.

4.1.2.2 Proposed Action (as modified)

Except as described herein, impacts to oceanography and water quality are as described in the 2018 Final EA (USACE, 2018). Precautions put into place for the storage and use of equipment on the newly proposed staging areas would prevent contaminants from entering the water or effecting the beach. There would be no new impacts to water quality as a result.

Dredging to a new authorized depth in the Advanced Maintenance Area in the Entrance Channel would result in a slight increase in dredge volume for the first dredge event only. Follow on years would dredge to the new authorized depth but would only remove the sand accumulated over the prior year, which would not be changed as a result of the new authorized depth. As a result, dredging may require an additional day in 2023. The maintenance dredging program would extend an additional three years, to June 2028.

Oceanographic and water quality impacts are considered less than significant; therefore, mitigation measures are not required.

4.1.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA for the Proposed Action.

4.2 Marine Resources

4.2.1 Affected Environment

Marine resources in the dredge and placement areas are essentially as described in the 2018 Final EA (USACE, 2018).

Green Sea Turtle (Chelonia mydas). There are two population centers of green sea turtles in southern California. The largest is located in south San Diego Bay where shallow waters and eelgrass beds create good conditions for green sea turtles. The second is in the Alamitos Bay/Anaheim Bay complex in Orange County. Warm effluent from an electrical generating plant in Alamitos Bay contributed to a thermal refuge for green sea turtles. A marine reserve attached to the Seal Beach Weapons Station has provided salt marsh with shallow channels and submerged aquatic vegetation that contributes to a second population center. Recent information on the movement of green sea turtles in the Alamitos Bay/Anaheim Bay complex as well as reports of strandings along the coast between San Diego and San Luis Obispo support the proposition that green sea turtles occasionally migrate along the coast. The sparsity of such reports also suggest that these are rare events.

Green sea turtles data in the Oceanside area have been provided to the USACE (Chesney, personal communication) for the period of 2015-2020. Sightings are limited to the following:

- Dead green sea turtle stranded on the beach south of the Oceanside harbor jetty; 2016
- Dead green sea turtle stranded on the beach south of the Oceanside harbor jetty; 2015.

4.2.2 Environmental Consequences

4.2.2.1 Significance Criteria

An impact to Marine Resources would be considered significant if: the population of a threatened, endangered, or candidate species is directly affected or its habitat lost or disturbed; if there is a net loss in value of a sensitive biological habitat including a marine mammal haul out site or breeding area, seabird rookery, or Area of Special Biological Significance (ASBS); if the movement or migration of fish is impeded; and/or if there is a substantial loss in the population or habitat of any native fish, wildlife, or vegetation (a substantial loss is defined as any change in a population which is detectable over natural variability for a period of 5 years or longer).

4.2.2.2 Proposed Action (Modified)

Except as discussed herein, impacts to marine resources are as described in the 2018 Final EA (USACE, 2018). Precautions put into place for the newly proposed equipment and pipeline storage areas would prevent contaminants from entering the water or affecting the nearby beach habitat. Expanded use of the beach as staging areas would result in short-term adverse impacts to the beach community directly affected. These areas are located above the highest tide and activities there would not affect spawning of California grunion. However, these beach areas receive high levels of recreational beach use year-round and support a reduced beach community as a result.

Dredging to a new authorized depth in the Advanced Maintenance Area in the Entrance Channel would result in a slight increase in dredge volume for the first dredge event only. Follow on years would dredge to the new authorized depth but would only remove the sand accumulated over the prior year, which would not be changed as a result of the new authorized depth. As a result, dredging may require an additional day in 2023. The maintenance dredging program would extend an additional three years, to June 2028.

Essential Fish Habitat

The USACE has determined that the modified Proposed Action, including the additional construction time, slightly deeper advanced maintenance dredge area, and beach placement volume, would not result in any substantial, adverse impacts to any species managed under the Coastal Pelagic Species Management Plan, Pacific Coast Groundfish Fishery Management Plan, or their habitat. Impacts, such as turbidity associated with the small increase in dredging and placement of dredged materials would be temporary and insignificant.

Threatened and Endangered Species

Impacts to threatened and endangered species are as described in the 2018 Final EA (USACE, 2018) with the exception that the construction period would extend for a day. The proposed monitoring and avoidance plan for western snowy plover would be prepared and implemented as described in the 2018 Final EA (USACE, 2018 Appendix E). Consultation has been reinitiated to cover expanded staging areas and transportation corridors.

Monitoring and avoidance measures for green sea turtles have been worked out in consultation with NMFS for earlier projects and their inclusion as part of the environmental commitments of the Modified Proposed Action represents continuing efforts for a consistent approach to green sea turtles in southern California by the USACE.

4.2.2.4 Environmental Commitments - Monitoring and Avoidance Measures for Green Sea Turtle

A qualified biologist or qualified monitor with experience monitoring green sea turtles and marine mammals must perform the following monitoring and avoidance protocols:

1. During dredging a qualified biologist with experience monitoring green sea turtles will be onboard the dredge to monitor for the presence of green sea turtles. The green sea turtle monitor will have the authority to cease or alter operations to avoid impacts to green sea turtles.
2. Adequate lighting will be provided during nighttime operations (i.e., dredging, dredge material transport and placement) to allow the monitor to observe the surrounding area effectively.
3. If a green sea turtle is observed within the vicinity of the project site during project operations, all appropriate precautions shall be implemented to avoid or minimize unintended impacts. These precautions include, but are not limited to:
   a. Cessation of dredging operations that is observed within 100 feet of a green sea turtle; and
   b. Operations may not resume until the green sea turtle has departed the monitoring zone by its own accord or has not been observed for a 15-minute period of time
4. Biological monitors will maintain a written log of all green sea turtle observations during project operations. This observation log will be provided to the NMFS as an attachment to the post-construction monitoring report for the project. Each observation log will contain the following information:
   a. Observer name and title;
   b. Type of construction activity: maintenance dredging;
   c. Date and time animal first observed (for each observation);
   d. Date and time observation ended (for each observation). A green sea turtle observation will terminate if (1) an animal is observed exiting the monitoring zone or (2) after a 15-minute period of no observation (assumption is that animal has exited, but was not observed to do so).
5. Location of monitor (latitude/longitude), direction of green sea turtle in relation to the monitor, and estimated distance (in meters) of green sea turtle to the monitor.
6. Nature and duration of equipment shutdown.
7. Any observations involving the potential "take" of green sea turtles will be reported to the USACE within 10 minutes of the incident and to the NMFS stranding coordinator immediately thereafter.

8. During the monitoring associated with this proposed project, the Corps should note marine mammal presence and any behaviors indicative of potential harassment under the MMPA. These behaviors could include startled response, irregular diving, or flushing from haul-out positions in the vicinity of the project area.

Construction is not expected to cause short- or result in long-term significant adverse marine resource impacts, including impacts listed species, net loss in value of any sensitive biological habitat, impedance to fish migration or movement, or any substantial loss in the population or habitat of any native fish, wildlife, or vegetation. Therefore, impacts associated with the Modified Proposed Action are considered to be short term and less than significant.

4.2.2.3 No Action alternative.

Impacts are the same as described in the 2018 Final EA for the Proposed Action.

4.3 Air Quality

4.3.1 Affected Environment

Air quality in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.3.2 Environmental Consequences

4.3.2.1 Significance Criteria

The applicability rates associated with the General Conformity Rule are used evaluate significance of impacts for the purpose of disclosure of the impact under NEPA. An impact to Air Quality would be considered significant if the project meets or exceeds the applicability rates for the SCAB provided in Tables 3 & 4.

4.3.2.2 Proposed Action (Modified)

Impacts to air quality are as described in the 2018 Final EA (USACE, 2018) with the exception that impacts would extend for an additional day. While emissions may extend into calendar year 2023, this evaluation treats them as occurring during the same calendar year as a conservative measure. If emissions were split over two calendar years total emissions per year would be reduced.

Air emissions calculations for this project are provided in Appendix D. Results are provided in Tables 3 and 4.

Table 3. Construction Air Emissions for Hydraulic Dredging

	VOC	CO	NO2	SOx	PM10	PM2.5	NOx
Peak Daily Emissions pounds)	12.6	56.6	27.5	25.1	7.0	7.1	27.5
Total Project Emissions (tons)	1.0	2.8	2.2	1.5	0.5	0.5	2.2
Applicability Rates (tons/year)	10	100	100	NA	100	70	10

SOx is in attainment in the SCAB, thus there are no applicability rates for this pollutant.

Table 4. Construction Air Emissions for Hopper Dredging

	VOC	CO	NO2	SOx	PM10	PM2.5	NOx
Peak Daily Emissions pounds)	57.6	623.8	216.8	17.2	33.7	33,3	216.8
Total Project Emissions (tons)	5.1	53.8	19.2	0.8	3.0	3.0	19.2
Applicability Rates (tons/year)	10	100	100	NA	100	70	10

SOx is in attainment in the SCAB, thus there are no applicability rates for this pollutant.

GHG Emissions. GHG emissions were estimated for the project. GHG emissions are provided in Table 5. Calculations are shown in Appendix D.

Table 5. Total GHG Emissions	
	Total Equivalent CO2
Daily Emissions (lbs/day)	24.3
Total Project Emissions (tons)	1.2

Further review of GHG emissions from the Proposed Action, as modified, is not warranted.

<u>4.3.2.2</u> <u>No Action alternative.</u>

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

Significant adverse air impacts are not expected. The Proposed Action will not: exceed the applicability rates if a hydraulic dredge is used. If a hopper dredge is used, which is considered to be highly unlikely, the applicability rate for NOx would be exceeded and further evaluation would be required.

<u>4.3.2.3 Environmental Commitments to Reduce Air Emissions</u>

- Construction equipment will be properly maintained to reduce emissions. These reduction measures are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

The inclusion of these measures will reduce emissions to the maximum extent feasible.

4.4 Noise

4.4.1 Affected Environment

Noise in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.4.2 Environmental Consequences

4.4.2.1 Significance Criteria

Project noise impacts would be considered significant if noise resulting from the project results in an increase of 10 dBA above background during the day or a night-time increase of 5 dBA above background. This is a short-term project and a perceived daytime doubling of noise levels is considered significant. A lower threshold is used for nighttime noise to reflect the increased sensitivity of people to nighttime sources of noise.

4.4.2.2 Proposed Action (Modified)

Impacts to noise are as described in the 2018 Final EA (USACE, 2018) with the exception that impacts would extend for an additional day. The Proposed Action, as modified, includes environmental commitments intended to reduce noise impacts. See 4.4.3 below. Dredging would occur 24 hours per day while beach operations would be limited to daylight hours (7:00 A.M and cease no later than 7:00 P.M., Monday through Saturday and not be permitted on Sundays nor holidays) to meet city noise ordinances.

4.4.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

Although short-term adverse noise impacts may occur, these impacts will not be significant. Long-term impacts will not occur.

4.4.4 Environmental Commitments

The following environmental commitments would be implemented to reduce noise as much as possible: all construction equipment shall be properly maintained and tuned to minimize noise emissions; and all equipment shall be fitted with properly operating mufflers, air intake silencers, and engine shrouds. These noise reduction measures are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

4.5 Cultural Resources

4.5.1 Affected Environment

Cultural resources in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.5.2 Environmental Consequences

4.5.2.1 Significance Criteria

The project would have a significant effect on cultural resources if it will disturb, remove from original context, or introduce incompatible elements out of character with any property considered eligible for the National Register of Historic Places.

4.5.2.2 Proposed Action (Modified)

Impacts to cultural resources are as described in the 2018 Final EA (USACE, 2018).

4.5.2.3 No Action alternative.

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

Significant adverse impacts to cultural resources are not expected.

4.6 Recreation Uses

4.6.1 Affected Environment

Recreation uses in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.6.2 Environmental Consequences

4.6.2.1 Significance Criteria

Impacts will be considered significant if the project results in a permanent loss of existing recreational uses.

4.6.2.2 Proposed Action (Modified)

Impacts to recreation uses are as described in the 2018 Final EA (USACE, 2018). The Proposed Action, as modified, includes environmental commitments intended to reduce impacts to recreation. See 4.6.3 below.

4.6.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

No significant adverse recreation use impacts are expected. Short-term impacts will be adverse, long term, beneficial.

4.6.4 Environmental Commitments

These environmental commitments are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

4.7 Ground Transportation

4.7.1 Affected Environment

Ground transportation in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.7.2 Environmental Consequences

4.7.2.1 Significance Criteria

A significant impact would occur if the proposed project results in: 1) inadequate parking facilities, 2) an inadequate access or on-site circulation system, or 3) the creation of hazardous traffic conditions.

4.7.2.2 Proposed Action (Modified)

Impacts to ground transportation are as described in the 2018 Final EA (USACE, 2018) with the exception that impacts would extend for an additional day.

4.7.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

Significant adverse ground transportation impacts are not expected.

4.8 Vessel Transportation and Safety

4.8.1 Affected Environment

Vessel transportation and safety in the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.8.2 Environmental Consequences

4.8.2.1 Significance Criteria

A significant impact would occur if the proposed project results in a substantial reduction of current safety levels for vessels in the Harbor. Safety impacts would be considered significant if activities present a navigational hazard to boat traffic or interfere with any emergency response or evacuation plans.

4.8.2.2 Proposed Action (Modified)

Impacts to vessel transportation and safety are as described in the 2018 Final EA (USACE, 2018). Following the tragic beach accident in 2021, additional safety measures were required for all beach activities, including Oceanside Harbor, to prevent future recurrences.

4.8.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action.

No significant adverse vessel safety impacts are expected.

4.9 Aesthetics

4.9.1 Affected Environment

Aesthetics of the dredge and placement areas are as described in the 2018 Final EA (USACE, 2018).

4.9.2 Environmental Consequences

4.9.2.1 Significance Criteria

The project would significantly impact the aesthetics if a landscape is changed in a manner that permanently and significantly degrades an existing viewshed or alters the character of a viewshed by adding incompatible structures.

4.9.2.2 Proposed Action(Modified)

Impacts to aesthetics are as described in the 2018 Final EA (USACE, 2018).

4.9.2.3 No Action Alternative

Impacts are the same as described in the 2018 Final EA (USACE, 2018) for the Proposed Action. **Aesthetic impacts will be temporary and adverse, but not significant.**

5.0 ENVIRONMENTAL COMPLIANCE AND COMMITMENTS

5.1 Compliance

5.1.1 National Environmental Compliance Act of 1969 (Public Law (PL) 91-190); National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.); Council on Environmental Quality Regulations for Implementing NEPA, 40 CFR Parts 1500 to 1508; USACE Regulations for Implementing NEPA, 33 CFR Part 230.

The National Environmental Compliance Act includes the improvement and coordination of Federal plans to attain the widest range of beneficial uses of the environment and to achieve a balance between population and resource use permitting high standards of living and a wide sharing of life's amenities.

The NEPA was established to ensure that environmental consequences of federal actions are incorporated into Agency decision-making processes. It establishes a process whereby parties most affected by impacts of a proposed action are identified and opinions solicited. The proposed action and several alternatives are evaluated in relation to their environmental impacts, and a tentative selection of the most appropriate alternative is made.

This SEA has been prepared to address impacts and develop mitigation (if warranted) associated with modifications to the Proposed Action. Similar to the EIS process, the Draft SEA is circulated for public review and appropriate resource agencies, environmental groups, and other interested parties provide comment on document adequacy. Comment responses are incorporated into the Final SEA and the USACE District Engineer signs a FONSI, if it is determined the Federal action will not have a significant impact on the quality of the human environment. Subsequently, the Final SEA and FONSI are made available to the public. If it is determined the Federal action will have a significant impact upon the quality of the human environment, an EIS must be prepared.

5.1.2 Clean Water Act of 1972 (33 USC 1251 et seq.)

The Clean Water Act (CWA) was passed to restore and maintain chemical, physical, and biological integrity of the Nation's waters. Specific sections of the CWA control the discharge of pollutants and wastes into aquatic and marine environments. The major sections of the CWA that apply to the proposed project is Section 401, which requires certification that the discharges comply with the State Water Quality Standards for actions within state waters, and Section 404(b)(1), which establishes guidelines for discharge of dredged or fill materials into an aquatic ecosystem. Although Sections 401 and 404(b)(1) of the CWA apply, by their own terms, only to applications for Federal permits, the USACE has, by regulation, made them applicable to their own projects. This policy is set out in USACE regulations at 33 CFR Part 336. Section 336.1(a) of that regulation states, "Although the USACE does not process and issue permits for its own activities, the USACE authorizes its own discharges of dredge or fill material by applying all applicable substantive legal requirements, including public notice, opportunity for public hearing, and application of the Section 404(b)(1) guidelines." The USACE applied for and received a Section 401 Water Quality Certification and prepared a Section 404(b)(1) Analysis for the original proposed action. A modification to the Section 401 Water Quality Certification will be proposed to the San Diego County Regional Water Quality Control Board to address project modifications. A copy of the 404(b)(1) Evaluation is included in Appendix B in this Draft SEA. Compliance is pending.

5.1.3 Endangered Species Act of 1973 (16 USC 1531 et seq.)

Under ESA Section 7(a)(2), each federal agency must ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the species' designated critical habitat (16 U.S.C. § 1536(a)(2)). If an agency determines that its actions "may affect" a listed species or its critical habitat, the agency must conduct informal or formal consultation, as appropriate, with either the USFWS or the NMFS, depending on the species at issue (50 C.F.R. §§402.01, 402.14(a)– (b)). If, however, the action agency independently determines that the action would have "no effect" on listed species or critical habitat, the agency has no further obligations under the ESA.

Western snowy plover may occur on the placement site beach. The USACE determined the Proposed Action, as modified, may affect but is unlikely to adversely affect western snowy plover. A monitoring and avoidance plan will be prepared, in coordination with the USFWS, CDFW, and CCC to ensure that western snowy plovers are not harassed or injured. Informal consultation with the USFWS is in progress.

The USACE has determined the modified Proposed Action, which includes environmental commitments described in 4.2.2.4 above, would have no effect on green sea turtles. Consultation is not required.

5.1.4 Coastal Zone Management Act of 1976 (16 USC 1456 et seq.)

Under the Coastal Zone Management Act (CZMA), any federal agency conducting or supporting activities directly affecting the coastal zone must demonstrate the activity is, and proceed in a manner, consistent with approved State's Coastal Zone Management Program, to the maximum extent practicable. As no federal agency activities are categorically exempt from this requirement, the USACE has prepared and received concurrence from the California Coastal Commission for the necessary negative determination (ND-0033-18, September 28, 2018) for the original project. A modification to the original negative determination will be proposed to the California Coastal Commission to address project modifications.

5.1.5 Clean Air Act of 1969, as amended (42 USC 7401 et seq

Air quality regulations were first promulgated with the Clean Air Act (CAA). The CAA is intended to protect the Nation's air quality by regulating emissions of air pollutants. Section 118 of the CAA requires that all Federal agencies engaged in activities that may result in the discharge of air pollutants comply with state and local air pollution control requirements. Section 176 of the CAA prohibits federal agencies from engaging in any activity that does not conform to an approved State Implementation Plan.

The CAA established the NAAQS and delegated enforcement of air pollution control to the states. In California, the Air Resources Board (ARB) has been designated as the state agency responsible for regulating air pollution sources at the state level. The ARB, in turn, has delegated the responsibility of regulating stationary emission sources to local air pollution control or management districts that, for the proposed project, is the South Coast Air Quality Management District (SCAQMD).

The CAA states that all applicable federal and state ambient air quality standards must be maintained during the operation of any emission source. The CAA also delegates to each state the authority to establish their own air quality rules and regulations. State adopted rules and regulations must be at least as stringent as the mandated federal requirements. In states where the NAAQS are exceeded, the CAA requires preparation of a State Implementation Plan (SIP) that identifies how the state will meet standards within timeframes mandated by the CAA.

The 1990 CAA established new nonattainment classifications, new emission control requirements, and new compliance dates for areas presently in nonattainment of the NAAQS, based on the design day value. The design day value is the fourth highest pollutant concentration recorded in a 3-year period. The requirements and compliance dates for reaching attainment are based on the nonattainment classification.

One of the requirements established by the 1990 CAA was an emission reduction amount, which is used to judge how progress toward attainment of the ozone standards is measured. The 1990 CAA requires areas in nonattainment of the NAAQS for ozone to reduce basin wide VOC emissions by 15 percent for the first 6 years and by an average 3 percent per year thereafter until attainment is reached. Control measures must be identified in the SIP, which facilitates reduction in emissions and show progress toward attainment of ozone standards.

The 1990 CAA states that a federal agency cannot support an activity in any way unless it determines the activity will conform to the most recent EPA-approved SIP. This means that Federally supported or funded activities will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any standard; or (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176 of the 1990 CAA, the EPA promulgated the final conformity rule for general Federal actions in the November 30, 1993 and revised the regulations effective July 6, 2010.

Project NOx emissions are not expected to equal or exceed the general conformity applicability rates with use of a hydraulic dredge. However, NOx emissions are expected to exceed the general conformity applicability rates with use of a hopper dredge. This is unlikely. A general conformity determination is not required if a hydraulic dredge is used. A general conformity determination would be required in the unlikely event that a hopper dredge is used and would be conducted. Therefore, the project is consistent with the SIP and meets the requirements of Section 176(c).

5.1.6 National Historic Preservation Act of 1966, as amended (54 USC 3000100 et seq.)

The purpose of the National Historic Preservation Act (NHPA) is to preserve and protect historic and prehistoric resources that may be damaged, destroyed, or made less available by a project. Under this Act, federal agencies are required to identify cultural or historical resources that may be affected by a project and to consult with the State Historic Preservation Officer (SHPO) when a federal action may affect cultural resources.

The USACE has determined that Stage 13 does not have the potential to cause effects to National Register eligible or listed properties. The current project will be in compliance with Section 106 of the National Historic Preservation Act pursuant to 36 CFR 800.

Additional consultation is being conducted to address project modifications with the SHPO. The initial determination by the USACE is that the project modifications would not result in any affect to cultural resources. Concurrence from SHPO is expected and will be documented as part of the Final SEA.

If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.13, *Discovery of Properties During Implementation of an Undertaking*, are met.

5.1.7 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) requires the USACE to consult with the U. S. Fish and Wildlife Service whenever the waters of any stream or other body of water are proposed to be impounded, diverted, or otherwise modified. Coordination efforts will continue in order to fulfill the requirements of the FWCA; at this time, we are in full compliance with its provisions.

5.1.8 Magnuson-Stevens Fishery Conservation and Management Act, as amended

The SEA contains an EFH Assessment as required by the Magnuson-Stevens Act. Although construction will occur within Essential Fish Habitat, the USACE has determined that the proposed project would not result in a substantial, adverse impact. In compliance with the coordination and supplemental consultation requirements of the Act, the USACE has reinitiated consultation with NMFS for the proposed modifications. Compliance with the Act is pending.

5.1.9 Executive Order 12898. Environmental Justice

E.O. 12898 focuses Federal attention on the environment and human health conditions of minority and low-income communities and calls on agencies to achieve environmental justice as part of its mission. The order requires the USEPA and all other Federal agencies (as well as state agencies receiving Federal funds) to develop strategies to address this issue as part of the NEPA process. The agencies are required to identify and address, as appropriate, any disproportionately high and adverse human health or environmental impacts of their programs, policies, and activities on minority and low-income populations. The order makes clear that its provisions apply fully to programs involving Native Americans. The CEQ has oversight responsibility for the Federal government's compliance with E.O. 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. According to the CEQ's Environmental Justice Guidance Under the National Environmental Policy Act, agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse human health or environmental impacts (CEQ 1997).

An analysis of demographic data was conducted to derive information on the approximate locations of low-income and minority populations in the affected area. This analysis was performed using the USEPA's Environmental Justice Screening and Mapping Tool (EJSCREEN; EPA 2020). Because the analysis considers disproportionate impacts, two areas must be defined to facilitate comparison between the area directly affected and a larger regional area that serves as a basis for comparison and includes the area actually affected. The larger regional area is defined as the smallest political unit that includes the affected area and is called the community of comparison. For purposes of this analysis, the affected area is an approximate one-mile radius around the project area. The community of comparison is the city of Oceanside.

E.O. 12898 defines a minority as an individual belonging to one of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of this environmental justice analysis, is identified when the minority population of the potentially affected area is greater than 50 percent or the minority population is meaningfully greater than the general population or other appropriate unit of geographic analysis. The E.O. does not provide criteria to determine if an affected area consists of a low-income population. For purposes of this SEA, the CEQ criterion for defining low-income population has been adapted to identify whether or not the population in an affected area constitutes a low-income population. An affected geographic area is considered to consist of a low-income population (i.e., below the poverty level, for purposes of this analysis) where the percentage of low-income persons: 1) is greater than 50%, or 2) is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis.

USEPA's EJScreen tool was used to obtain the study area demographics. Table 6 provides a summary of the study area demographics, complete EJScreen Reports can be found in Appendix E.

Table 6. Study Area Demographics

Demographic Affected	Affected Area	State	City of Oceanside
Minority Population	51%	63%	55%
Low-income Population	33%	29%	26%

The minority population in the project area exceeds 50 percent, therefore we have a minority population in the project area. The affected area minority population percentage is not greater than the minority population percentage in the state of California as a whole, which is approximately 63 percent, nor is it not greater than the city of Oceanside, which is 55 percent.

As shown in the table above, 33 percent of the individuals in the affected area are considered below the poverty level. This percentage in the affected area does not exceed 50 percent. In addition, the affected area low-income population percentage is not greater than the low-income population in the city, which is 26 percent, or the state of California, which is 42 percent. Therefore, the affected area does not contain a high concentration of low-income population.

The project area includes an EJ community. However, project impacts are restricted to construction impacts. Construction impacts are in the Harbor and on area beaches both of which are located relatively remotely from any potential project impacts. The minority population would, therefore, not be directly affected by the project. Therefore, there would not be disproportionately high and adverse human health or environmental impacts on minority populations.

5.2 Environmental Commitments

Environmental commitments are as described in the 2018 Final EA (USACE, 2018) with the addition of the following measures to ensure project activities do not affect green sea turtle. A monitoring and avoidance plan will be prepared, in coordination with the NMFS, to ensure that green sea turtles are not affected including the following measures.

A qualified biologist or qualified monitor with experience monitoring green sea turtles and marine mammals must perform the following monitoring and avoidance protocols:

1. During dredging a qualified biologist with experience monitoring green sea turtles will be onboard the dredge to monitor for the presence of green sea turtles. The green sea turtle monitor will have the authority to cease or alter operations to avoid impacts to green sea turtles.
2. Adequate lighting will be provided during nighttime operations (i.e., dredging, dredge material transport and placement) to allow the monitor to observe the surrounding area effectively.
3. If a green sea turtle is observed within the vicinity of the project site during project operations, all appropriate precautions shall be implemented to avoid or minimize unintended impacts. These precautions include, but are not limited to:

a. Cessation of dredging operations that is observed within 100 feet of a green sea turtle; and

b. Operations may not resume until the green sea turtle has departed the monitoring zone by its own accord or has not been observed for a 15-minute period of time

4. Biological monitors will maintain a written log of all green sea turtle observations during project operations. This observation log will be provided to the NMFS as an attachment to the post-construction monitoring report for the project. Each observation log will contain the following information:

   a. Observer name and title;

   b. Type of construction activity: maintenance dredging;

   c. Date and time animal first observed (for each observation);

   d. Date and time observation ended (for each observation). A green sea turtle observation will terminate if (1) an animal is observed exiting the monitoring zone or (2) after a 15-minute period of no observation (assumption is that animal has exited but was not observed to do so).

5. Location of monitor (latitude/longitude), direction of green sea turtle in relation to the monitor, and estimated distance (in meters) of green sea turtle to the monitor.

6. Nature and duration of equipment shutdown.

7. Any observations involving the potential "take" of green sea turtles will be reported to the USACE within 10 minutes of the incident and to the NMFS stranding coordinator immediately thereafter.

8. During the monitoring associated with this proposed project, the Corps should note marine mammal presence and any behaviors indicative of potential harassment under the MMPA. These behaviors could include startled response, irregular diving, or flushing from haul-out positions in the vicinity of the project area.

6.0 CUMULATIVE IMPACT ANALYSIS

NEPA requires that cumulative impacts of the proposed action be analyzed and disclosed. Cumulative impacts are impacts on the environment that would result from the incremental effect of the proposed action when combined with other past, present, and reasonably foreseeable planned and proposed actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Geographic scope of this analysis are the federal channels and the beach placement area.

Cumulative impacts remain unchanged from the 2018 Final EA (USACE, 2018) with the exception that construction impacts would occur over an additional day.

7.0 REFERENCES

Bredvik, Jessica J.; Graham, Suzanne E.; Saunders, Brendan P. 2019. Green Sea Turtle Satellite Tagging in Support of Naval Weapons Station Ammunition Pier and Turning Basin. Prepared for Naval Facilities Engineering Command (NAVFAC) Southwest. Submitted to National Marine Fisheries Service, California, September 2019.

Hamilton, M., Avendono, c., Gibson, D., Flick, R.E., and M.H.S. Elwany. 1998. Monitoring of Sand Disposed in the Nearshore Environment. Data Report No.1, 1 March 1997 - 30 April 1998. Center for Coastal Studies. Scripps Institution of Oceanography (SIO), La Jolla, California. SIO Reference Series No. 98-15, 10 August 1998.

Hanna, M.E., J. Bredvik, S.E. Graham, B. Saunders, J.A. Seminoff, T. Eguchi and C. Turner Tomaszewicz. 2020. Movements and habitat use of green sea turtles at the Seal Beach National Wildlife Refuge, CA. Prepared for Naval Weapons Station Seal Beach, California, September 2020.

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Long, E.R., McDonald, D.D., Smith, S.L., and ED. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management 19: 81-97.

USACE (U.S. Army Corps of Engineers). 1989. Feasibility Report Storm Damage Reduction and Navigation Improvements Oceanside Harbor San Diego County CA Final Report. March.

USACE (U.S. Army Corps of Engineers, Los Angeles District), 2018. Final Environmental Assessment Oceanside Harbor Maintenance Dredging.

8.0 ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
ARB	Air Resources Board
CAA	Clean Air Act
CEQ	Council on Environmental
CoE	Chief of Engineers
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
cy	cubic yard
dB	decibel
dBA	decibel (A weighted scale)
DO	dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
Final EA	Final Environmental Assessment
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
MLLW	mean lower low water
mcy	million cubic yards
NEPA	National Environmental Policy Agency
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
SBNWS	Seal Beach Naval Weapons Station
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
USACE	U.S. Army Corps of Engineers, Los Angeles District
USFWS	U.S. Fish and Wildlife Service

9.0 PREPARERS/REVIEWERS

9.1 Preparers

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Danielle Storey	USACE, Archeologist, Regional Planning Section

9.2 Reviewers

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Susie Ming	USACE, Programs and Project Management
Tiffany Bostwick	USACE, Chief Environmental Resources Branch
Hayley Lovan	USACE, Chief, Ecosystem Planning Section
John Hale	USACE, Archeologist, Regional Planning Section

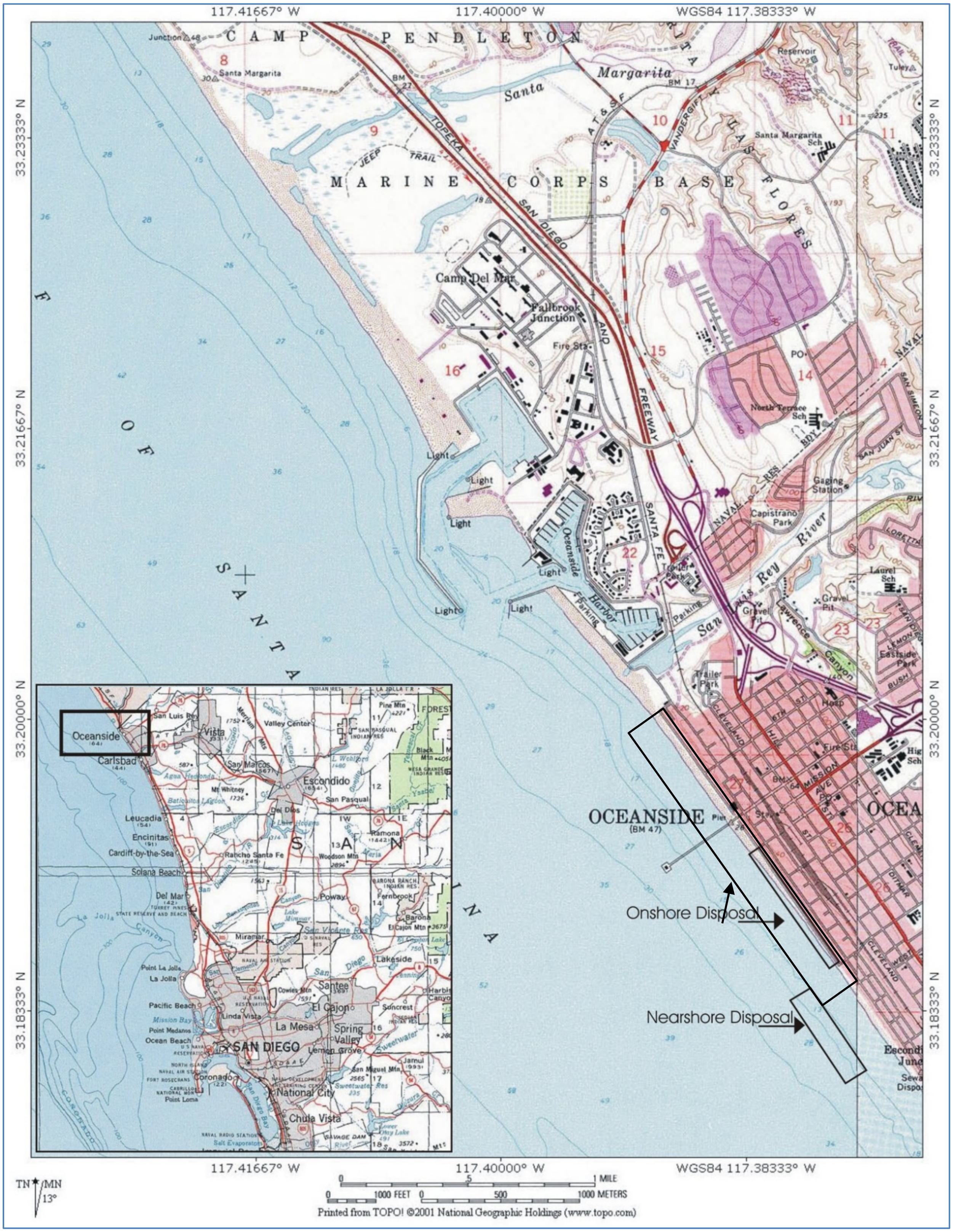
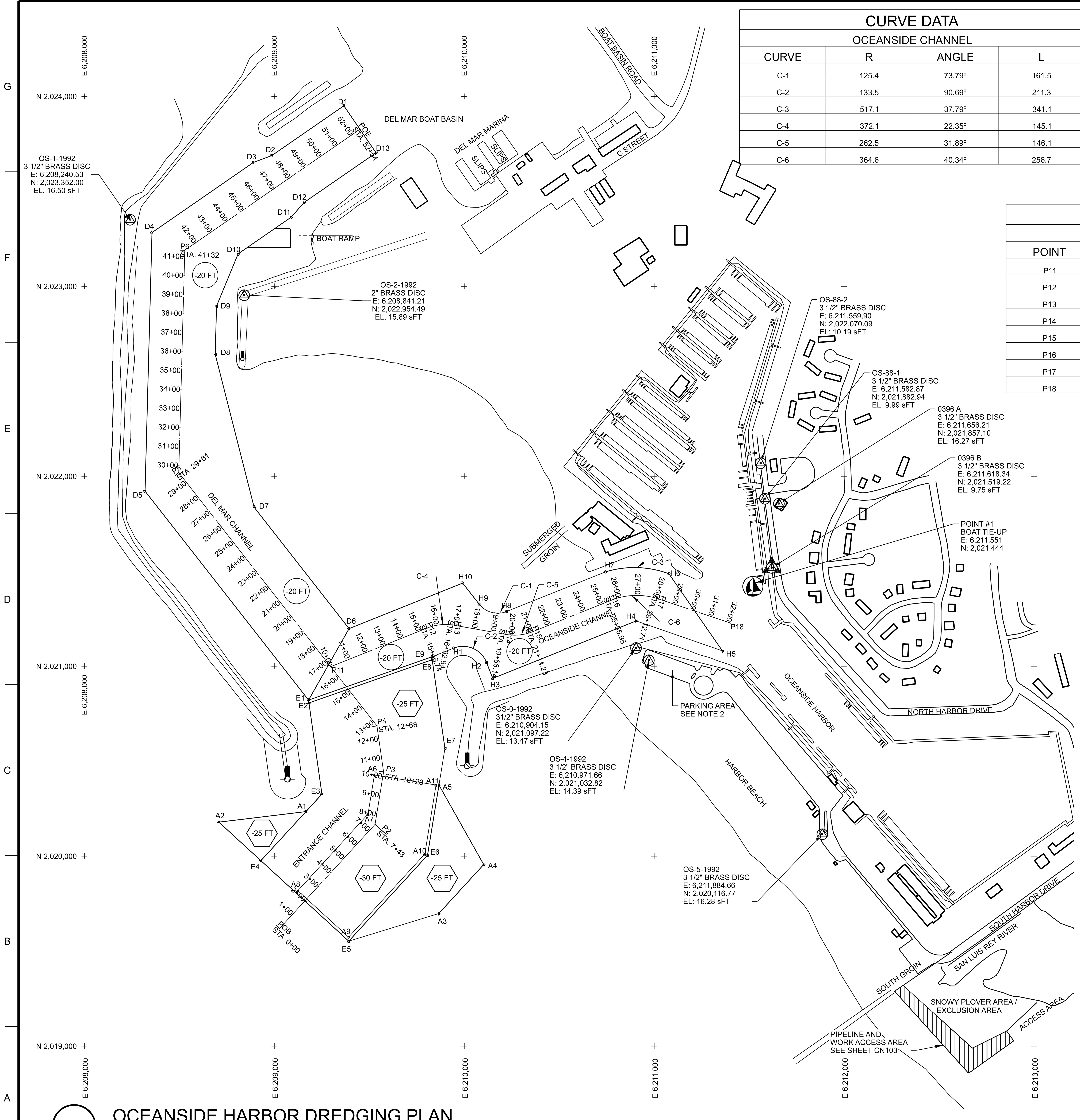


Figure 1. Location of Oceanside Harbor.



CURVE DATA

OCEANSIDE CHANNEL

CURVE	R	ANGLE	L
C-1	125.4	73.79°	161.5
C-2	133.5	90.69°	211.3
C-3	517.1	37.79°	341.1
C-4	372.1	22.35°	145.1
C-5	262.5	31.89°	146.1
C-6	364.6	40.34°	256.7

CHANNEL ALIGNMENT COORDINATES

ENTRANCE CHANNEL AND DEL MAR CHANNEL

POINT	STATION	EASTING	NORTHING
POB	0+00	6,209,027.51	2,019,619.65
P2	7+43.5	6,209,529.94	2,020,167.67
P3	10+23.0	6,209,574.99	2,020,443.59
P4	12+68.3	6,209,450.16	2,020,686.32
P5	29+61.3	6,208,496.72	2,022,019.58
P6	41+32.3	6,208,528.28	2,023,190.18
POE	52+53.5	6,209,450.92	2,023,827.26

CHANNEL ALIGNMENT COORDINATES

OCEANSIDE CHANNEL

POINT	TYPE	STATION	EASTING	NORTHING
P11	POB	10+00	6,209,296.39	2,020,997.82
P12	PC	15+46.7	6,209,803.90	2,021,201.19
P13	PT	16+91.9	6,209,947.36	2,021,215.98
P14	PC	19+67.2	6,210,218.43	2,021,167.91
P15	PT	21+13.3	6,210,361.88	2,021,182.70
P16	PC	25+56.1	6,210,771.91	2,021,349.99
P17	PT	28+12.8	6,211,023.29	2,021,354.28
P18	POE	32+10.1	6,211,400.06	2,021,228.12

SURVEY CONTROL POINTS

OCEANSIDE HARBOR

POINT	EASTING	NORTHING	ELEVATION
OS-0-1992	6,210,904.15	2,021,097.22	13.47
OS-1-1992	6,208,240.53	2,023,352.00	16.50
OS-2-1992	6,208,841.21	2,022,954.49	15.89
OS-4-1992	6,210,971.66	2,021,032.82	14.39
OS-5-1992	6,211,884.66	2,020,116.77	16.28
OS-88-1	6,211,582.87	2,021,882.94	9.99
OS-88-2	6,211,559.90	2,022,070.09	10.19
0396 A	6,211,656.21	2,021,857.10	16.27
0396 B	6,211,618.34	2,021,519.22	9.75
POINT #1	6,211,551	2,021,444	N/A

CHANNEL LIMIT COORDINATES

POINT	EASTING	NORTHING
ENTRANCE CHANNEL		
E1	6,209,179.90	2,020,821.90
E2	6,209,182.02	2,020,807.05
E3	6,209,250.60	2,020,327.10
E4	6,208,929.40	2,019,976.70
E5	6,209,391.71	2,019,552.80
E6	6,209,394.28	2,020,646.93
E7	6,209,898.00	2,020,567.70
E8	6,209,830.94	2,021,034.74
E9	6,209,828.81	2,021,049.59
ADVANCE MAINTENANCE -25 FT MLLW WEST EXTENSION		
A1	6,209,166.10	2,020,234.90
A2	6,208,708.20	2,020,179.40
E3	6,208,929.40	2,019,976.70
ADVANCE MAINTENANCE -25 FT MLLW EAST EXTENSION		
E5	6,209,391.71	2,019,552.80
A3	6,209,865.38	2,019,698.17
A4	6,210,102.20	2,019,956.40
A5	6,209,866.49	2,020,374.85
E6	6,209,394.28	2,020,646.93
ADVANCE MAINTENANCE -30 FT MLLW AREA		
A6	6,209,526.82	2,020,428.10
A7	6,209,493.11	2,020,221.65
A8	6,209,123.62	2,019,818.63
A9	6,209,390.79	2,019,573.99
A10	6,209,791.93	2,020,011.54
A11	6,209,851.33	2,020,375.11
DEL MAR CHANNEL		
D1	6,209,365.80	2,023,950.60
D2	6,208,986.80	2,023,688.90
D3	6,208,889.80	2,023,652.40
D4	6,208,355.70	2,023,283.30
D5	6,208,319.00	2,021,922.00
E1	6,209,179.90	2,020,821.90
D6	6,209,393.30	2,021,198.30
D7	6,208,893.30	2,021,837.30
D8	6,208,688.60	2,022,642.00
D9	6,208,695.40	2,022,896.00
D10	6,208,809.10	2,023,171.20
D11	6,209,088.80	2,023,364.50
D12	6,209,156.80	2,023,441.90
D13	6,209,535.30	2,023,703.50
OCEANSIDE CHANNEL		
E1	6,209,179.90	2,020,821.90
E9	6,209,828.81	2,021,049.59
H1	6,209,944.70	2,021,096.00
H2	6,210,117.30	2,021,019.70
H3	6,210,149.70	2,020,936.10
H4	6,210,904.70	2,021,238.60
H5	6,211,358.68	2,021,081.21
H6	6,211,077.20	2,021,486.90
H7	6,210,742.40	2,021,496.80
H8	6,210,222.90	2,021,288.60
H9	6,210,077.50	2,021,327.70
H10	6,209,991.20	2,021,437.90
D6	6,209,393.30	2,021,198.30

LEGEND

-25 FT — ADVANCE MAINTENANCE GRADE, PAY VOLUME DOES NOT INCLUDE OVERDEPTH DREDGING

-20 FT — PROJECT GRADE, PAY VOLUME ALLOWS FOR 2 FEET OF ADDITIONAL OVERDEPTH DREDGING

GENERAL SHEET NOTES

1. SEE SPECIFICATIONS FOR AVAILABLE VIBRA-CORE BORING LOGS AND LOCATIONS.
2. COORDINATE WITH CITY OF OCEANSIDE HARBOR MANAGER REGARDING CONTRACTOR'S PARKING AREA AND TRAILER STORAGE AREA.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: C. HAYWARD
DRAWN BY: C. HAYWARD
CHECKED BY: J. RYAN
SUBMITTED BY: OLUFUNKE A. OJURI, P.E.
SIZE: ANSI D
ISSUE DATE: JANUARY 2022
SOLICITATION NO.: W912PL-22-R-0008
CONTRACT NO.:
FILE NAME: C-0155
CAD FILE: 112812_CN101.dgn

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
LOS ANGELES, CALIFORNIA

SAN DIEGO COUNTY, CALIFORNIA
OCEANSIDE HARBOR
MAINTENANCE DREDGING

DREDGING PLAN AND SURVEY CONTROL

SHEET ID

CN101

A1 OCEANSIDE HARBOR DREDGING PLAN

SCALE: 1" = 300'

Figure 2 Oceanside Harbor Federal Channels

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Figure 3 Staging Areas

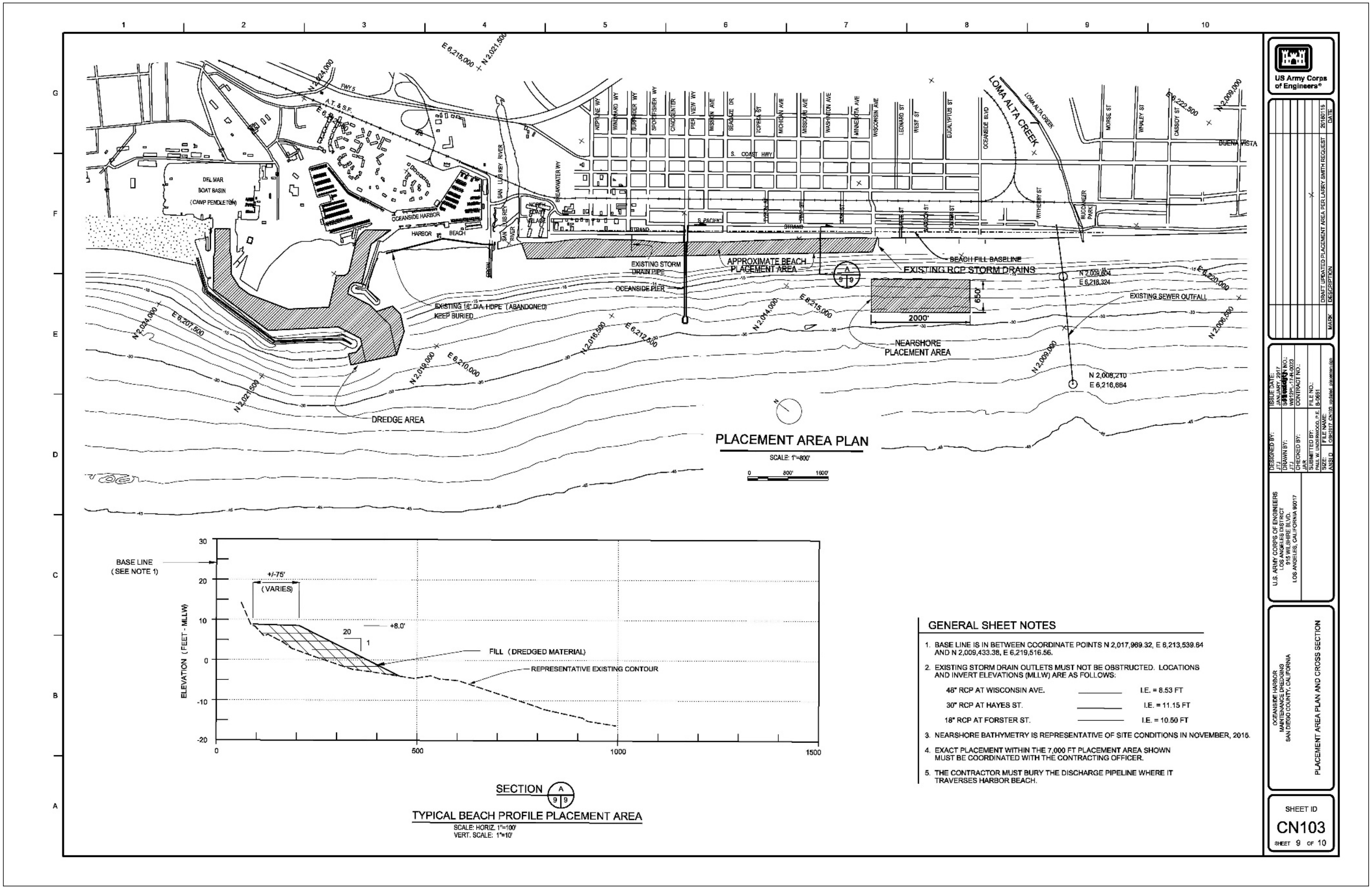

Figure 4 Dredge, Beach Placement, and Nearshore Placement Areas

Appendix A
Mailing List

California Department of Boating & Waterways
2000 Evergreen Street, Suite 100
Sacramento, CA 95815

Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

The Resources Agency of California
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Sacramento, CA 95814

San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, California 92131

State Clearing House
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Sacramento, CA 95814

State Lands Commission
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Sacramento, CA 95852-8202

State of California Department of Transportation
District 11
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San Diego, CA 92110

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Sacramento, CA 95814

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Bryant Chesney
National Marine Fisheries Service
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Appendix B
404(b)(1) Evaluation

THE EVALUATION OF THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO THE WATERS OF THE UNITED STATES IN SUPPORT OF THE SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR THE OCEANSIDE HARBOR MAINTENANCE DREDGING PROJECT LOCATED IN SAN DIEGO COUNTY, CALIFORNIA

I. INTRODUCTION. The following evaluation is provided in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharges of dredged or fill material into waters of the U.S. As such, it is not meant to stand-alone and relies heavily upon information provided in the environmental document to which it is attached. Citation in brackets [] refer to expanded discussion found in the Supplemental Environmental Assessment (SEA), to which the reader should refer for details. This analysis focuses on modifications to the project.

II. PROJECT DESCRIPTION. [1.1]

a. Location. [1.1.1] The proposed project is located in San Diego County and consists of maintenance dredging of the federal navigation channels in Oceanside Harbor.

b. General Description. [3.2.2] The plan provides for maintaining the depth of the entrance channel and inner harbor down to -25 ft and -20 ft MLLW, respectively; with a portion of the Entrance Channel dredged to -30 ft MLLW. The area around core B-04 would not be dredged. This area is identified as the area east of Station 27+00 as shown on Figure 2. Dredged material would be placed on the beach or in the near shore of Oceanside Beach, located south of the main entrance channel. The proposed six-year project includes annual dredging of up to approximately 500,000 cubic yards of littoral drift material from the harbor, the exact amount to be determined by need and funding, by a cutterhead hydraulic pipeline dredge, a hopper dredge, or a mechanical clamshell dredge.

Modifications: Add equipment and pipeline storage areas and transportation corridors on Harbor Beach. Deepen a portion of the advanced maintenance portion of the Entrance Channel to a newly authorized depth of -30 ft MLLW.

c. Authority and Purpose. [1.1.6] The Rivers and Harbors Act of 1899, as amended in 1965 (House Document 76, PL 89-298) authorized the USACE to maintain channel depths in Oceanside Harbor.

d. General Description of Dredged or Fill Material. [4.1.1.6]

(1) General Characteristics of Material: Water and sediment quality in the dredge and placement areas are as described in the 2018 Final EA. A Sampling and Analysis Program was conducted in 2018, the material in the dredge areas have been determined to be clean, beach-

compatible sand. The USACE is in the process of retesting all sediments prior to dredging in 2023.

(2) Quantity of Material: annual dredging of up to approximately 500,000 cubic yards of littoral drift material from the harbor.

(3) Source of Material: Oceanside Harbor Federal Channels.

e. Description of the Proposed Discharge Site [1.1.1 & 4.1.1.6]: Dredged material would be placed on Oceanside Beach in an area approximately 3,500 linear feet in length. The characteristic habitat type subject to impact by dredge material discharge is open-coast sandy beach and nearshore subtidal soft-bottom, sandy habitat. Material would be dredged from 52 acres of existing harbor bottom, consisting of unconfined, open water. Bottom type is poorly graded, fine to medium sands.

f. Description of Dredging and Disposal Methods: [1.1.5] Material would be dredged and transported via a hydraulic pipeline.

g. Timing and duration of Discharge [1.1.3] Dredging and beach nourishment would take approximately 3 weeks. Construction is scheduled to occur each year in the spring.

III. FACTUAL DETERMINATIONS.

a. Physical Substrate Determinations:

(1) Substrate Elevation and Slope.

Current bottom elevations in the federal channels range from -15’ to -25’ MLLW. The area is relatively flat with stable side slopes that have existed since the harbor was created back in 1942.

(2) Sediment type.

Geotechnical studies indicate that the sediment consists primarily of poorly graded sands. Dredged sediments are expected to be compatible with existing beach materials. Sediments were determined to be suitable for beach placement by the USACE in consultation with the SC-DMMT. This determination is still valid based on recent consultation with the SC-DMMT. Additional testing is being conducted in early 2023 prior to the next dredge event.

(3) Dredged Material Movement.

Dredged material would be placed onshore at Oceanside Beach. Sands are expected to move downcoast nourishing those beaches as well mimicking the natural process that was interrupted by Oceanside Harbor port development and San Luis Rey flood control river channelization projects.

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.).

Temporary, short-term impacts would occur at both the dredge site and beach placement area. Dredging would remove benthic organisms from the federal channels. This area is expected to recover in the short term by colonization from adjacent areas. Beach organisms would be buried by placement of sand. This area would also recover over the short term by colonization from adjacent areas. Portions of the beach are cobble at the start of each dredge cycle. Restoring a sandy beach results in improved habitat for sandy beach organisms and restores a suitable spawning beach for California grunion as well. However, no long-term, adverse significant impacts are expected. Minor turbidity levels may exist in the immediate vicinity of the dredging area and placement operations that may result in minor, temporary reductions in dissolved oxygen.

(5) Other Effects.

None.

(6) Actions Taken to Minimize Impacts (Subpart H).

Needed: __X__ YES ___ NO

Weekly monitoring of water quality to control turbidity and to monitor dissolved oxygen levels during placement would occur. If turbidity exceeds set standards and/or dissolved oxygen fall below a set standard of 5 mg/l, placement would be evaluated, and modifications would be made to get back into compliance.

If needed, Taken: __X__ YES ____ NO

A water quality monitoring plan would be part of the construction contract and would be coordinated with the Regional Water Quality Control Board, San Diego Region.

b. Water Circulation, Fluctuation, and Salinity Determinations:

(1) Water (refer to 40 CFR sections 230.11(b), 230.22 Water, and 230.25 Salinity Gradients; test specified in Subpart G may be required). Consider effects on salinity, water chemistry, clarity, odor, taste, dissolved gas levels, nutrients, eutrophication, others.

The Proposed Action, as modified is not expected to adversely affect water circulation, fluctuation, and/or salinity. Only clean, compatible sands from the project would be used for the nearshore placement. These sands are not a source of contaminants. Minor turbidity levels may exist in the immediate vicinity of the dredging and placement operations that may result in minor, temporary reductions in dissolved oxygen. Sands will not be a source of nutrients; thus eutrophication is not expected to result. Water used to entrain sands will be sea water as is water adjacent to nearshore placement, thus there will be no effect on salinity levels.

(2) Current Patterns and Circulation (consider items in sections 230.11(b), and 230.23), Current Flow, and Water Circulation.

The Proposed Action, as modified, is not expected to adversely affect current patterns or circulation. Circulation and current patterns in the project area are determined by a combination of tide, wind, thermal structure, and local bathymetry. Dredging of sand from the federal channels and placement of material at the beach placement site would result in negligible, localized changes to circulation patterns within the area.

(3) Normal Water Level Fluctuations (tides, river stage, etc.) (consider items in sections 230.11(b) and 230.24).

The Proposed Action, as modified, is not expected to have an adverse impact on normal tides. There would no change to tidal elevations, which is determined by access to the open ocean, which would not be changed.

(4) Salinity Gradients (consider items in sections 230.11(b) and 230.25)

The Proposed Action, as modified, is not expected to have any impact on normal water salinity nor is it expected to create salinity gradients. Water used to entrain sands would be sea water as is water adjacent to nearshore placement, thus there will be no effect on salinity levels, including the creation of any salinity gradients.

(5) Actions That Will Be Taken to Minimize Impacts (refer to Subpart H)

Needed: X YES __ NO
If needed, Taken: X YES _ NO

All dredging and placement operations would be monitored for effects on water quality, including turbidity, temperature, salinity, dissolved oxygen, and pH; monthly water samples will be taken and analyzed for total dissolved solids and TRPH. Best management practices would be implemented if turbidity and/or dissolved oxygen exceeds water quality criteria.

c. Suspended Particulate/Turbidity Determinations:

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site (consider items in sections 230.11(c) and 230.21).

Placement of sediments generally results in minor impacts to water quality from turbidity. Impacts would be temporary and adverse, but not significant. This is expected to be highly localized and visually indistinguishable from normal turbidity levels. The area is expected to return to background after placement ceases. Water quality monitoring during placement will allow USACE to modify operations (such as by slowing rate of discharge) until any water quality problems abate.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column (consider environmental values in section 230.21, as appropriate).

Placement of clean sandy sediments generally results in minor impacts to water quality due to resuspension of chemical contaminants in the sediments. Sediments are free of contaminants and impacts are expected to be negligible and be temporary. Minor turbidity levels may exist in the immediate vicinity of the dredging area and placement operations that may result in minor, temporary reductions in dissolved oxygen.

(3) Effects on Biota (consider environmental values in sections 230.21, as appropriate).

Biota buried during placement are expected to recover over the short term. Impacts will be temporary and adverse.

(4) Actions Taken to Minimize Impacts.

Needed: __X__ YES ___ NO
If needed, Taken: __X__ YES ____ NO

Monitoring of water quality to control turbidity and to monitor for possible resuspension of contaminants during placement would occur. If turbidity exceeds set standards and/or dissolved oxygen exceeds water quality criteria, disposal would be evaluated and modifications made to get back into compliance.

A water quality monitoring plan will be part of the construction contract and would be coordinated with the Regional Water Quality Control Board, San Diego Region.

d. Contaminant Determination. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate).

(1) Physical characteristics ...._X_

(2) Hydrography in relation to known or anticipated sources of contaminants ...._X_

(3) Results from previous testing of the material or similar material in the vicinity of the proposed project ...._X_

(4) Known, significant sources of contaminants (e.g. pesticides) from land runoff or percolation...___

(5) Spill records for petroleum products or designated (Section 311 of the CWA) hazardous substances ...._X_

(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources ....___

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities...___

(8) Other sources (specify) ...._X_

An evaluation of the Geotechnical Report indicates that the proposed dredge material is not a carrier of contaminants and that levels of contaminants are substantively similar in the extraction and disposal sites and is not likely to be constraints. The dredge site is an open coastal area free of known contaminant sources. A records search indicated no known spills in the area that could contaminate sands in the federal channels.

e. <u>Aquatic Ecosystem and Organism Determinations (use evaluation and testing procedures in Subpart G, as appropriate).</u>

(1) Plankton, Benthos and Nekton

Dredging and placement operations would result in short-term turbidity impacts that could affect plankton in the area. Organisms could stifle in the immediate vicinity as these small organisms are impacted by turbidity. However, these effects would be small in both area and time and the plankton would be expected to recover quickly once dredging and beach placement is completed. Benthic organisms would be buried by placement, but the areas would be minor in area and would quickly recolonize. Larger organisms in the nekton would be expected to avoid disposal operations and would not be impacted.

(2) Food Web

Impacts to the bottom of the food chain (plankton and nekton) would be short term and occur in a small area. Recovery would be quick once operations are concluded.

(3) Special Aquatic Sites

There are no special aquatic sites within the project area.

(4) Threatened & Endangered Species

The USACE has determined that the proposed project may affect but is unlikely to adversely affect western snowy plover and would not affect any other federally listed endangered or threatened species, or their critical habitat, and that formal consultation under Section 7 of the ESA is not required.

Western snowy plover may occur on the placement site beach. The USACE determined the proposed project may affect but is unlikely to adversely affect western snowy plover. A monitoring and avoidance plan has been prepared, in coordination with the USFWS, CDFW, and CCC to ensure that western snowy plovers are not harassed or injured.

The USACE has added environmental commitments to ensure no effect to green sea turtle during the Proposed Action, as modified.

(5) Other fish and wildlife

Marine mammals would not be affected by dredging or placement activities. Birds would generally avoid the dredging and placement sites, although placement could attract birds to the to the benthic organisms coming out of the pipeline or hopper dredge as an alternate food source.

(6) Actions Taken to Minimize Impacts.

Needed:- -X- YES _ _ NO

Grunion. Restoration of the eroded beach would have a short term beneficial effect on the California grunion by ensuring the presence of a beach on which to spawn. Beach construction activities are expected to overlap with the start of grunion spawning season. A monitoring and avoidance plan will be implemented to monitor and avoid, to the maximum extent practicable, impacts to spawning grunion. Eroded beaches, with little or no sand are not adequate sites for California grunion spawning.

Western snowy plover. A monitoring and avoidance plan will be prepared, in coordination with the USFWS, CDFW, and CCC, to ensure that western snowy plovers are not harassed or injured.

Green sea turtle. A monitoring and avoidance plan will be prepared, in coordination with the NMFS, to ensure that green sea turtles are not affected.

Monitor and control turbidity by during dredging, overflow, and placement operations to minimize impacts to plankton and nekton.

f. Proposed Disposal Site Determinations.
(1) Mixing Zone Determination (consider factors in section 230.11(f)(2))

Is the mixing zone for each disposal site confined to the smallest practicable zone?
X_ YES ___NO

The sediments do not require a mixing zone in order to remain in compliance with water quality standards. As such, the mixing zone is considered to be the smallest practicable.

(2) Determination of Compliance with Applicable Water Quality Standards (present the standards and rationale for compliance or non-compliance with each standard)

The State Board's Water Quality Control Plan for Ocean Waters of California (Ocean Plan), Water Quality Control Plan for Enclosed Bays and Estuaries of California, and the Thermal Plan, formerly known as the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" and any revision thereto, shall also apply to all ocean waters of the Region, with the Basin Plan applying in cases of differing objectives. The applicable objective and the rationale for compliance is discussed below.

The Proposed Action, as modified, will be in compliance with state water quality standards. Placement of material at the receiver site would result in short-term elevated turbidity levels and suspended sediment concentrations, but no appreciable long-term changes in other water quality parameters, including dissolved oxygen, pH, nutrients, or chemical contaminants. Factors considered in this assessment include the relatively localized nature of the expected turbidity plumes for the majority of the disposal/placement period and rapid diluting capacity of the receiving environment and the clean nature of re sediments to be dredged and placed. Water quality monitoring would be required as part of the overall project. If monitoring indicated that suspended particulate concentrations outside the zone of initial dilution exceeded permissible limits, disposal/placement operations would be modified to reduce turbidity to permissible levels. Therefore, impacts to water quality from disposal/placement of material at the receiver site would not violate water quality objectives or compromise beneficial uses listed in the Basin Plan. USACE will continue to coordinate with the Santa Ana Regional Water Quality Control Board during construction to minimize impacts to water quality.

(3) Potential Effects on Human Use Characteristic

(a) Municipal and Private Water Supply (refer to section 230.50)

There are no municipal or private water supply resources (i.e., aquifers, pipelines) in the project area. The Proposed Action, as modified, would have no effect on municipal or private water supplies or water conservation.

(b) Recreational and Commercial Fisheries (refer to section 230.51)

The proposed project area is not subject to commercial fishing. Recreational fishing would move to avoid dredging and placement activities and to follow fish out of these areas.

(c) Water Related Recreation (refer to section 230.52)

Construction equipment would be required to maintain ocean access for all uses. During dredging and placement activities, proper advanced notice to mariners would occur. Navigational traffic would not be blocked within the dredge area and nearshore placement discharge area. However, the proposed project would not significantly impact surfing conditions or other water sports once completed. The currents are not expected to change in magnitude or direction. Therefore, the Proposed Action, as modified, is not expected to measurably change currents or change surfing in any discernible way. To minimize navigation impacts and threats to vessel safety, all floating equipment would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners.

(d) Aesthetics (refer to section 230.53)

Minor, short term effects during dredging and placement are anticipated. During dredging and nearshore placement activities, the visual character of the proposed project area would be affected by the dredge; however, dredging activities and nearshore placement are temporary, and as such, would not result in permanent effects to the visual character of the proposed project area. Dredging would not result in any visible change to the dredge site. Placement of dredged material at Oceanside Beach would not result in any visible adverse changes to the nearshore area. Restoration of a sandy beach is considered a positive impact to beach aesthetics.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (refer to section 230.54).

The Proposed Action, as modified, would not have any effect on national and historic monuments, national seashores, wild and scenic rivers, wilderness areas or research sites.

(f) Determination of Cumulative Effects on the Aquatic Ecosystem (consider requirements in section 230.11 (g))

Cumulative effects were determined to be insignificant, refer to section 5 of the SEA.

(g) Determination of Secondary Effects on the Aquatic Ecosystem (consider requirements in section 230.11(h))

Secondary effects of the discharge of dredged or fill would be negligible. Areas outside the direct impact would have only negligible turbidity effects from dredging and onshore placement. Turbidity levels would be low and in the immediate vicinity of the dredging and onshore placement operations. Impacts of the Proposed Action, as modified, are all temporary construction impacts. Movement of sand downcoast would be indistinguishable from natural sand movement resulting in lowered erosion rates due to the increased volume of sand.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem:

All practicable alternatives for placement were evaluated. Alternative placement sites were not considered practicable due to their unavailability at this time. Alternative site placement sites would have similar impacts to the aquatic ecosystem and would not provide the same beneficial effects as those to be realized by placement on Oceanside Beach. Use of this placement area will nourish the beach and protect it from erosion. It will protect recreational uses of the beach as well as wildlife use by foraging shorebirds, spawning California grunion, and invertebrates commonly found only on sandy beaches. The Proposed Action, as modified, is the least environmentally damaging practicable alternative.

c. Compliance with Applicable State Water Quality Standards.

The Proposed Action, as modified, meets State of California water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act.

No toxic materials/wastes are expected to be produced or introduced into the environment by this project.

e. Compliance with Endangered Species Act of 1973.

Western snowy plover may occur on the placement site beach. The USACE determined the proposed project may affect but is unlikely to adversely affect western snowy plover. A monitoring and avoidance plan will be prepared, in coordination with the USFWS, CDFW, and CCC to ensure that western snowy plovers are not harassed or injured. Informal consultation is pending.

The USACE has added environmental commitments that would avoid effects to green sea turtle during construction. Therefore, consultation is not required.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

No sanctuaries as designated by the Marine Protection, Research and Sanctuaries Act of 1972 will be affected by the Proposed Action, as modified.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies

The Proposed Action, as modified, will have no significant adverse effects on municipal and private water supplies.

(b) Recreation and Commercial Fisheries

The Proposed Action will have minor, short-term impacts, but no significant adverse effects on recreational fisheries. The federal channels and beach placement areas are not subject to commercial fishing. Recreational fishing would move to avoid the dredging and placement activities and to follow fish out of these areas. To minimize navigation impacts and threats to vessel safety, all floating equipment would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners.

(c) Plankton

Dredging and placement operations would result in short-term turbidity impacts that would affect plankton in the area. Organisms could stifle in the immediate vicinity as these small organisms are impacted by turbidity. However, these effects would be small in both area and time and the plankton would be expected to recover quickly once dredging and placement is completed.

(d) Fish

Larger organisms in the nekton would be expected to avoid dredging and placement operations and would not be impacted.

(e) Shellfish

Benthic organisms, including shellfish, would be buried by onshore placement, but the areas would be minor in area and would quickly recolonize.

(f) Wildlife

Marine mammals would not be affected by dredging and onshore placement. Birds would generally avoid the dredging and placement, although nearshore placement could attract birds to the benthic organisms coming out of the dredge pipe as an alternate food source.

(g) Special Aquatic Sites

There are no special aquatic sites in the proposed project area.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems: Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability: Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values: Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Specific environmental commitments are outlined in the analysis above and in the SEA and 2018 Final EA. All appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

i. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material (specify which) is:

______(1) Specified as complying with the requirements of these guidelines; or,

______(2) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem; or,

_____(3) Specified as failing to comply with the requirements of these guidelines.

The final 404(b)(1) evaluation and Findings of Compliance will be included with the Final SEA.

Prepared by: Larry Smith______________ Date: __________________

Appendix C
Cultural Resources Documentation

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Attention: Elizabeth Hodges
Sacramento, California 95816

Dear Ms. Polanco:

The U.S. Army Corps of Engineers Los Angeles District (Corps) is initiating consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project, located in the City of Oceanside, San Diego County, California (Enclosure 1), is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. This correspondence is to request comments on our delineation of the Area of Potential Effects (APE) and historic property identification efforts and to request concurrence in our determination of effect for the undertaking.

The Corps is proposing maintenance dredging at the mouth of the Oceanside Harbor/Camp Pendleton Harbor complex located 35 miles north of the City of San Diego. The Corps dredges the entrance channel at this location on an annual basis in order to maintain the federally authorized depth for safe navigation of vessels necessary to accommodate the military, commercial and private vessels that use the harbors. The Corps works with Camp Pendleton and the project's local sponsor, the City of Oceanside, to accomplish this work.

Material dredged from the entrance channel is typically beach-quality sand that is used to re-nourish Oceanside's shoreline from south of the San Luis Rey River discharge to points south to the Oceanside pier and beyond, depending on the quantity dredged each year. This beneficial re-use improves the project's cost effectiveness and provides an economically acceptable way for the City of Oceanside to widen its beach, increasing its recreational value and adding protection for business and residences adjacent to the beach.

The APE is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The Corps has defined the APE as the horizontal and vertical extent of the Access, Dredging, and Material Placement areas. The Northern APE is situated within the Oceanside Harbor and Marina and the Southern APE is situated off the coast along the beach south of the Oceanside Pier. All staging areas will utilize the asphalt public parking lot at the Oceanside Harbor. Marine based equipment consisting of a barge-mounted dredging vessel with a shoreline removable pipeline would be utilized until the completion of the work. Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside. Ground disturbance associated with this undertaking would be limited to dredging and redepositing sediment on the beach.

The current maintenance contract dredging cycle is limited to the removal of soils that have accumulated in the entrance channels. Typically, all three channels are dredged every year. The three channels have been dredged in the same configuration and depths below the Mean Lower Low Water Mark (MLLW) since 1994. Vertical APE of dredging will be approximately -25 feet MLLW plus a 2-foot over-dredge allowance in Del Mar and Oceanside Channels and -25 feet MLLW plus a 2- foot over-dredge allowance in the Entrance Channel.

On November 14, 2022, the Corps completed a records search at the South Coastal Information Center (SCIC). The SCIC is the California Historical Resources Information System (CHRIS) for San Diego County. Results of the records search at the SCIC indicate that 84 cultural resource studies have been conducted within 0.8 km (0.50 mile) of the Project APE, of which several intersect the Project APE. The CHRIS records search identified a total of 25 previously documented cultural resources within a 0.8-km (0.50-mile) radius of the Project APE, none of which intersect the Project APE.

A pedestrian survey of the APE (Access and Material Placement areas) was conducted by Corps archaeologist Daniel Grijalva on November 15, 2022. Material Placement areas encompasses a public beach which is subject to tidal influence and erosion. No previously or newly recorded cultural or historic resources are present within the APE. The northern portion of the APE which includes the Dredging areas has been subject to multiple underwater investigations. Several eelgrass surveys have been completed for the APE since 1994. No human anomalies have been noted during pre- or post-construction activities. A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration (NOAA) was also completed on November 15, 2022. The APE is void of Obstructions and Wrecks based on the Automated Wreck and Obstruction Information System database (Enclosure 2).

Native American coordination was initiated by the Corps on November 23, 2022. If the Corps receives additional responses from any of the tribes the Corps will continue its consultation efforts accordingly and would notify the SHPO if any such outreach would result in a change to our Section 106 consultation (Enclosure 3).

Consistent with past practices, current maintenance and dredging measures will not have an effect on historic properties. The Corps has previous consulted with the SHPO on May 6, 1988, with the SHPO concurring with the Corps determination that no historic properties were affected (Enclosure 4).

At this time, the Corps invites your comments on our delineation of the APE, the adequacy of historic property identification, and the determination of effect for this undertaking per 36 CFR 800.4(a)(b)(c)[1][2]. The proposed undertaking is routine maintenance that has occurred since it was authorized in 1965 and has continued on a regular basis since 1994. Pursuant to 36 CFR Part 800.4 (b)(1) the Corps has made a reasonable and good faith effort to carry out the appropriate identification efforts. The Corps has determined that "no historic properties will be affected" by the undertaking pursuant to 36 CFR Part 800.4(d)(1).

If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Mr. Daniel Grijalva, Corps Archaeologist at (213) 215-3228 or via email at Daniel.S.Grijalva@usace.army.mil.

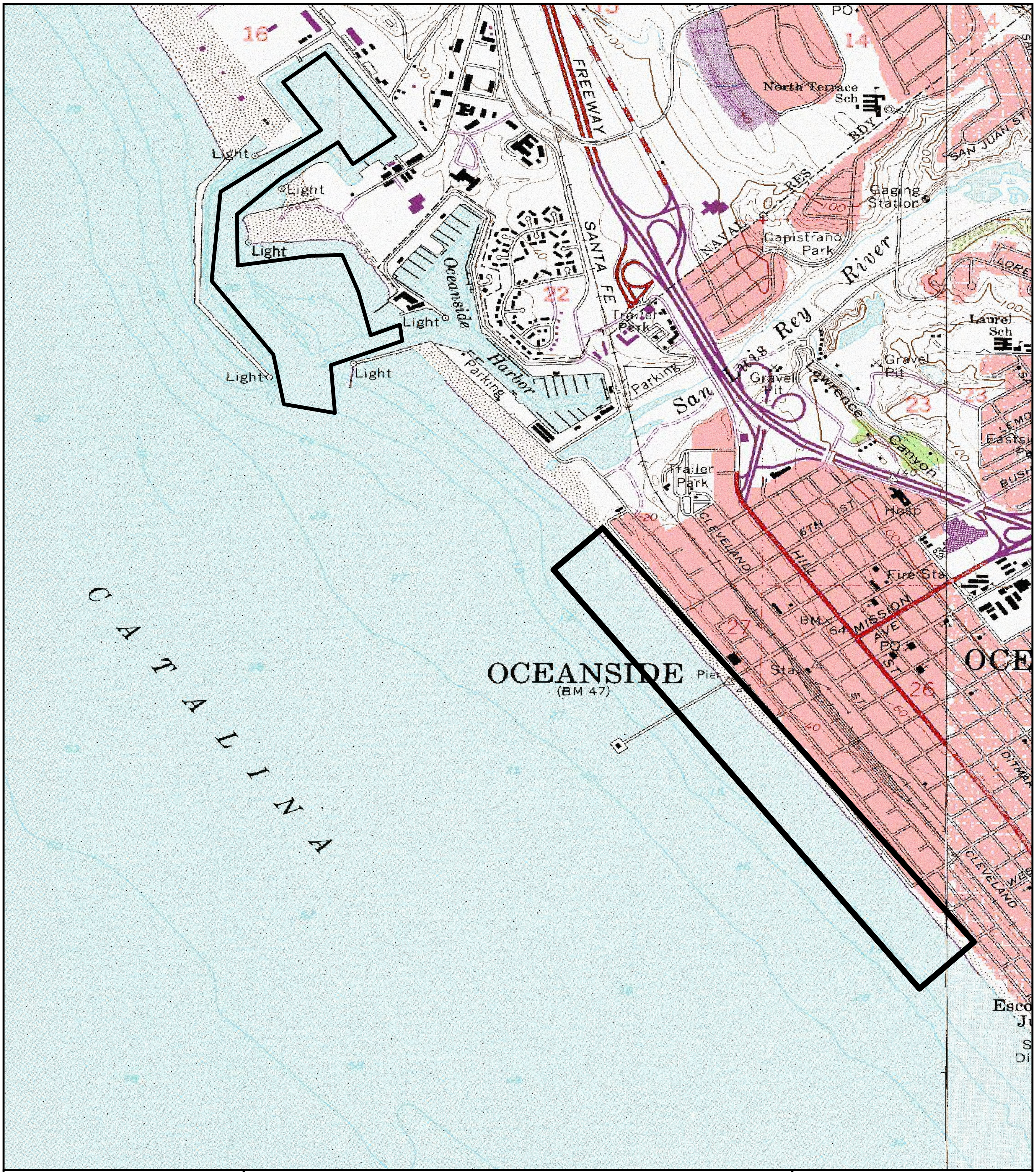
Sincerely,

J Clifford

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

Enclosure 1



USACE Los Angeles District Planning Division

APE

2022

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Enclosure 2

US Army Corps
of Engineers
Los Angeles District

Oceanside Harbor Maintenance Dredging Project
San Diego County, California

Section 106 of the National Historic Preservation Act and its Implementing Regulations at 36 CFR Part 800

Prepared by Daniel Grijalva, Archaeologist

November 2022

Environmental Resources Branch, Planning Division
U.S. Army Corps of Engineers, Los Angeles District

1. Summary and Purpose

The U.S. Army Corps of Engineers, Los Angeles District (Corps), annually dredges the mouth of the Oceanside Harbor for safe navigation of vessels, located in San Diego County, California (Enclosure 1). The Oceanside Harbor/Camp Pendleton Harbor complex is located north of the City of Oceanside and just south of Camp Pendleton Marine Corps Base, 35 miles north of San Diego, in San Diego County, California. The harbor's breakwater and south jetty form an entrance channel. The entrance channel splits to form the Oceanside Channel, which leads to a small craft harbor, and the Del Mar Channel, which leads to Camp Pendleton's Del Mar Boat Basin. Camp Pendleton is a large U.S. Marine Corps facility that dominates the surrounding area.

The U.S. Army Corps of Engineers Los Angeles District dredges this entrance channel on annual basis in order to maintain the federally authorized depth necessary to accommodate the military, commercial and private vessels that use the harbors. The Corps works with Camp Pendleton and the project's local sponsor, the City of Oceanside, to identify the most efficient and cost-effective way to complete the project.

Material dredged from the entrance channel is typically beach-quality sand that is used to re-nourish Oceanside's shoreline from south of the San Luis Rey River discharge to points south to the Oceanside pier and beyond, depending on the quantity dredged each year. This beneficial re-use improves the project's cost effectiveness and provides an economically acceptable way for the City of Oceanside to widen its beach, increasing its recreational value and adding protection for business and residences adjacent to the beach.

Figure 1: Northern portion of the APE showing the proposed dredging areas (Photo looking East)

2. Project Overview and Area of Potential Effect

2.1 Project Location

The Project APE consists of two discontinuous areas (referred to in this memo as the Northern APE and Southern APE) along the Pacific Ocean coast in Oceanside, California. Also included in the APE are staging and sediment disposal areas. The Northern APE is situated around the Oceanside Harbor Marina and the Southern APE is situated off the coast south of the Oceanside Pier. These locations are not sectioned in Township 11 South and Range 5 West as depicted on the U.S. Geological Survey (USGS) Oceanside, California, 7.5-minute topographic quadrangle (Enclosure 1).

2.2 Detailed Project Description

The undertaking is routine maintenance that has occurred on a regular basis since it was authorized in 1965 and has occurred on a yearly basis since 1994. Ground disturbance associated with this undertaking would be limited to sediment deposited within the last few years.

Dredging is the removal of sediments and debris from the bottom of lakes, rivers, harbors, and other water bodies. It is a routine necessity in waterways around the world because sedimentation—the natural process of sand and silt washing downstream—gradually fills channels and harbors.

Dredging often is focused on maintaining or increasing the depth of navigation channels, anchorages, or berthing areas to ensure the safe passage of boats and ships. Vessels require a certain amount of water in order to float and not touch bottom. This water depth continues to increase over time as larger and larger ships are deployed. Since massive ships carry the bulk of the goods imported into the country, dredging plays a vital role in the nation's economy.

Dredging is also performed to reduce the exposure of fish, wildlife, and people to contaminants and to prevent the spread of contaminants to other areas of the water body. This environmental dredging is often necessary because sediments in and around cities and industrial areas are frequently contaminated with a variety of pollutants. These pollutants are introduced to waterways from point sources such as sewer overflows, municipal and industrial discharges, and spills; or may be introduced from nonpoint sources such as surface runoff and atmospheric deposition. NOAA's Office of Response and Restoration plays a major role in protecting and restoring marine natural resources when environmental damage occurs.

The disposal of dredged material is managed and carried out by federal, state, and local governments, as well as by private entities such as port authorities. The U.S. Army Corps of Engineers issues permits for the disposal of dredged material; the U.S. Environmental Protection Agency provides oversight and authorization for the disposal of dredged materials.

The Corps has previously consulted with the SHPO on the dredging and beneficial placement of materials on Oceanside Beach under Section 106 of NHPA. The Corps determined that the undertaking would result in no historic properties affected. On May 6, 1988, the SHPO concurred with the Corps’ determination (Enclosure 2).

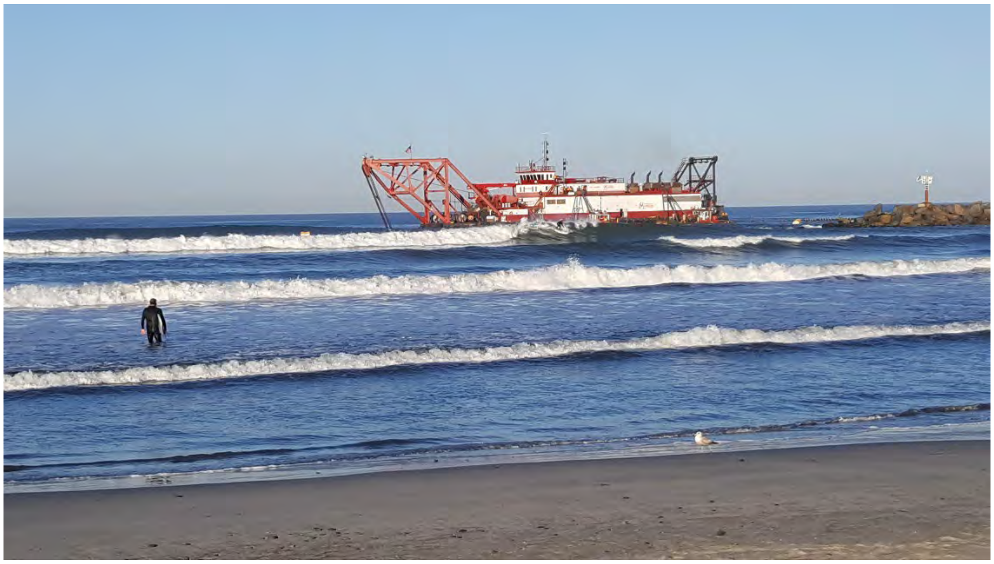

Photo: Vessel from previous Oceanside dredging

2.3 Area of Potential Effect

The area of potential effects (APE) is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The APE for this project includes the Access, Dredging, and Material Placement areas.

The current undertaking (maintenance contract dredging cycle) is limited to the removal of soils that have accumulated. Typically, all three channels are dredged every year; however, budget shortfalls in some years meant that some portions of the channel occurred every other year. The three channels have been dredged in the same configuration and depths below the Mean Lower Low Water Mark (MLLW). Vertical APE of dredging will be approximately -25 feet MLLW plus a 2-foot overdredge allowance in Del Mar and Oceanside Channels and -25 feet MLLW plus a 2- foot overdredge allowance in the Entrance Channel since 1994.

Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside and the Corps based on the Los Angeles Regional Dredged Material Management Plan by the Corps since 1994. A dredge vessel will pump sand thru a pipe to the shoreline. The amount of sand available each year to be placed on the beaches is dependent on how much excess sand fills in the harbor entrance each winter. Heavy equipment at the beach during this operation will include a large pipe and dozers.

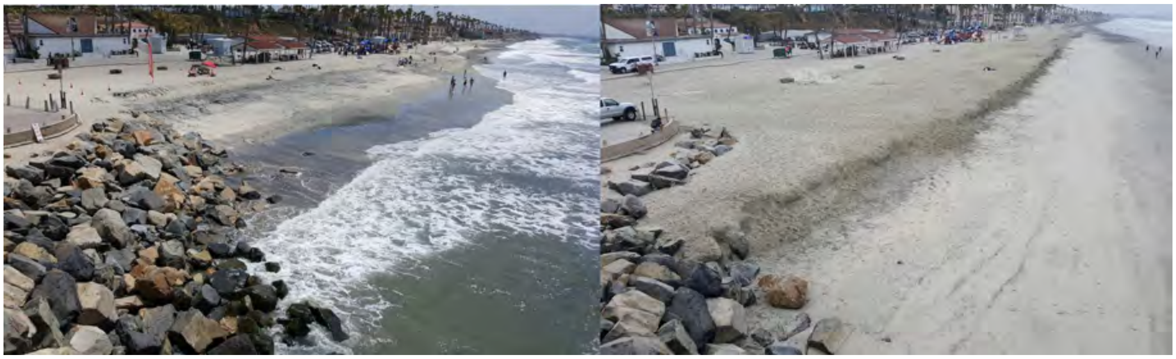

Photo: Oceanside dredging APE Material Placement areas (Before and After)

2.4 Record Search and Identification Results

Previously Conducted Studies

On November 14, 2022, Corps archaeologist Daniel Grijalva conducted a records search at the SCIC. The SCIC is the CHRIS information center for San Diego County. The results included records for all previously conducted cultural resources surveys and all previously identified cultural resources within the Project APE and a 0.8-km (0.5-mile) buffer. Information regarding previously identified cultural resources includes site type and location on the landscape in relation to the Project APE.

Results of the records search at the SCCIC indicate that 84 cultural resource studies have been conducted within 0.8-km (0.5-mile) of the Project APE, of which several intersect the Project APE.

Previously Recorded Cultural Resources

The CHRIS records search identified a total of 25 previously documented cultural resources within a 0.8-km (0.5-mile) radius of the Project APE, none of which intersect the Project APE. Fourteen resources are present in the northern portion of the APE within Camp Pendleton. All resources on

Camp Pendleton are part of the historic built environment. These include mostly military installation buildings.

The southern portion of the APE that includes the Material Placement areas. This portion of the APE is also void of previously documented cultural resources. Eleven previously cultural resources have been identified within a 0.8-km (0.5-mile) radius of the Project APE. These resources include; the BNSF rail line, BNSF buildings, and BNSF railyard; The Oceanside Beachfront Resort; and several historic residences along The Strand and South Pacific Street.

A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration was also completed. The APE is void of Obstructions and Wrecks.

2.5 Historic Context

Prehistoric Setting

Paleoindian Period (11,500 B.P. -8500/7500 B.P.)

The Paleoindian period begins with the Clovis era, a widespread phenomena throughout North America. Noted for a distinctive tool kit characterized by fluted points, Clovis occupation dates to the end of the Pleistocene, from 11,200 B.P. to 10,600 B.P. (Meltzer 1993). The Paleoindian period in San Diego County is considered to date to the terminal Pleistocene and the early Holocene, from > 10,000 B.P. to 8500/7500 B.P. (Moratto 1984; Warren et al. 1993). Although no Clovis sites are documented in the region, occasional isolated fluted points have been recovered, and hence there exists the potential for the discovery of terminal Pleistocene occupation.

Much has been written about Paleoindian assemblages in the southern California region, and a variety of terms proposed. Rogers, the first to temporally order the archaeological assemblages of the region, introduced and then discarded the terms Scraper-Makers, Malpais and Playa to label early lithic industries of the region (see Warren 1967 for a comprehensive review). Rogers (1939, 1945) coined the term San Dieguito to refer to the earliest artifact assemblages in San Diego County, and for many it remains a viable Paleoindian cultural complex. Rogers' (1929) use of the term San Dieguito developed out of pioneering survey work in which he distinguished a suite of lithic scatters situated on the San Dieguito plateau of San Diego County. These sites were initially termed the Scraper-Makers (and considered to postdate Shell-Midden sites situated closer to the coast). Key attributes of these Scraper-Maker sites included different scraper types, knives, and rare crescentic stones. These sites, situated on terraces and ridge tops, lacked subsurface material and middens, and were interpreted as evidence of a hunting-focused culture.

The discovery and subsequent excavation of the C. W. Harris Site in west-central San Diego County provided the first stratigraphic evidence to place the San Dieguito in the temporal sequence (Rogers 1938). This buried, multiphase site was exposed in an alluvial cut along the San Dieguito River, and trench excavations revealed San Dieguito and Late Prehistoric occupation episodes. Based on his more extensive research in the southern California deserts, Rogers (1938, 1939) considered the site to be a San Dieguito II or III occupation; in other words, a late Paleoindian settlement. The artifact assemblage was characterized by flaked lithic tools such as scrapers and scraper planes along with large bifaces and projectile points.

Additional fieldwork was carried out at this San Dieguito type-site from 1958 to 1967 (Warren 1966, 1967; Warren and True 1961). This research and the publication of Rogers' writings on the initial fieldwork provided the stratigraphic and analytical basis for defining the San Dieguito as a Paleoindian hunting culture. Notable aspects of these studies at the Harris Site were the absence of ground stone artifacts, stratigraphic superposition below a La Jolla occupation, and radiocarbon dates placing occupation between 9000 B.P. and 8500/7600 B.P. (Warren 1967). The absence of ground stone was considered an important distinction between San Dieguito and subsequent Archaic occupation (Warren 1967).

For over a decade, the relationship between San Dieguito (Paleoindian) and later La Jolla (Archaic) sites has been the subject of considerable debate (Bull 1983, 1987; Gallegos 1987; Moriarty 1969; Warren 1985, 1987; Warren et al. 1993). The key issues concern whether San Dieguito sites are chronologically earlier or not; whether San Dieguito sites lack ground stone artifacts; and whether subsequent Archaic sites have a strong bifacial tool component. A major alternative interpretation considers San Dieguito and La Jollan sites as functional variants of a single adaptive system with San Dieguito sites representing specialized quarrying or hunting locales (Bull 1987; Gallegos 1987). Such an interpretation fits with recent paleocoastal models that consider the earliest occupation of the western coast (pre-8500 B.P.) not to be focused on big game hunting but rather to represent a more generalized hunting and gathering adaptation (Erlandson and Colten 1991; Moratto 1984; Moss and Erlandson 1995). One of the major difficulties in resolving this issue is the dearth of sites with early Holocene subsurface assemblages (True and Bouey 1990; Warren et al. 1993). Paleoindian sites or isolated surface finds have not yet been documented on Camp Pendleton.

Archaic Period (8500 B.P.-1300/800 B.P.)

The Archaic period is considered to have extended from 8500 B.P., and possibly as early as 9000 B.P., until 1300 B.P./800 B.P. (Moratto 1984; Rogers 1966; Warren et al. 1993). A major distinction has been made between shell midden Archaic sites (near the coast) and non- shell midden Archaic sites further inland. Coastal Archaic sites (often termed the La Jolla complex) are characterized by shell middens, flaked cobble tools, basin metates, manos, discoidals, and flexed burials, while inland sites in northern San Diego County are often termed the Pauma complex. Alternative terminology includes Wallace's (1955) Milling Stone horizon and Warren's (1968) Encinitas tradition. This time period was considered to have differed from the prior San Dieguito adaptation by being more focused on gathering activities that emphasized marine mollusks, fish, and plant resources.

Rogers (1945:170-171) considered the Paleoindian (San Dieguito) and Archaic (La Jolla) occupations to be representative of different populations, a view also shared by Warren (1968). Later research, however, considered the potential for transitional coastal sites and cultural continuity (Kaldenberg 1982; Moriarty 1967). As discussed for the Paleoindian period, the extreme view considers the early Archaic and Paleoindian sites to be contemporaneous expressions of a single settlement system (Bull 1987; Gallegos 1987).

Initially, Rogers (1929) noted that archaeological sites of the Shell-Midden people were concentrated along major drainages and lagoons, extending up to four miles inland. The largest areal spread of such sites away from the major drainages occurred between Escondido and Agua Hedionda creeks. Shell midden sites were characterized by massive quantities of shellfish, along with manos and metates, hammerstones, and split cobbles. Rogers (1945:171) later coined the term "La Jolla culture" to refer to these early shell midden sites, and distinguished two phases (La Jolla I and II) within a continuous occupation based on stratigraphic observations. The early phase was characterized by basin metates, unshaped manos, cobble choppers, primary flakes, and inhumations without grave goods. The later phase included greater frequencies of ground stone and flaked artifacts, increased manufacturing sophistication, and inhumations interred in cemetery areas with grave goods such as shell beads and stone digging-weights, and inverted metates.

Subsequent excavations at a series of coastal Archaic shell middens provided the data and analytical basis to more accurately characterize the associated assemblages (Crabtree et al. 1963; Moriarty et al. 1959; Shumway et al. 1961; Warren et al. 1961). A series of Archaic coastal shell midden sites produced radiocarbon dates from the ninth millennium B.P. to the third millennium B.P. As a result of these studies, several proposals were offered regarding temporal change during the coastal Archaic. These interpretations either added or detracted additional subphases and modified the temporal distribution of various archaeological traits (Davis 1976; Harding 1951; Moriarty 1966; Warren 1964).

The reconstruction of San Diego County coastal adaptations has been, at its essence, the argument put forward succinctly in Warren's 1964 dissertation. In particular, the prehistory of one area, Batiquitos Lagoon at the base of San Marcos Creek in the central portion of the county, has essentially served as the type locality for the littoral prehistory of San Diego County (Gallegos 1985, 1987; Warren 1964; Warren and Pavesic 1963; Warren et al. 1961). Although refinements have been made by Warren and other scholars based primarily on new excavations (Christensen 1992; Gallegos 1987, 1992; Gallegos and Kyle 1988; Warren 1968; Warren et al. 1993), the broad perception of coastal adaptations for the last 7,000 years is largely unchanged.

The normative view of the coastal Archaic is that exploitation of the San Diego County littoral zone began early in the Holocene and was clustered around resource rich bays and estuaries (Warren 1964, 1968). Shellfish have been interpreted as a dietary staple, although plant resources, both nuts and grasses, were also an important dietary component. Major changes in human adaptations were considered to have occurred when lagoon silting became so extensive as to cause a decline in associated shellfish populations. This occurred between 4000 B.P. and 3000 B.P. at Batiquitos Lagoon and possibly later at other larger lagoons. The decline in littoral shellfish resources, Torrey pine nuts, and drinking water drastically affected human populations and resulted in a major depopulation of the coastal zone. Populations shifted inland to a river valley orientation and intensified exploitation of terrestrial small game and plant resources (possibly including acorns) (originally proposed by Rogers [1929:467]). The coast was either abandoned or subject to only seasonal, often short-term, occupation. The principal, well-recognized exception to this abandonment was the southern third of the coastline associated with Mission and San Diego bays where occupation continued as before unaffected by lagoon silting (yet see Christenson 1992). The San Diego County coastline north of Mission Bay, including the Camp Pendleton area, witnessed a major population decline due to a dearth of littoral resources. This new pattern of low-level exploitation of the coast (at best seasonal occupation) continued until historic contact.

A number of possible exceptions have been noted by Warren and by others, most notably Gallegos (1992). Warren (1964) pointed out that Santa Margarita River and possibly San Dieguito River may have had sufficient water to enable large populations to persist for a longer period, and Gallegos (1992) stated that occupation persisted throughout the prehistoric sequence at the Pefiasquitos Lagoon/Sorrento Valley area. The northern third of San Diego County, however, was rarely explicitly addressed due to the lack of research on Camp Pendleton.

Subsequent research by True and associates further refined the nature of the Pauma complex. An important new interpretation was that the Pauma complex was not part of the San Dieguito and Paleoindian age, but rather may have some mixing of earlier Paleoindian material culture (True 1980). Many similarities with coastal Archaic adaptations were recognized, but milling stones were more frequent in the Pauma complex sites, while scraping and planning tools and hammer/choppers more common on the coast (True and Beemer 1982). Excavations and radiocarbon dating at the Pankey Site in the Pauma Valley, yielded a Pauma occupation level with an inverted basin metate above a burial and low frequencies of shellfish remains (True and Pankey 1985). As a result of this fieldwork, it was hypothesized that the Pauma complex represents an inland, possibly seasonal, expression of the coastal Archaic (La Jolla).

Currently, inland Archaic adaptations are not as well understood. Initially, a series of 25 sites predating the Late Prehistoric period in inland northern San Diego County was termed the Pauma complex by True (1958). These sites were set on hills overlooking drainages, and associated with pre-late Holocene sediments. As a complex, they were considered distinct from coastal Archaic sites given their surficial nature and the lack of shellfish and bone. The economy at these sites was interpreted as oriented to seed gathering, given the predominance of grinding stones in the tool assemblages. True (1958) initially hypothesized that they may have similarities with San Dieguito (Paleoindian) sites based on the presence of bifaces, crescentics, and projectile points.

Late Prehistoric Period (1300/800 B.P.-200 B.P.)

The onset of the Late Prehistoric period in San Diego County is generally considered to have occurred between 1300 B.P. and 800 B.P. (Moratto 1984; Rogers 1945; Warren et al. 1993). The timing of this period may vary within the region (potentially earlier in the east and later in the west), and also according to the criteria applied. In general, this period is paradigmatically linked with the ethnohistoric record of local Native Americans. Specifically, applications of direct historical analogy to this time period assume a considerable period of stability during the Late Prehistoric period for populations, linguistic groups, and their territorial extent as documented by Europeans from Spanish contact through early twentieth century ethnohistoric accounts.

Two different linguistic groups, the Yuman language group speaking Dieguefio and the Shoshonean language group speaking Luiseno/Juaneno, inhabited the southern and northern portions of San Diego County during the Ethnohistoric period, respectively. It is therefore not surprising that two Late Prehistoric period complexes are distinguished that have the same broad boundaries. In general, the Late Prehistoric period is characterized by the appearance of small, pressure-flaked projectile points indicative of bow and arrow technology, the appearance of ceramics, the replacement of flexed inhumations with cremations, and an emphasis on inland plant food collection and processing (especially of acorns) (Meighan 1954; Rogers 1945; Warren 1964, 1968).

The explanations for the origin of the Late Prehistoric period are problematic and subject to differing interpretations (Meighan 1954; Moriarty 1966; Rogers 1945; True 1966). Kroeber (1925:578) speculated that Shoshonean language speakers migrated from the deserts to the southern coast of California at least 1, 000-1,500 years ago. Some subsequent investigators have embraced this hypothesis and correlated it with the origins of the Late Prehistoric period (Meighan 1954; Warren 1968).

Rogers' (1929) early views on the Late Prehistoric/Contact period discussed the Luiseno and Dieguefio together under the rubric of the Mission Indians, and distinguished them from earlier shell-midden and scraper-maker cultures. Mission Indian sites were typically situated on the east side and tops of rock hills overlooking water sources, under or near large boulders, and open-air sites were rare. Material culture included cremations, pottery, projectile points, bedrock mortars and metates, and portable ground stone. The economy was acorn-focused, and often situated near live oak stands.

Later, in building a three-phase model of Yuman prehistory (which focused on the southern half of San Diego County), Rogers (1945) argued for continuity in occupation from the Archaic to the Late Prehistoric period. On the coast, three phases of shell middens were noted extending from La Jolla I through La Jolla II to Yuman. He argued that the Dieguefio type of culture of 500 years ago was the result of a series of events. This included earlier migration of Yuman populations from the coast to the Colorado River (perhaps as the result of an influx of Shoshone populations in northern San Diego County), adaptation to this new riverine setting and adopting traits from adjacent populations in the Southwest, and ultimately movement back to the coast during the Yuman III phase introducing the material culture that defines the local Late Prehistoric period. Thus, he argued for both migration and cultural continuity. Later scholars have either supported the cultural continuity interpretation arguing for the addition of new traits, the proposed replacement of populations interpretation, or suggested that both were at play (Moriarty 1966; True 1966, 1970; Warren 1968).

Subsequent scholars focused on refining perceptions of Late Prehistoric material culture and adaptations. Meighan (1954), after excavating one aceramic site in the northern inland portion of the county, defined the San Luis Rey complex. He asserted that: "Historically the area was occupied by the Luiseno and there is every reason to believe that the site itself represents a prehistoric village occupied by ancestors of the modern Luiseno. The village was abandoned in pre-contact times and living Luiseno informants have no memory of it" (Meighan 1954:216). Thus, Meighan distinguished a pre-pottery San Luis Rey I phase as immediately pre-contact (200-550 B.P.), and a San Luis Rey II phase as contact period with ceramics (100-200 B.P.).

True continued to focus on interpreting inland adaptations, refining the San Luis Rey complex of the northern portion of the county, and defining the Cuyamaca complex in the south (True 1966, 1970; True et al. 1974; True et al. 1991). The Cuyamaca complex was distinguished from the San Luis Rey complex based on higher frequencies of side-notched points, flaked stone tools, ceramics, and milling stone implements; a wider range of ceramic vessel forms; a steatite industry; and cremations placed in urns.

The majority of True's research has focused on the inland portions of the San Luis Rey River system.

As a result, a revised, long chronology has emerged for the San Luis Rey complex. The San Luis Rey II is now considered to date primarily to the prehistoric era, the San Luis Rey I period extends considerable earlier than previously thought (beginning somewhere between 1000-2000 B.P.), and a prior intermediate or generalized San Luis Rey period is hypothesized (True et al. 1974:Figure 1; True and Waugh 1982:Figure 2, 1983). A small number of radiocarbon dates from only two sites, however, detracts from the viability of this model. True and Waugh (1982) also formulated a diachronic San Luis Rey settlement model that begins with a foraging pattern, characterized by small camps and several residential shifts each year during the San Luis Rey I period. During the San Luis Rey II period, settlement configuration became more territorial, strongly correlated with particular drainage systems and shifted to a classic collector strategy. This new configuration was bipolar - with permanent winter villages/ camps in the western foothills and associated permanent summer camps in the mountains. The highland settlements, often associated with milling stations at bedrock outcrops, were seasonally occupied to exploit acorns and other nuts. True (1993:17) has also hypothesized that the lower portions of the San Luis Rey drainage had sedentary villages with limited use of marine resources.

Recent research on Camp Pendleton has documented a range of Late Prehistoric settlements. Along the coast, a suite of sites is now well dated to the Late Prehistoric period (Byrd 1996a, 1996b, 1997; Byrd et al. 1995; Reddy et al. 1996). These sites were occupied for extended seasons, reveal intensive exploitation of local littoral resources, and have continuity with well- dated late Archaic adaptations in this area. In addition, upland Late Prehistoric settlements on Camp Pendleton have been investigated. These sites are often clustered around boulder outcrops to facilitate bedrock milling, and reveal a complex set of local adaptations that can be considered part of the San Luis Rey complex (Reddy 1997). As a whole, the Late Prehistoric period on Camp Pendleton reveals continuity with contemporaneous settlement northward in Orange County with continued exploitation of coastal resources, particularly shellfish (Moratto 1984).

Ethnohistoric

In California, Spanish explorers first encountered coastal villages of Native Americans in 1769 with the establishment of Mission San Diego de Alcala. The Mission of San Juan Capistrano, which initially had jurisdiction over the Camp Pendleton area, was subsequently established in 1776. After the founding of San Luis Rey de Franciscan in 1798, the Camp Pendleton area was effectively divided in half. These missions "recruited" coastal Native Americans to use as laborers and convert them to Catholicism, having a dramatic affect on traditional cultural practices. Inland Luiseno groups were not as heavily affected by Spanish influence until 1816, when an outpost of the mission was established 20 miles further inland at Pala (Sparkman1908). At the time of contact, Luiseno population may have ranged from 5,000 to as many as 10,000 individuals. To the south, Kumeyaay population was at the same level or probably somewhat higher. Missionization, along with the introduction of European diseases, greatly reduced their populations. Most villagers, however, continued to maintain many of their aboriginal customs while adopting the agricultural and animal husbandry practices learned from Spaniards.

By the early 1820s, California came under Mexico's rule, and in 1834, the missions were secularized. This resulted in political imbalance and a series of Native American uprisings against the Mexican rancheros. Many of the Luiseno and Kumeyaay left the missions and ranchos and returned to their original village settlements (Cuero 1970). When California became a sovereign state in 1850, the Luiseno and Kumeyaay were heavily recruited as laborers, and experienced even harsher treatment. Conflicts between Native Americans and encroaching Anglos finally led to the establishment of reservations for some villages, such as Pala and Sycuan. Other Mission groups were displaced from their homes, moving to nearby towns or ranches. The reservation system interrupted the social organization and settlement patterns, yet many aspects of the original culture still persist today including certain rituals and religious practices, along with traditional games, songs, and dances.

Territories

Territorial distribution of ethnohistoric groups is of critical importance in reconstructing adaptations and ethnohistoric modeling for prehistoric interpretation. Unfortunately there is very little ethnohistoric information recorded about the Juaneno, and much of it is derived from accounts about the Luiseno (Kroeber 1925). The name Juaneno derives from association with the Mission San Juan Capistrano. There appears to be spatial delineation between the Juaneno and Luiseno, despite their similarities. The limited territory ascribed to the Juaneno by Kroeber (1925:636) extended from Aliso Creek on the north to the area between San Onofre and Las Pulgas drainages on the south, with the Pacific Ocean forming the western boundary and the crest of the Santa Ana Mountains forming the boundary on the east. Their neighbors to the north were the Gabrielifio, and the Luiseno bordered them on the northeast, east, and south. There is, however, some controversy over the nature of the Juaneno as a group. Kroeber (1925:636) recognized Juaneno language as a dialect of Luiseno, but treated the populations as separate groups. Cameron (1987:318) supports this interpretation based on archaeological evidence. Bean and Shipek (1978:550) and White (1963:91) treat the Juaneno as part of the Luiseno on the basis of cultural and linguistic similarities. For the purposes of this ethnohistoric discussion, the Juaneno are considered together with and subsumed under the Luiseno.

The Shoshonean inhabitants of northern San Diego County were called Luisenos by Franciscan friars. They also named the San Luis Rey River and established the San Luis Rey Mission in the heart of Luiseno territory. Luiseno territory encompassed an area from roughly Agua Hedionda on the coast, east to Lake Henshaw, north into Riverside County, and west through San Juan Capistrano to the coast (Bean and Shipek 1978; Kroeber 1925). The Luiseno shared boundaries with the Gabrielinio and Serrano to the west and northwest, the Cahuilla from the deserts to the east, the Cupefio to the southeast, and the Kumeyaay to the south. All but the Kumeyaay (lpai or Northern Dieguetio) are linguistically similar to the Luiseno, belonging to the Takic subfamily of Uta-Aztecan (Bean and Shipek 1978).

The Yuman Ipai have a different language and cultural background but shared certain aspects of social structure and technology, and some Kumeyaay incorporated Luiseno religious practices into their cosmology. The Kumeyaay (for these purposes include the dialects Ipai and Tipai) inhabited the region directly south of the Luiseno in southern San Diego County, west and central Imperial County, and northern Baja California (Almstedt 1982; Gifford 1931; Hedges 1975; Luomala 1978; Shipek 1982; Spier 1923). The Kumeyaay speak a dialect of a Yuman language related to the large Hokan super family. Luomala (1978) defines the territory similar to the above at latitude 33°15' in the north to about 31°30' south latitude, while Almstedt (1982:9) cites a more traditional view that places the northern boundary around Agua Hedionda Lagoon at Carlsbad. Unlike the Luiseno, the Kumeyaay occupied a much larger and more diverse environment including marine, foothill, mountain, and desert resource zones.

2.6 Fieldwork

A pedestrian survey of the southern portion of the APE (Access and Material Placement areas) was conducted on November 15, 2022 by Corps archaeologist Daniel Grijalva. Access and staging will utilize the paved asphalt public parking lot at the Oceanside Harbor and Marina. Material Placement area is a public beach and subject to tidal influence and disturbances. No previously or newly recorded cultural or historic resources are present within the APE.

The northern portion of the APE which includes the dredging areas has been subject to multiple underwater investigations. Several eelgrass surveys have been completed for the APE since 1994. No human anomalies have been noted during pre or post construction activities.

A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration (NOAA) was also completed. The APE is void of Obstructions and Wrecks based on the Automated Wreck and Obstruction Information System database.

3.0 Determinations of Eligibility

Based on the identification efforts by the Corps it has been determined that no historic properties have been previously recorded within the APE. Current identification results have also failed to identify any historic property within the APE. No historic properties were also identified or affected for the SHPO concurrence on May 6, 1988 (Enclosure 4).

4.0 Finding of Effect

Consistent with past practices, current maintenance and dredging measures will not have an effect on historic properties. The undertaking is routine maintenance that has occurred since it was authorized in 1965 and has occurred on a regular basis since 1994. Pursuant to 36 CFR Part 800.4 (b)(1) the Corps has made a reasonable and good faith effort to carry out the appropriate identification efforts. The Corps has determined that “no historic properties will be affected” by the undertaking pursuant to 36 CFR Part 800.4(d)(1).

South Coastal Information Center
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-5320
Office: (619) 594-5682
www.scic.org
scic@mail.sdsu.edu

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM
CLIENT IN-HOUSE RECORDS SEARCH

Company: Army

Company Representative: Daniel Grijalva

Date: 11/14/2022

Project Identification: Oceanside Dredging Project

Search Radius: 1/4 mile

Historical Resources: SELF

Trinomial and Primary site maps have been reviewed. All sites within the project boundaries and the specified radius of the project area have been plotted. Copies of the site record forms have been included for all recorded sites.

Previous Survey Report Boundaries: SELF

Project boundary maps have been reviewed. National Archaeological Database (NADB) citations for reports within the project boundaries and within the specified radius of the project area have been included.

Historic Addresses: SELF

A map and database of historic properties (formerly Geofinder) has been included.

Historic Maps: SELF

The historic maps on file at the South Coastal Information Center have been reviewed, and copies have been included.

Copies: 141

Hours: 1

This is not an invoice. Please pay from the monthly billing statement

Enclosure 3

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Temet Aguilar
Pauma Band of Luiseno Indians
P.O. Box 369
Pauma Valley, CA, 92061

Chairperson Aguilar:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

The Corps is proposing maintenance dredging at the mouth of the Oceanside Harbor/Camp Pendleton Harbor complex located 35 miles north of the City of San Diego. The Corps dredges the entrance channel at this location on annual basis in order to maintain the federally authorized depth for safe navigation of vessels necessary to accommodate the military, commercial and private vessels that use the harbors. The Corps works with Camp Pendleton and the project's local sponsor, the City of Oceanside, to accomplish this work

Material dredged from the entrance channel is typically beach-quality sand that is used to re-nourish Oceanside's shoreline from south of the San Luis Rey River discharge to points south to the Oceanside pier and beyond, depending on the quantity dredged each year. This beneficial re-use improves the project's cost effectiveness and provides an economically acceptable way for the City of Oceanside to widen its beach, increasing its recreational value and adding protection for business and residences adjacent to the beach.

The area of potential effects (APE) is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The Corps has defined the APE as the horizontal and vertical extent of the Access, Dredging, and Material Placement areas. The Northern APE is situated within the Oceanside Harbor and Marina and the Southern APE is situated off the coast along the beach south of the Oceanside Pier. All staging areas will utilize the asphalt public parking lot at the Oceanside Harbor. Marine based

equipment consisting of a barge-mounted dredging vessel with a shoreline removable pipeline would be utilized until the completion of the work. Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside. Ground disturbance associated with this undertaking would be limited to dredging and redepositing sediment on the beach.

The current maintenance contract dredging cycle is limited to the removal of soils that have accumulated in the entrance channels. Typically, all three channels are dredged every year. The three channels have been dredged in the same configuration and depths below the Mean Lower Low Water Mark (MLLW) since 1994. Vertical APE of dredging will be approximately -25 feet MLLW plus a 2-foot over-dredge allowance in Del Mar and Oceanside Channels and -25 feet MLLW plus a 2- foot over-dredge allowance in the Entrance Channel.

On November 14, 2022, the Corps completed a records search at the South Coastal Information Center (SCIC). The SCIC is the California Historical Resources Information System (CHRIS) for San Diego County. Results of the records search at the SCIC indicate that 84 cultural resource studies have been conducted within 0.8 km (0.50 mile) of the Project APE, of which several intersect the Project APE. The CHRIS records search identified a total of 25 previously documented cultural resources within a 0.8-km (0.50-mile) radius of the Project APE, none of which intersect the Project APE.

A pedestrian survey of the APE (Access and Material Placement areas) was conducted by Corps archaeologist Daniel Grijalva on November 15, 2022. Material Placement areas encompasses a public beach which is subject to tidal influence and erosion. No previously or newly recorded cultural or historic resources are present within the APE. The northern portion of the APE which includes the Dredging areas has been subject to multiple underwater investigations. Several eelgrass surveys have been completed for the APE since 1994. No human anomalies have been noted during pre- or post-construction activities. A search of the Wrecks and Obstructions Database from the Office of Coast Survey under the National Oceanic and Atmospheric Administration (NOAA) was also completed on November 15, 2022. The APE is void of Obstructions and Wrecks based on the Automated Wreck and Obstruction Information System database.

Consistent with past practices and maintenance the dredging measures will not have an effect on historic properties. The Corps has previous consulted with the California State Historic Preservation Officer (SHPO) on May 6, 1988, with the SHPO concurring with the Corps determination that no “historic properties will be affected” by

the undertaking. If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Mr. Daniel Grijalva, Archaeologist at (213) 215-3228 or via email at Daniel.S.Grijalva@usace.army.mil.

Sincerely,

J Clifford

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson John Christman
Viejas Band of Kumeyaay Indians
1 Viejas Grade Road
Alpine, CA, 91901

Chairperson Christman:

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Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Norma Contreras
La Jolla Band of Luiseno Indians
22000 Highway 76 Pauma Valley, CA, 92061

Chairperson Contreras:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

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J Clifford

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Enclosure(s)

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Stephen Cope
San Pasqual Band of Dieguenо Mission Indians
P.O. Box 365
Valley Center, CA, 92082

Chairperson Cope:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Tribal Historic Officer, Resource Management
Ernest Pingleton
Viejas Band of Kumeyaay Indians
1 Viejas Grade Road
Alpine, CA, 91901

Ernest Pingleton:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Vice Chairperson Michael Garcia
Ewiiaapaayp Tribe
4054 Willows Road
Alpine, CA, 91901

Vice Chairperson Garcia:

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915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Environmental Coordinator
John Flores
San Pasqual Band of Diegueno Mission Indians
P.O. Box 365
Valley Center, CA, 92082

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Patricia Garcia
Director of Tribal Historic Preservation
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA, 92264

Director Garcia:

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Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Ralph Goff
Campo Band of Diegueno Mission Indians
36190 Church Road, Suite 1
Campo, CA, 91906

Chairperson Goff:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Erica Pinto
Jamul Indian Village
P.O. Box 612
Jamul, CA, 91935

Chairperson Pinto:

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Enclosure(s)

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Tribal Historic Preservation Officer
Rincon Band of Luiseno Indians
Jim McPherson
One Government Center Lane
Valley Center, CA, 92082

Jim McPherson:

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LOS ANGELES DISTRICT
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915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Cultural Resource Department
Joseph Ontiveros
Soboba Band of Luiseno Indians
P.O. Box 487
San Jacinto, CA 92581

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U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Director Clint Linton
Iipay Nation of Santa Ysabel
P.O. Box 507
Santa Ysabel, CA, 92070

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U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Cultural Resources Manager
Lisa Haws
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA, 92019

Lisa Haws:

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Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Mark Macarro
Pechanga Band of Luiseno Indians
P.O. Box 1477
Temecula, CA, 92593

Chairperson Macarro:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

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equipment consisting of a barge-mounted dredging vessel with a shoreline removable pipeline would be utilized until the completion of the work. Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside. Ground disturbance associated with this undertaking would be limited to dredging and redepositing sediment on the beach.

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Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Cody J. Martinez
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA, 92019

Chairperson Martinez:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Bo Mazzetti
Rincon Band of Luiseno Indians
One Government Center Lane
Valley Center, CA, 92082

Chairperson Mazzetti:

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915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Michael Linton
Mesa Grande Band of Diegueno Mission Indians
P.O Box 270
Santa Ysabel, CA, 92070

Chairperson Linton:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Reid Milanovich
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA, 92264

Chairperson Milanovich:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Tribal Administrator Javaughn Miller
La Posta Band of Diegueno Mission Indians
8 Crestwood Road
Boulevard, CA, 91905

Administrator Miller:

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915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Rebecca Osuna
Inaja-Cosmit Band of Indians
2005 S. Escondido Blvd.
Escondido, CA, 92025

Chairperson Osuna:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

The Corps is proposing maintenance dredging at the mouth of the Oceanside Harbor/Camp Pendleton Harbor complex located 35 miles north of the City of San Diego. The Corps dredges the entrance channel at this location on annual basis in order to maintain the federally authorized depth for safe navigation of vessels necessary to accommodate the military, commercial and private vessels that use the harbors. The Corps works with Camp Pendleton and the project's local sponsor, the City of Oceanside, to accomplish this work.

Material dredged from the entrance channel is typically beach-quality sand that is used to re-nourish Oceanside's shoreline from south of the San Luis Rey River discharge to points south to the Oceanside pier and beyond, depending on the quantity dredged each year. This beneficial re-use improves the project's cost effectiveness and provides an economically acceptable way for the City of Oceanside to widen its beach, increasing its recreational value and adding protection for business and residences adjacent to the beach.

The area of potential effects (APE) is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The Corps has defined the APE as the horizontal and vertical extent of the Access, Dredging, and Material Placement areas. The Northern APE is situated within the Oceanside Harbor and Marina and the Southern APE is situated off the coast along the beach south of the Oceanside Pier. All staging areas will utilize the asphalt public parking lot at the Oceanside Harbor. Marine based

equipment consisting of a barge-mounted dredging vessel with a shoreline removable pipeline would be utilized until the completion of the work. Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside. Ground disturbance associated with this undertaking would be limited to dredging and redepositing sediment on the beach.

The current maintenance contract dredging cycle is limited to the removal of soils that have accumulated in the entrance channels. Typically, all three channels are dredged every year. The three channels have been dredged in the same configuration and depths below the Mean Lower Low Water Mark (MLLW) since 1994. Vertical APE of dredging will be approximately -25 feet MLLW plus a 2-foot over-dredge allowance in Del Mar and Oceanside Channels and -25 feet MLLW plus a 2- foot over-dredge allowance in the Entrance Channel.

On November 14, 2022, the Corps completed a records search at the South Coastal Information Center (SCIC). The SCIC is the California Historical Resources Information System (CHRIS) for San Diego County. Results of the records search at the SCIC indicate that 84 cultural resource studies have been conducted within 0.8 km (0.50 mile) of the Project APE, of which several intersect the Project APE. The CHRIS records search identified a total of 25 previously documented cultural resources within a 0.8-km (0.50-mile) radius of the Project APE, none of which intersect the Project APE.

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the undertaking. If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Mr. Daniel Grijalva, Archaeologist at (213) 215-3228 or via email at Daniel.S.Grijalva@usace.army.mil.

Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Bernice Paipa
Iipay Nation of Santa Ysabel
P.O. Box 130
Santa Ysabel, CA, 92070

Vice Chairperson Paipa:

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Jodi L. Clifford
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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Gwendolyn Parada
La Posta Band of Diegueno Mission Indians
8 Crestwood Road
Boulevard, CA, 91905

Chairperson Parada:

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Jodi L. Clifford
Chief, Planning Division

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DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Cultural Resources Coordinator
Paul Macarro
Pechanga Band of Luiseno Indians
P.O. Box 1477
Temecula, CA, 92593

Paul Macarro:

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Chief, Planning Division

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Robert Pinto
Ewiiaapaayp Tribe
4054 Willows Road
Alpine, CA, 91901

Chairperson Pinto:

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Angela Santos
Manzanita Band of Kumeyaay Nation
P.O. Box 1302
Boulevard, CA, 91905

Chairperson Santos:

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J Clifford

Jodi L. Clifford
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U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Tribal Historic Preservation Officer
Shasta Gaughen
Pala Band of Mission Indians
PMB 50, 35008 Pala Temecula Rd.
Pala, CA, 92059

Shasta Gaughen:

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The area of potential effects (APE) is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR § 800.16). The Corps has defined the APE as the horizontal and vertical extent of the Access, Dredging, and Material Placement areas. The Northern APE is situated within the Oceanside Harbor and Marina and the Southern APE is situated off the coast along the beach south of the Oceanside Pier. All staging areas will utilize the asphalt public parking lot at the Oceanside Harbor. Marine based

equipment consisting of a barge-mounted dredging vessel with a shoreline removable pipeline would be utilized until the completion of the work. Access, Dredging, and Material Placement areas have been actively managed by the City of Oceanside. Ground disturbance associated with this undertaking would be limited to dredging and redepositing sediment on the beach.

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the undertaking. If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Mr. Daniel Grijalva, Archaeologist at (213) 215-3228 or via email at Daniel.S.Grijalva@usace.army.mil.

Sincerely,

J Clifford

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Tribal Council
San Luis Rey Band of Mission Indians
1889 Sunset Drive
Vista, CA, 92081

Tribal Council:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) is initiating Government-to-Government consultation with you under the National Historic Preservation Act (NHPA; 54 USC § 306108) and its implementing regulations (36 CFR 800). The proposed Oceanside Dredging Project is considered an undertaking pursuant to 36 CFR 800.16(y) and the Corps is responsible for compliance with the NHPA. We invite you to provide any feedback and comments to help preserve, protect, and to consider the potential effects of the Corps proposed project on natural and cultural resources.

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Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Isaiah Vivanco
Soboba Band of Luiseno Indians
P.O. Box 487
San Jacinto, CA 92581

Chairperson Vivanco:

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Chief, Planning Division

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LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 1109
LOS ANGELES, CALIFORNIA 90017-3409

November 23, 2022

Honorable Chairperson Raymond Welch
Barona Group of the Capitan Grande
1095 Barona Road
Lakeside, CA, 92040

Chairperson Welch:

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Sincerely,

Jodi L. Clifford
Chief, Planning Division

Enclosure(s)

Native American Heritage Commission
Native American Contact List
San Diego County

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
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ACBCI-THPO@aguacaliente.net

Barona Group of the Capitan Grande
Edwin Romero, Chairperson
1095 Barona Road — Diegueno
Lakeside, CA, 92040
Phone: (619) 443 - 6612
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Campo Band of Diegueno Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Diegueno
Campo, CA, 91906
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Ewiiaapaayp Tribe
Robert Pinto, Chairperson
4054 Willows Road — Diegueno
Alpine, CA, 91901
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Fax: (619) 445-9126
wmicklin@leaningrock.net

Ewiiaapaayp Tribe
Michael Garcia, Vice Chairperson
4054 Willows Road — Diegueno
Alpine, CA, 91901
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Fax: (619) 445-9126
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Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 — Diegueno
Santa Ysabel, CA, 92070
Phone: (760) 765 - 0845
Fax: (760) 765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
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cjlinton73@aol.com

Inaja-Cosmit Band of Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. — Diegueno
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Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 — Diegueno
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Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
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Pine Valley, CA, 91962 — Diegueno
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La Jolla Band of Luiseno Indians
Fred Nelson, Chairperson
22000 Highway 76 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 3771

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Oceanpointe Project, San Diego County.

Native American Heritage Commission
Native American Contact List
San Diego County

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Diegueno
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
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La Posta Band of Diegueno Mission Indians
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Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
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Mesa Grande Band of Diegueno Mission Indians
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Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
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Pauma Band of Luiseno Indians
Temet Aguilar, Chairperson
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Pechanga Band of Luiseno Indians
Mark Macarro, Chairperson
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Pechanga Band of Luiseno Indians
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Rincon Band of Luiseno Indians
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Rincon Band of Luiseno Indians
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One Government Center Lane — Luiseno
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bomazzetti@aol.com

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San Luis Rey, Tribal Council
1889 Sunset Drive
Vista, CA, 92081
Phone: (760) 724 - 8505
Fax: (760) 724-2172
cjmojado@slrmissionindians.org
Luiseno

San Luis Rey Band of Mission Indians
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cjmojado@slrmissionindians.org
Luiseno

San Pasqual Band of Diegueno Mission Indians
Allen Lawson, Chairperson
P.O. Box 365
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
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Diegueno

San Pasqual Band of Diegueno Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
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Diegueno

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
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San Jacinto, CA, 92581
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Fax: (951) 654-4198
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Cahuilla
Luiseno

Soboba Band of Luiseno Indians
Scott Cozart, Chairperson
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San Jacinto, CA, 92583
Phone: (951) 654 - 2765
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov
Cahuilla
Luiseno

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court
El Cajon, CA, 92019
Phone: (619) 445 - 2613
Fax: (619) 445-1927
ssilva@sycuan-nsn.gov
Kumeyaay

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court
El Cajon, CA, 92019
Phone: (619) 312 - 1935
lhaws@sycuan-nsn.gov
Kumeyaay

Viejas Band of Kumeyaay Indians
John Christman, Chairperson
1 Viejas Grade Road
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
Diegueno

Viejas Band of Kumeyaay Indians
Ernest Pingleton, Tribal Historic Officer, Resource Management
1 Viejas Grade Road
Alpine, CA, 91901
Phone: (619) 659 - 2314
epingleton@viejas-nsn.gov
Diegueno

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Enclosure 4

CRB

STATE OF CALIFORNIA – THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, *Governor*

OFFICE OF HISTORIC PRESERVATION

DEPARTMENT OF PARKS AND RECREATION

POST OFFICE BOX 942896
SACRAMENTO, CALIFORNIA 94296-0001
(916) 445-8006

28 April 1988

Reply to: COE 880404A

Robert S. Joe, Chief
Planning Division
U.S. Army Corps of Engineers
Box 2711
Los Angeles, CA 90053-2325
attn: Bradley Sturm

Subject: OCEANSIDE HARBOR EXPANSION

Thank you for requesting our comments on your proposed project.

Compliance with Section 106 of the National Historic Preservation Act and 36 CFR 800 is mandatory for any undertaking which is federally permitted, funded, initiated, assisted, or which takes place on lands under federal ownership or jurisdiction. Your proposal falls under this requirement.

Federal law also requires that our office review such undertakings for potential effects to significant archaeological or historical resources. To complete this review, we need additional information from you.

Please forward documentation which identifies the potential for your project to damage significant archaeological properties. The documentation should assess possible effects to land and submerged archaeological resources. You should also include photographs of any building or other structure which appears to be more than fifty years old and which will be altered or demolished by your project.

If you have any questions, please telephone Nicholas Del Cioppo of my staff at (916) 322-4419.

Sincerely,

for

Kathryn Gualtieri
State Historic Preservation Officer

FHB

STA.E OF CALIFORNIA – THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, *Governor*

FFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
POST OFFICE BOX 942896
SACRAMENTO, CALIFORNIA 94296-0001
(916) 445-8006

6 May 1988

Reply to: COE 880404A

Robert S. Joe, Chief
Planning Division
U.S. Army Corps of Engineers
Box 2711
Los Angeles, CA 90053-2325
attn: Bradley Sturm

Subject: Oceanside Harbor Expansion

Dear Mr. Joe:

Thank you for consulting with us in compliance with Section 106 of the National Historic Preservation Act and 36 CFR 800. We also appreciate your sending the documentation we needed to complete our review of your proposed project and any effects it might have on significant historic properties.

Your archaeological site records search and search of the most current listings of the National Register sent for our review adequately demonstrated that no archaeological or historic properties will be affected by the proposed project.

Based on the information you have provided, we agree with your determination that the proposed project will have no effect on cultural properties listed in or eligible for inclusion in the National Register of Historic Places.

If you have any questions, please telephone Nicholas Del Cioppo, State Archaeologist II, at (916) 322-4419.

Sincerely,

for

Kathryn Gualtieri
State Historic Preservation Officer

Appendix D
Air Emissions Calculations

Maintenance Dredging

Emission Source Data for Maintenance Dredging

Construction Activity/Equipment Type	Power Rating	Load Factor	# Active	Hourly Hp-Hrs	Fuel Use GPH	Hrs per Day [1]	Total Work Days [2]	DailyTotal Hp-Hrs (1)
Clamshell dredge	N/A	N/A	N/A	N/A	N/A	22	50	N/A
Tug boat-clamshell dredge	800	0.20	1	160	8.0	22	50	176
Hydraulic Dredge	2,600	N/A	N/A	N/A	N/A	22	21	N/A
Hopper Dredge-propulsion	1,140		2	2,280	NA	22	58	TBD
Hopper Dredge-generator	805	0.70	2	1,127	NA	18	58	20,286
Bulldozer-D8	335	0.50	2	335	18.8	8	21	2,680

Hopper propulsion load factor = 50% for loaded transit, 10% for empty transit, 10% for dredging

Emission Factors for Construction Equipment

Equipment Type	ROG	CO	NOx	SOx	PM10
Clamshell dredge (lb/hr)	1.1	0.3	1.1	1.0	0.7
Tugboat (lbs/1,000 Gal)	18.2	57.0	419.0	75.0	9.0
Hydraulic dredge (lb/hr)	0.2	0.1	0.5	0.3	0.2
Hooper Dredge (lb/hp-hr)	0.0001	0.0055	0.0130	0.0081	0.0007
Bulldozer (grms/HP-HR)	1.7	4.8	10.3	0.9	1.1

Daily Emissions from Construction Activities Clamshell Dredge

	Pounds per day				
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Clamshell dredge	23.8	6.6	24.0	20.9	15.2
Tug boat-clamshell dredge	3.2	10.0	73.7	13.2	1.6
Crew boat [3]	0.9	0.4	0.8	0.1	0.1
Worker Vehicles [3]	0.1	1.2	0.9	0.1	0.1
Peak Daily Emissions	**28.0**	**18.2**	**99.4**	**34.3**	**16.9**
SCAQMD Daily Significance Thresholds	**75**	**550**	**100**	**150**	**150**

Daily Emissions from Construction Activities Hydraulic Dredge

	Pounds per day				
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Hydraulic dredge	4.4	2.2	11.0	6.6	4.4
Tug boat-hydraulic dredge [3]	5.2	6.8	9.5	2.4	2.2
Crew boat [3]	0.4	0.3	0.8	0.1	0.1
Worker Vehicles [3]	0.2	2.1	1.0	0.1	0.2
Bulldozer-D8	10.0	28.4	60.9	5.3	6.5
Peak Daily Emissions	**20.2**	**39.8**	**83.2**	**14.6**	**13.4**
SCAQMD Daily Significance Thresholds	**75**	**550**	**100**	**150**	**150**

Daily Emissions from Construction Activities Hopper Dredge

	Pounds per day				
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Hopper dredge-dredging	2.4	134.1	317.1	197.3	17.1
Hopper dredge-transit loaded	0.2	9.4	22.2	13.8	1.2
Hopper dredge-transit unloaded	0.0	1.9	4.4	2.8	0.2
Crew boat [3]	0.4	0.3	0.8	0.1	0.1
Worker Vehicles [3]	0.2	2.1	1.0	0.1	0.2
Peak Daily Emissions	**3.2**	**147.8**	**345.5**	**214.2**	**18.8**
SCAQMD Daily Significance Thresholds	**75**	**550**	**100**	**150**	**150**

(1) Assumes 2-hour down time per day for shift change, maintenance, fueling. Three shifts per day.
(2) Assumes average duration of three weeks for hydraulic and clamshell and 60 days for hopper.
(3) See following pages for source date, emissions factors, and emissions calculations.

Assume dredge volume of 350,000 cubic yards, maximum expected based on funding limitations
Emissions factors for Maintenance Dredging for tugboat and bulldozer taken from the Port of Los Angeles Channel Deepening Project Final Supplemental Environmental Impact Statement/Environmental Impact Report, September 2000.
Emissions factors for Maintenance Dredging for the Clamshell Dredge provided by Justice and Associates for a Manson clamshell dredge.
Assumes 48,000 cubic yards with near shore disposal at a reate of 7,000 cubic yards per day, clamshell.
Emission factors for hopper dredge taken from AP-42 for diesel engines.
Hopper dredge specifications based on Corps dredge Yaquina

Capacity: 1,000 cubic yards
2 x 1,140 hp main engines
2 x 805 hp generators

2 x 565 hp pumps (generator load factor = 565/805 = 70%)
Loaded speed 10 knots
Unloaded speed 10.5 knots
Distance to disposal site 1.5 nm
Transit time loaded = 15 minutes
Transit time unloaded = 15 minutes
Dredge cycle = 3 hours
6 dredge cycles per day
6,000 cubic yards per day, 58-day project duration to dredge 350,000 cubic yards

Total Project Construction Emissions

	Tons				
	ROG	**CO**	**NOx**	**SOx**	**PM10**
Project Emissions					
Hydraulic Dredge	0.2	0.4	0.9	0.2	0.1
Clamshell Dredge	0.7	0.5	2.5	0.9	0.4
Hopper Dredge	0.1	4.3	10.0	6.2	0.5
de minimis Thresholds	**10**	**100**	**10**	**100**	**70**

GHG Emissions

Maintenance Dredging

Emission Source Data for Maintenance Dredging

Construction Activity/Equipment Type	Power Rating	Load Factor	# Active	Hourly Hp-Hrs	Fuel Use GPH	Hrs per Day	Total Work Days(3)	DailyTotal Hp-Hrs (1)
Clamshell dredge	1,890	1.0	1	1,890	N/A	22	123	41,580
Tug boat-clamshell dredge	800	0.20	1	160	8.0	22	123	176
Hydraulic Dredge	2,600	NA	1	NA	NA	22	18	NA
Crew Boat	50	NA	1	NA	NA	4	141	NA
Tug boat-hydraulic dredge	1,600	NA	1	NA	NA	2	18	NA
Worker vehicles	NA	NA	18	NA	NA	12.5	141	NA
Hopper Dredge	2,000					22	21	22,000
Bulldozer-D8	335	0.50	2	335	18.8	8	18	2,680

Emission Factors for Construction Equipment

	Grams per HP-HR
Equipment Type	**CO2**
Clamshell dredge	568
Tugboat	509
Hydraulic Dredge	183
Crew Boat	75
Tug boat-hydraulic dredge	93.9
Worker vehicles	1.1
Hopper Dredge	183
Bulldozer	390

Estimated Emissions from Construction Equipment

	CO2	
Equipment Type	**lbs/day**	**tons total**
Clamshell dredge	27.6	0.3
Tugboat	24.7	0.3
Hydraulic Dredge	8.9	0.1
Crew Boat	0.7	0.0
Tug boat-hydraulic dredge	0.4	0.0
Worker vehicles	0.5	0.0
Hopper Dredge	8.9	0.1
Bulldozer	6.9	0.1
Total	69.1	0.7
Hydraulic Dredge	17.4	0.2
Clamshell dredge	53.5	0.6
Hopper Dredge	10.1	0.1
Total Equivalent CO2		
Hydraulic Dredge	17.5	0.2
Clamshell dredge	53.9	0.6
Hopper Dredge	10.2	0.1

CO2 Equivalent = CO2*1.008

Appendix E
Environmental Justice Screen Results

EJScreen Report (Version 2.1)

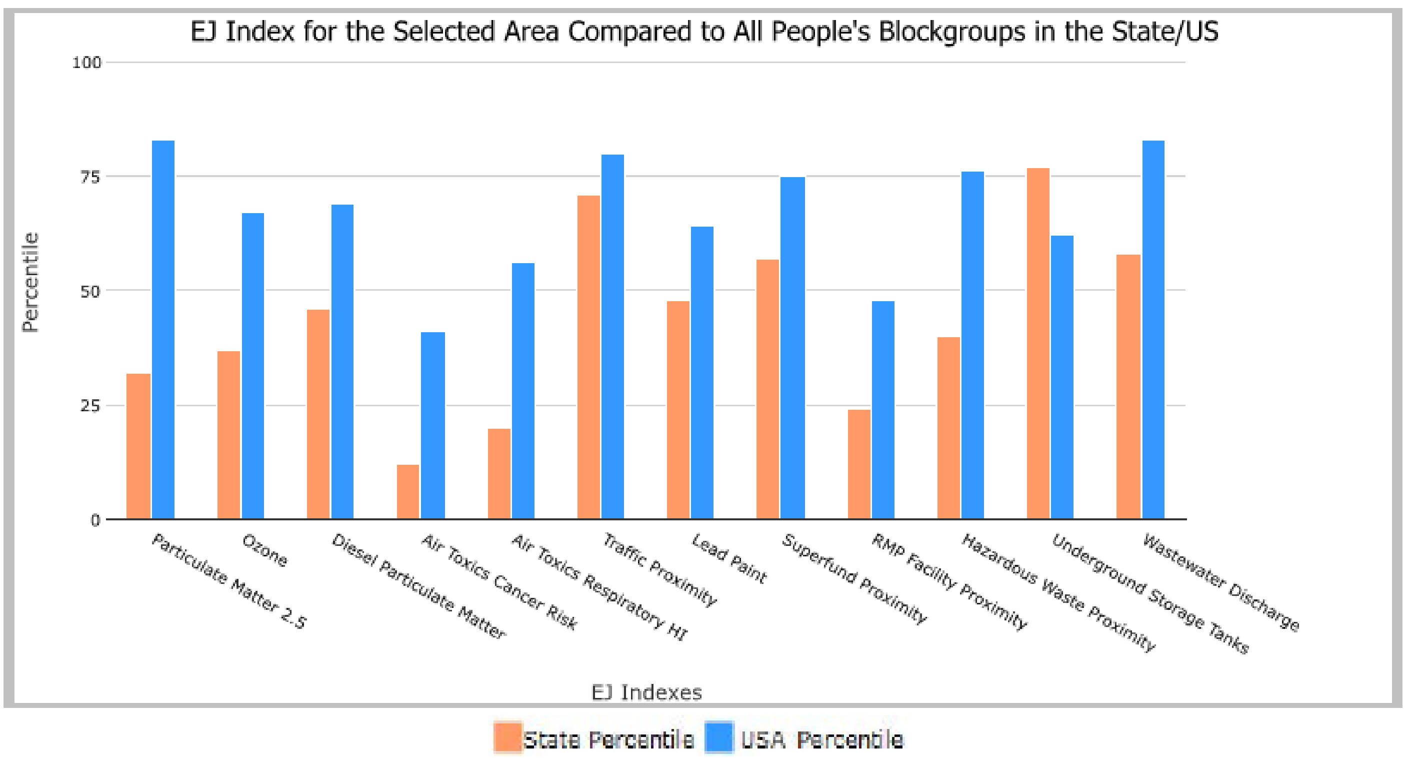
1 mile Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 18,533

Input Area (sq. miles): 9.22

Oceanside Harbor (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	USA Percentile
Environmental Justice Indexes		
EJ Index for Particulate Matter 2.5	32	83
EJ Index for Ozone	37	67
EJ Index for Diesel Particulate Matter*	46	69
EJ Index for Air Toxics Cancer Risk*	12	41
EJ Index for Air Toxics Respiratory HI*	20	56
EJ Index for Traffic Proximity	71	80
EJ Index for Lead Paint	48	64
EJ Index for Superfund Proximity	57	75
EJ Index for RMP Facility Proximity	24	48
EJ Index for Hazardous Waste Proximity	40	76
EJ Index for Underground Storage Tanks	77	62
EJ Index for Wastewater Discharge	58	83



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

United States Environmental Protection Agency

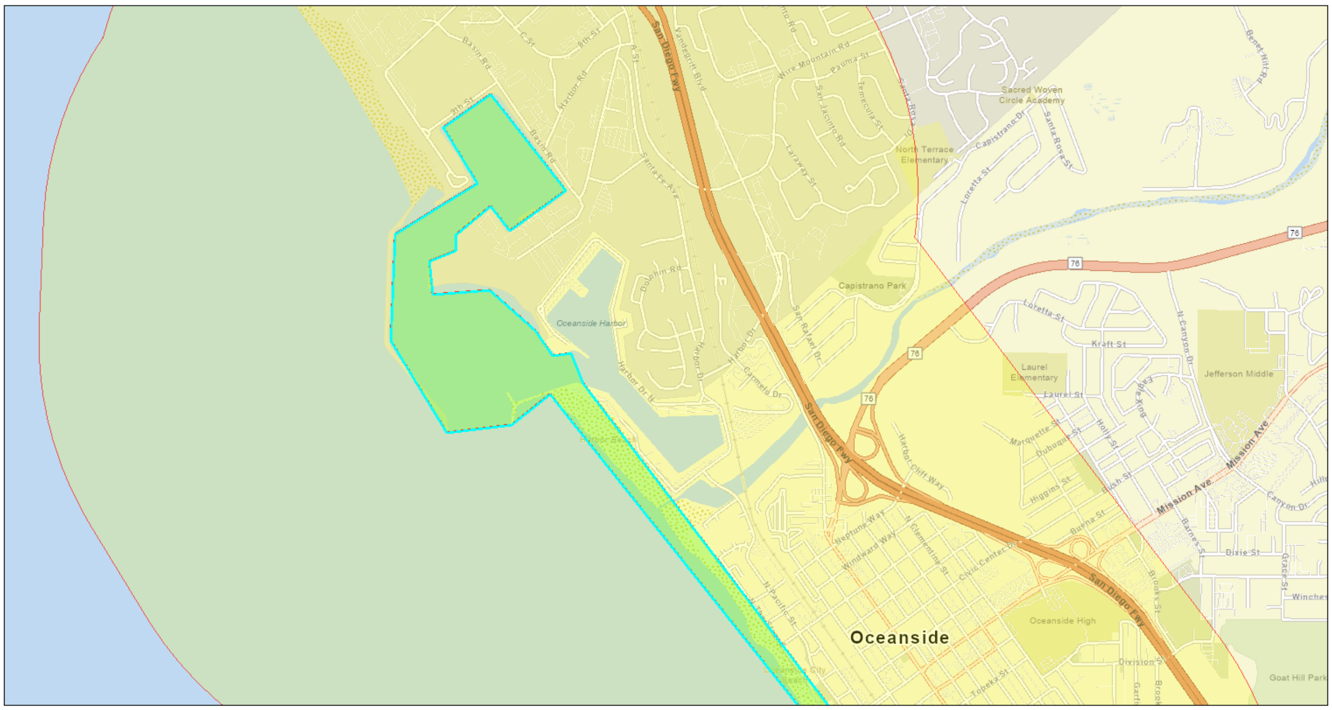
EJScreen Report (Version 2.1)

1 mile Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 18,533

Input Area (sq. miles): 9.22

Oceanside Harbor (The study area contains 1 blockgroup(s) with zero population.)



November 10, 2022

Oceanside Harbor

1:18,056

0 0.17 0.35 0.7 mi

0 0.3 0.6 1.2 km

Esri Community Maps Contributors, SanGIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EJScreen Report (Version 2.1)

1 mile Ring around the Area, CALIFORNIA, EPA Region 9

Approximate Population: 18,533

Input Area (sq. miles): 9.22

Oceanside Harbor (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 ($\mu g/m^3$)	10.2	11.7	23	8.67	87
Ozone (ppb)	41.6	47.7	31	42.5	43
Diesel Particulate Matter* ($\mu g/m^3$)	0.263	0.33	39	0.294	50-60th
Air Toxics Cancer Risk* (lifetime risk per million)	20	31	17	28	<50th
Air Toxics Respiratory HI*	0.3	0.43	24	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	2500	1400	84	760	93
Lead Paint (% Pre-1960 Housing)	0.23	0.28	49	0.27	50
Superfund Proximity (site count/km distance)	0.1	0.17	57	0.13	67
RMP Facility Proximity (facility count/km distance)	0.21	1.1	26	0.77	40
Hazardous Waste Proximity (facility count/km distance)	2.4	5.2	35	2.2	73
Underground Storage Tanks (count/km^2)	2.4	1.5	79	3.9	62
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.17	67	61	12	87
Socioeconomic Indicators					
Demographic Index	43%	44%	48	35%	67
People of Color	51%	63%	38	40%	67
Low Income	33%	29%	63	30%	59
Unemployment Rate	7%	6%	66	5%	71
Limited English Speaking Households	6%	9%	53	5%	77
Less Than High School Education	14%	16%	57	12%	68
Under Age 5	5%	6%	50	6%	52
Over Age 64	11%	14%	37	16%	30

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen Report (Version 2.1)

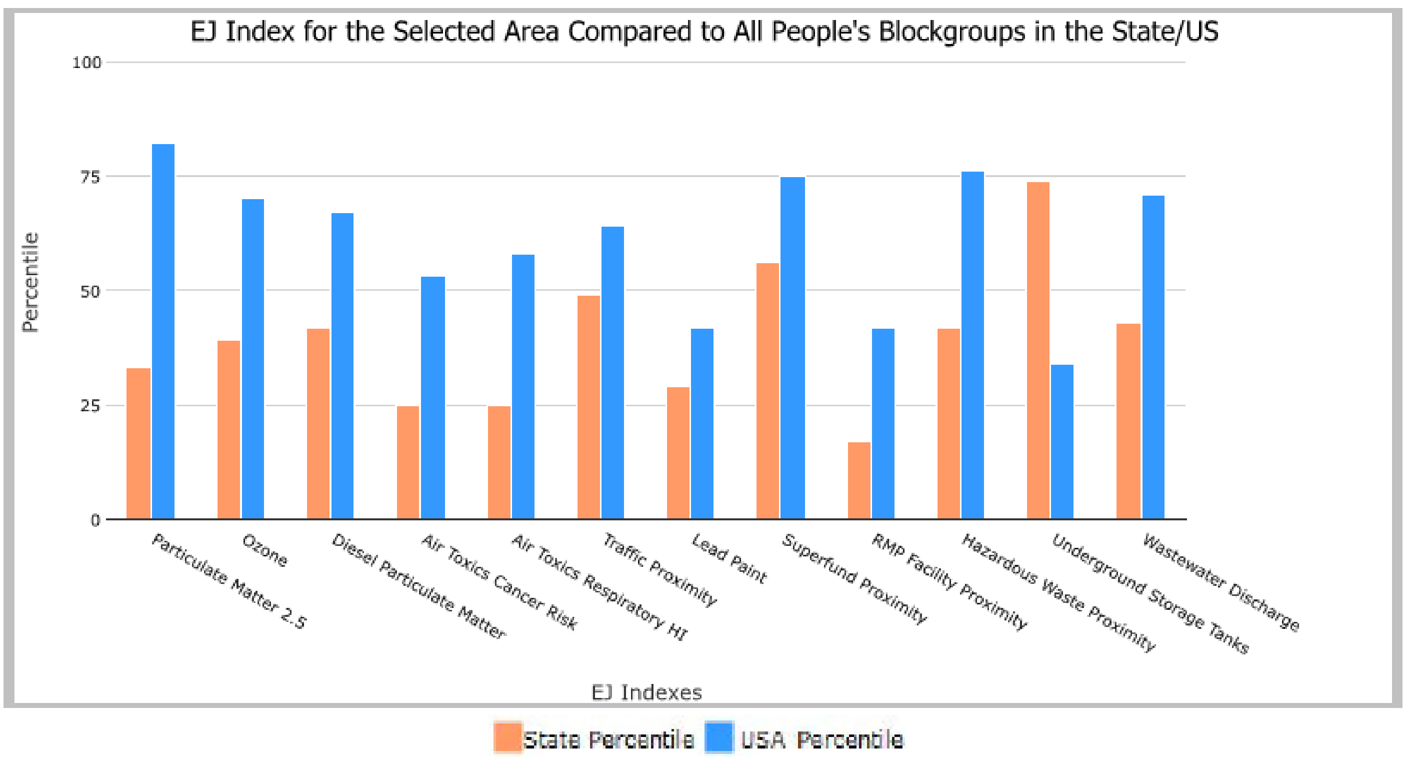
City: Oceanside, CALIFORNIA, EPA Region 9

Approximate Population: 176,658

Input Area (sq. miles): 42.16

City of Oceanside (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	USA Percentile
Environmental Justice Indexes		
EJ Index for Particulate Matter 2.5	33	82
EJ Index for Ozone	39	70
EJ Index for Diesel Particulate Matter*	42	67
EJ Index for Air Toxics Cancer Risk*	25	53
EJ Index for Air Toxics Respiratory HI*	25	58
EJ Index for Traffic Proximity	49	64
EJ Index for Lead Paint	29	42
EJ Index for Superfund Proximity	56	75
EJ Index for RMP Facility Proximity	17	42
EJ Index for Hazardous Waste Proximity	42	76
EJ Index for Underground Storage Tanks	74	34
EJ Index for Wastewater Discharge	43	71



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

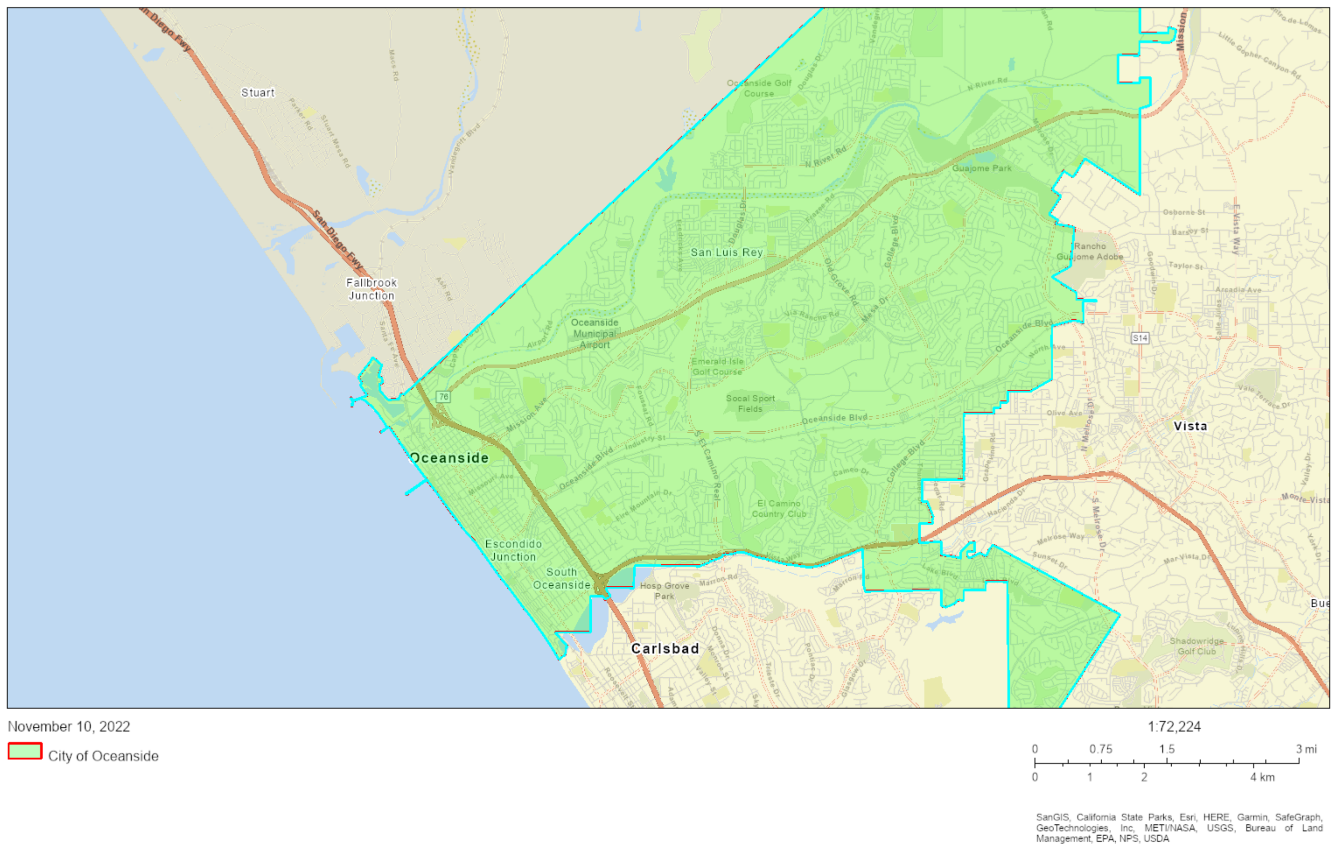
EJScreen Report (Version 2.1)

City: Oceanside, CALIFORNIA, EPA Region 9

Approximate Population: 176,658

Input Area (sq. miles): 42.16

City of Oceanside (The study area contains 1 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	12

EJScreen Report (Version 2.1)

City: Oceanside, CALIFORNIA, EPA Region 9

Approximate Population: 176,658

Input Area (sq. miles): 42.16

City of Oceanside (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 (μg/m^3)	10.3	11.7	26	8.67	88
Ozone (ppb)	42.5	47.7	34	42.5	52
Diesel Particulate Matter* (μg/m^3)	0.253	0.33	37	0.294	50-60th
Air Toxics Cancer Risk* (lifetime risk per million)	24	31	39	28	50-60th
Air Toxics Respiratory HI*	0.32	0.43	33	0.36	50-60th
Traffic Proximity (daily traffic count/distance to road)	820	1400	66	760	77
Lead Paint (% Pre-1960 Housing)	0.093	0.28	34	0.27	34
Superfund Proximity (site count/km distance)	0.1	0.17	57	0.13	67
RMP Facility Proximity (facility count/km distance)	0.14	1.1	12	0.77	25
Hazardous Waste Proximity (facility count/km distance)	3	5.2	41	2.2	78
Underground Storage Tanks (count/km^2)	0.62	1.5	75	3.9	42
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.06	67	56	12	82
Socioeconomic Indicators					
Demographic Index	40%	44%	45	35%	65
People of Color	55%	63%	42	40%	70
Low Income	26%	29%	52	30%	47
Unemployment Rate	6%	6%	56	5%	63
Limited English Speaking Households	5%	9%	48	5%	74
Less Than High School Education	13%	16%	55	12%	66
Under Age 5	6%	6%	60	6%	61
Over Age 64	15%	14%	58	16%	49

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

Appendix F

Sediment Sampling and Analysis Plan Report

FINAL SAMPLING AND ANALYSIS REPORT

2017-2018 OCEANSIDE HARBOR GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION PROJECT

USACE Contract No. W912PL-17-D-0003, Task Order No. 0004

AECOM Project No. 60555449.01000

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
LOS ANGELES, CALIFORNIA

Prepared by:

AECOM Technical Services
999 TOWN AND COUNTRY ROAD
ORANGE, CA 92868

AECOM

KINNETIC LABORATORIES INC.
10377 LOS ALAMITOS BLVD
LOS ALAMITOS, CA 90720

KINNETIC LABORATORIES INCORPORATED

June 8, 2018

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FINAL SAMPLING AND ANALYSIS REPORT
2017-2018 Oceanside Harbor Geotechnical and Environmental Investigation Project

USACE Contract No. W912PL-17-D-0003, Task Order No. 0004

AECOM Project No. 60555449.01000

June 8, 2018

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APPENDICES

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LIST OF ACRONYMS

ASTM	American Society for Testing and Materials	**NAD 83**	North American Datum of 1983
BLK	Method or Procedural Blank	**ND**	Not Detected
BMP	Best Management Practice	**NOAA**	National Oceanic and Atmospheric Administration
BS	Blank Spike	**OEHA**	Office of Environmental Hazard Assessment
BSD	Blank Spike Duplicate	**OTM**	Ocean Testing Manual
Cal/EPA	California Environmental Protection Agency	**PAH**	Polyaromatic Hydrocarbon
CD	Compact Disc	**PCB**	Polychlorinated Biphenyl
CDFG	California Department of Fish and Game	**PDS**	Post Digestion Spike
CESPD	Corps of Engineers South Pacific Division	**PDSD**	Post Digestion Spike Duplicate
CHHSL	California Human Health screening Level	**PPB**	Parts Per Billion
COC	Chain of Custody	**PPM**	Parts Per Million
CSLC	California State Lands Commission	**PRG**	Preliminary Remediation Goals
CV	Coefficient of Variation	**PVC**	Polyvinyl Chloride
cy	Cubic Yards	**QA**	Quality Assurance
CRM	Certified Reference Material	**QC**	Quality Control
DDD	Dichlorodiphenyldichloroethane	**QUAL**	Qualifier
DDE	Dichlorodiphenyldichloroethylene	**RBC**	Risk-Based Concentration
DDT	Dichlorodiphenyltrichloroethane	**RL**	Reporting Limit
DGPS	Differential Global Positioning Satellite	**RPD**	Relative Percent Difference
DTSC	Department of Toxic Substances Control	**RSLs**	Regional Screening Levels for Cleanup of Superfund Sites
DUP	Laboratory Replicates	**SAPR**	Sampling and Analysis Report
EDD	Electronic data deliverable	**SAP**	Sampling and Analysis Plan
ERL	NOAA Effects Range Low	**SC-DMMT**	Southern California Dredge Material Management Team
ERM	NOAA Effects Range Medium	**SOPs**	Standard Operating Procedures
GPS	Global Positioning Satellite	**SRM**	Standard Reference Material
HHMSSL	Human Health Medium – Specific Screening Levels	**STLC**	Title 22 Soluble Threshold Limit Concentration
HDPE	High-density Polyethylene	**SURR**	Surrogate Analysis
ITM	Inland Testing Manual	**SDRWQCB**	San Diego Regional Water Quality Control Board
LCL	Lower Control Limit	**SWQCB**	State Water Resources Control Board
LCS	Laboratory Control Spike	**TOC**	Total Organic Carbon
LDPE	Low-density Polyethylene	**TRPH**	Total Recoverable Hydrocarbons
LPC	Limiting Permissible Concentration	**TTLC**	Title 22 Total Threshold Limit Concentration
LSD	Least Significant Difference	**USACE**	U.S. Army Corps of Engineers
MLLW	Mean Lower Low Water	**USFWS**	U.S. Fish and Wildlife Service
MS	Matrix Spike	**USEPA**	U.S. Environmental Protection Agency
MSD	Minimum Significant Difference	**USNMFS**	U.S. National Marine Fisheries Service

FINAL SAMPLING AND ANALYSIS REPORT

2017-2018 Oceanside Harbor Geotechnical and Environmental Investigation Project

USACE Contract No. W912PL-17-D-0003, Task Order No. 0004

June 8, 2018

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) conducts periodic maintenance dredging of the Entrance Channel, Del Mar Channel, and Oceanside Channel of Oceanside Harbor in Oceanside, California (Figures 1 and 2). The dredging is perfomed in order to remove accumulated sediment above design depths. Sediments to be dredged require an environmental and physical evaluation periodically in order to support planning and permitting for dredging and reuse.

This sampling and analysis report (SAPR) has been prepared on behalf of the USACE, Los Angeles District to detail procedures and results, including quality assurance/quality control (QA/QC) results, from the sampling and testing of sediments from Oceanside Harbor identified for reuse for beach nourishment. This work was performed under AECOM's USACE Contract No. W912PL-17-D-0003 and is authorized by 1958 Rivers and Harbors Act (H. DOC. 356, 90TH CONG. 2nd SESS).

1.1 Project Summary

The purpose of this project was to sample and test sediments from shoaled areas within the Oceanside Harbor federal channels and provide sediment quality data necessary to evaluate the intended reuse of the dredged sediments. This project was designed to fulfill requirements of CESPD Regulation No. 1110-1-8 (CESPD, 2000), the Inland Testing Manual (ITM) (USACE and USEPA, 1998), the Clean Water Act (CWA), and the Southern California Dredge Material Management Team (SC-DMMT) draft guidelines. Sampling and testing of this project was conducted according to the project Sampling and Analysis Plan (SAP) (AECOM and Kinnetic Laboratories, 2017) finalized in November 2017.

Oceanside Harbor has been divided into three dredge units based on the channel area or sand trap area and design depths. The Del Mar (Area A) and Oceanside (Area B) Channels both have an authorized depth of -20 ft MLLW. The Entrance Channel and adjacent sand traps (Area C) have an authorized depth of -25 feet MLLW. Allowable overdredge depth is two feet for all areas. An additional three feet has been allocated for the Entrance Channel Advanced Maintenance areas to a depth of -30 feet MLLW. Figures 3 through 5 depict the October 2017 bathymetric data and shoaling left after the October 2017 maintenance dredging. Exact future dredging volumes are uncertain at this time and will not be known until pre-dredge condition surveys are conducted. Over the past 10 years, an average of 270,400 cy/year has been dredged from the federal channels with most of the material coming from the Entrance Channel and Sand Traps. The project intent is to beneficially reuse all of the Oceanside Harbor dredged material each dredge cycle for beach nourishment at Oceanside Beach and/or at a nearshore placement site to the south of Oceanside Beach, provided that physical and chemical properties of the sediments are suitable for such reuse. Figure 6 shows the locations of the placement sites. Project elevations, sampling elevations, and 10-year average dredge volumes for each channel in Oceanside Harbor are provided in Table 1.

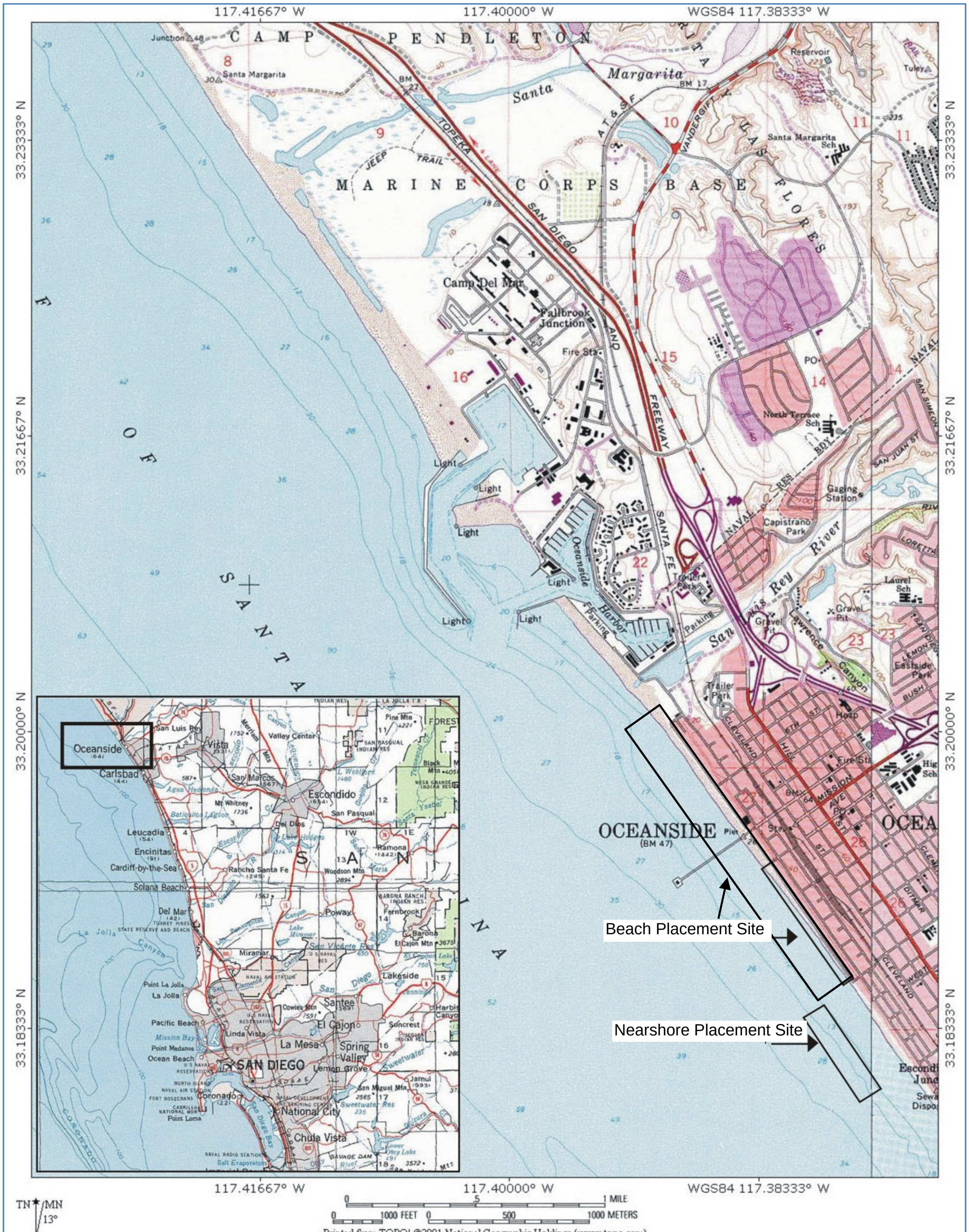
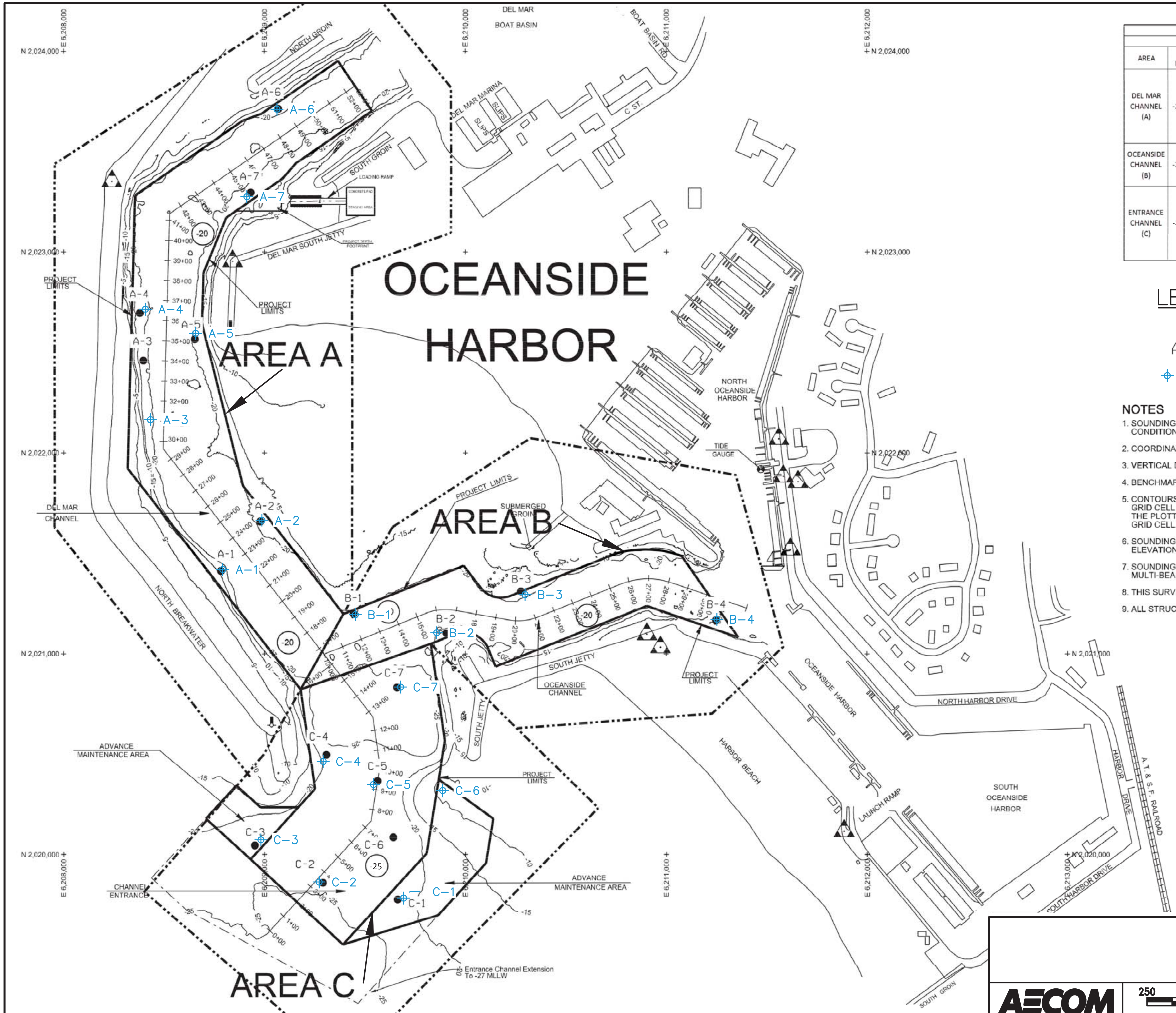


Figure 1. Location of Oceanside Harbor



OCEANSIDE MAINTENANCE DREDGING 2018					
CORE SAMPLE LOCATIONS					
AREA	PROJECT ELEVATION	OVERDEPTH ELEVATION	VIBRACORE NAME	EASTING	NORTHING
DEL MAR CHANNEL (A)	-20 FT MLLW	-22 FT MLLW	OHVC17-A-1	6,208,783	2,021,412
			OHVC17-A-2	6,208,980	2,021,658
			OHVC17-A-3	6,208,397	2,022,459
			OHVC17-A-4	6,208,380	2,022,696
			OHVC17-A-5	6,208,653	2,022,566
			OHVC17-A-6	6,209,069	2,023,713
			OHVC17-A-7	6,208,932	2,023,296
OCEANSIDE CHANNEL (B)	-20 FT MLLW	-22 FT MLLW	OHVC17-B-1	6,209,444	2,021,198
			OHVC17-B-2	6,209,907	2,021,102
			OHVC17-B-3	6,210,276	2,021,311
			OHVC17-B-4	6,211,248	2,021,166
ENTRANCE CHANNEL (C)	-25 FT MLLW	-30 FT MLLW	OHVC17-C-1	6,209,663	2,019,777
			OHVC17-C-2	6,209,291	2,019,860
			OHVC17-C-3	6,208,952	2,020,046
			OHVC17-C-4	6,209,309	2,020,496
			OHVC17-C-5	6,209,562	2,020,366
			OHVC17-C-6	6,209,641	2,020,086
			OHVC17-C-7	6,209,659	2,020,832

LEGEND

A-1 SAMPLE LOCATION

B-4 PROPOSED SAMPLE LOCATION

NOTES

1. SOUNDINGS AND ELEVATIONS, IN SURVEY FEET, INDICATE THE GENERAL CONDITIONS EXISTING ONLY AT THE TIME OF THE SURVEY - JUNE 15 2017.
2. COORDINATES ARE CALIFORNIA LAMBERT ZONE VI, (NAD 1983) .
3. VERTICAL DATUM IS MLLW, OCEANSIDE, EPOCH 1983-2001, STATION ID# 9410396.
4. BENCHMARK IS 0396 A (VM# 7990) , ELEVATION 16.29 US FEET.
5. CONTOURS ARE BASED ON THE AVERAGE DEPTH OF SOUNDINGS WITHIN A 3ft GRID CELL AND ARE GIVEN THE COORDINATES OF THE CENTER OF THAT CELL, THE PLOTTED DEPTHS ARE FROM THE SOUNDING NEAREST THE CENTER OF A 50ft GRID CELL.
6. SOUNDINGS ARE SHOWN TO THE NEAREST 0.1 FOOT AND IF THERE ARE NON-WATER ELEVATIONS THEY ARE SHOWN TO THE NEAREST 0.01 FOOT
7. SOUNDINGS LOCATED BY DIFFERENTIAL GPS SYSTEM. DEPTHS MEASURED BY A MULTI-BEAM ECHO SOUNDER PROVIDING NEAR FULL BOTTOM COVERAGE.
8. THIS SURVEY WAS PERFORMED USING THE 26ft SURVEY BOAT "MAPPER".
9. ALL STRUCTURES SHOWN ARE APPROXIMATE.

OCEANSIDE HARBOR FEDERAL CHANNELS
O&M DREDGING PROJECT AREA
OCEANSIDE, CALIFORNIA

AECOM	250 0 250 500 FT SCALE: 1"= 500'	CHECKED BY:	DATE: 03-29-18	FIG. NO:
		PM: XXX	PROJ. NO: 60555449	2

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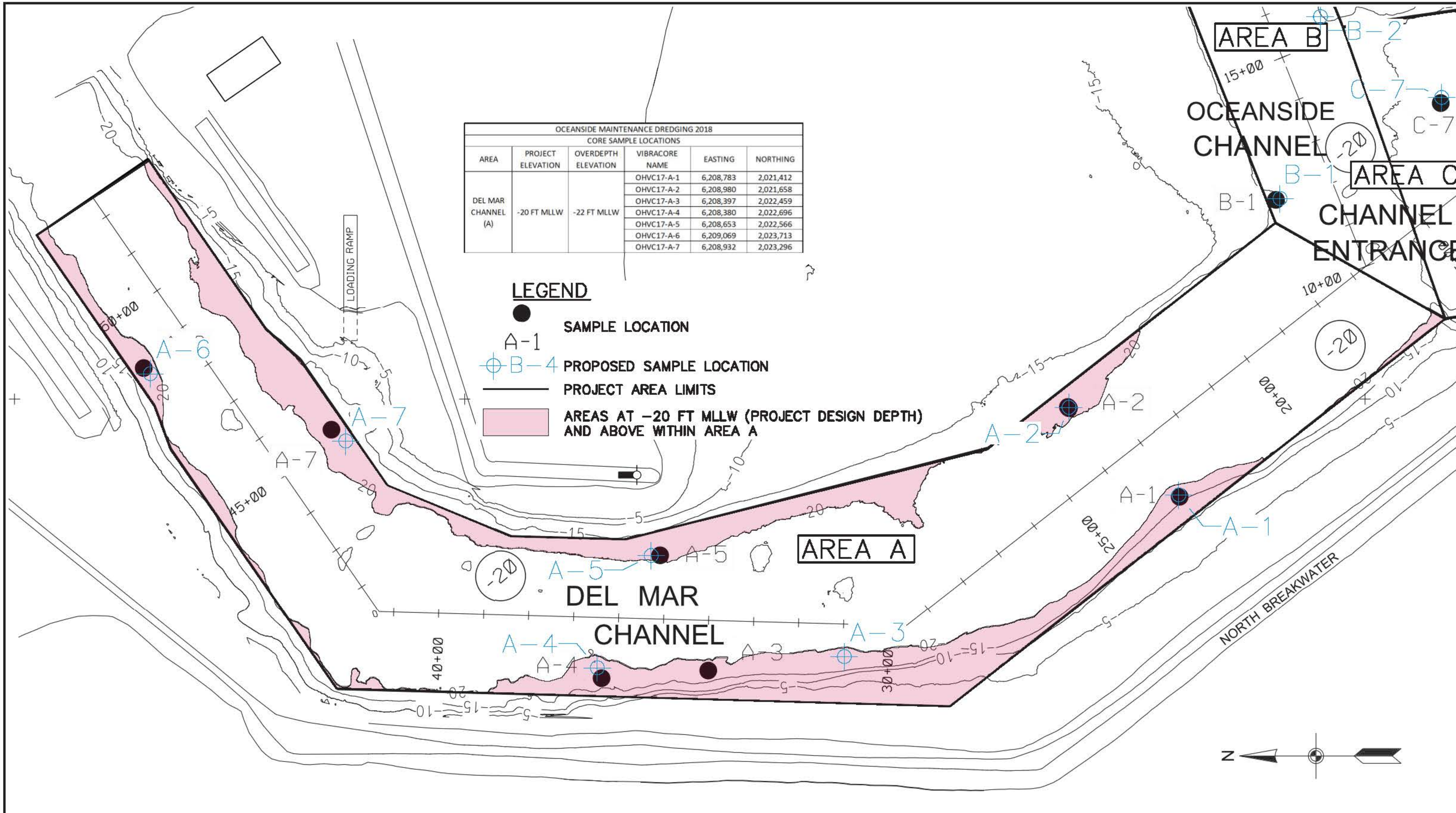

OCEANSIDE MAINTENANCE DREDGING 2018					
CORE SAMPLE LOCATIONS					
AREA	PROJECT ELEVATION	OVERDEPTH ELEVATION	VIBRACORE NAME	EASTING	NORTHING
DEL MAR CHANNEL (A)	-20 FT MLLW	-22 FT MLLW	OHVC17-A-1	6,208,783	2,021,412
			OHVC17-A-2	6,208,980	2,021,658
			OHVC17-A-3	6,208,397	2,022,459
			OHVC17-A-4	6,208,380	2,022,696
			OHVC17-A-5	6,208,653	2,022,566
			OHVC17-A-6	6,209,069	2,023,713
			OHVC17-A-7	6,208,932	2,023,296

OCEANSIDE HARBOR FEDERAL CHANNELS
O&M DREDGING PROJECT AREA
OCEANSIDE, CALIFORNIA

AECOM	SCALE: 1"= 200' (100 0 100 200 FT)	CHECKED BY:	DATE: 03-14-18	FIG. NO: 3
		PM: XXX	PROJ. NO: 60555449	

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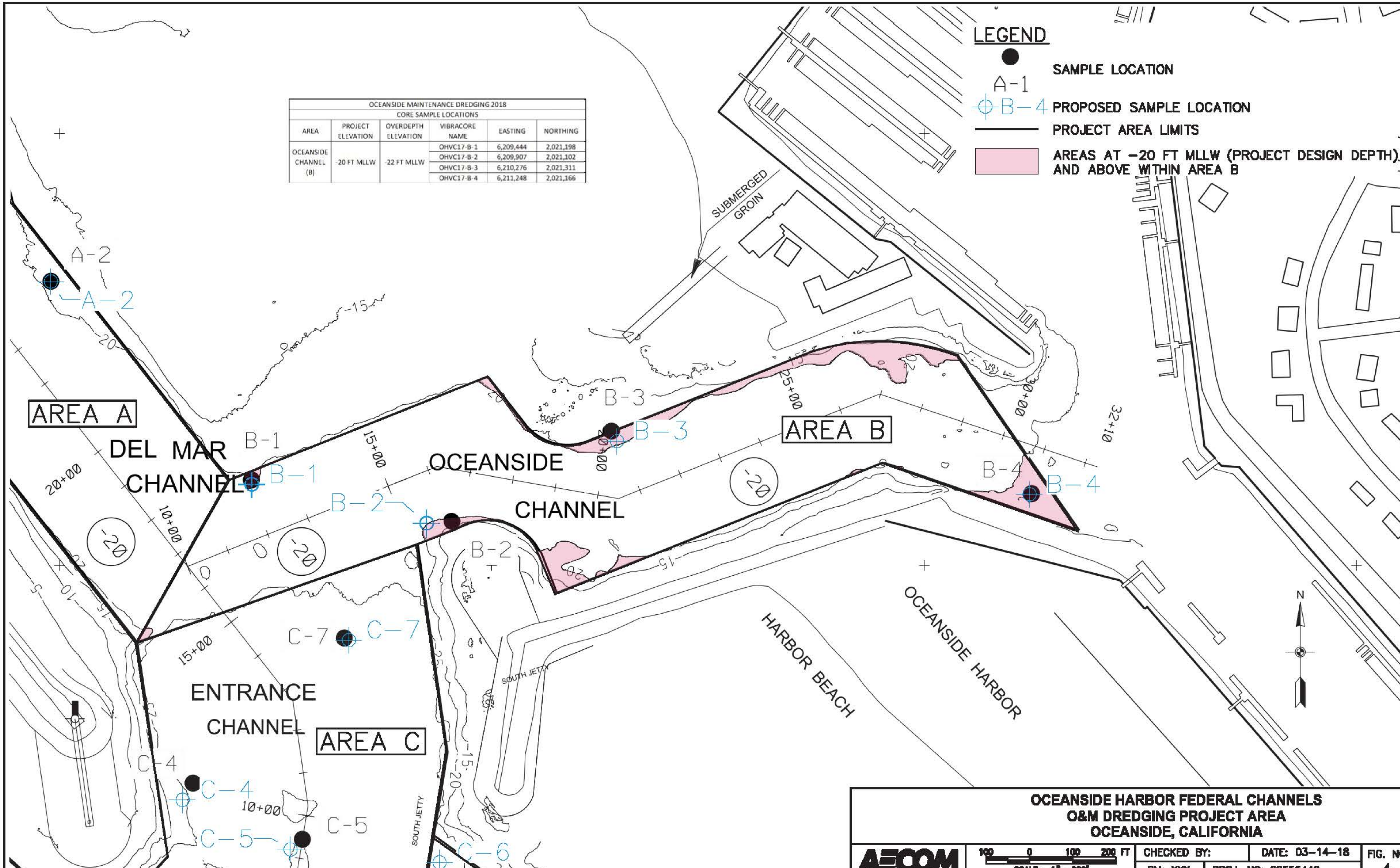

OCEANSIDE MAINTENANCE DREDGING 2018					
CORE SAMPLE LOCATIONS					
AREA	PROJECT ELEVATION	OVERDEPTH ELEVATION	VIBRACORE NAME	EASTING	NORTHING
OCEANSIDE CHANNEL (B)	-20 FT MLLW	-22 FT MLLW	OHVC17-B-1	6,209,444	2,021,198
			OHVC17-B-2	6,209,907	2,021,102
			OHVC17-B-3	6,210,276	2,021,311
			OHVC17-B-4	6,211,248	2,021,166

OCEANSIDE HARBOR FEDERAL CHANNELS
O&M DREDGING PROJECT AREA
OCEANSIDE, CALIFORNIA

AECOM

100 0 100 200 FT
SCALE: 1"= 200'

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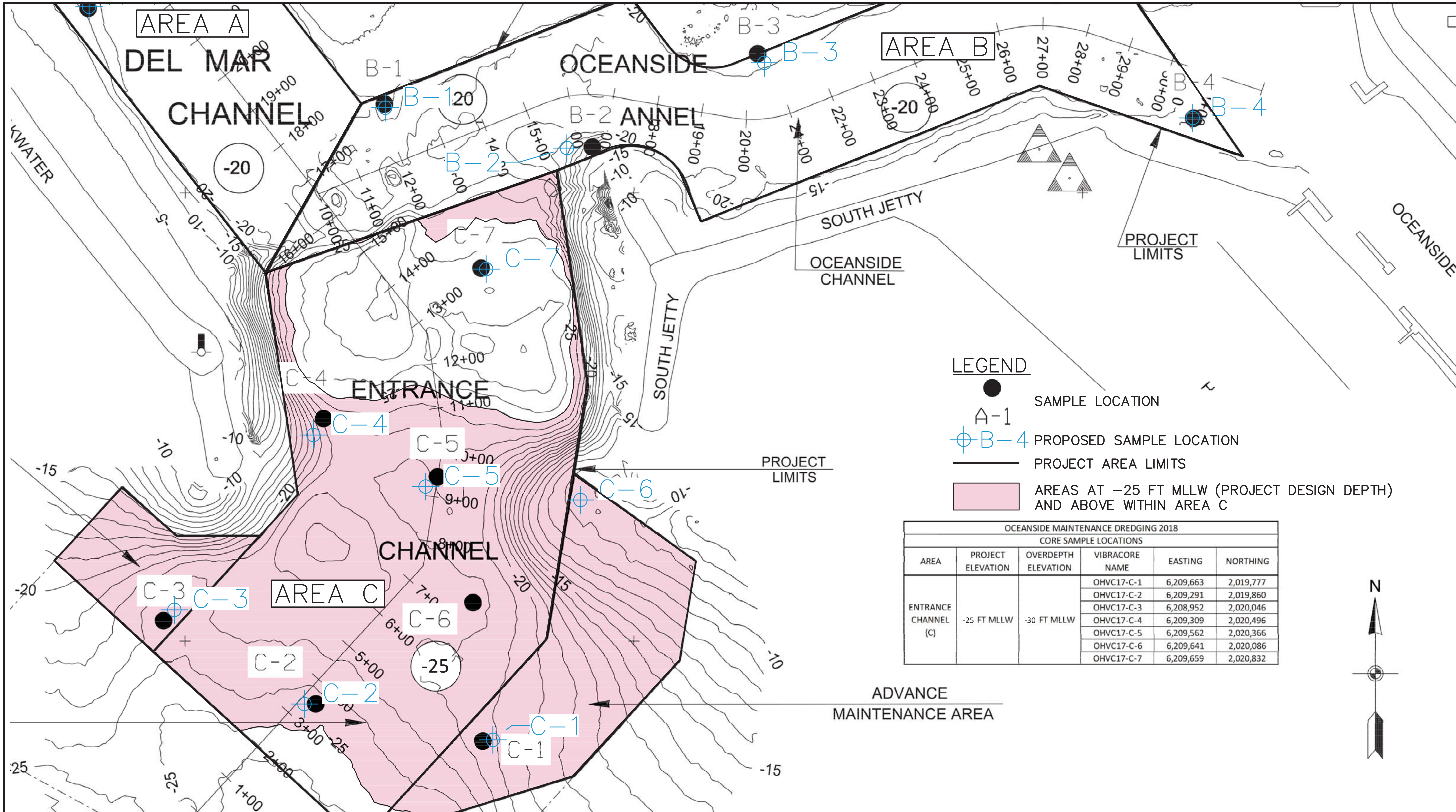

OCEANSIDE MAINTENANCE DREDGING 2018					
CORE SAMPLE LOCATIONS					
AREA	PROJECT ELEVATION	OVERDEPTH ELEVATION	VIBRACORE NAME	EASTING	NORTHING
ENTRANCE CHANNEL (C)	-25 FT MLLW	-30 FT MLLW	OHVC17-C-1	6,209,663	2,019,777
			OHVC17-C-2	6,209,291	2,019,860
			OHVC17-C-3	6,208,952	2,020,046
			OHVC17-C-4	6,209,309	2,020,496
			OHVC17-C-5	6,209,562	2,020,366
			OHVC17-C-6	6,209,641	2,020,086
			OHVC17-C-7	6,209,659	2,020,832

Entrance Channel Extension

OCEANSIDE HARBOR FEDERAL CHANNELS
O&M DREDGING PROJECT AREA
OCEANSIDE, CALIFORNIA

AECOM

100 0 100 200 FT
SCALE: 1"= 200'

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FIG. NO: 5

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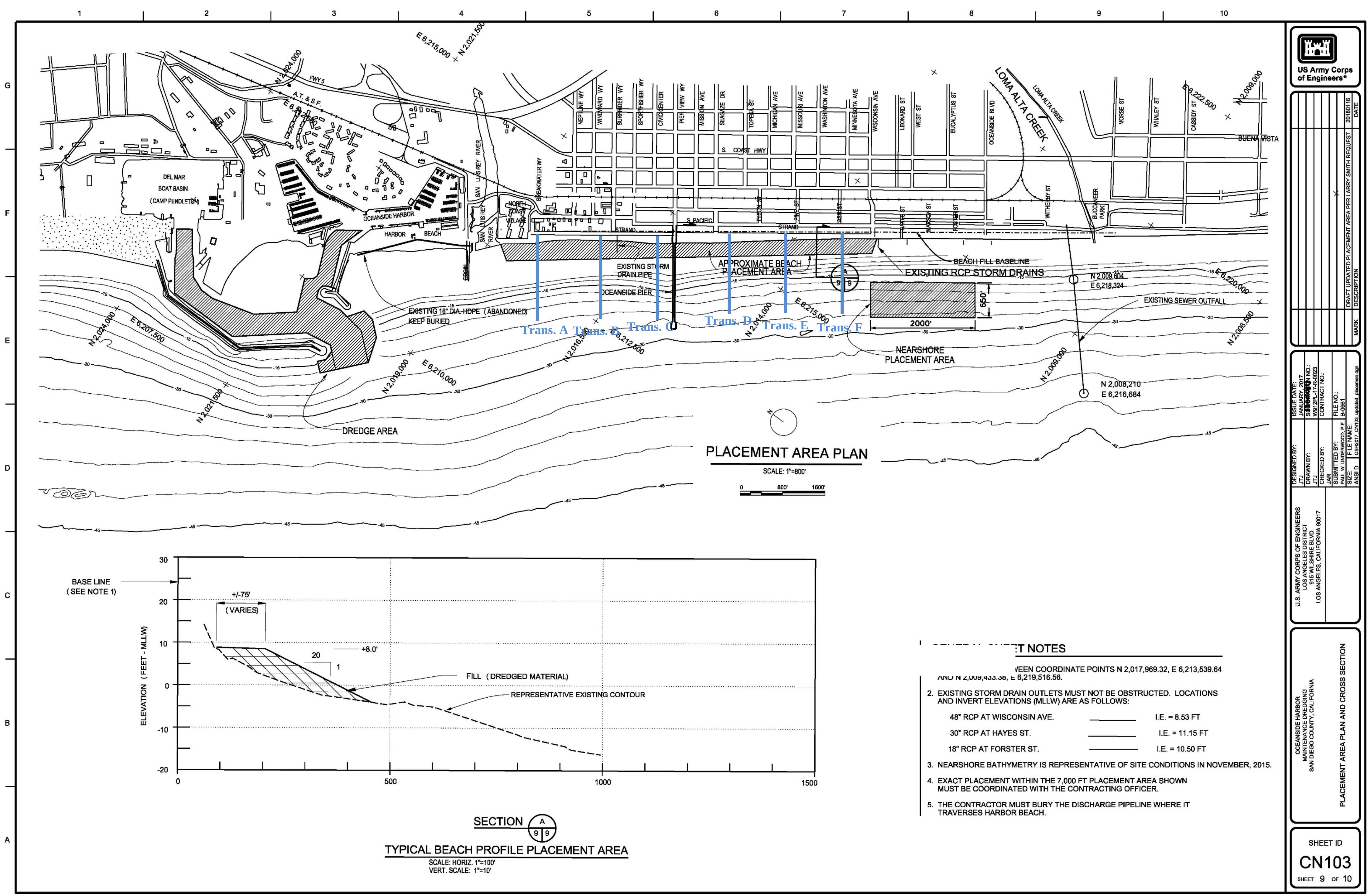

Figure 6. Oceanside City Beach Placement Sites and Beach Transect Locations.

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Table 1. Dredge Area Volume Estimates for the Oceanside Federal Channels.

Dredge/ Composite Area	Project Elevation (ft, MLLW)	Project Elevation + Overdepth (ft, MLLW)	Sampling Elevation* (ft, MLLW)	10-Year Average Dredge Quantities (CY)
A	-20	-22	-22	4,414
B	-20	-22	-22	6,225
C	-25	-30	-30	259,761
TOTAL YEARLY AVERAGE DREDGE QUANTITIES				**270,400**

* Sampling depth includes two feet for overdepth allowance for Areas A and B and C; Area C has an advanced maintenance dredging allowance to -30 feet MLLW.

Oceanside Harbor is usually dredged with a hydraulic cutterhead dredge, and this same method is expected for future dredging episodes. Dredged material is usually placed directly on the beach.

1.2 Site Location

Oceanside Harbor is located in San Diego County, California (Figure 1). Geographic coordinates (NAD 83) for the north side of the Entrance to Ocean Side Harbor are 33° 12' 20" N and 117° 24' 3" W. The Oceanside Beach placement site is to the south of Oceanside Harbor and the San Luis Rey River along the Strand between 33° 11' 9' N and 117° 23' 36" W and 33° 10' 52" N and 117° 22' 39" W; starting at the northern boundary of the North Coast Village extending to Wisconsin Avenue (Figure 6).

The Oceanside nearshore placement site is bounded by the following corner coordinates:

- 33° 11.081'N, 117° 22.765'W
- 33° 11.018'N, 117° 22.880'W
- 33° 10.754'N, 117° 22.655'W
- 33° 10.817'N, 117° 22.551'W

1.3 Roles and Responsibilities

Project responsibilities and key contacts for this sediment characterization program are listed in Tables 2 and 3. Kinnetic Laboratories Inc. (KLI) provided sampling services. Core logging and geotechnical testing was provided by AECOM. Both AECOM and KLI were responsible for SAP development and reporting. Analytical chemical testing of sediments for this project was carried out by Eurofins Calscience (Cal-ELAP No. 2944).

Table 2. Project Team and Responsibilities.

Responsibility	Name	Affiliation
Project Planning and Coordination	James Fields Jeffrey Devine Larry Smith David Schug Ken Kronschnabl	USACE USACE USACE AECOM Kinnetic Laboratories
SAP Preparation	Ken Kronschnabl David Schug	Kinnetic Laboratories AECOM
Field Sample Collection and Transport	Spencer Johnson Dale Parent	Kinnetic Laboratories Kinnetic Laboratories
Geotechnical Investigation	David Schug Sabah Fanaiyan Jeffrey Devine	AECOM AECOM USACE
Health and Safety Officer and Site Safety Plan	Derek Rector[1] Jon Toal	AECOM Kinnetic Laboratories
Laboratory Chemical Analyses and Laboratory Coordination	Carla Hollowell Amy Howk	Eurofins Kinnetic Laboratories
QA/QC Management Analytical Laboratory QA/QC	Danielle Gonsman Amy Howk Carla Hollowell Amy Dahl	Kinnetic Laboratories Kinnetic Laboratories Eurofins AECOM
Technical Review	Pat Kinney Jeffrey Devine Joe Ryan	Kinnetic Laboratories USACE USACE
Final Report	Ken Kronschnabl David Schug Michael Smith	Kinnetic Laboratories AECOM AECOM
Agency Coordination	Jeffrey Devine Larry Smith	USACE USCAE

[1] Other AECOM staff may be SSHO's depending on availability.

Table 3. Key Project Contacts

James Fields USACE Project Manager PPMD Navigation and Coastal Projects Branch U. S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, Ca. 90017 Tel. (213) 452-3403 james.A.Fields@usace.army.mil	Jeffrey Devine USACE Project Technical Manager Geology and Investigations Section U. S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, Ca. 90017 Tel. (213) 452-3579 Jeffrey.D.Devine@usace.army.mil
David Schug, CEG, CHG Senior Principal Geologist, GeoEngineering AECOM 401 West A Street, Suite 1200 San Diego, CA 92101 Tel. (619) 610-7600 david.schug@aecom.com	Ken Kronschnabl Project Manager - Sampling/Testing Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 kkronsch@kinneticlabs.net
Spencer Johnson Field Operations Mgr. Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 sjohnson@kinneticlabs.net	Michele Castro Business Development Manager Eurofins Calscience, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Tel.: (949) 870-8766 MicheleCastro@eurofinsUS.com
Amy Howk KLI QA/QC Management Kinnetic Laboratories, Inc. 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 ahowk@kinneticlabs.net	Michael Smith, PE, GE, Principal Geotechnical Engineer AECOM 999 Town and Country Road Orange, CA 92868 D 1-714-567-2791 C 1-714-697-5239 michael.g.smith@aecom.com
Larry Smith USACE Environmental Coordinator U.S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, CA 90017 Tel (213) 452-3846 lawrence.j.smith@usace.army.mil	

1.3.1 Data Users

The principal users of data produced by this project are the following Southern California Dredge Material Management Team (SC-DMMT) regulating agencies:

1. Los Angeles District, U.S. Army Corps of Engineers (USACE);
2. San Diego Regional Water Quality Control Board (RWQCB)—Region 9;
3. U.S. Environmental Protection Agency (USEPA) - Region IX; and
4. California Coastal Commission.

Other users of the data may include the following agencies:

1. California Department of Fish and Wildlife (CDFW);
2. U.S. Fish and Wildlife Service (USFWS);
3. U.S. National Marine Fisheries Service (USNMFS); and
4. California State Lands Commission (CSLC).

1.3.2 Operational Coordination with Others

Coordination of field operations, security requirements, and berthing options were made with the following contacts:

U.S. Coast Guard
Notice to Mariners
D11LNM@uscg.mil.

Oceanside Harbor Master
1540 Harbor Drive North
Oceanside, CA 92054-1070
Tel. (760) 435-4032

Robert Directo, P.E.
Project Leader, (Civil)
O&T Team
AC/S G-F, Public Works Dept.
Architecture & Engineering
robert.directo@usmc.mil

2.0 SITE HISTORY AND HISTORICAL DATA REVIEW

This section provides a brief history of Oceanside Harbor, potential sources of contamination, dredging history, and most recent testing and sampling results.

2.1 Harbor Construction, Site Setting and Potential Sources of Contamination

Oceanside Harbor is located 37 miles north of the City of San Diego and just to the north of the City of Oceanside and the mouth of the San Luis Rey River. The harbor was built in two sections. The southern wing houses a small fishing fleet and the northern wing is for recreational boaters. There are more than 900 permanent slips.

The Del Mar Boat Basin is located to the north of the Harbor and is connected to the entrance by the Del Mar Channel. It was first developed in 1942 shortly after Camp Pendleton was commissioned to support US Marine amphibious training missions.

The U.S. Army Corps of Engineers maintains the Entrance Channel, the Oceanside Channel and the Del Mar Channel. The Entrance Channel has an authorized dredge depth of –25 feet MLLW. The Oceanside Channel and the Del Mar Channel both have an authorized dredge depth of -20 feet MLLW. Advanced maintenance dredging has been authorized for the Entrance Channel and adjacent sand traps. The "Advances Maintenance" areas are designed to trap sediments deposited by along shore currents. Allowable overdredge depth is two feet for all areas. The depth of the advanced maintenance dredging has been allocated for the Entrance Channel Advanced Maintenance areas to a depth of -30 feet MLLW.

There are no fuel docks, pump out facilities, commercial and industrial facilities, and major storm drains bordering the federal channel areas. There is a fuel dock located just inside the public marina on the far end of the Oceanside Channel. The public marina also contains several pump out facilities and numerous small storm water outfalls that drain local streets and parking lots. However, there are no major storm water outfalls within the public marina. The Del Mar Boat Basin also contains a fuel dock and pump out facilities.

2.2 Previous Oceanside Harbor Dredging and Testing Episodes

Oceanside Harbor was formally dedicated in 1963. The U.S. Army Corps of Engineers has dredged every year since 2004. Volumes, methods, and placement sites for these dredging episodes are identified in Table 4.

Oceanside Harbor sediments were last sampled in February 2012 and tested for beach nourishment. Thirty-five core samples (16 from the Del Mar Channel, 8 from the Oceanside Channel and 11 from the Entrance Channel/Sand Traps) were collected to project depths plus two feet (or refusal) and analyzed for grain size distribution. Data from these analyses were compared to the grain size distribution of sediments from Oceanside City Beach collected along four transects as well as from a nearshore placement site. Representative portions of the 35 cores were combined into three composite samples (one from each channel area) and tested for bulk sediment chemical analyses to determine if the Harbor sediments were environmentally suitable for beach nourishment. Results of this study are summarized in a report by Diaz Yourman, GeoPentech and Kinnetic Laboratories, JV (2012). Summary sampling and testing data from this 2012 study are provided in Appendix A.

Table 4. Oceanside Harbor Dredging History

Dredge Year	Channel(s) Dredged	Vol. Removed *(cubic yards)*	Dredge Method	Placement Location
2004	Entrance Oceanside	212,900 9,700	hydraulic cutterhead	Oceanside Beach
2005	Entrance Del Mar	262,000 3,000	hydraulic cutterhead	Oceanside Beach
2006	Entrance Oceanside Del Mar	204,800 6,200 16,600	hydraulic cutterhead	Oceanside Beach
2007	Entrance Oceanside Del Mar	122,000 7,000 58,000	hydraulic cutterhead	Oceanside Beach
2008	Entrance	240,000	hydraulic cutterhead	Oceanside Beach
2009	Entrance	227,500	hydraulic cutterhead	Oceanside Beach
2010	Entrance Oceanside	269,000 6,000	hydraulic cutterhead	Oceanside Beach
2011	Entrance Del Mar	166,000 13,100	hydraulic cutterhead	Oceanside Beach
2012	Entrance	244,400	hydraulic cutterhead	Oceanside Beach
2013	Entrance Del Mar	187,900 5,900	hydraulic cutterhead	Oceanside Beach Oceanside Beach
2014	Entrance	200,400	hydraulic cutterhead	Oceanside Beach
2015	Entrance	199,400	hydraulic cutterhead	Oceanside Beach
2016	Entrance Oceanside	208,500 36,700	hydraulic cutterhead	Oceanside Beach
2017	Entrance Oceanside Del Mar	416,300 7,100 11,800	hydraulic cutterhead	Oceanside Beach (North coast Village to Seagaze Dr.)

USACE, Los Angeles District conducted the beach physical compatibility analysis based on the 2012 sampling event. Their report concluded that all of the sediment within the three dredge footprint areas (A, B and C) were compatible at the receiver beaches and nearshore site based on the weighted average grain size composite curve of each footprint area as a whole. There were some areas of less compatible sediment (two locations in the Del Mar Channel and two locations in the Oceanside Channel). However, the overall proportion of fines in the vicinity of the locations with finer grain sediment was approximately 6% for the Del Mar Channel and 12% for the Oceanside Channel.

Most chemical contaminants were not detected in the three composite samples (Diaz Yourman, GeoPentech and Kinnetic Laboratories, JV, 2012). Of those detected, most concentrations were very low compared to ecological effects based screening values and human health screening values. Total DDT in the Oceanside Channel composite sample was the only contaminant in a sample above lower effects based screening levels. Arsenic, which is found naturally in California soils, was the only contaminant above human health screening values.

Based on the physical characteristics and low contaminant concentrations, the 2012 Oceanside harbor sediments were deemed ideal for beach nourishment reuse.

3.0 METHODS

This section describes the dredging design, study design and field and analytical methods for this testing program.

3.1 Dredge Design

Bathymetric data from October 2017 in relationship to target sampling locations are shown on Figures 3 through 5. These figures also define the limits of dredging, and design depths for each area identified for dredging are indicated on these figures.

3.2 Sampling and Testing Design

The sampling and testing design for this SAPR covers data collection tasks for Oceanside Harbor sediment collection and testing and Oceanside City Beach placement site and nearshore site sampling and testing. Evaluation guidelines are also discussed.

3.2.1 Sampling and Testing Approach

The main approach was to sample dredge sediments to dredge depths plus allowable overdepth, composite sediments by area, and submit the composite samples for chemical testing to determine if they are suitable for beach nourishment. The approach was also to determine the physical properties of the sediments at each location and at different depths. Testing followed requirements and procedures detailed in the ITM (USEPA/USACE, 1998) with further guidance from Los Angeles District USACE guidelines (CESPL, undated), and from SC-DMMT draft guidelines. Acceptability guidelines published in these documents were used to evaluate the suitability of Oceanside Harbor maintenance-dredged sediments for beach nourishment.

3.2.2 Oceanside Harbor Sample Identification, Composite Areas, Sediment Collection and Testing

Vibracore sampling, as described in Section 3.3.2 (Vibracore Sampling Methods), was carried out to collect subsurface sediment data at seven (7) locations within Area A, four (4) locations in Area B, and at seven (7) locations in Area C for a total of 18 separate vibracore sampling locations. The prefix for each vibracore locations is “OSHVC-17-#-##.” Final sampling locations in relation to the target sampling locations are shown on Figures 2 through 5. All cores were advanced to below overdepth elevations. Geographic coordinates, approximate seafloor elevations, and target elevations for the sample locations are listed in Table 5. Note that a few sample locations in Area A and B were moved slightly to target more shoaling. In addition, Locations C-3 and C-6 were moved away from areas with extensive shoaling for safety reasons.

Table 5. Actual Sampling Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, and Sampling Elevations for Oceanside Harbor

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	California Lambert Zone 6 (NAD 83)		Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)[1]	Core Recovery (Sampled) (ft.)[2]	Core Interval Sampled (ft., MLLW)
				Northing (feet)	Easting (feet)	Latitude North	Longitude West				
Area A	OSHVC-17-A1	12/13/2017	0815	2021412	6208783	33° 12.505′	117° 24.224′	-18.8	-22.0	11.3 (3.2)	-18.8 to -22
	OSHVC-17-A2	12/13/2017	0840	2021658	6208980	33° 12.546′	117° 24.186′	-19.6	-22.0	11.4 (2.4)	-19.6 to -22
	OSHVC-17-A3	12/13/2017	0910	2022459	6208397	33° 12.627′	117° 24.302′	-16.4	-22.0	10.6 (5.6)	-16.4 to -22
	OSHVC-17-A4	12/13/2017	0940	2022696	6208380	33° 12.716′	117° 24.306′	-16.3	-22.0	11.1 (5.7)	-16.3 to -22
	OSHVC-17-A5	12/13/2017	1010	2022566	6208653	33° 12.695′	117° 24.252′	-19.3	-22.0	10.9 (2.7)	-19.3 to -22
	OSHVC-17-A6	12/13/2017	1045	2023713	6209069	33° 12.885′	117° 24.173′	-17.0	-22.0	11.3 (5.0)	-17.0 to -22
	OSHVC-17-A7	12/13/2017	1110	2023296	6208932	33° 12.816′	117° 24.199′	-17.2	-22.0	11.1 (4.8)	-17.2 to -22
Area B	OSHVC-17-B1	12/12/2017	1520	2021198	6209444	33° 12.471′	117° 24.094′	-19.4	-22.0	10.3 (2.6)	-19.4 to -22
	OSHVC-17-B2	12/12/2017	1550	2021102	6209907	33° 12.456′	117° 24.003′	-17.2	-22.0	10.9 (4.8)	-17.2 to -22
	OSHVC-17-B3	12/12/2017	1625	2021311	6210276	33° 12.491′	117° 23.931′	-18.3	-22.0	10.6 (3.7)	-18.3 to -22
	OSHVC-17-B4	12/13/2017	0735	2021166	6211248	33° 12.469′	117° 23.740′	-19.7	-22.0	11.1 (2.3)	-19.7 to -22
Area C	OSHVC-17-C1	12/12/2017	0835	2019777	6209663	33° 12.237′	117° 24.048′	-21.5	-30.0	13.5 (8.5)	-21.5 to -30
	OSHVC-17-C2	12/12/2017	1010	2019860	6209291	33° 12.250′	117° 24.121′	-24.5	-30.0	11.1 (5.5)	-24.5 to -30
	OSHVC-17-C3	12/12/2017	1050	2020046	6208952	33° 12.280′	117° 24.188′	-23.4	-30.0	12.0 (6.6)	-23.4 to -30
	OSHVC-17-C4	12/12/2017	1315	2020496	6209309	33° 12.355′	117° 24.119′	-23.0	-30.0	11.8 (7.0)	-23.0 to -30
	OSHVC-17-C5	12/12/2017	1240	2020366	6209562	33° 12.334′	117° 24.069′	-21.6	-30.0	10.7 (8.4)	-21.6 to -30
	OSHVC-17-C6	12/12/2017	1125	2020086	6209641	33° 12.288′	117° 24.053′	-22.8	-30.0	10.2 (7.2)	-22.8 to -30
	OSHVC-17-C7	12/12/2017	1345	2020832	6209659	33° 12.411′	117° 24.051′	-25.9	-30.0	11.6 (4.1)	-25.9 to -30

[1] Design depth plus overdepth is the environmental sampling depth. Overdepth is two feet for Areas A, B and C. An additional three feet has been allocated for Area C to a depth of -30 feet MLLW.

[2] (The bracketed depth is the depth of material included in the composite samples and depth of material used for physical compatibility analyses).

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A total of three (3) area composite samples were created from the three (3) channel/sand trap areas shown on Figure 2 and analyzed for bulk sediment chemistry. One composite sample was created from each channel area. Continuous samples from the mudline to project depths plus two feet for overdepth testing for Areas A, B and C, plus an additional three feet of advance maintenance for Area C, were collected from all core locations. These primary core intervals were homogenized and then combined with all primary core intervals in a composite area to the form composite samples for bulk sediment chemistry analyses. Sediments below overdepth elevations were not included in any sediment composite samples for chemistry. Composite samples and overdepth elevations are summarized in Table 5.

In addition to the composite samples, one archive bulk sediment chemistry sample was collected from each core location that represented the entire primary core interval (mudline to overdepth elevations). Further archiving was performed if any other suspicious potential contaminated layer existed, or if there was a significant change in the stratigraphy greater than two feet. All archive samples are being stored frozen for at least six months from the time of collection unless directed otherwise by the USACE Technical Manager.

Core subsamples for geotechnical testing included any geo-physically different layers of material in each core and analyzed for grain size distribution as described later in Section 3.2.4.

3.2.3 Oceanside City Beach Reference Samples

A series of surface grabs were collected along six (6) transects perpendicular to the shore at the receiving beach and from within a nearshore site south of the main placement site. The beach transect sampling consisted of collecting surface grab samples at eight elevations (+12, +6, 0, -6, -12, -18, -24 and -30 feet MLLW) along the six perpendicular transects. Three (3) of the beach transects were north of the Oceanside Pier and three (3) were south of the Pier as shown on Figures 6 and 7. Note that the +12 sample was not collected along the E and F transects (E1 and F1) due to a lack of beach and presence of riprap at the +12 feet MLLW elevation.

The nearshore sampling consisted of collecting ten (10) randomly placed sampling locations within the nearshore placement site identified on Figures 6 and 7. Individual geotechnical grain size testing was performed on all grab samples collected from the beach and nearshore sites. Table 6 provides a list of the final locations for the beach reference samples along with date and time of collection, and Figure 7 depicts the final locations.

In addition to individual grain size analyses, the 10 grab samples collected from the Corps of Engineers designated Oceanside nearshore placement site were composited into a single composite sample. This composite sample was archived as reference material should additional Tier III testing of the Oceanside Harbor composite samples becomes warranted.

Table 6. Dates, Times and Sampling Coordinates for Samples Collected from Beach Transects and Nearshore Placement Site

Area	Site Designations	Date	Time	Sampling Elevations (feet, MLLW)	Geographic Coordinates (NAD 83)	
					Latitude North	Longitude West
Transect A	A+12 (A1)	12/13/17	14:40	+12	33º 12.019′	117º 23.389′
	A+6 (A2)	12/13/17	14:32	+6	33º 12.011′	117º 23.398′
	A0 (A3)	12/13/17	14:35	0	33º 11.992′	117º 23.427′
	A-6 (A4)	12/18/17	15:03	-6	33º 11.970′	117º 23.461′
	A-12 (A5)	12/13/17	16:40	-12	33º 11.929′	117º 23.528′
	A-18 (A6)	12/11/17	13:33	-18	33º 11.933′	117º 23.546′
	A-24 (A7)	12/11/17	13:47	-24	33 º11.905′	117º 23.587′
	A-30 (A8)	12/11/17	13:54	-30	33º 11.844′	117º 23.66′
Transect B	B+12 (B1)	12/13/17	14:20	+12	33º 11.855′	117º 23.237′
	B+6 (B2)	12/13/17	14:15	+6	33º 11.851′	117º 23.245′
	B0 (B3)	12/13/17	14:10	0	33º 11.831′	117º 23.275′
	B-6 (B4)	12/18/17	14:50	-6	33º 11.816′	117º 23.300′
	B-12 (B5)	12/13/17	16:35	-12	33º 11.777′	117º 23.37′
	B-18 (B6)	12/11/17	12:44	-18	33º 11.761′	-117º 23.378′
	B-24 (B7)	12/11/17	12:57	-24	33º 11.739′	117º 23.441′
	B-30 (B8)	12/11/17	13:09	-30	33º 11.709′	117º 23.507′
Transect C	C+12 (C1)	12/13/17	13:58	+12	33º 11.694′	117º 23.098′
	C+6 (C2)	12/13/17	13:55	+6	33º 11.685′	117º 23.120′
	C0 (C3)	12/13/17	13:50	0	33º 11.662′	117º 23.161
	C-6 (C4)	12/18/17	15:15	-6	33º 11.649′	117º 23.186′
	C-12 (C5)	12/13/17	16:25	-12	33º 11.598′	117º 23.243′
	C-18 (C6)	12/11/17	12:08	-18	33º 11.582′	117º 23.248′
	C-24 (C7)	12/11/17	12:18	-24	33º 11.585′	117º 23.287′
	C-30 (C8)	12/11/17	12:25	-30	33º 11.548′	117º 23.335′
Transect D	D+12 (D1)	12/13/17	13:35	+12	33º 11.528′	117º 22.953′
	D+6 (D2)	12/13/17	13:29	+6	33º 11.521′	117º 22.963′
	D0 (D3)	12/13/17	13:25	0	33º 11.504′	117º 22.991′
	D-6 (D4)	12/18/17	15:33	-6	33º 11.481′	117º 23.028′
	D-12 (D5)	12/13/17	16:15	-12	33º 11.46′	117º 23.078′
	D-18 (D6)	12/11/17	11:38	-18	33º 11.437′	117º 23.083′
	D-24 (D7)	12/11/17	11:44	-24	33º 11.404′	117º 23.124′
	D-30 (D8)	12/11/17	11:53	-30	33º 11.369′	117º 23.194′

Table 6. Dates, Times and Sampling Coordinates for Samples Collected from Beach Transects and Nearshore Placement Site (Continued)

Area	Site Designations	Date	Time	Sampling Elevations (feet, MLLW)	Geographic Coordinates (NAD 83)	
					Latitude North	Longitude West
Transect E	E+12 (E1)	NS	NS	+12	NS	NS
	E+6 (E2)	12/13/17	13:05	+6	33º 11.362′	117º 22.808′
	E0 (E3)	12/13/17	13:10	0	33º 11.340′	117º 22.843′
	E-6 (E4)	12/18/17	15:38	-6	33º 11.327′	117º 22.864′
	E-12 (E5)	12/13/17	16:10	-12	33º 11.302′	117º 22′.917′
	E-18 (E6)	12/11/17	11:04	-18	33º 11.285′	117º 22′.928′
	E-24 (E7)	12/11/17	11:15	-24	33º 11.251′	117º 22′.974′
	E-30 (E8)	12/11/17	11:22	-30	33º 11.193′	117º 23′.064′
Transect F	F+12 (F1)	NS	NS	+12	NS	NS
	F+6 (F2)	12/13/17	12:45	+6	33º 11.252′	117º 22.718′
	F0 (F3)	12/13/17	12:48	0	33º 11.238′	117º 22.740′
	F-6 (F4)	12/18/17	12:52	-6	33º 11.223′	117º 22.764′
	F-12 (F5)	12/13/17	16:00	-12	33º 11.206′	117º 22.827′
	F-18 (F6)	12/11/17	10:32	-18	33º 11.188′	117º 22.845′
	F-24 (F7)	12/11/17	10:42	-24	33º 11.162′	117º 22.885′
	F-30 (F8)	12/11/17	10:50	-30	33º 11.122′	117º 22.95′
Nearshore	OSCBNS17-D-01	12/11/17	08:05	-23.4	33º 10.971′	117º 22.743′
	OSCBNS17-D-02	12/11/17	08:25	-21.5	33º 10.955′	117º 22.756′
	OSCBNS17-D-03	12/11/17	08:37	-20.5	33º 10.921′	117º 22.692′
	OSCBNS17-D-04	12/11/17	08:54	-20.5	33º 10.871′	117º 22.644′
	OSCBNS17-D-05	12/11/17	09:05	-19.5	33º 10.836′	117º 22.599′
	OSCBNS17-D-06	12/11/17	09:25	-22.4	33º 10.791′	117º 22.603′
	OSCBNS17-D-07	12/11/17	09:34	-27.5	33º 10.813′	117º 22.682′
	OSCBNS17-D-08	12/11/17	09:45	-24.3	33º 10.898′	117º 22.735′
	OSCBNS17-D-09	12/11/17	09:54	-19.4	33º 11.034′	117º 22.760′
	OSCBNS17-D-10	12/11/17	10:10	-18.4	33º 10.994′	117º 22.725′

NS = Not sampled due to the lack of beach.

Figure 7. Locations of the Beach Transect and Nearshore Placement Site Samples Collected

3.2.4 Geotechnical Samples and Testing

A sufficient quantity of sediment was collected from each location within the Oceanside Harbor federal channels so that a representative amount of sediment was included in each geotechnical sample. Up to four grain size samples were formed from the mudline to the overdepth elevation from each core and analyzed. Each sample represented a layer of physically different material greater than six (6) inches thick. Grain size analyses were also run on each sampling location along the six (6) Oceanside City Beach transects and from the nearshore site locations.

In addition to the mechanical grain size samples, five (5) hydrometer tests and five (5) Atterberg Limits tests were run. The hydrometer and Atterberg tests were run on representative samples of fine grained material collected from the sediment cores.

USACE, Los Angeles District requested that at least one additional sample from each core that represents up to five feet of material below the overdepth elevation be collected and tested for grain size. Data from these samples were for informational and internal purposes only and were <u>not</u> used for beach suitability purposes and are <u>not</u> included in this report.

All geotechnical data gathered, except for the below the overdepth elevation, were used to do physical beach compatibility analyses between the dredged sediments and the receiving beach. This task was accomplished by USACE-Los Angeles District and reported separately as Appendix B to this report.

3.2.5 Summary of Oceanside Harbor Testing and Evaluation Sequence

The testing and evaluation sequence for the Oceanside Harbor composite samples is described in detail in the next subsection and is outlined as follows:

1) Bulk sediment chemical analyses were conducted on each composite sample.
2) Physical testing was conducted on all core strata.
3) Grain size physical compatibility analyses were conducted by the Los Angeles District U.S. Army Corps of Engineers Geotechnical Branch.
4) Analytical results were evaluated using the sediment quality guidelines consisting of Effects Range Low (ERL) and Effects Range Medium (ERM) values developed by Long, *et al*. (1995) that correlate concentrations of selected contaminants with likelihood of adverse biological effects.
5) Analytical results were also evaluated using the USEPA's RSL (Regional Screening Levels) (USEPA Region 9, updated 2017) and the State of California's CHHSL (California Human Health Screening Levels) for potential effects to humans (Cal/EPA, 2005 – updated 2010).

If grain size characteristics are compatible with the receiving beach and contaminant levels are low compared to lower effects based screening levels and human health screening levels, then the sediments are considered suitable for beach nourishment and no further testing is required. Though unlikely, further chemical or Tier III testing may be required by the SC-DMMT. As such, individual cores were archived for potential chemical testing and composite sediments were archived for potential Tier III testing.

3.2.6 Evaluation Guidelines

As mentioned above, to aid in the evaluation of sediment test data, chemical concentrations of contaminants found within the sediments were compared to sediment quality guidelines (Long et. al., 1995) developed by NOAA. These guidelines were used to screen sediments for contaminant concentrations that might cause biological effects. For any given contaminant, ERL guidelines represent the 10th percentile concentration value in the NOAA database that might be expected to cause adverse biological effects and ERM guidelines reflect the 50th percentile value in the database. Note that ERLs and ERMs were only used as a screening tool. They were not used to determine suitability.

As an additional measure of potential toxicity, the mean ERM quotient (ERMq) for the composite samples was calculated according to Long et al. (1998a) and Hyland et al. (1999). ERMq is calculated by dividing each contaminant concentration by its respective ERM value and then summing the results and dividing through by the number of contaminants as shown in the following equation:

$$\boxed{ERMQuotien\ \ t = \tfrac{1}{24}\sum \frac{SampleConc\ \ entration}{ERM}}$$

In cases where concentrations of measured contaminants were below the method detection limit (MDL), a value of ½ the MDL was used for the ERMq calculations. For a general overall indication of toxicity, a quotient less than 0.1 is indicative of a low probability (<12%) of a highly toxic response to marine amphipods (Long and MacDonald, 1998b). If there are no ERL exceedances in a sample, there is less than a 10% probability of a highly toxic response to marine amphipods. The probability of a highly toxic response increases to 71% for quotients greater than 1.0.

The dredge material was also assessed to whether or not it is suitable for human contact after reuse in the nearshore site. To do so, the chemical results were compared to “Regional Screening Levels for Chemical Contaminants at Superfund Sites" (RSLs) (USEPA Region 9, updated 2017), formerly known as Preliminary Remediation Goals (PRGs), and to California Human Health Screening Levels (CHHSLs) (Cal/EPA, updated 2010). RSLs were developed for Superfund/RCRA programs and are a consortium of USEPA Region 9 Preliminary Remediation Goals (PRGs), USEPA Region 3 Risked-Based Concentrations (RBCs) and EPA Region 6 Human Health Medium – Specific Screening Levels (HHMSSLs). RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. RSLs that were uses were based on a target hazard quotient of 0.1. CHHSLs are concentrations of 54 hazardous chemicals in soil or soil gas that are considered to be protective of human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) on behalf of California Environmental Protection Agency (Cal/EPA). CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by the USEPA and Cal/EPA. CHHSLs used were developed separately for industrial/commercial settings and for residential settings.

3.3 Field Sampling Protocols

The field effort for this project took place from December 11 to December 18, 2018. Vibracore sampling, grab sampling, decontamination, sample processing and documentation procedures are discussed in this section.

3.3.1 Positioning and Depth Measurements

Positioning at sampling locations was accomplished using a differential GPS (DGPS) navigation system referenced to a local geodetic benchmark with positioning accuracies of 3 to 10 feet. The locations were recorded in Geographic coordinates (NAD 83) and converted to State Plane Coordinates (CA Zone VI, NAD 83). Water depths were measured with a graduated lead line and corrected to mean lower low water (MLLW). Tidal stage was determined using NOAA predicted tide tables checked against a local tide gage or real-time tidal stage data. These tide data were used to calculate the seafloor elevation/mudline for each site.

All sampling sites were located within Federal Channel limits and generally within 50 feet of target coordinates if practical. Some of the actual locations listed on Table 5 changed to target more shoaling and for safety reasons due to excess shoaling.

Records were maintained during fieldwork to confirm the accuracy of the DGPS. The DGPS was checked against a known location at least twice a day, prior to leaving or underway from the dock at the beginning of the day and upon return at the end of the day. These measurements are included in Appendix C.

3.3.2 Vibracore Sampling Methods

All sediment samples were collected using an electric vibracore that can penetrate and obtain samples to the project sample elevations. The cores were taken to the target sampling elevations (project elevations plus overdepth allowance plus two to eight feet for geotechnical purposes only) At the conclusion of a successful vibracore, the core liner was removed and split open for inspection and sampling. Extrusion of the core was not allowed. Processing took place onboard the sampling vessel.

Vibracore sampling was conducted from the 35-foot vessel ***DW Hood***. This vessel was fully equipped with all necessary navigation, safety, and lifesaving devices per Coast Guard requirements and was capable of three-point anchoring.

Kinnetic Laboratories' vibracore consists of a 4-inch diameter aluminum coring tube, a stainless steel cutting tip, and a stainless-steel core catcher. Inserted into the core tubes was food-grade clean polyethylene liners. The vibrating unit contains two counter-rotating motors encased in a waterproof aluminum housing. The motors are powered by a three-phase, 240-volt generator. The vibracore head and tube were lowered overboard with the A-frame and winch and then lowered to the mudline. The unit was then vibrated until it reached the desired distance beyond the target sampling elevation.

When penetration of the vibracore was complete, power was shut off to the vibra-head and the vibracore was brought aboard the DW Hood. A check valve, located on top of the core tube, reduced or prevented sediment loss during pull-out. The length of sediment recovered was noted by measuring down the interior of the core tube to the top of the sediment. The core tube was then detached from the vibra-head, and the core cutting tip and catcher were removed. Afterwards, the core liners were removed and sealed on both ends and kept sealed until processed, which occurred shortly after collection.

A stand was used to support the vibracore in waters unprotected from wave action. The vibracore and stand were lowered overboard from the sampling vessel as one unit. Use of a stand allowed the sampling vessel to move off of the sampling location while the coring apparatus penetrates the sediment. Thus, one-point anchoring or no anchoring was utilized. A stand also prevented the coring apparatus from being pulled up from waves while trying to penetrate, thus alleviating multiple penetrations of the same material.

3.3.3 Vibracore Decontamination

All sample contact surfaces were stainless-steel or food-grade clean polyethylene. Compositing tools were stainless steel. Except for the core liners, all contact surfaces of the sampling devices and the coring tubes were cleaned for each sampling area. The cleaning protocol consisted of a site water rinse, a Micro-90® soap wash, and then finished with deionized water rinses. The polyethylene core liners were new for each core. All rinseate was collected in containers and disposed of properly.

3.3.4 Core Processing

Whole cores were processed on deck. The deck had a plastic covering that was freshly changed for every core. Cores were placed in a PVC core rack that was cleaned between cores. After placement in the core rack, core liners were split lengthwise to expose the recovered sediment. Once exposed, sediment that came in contact with the core liner was removed by scraping with a pre-cleaned stainless steel spoon. Each core was photographed, measured, and lithologically logged in accordance with the Unified Soil Classification System (USCS) as outlined in ASTM Standards D-2488 (2006) and D-2487 (2006). A geologist from AECOM conducted the lithologic logging along with collection of sample splits for geotechnical testing.

Photographs were taken of each core (each photograph will cover a maximum two-foot interval), and of sampling equipment and procedures. These pictures are provided with the field logs in Appendix D and visually include the date and time of sampling and the core interval.

Following logging, vertical composite subsamples for archiving and horizontal composite formation along with samples for grain size analyses were then formed by combining and homogenizing a representative sample from the mudline to two or three feet below the design depth from each sampling interval, as described in Section 3.2.2, in a pre-cleaned stainless steel tray. A 0.5-liter portion of each vertical composite subsample and core stratum for grain size was placed in a pre-cleaned and certified glass jar with a Teflon®-lined lid for archived material, and sufficient material from each core stratum was placed in Ziploc bags for the geotechnical samples. Archive material was placed in additional jars if significant layering as described earlier existed. An additional representative portion of each vertical composite subsample was placed in a large pre-cleaned mixing bowl for area compositing with all other cores from an area. These composited sediments were placed in two 1-liter pre-cleaned and certified glass jars with a Teflon®-lined lids. All remaining material from each core after subsample formation and composite chemistry sample formation was placed in a food-grade clean 5-gallon LPDE bucket liners for Tier III biological archiving. All samples for grain size analyses were transferred to pre-labeled sample containers (sealed plastic bags) and stored appropriately until they are ultimately transferred to an AECOM laboratory for analysis.

Except for chemistry archival material, containers were completely filled to minimize air bubbles being trapped in the sample container. A small amount of headspace was allowed for archived chemistry samples to prevent container breakage during freezing. For the preservation of all sediment composite chemistry samples, filled containers were placed on ice immediately following sampling and maintained at 2 to 4°C until analyzed. Archived samples for chemistry were placed on ice initially and then frozen as soon as possible. Archived samples for Tier III testing are being kept refrigerated and maintained at 2 to 4°C. The sample containers, both jars and bags, were sealed to prevent any moisture loss and possible contamination.

3.3.5 Beach Transect and Nearshore Placement Site Grab Samples

Positioning at all transect and nearshore placement site sampling locations was accomplished using a DGPS navigation system. Water depths at intertidal and subtidal locations were measured with a graduated lead line (or other approved method) and corrected to MLLW. Oceanside Beach Placement site locations were determined with a level transit and stadia rod.

The top six inches of sand or sediment was collected at all beach transect and nearshore site sampling locations. The three highest locations along each beach transect were sampled on land using a hand held scoop. All other offshore stations were sampled from a 17-foot Boston Whaler and the ***DW Hood*** using an acceptable grab (e.g., Ponar or Smith McIntyre Grab). The grab sampler was deployed at each offshore location, and upon retrieval, the grab was visually inspected to ensure the sample is acceptable according to SOPs. A plastic scoop was used to transfer sediment.

All samples for grain size analyses was transferred to pre-labeled sample containers (sealed plastic bags) and stored appropriately until they were ultimately transferred to the AECOM geotechnical laboratory for analysis.

3.3.6 Detailed Soils Log

A detailed soils log was prepared for each sampling location, including beach transect locations. As a minimum, this log included the project name, hole or transect number or designation, date, time, location, water depth, estimated tide, mudline elevation, type and size of sampling device used, depth of penetration, length of recovery, name of person(s) taking samples, depths below mudline of samples, and a description and condition of the sediment. The description of the sediment was in accordance with ASTM D 2488 (2006), and included as a minimum: grain size, color, maximum particle size, odor (if present), and description of amount and types of organics and trash present.

3.3.7 Documentation and Sample Custody

Sample location, date, time and appropriate identification were physically marked on all sample containers, and all samples were handled under Chain of Custody (COC) protocols beginning at the time of collection. Redundant sampling data was also recorded on field data log sheets. Copies of the field data logs are included in Appendix D.

Samples were considered to be "in custody" if they were (1) in the custodian's possession or view, (2) in a secured place (locked) with restricted access, or (3) in a secure container. Standard COC procedures were used for all samples collected, transferred, and analyzed as part of this project. COC forms were used to identify the samples, custodians, and dates of transfer. Except for the shipping company, each person who had custody of the samples signed the COC form and ensured samples were stored properly and not left unattended unless properly secured.

Standard information on Chain of Custody forms included:

- Sample Identification
- Sample Collection Date and Time
- Sample Matrices (e.g., marine sediment)
- Analyses to be Performed
- Container Types
- Preservation Method
- Sampler Identification
- Dates of Transfer
- Names of Persons with Custody

The completed COC forms were placed in a sealable plastic bag and taped to the inside of one or more coolers. Chemistry samples were delivered to the laboratory by Kinnetic Laboratories' personnel. COC records are included with the laboratory reports in Appendix E.

A daily field activity log was maintained listing the beginning and ending time for every and all phases of operation, the names and responsibilities of all field personnel present, description and length of any delays, and weather and sea conditions. This log (Appendix C) includes DGPS calibration/verification notes.

As described in Sections 3.3.6, detailed soil logs were prepared from each sampling location, including reference locations. These soil logs are included as Appendix F.

3.4 Laboratory Testing Methods

Physical and analytical chemical testing of sediments for this project used USEPA and USACE approved methodologies.

3.4.1 Geotechnical Testing

Sieve analyses and hydrometer testing were performed according to ASTM D 422 (1963), and Atterberg Limits were determined according to ASTM D 4318 (2005). Required U.S. standard sieve sizes included No. 4, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230 sieves. All sediment samples were classified in accordance with the Unified Soil Classification System (ASTM D 2487-06 and ASTM D 2488-06). Grain size compatibility of the proposed dredge material with the reuse areas were evaluated by the Los Angeles District USACE.

3.4.2 Bulk Sediment Chemical Analyses

The three sediment composite samples collected from within Oceanside Harbor were analyzed for according to the parameters, methods and quantification limits specified in Table 7. The results are reported on a dry mass basis unless noted otherwise. All analyses were conducted in a manner consistent with guidelines for dredge material testing methods in the USEPA/USACE ITM. Samples were extracted and analyzed within specified USEPA holding times, and all analyses were accomplished with appropriate quality control (QC) measures. Discrete chemistry samples from each location were archived frozen for at least 180 days from collection in case discrete chemical analyses are requested by the SC-DMMT.

Table 7. Analytical Methods and Quantitation Limits Achieved for the Sediment Samples

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
CONVENTIONALS (mg/kg except where noted)				
Ammonia	SM 4500-NH3 B/C (M)	0.15 - 0.16	0.26 – 0.28	0.2
Percent Solids (%)	SM 2540 B	0.10	0.10	0.1
Total Organic Carbon (%)	EPA 9060A	0.03	0.03	0.05
Total Volatile Solids (%)	EPA 160.4M	0.10	0.10	0.1
Total and Dissolved Sulfides	EPA 376.2M	0.017 – 2.8	0.10 – 3.4	10 and 0.1
Oil & Grease	EPA 1664A (M) HEM	10 – 11	13 – 14	10
TRPH	EPA 1664A (M) HEM-SGT	11	13 – 14	10
METALS (mg/kg)				
Arsenic	EPA 6020	0.116 – 0.124	0.132 – 0.142	0.1
Cadmium	EPA 6020	0.0758 – 0.0811	0.132 – 0.142	0.1
Chromium	EPA 6020	0.0822 – 0.879	0.132 – 0.142	0.1
Copper	EPA 6020	0.0555 – 0.0594	0.132 – 0.142	0.1
Lead	EPA 6020	0.0873 – 0.0933	0.132 – 0.142	0.1
Mercury	EPA 7471A	0.00753 – 0.00818	0.0256 – 0.0279	0.02
Nickel	EPA 6020	0.0671 – 0.0717	0.132 – 0.142	0.1
Selenium	EPA 6020	0.0968 – 0.103	0.132 – 0.142	0.1
Silver	EPA 6020	0.0415 – 0.0443	0.132 – 0.142	0.1
Zinc	EPA 6020	1.05 – 1.13	1.32 – 1.42	1.0

Table 7. Analytical Methods and Quantitation Limits Achieved for the Sediment Samples (Continued)

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
ORGANICS-CHLORINATED PESTICIDES (µg/kg)				
2,4' DDD	EPA 8270C PEST-SIM	0.10 – 0.11	0.26 – 0.28	0.2
2,4' DDE	EPA 8270C PEST-SIM	0.46 – 0.49	0.26 – 0.28	0.2
2,4' DDT	EPA 8270C PEST-SIM	0.082 – 0.087	0.26 – 0.28	0.2
4,4' DDD	EPA 8270C PEST-SIM	0.053 – 0.056	0.26 – 0.28	0.2
4,4' DDE	EPA 8270C PEST-SIM	0.053 – 0.057	0.26 – 0.28	0.2
4,4' DDT	EPA 8270C PEST-SIM	0.069 – 0.073	0.26 – 0.28	0.2
Total DDT	EPA 8270C PEST-SIM	--	0.26 – 0.28	0.2
Aldrin	EPA 8270C PEST-SIM	0.050 – 0.053	0.26 – 0.28	0.2
BHC-alpha	EPA 8270C PEST-SIM	0.076 – 0.080	0.26 – 0.28	0.2
BHC-beta	EPA 8270C PEST-SIM	0.089 – 0.094	0.26 – 0.28	0.2
BHC-delta	EPA 8270C PEST-SIM	0.12 – 0.13	0.26 – 0.28	0.2
BHC-gamma (Lindane)	EPA 8270C PEST-SIM	0.045 – 0.048	0.26 – 0.28	0.2
Chlordane (Technical)	EPA 8270C-GCECD	6.8 – 7.3	13 - 14	10
Chlordane-alpha	EPA 8270C PEST-SIM	0.088 – 0.093	0.26 – 0.28	0.2
Chlordane-gamma	EPA 8270C PEST-SIM	0.070 – 0.075	0.26 – 0.28	0.2
Oxychlordane	EPA 8270C PEST-SIM	0.096 – 0.10	0.26 – 0.28	0.2
Total Chlordane	EPA 8270C PEST-SIM	--	0.26 – 0.28	0.2
Dieldrin	EPA 8270C PEST-SIM	0.14 – 0.15	0.26 – 0.28	0.2
Endosulfan sulfate	EPA 8270C PEST-SIM	0.14 – 0.15	0.26 – 0.28	0.2
Endosulfan I	EPA 8270C PEST-SIM	0.076 – 0.081	0.26 – 0.28	0.2
Endosulfan II	EPA 8270C PEST-SIM	0.12 – 0.13	0.26 – 0.28	0.2
Endrin	EPA 8270C PEST-SIM	0.075 – 0.079	0.26 – 0.28	0.2
Endrin aldehyde	EPA 8270C PEST-SIM	0.13 – 0.14	0.26 – 0.28	0.2
Endrin ketone	EPA 8270C PEST-SIM	0.073 – 0.077	0.26 – 0.28	0.2
Heptachlor	EPA 8270C PEST-SIM	0.068 – 0.072	0.26 – 0.28	0.2
Heptachlor epoxide	EPA 8270C PEST-SIM	0.058 – 0.062	0.26 – 0.28	0.2
Methoxychlor	EPA 8270C PEST-SIM	0.089 – 0.094	0.26 – 0.28	0.2
Mirex	EPA 8270C PEST-SIM	0.052 – 0.055	0.26 – 0.28	0.2
Toxaphene	EPA 8270C-GCECD	12 – 13	26 – 28	10
trans-Nonachlor	EPA 8270C PEST-SIM	0.057 – 0.060	0.26 – 0.28	0.2
ORGANICS-Pyrethroid Pesticides (µg/kg)				
Allethrin (Bioallethrin)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Bifenthrin	EPA 8270D (M)/TQ/EI	0.39 – 0.42	0.66 – 0.70	0.5
Cyfluthrin-beta (Baythroid)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Cyhalothrin-Lamba	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Cypermethrin	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Deltamethrin (Decamethrin)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Esfenvalerate	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Fenpropathrin (Danitol)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Fenvalerate (sanmarton)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Fluvalinate	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
Permethrin (cis and trans)	EPA 8270D (M)/TQ/EI	0.66 – 0.70	1.3 – 1.4	1.0
Resmethrin/Bioresmethrin	EPA 8270D (M)/TQ/EI	0.56 – 0.60	0.66 – 0.70	0.5
Sumithrin (Phenothrin)	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5

Table 7. Analytical Methods and Quantitation Limits Achieved for the Sediment Samples (Continued)

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
Tetramethrin	EPA 8270D (M)/TQ/EI	0.39 – 0.42	0.66 – 0.70	0.5
Tralomethrin	EPA 8270D (M)/TQ/EI	0.33 – 0.35	0.66 – 0.70	0.5
ORGANICS-BUTYLTINS (µg/kg)				
Monbutyltin	Krone et al., 1989	1.8 – 1.9	3.9 – 4.2	3.0
Dibutyltin	Krone et al., 1989	0.95 – 1.0	3.9 – 4.2	3.0
Tributyltin	Krone et al., 1989	1.9 – 2.1	3.9 – 4.2	3.0
Tetrabutyltin	Krone et al., 1989	0.97 – 1.0	3.9 – 4.2	3.0
ORGANICS-PHTHALATES (µg/kg)				
bis(2-ethylhexyl) phthalate	EPA 8270C (SIM)	2.0 – 2.1	66 - 69	10
Butyl benzyl phthalate	EPA 8270C (SIM)	2.6 – 2.7	66 - 69	10
Diethyl Phthalate	EPA 8270C (SIM)	2.1 – 2.2	66 - 69	10
Dimethyl Phthalate	EPA 8270C (SIM)	2.7 – 2.8	66 - 69	10
Di-n-butyl Phthalate	EPA 8270C (SIM)	2.5 – 2.7	66 - 69	500
Di-n-octyl Phthalate	EPA 8270C (SIM)	2.5 – 2.6	66 - 69	10
ORGANICS-PHENOLS (µg/kg)				
2,3,4,6-Tetrachlorophenol	EPA 8270C (SIM)	5.2 – 2.4	13 - 14	10
2,4,5-Trichlorophenol	EPA 8270C (SIM)	1.6 – 1.7	13 - 14	10
2,4,6-Trichlorophenol	EPA 8270C (SIM)	1.7 – 1.8	13 - 14	10
2,4-Dichlorophenol	EPA 8270C (SIM)	2.3 – 2.4	13 - 14	10
2,4-Dimethylphenol	EPA 8270C (SIM)	3.4 – 3.6	660 - 690	500
2,4-Dinitrophenol	EPA 8270C (SIM)	79 – 83	660 - 690	500
2,6-Dichlorophenol	EPA 8270C (SIM)	2.8 – 3.0	13 - 14	10
2-Chlorophenol	EPA 8270C (SIM)	2.5 – 2.6	13 - 14	10
2-Methyl-4,6-dinitrophenol	EPA 8270C (SIM)	88 - 92	660 - 690	500
2-Methylphenol	EPA 8270C (SIM)	2.6 – 2.7	13 - 14	10
2-Nitrophenol	EPA 8270C (SIM)	2.2 – 2.3	660 - 690	500
3+4-Methylphenol	EPA 8270C (SIM)	4.8 – 5.0	13 – 14	10
4-Chloro-3-methylphenol	EPA 8270C (SIM)	2.7 – 2.9	13 - 14	10
4-Nitrophenol	EPA 8270C (SIM)	110	660 - 690	500
Bisphenol A	EPA 8270C (SIM)	2.7 – 2.9	13 - 14	10
Pentachlorophenol	EPA 8270C (SIM)	1.8	660 - 690	500
Phenol	EPA 8270C (SIM)	3.1 – 3.2	13 - 14	10
ORGANICS-PCBs (µg/kg) PCB congeners of: 018, 028, 037, 044, 049, 052, 066, 070, 074, 077, 081, 087, 099, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138/158, 149, 151, 153, 156, 157, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.	EPA 8270C (SIM)	0.044 – 0.49	0.26 – 0.56	0.5
Total PCBs as sum of all individual PCB congeners.	EPA 8270C (SIM)	--	0.26 – 0.56	0.5

Table 7. Analytical Methods and Quantitation Limits Achieved for the Sediment Samples (Continued)

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
ORGANICS-PAHs (µg/kg dry)				
1-Methylnaphthalene	EPA 8270C (SIM)	1.4 – 1.5	13 – 14	10
1-Methylphenanthrene	EPA 8270C (SIM)	2.6 – 2.7	13 – 14	10
1,6,7-Trimethylnaphthalene	EPA 8270C (SIM)	2.3 – 2.4	13 – 14	10
2,6-Dimethylnaphthalene	EPA 8270C (SIM)	2.8 – 2.9	13 – 14	10
2-Methylnaphthalene	EPA 8270C (SIM)	2.2 – 2.3	13 – 14	10
Acenaphthene	EPA 8270C (SIM)	2.0 – 2.1	13 – 14	10
Acenaphthylene	EPA 8270C (SIM)	2.2 – 2.3	13 – 14	10
Anthracene	EPA 8270C (SIM)	2.6 – 2.7	13 – 14	10
Benzo[a]anthracene	EPA 8270C (SIM)	1.9 – 2.0	13 – 14	10
Benzo[a]pyrene	EPA 8270C (SIM)	1.8 – 1.9	13 – 14	10
Benzo[b]fluoranthene	EPA 8270C (SIM)	1.9 – 2.0	13 – 14	10
Benzo[e]pyrene	EPA 8270C (SIM)	2.2 – 2.3	13 – 14	10
Benzo[g,h,i]perylene	EPA 8270C (SIM)	2.0 – 2.1	13 – 14	10
Benzo[k]fluoranthene	EPA 8270C (SIM)	2.0 – 2.1	13 – 14	10
Biphenyl	EPA 8270C (SIM)	2.5 – 2.6	13 – 14	10
Chrysene	EPA 8270C (SIM)	1.8 – 1.9	13 – 14	10
Dibenzo[a,h]anthracene	EPA 8270C (SIM)	1.9 – 2.0	13 – 14	10
Dibenzothiophene	EPA 8270C (SIM)	1.8 – 1.9	13 – 14	10
Fluoranthene	EPA 8270C (SIM)	2.3 – 2.4	13 – 14	10
Fluorene	EPA 8270C (SIM)	2.2 – 2.3	13 – 14	10
Indeno[1,2,3-c,d]pyrene	EPA 8270C (SIM)	1.7 – 1.8	13 – 14	10
Naphthalene	EPA 8270C (SIM)	2.0 – 2.1	13 – 14	10
Perylene	EPA 8270C (SIM)	1.5 – 1.6	13 – 14	10
Phenanthrene	EPA 8270C (SIM)	2.3 – 2.4	13 – 14	10
Pyrene	EPA 8270C (SIM)	2. 2 – 2.3	13 – 14	10
Total Low Weight PAHs	EPA 8270C (SIM)	--	13 – 14	10
Total High Weight PAHs	EPA 8270C (SIM)	--	13 – 14	10
Total Detectable PAHs	EPA 8270C (SIM)	--	13 – 14	10

4.0 RESULTS

Physical and chemical results for the Oceanside Harbor and receiving beach sediments are summarized in Tables 8 through 12 below. Tables do not include analytical quality assurance/quality control (QA/QC) data. Complete analytical results including all associated QA/QC data are provided in Appendix E. A complete set of physical results with grain size distribution curves are included in Appendix H.

4.1 Sediment Physical Results

Grain Size analyses were performed on multiple layers from each of the 18 cores collected. Data for each core and each individual layer are provided in Table 8. Weighted average sieve analysis data for each core are provided in Table 9 and weighted average sieve analysis data for each composite area are provided in Table 10. Sieve analysis data for the beach transects and nearshore placement site samples are provided in Table 11. Individual grain size distribution curves for each individual grain size sample are provided in Appendix H along with plasticity index plots and hydrometer data for a select number of samples.

4.2 Sediment Chemistry Results

A summary of the sediment chemical testing results for the Oceanside Harbor composite samples are provided in Table 12. Included in Table 12 are screening values consisting of NOAA ERL and ERM values and human health criteria for residential and industrial settings consisting of RSLs and CHHSLs (see Section 3.2.6). Any testing values that exceed any of these screening values are highlighted. Concentrations that exceed ERL values are bolded red. There were no concentrations that exceeded an ERM value. Table cells that exceed one or more screening values for human health in residential settings are shaded in orange. Table cells that exceed one or more screening values for human health in commercial/industrial settings are shaded in green. Estimated values between the method detection limits and reporting limits were considered real values for the purpose of these comparisons.

Data contained in Table 12 are often coded. Values that were not detected above the method detection limit were assigned a “<” prefix symbol. Values estimated between the MDL and RL were tagged with a “J”. A “J” code may also indicate an estimated value due to QC data for that value being outside of certain QC objectives. Definitions of all other symbols are described in the QA/QC report in Appendix L and in table footnotes.

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Table 8. 2017 Oceanside Harbor Grain Size (Sieve) Analysis Data for Individual Vibracore Boreholes.

Core Designation	Elevation (ft. MLLW)		Gravel			Coarse Sand			Medium Sand			Fine Sand			Silt/Clay		Atterberg Limits		Classification
			Sieve No. / Sieve Size / % Passing																
			3/8	4	7	10	14	18	25	35	45	60	80	120	200	230			
	Top	Bottom	9.5mm	4.75mm	2.80mm	2.00mm	1.40mm	1.00mm	0.71mm	0.50mm	0.355mm	0.250mm	0.180mm	0.125mm	0.075mm	0.063mm	LL	PL	
Del Mar Channel (Area A)																			
OSHVC-17-A-01	-18.8	-20.3	100	100	100	100	100	100	100	99	98	94	83	53	14	12			SILTY SAND (SM)
OSHVC-17-A-01	-20.3	-22	100	100	100	100	100	100	100	100	99	97	93	69	24	19	29	0	SILTY SAND (SM)
OSHVC-17-A-02	-19.6	-22	100	100	100	100	100	100	100	100	99	98	96	85	47	41			SILTY SAND (SM)
OSHVC-17-A-03	-16.4	-18.4	100	100	100	100	100	100	100	100	99	94	74	22	3	2			POORLY GRADED SAND (SP)
OSHVC-17-A-03	-18.4	-22.0	100	100	100	100	100	100	100	99	98	92	71	24	5	4			POORLY GRADED SAND (SP)
OSHVC-17-A-04	-16.3	-20.8	100	100	100	100	100	100	100	100	99	87	58	13	2	2			POORLY GRADED SAND (SP)
OSHVC-17-A-04	-20.8	-22.0	100	100	100	100	100	100	100	100	99	96	81	35	12	11			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-A-05	-19.3	-19.9	100	100	100	100	100	100	100	98	94	83	66	33	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-A-05	-19.9	-22.0	100	97	97	97	96	95	93	90	86	80	72	45	15	12	30	1	SILTY SAND (SM)
OSHVC-17-A-06	-17.0	-20.1	100	100	100	100	100	100	99	97	94	73	42	11	2.5	2			POORLY GRADED SAND (SP)
OSHVC-17-A-06	-20.1	-22.0	100	100	100	100	100	100	99	99	97	94	85	66	41	37	36	13	CLAYEY SAND (SC)
OSHVC-17-A-07	-17.2	-19.2	100	100	100	100	100	100	100	99	98	88	68	28	4	3			POORLY GRADED SAND (SP)
OSHVC-17-A-07	-19.2	-22.0	100	100	100	100	100	100	100	99	96	83	58	20	3	2			POORLY GRADED SAND (SP)
Oceanside Channel (Area B)																			
OSHVC-17-B-01	-19.4	-22.0	100	100	100	100	100	100	100	100	100	98	93	53	8.9	7			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-B-02	-17.2	-19.2	100	100	100	100	100	100	100	99	97	86	48	10	1	1			POORLY GRADED SAND (SP)
OSHVC-17-B-02	-19.2	-22.0	100	100	100	100	100	100	100	99	96	84	51	8.4	2	1			POORLY GRADED SAND (SP)
OSHVC-17-B-03	-18.3	-19.1	100	100	100	100	100	100	100	99	98	92	77	40	11	9			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-B-03	-19.1	-22.0	100	99	99	99	99	99	99	99	98	95	91	72	36	31			SILTY SAND (SM)
OSHVC-17-B-04	-19.7	-22.0	100	100	100	100	100	100	100	99	99	98	95	94	91	90	69	40	LEAN CLAY (CL)
Entrance Channel (Area C)																			
OSHVC-17-C-01	-21.5	-23.5	100	100	100	100	100	100	100	100	100	100	96	66	6	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-01	-23.5	-30.0	100	100	100	100	100	100	100	100	100	99	95	70	10	8			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-02	-24.5	-26.5	100	100	100	100	100	100	100	100	100	99	97	76	15	12			SILTY SAND (SM)
OSHVC-17-C-02	-26.5	-30.0	100	100	100	100	100	100	100	100	100	98	93	62	7	5			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-03	-23.4	-25.4	100	100	100	100	100	100	100	100	100	99	96	63	9	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-03	-25.4	-30.0	100	100	100	100	100	100	100	100	100	99	97	72	8	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-04	-23.0	-25.0	100	96	96	96	96	96	95	95	94	92	87	47	5	3			POORLY GRADED SAND (SP)
OSHVC-17-C-04	-25.0	-30.0	100	100	100	100	100	100	100	100	100	98	89	44	6	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-05	-21.6	-23.6	100	100	100	100	100	100	100	100	98	95	84	29	3	2			POORLY GRADED SAND (SP)
OSHVC-17-C-05	-23.6	-30.0	100	100	100	100	100	100	100	100	99	97	90	48	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-06	-22.8	-24.8	100	100	100	100	100	100	100	100	99	96	89	43	5	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-06	-24.8	-30.0	100	100	100	100	100	100	100	100	99	96	90	43	5	3			POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-07	-25.9	-26.6	100	100	100	100	100	99	99	99	98	95	90	55	14	13			SILTY SAND (SM)
OSHVC-17-C-07	-26.6	-30.0	100	100	100	100	100	100	100	100	99	97	92	54	9	7			POORLY GRADED SAND WITH SILT (SP-SM)

Table 9. 2017 Oceanside Harbor Weighted Average Grain Size (Sieve) Analysis Data for Individual Vibracore Boreholes.

Core Designation	Elevation (ft. MLLW)		Gravel			Coarse Sand			Medium Sand			Fine Sand				Silt/Clay		Classification
			Sieve No. / Sieve Size / % Passing															
			3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
	Top	Bottom	9.5mm	4.75mm	2.80mm	2.00mm	1.40mm	1.00mm	0.71mm	0.50mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm	
Del Mar Channel (Area A)																		
OSHVC-17-A-01	-18.8	-22	100	100	100	100	100	100	100	99	99	96	88	62	30	19	16	SILTY SAND (SM)
OSHVC-17-A-02	-19.6	-22	100	100	100	100	100	100	100	100	99	98	96	85	61	**47**	41	SILTY SAND (SM)
OSHVC-17-A-03	-16.4	-22	100	100	100	100	100	100	100	100	99	92	72	23	7	4	3	POORLY GRADED SAND (SP)
OSHVC-17-A-04	-16.3	-22	100	100	100	100	100	100	100	100	99	89	63	17	5	4	3	POORLY GRADED SAND (SP)
OSHVC-17-A-05	-19.3	-22	100	98	98	98	97	96	95	92	89	82	72	42	20	13	10	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-A-06	-17.0	-22	100	100	100	100	100	100	99	98	95	81	58	32	20	17	15	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-A-07	-17.2	-22	100	100	100	100	100	100	100	99	97	85	62	23	7	3	2	POORLY GRADED SAND (SP)
Oceanside Channel (Area B)																		
OSHVC-17-B-01	-19.4	-22	100	100	100	100	100	100	100	100	100	98	93	53	18	9	7	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-B-02	-17.2	-22	100	100	100	100	100	100	100	99	97	85	50	9	3	2	1	POORLY GRADED SAND (SP)
OSHVC-17-B-03	-18.3	-22	100	100	100	100	99	99	99	99	98	95	88	65	42	**31**	26	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-B-04	-19.7	-22	100	100	100	100	100	100	100	100	99	98	95	94	92	**91**	90	LEAN CLAY (CL)
Entrance Channel (Area C)																		
OSHVC-17-C-01	-21.5	-30	100	100	100	100	100	100	100	100	100	99	95	69	25	9	7	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-02	-24.5	-30	100	100	100	100	100	100	100	100	100	98	94	67	25	10	8	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-03	-23.4	-30	100	100	100	100	100	100	100	100	100	99	97	69	24	8	6	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-04	-23.0	-30	99	99	99	99	99	99	99	99	98	96	88	45	14	5	4	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-05	-21.6	-30	100	100	100	100	100	100	100	100	99	96	88	43	14	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-06	-22.8	-30	100	100	100	100	100	100	100	100	99	96	89	43	14	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
OSHVC-17-C-07	-25.9	-30	100	100	100	100	100	99	99	99	99	97	92	54	20	10	8	SILTY SAND (SM)

Table 10. 2017 Oceanside Harbor Weighted Average Grain Size (Sieve) Analysis Data for Each Composite Area.

Core Designation	Gravel				Coarse Sand			Medium Sand			Fine Sand				Silt/Clay		Classification
	Sieve No. / Sieve Size / % Passing																
	3/4	3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
	19mm	9.5mm	4.75mm	2.80mm	2.00mm	1.40mm	1.00mm	0.71mm	0.50mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm	
Del Mar Channel (Area A)	100	100	100	100	100	100	100	99	99	97	88	70	35	17	12	10	POORLY GRADED SAND WITH SILT (SP-SM)
Oceanside Channel (Area B)	100	100	100	100	100	100	100	100	99	98	93	76	48	32	27	25	SILTY SAND (SM)
Entrance Channel (Area C)	100	100	100	100	100	100	100	100	100	99	97	92	56	19	7	5	POORLY GRADED SAND WITH SILT (SP-SM)

Table 11. 2017 Oceanside City Beach Nearshore Placement Site & Beach Transect Sieve Analysis Data.

Core Designation	Sample No.	Elevation (ft)	Gravel		Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Atterberg Limits		Classification
			Sieve No. / Sieve Size / % Passing																	
			3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	LL	PI	
			9.5mm	4.75mm	2.80mm	2.00mm	1.40mm	1.00mm	0.71mm	0.50mm	0.355mm	0.25mm	0.18mm	0.125mm	0.09mm	0.075mm	0.063mm			
Nearshore																				
OSCBNS17-D	1	-23.40	100	100	100	100	100	100	100	99	99	97	94	68	28	13	8			SILTY SAND (SM)
OSCBNS17-D	2	-21.48	100	100	100	100	100	100	100	99	99	98	94	71	29	14	9			SILTY SAND (SM)
OSCBNS17-D	3	-20.51	100	100	100	100	100	100	99	99	98	95	84	55	23	10	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	4	-20.48	100	96	95	94	93	92	90	88	87	84	79	59	27	11	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	5	-19.52	100	99	99	98	98	98	97	97	95	89	70	34	15	6	3			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	6	-22.44	100	99	98	98	97	97	97	97	96	95	88	53	21	10	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	7	-27.52	100	100	100	100	100	100	100	100	100	99	97	58	22	9	5			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	8	-24.35	100	100	100	100	100	100	100	100	100	99	98	85	37	20	13			SILTY SAND (SM)
OSCBNS17-D	9	-19.38	100	96	95	95	94	94	94	94	93	91	84	48	19	8	6			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBNS17-D	10	-18.38	100	96	95	95	94	94	94	93	92	90	82	47	18	8	4			POORLY GRADED SAND WITH SILT (SP-SM)
Transect A																				
OSCBTS17-A	1	+12	100	99	99	99	98	98	97	92	75	39	16	4	2	2	2			POORLY GRADED SAND (SP)
OSCBTS17-A	2	+6	100	100	100	100	100	100	100	100	100	91	50	10	2	1	1			POORLY GRADED SAND (SP)
OSCBTS17-A	3	0	100	100	100	100	100	100	99	99	98	94	81	26	7	3	2			POORLY GRADED SAND (SP)
OSCBTS17-A	4	-6	100	100	100	100	100	100	100	100	99	97	89	36	11	4	2			POORLY GRADED SAND (SP)
OSCBTS17-A	5	-12	100	99	99	99	99	99	99	99	99	98	94	44	12	5	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-A	6	-18	100	100	100	100	100	100	100	100	100	99	96	40	14	5	3			POORLY GRADED SAND (SP)
OSCBTS17-A	7	-24	100	100	100	100	100	100	100	100	100	98	97	80	28	15	12			SILTY SAND (SM)
OSCBTS17-A	8	-30	100	100	100	100	100	100	100	100	99	98	95	84	40	24	21			SILTY SAND (SM)
Transect B																				
OSCBTS17-B	1	+12	100	95	94	94	93	93	92	90	82	59	32	11	4	2	2			POORLY GRADED SAND (SP)
OSCBTS17-B	2	+6	100	100	100	100	100	100	100	100	100	80	37	8	2	1	1			POORLY GRADED SAND (SP)
OSCBTS17-B	3	0	100	100	100	99	99	97	93	86	76	63	30	11	3	2	2			POORLY GRADED SAND (SP)
OSCBTS17-B	4	-6	100	100	100	100	100	100	100	100	99	97	90	35	11	3	3			POORLY GRADED SAND (SP)
OSCBTS17-B	5	-12	100	100	99	99	99	99	99	99	99	98	90	38	11	5	3			POORLY GRADED SAND (SP)
OSCBTS17-B	6	-18	100	99	98	98	98	98	98	98	97	94	84	43	20	10	8			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-B	7	-24	100	100	100	100	100	100	100	100	100	99	96	82	37	19	14			SILTY SAND (SM)
OSCBTS17-B	8	-30	100	100	100	100	100	100	99	99	99	98	96	84	41	27	23			SILTY SAND (SM)
Transect C																				
OSCBTS17-C	1	+12	100	100	100	100	100	100	99	98	93	79	55	22	9	4	3			POORLY GRADED SAND (SP)
OSCBTS17-C	2	+6	100	100	100	100	100	100	100	100	100	89	46	9	2	1	0			POORLY GRADED SAND (SP)
OSCBTS17-C	3	0	100	100	100	100	99	99	99	97	91	78	52	17	6	2	1			POORLY GRADED SAND (SP)
OSCBTS17-C	4	-6	100	100	100	100	100	99	99	98	97	93	75	31	10	3	2			POORLY GRADED SAND (SP)
OSCBTS17-C	5	-12	100	100	100	100	100	100	100	100	99	96	80	36	13	6	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-C	6	-18	100	100	100	100	100	100	100	100	100	98	92	51	19	8	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-C	7	-24	100	100	100	100	100	100	100	100	99	96	86	46	19	8	5			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-C	8	-30	100	100	100	100	100	100	100	100	99	99	96	76	35	18	12			SILTY SAND (SM)
Transect D																				
OSCBTS17-D	1	+12	100	100	100	100	100	99	99	99	97	91	75	33	12	6	4			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-D	2	+6	100	100	100	100	100	100	100	100	100	75	29	6	2	1	1			POORLY GRADED SAND (SP)

Table 11. Oceanside Nearshore Placement Site & Beach Transects Sieve Analysis Data (Continued).

Core Designation	Sample No.	Elevation (feet)	Gravel		Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Atterberg Limits		Classification
			Sieve No. / Sieve Size / % Passing																	
			3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	LL	PI	
			9.5mm	4.75mm	2.80mm	2.00mm	1.40mm	1.00mm	0.71mm	0.50mm	0.355mm	0.25mm	0.18mm	0.125mm	0.09mm	0.075mm	0.063mm			
OSCBTS17-D	3	0	100	100	100	100	100	100	99	98	93	79	55	22	9	4	3			POORLY GRADED SAND (SP)
OSCBTS17-D	4	-6	100	100	100	100	100	100	100	100	100	89	46	9	2	1	0			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-D	5	-12	100	100	100	100	99	99	99	97	91	78	52	17	6	2	1			POORLY GRADED SAND (SP)
OSCBTS17-D	6	-18	100	100	100	100	100	99	99	98	97	93	75	31	10	3	2			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-D	7	-24	100	100	100	100	100	100	100	100	99	96	80	36	13	6	4			SILTY SAND (SM)
OSCBTS17-D	8	-30	100	100	100	100	100	100	100	100	100	98	92	51	19	8	4			SILTY SAND (SM)
Transect E																				
OSCBTS17-E	1	+6	100	100	100	100	100	100	100	100	94	52	18	3	1	0	0			POORLY GRADED SAND (SP)
OSCBTS17-E	2	0	100	98	96	93	88	81	68	54	48	44	38	15	4	1	1			POORLY GRADED SAND (SP)
OSCBTS17-E	3	-6	100	100	100	100	100	100	100	100	100	98	90	39	4	3	2			POORLY GRADED SAND (SP)
OSCBTS17-E	4	-12	100	99	99	99	99	99	98	98	98	96	83	34	12	5	3			POORLY GRADED SAND (SP)
OSCBTS17-E	5	-18	100	94	93	93	93	93	92	92	92	90	82	35	13	5	3			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-E	6	-24	100	97	96	96	95	94	93	92	90	88	79	50	25	11	7			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-E	7	-30	100	100	100	100	100	100	100	99	98	97	95	83	43	25	19			SILTY SAND (SM)
Transect F																				
OSCBTS17-F	1	+2.3	100	100	100	100	100	100	100	100	94	52	18	3	1	0	0			POORLY GRADED SAND (SP)
OSCBTS17-F	2	0	100	98	96	93	88	81	68	54	48	44	38	15	4	1	1			POORLY GRADED SAND (SP)
OSCBTS17-F	3	-6	100	100	100	100	100	100	100	100	100	98	90	39	4	3	2			POORLY GRADED SAND (SP)
OSCBTS17-F	4	-12	100	99	99	99	99	99	98	98	98	96	83	34	12	5	3			POORLY GRADED SAND (SP)
OSCBTS17-F	5	-18	100	94	93	93	93	93	92	92	92	90	82	35	13	5	3			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-F	6	-24	100	97	96	96	95	94	93	92	90	88	79	50	25	11	7			POORLY GRADED SAND WITH SILT (SP-SM)
OSCBTS17-F	7	-30	100	100	100	100	100	100	100	99	98	97	95	83	43	25	19			SILTY SAND (SM)

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Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS										
Percent Solids	%	74.2	70.6	75.5						
Total Volatile Solids	%	0.56	1	0.49						
Total Organic Carbon	%	0.22	0.28	0.11						
Total Sulfides	mg/kg dry	84	110	3						
Dissolved Sulfides	mg/kg	<0.017	<0.017	<0.017						
Oil and Grease	mg/kg dry	22	<11	<10						
TRPH	mg/kg dry	<11	<11	<11						
Total Ammonia	mg/kg dry	1.3	1.2	1.3						
METALS										
Arsenic	mg/kg dry	1.88	2.02	1.79	8.2	70	0.68	3.0	0.07	0.24
Cadmium	mg/kg dry	0.134J	0.162	<0.0758	1.2	9.6	7.1	98	1.7	7.5
Chromium	mg/kg dry	14	14.7	14.2	81	370			100,000[4]	100,000[4]
Copper	mg/kg dry	8.44	13.6	4.92	34	270	310	4,700	3,000	38,000
Lead	mg/kg dry	3.15	3.31	1.76	46.7	218	400	800	80	320
Mercury	mg/kg dry	0.00939J	0.0119J	<0.00753	0.15	0.71	1.1	4.6	18	180
Nickel	mg/kg dry	6.17	6.3	5.72	20.9	51.6	150	2,200	1,600	16,000
Selenium	mg/kg dry	<0.0985	<0.103	<0.0968			39	580	380	4,800
Silver	mg/kg dry	<0.0422	<0.0443	<0.0415	1	3.7	39	580	380	4,800
Zinc	mg/kg dry	42.5	43.6	39.9	150	410	2,300	35,000	23,000	100,000
BUTYLTINS										
Monobutyltin	µg/kg dry	<1.8	<1.9	<1.8						
Dibutyltin	µg/kg dry	<0.97	3.2J	<0.95			1,900	25,000		
Tributyltin	µg/kg dry	<2	<2.1	<1.9			1,900	25,000		
Tetrabutyltin	µg/kg dry	<0.99	<1	<0.97						
PAH's										
1-Methylnaphthalene	µg/kg dry	<1.4	<1.5	<1.4			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<2.6	<2.7	<2.6						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.4	<2.4	<2.3						
2,6-Dimethylnaphthalene	µg/kg dry	<2.8	<2.9	<2.8						
2-Methylnaphthalene	µg/kg dry	<2.2	<2.3	<2.2	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<2.1	<2.1	<2	16	500	360,000	4,500,000		

Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Acenaphthylene	µg/kg dry	<2.3	<2.3	<2.2	44	640				
Anthracene	µg/kg dry	<2.6	<2.7	<2.6	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	<1.9	<2	<1.9	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	<1.9	<1.9	<1.8	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	<1.9	<2	<1.9			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	<2.3	<2.3	<2.2						
Benzo (g,h,i) Perylene	µg/kg dry	<2.1	<2.1	<2						
Benzo (k) Fluoranthene	µg/kg dry	<2	<2.1	<2			11,000	210,000		
Biphenyl	µg/kg dry	<2.6	<2.6	<2.5						
Chrysene	µg/kg dry	<1.8	<1.9	<1.8	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<1.9	<2	<1.9	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.8	<1.9	<1.8			78,000	1,200,000		
Fluoranthene	µg/kg dry	<2.4	2.6J	<2.3	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<2.2	<2.3	<2.2	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	<1.8	<1.8	<1.7			1,100	21,000		
Naphthalene	µg/kg dry	<2.1	<2.1	<2	160	2100	3,800	17,000		
Perylene	µg/kg dry	<1.6	<1.6	<1.5						
Phenanthrene	µg/kg dry	<2.3	<2.4	<2.3	240	1500				
Pyrene	µg/kg dry	<2.2	<2.3	<2.2	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	ND	ND	ND	552	3160				
Total High Weight PAHs	µg/kg dry	ND	2.7	ND	1700	9600				
Total PAHs	µg/kg dry	ND	2.7	ND	4022	44792				
PHTHALATES										
Benzyl Butyl Phthalate	µg/kg dry	67U	69U	66U			290,000	1,200,000		
bis-(2-Ethylhexyl) Phthalate	µg/kg dry	3.7J	<2.1	<2			39,000	160,000		
Diethyl Phthalate	µg/kg dry	3.7J	3.4J	3.4J			5,100,000	66,000,000		
Dimethyl Phthalate	µg/kg dry	<2.7	<2.8	<2.7			780,000	12,000,000		
Di-n-Butyl Phthalate	µg/kg dry	14J	38J	36J			630,000	8,200,000		
Di-n-Octyl Phthalate	µg/kg dry	<2.5	<2.6	<2.5			63,000	820,000		

Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PHENOLS										
2,3,4,6-Tetrachlorophenol	µg/kg dry	<5.3	<5.4	<5.2			190,000	2,500,000		
2,4,5-Trichlorophenol	µg/kg dry	<1.6	<1.7	<1.6			630,000	8,200,000		
2,4,6-Trichlorophenol	µg/kg dry	<1.8	<1.8	<1.7			6,300	82,000		
2,4-Dichlorophenol	µg/kg dry	<2.3	<2.4	<2.3			19,000	250,000		
2,4-Dimethylphenol	µg/kg dry	<3.5	<3.6	<3.4			130,000	1,600,000		
2,4-Dinitrophenol	µg/kg dry	<81	<83	<79			13,000	160,000		
2,6-Dichlorophenol	µg/kg dry	<2.9	<3	<2.8						
2-Chlorophenol	µg/kg dry	<2.5	<2.6	<2.5			39,000	580,000		
2-Methylphenol	µg/kg dry	<2.6	<2.7	<2.6						
2-Nitrophenol	µg/kg dry	<2.3	<2.3	<2.2						
3/4-Methylphenol	µg/kg dry	<4.9	<5	<4.8						
4,6-Dinitro-2-Methylphenol	µg/kg dry	<89	<92	<88						
4-Chloro-3-Methylphenol	µg/kg dry	<2.8	<2.9	<2.7						
4-Nitrophenol	µg/kg dry	<110	<110	<110						
Bisphenol A	µg/kg dry	<2.8	<2.9	<2.7			320,000	4,100,000		
Pentachlorophenol	µg/kg dry	<1.8	<1.8	<1.8			1,000	4,000	4,400	13,000
Phenol	µg/kg dry	<3.1	<3.2	<3.1			1,900,000	25,000,000		
CHLORINATED PESTICIDES										
2,4'-DDD	µg/kg dry	<0.1	<0.11	<0.1						
2,4'-DDE	µg/kg dry	<0.046	<0.049	<0.046						
2,4'-DDT	µg/kg dry	<0.082	<0.087	<0.082						
4,4'-DDD	µg/kg dry	<0.053	0.4	<0.053	2	20	2,300	9,600	2,300	9,000
4,4'-DDE	µg/kg dry	<0.054	**2.8**	<0.053	2.2	27	2,000	9,300	1,600	6,300
4,4'-DDT	µg/kg dry	<0.07	<0.073	<0.069	1	7	1,900	8,500	1,600	6,300
Total DDT	µg/kg dry	0	**3.2**	0	1.58	46.1				
Aldrin	µg/kg dry	<0.05	<0.053	<0.05			39	180	33	130
BHC-alpha	µg/kg dry	<0.076	<0.08	<0.076			86	360		
BHC-beta	µg/kg dry	<0.089	<0.094	<0.089			300	1,300		
BHC-delta	µg/kg dry	<0.12	<0.13	<0.12						
BHC-gamma (Lindane)	µg/kg dry	<0.046	<0.048	<0.045			570	2,500		
Chlordane-alpha	µg/kg dry	<0.088	<0.093	<0.088						

Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Chlordane-gamma	µg/kg dry	<0.071	<0.075	<0.07						
Chlordane (Technical)	µg/kg dry	<7	<7.3	<6.8			1,700	7,700	430	1,700
Cis-nonachlor	µg/kg dry	<0.067	<0.071	<0.067						
Dieldrin	µg/kg dry	<0.14	<0.15	<0.14	0.02	8	34	140	35	130
Endosulfan Sulfate	µg/kg dry	<0.14	<0.15	<0.14						
Endosulfan I	µg/kg dry	<0.076	<0.081	<0.076			47,000	700,000		
Endosulfan II	µg/kg dry	<0.12	<0.13	<0.12						
Endrin	µg/kg dry	<0.075	<0.079	<0.075		45	1,900	25,000	21,000	230,000
Endrin Aldehyde	µg/kg dry	<0.13	<0.14	<0.13						
Endrin Ketone	µg/kg dry	<0.073	<0.077	<0.073						
Heptachlor	µg/kg dry	<0.068	<0.072	<0.068			130	630	130	520
Heptachlor Epoxide	µg/kg dry	<0.059	<0.062	<0.058			70	330		
Methoxychlor	µg/kg dry	<0.089	<0.094	<0.089			32,000	410,000	340,000	3,800,000
Mirex	ug/kg dry	<0.052	<0.055	<0.052			36	170	31	120
Oxychlordane	ug/kg dry	<0.096	<0.1	<0.096						
Toxaphene	ug/kg dry	<12	<13	<12			490	2,100	460	1,800
Trans-nonachlor	ug/kg dry	<0.057	<0.06	<0.057						
Total Chlordane	ug/kg dry	ND	ND	ND	0.5	6	1,700	7,700	430	1,700
PCB CONGENERS										
PCB018	µg/kg dry	<0.086	<0.091	<0.084						
PCB028	µg/kg dry	<0.092	<0.097	<0.09						
PCB037	µg/kg dry	<0.08	<0.085	<0.078						
PCB044	µg/kg dry	<0.2	<0.21	<0.2						
PCB049	µg/kg dry	<0.066	<0.07	<0.064						
PCB052	µg/kg dry	<0.25	<0.27	<0.25						
PCB066	µg/kg dry	<0.16	<0.17	<0.16						
PCB070	µg/kg dry	<0.095	<0.1	<0.092						
PCB074	µg/kg dry	<0.12	<0.13	<0.12						
PCB077	µg/kg dry	<0.15	<0.16	<0.15			38	160		
PCB081	µg/kg dry	<0.12	<0.13	<0.12			12	48		
PCB087	µg/kg dry	<0.15	<0.16	<0.14						
PCB099	µg/kg dry	<0.063	<0.067	<0.061						
PCB101	µg/kg dry	<0.059	<0.062	<0.057						

Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB105	µg/kg dry	<0.071	<0.075	<0.069			120	490		
PCB110	µg/kg dry	<0.045	<0.047	<0.044						
PCB114	µg/kg dry	<0.098	<0.1	<0.096			120	500		
PCB118	µg/kg dry	<0.046	<0.049	<0.045			120	490		
PCB119	µg/kg dry	<0.083	<0.088	<0.081						
PCB123	µg/kg dry	<0.097	<0.1	<0.094			120	490		
PCB126	µg/kg dry	<0.073	<0.077	<0.071			0.036	0.15		
PCB128	µg/kg dry	<0.16	<0.17	<0.16						
PCB132/153	µg/kg dry	<0.22	<0.23	<0.21						
PCB138/158	µg/kg dry	<0.47	<0.49	<0.46						
PCB149	µg/kg dry	<0.16	<0.17	<0.15						
PCB151	µg/kg dry	<0.12	<0.12	<0.11						
PCB156	µg/kg dry	<0.1	<0.11	<0.1			120	500		
PCB157	µg/kg dry	<0.11	<0.12	<0.11			120	500		
PCB167	µg/kg dry	<0.18	<0.19	<0.17			120	510		
PCB168	µg/kg dry	<0.19	<0.2	<0.18						
PCB169	µg/kg dry	<0.086	<0.091	<0.084			0.12	0.51		
PCB170	µg/kg dry	<0.15	<0.16	<0.14						
PCB177	µg/kg dry	<0.16	<0.16	<0.15						
PCB180	µg/kg dry	<0.12	<0.13	<0.12						
PCB183	µg/kg dry	<0.12	<0.13	<0.12						
PCB187	µg/kg dry	<0.14	<0.14	<0.13						
PCB189	µg/kg dry	<0.085	<0.09	<0.083			130	520		
PCB194	µg/kg dry	<0.098	<0.1	<0.096						
PCB201	µg/kg dry	<0.045	<0.048	<0.044						
PCB206	µg/kg dry	<0.15	<0.16	<0.15						
Total PCB Congeners	µg/kg dry	ND	ND	ND	22.7	180	230	940	89	300
PYRETHROIDS										
Allethrin	µg/kg dry	<0.33	<0.35	<0.33						
Bifenthrin	µg/kg dry	<0.4	<0.42	<0.39			95,000	1,200,000		
Cyfluthrin	µg/kg dry	<0.33	<0.35	<0.33			160,000	2,100,000		
Cyhalothrin-lambda	µg/kg dry	<0.33	<0.35	<0.33			6,300	82,000		

Table 12. 2017 Oceanside Harbor Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	OSHVC-17-			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	B	C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Cypermethrin	µg/kg dry	<0.33	<0.35	<0.33			380,000	4,900,000		
Deltamethrin:Tralomethrin	µg/kg dry	<0.33	<0.35	<0.33			47,000	620,000		
Esfenvalerate:Fenvalerate	µg/kg dry	<0.33	<0.35	<0.33			160,000	2,100,000		
Fenpropathrin	µg/kg dry	<0.33	<0.35	<0.33			160,000	2,100,000		
Fluvalinate	µg/kg dry	<0.33	<0.35	<0.33			63,000	820,000		
Phenothrin (Sumithrin)	µg/kg dry	<0.33	<0.35	<0.33						
Permethrin (cis/trans)	µg/kg dry	<0.67	<0.7	<0.66			320,000	4,100,000		
Resmethrin:Bioresmethrin	µg/kg dry	<0.57	<0.6	<0.56			190,000	2,500,000		
Tetramethrin	µg/kg dry	<0.4	<0.42	<0.39						
ERM Quotient		0.01	0.02	0.01						

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).
4. CHHSL values for chromium are based on chromium III.

Red values exceed ERL values.
Red underlined values exceed ERM values.
Orange shaded values exceed one or more of the corresponding residential human health values.
Green shaded values exceed one or more of the corresponding commercial/industrial human health values.
ND = Not Detected
NF= Not found as a Tentatively Identifiable Compound.
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit.
U = Sample is ND at the sample value due to a method blank detection.

5.0 DISCUSSION

5.1 Sediment Observations

Most observed sediment characteristics were somewhat similar among cores. According to sediment logs (Appendix F), sediments from most cores were described as poorly graded sand (SP) or poorly graded sand with silt (SP-SM) down to the project overdepth elevations. Two cores in Area A consisted entirely of silty sand (SM), and silty sand was found in layers of varying thickness from at least one core in each area. One core consisted entirely of lean clay (CL). This core, B-4, was located at the entrance to the public marina at the end of the Oceanside Channel. In comparison, all Oceanside City Beach transect samples, from the top of the beach out to -6 or -12 feet MLLW, were described as poorly graded sand (SP). The deeper beach transect samples primarily consisted of either poorly graded sand (SP), poorly graded sand with silt (SP-SM), or silty sand (SM), with only the lowest sample elevations being described as silty sand (SM). The Nearshore Placement Site samples were primarily characterized as silty sand (SM) or poorly graded sand with silt (SP-SM).

A strong H_2S odor was noted for Locations A-2 and C-7, and a slight sulfur odor was noted for Location A-5. No petroleum odors were noted for any of the cores. Only one core (A-5) had trash noted at 1.5 feet from the top of the core. Very little in the way of organic material and shell fragments were noted in any of the cores.

5.2 Sediment Grain Size

The weighted average composite grain size gradations were calculated for all three dredge areas based on the grain size test results from all individual vibracore borehole samples. The results indicate that the weighted average sand and fines content was 88% and 12% respectively for Area A, 73% and 27% respectively for Area B and 93% and 7% respectively for Area C. A large portion of fine grain material in the Area B composite sample came from the Location B-4 core at the entrance to the public marina. If that core is excluded from the composite weighted average calculation, the percentage of sand for Area B jumps to 87% with a 13% fines content. Composite grain size averages for Areas A and C are well within the bounding (beach compatibility envelope) grain size curves for both the nearshore and beach placement sites. When excluding core No. 4 from Area B, the composite grain size average for Area B is within the bounding (envelope) grain size curves for both the nearshore and beach placement sites. In addition, and with three exceptions, all of the weighted average grain size gradations for each of the individual vibracore sample locations were within the nearshore and beach placement site envelopes as well. The exceptions were for core A-2 in Area A and cores B-3 and B-4 for Area B. Core A-2 in Area A contained a weighted average of 47% fines and 53% sand, core B-3 for Area B contained a weighted average of 31% fines and 69% sand, and core B-4 for Area B contained a weighted average of 91% fines and 9% sand. These values exceed the fines limit envelope curve for the beach placement and nearshore placement sites. The actual allowable amount of fines based on the beach placement site fines limit curve is 29% for the site north of Oceanside Pier (transects A, B and C) and 23% for the site south of Oceanside Pier (transects D, E and F). The actual allowable amount of fines based on the nearshore placement site fines limit curve is 30%. The weighted average percent fines from core A-2 is negligible when factored into the weighted average composite grain size for Area A. The same can be said for core B-3. In order for sediments from the Oceanside Channel (Area B) to be compatible with all three beach placement sites (north of Oceanside Pier, south of Oceanside Pier and the nearshore site), sediments surrounding location B-04 would need to be excluded from the grain size composite weighted average calculations for this site.

Results of the physical compatibility analysis are provided in Appendix B as a separate report prepared by the Los Angeles District USACE.

5.3 Bulk Sediment Chemistry

Overall, analyte concentrations in the Oceanside Harbor area composite samples, as summarized in Table 10, were below detection limits or low compared to effects based screening values. The only constituents detected above a NOAA ERL value were total DDT and 4,4'-DDE in the Area B composite sample, which were detected only slightly above the ERL values and as such, no sample values exceed a NOAA ERM value. Furthermore, 4,4'-DDE in the Area B composite sample was the only organic constituent reported above a laboratory reporting limit. Therefore, adverse ecological effects are not expected from the dredge material. This is further supported by the fact mean ERM quotients were only 0.01 to 0.02. With an ERMq of 0.1, there is less than a 12% probability of a toxic response.

Except for arsenic, all contaminants detected in the Oceanside Harbor sediments were well below RSLs and CHHSLs for residential soils developed for human protection. Elevated arsenic concentrations occur commonly in Southern California dredge sediments and soils, and the concentrations of arsenic in the Oceanside Harbor samples were less than the background concentration (3.5 mg/kg) of soils throughout California (Bradford et al., 1996).

In comparison to the last report in 2012, total sulfide levels have decreased. However, current levels of sulfides could result in the production of obnoxious smells during placement activities if the material is to be placed directly on the beach or intertidal area. However, there were very little or no soluble sulfides suggesting the volatilization of hydrogen sulfide should be minor. Hydrogen sulfide, responsible for most odors during placement, is very soluble in water.

5.4 Conclusions and Recommendations

This report supports a strong recommendation that the Oceanside Harbor sediments are suitable to be reused at Oceanside City Beach. With the exception of one small area of the Oceanside Channel (Area B) near the public marina represented by core location B-4, the Harbor sediments are physically compatible with the two receiving beaches and nearshore site. The incompatible area had 91% fine grain sediments and represents only 1% of the overall dredge volume. It was agreed upon with the SC-DMMT stakeholders that the shoaling surrounding location B-4 would be excluded from future maintenance dredging activities. The sediment within the rest of Area B is still considered compatible for all three placement sitess based on composite grain size weighted average of vibracore boreholes B-1, B-2 and B-3 only. Therefore, all sediment in Area B, except for the small amount around vibracore B-4, would be targeted for removal during future Corps of Engineers maintenance dredging events. Note that only about 10 cy of sediment a year is expected to accumulate on the shoal around location B-4.

Based on the bulk sediment chemistry data, it appears unlikely that the placement of Oceanside Harbor sediments at Oceanside City Beach would cause any adverse ecological or human health impacts due to chemical contamination.

Results from this study where very similar to the results from the 2012 Geotechnical and Environmental Investigation Project (Appendix A). The 2012 study concluded that the Oceanside Harbor sediments were ideal for beach nourishment reuse. This same conclusion is supported by the results of this study.

6.0 QUALITY CONTROL REQUIREMENTS

Formal QA/QC procedures were followed for this project. The objectives of the QA/QC Program were to fully document the field and laboratory data collected, to maintain data integrity from the time of field collection through storage and archiving, and to produce the highest quality data possible. Quality assurance involves all of the planned and systematic actions necessary to provide confidence that work performed by the project team conforms to contract requirements, laboratory methodologies, state and federal regulation requirements, and corporate standard operating procedures (SOPs). The program is designed to allow the data to be assessed by the following parameters: Precision, accuracy, comparability, representativeness, and completeness. These parameters are controlled by adhering to documented methods and procedures (SOPs), and by the analysis of quality control (QC) samples on a routine basis.

6.1 Field Sampling Quality Management

Field quality control procedures were followed and included adherence to SOPs, field documentation, formal sample documentation and tracking, use of certified clean laboratory containers, protocol cleaning, and sample preservation. There were no field issues to report that could have affected the quality of data collected.

6.2 Analytical Chemistry QA/QC

Analytical chemistry QC is formalized by EPA and State Certification agencies, and involves internal quality control checks for precision and accuracy. Any issues associated with the analytical laboratory quality control checks are summarized in Appendix G.

QA/QC findings presented are based on the validation of the data according to the quality assurance objectives detailed in the project SAP (AECOM and Kinnetic Laboratories) and in Appendix G, and using guidance from EPA National Functional Guidelines for inorganic and organic data review (USEPA, 2017 and 2017).

As the first step in the validation process, all results were carefully reviewed to check that the laboratories met project reporting limits and that chemical analyses were completed within holding times. Except for six phthalate compounds, all wet weight detection limits and reporting limits for this project, as specified in the project SAP and SC-DMMT SAP guidance document, were met. A wet weight RL of 60 µg/kg was achieved for the six phthalate compounds. The project SAP specified an RL of 10 µg/kg and the SC-DMMT guidance document specified an RL of 20 µg/kg for these compounds. Note though that method detection limits for these compounds were 2.0 µg/kg wet weight. All analyses were completed within EPA and Surface Water Ambient Monitoring Program (SWAMP) specified holding times.

QA/QC records (476 total) for the sediment and tissue analyses included method blanks (BLK), laboratory duplicates (DUP), laboratory control samples and their duplicates (LCS/LCSDs), matrix spikes and matrix spike duplicates (MS/MSDs), post digestion spikes (PDS) and surrogates (SURR). Total numbers of QC records by type are summarized in Table 13. Three sediment sample results (all phthalate compounds and 0.7% of the total sediment results) were qualified as a result of the QC review and are summarized in Table 14. All of these qualifications were a result of method blank detections. The reasoning behind these qualifications is explained in Appendix G. Despite these minor QC issues, overall evaluation of the analytical QA/QC data indicates that the chemical data are for the most part within established performance criteria and can be used for characterization of sediments in the Oceanside Harbor project area.

Table 13. Counts of QC records per Chemical Category

Analyte Group	BLK	DUP	LCS / LCSD	MS / MSD	PDS	SURR	Total
			Sediment				
Conventionals							
Percent Solids	1	1					2
Ammonia	1		2	2			5
Total Organic Carbon	1		2				3
Total Volatile Solids	1	1					2
O&G	1		2	2			5
TRPH	1		2	2			5
Total Sulfides	1	1	2				4
Dissolved Sulfides	1	1	2				4
Total Metals	10		10	20	9		49
PAH's, Phthalates & Phenols	48		17	34		24	123
Chlorinated Pesticides	29		22	44		16	111
PCB Congeners	40		15	30		8	93
Butyltins	4		2	4		4	14
Pyrethroids	13		13	26		4	56
Sediment Totals	152	4	91	164	9	56	476

Table 14. Final QC Qualification Applied to Sample Results

Analyte	# Samples Qualified	Final Qualifier	BLK	DUP	LCS	MS	PDS	SURR
Phthalates – Sediment								
Butyl Benzyl Phthalate	3	U	U					
Total number of affected samples	3							
Percentage of all samples	0.7%							

7.0 REFERENCES CITED

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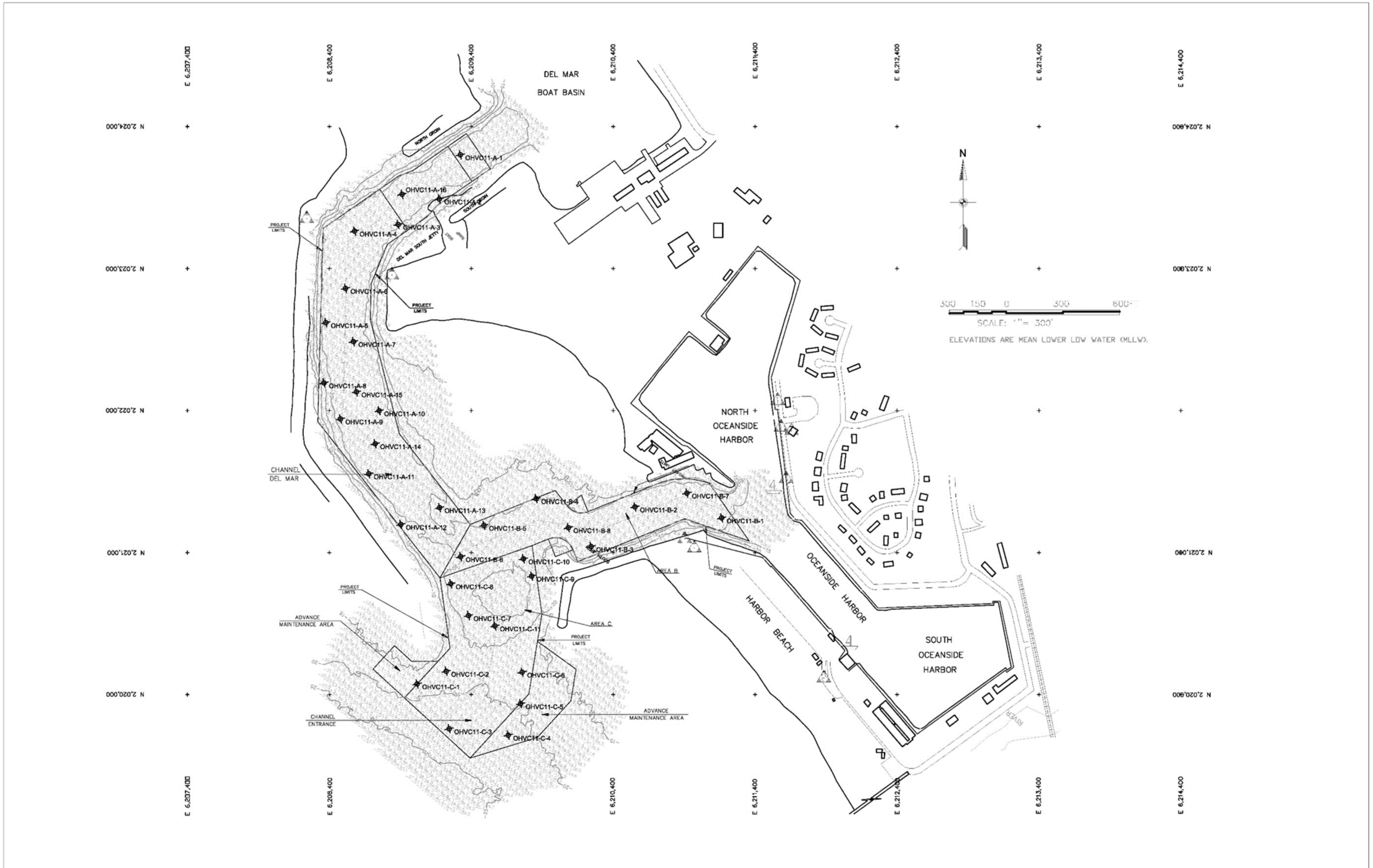
Appendix A

Sampling, Physical and Analytical Data
Oceanside Harbor 2012 Environmental and
Geotechnical Investigation Project
(Diaz Yourman, GeoPentech and
Kinnetic Laboratories, JV, 2012)



Oceanside Harbor 2012 Composite Areas and Sampling Locations.

Table 3. Core Sampling Locations and Depths, Existing Mudline Elevations, and Project and Sampling Elevations, Oceanside Harbor.

Composite Area	Core Designation	Sampling Date	Sampling Time	Latitude North	Longitude West	Mudline (ft, MLLW)	Project Elevation (ft, MLLW)	Core Length Recovery (feet)	Target Sampling Elevation (ft, MLLW)	Core Length Sampled (ft)
					Del Mar Channel					
A	OHVC11-A-1	2/17/12	1035	33° 12’ 54.0”	117° 24’ 7.4”	-20.8	-20	13	-22	1.2
A	OHVC11-A-2	2/17/12	1117	33° 12’ 50.9”	117° 24’ 9.1”	-19.1	-20	13.6	-22	2.9
A	OHVC11-A-3	2/17/12	0943	33° 12’ 49.1”	117° 24’ 12.5”	-19.5	-20	10.4	-22	2.5
A	OHVC11-A-4	2/17/12	0918	33° 12’ 48.6”	117° 24’ 16.1”	-19.9	-20	9	-22	2.1
A	OHVC11-A-5	2/17/12	0853	33° 12’ 42.2”	117° 24’ 18.4”	-19.4	-20	11	-22	2.6
A	OHVC11-A-6	2/17/12	0820	33° 12’ 44.6”	117° 24’ 16.8”	-19.5	-20	8.4	-22	2.5
A	OHVC11-A-7	2/17/12	0750	33° 12’ 40.9”	117° 24’ 16.1”	-21	-20	7.9	-22	1.0
A	OHVC11-A-8	2/17/12	1212	33° 12’ 58.0”	117° 24’ 18.5”	-15	-20	14	-22	7.0
A	OHVC11-A-9	2/16/12	1502	33° 12’ 35.5”	117° 24’ 17.1”	-21	-20	8.2	-22	1.0
A	OHVC11-A-10	2/16/12	1619	33° 12’ 36.1”	117° 24’ 13.9”	-20.5	-20	12	-22	1.5
A	OHVC11-A-11	2/16/12	1427	33° 12’ 31.7”	117° 24’ 14.7”	-21.1	-20	12.2	-22	0.9
A	OHVC11-A-12	2/16/12	1347	33° 12’ 28.2”	117° 24’ 12.0”	-20.8	-20	9.1	-22	1.2
A	OHVC11-A-13	2/16/12	1310	33° 12’ 29.4”	117° 24’ 8.8”	-21.1	-20	7	-22	0.9
A	OHVC11-A-14	2/16/12	1535	33° 12’ 33.8”	117° 24’ 14.2”	-20.0	-20	12.2	-22	2.0
A	OHVC11-A-15	2/16/12	1650	33° 12’ 37.4”	117° 24’ 15.8”	-20.2	-20	11.8	-22	1.8
A	OHVC11-A-16	2/17/12	1000	33° 12’ 51.2”	117° 24’ 12.2”	-19.8	-20	10.7	-22	2.2
					Oceanside Channel					
B	OHVC11-B-1	2/15/12	1430	33° 12’ 28.9”	117° 23’ 45.4”	-21.0	-20	6.6	-22	1.0
B	OHVC11-B-2	2/14/12	1540	33° 12’ 29.6”	117° 23’ 52.6”	-20.2	-20	7.1	-22	1.8
B	OHVC11-B-3	2/14/12	1515	33° 12’ 26.8”	117° 23’ 56.2”	-19.2	-20	8.5	-22	2.5
B	OHVC11-B-4	2/16/12	0750	33° 12’ 30.1”	117° 24’ 00.8”	-19.4	-20	9.8	-22	2.6
B	OHVC11-B-5	2/16/12	1040	33° 12’ 28.2”	117° 24’ 5.1”	-18.6	-20	13.4	-22	3.4
B	OHVC11-B-6	2/16/12	1141	33° 12’ 26.0”	117° 24’ 7.0”	-20.4	-20	8.9	-22	1.6
B	OHVC11-B-7	2/14/12	1605	33° 12’ 30.6”	117° 23’ 48.3”	-20.2	-20	7.7	-22	1.8
B	OHVC11-B-8	2/14/12	1444	33° 12’ 28.1”	117° 23’ 58.1”	-20.3	-20	9.2	-22	1.7

Table 3. Core Sampling Locations and Depths, Existing Mudline Elevations, and Project and Sampling Elevations, Oceanside Harbor.

Composite Area	Core Designation	Sampling Date	Sampling Time	Latitude North	Longitude West	Mudline (ft, MLLW)	Project Elevation (ft, MLLW)	Core Length Recovery (feet)	Target Sampling Elevation (ft, MLLW)	Core Length Sampled (ft)
Entrance Channel and Advanced Maintenance Area										
C	OHVC11-C-1	2/22/12	0945	33° 12′ 17.1″	117° 24′ 10.5″	-16.4	-25	-16.5	-30*	14.6
C	OHVC11-C-2	2/22/12	1100	33° 12′ 18.0″	117° 24′ 8.1″	-15.5	-25	-19	-30*	14.5
C	OHVC11-C-3	2/22/12	0835	33° 12′ 14.0″	117° 24′ 7.8″	-21.1	-25	-13.4	-30*	8.9
C	OHVC11-C-4	2/22/12	1200	33° 12′ 13.6″	117° 24′ 2.9″	-20.1	-25	-13.3	-30*	9.9
C	OHVC11-C-5	2/23/12	1105	33° 12′ 15.8″	117° 24′ 01.9″	-16.5	-25	-18.3	-30*	13.5
C	OHVC11-C-6	2/23/12	0957	33° 12′ 18.0″	117° 24′ 1.8″	-13.0	-25	-18	-30*	17.0
C	OHVC11-C-7	2/23/12	0820	33° 12′ 21.9″	117° 24′ 6.3″	-17.3	-25	-19	-30*	12.7
C	OHVC11-C-8	2/23/12	1200	33° 12′ 24.1″	117° 24′ 7.8″	-20.4	-25	-16.5	-30*	9.6
C	OHVC11-C-9	2/22/12	1500	33° 12′ 24.7″	117° 24′ 1.1″	-23.1	-25	-12.5	-30*	6.9
C	OHVC11-C-10	2/23/12	1350	33° 12′ 25.9″	117° 24′ 1.8″	-23.7	-25	-14.4	-30*	6.3
C	OHVC11-C-11	2/22/12	1330	33° 12′ 21.2″	117° 24′ 4.1″	-18.6	-25	-13.8	-30*	11.4

* Includes two feet of overdredge + three feet of advanced maintenance dredging.

Table 9. 2012 Oceanside Harbor Physical Data Above Overdredge Depth for Each Individual Core.

Core Designation	Sample No.	Mudline Elevation (feet MLLW)	Sample Elevation (feet MLLW)		Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Atterberg Limits		Classification
					Sieve No. / Sieve Size / % Passing																		
			Top	Bottom	19.0mm	3/8 9.5mm	4 4.750mm	7 2.800mm	10 2.000mm	14 1.400mm	18 1.000mm	25 0.710mm	35 0.500mm	45 0.355mm	60 0.250mm	80 0.180mm	120 0.125mm	170 0.090mm	200 0.075mm	230 0.063mm	LL	PI	
Del Mar Channel (Area A)																							
OHVC11-A-1	1	-20.8	-20.8	-22.0	100	100	100	100	100	100	100	99	98	93	85	71	28	10	5	3			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-2	1	-19.1	-19.1	-20.4	100	100	100	100	100	100	99	99	97	94	89	76	34	11	5	4			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-2	2	-19.1	-20.4	-21.4	100	100	100	100	100	100	100	100	100	100	99	94	72	46	35	31			SILTY SAND (SM)
OHVC11-A-2	3	-19.1	-21.4	-22.0	100	100	100	100	100	100	100	100	98	96	91	79	33	11	5	3			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-3	1	-19.5	-19.5	-19.8	100	100	100	100	100	100	100	100	98	96	90	79	44	15	6	4			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-3	2	-19.5	-19.8	-22.0	100	100	100	100	100	100	99	99	97	94	87	74	37	14	8	6			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-4	1	-19.9	-19.9	-21.4	100	100	100	100	100	100	100	100	98	96	85	58	31	13	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-4	2	-19.9	-21.4	-22.0	100	100	100	100	96	91	86	82	78	74	71	65	51	36	29	23	NP	NP	SILTY SAND (SM)
OHVC11-A-5	1	-19.4	-19.4	-22.0	100	100	100	100	100	100	99	99	97	95	84	59	17	5	3	2			POORLY GRADED SAND (SP)
OHVC11-A-6	1	-19.5	-19.5	-21.5	100	100	100	100	99	99	99	98	97	96	93	85	57	27	14	12			SILTY SAND (SM)
OHVC11-A-6	2	-19.5	-21.5	-22.0	100	100	100	100	99	98	96	94	92	89	84	76	42	21	7	5			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-7	1	-21.0	-21.0	-22.0	100	100	100	100	100	100	99	98	94	91	86	79	62	40	31	24	NP	NP	SILTY SAND (SM)
OHVC11-A-8	1	-15.0	-15.0	-22.0	100	100	100	100	100	100	100	100	99	97	91	72	21	4	2	1			POORLY GRADED SAND (SP)
OHVC11-A-9	1	-21.0	-21.0	-21.6	100	100	100	100	100	100	100	100	100	100	99	95	71	41	31	28			SILTY SAND (SM)
OHVC11-A-9	2	-21.0	-21.6	-22.0	100	100	100	100	100	100	100	100	100	100	99	96	75	48	39	35			SILTY SAND (SM)
OHVC11-A-10	1	-20.5	-20.5	-22.0	100	100	100	100	100	99	98	98	97	96	92	77	40	12	5	4			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-11	1	-21.1	-21.1	-22.0	100	100	100	100	99	98	98	97	96	95	93	86	57	24	11	9			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-12	1	-20.8	-20.8	-21.2	100	100	100	100	99	98	97	97	96	95	93	89	65	26	11	7			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-12	2	-20.8	-21.2	-22.0	100	100	100	100	99	98	97	97	96	95	93	88	51	16	10	7			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-13	1	-21.1	-21.1	-22.0	100	100	100	100	98	96	96	95	94	93	92	88	57	25	12	8			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-14	1	-20.0	-20.0	-20.5	100	100	100	100	99	98	97	96	94	93	90	87	74	45	30	25			SILTY SAND (SM)
OHVC11-A-14	2	-20.0	-20.5	-22.0	100	100	100	100	100	100	100	100	100	100	100	99	95	80	69	64			SANDY SILT (ML)
OHVC11-A-15	1	-20.2	-20.2	-22.0	100	100	100	100	100	99	98	98	97	96	91	83	46	16	6	3			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-A-16	1	-19.8	-19.8	-22.0	100	100	100	100	100	100	100	100	99	97	92	78	40	15	7	5			POORLY GRADED SAND WITH SILT (SP-SM)
Oceanside Channel (Area B)																							
OHVC11-B-1	1	-21.0	-21.0	-21.2	100	100	100	100	100	100	100	99	97	91	80	69	58	53	51	49			SANDY SILT (ML)
OHVC11-B-1	2	-21.0	-21.2	-22.0	100	100	100	100	98	95	92	91	88	85	77	61	39	32	29	26			SILTY SAND (SM)
OHVC11-B-2	1	-20.2	-20.2	-20.7	100	100	100	100	100	100	100	100	99	99	98	96	91	86	82	78			SILT WITH SAND (ML)
OHVC11-B-2	2	-20.2	-20.7	-22.0	100	100	100	100	100	100	99	98	96	92	91	82	69	54	44	37			SILTY SAND (SM)
OHVC11-B-3	1	-19.2	-19.2	-22.0	100	100	100	100	100	99	99	98	97	96	94	86	54	31	23	20			SILTY SAND (SM)
OHVC11-B-4	1	-19.4	-19.4	-21.6	100	100	100	100	99	99	98	98	97	96	93	87	64	30	13	7			SILTY SAND (SM)
OHVC11-B-4	2	-19.4	-21.6	-22.0	100	100	100	100	99	99	98	98	97	96	94	89	66	28	11	6			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-B-5	1	-18.6	-18.6	-19.5	100	100	100	100	100	99	99	98	97	97	95	90	64	7	3	2			POORLY GRADED SAND (SP)
OHVC11-B-5	2	-18.6	-19.5	-22.0	100	100	100	100	99	99	98	98	97	97	95	92	67	24	10	5			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-B-6	1	-20.4	-20.4	-21.4	100	100	100	100	100	99	99	98	97	97	95	90	65	31	18	14			SILTY SAND (SM)
OHVC11-B-6	2	-20.4	-21.4	-22.0	100	100	100	100	100	99	99	98	98	97	95	91	63	23	10	7			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-B-7	1	-20.2	-20.2	-22.0	100	100	100	100	98	96	93	90	85	82	76	68	55	45	37	28			SILTY SAND (SM)
OHVC11-B-8	3	-20.3	-20.3	-22.0	100	100	100	100	99	99	98	96	93	89	84	74	45	21	12	9			POORLY GRADED SAND WITH SILT (SP-SM)
Entrance Channel and Advanced Maintenance Area (Area C)																							
OHVC11-C-1	1	-16.4	-16.4	-30.0	100	100	100		100	100	99	99	98	97	94	88	57	19	6	3			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-C-2	1	-15.5	-15.5	-30.0	100	100	100	100	100	100	99	99	99	98	95	86	38	9	2	1			POORLY GRADED SAND (SP)
OHVC11-C-3	1	-21.1	-21.1	-22.6	100	100	100	100	100	100	99	99	98	97	95	88	55	20	8	4			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-C-3	2	-21.1	-22.6	-30	100	100	100	100	100	100	99	99	98	97	97	88	55	19	6	2			POORLY GRADED SAND WITH SILT (SP-SM)

Table 9. 2012 Oceanside Harbor Physical Data Above Overdredge Depth for Each Individual Core.

Core Designation	Sample No.	Mudline Elevation (feet MLLW)	Sample Elevation (feet MLLW)		Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Atterberg Limits		Classification
					Sieve No. / Sieve Size / % Passing																		
			Top	Bottom		3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	LL	PI	
					19.0mm	9.5mm	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm			
OHVC11-C-4	1	-20.1	-20.1	-30.0	100	100	100	100	100	99	99	98	97	96	92	83	57	21	7	3			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-C-5	1	-16.5	-16.5	-30.0	100	100	100	100	100	100	100	99	99	98	95	88	49	13	3	1			POORLY GRADED SAND (SP)
OHVC11-C-6	1	-13.0	-13.0	-30.0	100	100	100	100	100	100	99	99	98	97	94	84	45	12	2	0			POORLY GRADED SAND (SP)
OHVC11-C-7	1	-17.3	-17.3	-30.0	100	100	100	100	100	100	99	99	98	96	92	82	43	11	2	1			POORLY GRADED SAND (SP)
OHVC11-C-8	1/2	-20.4	-20.4	-30.0	100	100	100	100	100	100	99	99	98	97	95	87	54	16	4	2			POORLY GRADED SAND (SP)
OHVC11-C-9	1	-23.1	-23.1	-30.0	100	100	100	100	100	99	99	98	96	93	87	76	26	9	2	1			POORLY GRADED SAND (SP)
OHVC11-C-10	1	-23.7	-23.7	-24.9	100	100	100	100	100	99	99	98	97	95	91	85	61	29	14	11			SILTY SAND (SM)
OHVC11-C-10	2	-23.7	-24.9	-25.9	100	100	100	99	98	96	93	92	89	86	82	77	63	45	33	28			SILTY SAND (SM)
OHVC11-C-10	3	-23.7	-25.9	-30.0	100	100	100	100	100	100	99	99	98	97	94	88	68	37	19	14			SILTY SAND (SM)
OHVC11-C-11	1	-18.6	-18.8	-26.6	100	100	100	100	100	100	100	99	98	97	94	86	45	12	2	0			POORLY GRADED SAND WITH SILT (SP-SM)
OHVC11-C-11	2	-18.6	-26.6	-30.0	100	100	100	100	100	99	99	99	98	97	93	86	48	20	7	3			POORLY GRADED SAND WITH SILT (SP-SM)

Table 10. Surface Physical Data for Oceanside City and Oceanside Pier Beaches and the Oceanside Nearshore Placement Area Collected in 2012.

Core Designation	Sample or Transect ID	Mudline Elevation (feet MLLW)	Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Atterberg Limits		Classification
			Sieve No. / Sieve Size / % Passing																		
				3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	LL	PI	
			19.0mm	9.5mm	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm			
Pier View Way																					
OCBGS11-A-1	A	12	100	100	100	100	100	100	100	100	99	91	55	22	4	0	0	0			POORLY GRADED SAND (SP)
OCBGS11-A-2	A	6	100	100	100	100	100	100	100	99	97	90	71	42	7	1	0	0			POORLY GRADED SAND (SP)
OCBGS11-A-3	A	0	100	100	100	100	99	99	98	97	88	67	44	27	7	1	0	0			POORLY GRADED SAND (SP)
OCBGS11-A-4	A	-6	100	100	100	100	99	99	98	97	96	93	86	71	27	7	2	1			POORLY GRADED SAND (SP)
OCBGS11-A-5	A	-12	100	100	100	100	100	100	100	99	99	97	92	83	61	30	11	4			POORLY GRADED SAND WITH SILT (SP-SM)
OCBGS11-A-6	A	-18	100	100	100	100	100	100	100	99	99	97	93	87	58	21	5	2			POORLY GRADED SAND WITH SILT (SP-SM)
OCBGS11-A-7	A	-24	100	100	100	100	100	99	99	98	97	95	86	79	70	54	28	13			SILTY SAND (SM)
OCBGS11-A-8	A	-30	100	100	100	100	100	100	100	99	99	95	85	74	63	48	29	17			SILTY SAND (SM)
OCBGS11-B-1	B	12	100	100	100	100	100	100	100	100	100	97	77	40	7	1	0	0			POORLY GRADED SAND (SP)
OCBGS11-B-2	B	6	100	100	100	100	100	100	100	100	99	95	72	36	6	1	0	0			POORLY GRADED SAND (SP)
OCBGS11-B-3	B	0	100	100	100	100	100	100	99	99	96	89	74	52	15	3	1	0			POORLY GRADED SAND (SP)
OCBGS11-B-4	B	-6	100	100	100	100	99	99	98	97	95	91	86	75	29	8	2	1			POORLY GRADED SAND (SP)
OCBGS11-B-5	B	-12	100	100	100	99	99	99	98	98	97	97	95	89	50	14	3	1			POORLY GRADED SAND (SP)
OCBGS11-B-6	B	-18	100	100	100	99	99	99	99	98	98	97	96	93	77	41	14	4			SILTY SAND (SM)
OCBGS11-B-7	B	-24	100	100	100	100	100	100	99	99	99	98	97	95	87	56	25	13			SILTY SAND (SM)
OCBGS11-B-8	B	-30	100	100	100	100	100	99	99	99	98	98	97	95	89	73	41	25			SILTY SAND (SM)
Oceanside City Beach																					
OCPGS11-C-1	A	12	100	100	100	100	100	100	99	97	80	46	14	3	1	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-C-2	A	6	100	100	100	100	99	96	87	73	54	39	18	5	0	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-C-3	A	0	100	100	99	97	94	85	77	65	52	42	28	13	2	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-C-4	A	-6	100	100	100	100	100	99	98	97	95	93	87	74	29	8	1	0			POORLY GRADED SAND (SP)
OCPGS11-C-5	A	-12	100	100	100	99	99	98	98	97	96	94	92	87	63	27	10	3			POORLY GRADED SAND WITH SILT (SP-SM)
OCPGS11-C-6	A	-18	100	100	100	100	100	99	98	97	96	96	94	92	78	33	12	5			POORLY GRADED SAND WITH SILT (SP-SM)
OCPGS11-C-7	A	-24	100	100	99	99	99	97	95	93	91	90	89	87	74	37	18	10			SILTY SAND (SM)
OCPGS11-C-8	A	-30	100	100	100	100	100	99	98	98	97	97	96	95	91	68	33	19			SILTY SAND (SM)
OCPGS11-D-1	B	12	100	100	100	100	100	99	97	88	59	28	7	1	0	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-D-2	B	6	100	100	100	100	99	99	97	93	80	62	26	6	1	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-D-3	B	0	88	77	68	59	51	42	32	24	19	15	10	4	1	0	0	0			POORLY GRADED SAND (SP)
OCPGS11-D-4	B	-6	100	100	100	100	99	99	98	96	94	91	84	66	23	6	1	0			POORLY GRADED SAND (SP)
OCPGS11-D-5	B	-12	100	100	100	100	99	99	98	97	96	95	93	87	44	15	4	1			POORLY GRADED SAND (SP)
OCPGS11-D-6	B	-18	100	100	100	100	99	99	98	98	96	94	93	90	77	41	17	6			SILTY SAND (SM)
OCPGS11-D-7	B	-24	100	100	100	99	99	98	98	97	96	95	94	92	82	44	21	11			SILTY SAND (SM)
OCPGS11-D-8	B	-30	100	100	99	98	97	96	94	92	90	87	81	77	70	54	28	18			SILTY SAND (SM)
Oceanside Nearshore Placement Area																					
ONRAGS11- 1	1	-15	100	100	100	100	99	99	98	98	97	97	95	88	45	18	5	1			POORLY GRADED SAND WITH SILT (SP-SM)
ONRAGS11- 2	2	-24	100	100	100	100	100	100	100	99	99	98	96	94	82	41	20	8			SILTY SAND (SM)
ONRAGS11- 3	3	-20	100	100	95	95	94	94	93	92	91	90	88	84	64	31	10	3			POORLY GRADED SAND WITH SILT (SP-SM)
ONRAGS11- 4	4	-16	100	100	98	96	95	94	93	92	90	88	86	82	64	33	15	8			SILTY SAND (SM)
ONRAGS11- 5	5	-26	100	100	100	100	100	98	97	96	95	93	91	89	79	41	17	8			SILTY SAND (SM)
ONRAGS11- 6	6	-17	100	100	100	100	99	99	98	97	95	93	89	83	62	28	11	4			POORLY GRADED SAND WITH SILT (SP-SM)
ONRAGS11- 7	7	-20	100	100	100	100	99	99	98	98	96	94	89	81	56	25	10	4			POORLY GRADED SAND WITH SILT (SP-SM)
ONRAGS11- 8	8	-27	100	100	100	100	100	99	97	96	93	92	90	88	79	47	23	12			SILTY SAND (SM)
ONRAGS11- 9	9	-23	100	100	100	100	100	99	98	97	96	95	93	89	69	36	18	11			SILTY SAND (SM)
ONRAGS11-10	10	-16	100	100	100	100	100	99	99	98	97	96	93	89	62	25	10	3			POORLY GRADED SAND WITH SILT (SP-SM)

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS										
Percent Solids	%	77	64.1	64.1						
Total Volatile Solids	%	0.96	1.1	1.1						
pH	pH Units	8.15	8.27	8.27						
Total Organic Carbon	%	0.35	0.69	0.69						
Oil and Grease	mg/kg dry	47	30	30						
TRPH	mg/kg dry	30	37	37						
Total Ammonia	mg/kg dry	3.6	3.9	3.9						
Water Soluble Sulfides	mg/L	0.1U	0.1U	0.1U						
Total Sulfides	mg/kg dry	83	240	240						
METALS										
Arsenic	mg/kg dry	1.6	2.56	1.55	8.2	70	0.39	1.6	0.07	0.24
Cadmium	mg/kg dry	0.0927J	0.169	0.0636J	1.2	9.6	70	800	1.7	7.5
Chromium	mg/kg dry	12.4	21.2	13.3	81	370			100,000	1,000,000
Copper	mg/kg dry	8.23	21	6.3	34	270	3,100	41,000	3,000	38,000
Lead	mg/kg dry	2.6	4.97	1.81	46.7	218	400	800	150	3,500
Mercury	mg/kg dry	0.009J	0.0322	0.0265U	0.15	0.71	10	43	18	180
Nickel	mg/kg dry	5.23	9.22	5.12	20.9	51.6	1,500	20,000	1,600	16,000
Selenium	mg/kg dry	0.121J	4.59	0.131J			390	5,100	380	4,800
Silver	mg/kg dry	0.0176J	0.0408J	0.132U	1	3.7	390	5,100	380	4,800
Zinc	mg/kg dry	35.6	61.3	36.3	150	410	23,000	310,000	23,000	100,000
BUTYLTINS										
Dibutyltin	µg/kg dry	3.9U	4.7U	4.0U			18,000	180,000		
Monobutyltin	µg/kg dry	3.9U	4.7U	4.0U						
Tetrabutyltin	µg/kg dry	3.9U	4.7U	4.0U						
Tributyltin	µg/kg dry	3.9U	4.7U	4.0U			18,000	180,000		
POLYAROMATIC HYDROCARBONS										
1,6,7-Trimethylnaphthalene	µg/kg dry	13U	16U	13U						
1-Methylnaphthalene	µg/kg dry	13U	16U	13U			22,000	99,000		

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
1-Methylphenanthrene	µg/kg dry	13U	16U	13U						
2,6-Dimethylnaphthalene	µg/kg dry	4.4J	4.4J	13U						
2-Methylnaphthalene	µg/kg dry	13U	16U	13U	70	670	310,000	4,100,000		
Acenaphthene	µg/kg dry	13U	16U	13U	16	500	3,400,000	33,000,000		
Acenaphthylene	µg/kg dry	13U	16U	13U	44	640				
Anthracene	µg/kg dry	13U	16U	13U	85.3	1100	17,000,000	170,000,000		
Benzo (a) Anthracene	µg/kg dry	13U	16U	13U	261	1600	150	2100		
Benzo (a) Pyrene	µg/kg dry	13U	16U	13U	430	1600	15	210	38	130
Benzo (b) Fluoranthene	µg/kg dry	13U	16U	13U			150	2100		
Benzo (e) Pyrene	µg/kg dry	13U	2.8J	13U						
Benzo (g,h,i) Perylene	µg/kg dry	13U	16U	13U						
Benzo (k) Fluoranthene	µg/kg dry	13U	16U	13U			1500	21,000		
Biphenyl	µg/kg dry	13U	16U	13U						
Chrysene	µg/kg dry	13U	16U	13U	384	2800	15,000	210,000		
Dibenz (a,h) Anthracene	µg/kg dry	13U	16U	13U	63.4	260	15	210		
Fluoranthene	µg/kg dry	13U	9.4J	13U	600	5100	2,300,000	22,000,000		
Fluorene	µg/kg dry	13U	16U	13U	19	540	2,300,000	22,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	13U	16U	13U			150	2100		
Naphthalene	µg/kg dry	13U	16U	13U	160	2100	3600	18,000		
Perylene	µg/kg dry	13U	3.1J	13U						
Phenanthrene	µg/kg dry	13U	16U	13U	240	1500				
Pyrene	µg/kg dry	13U	16U	13U	665	2600	1,700,000	17,000,000		
Total Low Weight PAHs	µg/kg dry	13U	16U	13U	552	3160				
Total High Weight PAHs	µg/kg dry	13U	9.4J	13U	1700	9600				
Total PAHs	µg/kg dry	4.4J	20	13U	4022	44792				
PHTHALATES										
Benzyl butyl phthalate	µg/kg dry	14	10J	9.4J			260,000	910,000		
bis-(2-Ethylhexyl)phthalate	µg/kg dry	30	20	9.7J			35,000	120,000		

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Diethyl phthalate	µg/kg dry	13U	16U	13U			49,000,000	490,000,000		
Dimethyl phthalate	µg/kg dry	13U	16U	13U						
Di-n-butyl phthalate	µg/kg dry	14	15J	22			6,100,000	62,000,000		
Di-n-octyl phthalate	µg/kg dry	13U	16U	13U						
PHENOLS										
2,4,6-Trichlorophenol	µg/kg dry	13U	16U	13U			44,000	160,000		
2,4-Dichlorophenol	µg/kg dry	13U	16U	13U			180,000	1,800,000		
2,4-Dimethylphenol	µg/kg dry	13U	16U	13U			1,200,000	12,000,000		
2,4-Dinitrophenol	µg/kg dry	78U	93U	79U			120,000	1,200,000		
2-Chlorophenol	µg/kg dry	13U	16U	13U			390,000	5,100,000		
2-Methylphenol	µg/kg dry	13U	16U	13U						
2-Nitrophenol	µg/kg dry	13U	16U	13U						
3/4-Methylphenol	µg/kg dry	3.1J	2.5J	2.6J						
4,6-Dinitro-2-Methylphenol	µg/kg dry	78U	93U	79U						
4-Chloro-3-Methylphenol	µg/kg dry	13U	16U	13U						
4-Nitrophenol	µg/kg dry	78U	93U	79U						
Benzoic Acid	µg/kg dry	130U	160U	130U						
Pentachlorophenol	µg/kg dry	13U	16U	13U			890	2,700	4,400	13,000
Phenol	µg/kg dry	54	42	23J			18,000,000	180,000,000		
CHLORINATED PESTICIDES										
2,4'-DDD	µg/kg dry	1.3U	1.6U	1.3U						
2,4'-DDE	µg/kg dry	1.3U	1.6U	1.3U						
2,4'-DDT	µg/kg dry	1.3U	1.6U	1.3U						
4,4'-DDD	µg/kg dry	1.3U	1.6U	1.3U	2	20	2,000	7,200	2,300	9,000
4,4'-DDE	µg/kg dry	0.99J	1.3J	0.54J	2.2	27	1,400	5,100	1,600	6,300
4,4'-DDT	µg/kg dry	1.3U	0.41J	1.3U	1	7	1,700	7,000	1,600	6,300
Total DDT	µg/kg dry	0.99J	**1.7**	0.54J	1.58	46.1				
Aldrin	µg/kg dry	1.3U	1.6U	1.3U			29	100	33	130
BHC-alpha	µg/kg dry	1.3U	1.6U	1.6U						

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
BHC-beta	µg/kg dry	1.3U	1.6U	1.6U						
BHC-delta	µg/kg dry	1.3U	1.6U	1.6U						
BHC-gamma	µg/kg dry	1.3U	1.6U	1.6U						
Chlordane-alpha	µg/kg dry	1.3U	1.6U	1.6U						
Chlordane-gamma	µg/kg dry	1.3U	1.6U	1.6U						
Chlordane (Technical)	µg/kg dry	13U	16U	13U			1,600	6,500	430	1,700
Cis-nonachlor	µg/kg dry	1.3U	1.6U	1.6U						
DCPA (Dacthal)	µg/kg dry	1.3U	1.6U	1.6U	0.02	8	610,000	6,200,000		
Dieldrin	µg/kg dry	1.3U	1.6U	1.6U			30	110	35	130
Endosulfan Sulfate	µg/kg dry	1.3U	1.6U	1.6U						
Endosulfan I	µg/kg dry	1.3U	1.6U	1.6U			370,000	3,700,000		
Endosulfan II	µg/kg dry	1.3U	1.6U	1.6U						
Endrin	µg/kg dry	1.3U	1.6U	1.6U			180,000	1,800,000	21,000	230,000
Endrin Aldehyde	µg/kg dry	1.3U	1.6U	1.6U						
Endrin Ketone	µg/kg dry	1.3U	1.6U	1.6U						
Heptachlor	µg/kg dry	1.3U	1.6U	1.6U			110	380	130	520
Heptachlor Epoxide	µg/kg dry	1.3U	1.6U	1.6U			53	190		
Methoxychlor	µg/kg dry	1.3U	1.6U	1.6U			310,000	3,100,000	340,000	3,800,000
Mirex	µg/kg dry	6.5U	7.8U	6.6U			27	96	31	120
Oxychlordane	µg/kg dry	1.3U	1.6U	1.6U						
Perthane	µg/kg dry	1.3U	1.6U	1.6U						
Toxaphene	µg/kg dry	26U	31U	26U			440	1600	460	1,800
Trans-nonachlor	µg/kg dry	1.3U	1.6U	1.6U						
Total Chlordane	µg/kg dry	1.3U	1.6U	1.6U						
PCB Aroclors										
Aroclor 1016	µg/kg dry	13U	16U	13U						
Aroclor 1221	µg/kg dry	13U	16U	13U						
Aroclor 1232	µg/kg dry	13U	16U	13U						
Aroclor 1242	µg/kg dry	13U	16U	13U						

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Aroclor 1248	µg/kg dry	13U	16U	13U						
Aroclor 1254	µg/kg dry	13U	16U	13U						
Aroclor 1260	µg/kg dry	13U	16U	13U						
Aroclor 1262	µg/kg dry	13U	16U	13U						
Total Aroclors	µg/kg dry	13U	16U	13U						
PCB CONGENERS										
PCB003	µg/kg dry	0.65U	0.78U	0.66U						
PCB008	µg/kg dry	0.65U	0.78U	0.66U						
PCB018	µg/kg dry	0.65U	0.78U	0.66U						
PCB028	µg/kg dry	0.17J	0.78U	0.66U						
PCB031	µg/kg dry	0.65U	0.78U	0.66U						
PCB033	µg/kg dry	0.65U	0.78U	0.66U						
PCB037	µg/kg dry	0.65U	0.78U	0.66U						
PCB044	µg/kg dry	0.65U	0.78U	0.66U						
PCB049	µg/kg dry	0.65U	0.78U	0.66U						
PCB052	µg/kg dry	0.23J	0.78U	0.66U						
PCB056	µg/kg dry	0.65U	0.78U	0.66U						
PCB066	µg/kg dry	0.65U	0.78U	0.66U						
PCB070	µg/kg dry	0.65U	0.78U	0.66U						
PCB074	µg/kg dry	0.65U	0.78U	0.66U						
PCB077	µg/kg dry	0.65U	0.78U	0.66U			34	110		
PCB081	µg/kg dry	0.65U	0.78U	0.66U			11	38		
PCB087	µg/kg dry	0.65U	0.78U	0.66U						
PCB095	µg/kg dry	0.65U	0.78U	0.66U						
PCB097	µg/kg dry	0.65U	0.78U	0.66U						
PCB099	µg/kg dry	0.65U	0.78U	0.66U						
PCB101	µg/kg dry	0.17J	0.78U	0.66U						
PCB105	µg/kg dry	0.26J	0.78U	0.66U			110	380		
PCB110	µg/kg dry	0.65U	0.78U	0.66U						

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB114	µg/kg dry	0.26J	0.78U	0.66U			110	380		
PCB118	µg/kg dry	0.18J	0.78U	0.66U			110	380		
PCB119	µg/kg dry	0.65U	0.78U	0.66U						
PCB123	µg/kg dry	0.65U	0.78U	0.66U			110	380		
PCB126	µg/kg dry	0.65U	0.78U	0.66U			0.034	0.11		
PCB128	µg/kg dry	0.17J	0.78U	0.66U						
PCB132	µg/kg dry	0.65U	0.78U	0.66U						
PCB138/158	µg/kg dry	1.3U	1.6U	1.3U						
PCB141	µg/kg dry	0.65U	0.78U	0.66U						
PCB149	µg/kg dry	0.65U	0.78U	0.66U						
PCB151	µg/kg dry	0.65U	0.78U	0.66U						
PCB153	µg/kg dry	0.21J	0.78U	0.66U						
PCB156	µg/kg dry	0.65U	0.78U	0.66U			110	380		
PCB157	µg/kg dry	0.65U	0.78U	0.66U			110	380		
PCB167	µg/kg dry	0.65U	0.78U	0.66U			110	380		
PCB168	µg/kg dry	0.65U	0.78U	0.66U						
PCB169	µg/kg dry	0.65U	0.78U	0.66U			0.11	0.38		
PCB170	µg/kg dry	0.17J	0.78U	0.66U			30	99		
PCB174	µg/kg dry	0.65U	0.78U	0.66U						
PCB177	µg/kg dry	0.65U	0.78U	0.66U						
PCB180	µg/kg dry	0.2J	0.78U	0.66U			300	990		
PCB183	µg/kg dry	0.65U	0.78U	0.66U						
PCB184	µg/kg dry	0.65U	0.78U	0.66U						
PCB187	µg/kg dry	0.14J	0.78U	0.66U						
PCB189	µg/kg dry	0.65U	0.78U	0.66U			110	380		
PCB194	µg/kg dry	0.65U	0.78U	0.66U						
PCB195	µg/kg dry	0.65U	0.78U	0.66U						
PCB200	µg/kg dry	0.65U	0.78U	0.66U						
PCB201	µg/kg dry	0.65U	0.78U	0.66U						

Table 11. 2012 Oceanside Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Oceanside Composite Samples			NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		Del Mar OHVC11-A	Oceanside OHVC11-B	Entrance OHVC11-C	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB203	µg/kg dry	0.65U	0.78U	0.66U						
PCB206	µg/kg dry	0.65U	0.78U	0.66U						
PCB209	µg/kg dry	0.65U	0.78U	0.66U						
Total PCB Congeners	µg/kg dry	2.3	0.78U	0.66U	22.7	180			89	300
ERM Quotient		0.012	0.009	0.021						

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, 2010).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Bolded values exceed ERL values.

Bolded and underlined values exceed ERM values.

Green shaded values exceed one or more of the corresponding human health values.

U = Not detected at the corresponding reporting limit.

J = Estimated between the Reporting Limit and the Method Detection Limit.

Appendix B

USACE Beach Physical Compatibility Report

US Army Corps
of Engineers

Los Angeles District Geotechnical Branch
Geology and Investigations Section
915 Wilshire Blvd
Los Angeles, CA 90017

Grain Size Analysis and Compatibility of Dredged Sediment
Oceanside Harbor, Maintenance Dredging
San Diego County, CA
March 2018

Dredge material placement compatibility analysis (Beach Compatibility) based on grain size analysis.

The sediment within the three Federal Channel dredge footprint areas at Oceanside Harbor has been routinely dredged by the Corps of Engineers Los Angeles District as part of its maintenance dredging activities. Sediment from these areas have been routinely placed as beach fill by the Corps on the onshore placement site, just down coast of the harbor's southern breakwater at Oceanside City Beach. Geographic coordinates of the approximate limits of the onshore placement are between: 33 degrees, 11 minutes, 9 seconds North Latitude and 117 degrees, 23 minutes, 36 seconds West Longitude; and 33 degrees, 10 minutes, 52 seconds North Latitude and 117 degrees, 22 minutes, 39 seconds West Longitude. The sediment is routinely placed parallel along the beach between these limits, which is approximately between the mouth of the San Luis Rey River and Wisconsin Avenue. Dredging of the harbor by the Corps last occurred in 2017. During this event, approximately 435,200 cubic yards of sediment from the harbor was placed at the onshore site.

The three Federal Channel footprints of the Area A, Del Mar Channel; Area B, Oceanside Channel; and Area C Entrance Channel are scheduled to be dredged in 2018, as part of the District's maintenance dredging plan.

The sediment within the three footprints was analyzed as to its physical suitability for use as nourishment material for the onshore and nearshore placement sites at Oceanside beach. This analysis is based on the grain size compatibility between the three footprints and the placement sites and was conducted according to Los Angeles District U.S. Army Corps of Engineers (USACELAD) Geotechnical Branch and Southern California Dredged Material Management Team (SC-DMMT) guidelines. These guidelines are the same as the SCOUP (Sand Compatibility and Opportunistic Use Program). This analysis was performed by the USACELAD Geology and Investigations Section, Geotechnical Branch and is based on deep subsurface and shallow sediment samples collected and tested for grain size on behalf of the USACELAD in December of 2017 by AECOM Tehcnical Services and Kinnetic Laboratories Inc. The deep samples were collected by vibratory borehole core methods, while the shallow samples were collected by shovel and ponar grab methods. All samples were tested according to ASTM D 422, using the U.S. Standard sieve sizes of: No. 4, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230 sieves. Samples of sediment collected by vibracores were taken to project maintenance depth plus over depth as follows:

Channel/Composite Area	Project Elevation	Project Elevation Plus Over Depth
Del Mar Channel (Area A)	-20 feet MLLW	-22 feet MLLW
Oceanside Channel (Area B)	-20 feet MLLW	-22 feet MLLW
Entrance Channel (Area C)	-28 feet MLLW	-30 feet MLLW

The beach compatibility analysis is based on calculating the natural beach compatibility envelope expressed as a set of three gradation curves. These are drawn as set of three grain size curve envelopes for each placement site (onshore and/or nearshore) and are commonly known as the “beach compatibility envelope”. The three envelopes of each set of curves are labeled “fine limit”, “coarse limit” and “average”. Once this is established, the weighted average grain size curve of each individual dredge footprint sediment vibratory core sample and the composite grain size curve for all of the individual core samples from each of the three footprint areas are matched to see where they fit within the envelope. For this analysis there are three separate sets of three beach grain size curve envelopes used to determine individual weighted average compatibility of all the vibracore sample locations to the three placement sites placement sites. Another set of three separate sets are used to determine the <u>composite</u> weighted average compatibility of all the vibracore sample locations within each of the four footprints.

All of the beach compatibility grain size analysis curves are shown in Figures A1 to A23 at the end of this report, for a total of 23 curve figures. Figures A1 to A14 show the <u>individual</u> weighted grain size compatibility curves of each of the vibracore sampling locations compared to the nearshore beach placement site. Figures A15 to A23 show the <u>composite</u> weighted grain size compatibility curves for each footprint. The composite is calculated as a weighted average of the entirety of all of the individual vibracore sampling locations within each dredge footprint.

Results of dredge material placement compatibility analysis.

The grain size compatibility analysis was made according to the USACE LAD guidelines. These guidelines specify that individual sediment samples collected from each dredged footprint area and/or the composite gradation curve for the overall dredge footprint area can be no more than 10% above the finest limit gradation curve of the beach fill or placement area. The finest limit curve is one of the three curves representing the overall composite grain size gradation of the weighted average calculated profile or “beach compatibility envelope” of the placement area(s). The compatibility envelope is based on the weighted average of the finest, coarsest and average grain sizes from the individual beach profile samples. The “finest limit” gradation is based on a sample for a U.S. Sieve size no. 200 (0.08 mm) result. The guidelines also specify that the dredged sediment can be greater than the “coarsest limit” placement profile sample grain size composite curve, as long as aesthetic quality of the dredged sediment in this coarser size range is acceptable. The sediment samples collected for the one onshore placement area of Anaheim Bay beach were taken along three beach profile transects, located perpendicular to the beach. Samples from the offshore portion of the beach transect profile were collected from -6 to -30 feet MLLW by a Ponar grab sampler device, while the onshore portion of the profile was collected from 0 to +12 feet MLLW via hand trowel and bucket. Eleven samples were collected by ponar grab sampling device at random at each of the four nearshore placement areas from depths of approximately -17 to -30 feet MLLW. The results of the analysis are summarized as follows:

<u>Placement Sites.</u>

The maximum allowable fines limit for all three sites is as follows:

Nearshore (south of Oceanside City Pier): The highest amount of fines allowable on the nearshore is calculated to be approximately 30% or less (20% + 10% = 30%).

Transect A to C (north of Oceanside City Pier): The highest amount of fines allowable on transect A to C is calculated to be approximately 30% or less (19% + 10% = 29%).

Transect D to F (south of Oceanside City Pier): The highest amount of fines allowable on transect D to F is calculated to be approximately 30% or less (13% + 10% = 23%).

<u>Dredge Footprints.</u>

<u>Area A, Del Mar Channel-</u>

The weighted average grain size of six of the seven <u>individual</u> vibratory core borehole samples (OSHVC-17-A-01 and to 03 to 07) collected from Area A fit within the grain size compatibility envelopes for all three of the placement sites, with the exception of core A-02. This core contains approximately 47 percent of fines passing the U.S. no. 200 sieve and is therefore not compatible with any of the placement sites. The comparison of this core to all of the sites is as follows: Compared to the nearshore placement site, core A-02 is approximately 17 percent finer that the nearshore site maximum allowable fines limit of 20 percent; and approximately 18 percent finer than transect A to C (north of Oceanside City Pier) maximum allowable fines limit of 29 percent; and approximately 24 percent finer that transect D to F (south of Oceanside City Pier) maximum allowable fines limit of 23 percent. Approximately 47 percent of sediment sampled within core A-02 is silt, while the rest of the sediment (53 percent) is a fine grained sand to silty sand. The extent of the silt sediment in the Del Mar Channel surrounding this core sample location is of limited areal extent and amounts to approximately 1,000 cubic yards. The majority of volume of the entire area A Del Mar Channel dredge footprint is still predominantly composed of sand to silty sand.

The composite weighted average of all seven cores collected at Area A2 fits well within the grain size compatibility envelope of all three placement sites.. The composite average is 12% compared to the maximum fines envelope curve of 30% for the nearshore area; 29% for Transect A to C; and 23% for Transect D to F.

The sediment within entire Del Mar Channel dredged footprint is compatible and the resulting engineering soil classification for the sediment is predominantly a poorly graded sand with silt (SP-SM). The range of grain sizes is from 0.08 to 1.1 mm diameter. This is equivalent to a fine grained sand with some amount of medium grained sand.

Area B, Oceanside Channel-

The weighted average grain size of two of the four individual vibratory core borehole samples (OSHVC-17-B-01 to 04) collected from Area B do not fit within the grain size compatibility envelopes for all three placement sites. Vibracores B-03 and 04 contain fines in the amount of 31% and 91%, respectively. The comparison of these two vibracores to the three placement sites is as follows: For core B-03, it is 1 percent finer than the nearshore; 2 % finer than Transect A to C and 8% finer than Transect D to F. For core B-04, it is approximately 61% finer than nearshore; 62% finer than Transect A to F; and 68% finer than Transect D to F. The extent of the silt sediment in the area B surrounding these two core sample locations is of limited areal extent and amounts to approximately 1,500 cubic yards. per each core. The remaining volume of the area B is still predominantly composed of sand to silty sand.

The composite weighted average grain size of all four Oceanside Channel core sample locations is calculated to approximately 27% for the U.S. no. 200 sieve, which is the maximum fines percentage content for the Entrance channel composite. According this result, the entire dredge footprint area is compatible for Transect A to C and the nearshore placement sites. It is not compatible for placement at Transect D to F. Therefore, a second composite calculation was performed in which only cores B-01 to 03 were included. The result was a coarser composite weighted average of 13%. Based on this revised composite weighted average, the sediment in the majority of the Oceanside Channel footprint is compatible with all three placement sites, with the exception of sediment in the vicinity of core B-04.

The resulting engineering soil classification for the sediment in the vicinity of cores B-01 to 03 is predominantly a poorly graded sand with silt (SP-SM) and a poorly graded sand (SP). The range of grain sizes is from 0.08 to 0.45 mm diameter. This is equivalent to a fine grained sand with some very small amounts of medium grained sand.

Area C, Entrance Channel-

The weighted average grain size of all seven individual vibratory core borehole samples (OSVC-17-C-01 to 07) collected from Area C Entrance Channel fits within the grain size compatibility envelopes for all three of the placement sites.

The composite weighted average of all seven vibracore samples collected in Area C is 7%, which fits well within the grain size compatibility envelope for all three placement sites.

Based on both individual and composite weighted average grain size, the entire sediment within entire Area C footprint is compatible for all three placement sites. The resulting engineering soil classification for the sediment is predominantly a poorly graded sand with silt (SP-SM). The range of grain sizes is from 0.08 to 0.5 mm diameter. This is equivalent to fine grained sand with silt.

Summary results of grain size analysis.

Area A, Del Mar Channel: The individual weighted average grain size curves for one vibracore of A-02 does not fit within the overall grain size envelope for any of the three placement sites. Core A-02 is approximately 17 percent finer that the nearshore site maximum allowable fines limit of 20 percent; and approximately 18 percent finer than transect A to C (north of Oceanside City Pier) maximum allowable fines limit of 29 percent; and approximately 24 percent finer that transect D to F (south of Oceanside City Pier) maximum allowable fines limit of 23 percent.. The weighted average composite grain size curves for all seven cores does fit within the beach compatibility envelopes for all three sites.

The extent of the fines within core A-02 in the surrounding sediment is insignificant. When combined with the rest of the entire dredge footprint and calculated as a composite weighted average grain size, the sediment in the vicinity of A-02 is compatible with all three placement sites. Therefore all of the sediment within the Del Mar Channel dredge footprint t is compatible for placement at the three sites.

Area B, Oceanside Channel: Vibracores B-03 and B-04 are not individually compatible with the three placement sites. The composite weighted average grain size calculation result for all four cores B-01 to 04, indicates that the entire dredge footprint for Area B is compatible for the nearshore and Transect A to C (north of Oceanside City Pier) placement sites. It is not compatible for the Transect D to F placement site. The revised composite calculation shows that the majority of sediment in Del Mar Channel is compatible for all three placement sites. The revised calculation includes only cores B-01 to 03 and excludes core B-04.

Area C, Entrance Channel: All of seven individual and composite vibracore sample grain size curves for Areas C fit well within the overall grain size envelope for all three placement sites. Therefore all of the sediment within the Entrance Channel is compatible for placement at all three sites.

Based on a composite weighted average grain size, the majority of the sediment from the compatible areas of the dredge footprints is a fine grained sand with some good amount of medium grained sand and minor amount of silt and is made up of approximately 73 to 99% sand.

The incompatible area around vibracore B-04 is shown on the map figure B1 at the back of this report. The rest of the all of the three dredge footprints contain sediment that is compatible for all three placement sites.

Recommendations.

The future disposition of dredged sediment from the maintenance dredging event is proposed to occur at the two onshore placement areas. These areas have been preselected for placement because sediment from the harbor has been placed at these area during past Corps of Engineers routine maintenance dredge events. Sediment may also be placed at the nearshore site.

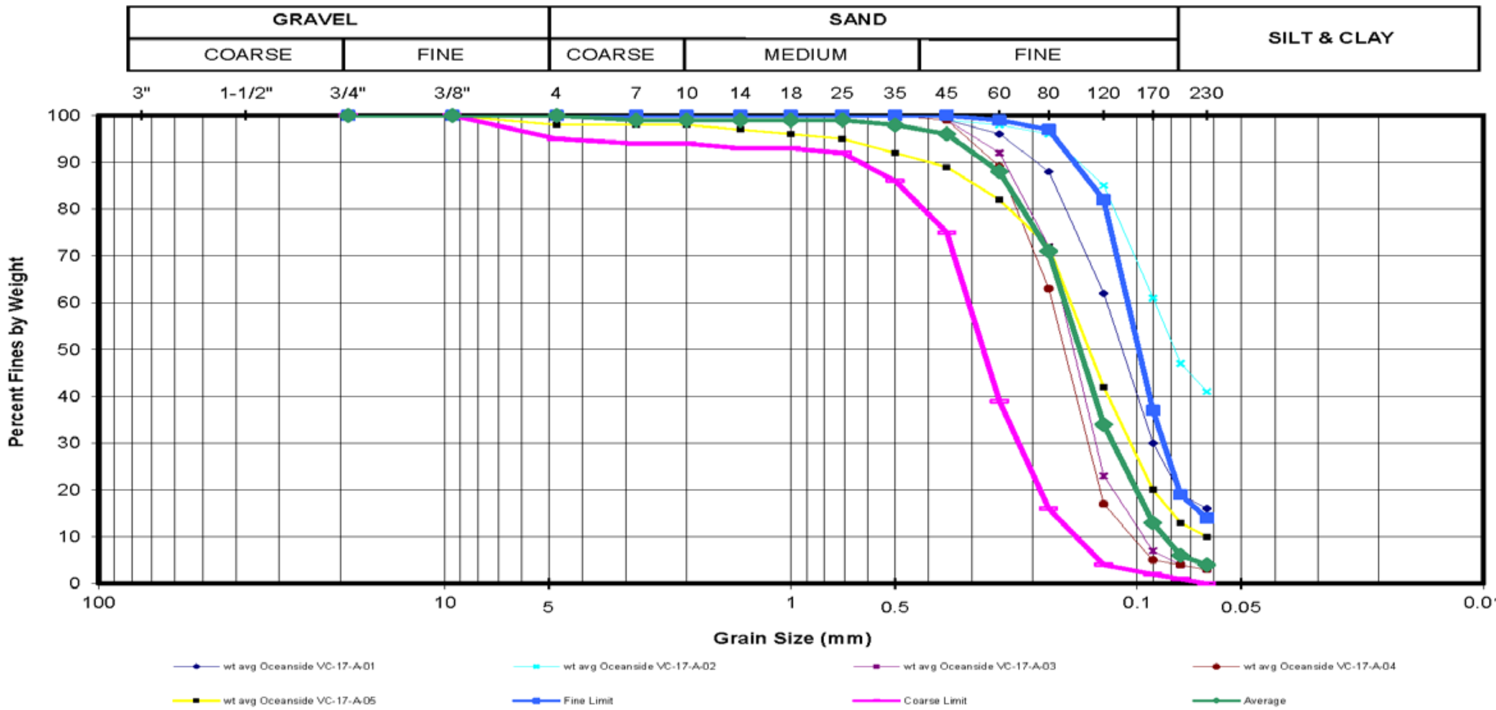
The recommendations for disposition and beach compatibility of future Corps of Engineers dredged sediment from Oceanside harbor are based on this physical grain size analysis within this report and the bulk sediment chemistry test results.

The following are the recommendations:

Sediment for all of Areas A, B and C dredge footprints is compatible with the three placement sites, with the exception of a small amount of sediment in the vicinity of core B-04, which is too fine and not compatible based on this individual core alone. Cores B-03 and A-02 are also not compatible individually. However, the weighted average percent of fines sediment in these two cores at 31% and 47%, respectively, and their corresponding combined volume of 3,000 cubic yards, is a small in comparison to the overall volume of sediment to be dredged from all three footprints. The composite weighted average grain size calculation for Area A and C and the revised composite calculation for Area B (including cores B-01 to B-03 only and excluding core B-040, shows that the vast majority of sediment within all three footprints is compatible for all three placement sites.

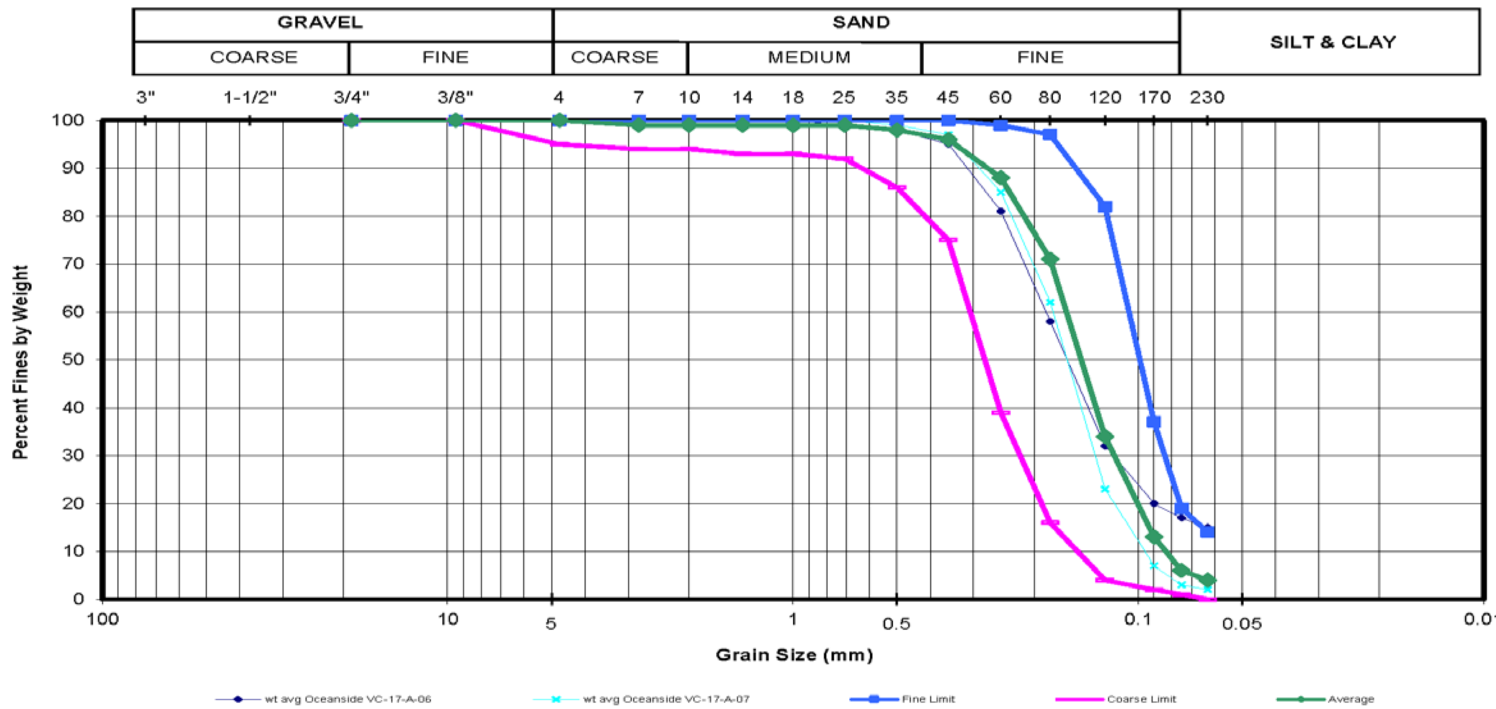
It is recommended that all of the sediment within the Areas A, B and C, with the exception of sediment in the vicinity of vibracore B-04, be placed at all or any one of the three placement sites at Oceanside beach.

Figures A1 to A14. Individual Weighted Average Grain size beach compatibility curves.



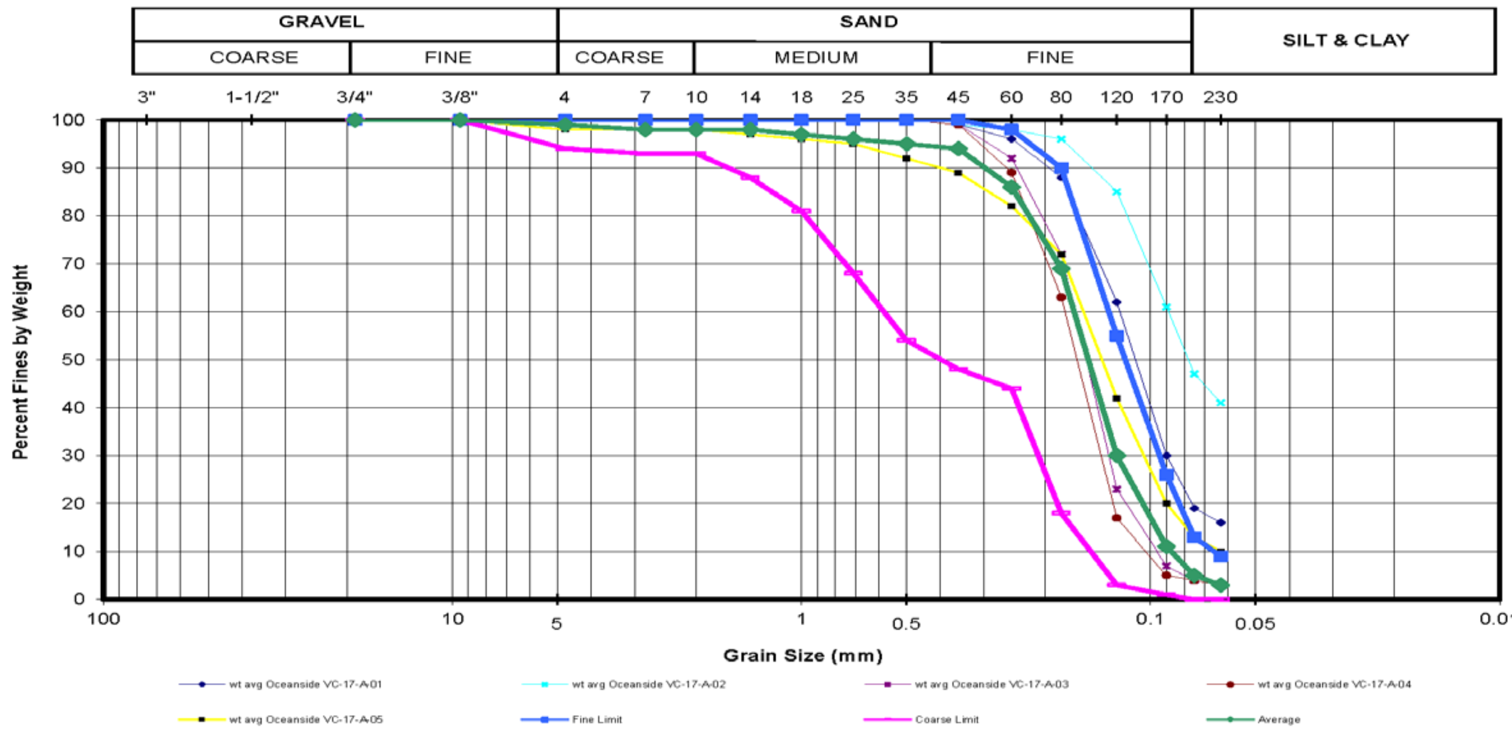
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-1



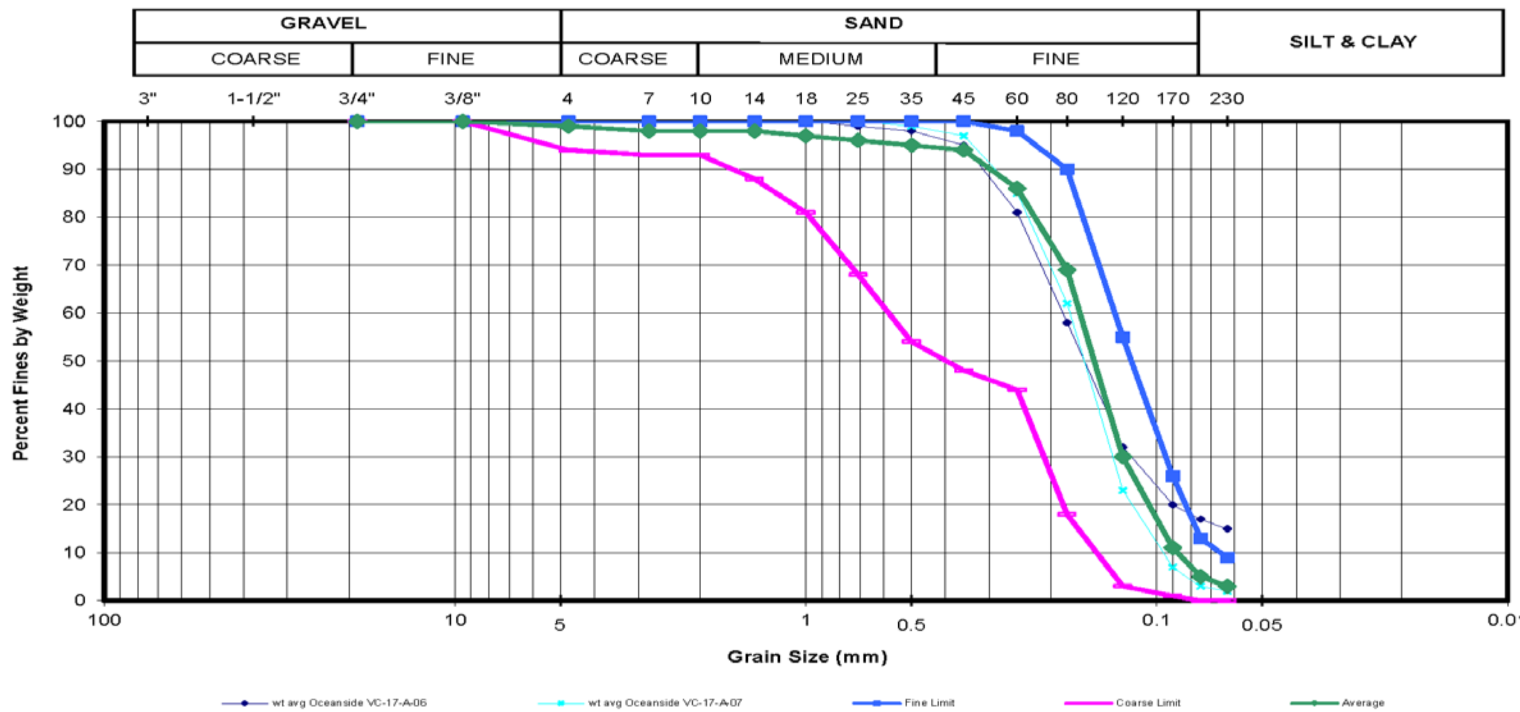
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 06 to 07. <u>Individual</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-2



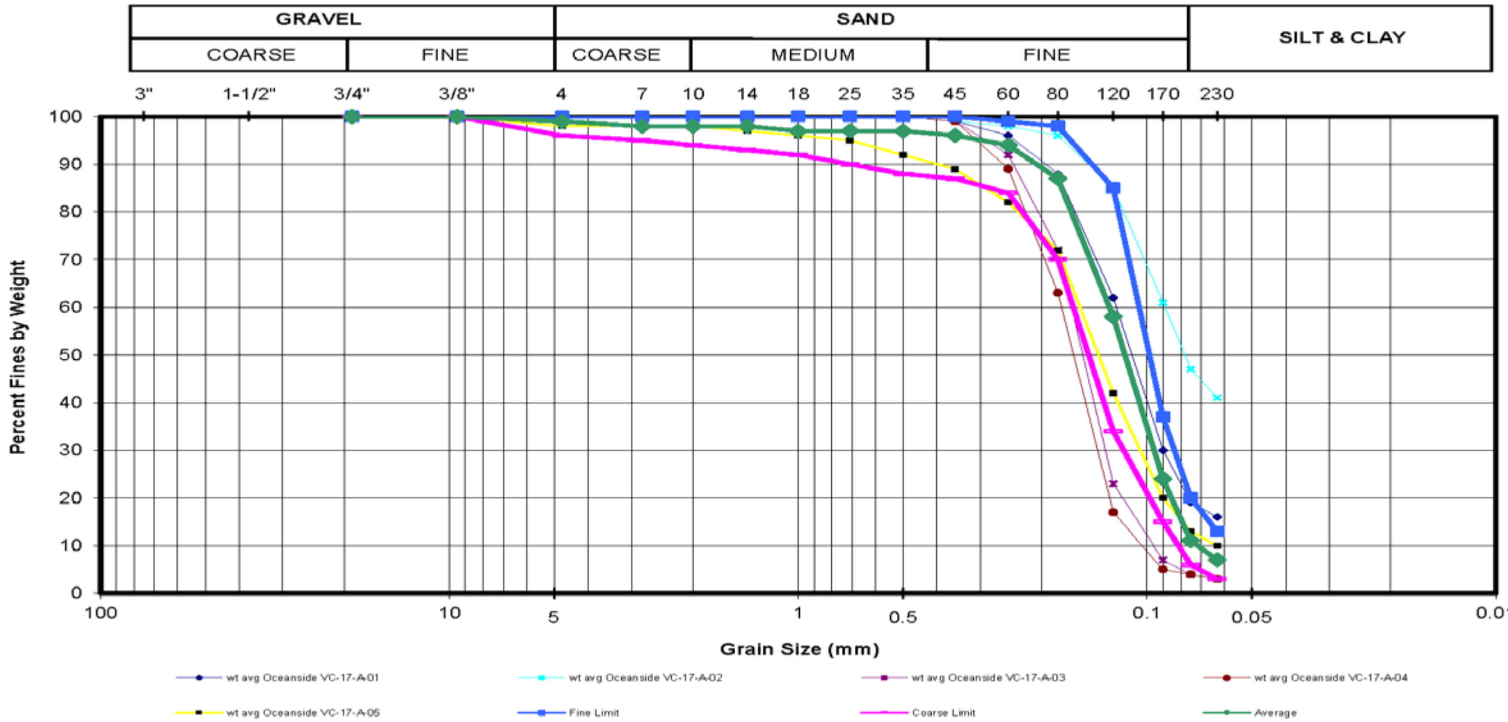
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-3



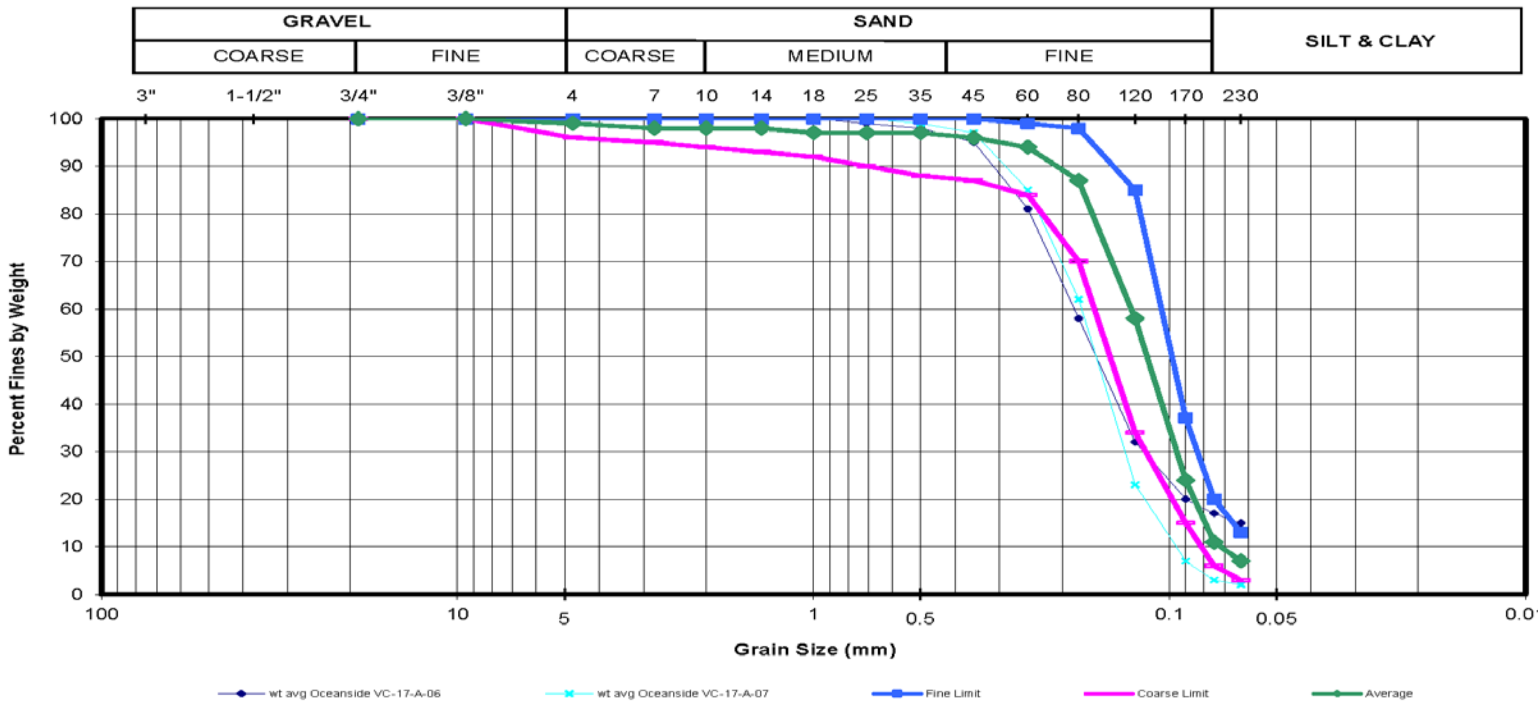
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 06 to 07. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-4



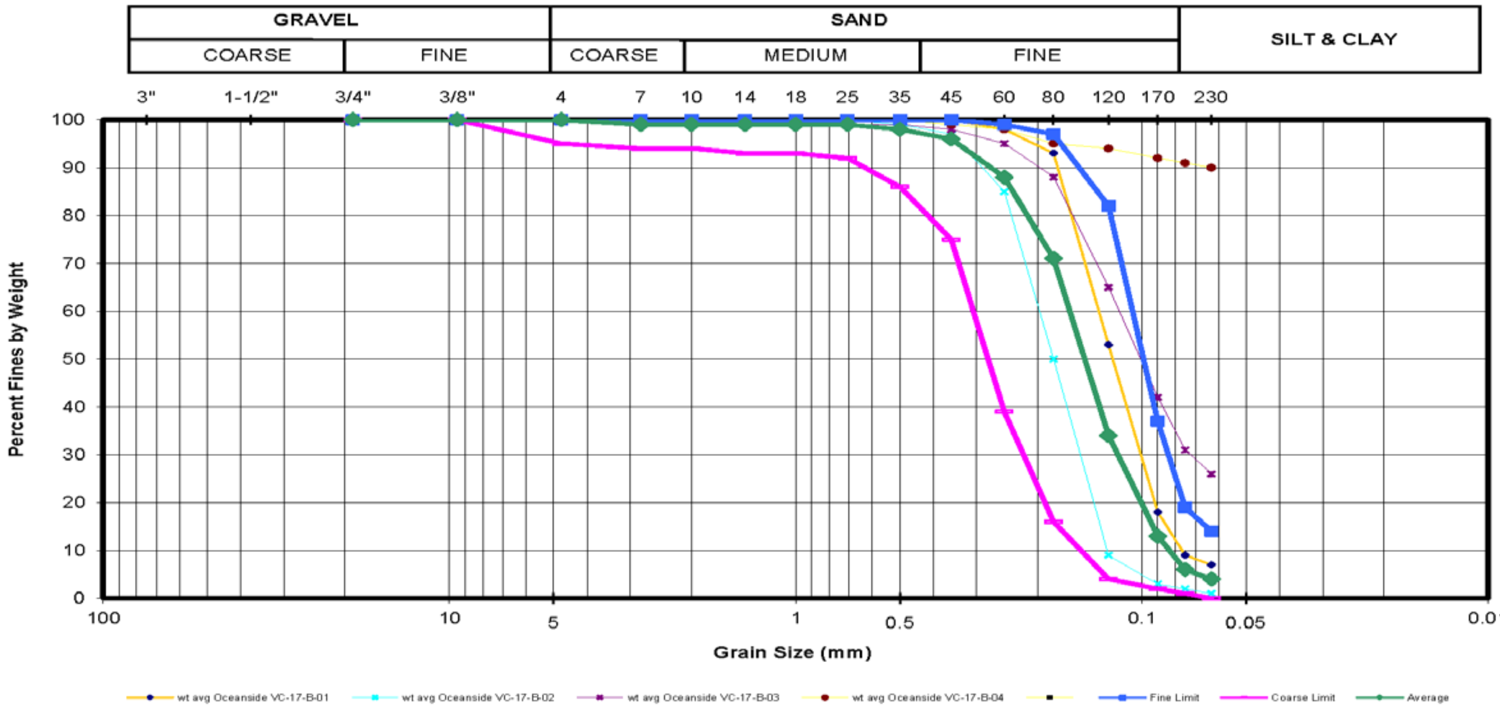
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-5



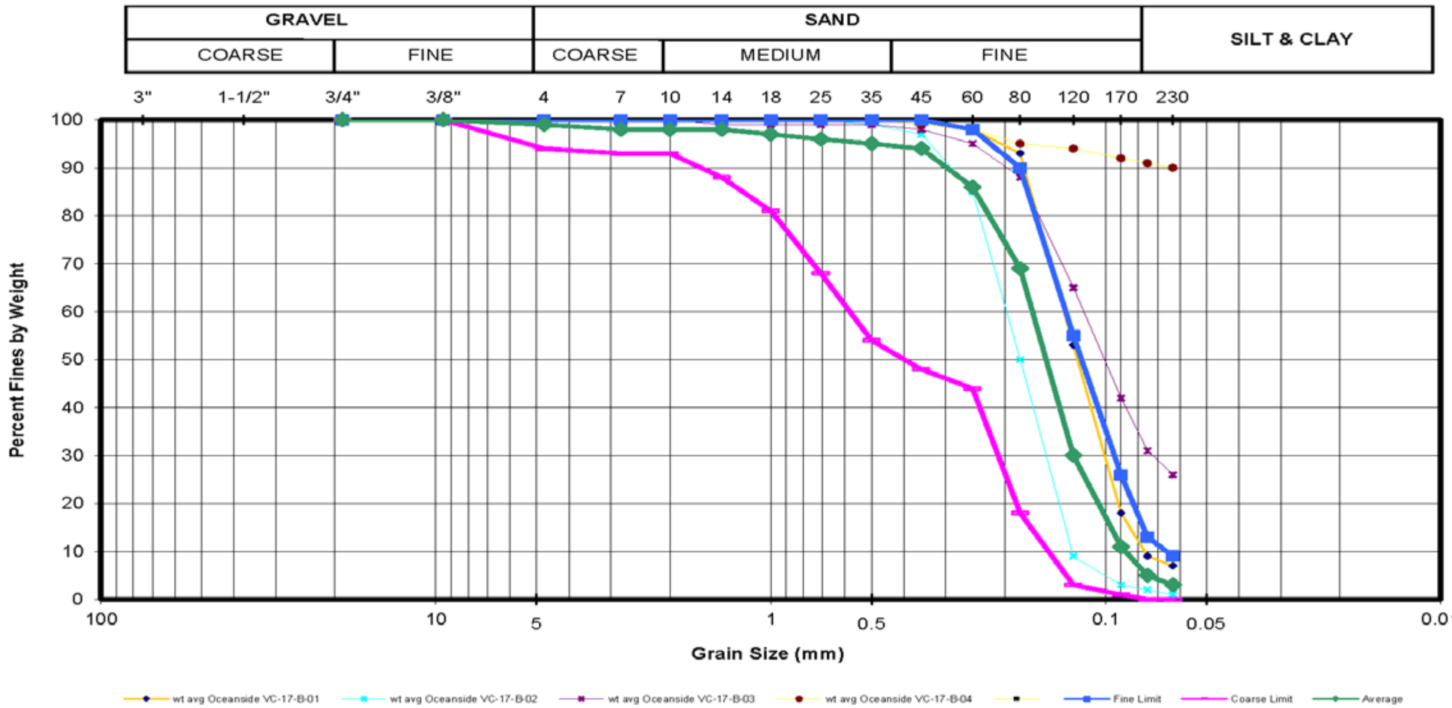
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 06 to 07. <u>Individual</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-6



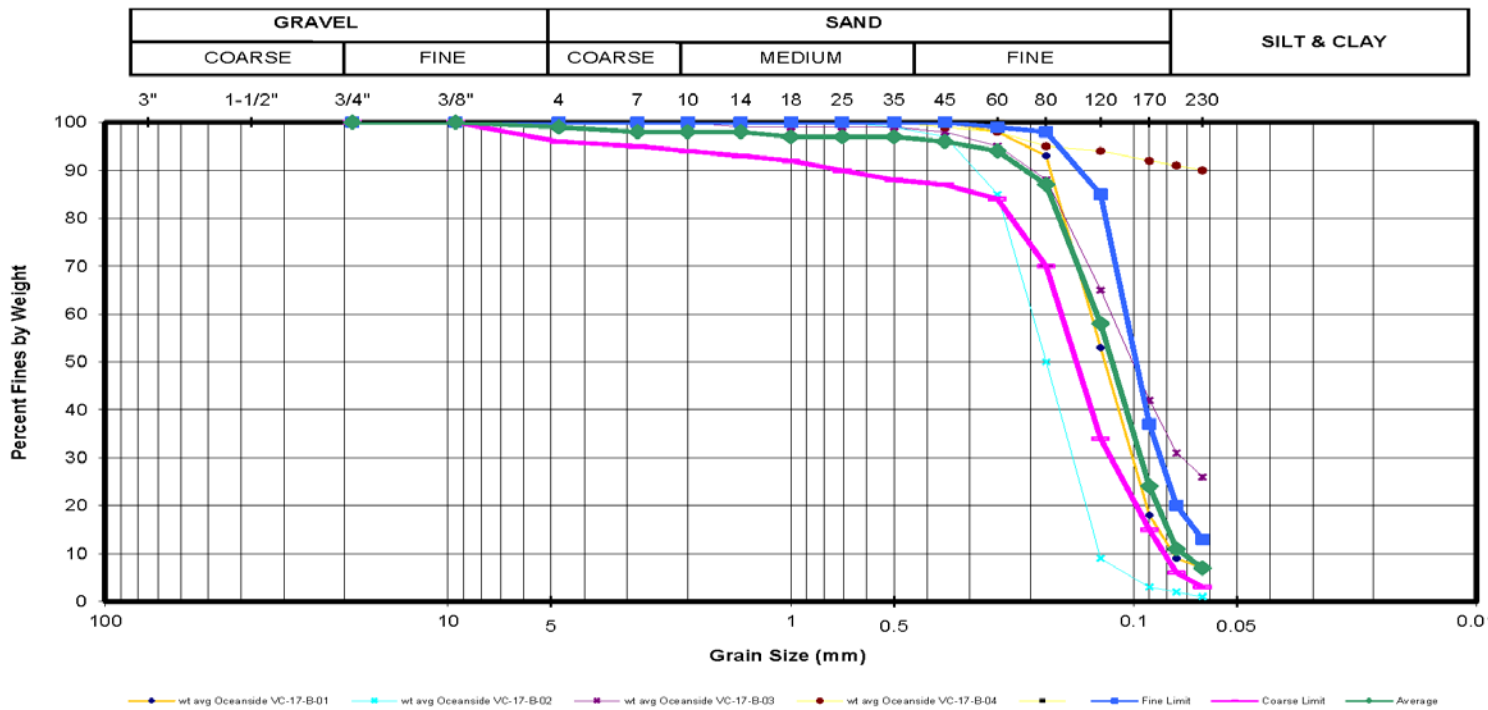
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 04. <u>Individual</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-7



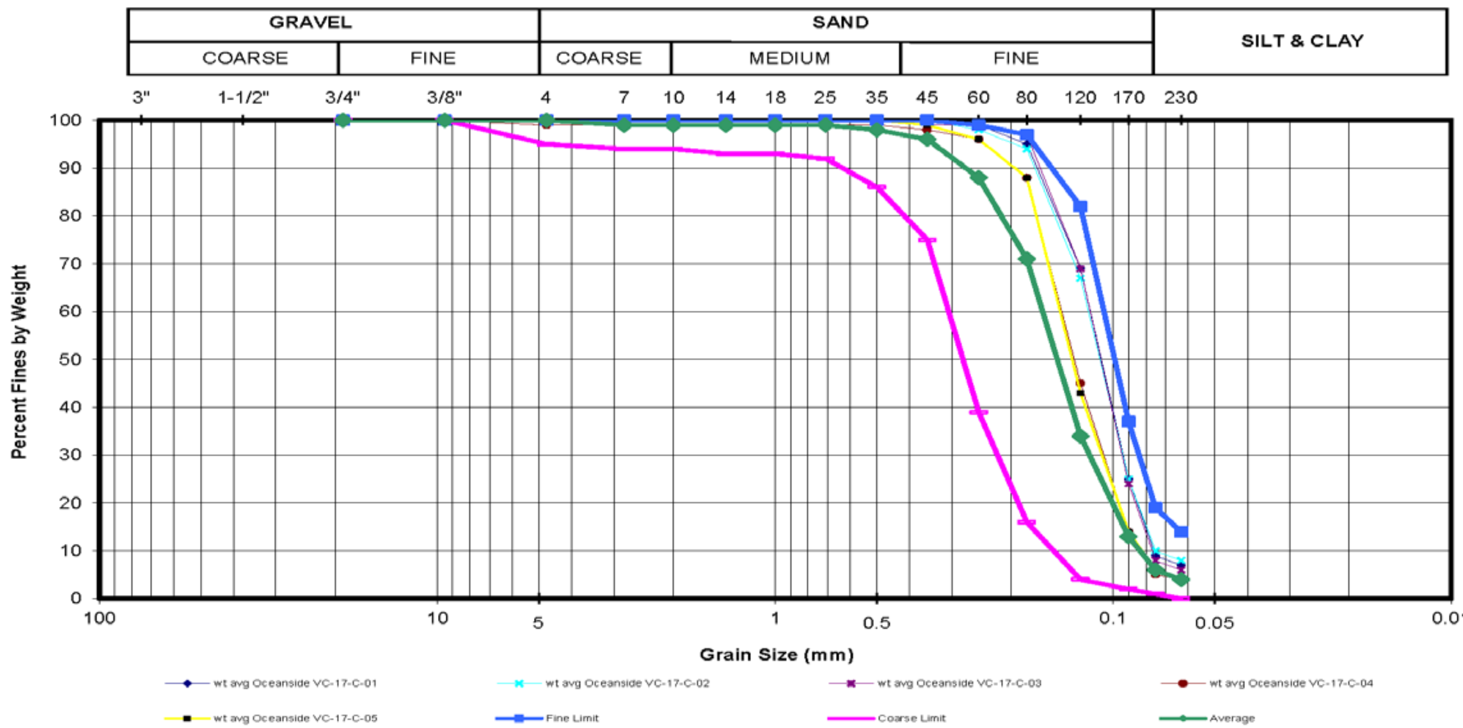
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 04. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-8



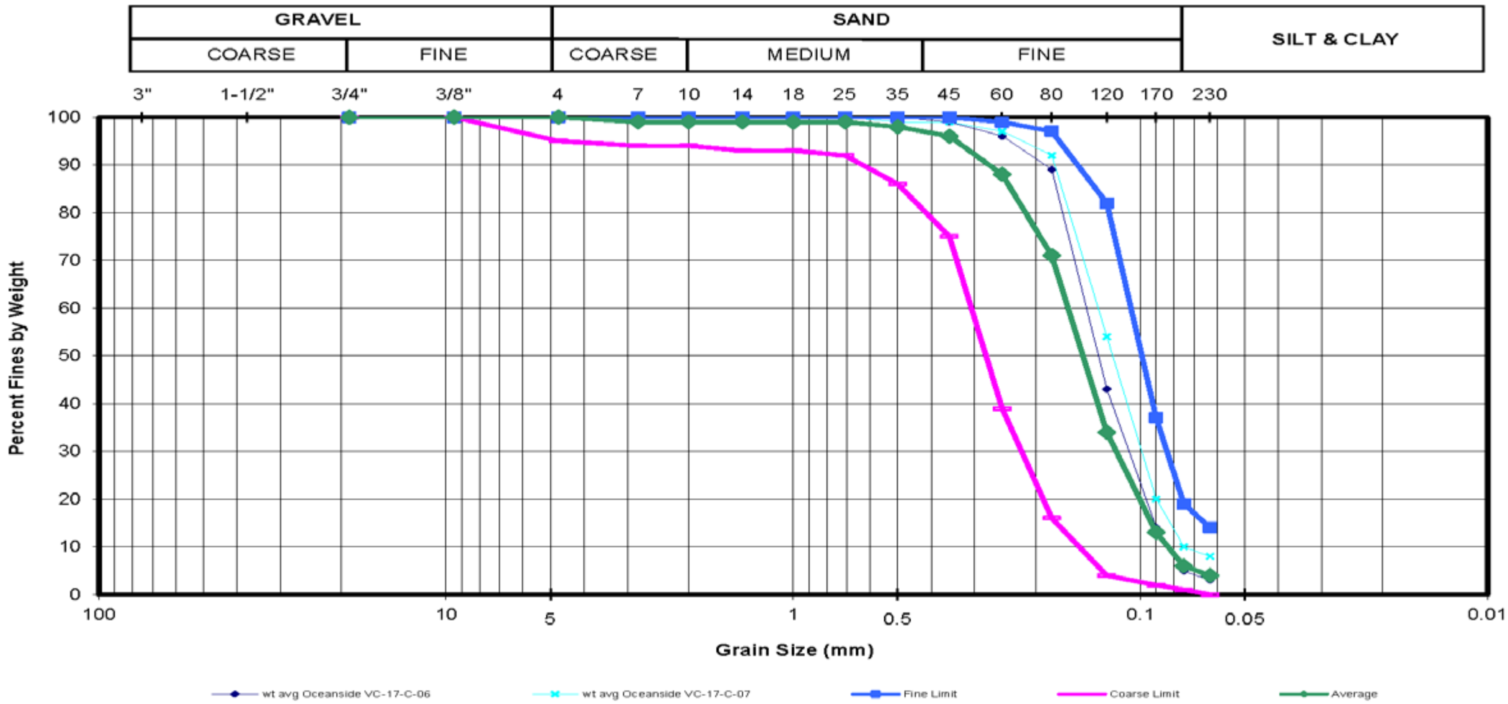
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 04. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-9



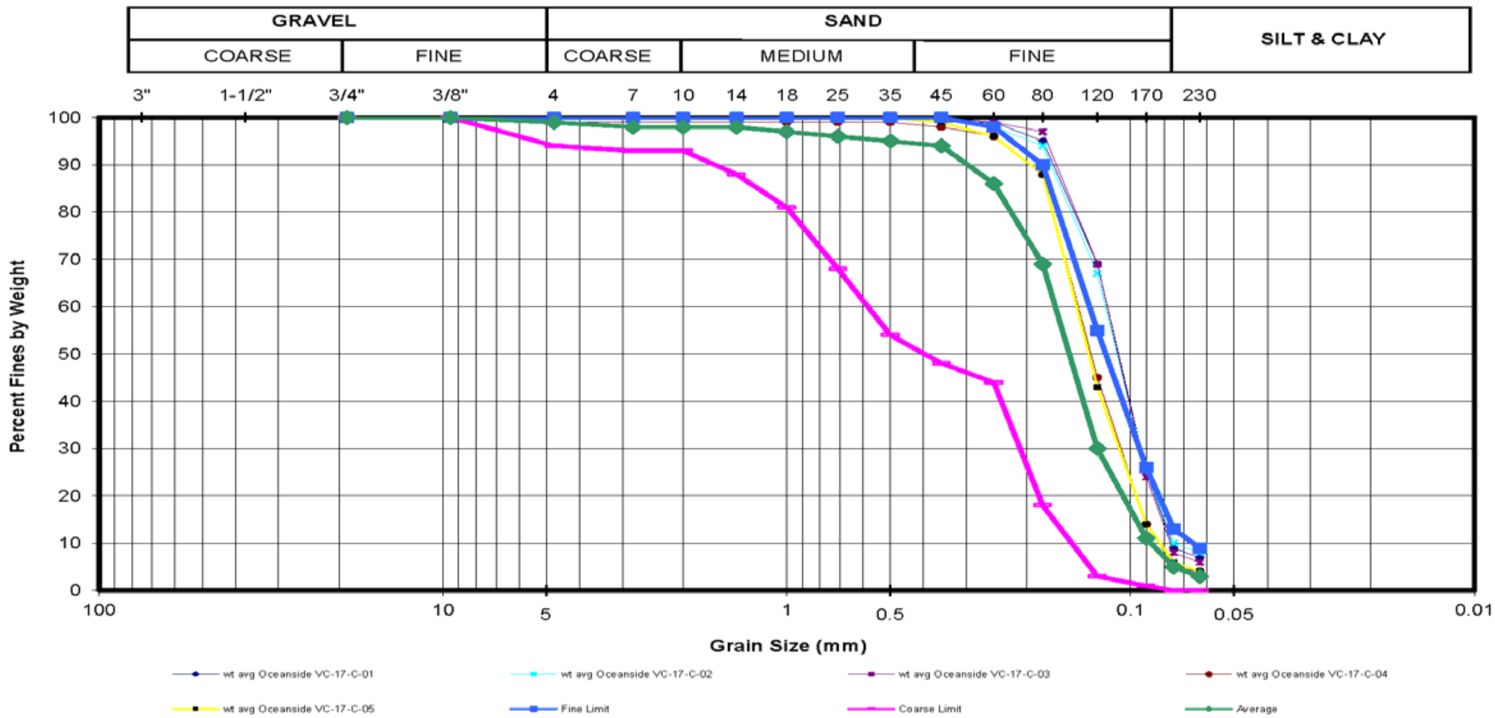
"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-10



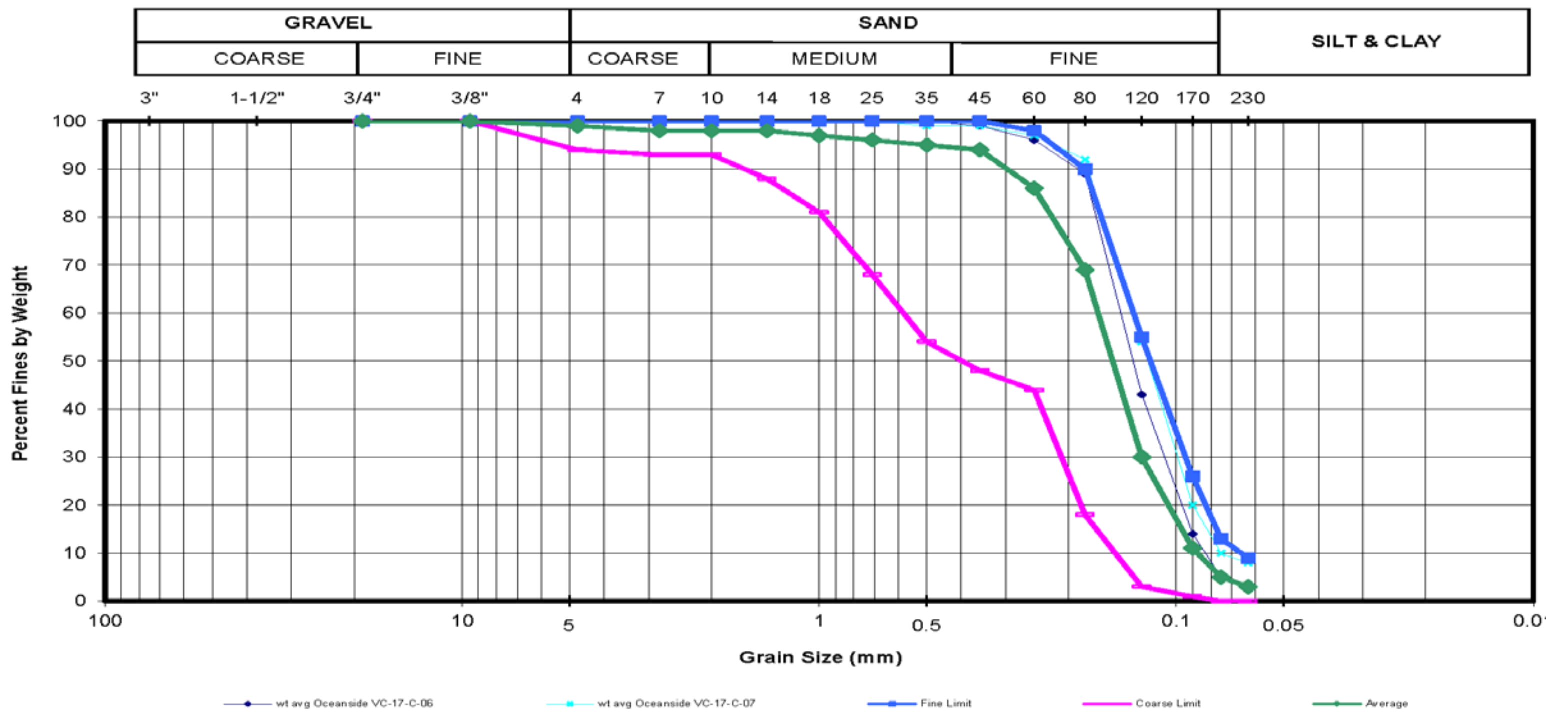
"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 06 to 07. <u>Individual</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site."

Figure A-11



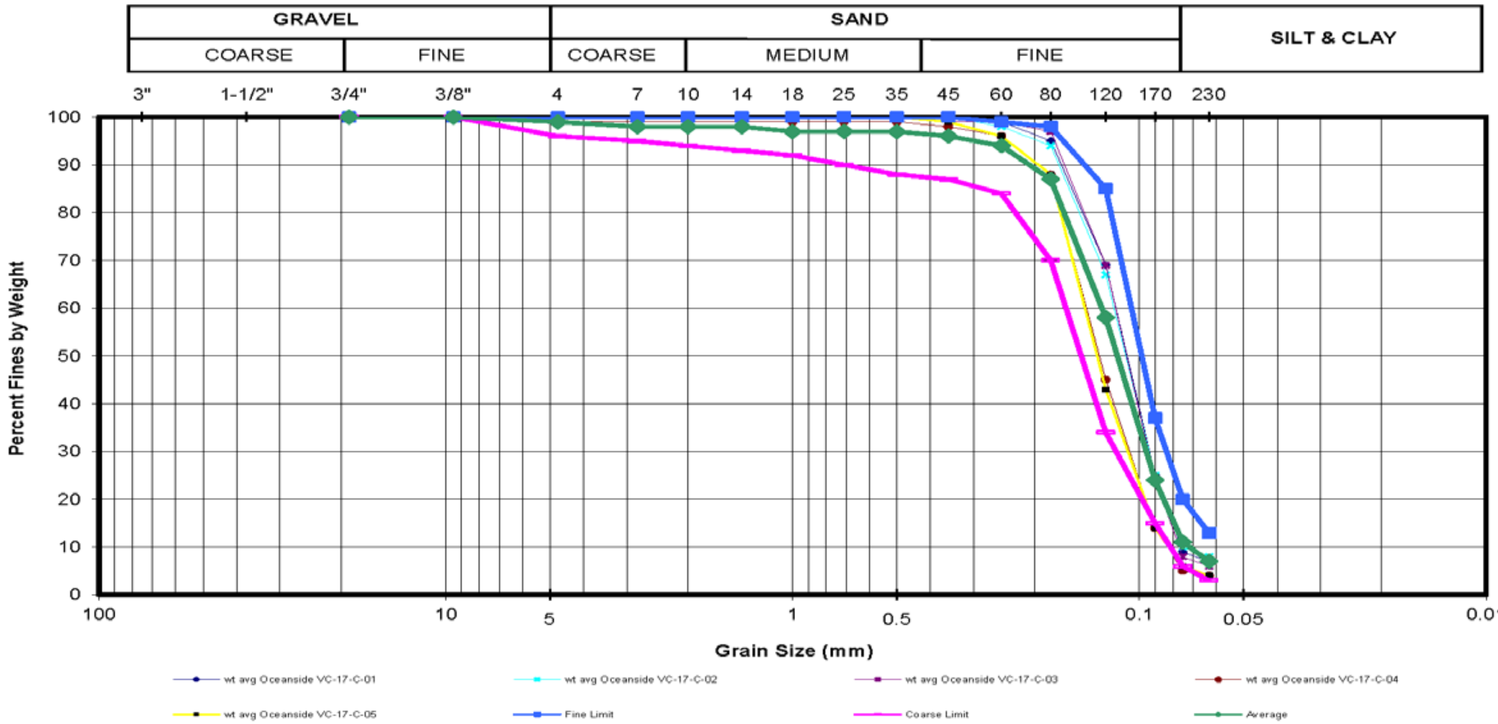
"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-12



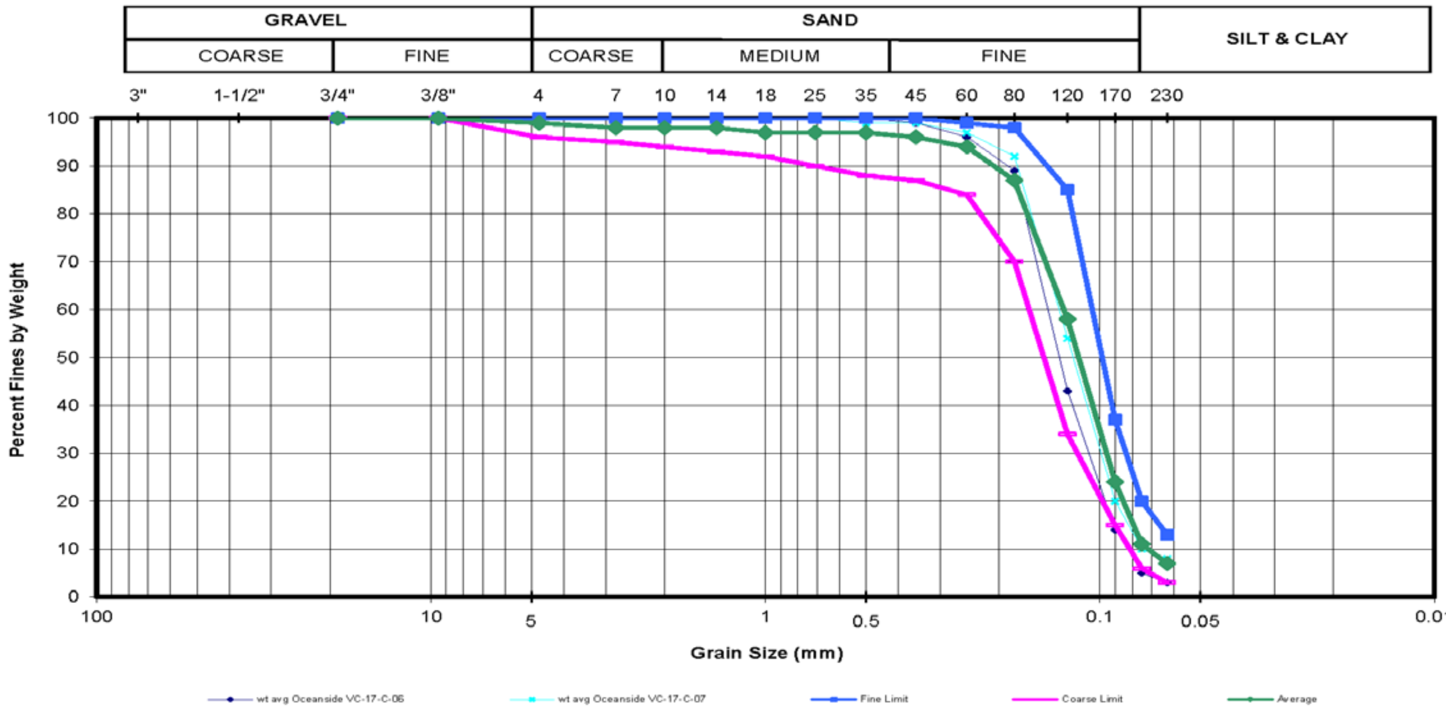
"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 06 to 07. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-13



"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 05. Individual weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach nearshore placement site.

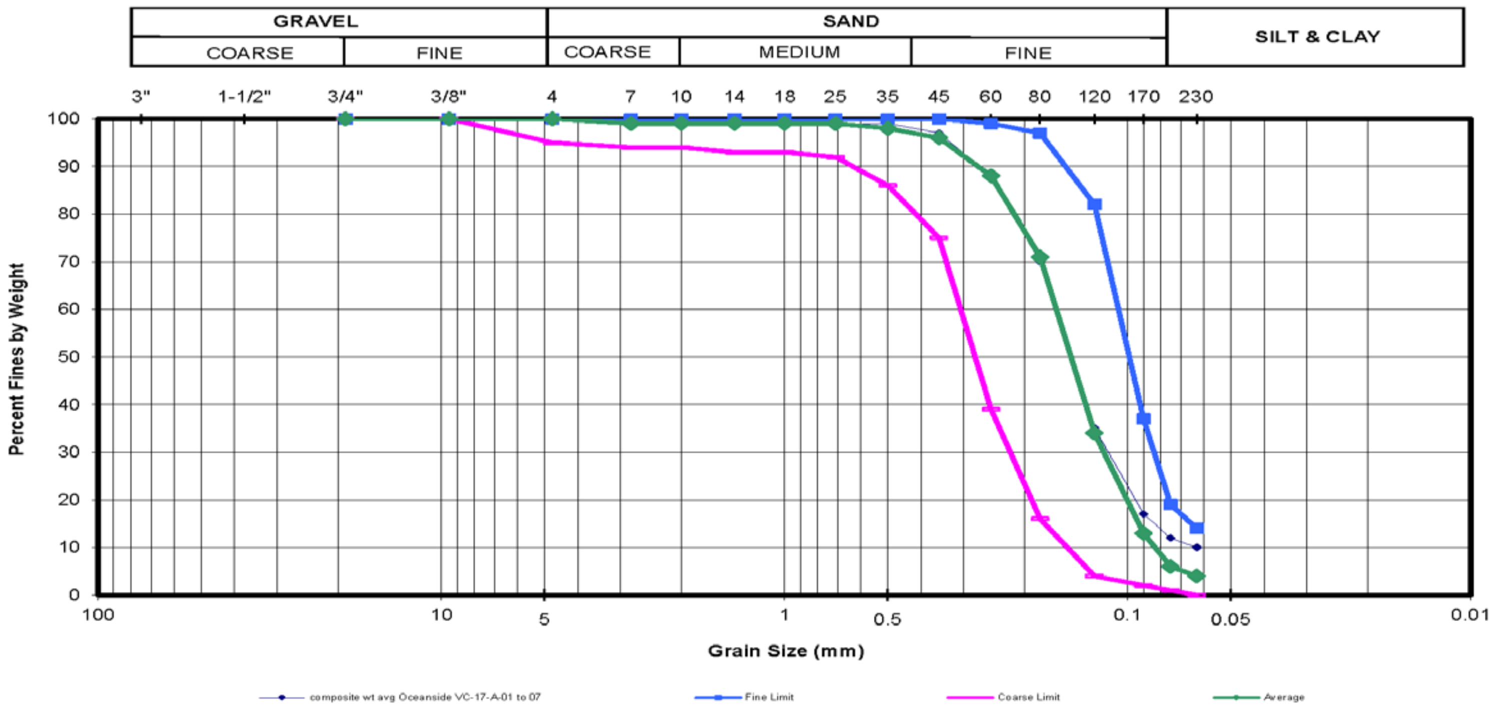
Figure A-14



"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 06 to 07. <u>Individual</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach nearshore placement site.

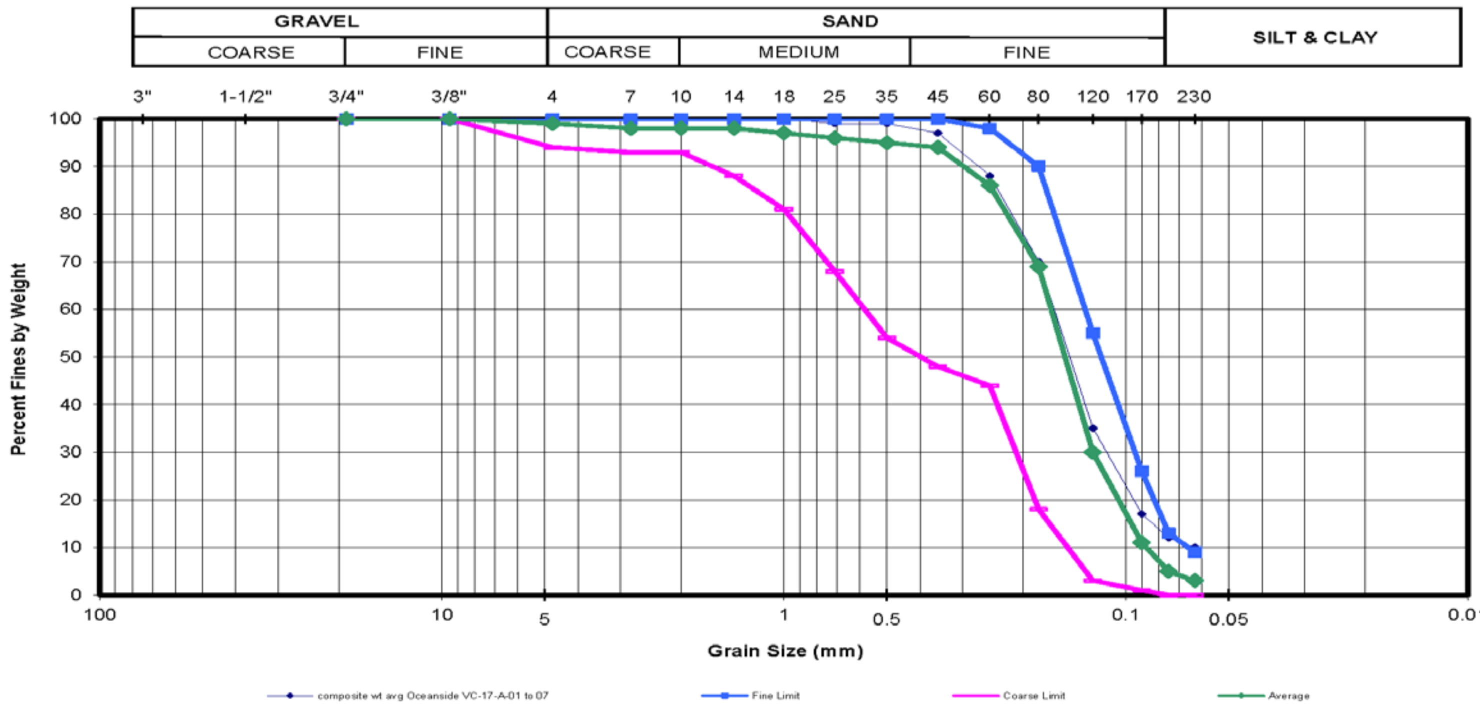
Figure A-14

Figures A15 to A23. Composite Weighted Average Grain size beach compatibility curves.



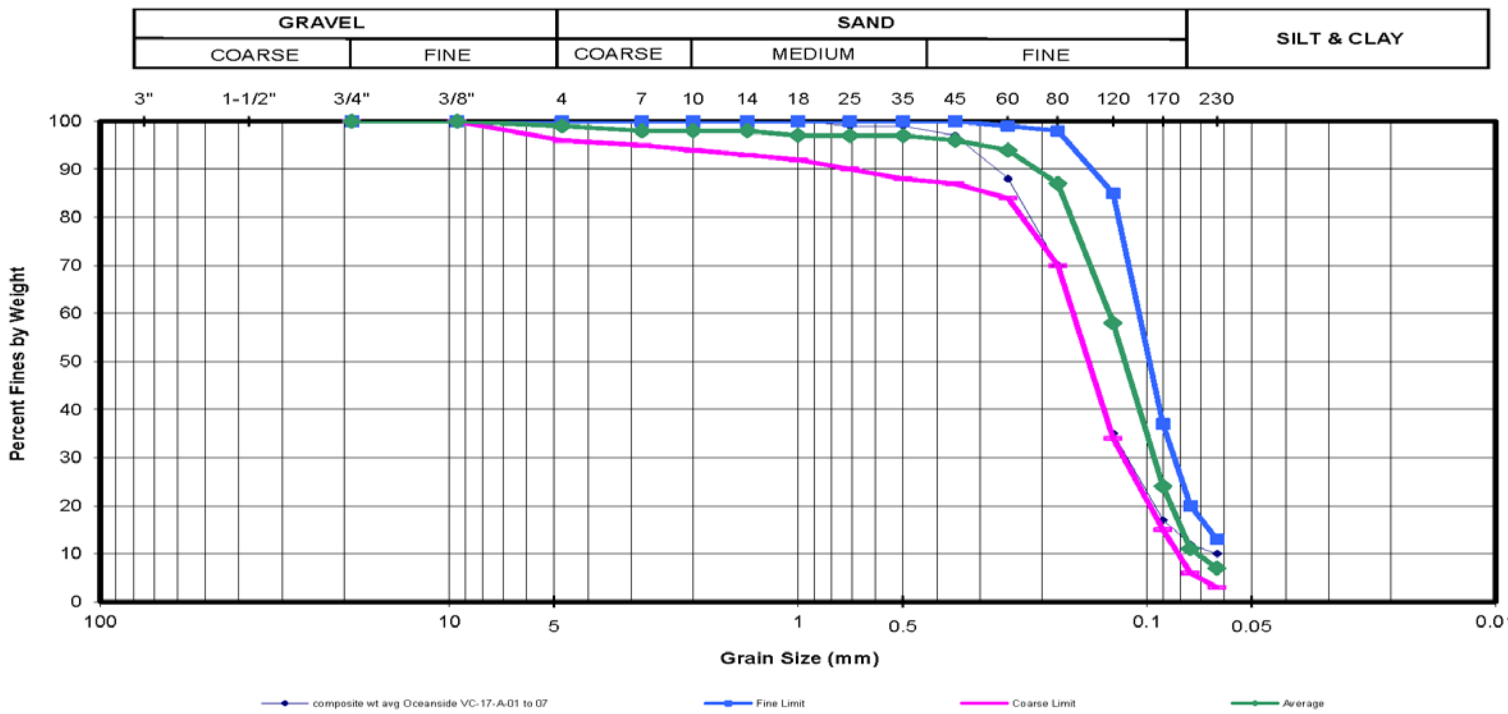
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 07.
<u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-15



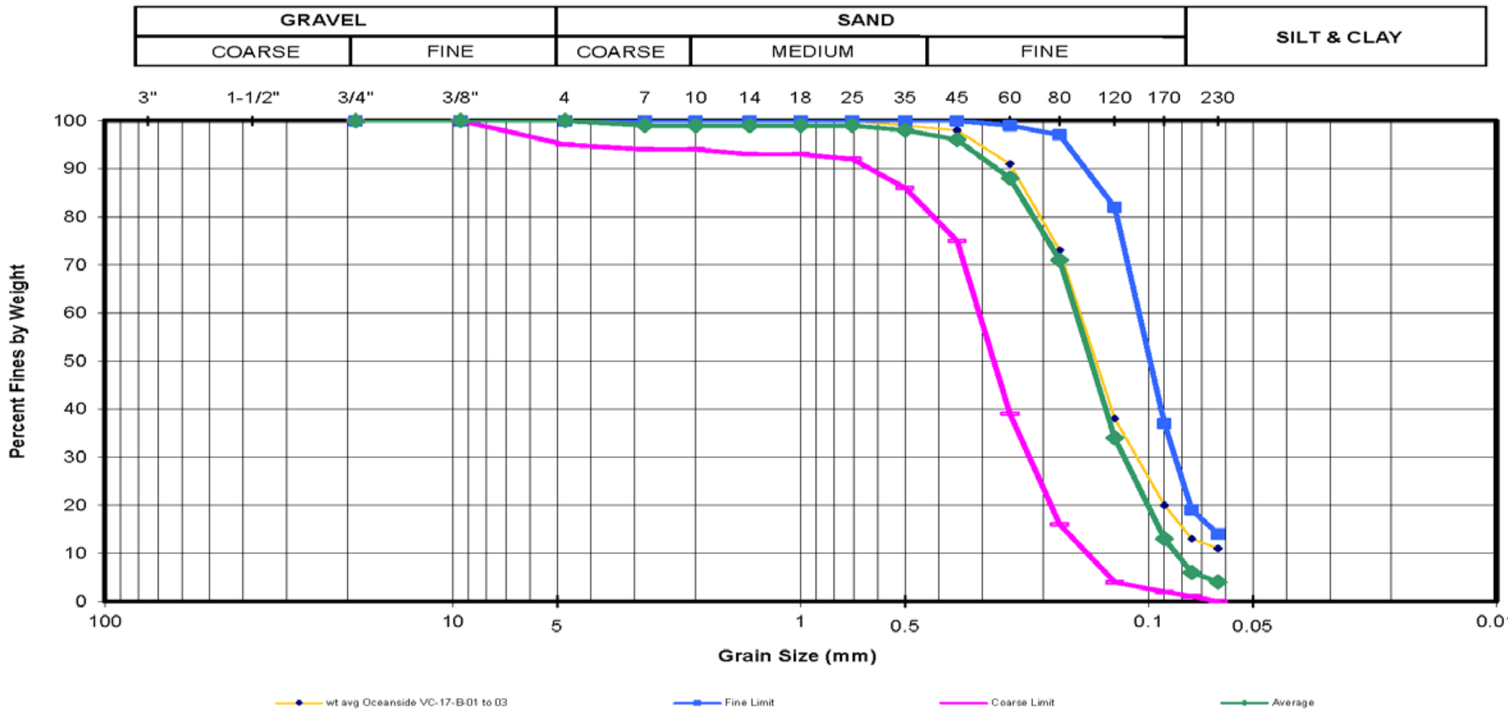
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 07. <u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-16



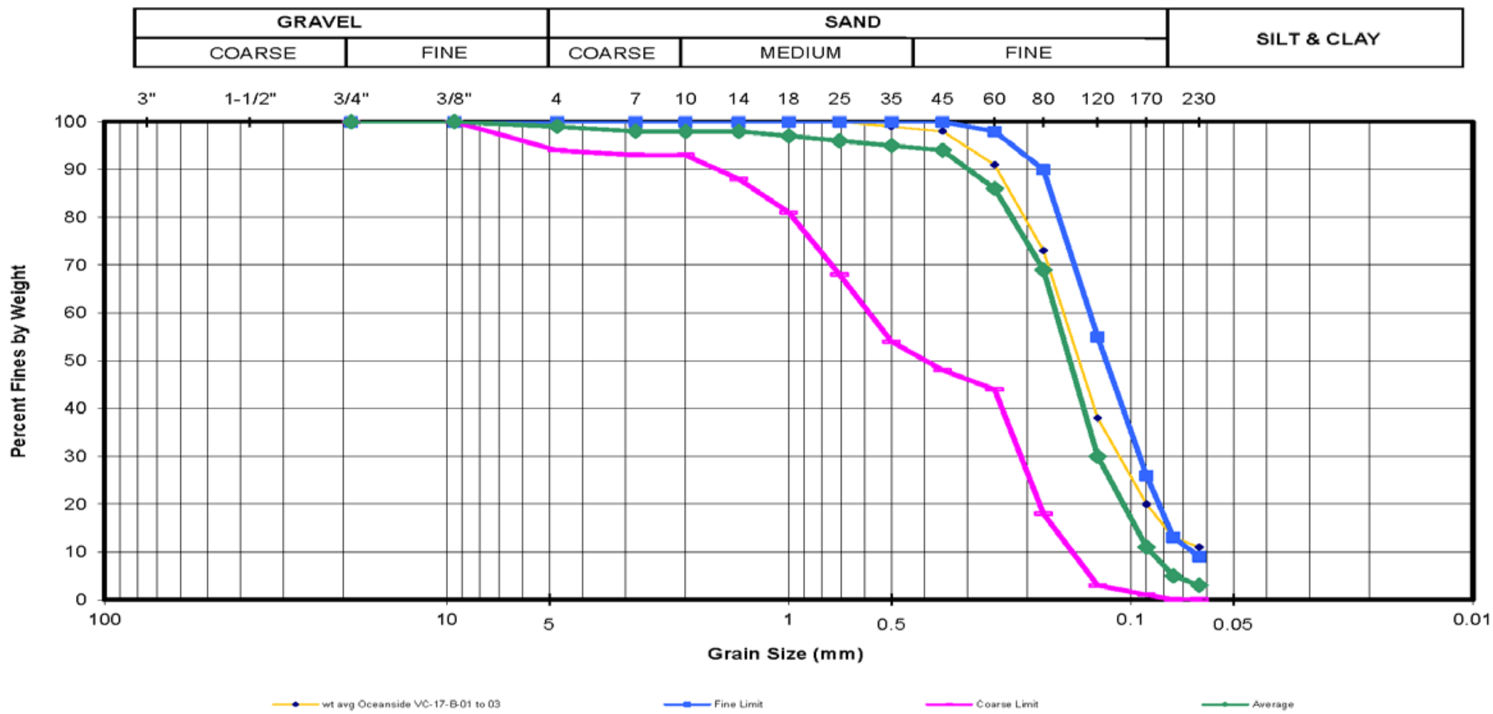
"Oceanside Harbor Area A, Del Mar Channel" 2017, vibracores 01 to 07. <u>composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-17



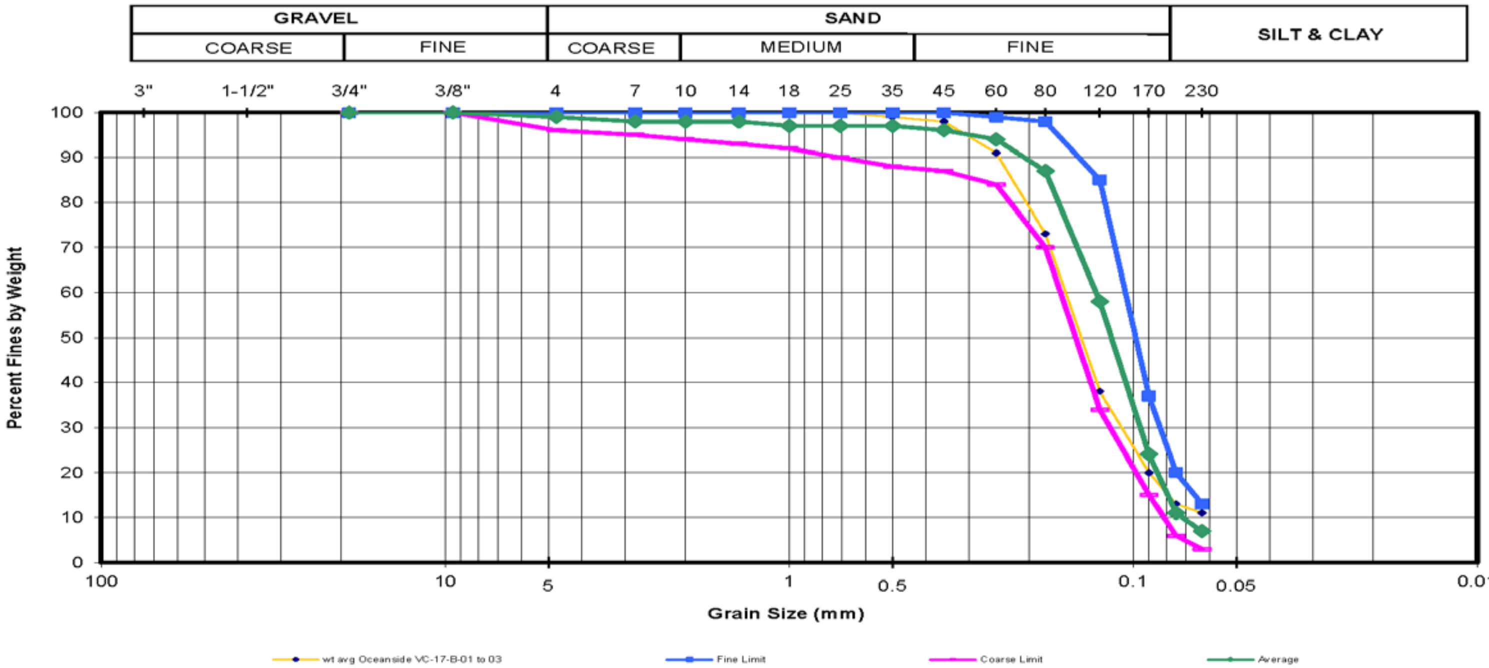
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 03. <u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-18



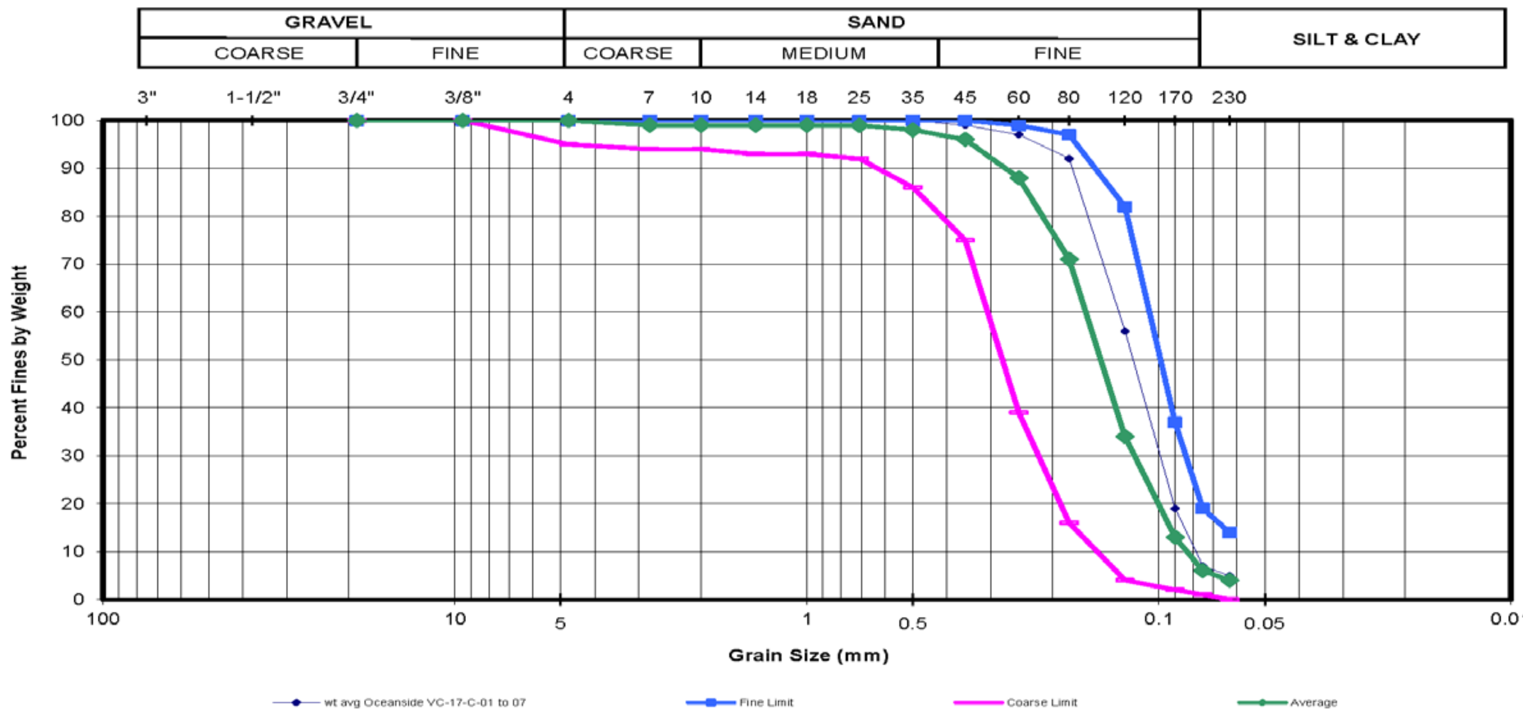
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 03. <u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-19



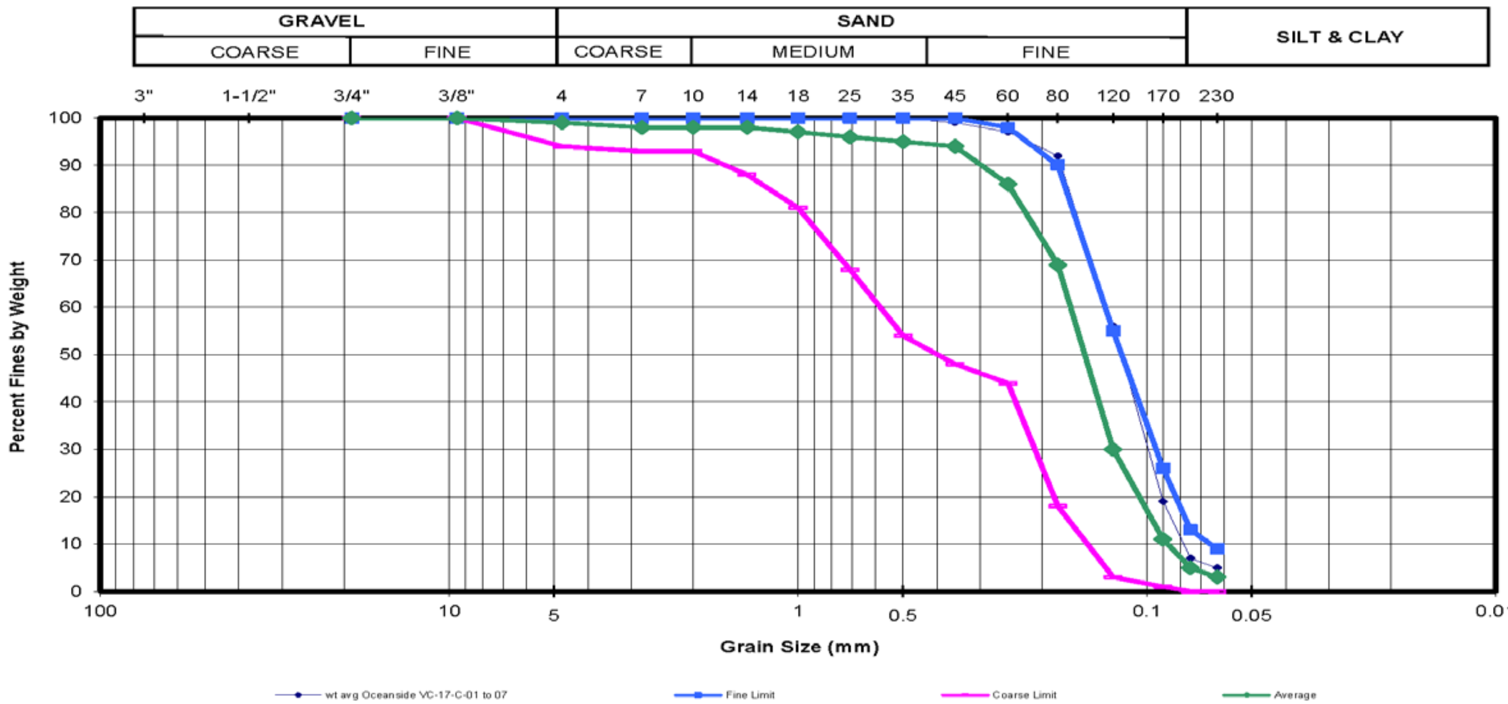
"Oceanside Harbor Area B, Oceanside Channel" 2017, vibracores 01 to 03. <u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -20 ft MLLW and Over Dredge depth of -22 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-20



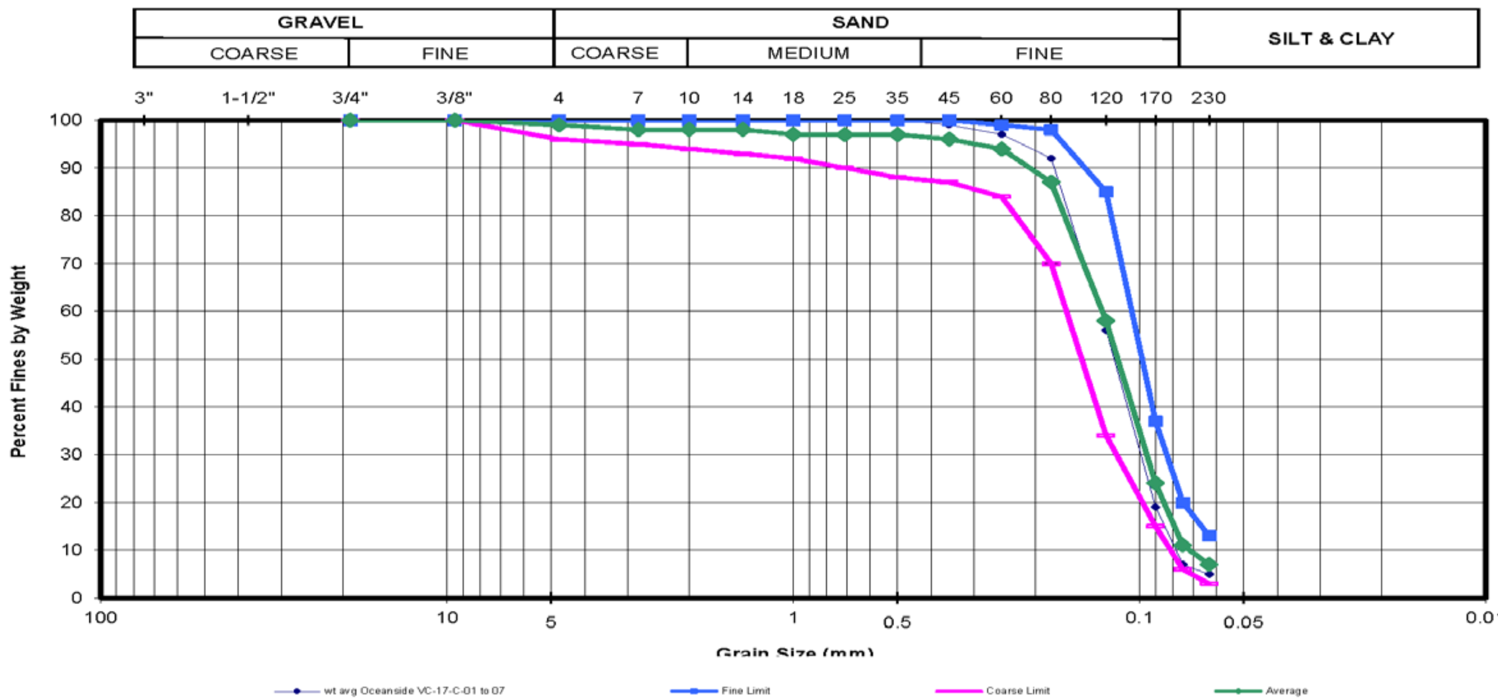
"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 07. Composite weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects A to C, onshore placement site.

Figure A-21



"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 07. <u>Composite</u> weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach Transects D to F, onshore placement site.

Figure A-22



"Oceanside Harbor Area C, Entrance Channel" 2017, vibracores 01 to 07. Composite weighted average Beach Compatibility Gradation Curves to Project Depth of -28 ft MLLW and Over Dredge depth of -30 ft MLLW, compared to Oceanside City Beach nearshore placement site.

Figure A-23

Figure B1. Map showing incompatible sediment areas around vibracore B-04.

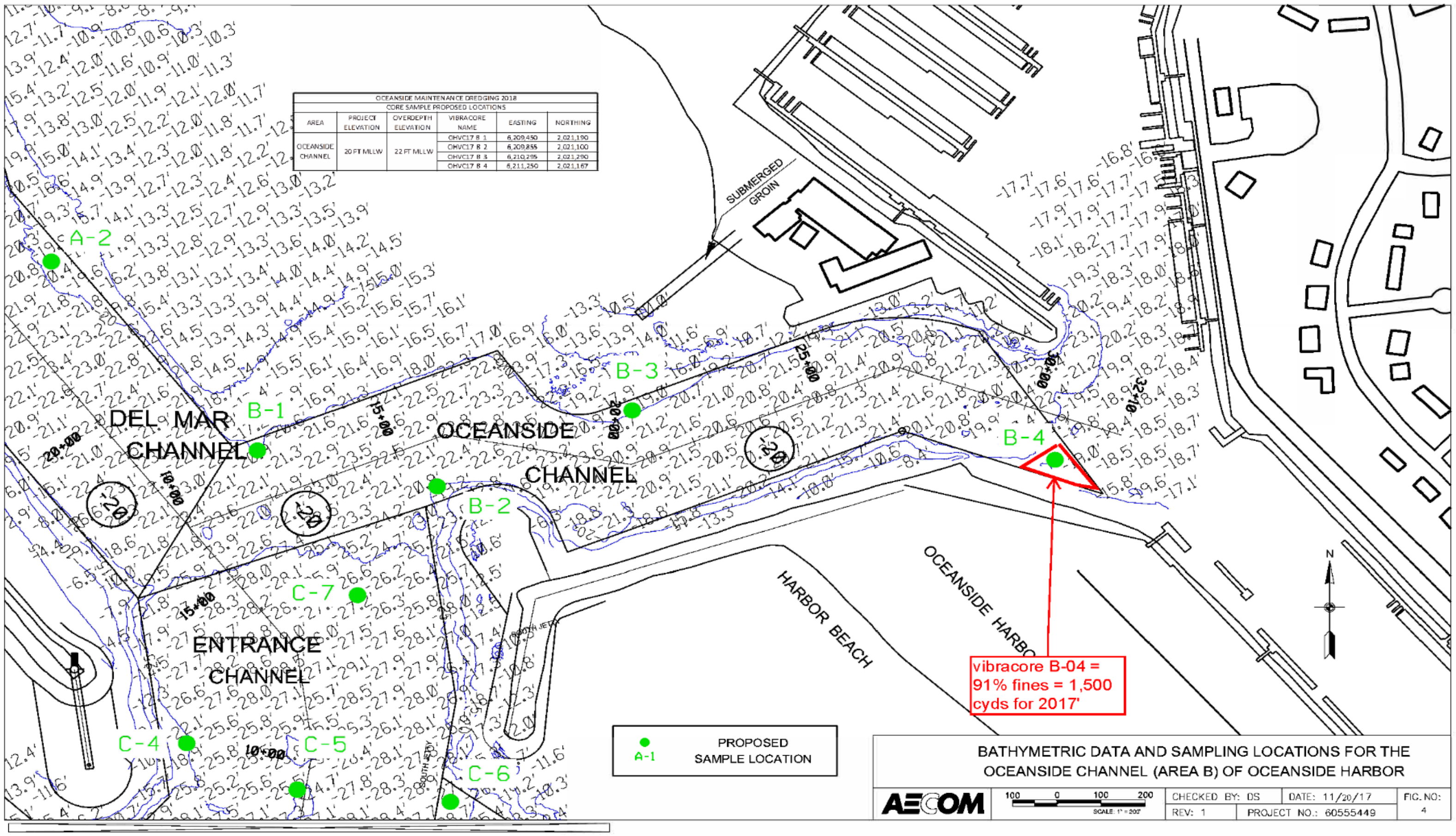


Figure 4. Bathymetric Data and Sampling Locations for the Oceanside Channel (Area B) of Oceanside Harbor

5

Figure B1.

Tables showing gradation test results for each vibracore location sample and three placement sites.

Weighted Average of Individual Vibracore Borehole Samples, Oceanside Harbor 2017																					
Dredge Area	Vibracore No.	Sample Depth (feet)	Sample Surface Elev (feet MLLW)	Elevation (feet MLLW)	Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Engineering Soil Classification (United States Soil Classification System)
					Sieve No./Sieve Size/% Passing																
					3/4	3/8	4	7	10	14	18	25	35	45	60	80	120	170	**200**	230	
					19.0mm	9.5mm	4.75mm	2.8mm	2.0mm	1.4mm	1.0mm	0.71mm	0.50mm	0.35mm	0.25mm	0.18mm	0.125mm	0.090mm	0.075mm	0.063mm	
Area **A** Del Mar Channel	OSHVC-17-A-01	0.0 to 3.2	-18.8	-22.0	100	100	100	100	100	100	100	100	99	99	96	88	62	30	19	16	SILTY SAND (SM)
	OSHVC-17-A-02	0.0-2.4	-19.6	-22.0	100	100	100	100	100	100	100	100	100	99	98	96	85	61	**47**	41	SILTY SAND (SM)
	OSHVC-17-A-03	0.0-5.6	-16.4	-22.0	100	100	100	100	100	100	100	100	100	99	92	72	23	7	4	3	POORLY GRADED SAND (SP)
	OSHVC-17-A-04	0.0-5.7	-16.3	-22.0	100	100	100	100	100	100	100	100	100	99	89	63	17	5	4	3	POORLY GRADED SAND (SP)
	OSHVC-17-A-05	0.0-2.7	-19.3	-22.0	100	100	98	98	98	97	96	95	92	89	82	72	42	20	13	10	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-A-06	0.0-5.0	-17.0	-22.0	100	100	100	100	100	100	100	99	98	95	81	58	32	20	17	15	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-A-07	2.0-4.8	-17.2	-22.0	100	100	100	100	100	100	100	100	99	97	85	62	23	7	3	2	POORLY GRADED SAND (SP)
Area **B** Oceanside Channel	OSHVC-17-B-01	0.0-2.6	-19.4	-22.0	100	100	100	100	100	100	100	100	100	100	98	93	53	18	9	7	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-B-02	0.0-4.8	-17.2	-22.0	100	100	100	100	100	100	100	100	99	97	85	50	9	3	2	1	POORLY GRADED SAND (SP)
	OSHVC-17-B-03	0.0-3.7	-18.3	-22.0	100	100	100	100	100	99	99	99	99	98	95	88	65	42	**31**	26	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-B-04	0.0-2.3	-19.7	-22.0	100	100	100	100	100	100	100	100	100	99	98	95	94	92	**91**	90	LEAN CLAY (CL)
Area **C** Entrance Channel	OSHVC-17-C-01	0.0-8.5	-21.5	-30.0	100	100	100	100	100	100	100	100	100	100	99	95	69	25	9	7	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-02	2.0-5.5	-24.5	-30.0	100	100	100	100	100	100	100	100	100	100	98	94	67	25	10	8	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-03	0.0-6.6	-23.4	-30.0	100	100	100	100	100	100	100	100	100	100	99	97	69	24	8	6	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-04	0.0-7.0	-23.0	-30.0	100	99	99	99	99	99	99	99	99	98	96	88	45	14	5	4	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-05	0.0-8.4	-21.6	-30.0	100	100	100	100	100	100	100	100	100	99	96	88	43	14	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-06	0.0-7.2	-22.8	-30.0	100	100	100	100	100	100	100	100	100	99	96	89	43	14	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
	OSHVC-17-C-07	0.0-4.1	-25.9	-30.0	100	100	100	100	100	100	99	99	99	99	97	92	54	20	10	8	SILTY SAND (SM)

Composite Weighted Average of all Vibracore Borehole Samples, Oceanside 2017 SAP																	
Dredge Area	Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Engineering Soil Classification (United States Soil Classification System)
	Sieve No./Sieve Size/% Passing																
	3/4	3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
	19.0mm	9.5mm	4.75mm	2.8mm	2.0mm	1.4mm	1.0mm	0.71mm	0.50mm	0.35mm	0.25mm	0.18mm	0.125mm	0.090mm	0.075mm	0.063mm	
Area **A** Del Mar Channel	100	100	100	100	100	100	100	99	99	97	88	70	35	17	12	10	POORLY GRADED SAND WITH SILT (SP-SM)
Area **B** Oceanside Channel	100	100	100	100	100	100	100	100	99	98	93	76	48	32	27	25	SILTY SAND (SM)
Area **C** Entrance Channel	100	100	100	100	100	100	100	100	100	99	97	92	56	19	7	5	POORLY GRADED SAND WITH SILT (SP-SM)

Appendix C

Daily Logs

KLI Daily Log Oceanside Harbor Dredge Sampling Date: 12/12/17

	GPS Start: 33° 12.529', 117° 23.680'	S. Johnson
	GPS End: 33° 12.529', 117° 23.680'	C. Davidson
0705	Arrive Vessel	S. Stringer
0745	Underway	R. Marquez
0835	Attempt C1 → good	A. Alba
1010	Attempt C2 → good	A. Apatkian (AE)
1050	Attempt C3 → good moved for safety	
1125	Attempt C6 → good " " "	
1205	lunch	
1240	Attempt C5 → good	
1315	Attempt C4 → good	
1345	Attempt C7 → good	
1520	Attempt (2nd) B1 → good	
1550	Attempt B2 → good	
1625	Attempt B3 → good	
1635	Underway	
1645	Tie off dock Z10, wash, off load	
1710	Secure Vessel	

KLI Daily Log Oceanside Harbor Dredge Sampling **Date**

	GPS Start: 33 12.528' 117°23.680'	S. Johnson
	GPS End: 33° 12.528' 117 23.680	C. Davidson
0650	Arrive Vessel	S. Springer
0725	Underway	R. Marquez
0735	Attempt core B4 → good	A. Alba
0815	Attempt core A1 → good	A. Avakian (AECOM)
0840	Attempt core A2 → good	
0910	Attempt core A3 → good	
0940	Attempt core A4 → good	
1010	Attempt core A5 → good	
1045	Attempt core A6 → good	
1110	Attempt core A7 → good	
1125	Underway	
1135	Tie off, Demob	

Appendix D

Field Logs Including Core Photographs

Oceanside Harbor 2017

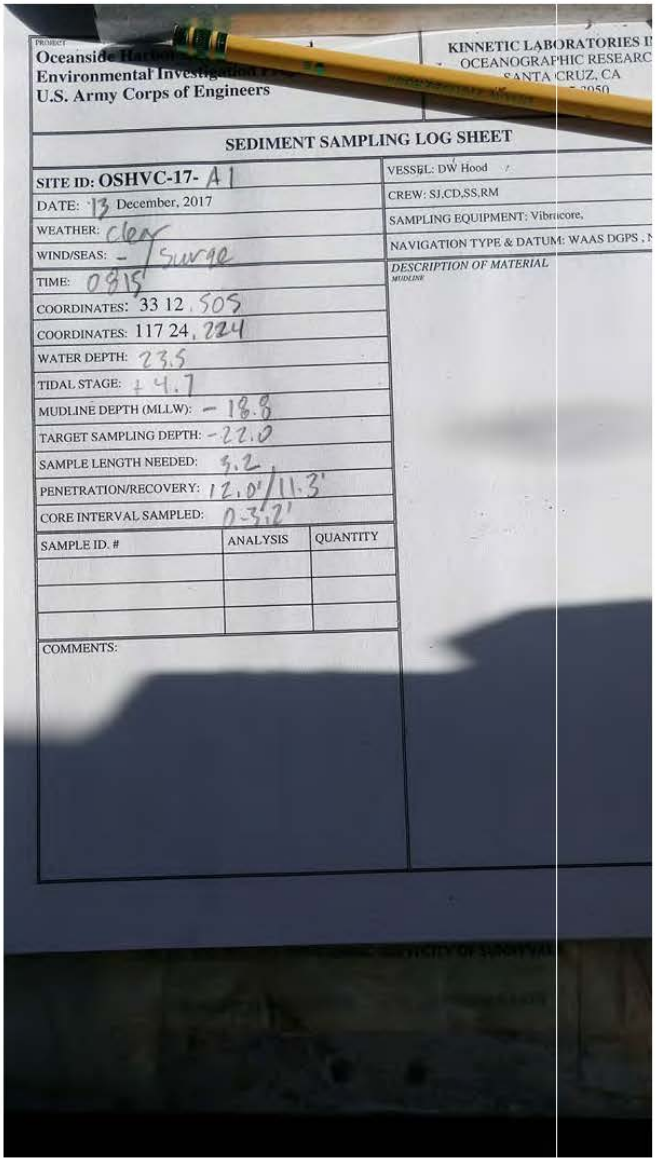
VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-01	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 8:15 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.505
Sea State: Surge	**Longitude:** 117 24.224

Water Depth (ft.): 23.50	**Tidal Stage (+/- ft.):** 4.70
Actual Mudline Elevation (ft. MLLW): -18.80	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 12.00	**Recovery (ft.):** 11.30
Core Interval Sampled (ft.): 3.20	
Fines/Suspect Layer? (Y/N): Y	**If Y, layer interval (ft.):** 1.5 to 4.2

Notes: Change from interbedded silt in sand to 1.5 feet to Sandy silt to 4.2 feet. Taking secondary sample for 1.5 to 4.2 section

Field Log Photo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SEDIMENT SAMPLING LOG SHEET

SITE ID: OSHVC-17- A1
DATE: 13 December, 2017
WEATHER: clear
WIND/SEAS: – / surge
TIME: 0815
COORDINATES: 33 12.505
COORDINATES: 117 24.224
WATER DEPTH: 23.5
TIDAL STAGE: +4.7
MUDLINE DEPTH (MLLW): –18.8
TARGET SAMPLING DEPTH: –22.0
SAMPLE LENGTH NEEDED: 3.2
PENETRATION/RECOVERY: 12.0'/11.3'
CORE INTERVAL SAMPLED: 0-3.2'

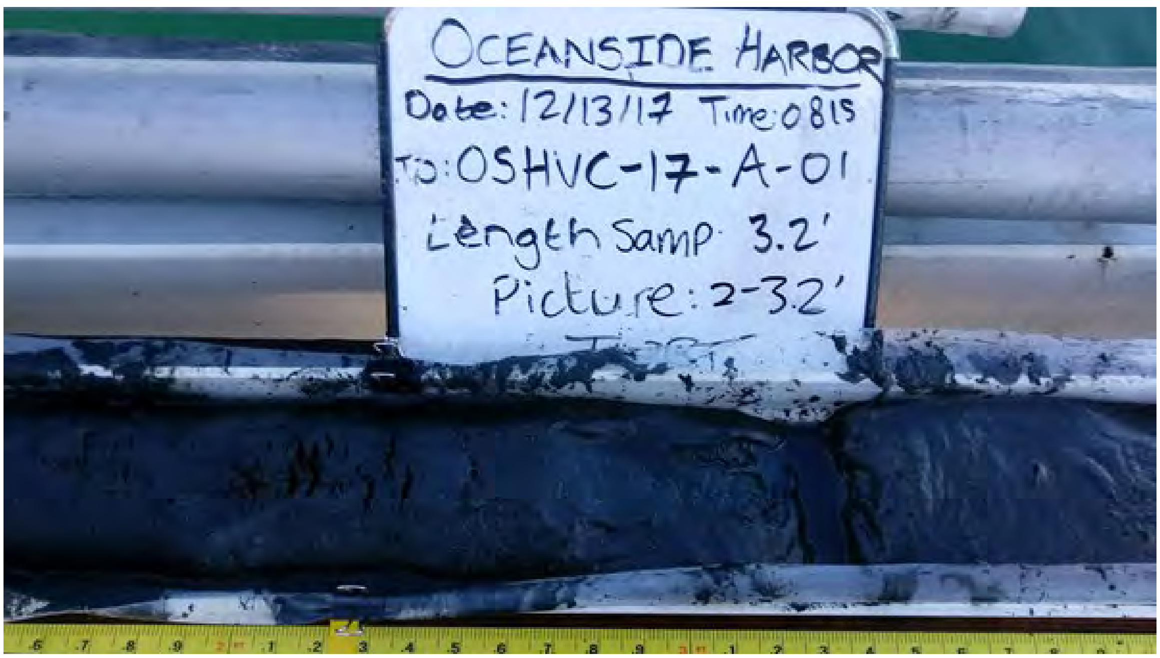
VESSEL: DW Hood
CREW: SJ,CD,SS,RM
SAMPLING EQUIPMENT: Vibracore,
NAVIGATION TYPE & DATUM: WAAS DGPS ,
DESCRIPTION OF MATERIAL
MUDLINE

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:

OSHVC-17-A-01 0 - 2ft 12/13/2017, 8:15 AM

OSHVC-17-A-01 2 - 4ft 12/13/2017, 8:15 AM



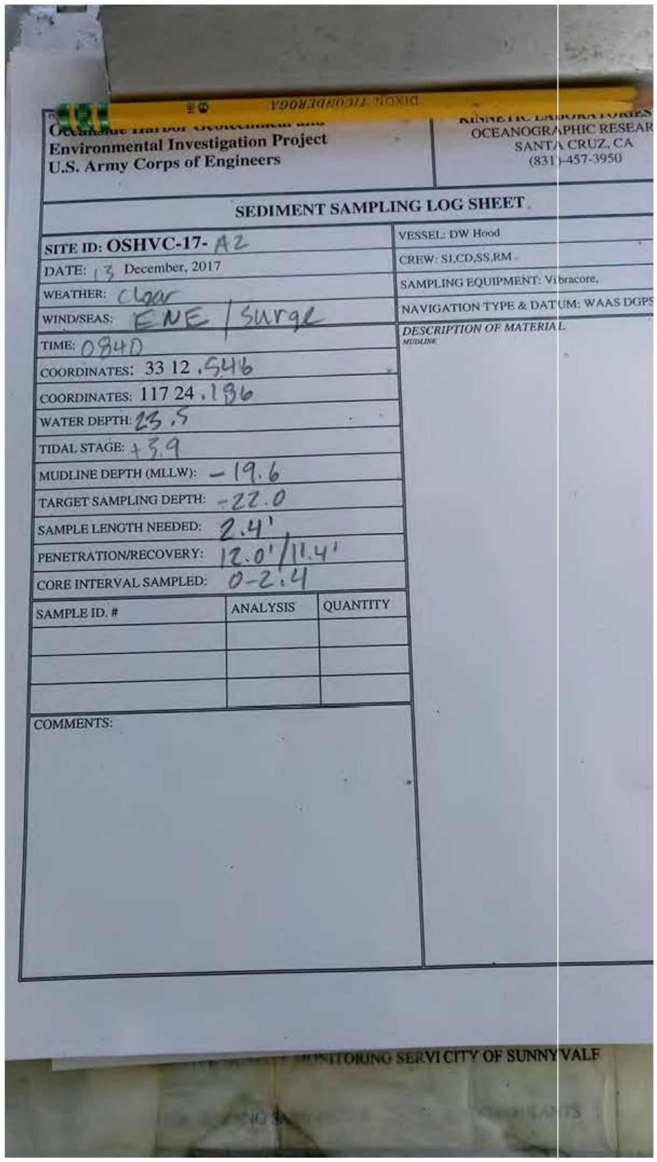
Oceanside Harbor 2017

VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-02	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 8:40 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction: NE**]**	**Latitude:** 33 12.546
Sea State: Surge	**Longitude:** 117 24.186
Water Depth (ft.): 23.50	**Tidal Stage (+/- ft.):** 3.90
Actual Mudline Elevation (ft. MLLW): -19.60	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 12.00	**Recovery (ft.):** 11.40
Core Interval Sampled (ft.): 2.40	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: Strong H2S odor.

Field Log Photo



OSHVC-17-A-02 0 - 2ft 12/13/2017, 8:40 AM

OSHVC-17-A-02 2 - 4ft 12/13/2017, 8:40 AM

Oceanside Harbor 2017

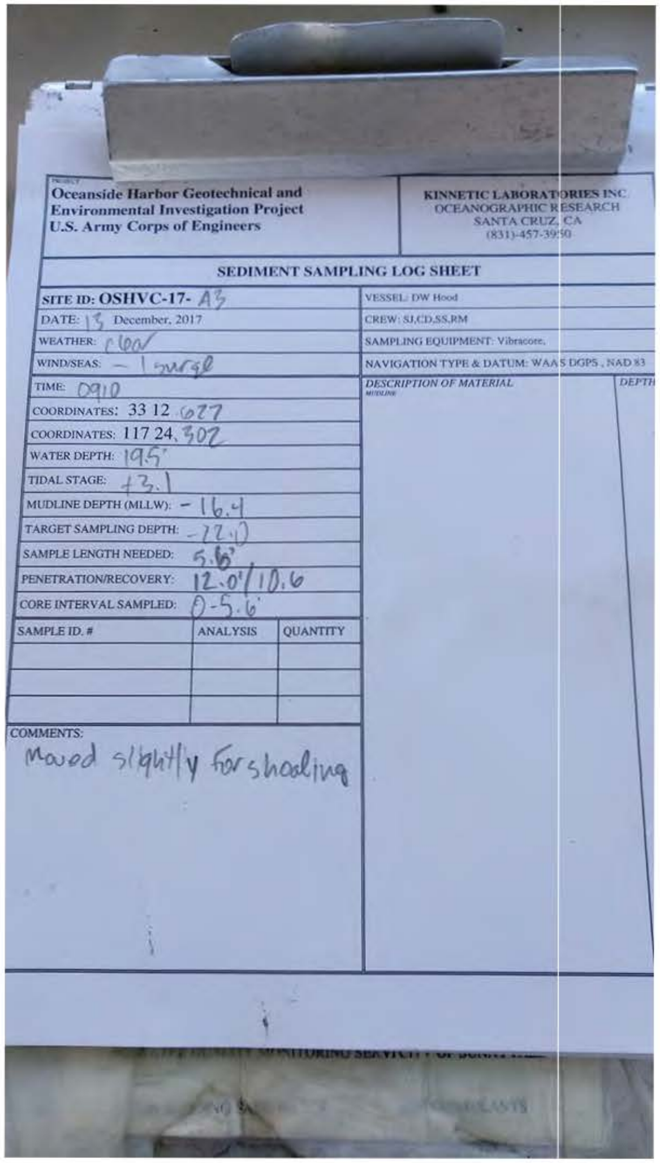
VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-03	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 9:10 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.627
Sea State: Surge	**Longitude:** 117 24.302

Water Depth (ft.): 19.50	**Tidal Stage (+/- ft.):** 3.10
Actual Mudline Elevation (ft. MLLW): -16.40	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 12.00	**Recovery (ft.):** 10.60
Core Interval Sampled (ft.): 5.60	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: Moved slightly for shoaling.

Field Log Photo



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SEDIMENT SAMPLING LOG SHEET

SITE ID: OSHVC-17- A3	VESSEL: DW Hood
DATE: 13 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibracore,
WIND/SEAS: — 1' surge	NAVIGATION TYPE & DATUM: WAAS DGPS , NAD 83
TIME: 0910	DESCRIPTION OF MATERIAL / MUDLINE — DEPTH
COORDINATES: 33 12.627	
COORDINATES: 117 24.302	
WATER DEPTH: 19.5'	
TIDAL STAGE: +3.1	
MUDLINE DEPTH (MLLW): −16.4	
TARGET SAMPLING DEPTH: −22.0	
SAMPLE LENGTH NEEDED: 5.6'	
PENETRATION/RECOVERY: 12.0'/10.6	
CORE INTERVAL SAMPLED: 0-5.6'	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:
Moved slightly for shoaling

OSHVC-17-A-03 0 - 2ft 12/13/2017, 9:10 AM

OSHVC-17-A-03 2 - 4ft 12/13/2017, 9:10 AM

OSHVC-17-A-03 4 - 6ft 12/13/2017, 9:10 AM

OSHVC-17-A-03 6 - 8ft 12/13/2017, 9:10 AM

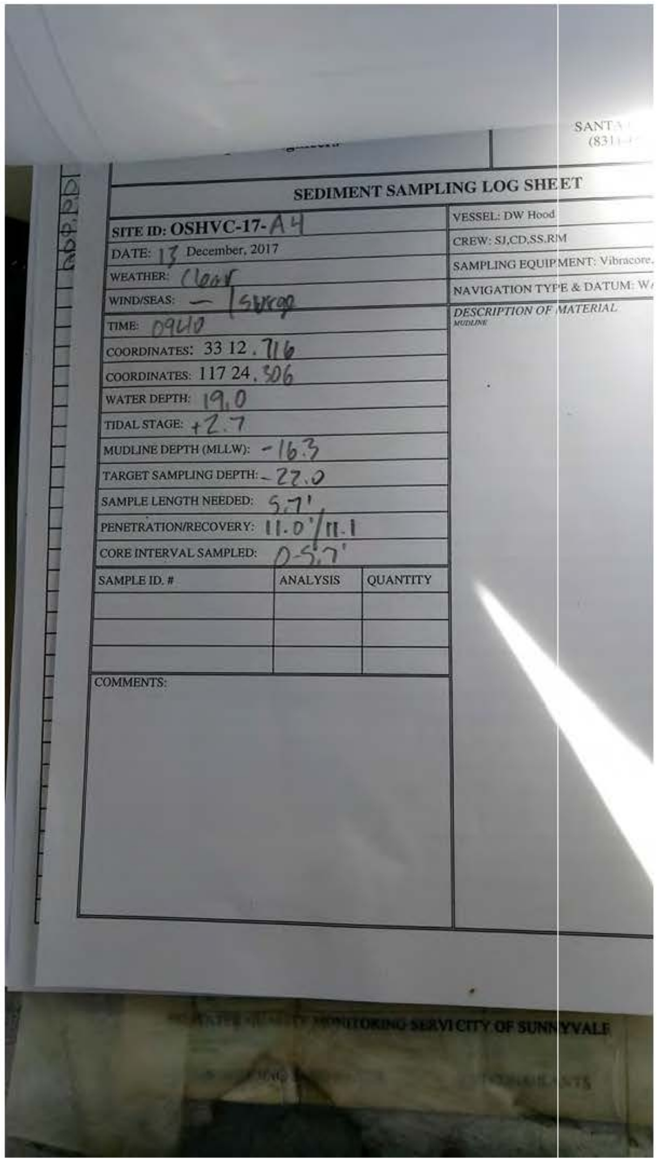
Oceanside Harbor 2017

VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-04	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 9:40 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.716
Sea State: Surge	**Longitude:** 117 24.306
Water Depth (ft.): 19.00	**Tidal Stage (+/- ft.):** 2.70
Actual Mudline Elevation (ft. MLLW): -16.30	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.00	**Recovery (ft.):** 11.10
Core Interval Sampled (ft.): 5.70	
Fines/Suspect Layer? (Y/N): Y	**If Y, layer interval (ft.):** 4.5 - end

Notes: Possible fines starting at 4.5 feet to end of core. Took secondary sample from 4.5 to 5.7 since that is the end of kli sampling section

Field Log Photo



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SEDIMENT SAMPLING LOG SHEET

SITE ID: **OSHVC-17-** A4	VESSEL: DW Hood
DATE: 13 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: Clear	SAMPLING EQUIPMENT: Vibracore,
WIND/SEAS: — / Swell	NAVIGATION TYPE & DATUM: W
TIME: 0940	DESCRIPTION OF MATERIAL MUDLINE
COORDINATES: 33 12.716	
COORDINATES: 117 24.306	
WATER DEPTH: 19.0	
TIDAL STAGE: +2.7	
MUDLINE DEPTH (MLLW): -16.3	
TARGET SAMPLING DEPTH: -22.0	
SAMPLE LENGTH NEEDED: 5.7'	
PENETRATION/RECOVERY: 11.0'/11.1	
CORE INTERVAL SAMPLED: 0-5.7'	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:

OSHVC-17-A-04 0 - 2ft 12/13/2017, 9:40 AM

OSHVC-17-A-04 2 - 4ft 12/13/2017, 9:40 AM

OSHVC-17-A-04 4 - 6ft 12/13/2017, 9:40 AM

OSHVC-17-A-04 6 - 8ft 12/13/2017, 9:40 AM

OSHVC-17-A-04 Fines/Suspect Layer: 4.5 - end

Extra Photos

<<Image 1>>

Oceanside Harbor 2017

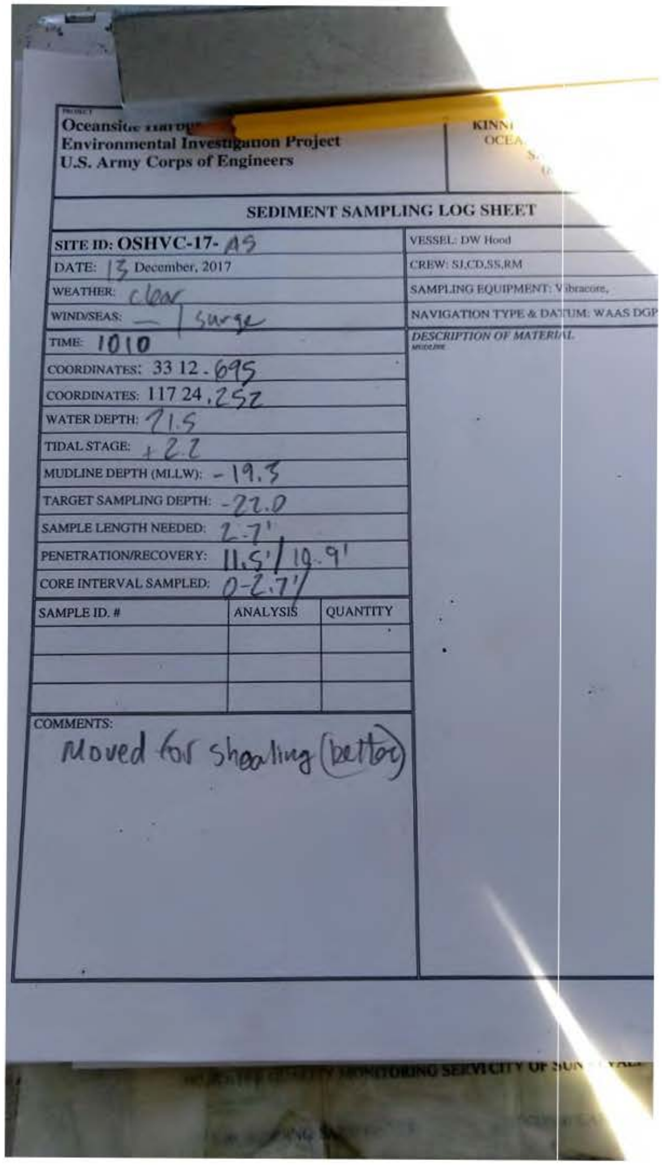
VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-05	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 10:10 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.695
Sea State: Surge	**Longitude:** 117 24.252

Water Depth (ft.): 21.50	**Tidal Stage (+/- ft.):** 2.20
Actual Mudline Elevation (ft. MLLW): -19.30	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 10.90
Core Interval Sampled (ft.): 2.70	
Fines/Suspect Layer? (Y/N):	**If Y, layer interval (ft.):**

Notes: Moved for better shoaling. Small piece of plastic trash at 1.1 feet. Slight sulfur odor. Slight change around 2.7 feet to Sandier material. Not enough to constitute secondary sample.

Field Log Photo



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SEDIMENT SAMPLING LOG SHEET

SITE ID: **OSHVC-17-** A5	VESSEL: DW Hood
DATE: 13 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibracore,
WIND/SEAS: — / surge	NAVIGATION TYPE & DATUM: WAAS DGP...
TIME: 1010	*DESCRIPTION OF MATERIAL*
COORDINATES: 33 12.695	
COORDINATES: 117 24.252	
WATER DEPTH: 21.5	
TIDAL STAGE: +2.2	
MUDLINE DEPTH (MLLW): -19.3	
TARGET SAMPLING DEPTH: -22.0	
SAMPLE LENGTH NEEDED: 2.7'	
PENETRATION/RECOVERY: 11.5' / 10.9'	
CORE INTERVAL SAMPLED: 0-2.7'	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:
Moved for shoaling (better)

OSHVC-17-A-05 0 - 2ft 12/13/2017, 10:10 AM

OSHVC-17-A-05 2 - 4ft 12/13/2017, 10:10 AM

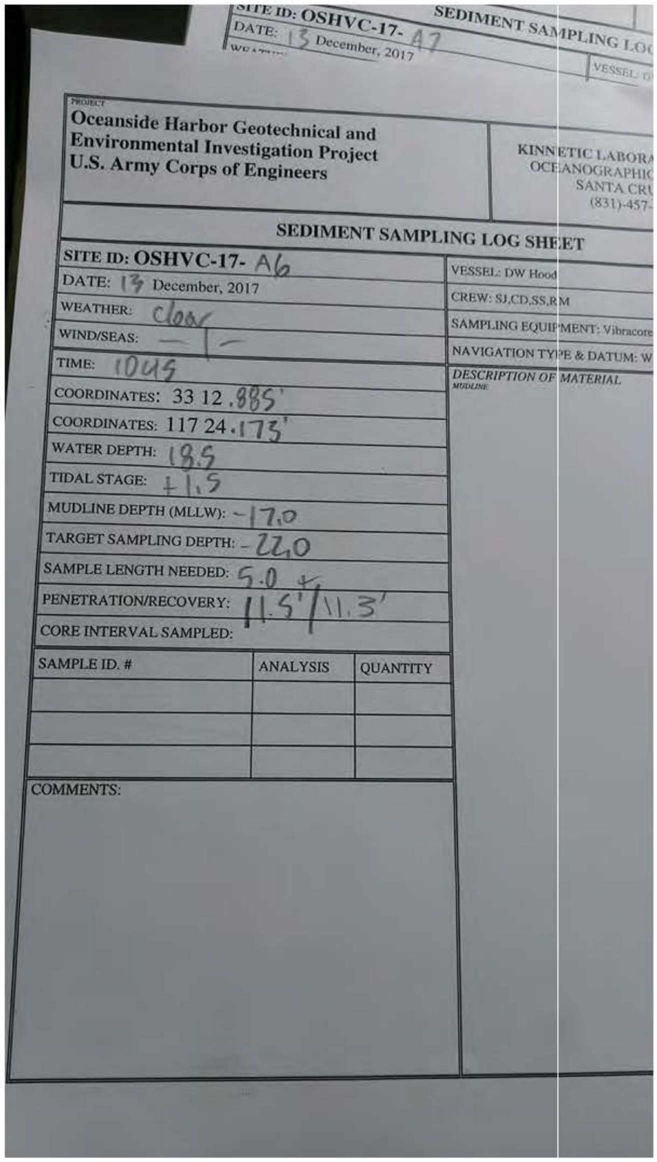
Oceanside Harbor 2017

VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-06	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 10:45 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.885
Sea State:	**Longitude:** 117 24.173
Water Depth (ft.): 18.50	**Tidal Stage (+/- ft.):** 1.50
Actual Mudline Elevation (ft. MLLW): -17.00	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 11.30
Core Interval Sampled (ft.): 5.00	
Fines/Suspect Layer? (Y/N): Y	**If Y, layer interval (ft.):** 3.1 to 5

Notes: Fines layer starting at 3.1 to 5 feet. Secondary sample taken.

Field Log Photo



SITE ID: OSHVC-17- A7
DATE: 13 December, 2017
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VESSEL: D

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SEDIMENT SAMPLING LOG SHEET

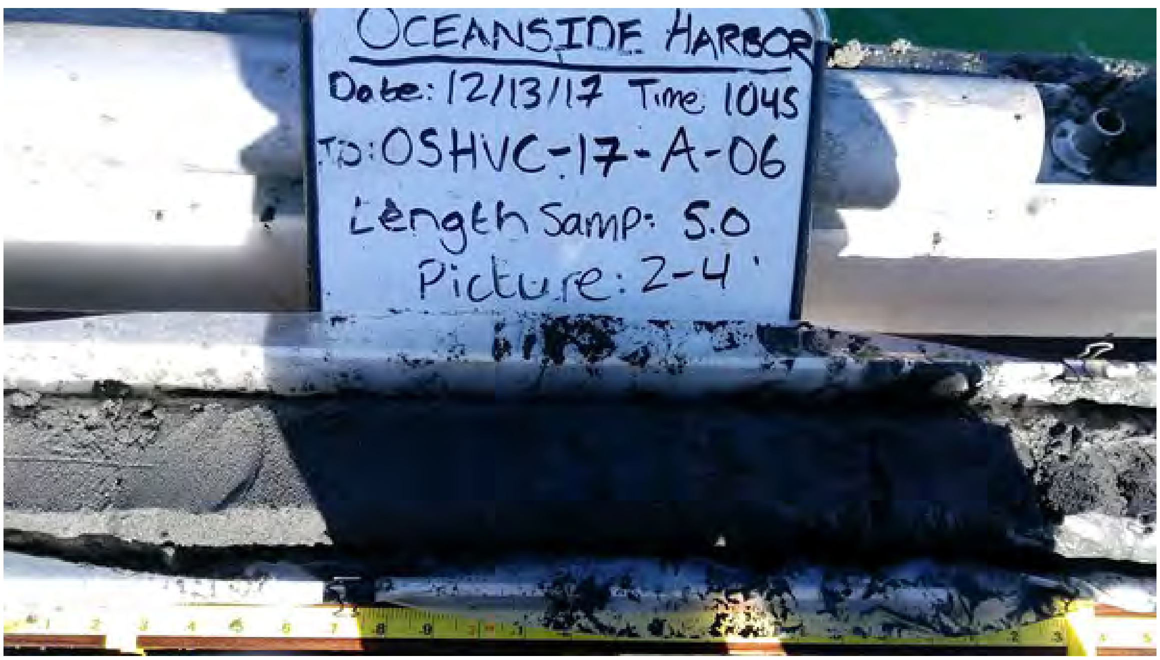
SITE ID: OSHVC-17- A6	VESSEL: DW Hood
DATE: 13 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibracore
WIND/SEAS: — / —	NAVIGATION TYPE & DATUM: W
TIME: 1045	DESCRIPTION OF MATERIAL MUDLINE
COORDINATES: 33 12.885'	
COORDINATES: 117 24.173'	
WATER DEPTH: 18.5	
TIDAL STAGE: +1.5	
MUDLINE DEPTH (MLLW): -17.0	
TARGET SAMPLING DEPTH: - 22.0	
SAMPLE LENGTH NEEDED: 5.0 +	
PENETRATION/RECOVERY: 11.5'/11.3'	
CORE INTERVAL SAMPLED:	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:

OSHVC-17-A-06 0 - 2ft 12/13/2017, 10:45 AM

OSHVC-17-A-06 2 - 4ft 12/13/2017, 10:45 AM



OSHVC-17-A-06 4 - 6ft 12/13/2017, 10:45 AM

OSHVC-17-A-06 6 - 8ft 12/13/2017, 10:45 AM

OSHVC-17-A-06 Fines/Suspect Layer: 3.1 to 5

Extra Photos

<<Image 1>>

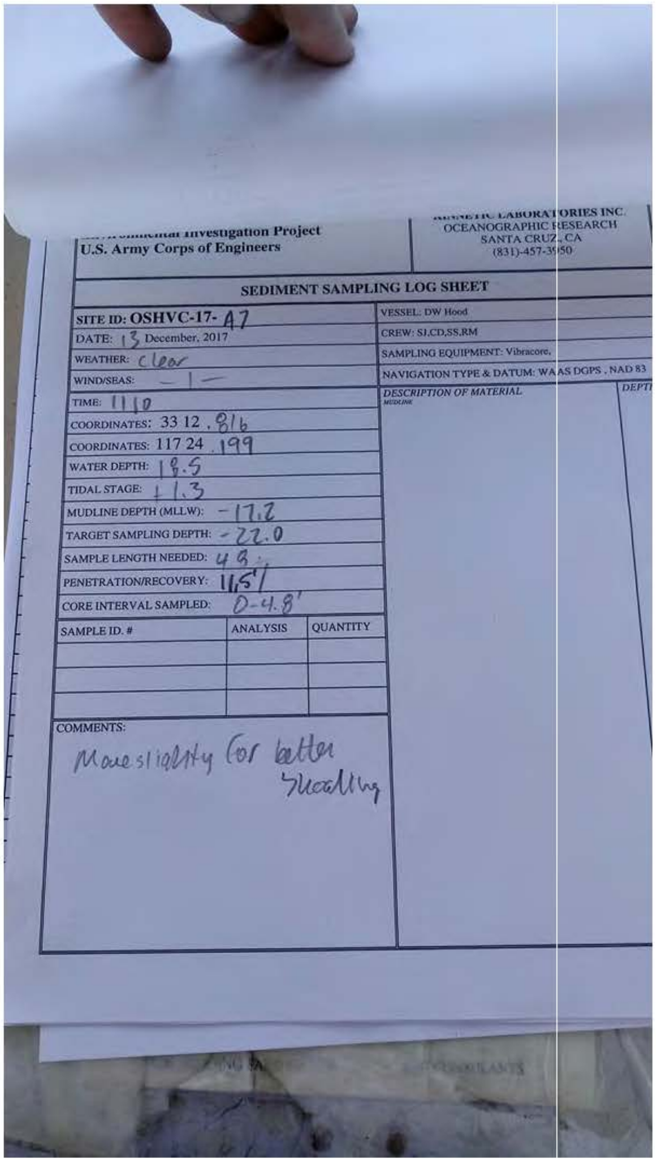
Oceanside Harbor 2017

VIBRACORE LOG SHEET

SITE ID: OSHVC-17-A-07	**Vessel:** D.W. Hood
Date: 12/13/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 11:36 AM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.816
Sea State:	**Longitude:** 117 24.199
Water Depth (ft.): 18.50	**Tidal Stage (+/- ft.):** 1.30
Actual Mudline Elevation (ft. MLLW): -17.20	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 11.10
Core Interval Sampled (ft.): 4.80	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: No secondary sample required. Moved slightly for better shoaling

Field Log Photo



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SEDIMENT SAMPLING LOG SHEET

SITE ID: OSHVC-17- A7	VESSEL: DW Hood
DATE: 13 December, 2017	CREW: SI,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibracore,
WIND/SEAS: — 1 —	NAVIGATION TYPE & DATUM: WAAS DGPS , NAD 83
TIME: 1110	DESCRIPTION OF MATERIAL / MUDLINE
COORDINATES: 33 12 .816	
COORDINATES: 117 24 .199	
WATER DEPTH: 18.5	
TIDAL STAGE: +1.3	
MUDLINE DEPTH (MLLW): -17.2	
TARGET SAMPLING DEPTH: -22.0	
SAMPLE LENGTH NEEDED: 4.8	
PENETRATION/RECOVERY: 11.5'/	
CORE INTERVAL SAMPLED: 0-4.8'	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:
Move slightly for better Shoaling

OSHVC-17-A-07 0 - 2ft 12/13/2017, 11:36 AM

OSHVC-17-A-07 2 - 4ft 12/13/2017, 11:36 AM

OSHVC-17-A-07 4 - 6ft 12/13/2017, 11:36 AM

OSHVC-17-A-07 6 - 8ft 12/13/2017, 11:36 AM

Oceanside Harbor 2017

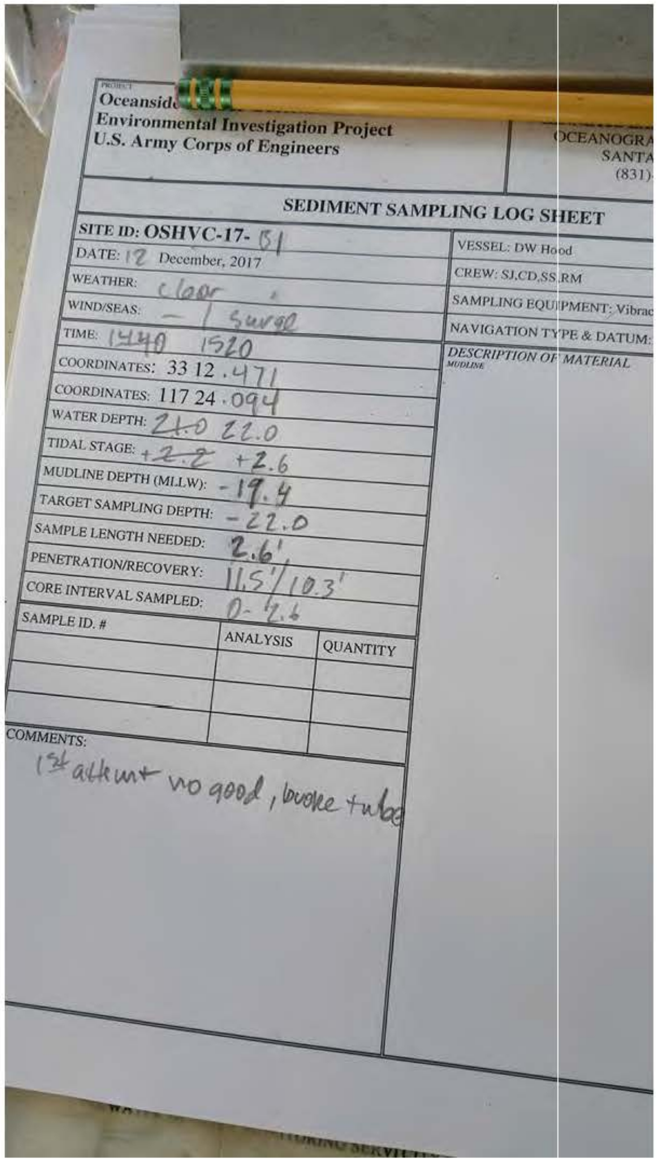
VIBRACORE LOG SHEET

SITE ID: OSHVC-17-B-01	**Vessel:** D.W. Hood
Date: 12/12/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 3:20 PM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.471
Sea State: Swell	**Longitude:** 117 24.094

Water Depth (ft.): 22.00	**Tidal Stage (+/- ft.):** 2.60
Actual Mudline Elevation (ft. MLLW): -19.40	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 10.30
Core Interval Sampled (ft.): 2.60	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: Tube broke on first attempt. Had to repeat. Uniform sand with silt

Field Log Photo



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SANTA[...]
(831)[...]

SEDIMENT SAMPLING LOG SHEET

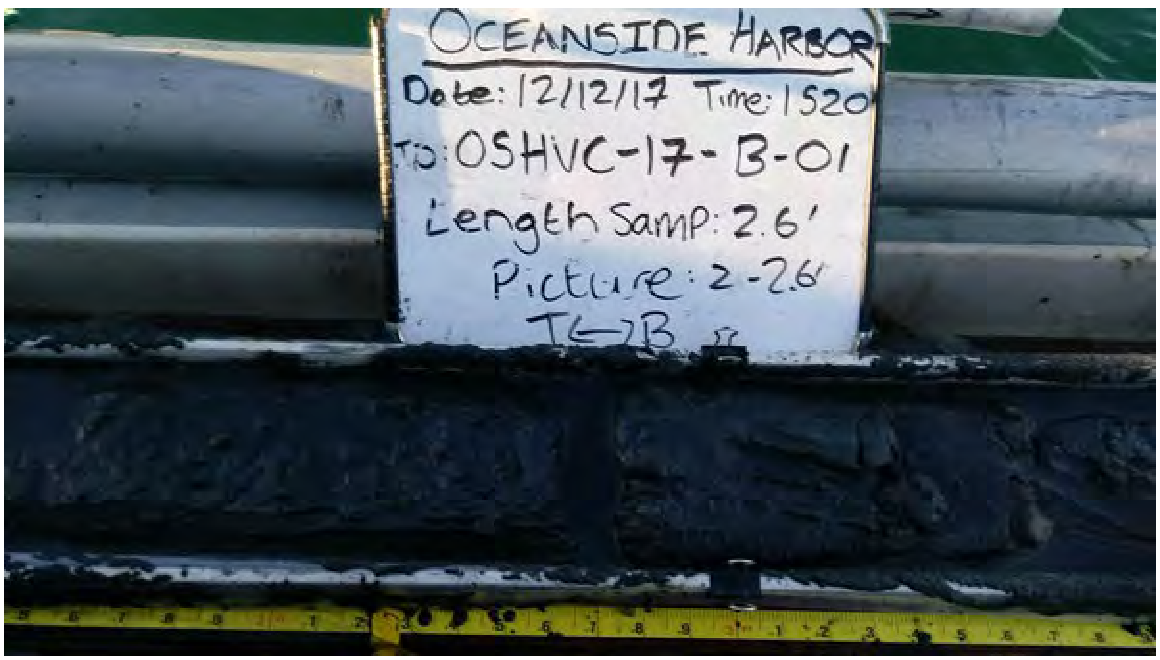
SITE ID: OSHVC-17- B1	VESSEL: DW Hood
DATE: 12 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibrac[...]
WIND/SEAS: — / surge	NAVIGATION TYPE & DATUM:
TIME: ~~1440~~ 1520	DESCRIPTION OF MATERIAL
COORDINATES: 33 12 .471	MUDLINE
COORDINATES: 117 24 .094	
WATER DEPTH: ~~21.0~~ 22.0	
TIDAL STAGE: ~~+2.2~~ +2.6	
MUDLINE DEPTH (MLLW): -19.4	
TARGET SAMPLING DEPTH: -22.0	
SAMPLE LENGTH NEEDED: 2.6'	
PENETRATION/RECOVERY: 11.5'/10.3'	
CORE INTERVAL SAMPLED: 0-2.6	

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:
1st attempt no good, broke tube

OSHVC-17-B-01 0 - 2ft 12/12/2017, 3:20 PM

OSHVC-17-B-01 2 - 4ft 12/12/2017, 3:20 PM



Oceanside Harbor 2017

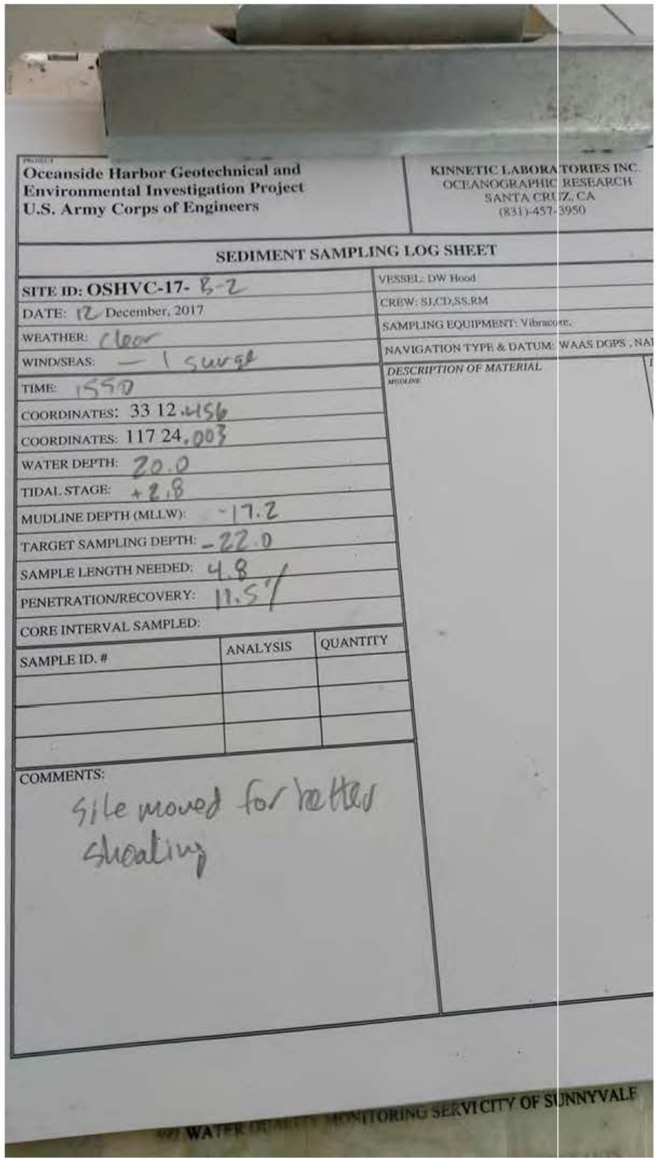
VIBRACORE LOG SHEET

SITE ID: OSHVC-17-B-02	**Vessel:** D.W. Hood
Date: 12/12/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 3:50 PM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.456
Sea State: Swell	**Longitude:** 117 24.003

Water Depth (ft.): 20.00	**Tidal Stage (+/- ft.):** 2.80
Actual Mudline Elevation (ft. MLLW): -17.20	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 10.90
Core Interval Sampled (ft.): 4.80	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: A lot sanded. No fines really. Had to move site due to shoaling

Field Log Photo



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SEDIMENT SAMPLING LOG SHEET

SITE ID: **OSHVC-17-** B-2

DATE: 12 December, 2017

WEATHER: clear

WIND/SEAS: — 1 surge

TIME: 1550

COORDINATES: 33 12.456

COORDINATES: 117 24.003

WATER DEPTH: 20.0

TIDAL STAGE: +2.8

MUDLINE DEPTH (MLLW): -17.2

TARGET SAMPLING DEPTH: -22.0

SAMPLE LENGTH NEEDED: 4.8

PENETRATION/RECOVERY: 11.5' /

CORE INTERVAL SAMPLED:

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:
site moved for better shoaling

VESSEL: DW Hood

CREW: SJ,CD,SS,RM

SAMPLING EQUIPMENT: Vibracore,

NAVIGATION TYPE & DATUM: WAAS DGPS , NA

DESCRIPTION OF MATERIAL
MUDLINE

OSHVC-17-B-02 0 - 2ft 12/12/2017, 3:50 PM

OSHVC-17-B-02 2 - 4ft 12/12/2017, 3:50 PM

OSHVC-17-B-02 4 - 6ft 12/12/2017, 3:50 PM

OSHVC-17-B-02 6 - 8ft 12/12/2017, 3:50 PM

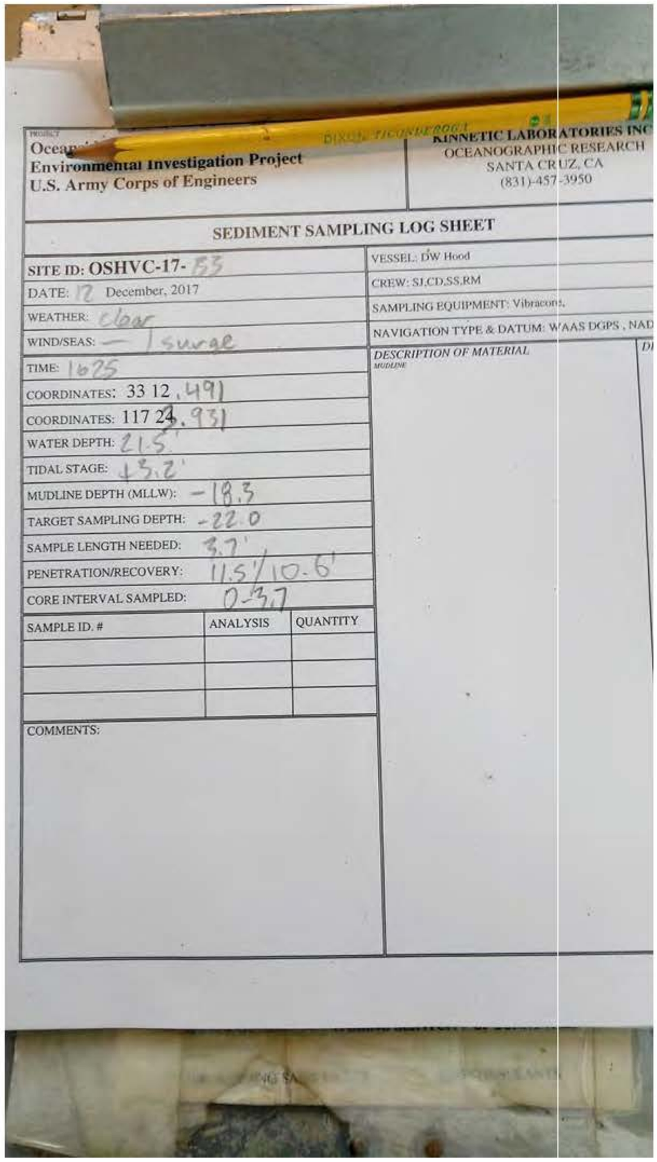
Oceanside Harbor 2017

VIBRACORE LOG SHEET

SITE ID: OSHVC-17-B-03	**Vessel:** D.W. Hood
Date: 12/12/2017	**Crew:** Barnes, Davidson, Johnson, Marquez, Stringer
Time: 4:25 PM	**Sampling Equipment:** KLI Vibracore
Weather: Sunny	**Navigation Equipment:** Garmin GPS
Wind [Speed: Direction:]	**Latitude:** 33 12.491
Sea State: Surge	**Longitude:** 117 23.931
Water Depth (ft.): 21.50	**Tidal Stage (+/- ft.):** 3.20
Actual Mudline Elevation (ft. MLLW): -18.30	**Target Sampling Depth (ft.):** -22.00
Penetration (ft.): 11.50	**Recovery (ft.):** 10.60
Core Interval Sampled (ft.): 3.70	
Fines/Suspect Layer? (Y/N): N	**If Y, layer interval (ft.):**

Notes: Slighr silt content change at .8 feet. Not enough to constitute secondary sample.

Field Log Photo



PROJECT
Ocea[illegible]
Environmental Investigation Project
U.S. Army Corps of Engineers

KINNETIC LABORATORIES INC
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
(831)-457-3950

SEDIMENT SAMPLING LOG SHEET

SITE ID: OSHVC-17- 53	VESSEL: DW Hood
DATE: 12 December, 2017	CREW: SJ,CD,SS,RM
WEATHER: clear	SAMPLING EQUIPMENT: Vibracore
WIND/SEAS: — / surge	NAVIGATION TYPE & DATUM: WAAS DGPS , NAD

TIME: 1625	
COORDINATES: 33 12.491	
COORDINATES: 117 24.931	
WATER DEPTH: 21.5'	
TIDAL STAGE: +3.2'	
MUDLINE DEPTH (MLLW): -18.3	
TARGET SAMPLING DEPTH: -22.0	
SAMPLE LENGTH NEEDED: 3.7'	
PENETRATION/RECOVERY: 11.5'/10.6'	
CORE INTERVAL SAMPLED: 0-3.7	

DESCRIPTION OF MATERIAL
MUDLINE

SAMPLE ID. #	ANALYSIS	QUANTITY

COMMENTS:

OSHVC-17-B-03 0 - 2ft 12/12/2017, 4:25 PM

OSHVC-17-B-03 2 - 4ft 12/12/2017, 4:25 PM

Appendix E

Analytical Laboratory Reports

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Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060-4928

Project: Oceanside Harbor

Date Received: 12/14/17
Work Order: 17-12-1122
Preparation: EPA 3541
Method: EPA 8270C SIM PCB Congeners

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
OSHVC-17-C	**Sample**	**Sediment**	**GC/MS HHH**	**12/19/17**	**12/21/17 23:49**	**171219S07**
OSHVC-17-C	**Matrix Spike**	**Sediment**	**GC/MS HHH**	**12/19/17**	**12/21/17 22:16**	**171219S07**
OSHVC-17-C	**Matrix Spike Duplicate**	**Sediment**	**GC/MS HHH**	**12/19/17**	**12/21/17 22:39**	**171219S07**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
PCB018	ND	50.00	44.75	90	48.93	98	50-150	9	0-25	
PCB028	ND	50.00	55.44	111	59.78	120	50-150	8	0-25	
PCB044	ND	50.00	53.65	107	56.99	114	50-150	6	0-25	
PCB052	ND	50.00	49.49	99	52.43	105	50-150	6	0-25	
PCB066	ND	50.00	64.89	130	69.23	138	50-150	6	0-25	
PCB077	ND	50.00	60.20	120	64.80	130	50-150	7	0-25	
PCB101	ND	50.00	55.72	111	60.03	120	50-150	7	0-25	
PCB105	ND	50.00	61.42	123	67.71	135	50-150	10	0-25	
PCB118	ND	50.00	61.53	123	66.77	134	50-150	8	0-25	
PCB126	ND	50.00	58.80	118	64.48	129	50-150	9	0-25	
PCB128	ND	50.00	56.95	114	62.19	124	50-150	9	0-25	
PCB170	ND	50.00	56.73	113	59.33	119	50-150	4	0-25	
PCB180	ND	50.00	62.57	125	68.47	137	50-150	9	0-25	
PCB187	ND	50.00	62.10	124	67.80	136	50-150	9	0-25	
PCB206	ND	50.00	50.41	101	53.44	107	50-150	6	0-25	

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RPD: Relative Percent Difference.   CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060-4928

Project: Oceanside Harbor

Date Received: 12/14/17
Work Order: 17-12-1122
Preparation: EPA 3550B (M)
Method: Organotins by Krone et al.

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
17-12-0896-1	**Sample**	**Sediment**	**GC/MS Y**	**12/16/17**	**12/20/17 11:54**	**171216S10**
17-12-0896-1	**Matrix Spike**	**Sediment**	**GC/MS Y**	**12/16/17**	**12/19/17 19:34**	**171216S10**
17-12-0896-1	**Matrix Spike Duplicate**	**Sediment**	**GC/MS Y**	**12/16/17**	**12/19/17 19:52**	**171216S10**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	ND	100.0	108.4	108	97.90	98	33-129	10	0-36	
Tributyltin	ND	100.0	62.56	63	50.34	50	34-142	22	0-50	

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RPD: Relative Percent Difference. CL: Control Limits

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

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Quality Control - PDS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3050B
	Method: EPA 6020
Project: Oceanside Harbor	Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
17-12-0896-1	**Sample**	**Sediment**	**ICP/MS 03**	**12/20/17 00:00**	**12/20/17 16:32**	**171220S01**
17-12-0896-1	**PDS**	**Sediment**	**ICP/MS 03**	**12/20/17 00:00**	**12/20/17 16:27**	**171220S01**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Arsenic	0.8605	25.00	26.18	101	75-125	
Cadmium	ND	25.00	26.31	105	75-125	
Chromium	8.826	25.00	34.80	104	75-125	
Copper	1.977	25.00	27.25	101	75-125	
Lead	1.618	25.00	27.92	105	75-125	
Nickel	5.735	25.00	31.49	103	75-125	
Selenium	ND	25.00	26.39	106	75-125	
Silver	ND	12.50	12.97	104	75-125	
Zinc	26.65	25.00	53.15	106	75-125	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: N/A
	Method: EPA 160.4 (M)
Project: Oceanside Harbor	Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
OSHVC-17-A	**Sample**	**Sediment**	**N/A**	**12/19/17 00:00**	**12/19/17 20:00**	**H1219VSD1**
OSHVC-17-A	**Sample Duplicate**	**Sediment**	**N/A**	**12/19/17 00:00**	**12/19/17 20:00**	**H1219VSD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Volatile	0.5600	0.6400	13	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060-4928

Date Received: 12/14/17
Work Order: 17-12-1122
Preparation: N/A
Method: EPA 376.2M

Project: Oceanside Harbor

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
OSHVC-17-A	**Sample**	**Sediment**	**N/A**	**12/18/17 00:00**	**12/18/17 15:37**	**H1218SD2**
OSHVC-17-A	**Sample Duplicate**	**Sediment**	**N/A**	**12/18/17 00:00**	**12/18/17 15:37**	**H1218SD2**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Sulfide, Total	62.50	65.00	4	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.		Date Received:	12/14/17
307 Washington Street		Work Order:	17-12-1122
Santa Cruz, CA 95060-4928		Preparation:	N/A
		Method:	EPA 376.2M
Project: Oceanside Harbor			Page 3 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
OSHVC-17-C	**Sample**	**Sediment**	**N/A**	**12/18/17 00:00**	**12/18/17 14:25**	**H1218DSD1**
OSHVC-17-C	**Sample Duplicate**	**Sediment**	**N/A**	**12/18/17 00:00**	**12/18/17 14:25**	**H1218DSD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Sulfide, Dissolved	ND	ND	N/A	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: N/A
	Method: SM 2540 B (M)
Project: Oceanside Harbor	Page 4 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
OSHVC-17-A	**Sample**	**Sediment**	**N/A**	**12/19/17 00:00**	**12/19/17 18:00**	**H1219TSD2**
OSHVC-17-A	**Sample Duplicate**	**Sediment**	**N/A**	**12/19/17 00:00**	**12/19/17 18:00**	**H1219TSD2**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total	74.20	73.70	1	0-10	

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RPD: Relative Percent Difference.   CL: Control Limits

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Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: N/A
	Method: EPA 1664A (M)
Project: Oceanside Harbor	Page 1 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-929-22	**LCS**	**Solid**	**N/A**	**01/03/18**	**01/03/18 16:30**	**I0103HEML3**
099-16-929-22	**LCSD**	**Solid**	**N/A**	**01/03/18**	**01/03/18 16:30**	**I0103HEML3**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM: Oil and Grease	40.00	36.62	92	33.30	83	78-114	9	0-18	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: N/A
	Method: EPA 1664A (M)
Project: Oceanside Harbor	Page 2 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-931-13	**LCS**	**Solid**	**N/A**	**01/03/18**	**01/03/18 18:00**	**I0103HEML4**
099-16-931-13	**LCSD**	**Solid**	**N/A**	**01/03/18**	**01/03/18 18:00**	**I0103HEML4**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
HEM - SGT: Oil and Grease	20.00	16.64	83	16.65	83	64-132	0	0-34	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060-4928

Date Received: 12/14/17
Work Order: 17-12-1122
Preparation: N/A
Method: EPA 376.2M

Project: Oceanside Harbor

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-352-155	**LCS**	**Solid**	**N/A**	**12/18/17**	**12/18/17 15:37**	**H1218SL2**
099-16-352-155	**LCSD**	**Solid**	**N/A**	**12/18/17**	**12/18/17 15:37**	**H1218SL2**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Sulfide, Total	1.000	0.8000	80	0.8500	85	80-120	6	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.		Date Received:	12/14/17
307 Washington Street		Work Order:	17-12-1122
Santa Cruz, CA 95060-4928		Preparation:	N/A
		Method:	EPA 376.2M
Project: Oceanside Harbor			Page 4 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-354-85	**LCS**	**Solid**	**N/A**	**12/18/17**	**12/18/17 14:25**	**H1218DSL1**
099-16-354-85	**LCSD**	**Solid**	**N/A**	**12/18/17**	**12/18/17 14:25**	**H1218DSL1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Sulfide, Dissolved	1.000	0.8500	85	0.9000	90	80-120	6	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: N/A
	Method: SM 4500-NH3 B/C (M)
Project: Oceanside Harbor	Page 5 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-816-173	**LCS**	**Solid**	**BUR12**	**12/19/17**	**12/19/17 15:20**	**H1219NH3L3**
099-12-816-173	**LCSD**	**Solid**	**BUR12**	**12/19/17**	**12/19/17 15:20**	**H1219NH3L3**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Ammonia (as N)	10.00	8.960	90	9.100	91	80-120	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3541
	Method: EPA 8270D (M)/TQ/EI
Project: Oceanside Harbor	Page 6 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-403-139	**LCS**	**Solid**	**GCTQ 2**	**12/18/17**	**12/23/17 04:57**	**171218L05**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Allethrin	5.000	6.927	139	10-148	0-171	
Bifenthrin	5.000	6.113	122	26-128	9-145	
Cyfluthrin	5.000	3.848	77	10-131	0-151	
Cypermethrin	5.000	3.851	77	10-136	0-157	
Deltamethrin/Tralomethrin	5.000	4.596	92	13-190	0-220	
Fenpropathrin	5.000	4.951	99	10-148	0-171	
Fenvalerate/Esfenvalerate	5.000	4.447	89	10-149	0-172	
Fluvalinate	5.000	1.578	32	10-121	0-140	
Permethrin (cis/trans)	5.000	6.931	139	45-123	32-136	X
Phenothrin	5.000	6.646	133	45-165	25-185	
Resmethrin/Bioresmethrin	5.000	6.257	125	38-164	17-185	
Tetramethrin	5.000	5.988	120	15-153	0-176	
lambda-Cyhalothrin	5.000	3.503	70	10-123	0-142	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3050B
	Method: EPA 6020
Project: Oceanside Harbor	Page 7 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-254-559	**LCS**	**Solid**	**ICP/MS 03**	**12/20/17**	**12/20/17 16:20**	**171220L01E**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Arsenic	25.00	25.10	100	80-120	
Cadmium	25.00	25.94	104	80-120	
Chromium	25.00	26.26	105	80-120	
Copper	25.00	26.64	107	80-120	
Lead	25.00	26.02	104	80-120	
Nickel	25.00	26.16	105	80-120	
Selenium	25.00	25.39	102	80-120	
Silver	12.50	12.72	102	80-120	
Zinc	25.00	26.80	107	80-120	

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RPD: Relative Percent Difference.   CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 7471A Total
	Method: EPA 7471A
Project: Oceanside Harbor	Page 8 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-278-357	**LCS**	**Solid**	**Mercury 07**	**12/20/17**	**12/20/17 14:32**	**171220L01A**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.8350	0.8120	97	82-124	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.		Date Received:	12/14/17
307 Washington Street		Work Order:	17-12-1122
Santa Cruz, CA 95060-4928		Preparation:	EPA 3541
		Method:	EPA 8081A
Project: Oceanside Harbor			Page 9 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-824-9	**LCS**	**Solid**	**GC 44**	**12/18/17**	**12/20/17 21:14**	**171218L09**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chlordane	50.00	33.73	67	50-135	
Toxaphene	100.0	82.44	82	50-135	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3545
	Method: EPA 8270C Bisphenol
Project: Oceanside Harbor	Page 10 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-401-19	**LCS**	**Solid**	**GC/MS JJJ**	**12/16/17**	**12/19/17 09:45**	**171216L04**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Bisphenol A	100.0	76.52	77	50-150	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060-4928

Date Received: 12/14/17
Work Order: 17-12-1122
Preparation: EPA 3541
Method: EPA 8270C PEST-SIM

Project: Oceanside Harbor

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-154-86	**LCS**	**Solid**	**GC/MS BBB**	**12/18/17**	**12/20/17 20:19**	**171218L10**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Aldrin	5.000	4.387	88	25-200	0-229	
Alpha Chlordane	5.000	4.564	91	25-200	0-229	
Alpha-BHC	5.000	4.244	85	25-200	0-229	
Beta-BHC	5.000	4.537	91	25-200	0-229	
4,4'-DDD	5.000	4.760	95	25-200	0-229	
4,4'-DDE	5.000	5.067	101	25-200	0-229	
4,4'-DDT	5.000	4.973	99	25-200	0-229	
Delta-BHC	5.000	4.462	89	25-200	0-229	
Dieldrin	5.000	4.790	96	25-200	0-229	
Endosulfan I	5.000	4.690	94	25-200	0-229	
Endosulfan II	5.000	4.430	89	25-200	0-229	
Endosulfan Sulfate	5.000	4.483	90	25-200	0-229	
Endrin	5.000	4.055	81	25-200	0-229	
Endrin Aldehyde	5.000	3.481	70	25-200	0-229	
Endrin Ketone	5.000	4.579	92	25-200	0-229	
Gamma Chlordane	5.000	4.433	89	25-200	0-229	
Gamma-BHC	5.000	4.308	86	25-200	0-229	
Heptachlor	5.000	4.446	89	25-200	0-229	
Heptachlor Epoxide	5.000	4.452	89	25-200	0-229	
Methoxychlor	5.000	4.901	98	25-200	0-229	

Total number of LCS compounds: 20
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

eurofins Calscience

Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3541
	Method: EPA 8270C SIM
Project: Oceanside Harbor	Page 12 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-256-199	**LCS**	**Solid**	**GC/MS MM**	**12/19/17**	**12/22/17 15:56**	**171219L08**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
2,4,6-Trichlorophenol	1000	1038	104	40-160	20-180	
2,4-Dichlorophenol	1000	983.0	98	40-160	20-180	
2-Methylphenol	1000	1051	105	40-160	20-180	
2-Nitrophenol	1000	912.1	91	40-160	20-180	
4-Chloro-3-Methylphenol	1000	1057	106	40-160	20-180	
Acenaphthene	1000	1023	102	48-108	38-118	
Benzo (a) Pyrene	1000	1101	110	17-163	0-187	
Chrysene	1000	1045	105	17-168	0-193	
Di-n-Butyl Phthalate	1000	1102	110	40-160	20-180	
Dimethyl Phthalate	1000	1047	105	40-160	20-180	
Fluoranthene	1000	1131	113	26-137	8-156	
Fluorene	1000	1031	103	59-121	49-131	
Naphthalene	1000	980.4	98	21-133	2-152	
Phenanthrene	1000	1132	113	54-120	43-131	
Phenol	1000	1012	101	40-160	20-180	
Pyrene	1000	1021	102	28-106	15-119	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.		Date Received:	12/14/17
307 Washington Street		Work Order:	17-12-1122
Santa Cruz, CA 95060-4928		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Oceanside Harbor			Page 13 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-418-280	**LCS**	**Solid**	**GC/MS HHH**	**12/19/17**	**12/21/17 21:53**	**171219L07**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
PCB018	50.00	45.96	92	24-132	6-150	
PCB028	50.00	57.62	115	31-133	14-150	
PCB044	50.00	54.54	109	36-120	22-134	
PCB052	50.00	50.52	101	31-121	16-136	
PCB066	50.00	66.36	133	43-139	27-155	
PCB077	50.00	62.68	125	41-131	26-146	
PCB101	50.00	57.42	115	37-121	23-135	
PCB105	50.00	64.56	129	48-132	34-146	
PCB118	50.00	62.97	126	46-136	31-151	
PCB126	50.00	61.08	122	38-134	22-150	
PCB128	50.00	58.47	117	40-130	25-145	
PCB170	50.00	57.77	116	40-124	26-138	
PCB180	50.00	64.30	129	41-143	24-160	
PCB187	50.00	63.47	127	39-129	24-144	
PCB206	50.00	52.97	106	33-135	16-152	

Total number of LCS compounds: 15
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Kinnetic Laboratories, Inc.	Date Received: 12/14/17
307 Washington Street	Work Order: 17-12-1122
Santa Cruz, CA 95060-4928	Preparation: EPA 3550B (M)
	Method: Organotins by Krone et al.
Project: Oceanside Harbor	Page 14 of 14

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-07-016-1548	**LCS**	**Solid**	**GC/MS Y**	**12/16/17**	**12/19/17 19:17**	**171216L10**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Tetrabutyltin	100.0	65.70	66	40-142	
Tributyltin	100.0	51.65	52	33-147	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 17-12-1122 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Chain of Custody Record

To:		From:
Eurofins Calscience, Inc. 7440 Lincoln Way Garden Grove, CA 92841 Phone: (714) 895-5494 Contact: Kathy Burney	Date Received: Lab #:	Kinnetic Laboratories, Inc 307 Washington St. Santa Cruz, CA 95060 (831) 457-3950 (831) 426-0405 Fax Contact: Amy Howk

17-12-1122

Project: Oceanside Harbor **Matrix:** Sediment **Project #:** 5815.01

Complete by: 10-day TAT

SampleID	StationID	Sample Date	Sample Time	Sample Type	Analysis	Container	Pres	No. of Containers	LabID	Condition Upon Receipt
OSHVC-17-A	Del Mar Channel (Area A)	12/13/17	0815	Comp	Bulk Chemistry*	32-oz WMGJ	4° C	1	1	
OSHVC-17-B	Oceanside Channel (Area B)	12/12/17	1520	Comp	Bulk Chemistry*	32-oz WMGJ	4° C	1	2	
OSHVC-17-C	Entrance Channel (Area C)	12/12/17	0835	Comp	Bulk Chemistry*	32-oz WMGJ	4° C	1	3	

Data Report MUST include the following: Sample ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer. All times on this sheet are military time. Submit all PDF/EDD reports to edd@kinneticlabs.net. *Reference project SAP for required QA/QC, methods, RLs, etc. Reference quote #963994.*

Special Instructions/Comments: *See attached Table 9 for analyses and required detection limits. Bulk Chem. includes: NH_3, % Solids, TOC, TVS, Total & Dissolved Sulfides, O&G, TRPH, Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn), OC Pesticides (incl. cis-Nonachlor), Pyrethroids, Organotins, Phthalates, Phenols (incl. Bisphenol-A), PAHs and PCB Congeners. Report on a dry weight basis.

Sampled and Relinquished By:	Date/Time:	Transporter	Received By:	Date/Time:
[signature]	12/14/17 0838	KLI	[signature]	12/14/17 0838
Relinquished By:	**Date/Time:**	**Transporter**	**Received By:**	**Date/Time:**

v20020904

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WORK ORDER NUMBER: 17-12-1122

SAMPLE RECEIPT CHECKLIST

COOLER 1 **OF** 1

CLIENT: Kinnetic **DATE:** 12/14/2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)
Thermometer ID: SC6 (CF: -0.4°C); Temperature (w/o CF): 2.4 °C (w/ CF): 2.0 °C; ☐ Blank ☑ Sample
☐ Sample(s) outside temperature criteria (PM/APM contacted by: ________)
☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
☐ Sample(s) received at ambient temperature; placed on ice for transport by courier
Ambient Temperature: ☐ Air ☐ Filter Checked by: 15

CUSTODY SEAL:

Cooler	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 15
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 836

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	☐	☐	☑
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: **(Trip Blank Lot Number: ________________)**

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna₂ ☐ 100PJ ☐ 100PJna₂ ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna (pH__9) ☐ 250AGB ☐ 250CGB ☐ 250CGBs (pH__2) ☐ 250PB ☐ 250PBn (pH__2) ☐ 500AGB ☐ 500AGJ ☐ 500AGJs (pH__2) ☐ 500PB ☐ 1AGB ☐ 1AGBna₂ ☐ 1AGBs (pH__2) ☐ 1AGBs (O&G) ☐ 1PB ☐ 1PBna (pH__12) ☐ ________ ☐ ________ ☐ ________

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (___) ☐ EnCores® (___) ☐ TerraCores® (___) ☑ ________ ☐ ________ ☐ ________

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ ________ **Other Matrix** (Sediment): ☑ 1CGJ ☐ ________ ☐ ________

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na₂** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 836
Reviewed by: 728

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Subcontractor Analysis Report

Work Order: 17-12-1122 Page 1 of 1

One or more samples in this work order have tests that were subcontracted. The subcontract report(s) follows.

For subcontracted tests, please reference the laboratory information noted below.

1. McCampbell Analytical, Inc. - Pittsburg,CA CA ELAP 1644
   TOC

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McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1712948 **Amended:** 01/02/2018

Report Created for: Eurofins Calscience, Inc.

7440 Lincoln Way
Garden Grove, CA 92841

Project Contact: Carla Hollowell
Project P.O.:
Project: 17-12-1122; Oceanside Harbor

Project Received: 12/20/2017

Analytical Report reviewed & approved for release on 12/27/2017 by:

Christine Askari
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

NELAP ACCREDITED TNI LABORATORY

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1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
CA ELAP 1644 ♦ NELAP 4033 ORELAP

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Eurofins Calscience, Inc.
Project: 17-12-1122; Oceanside Harbor
WorkOrder: 1712948

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Eurofins Calscience, Inc.	**WorkOrder:**	1712948
Date Received:	12/20/17 9:28	**Extraction Method:**	SW9060A
Date Prepared:	12/22/17	**Analytical Method:**	SW9060A
Project:	17-12-1122; Oceanside Harbor	**Unit:**	wt %-dry

Total Organic Carbon (TOC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OSHVC-17-A	**1712948-001A**	**Soil**	**12/13/2017 08:15**	**WC_CNS F122217-1_1710_**	**150715**

Analytes	Result	MDL	RL	DF	Date Analyzed
TOC	**0.22**	0.030	0.030	1	12/22/2017 13:06

Analyst(s): RB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OSHVC-17-B	**1712948-002A**	**Soil**	**12/12/2017 15:20**	**WC_CNS F122217-1_1710_**	**150715**

Analytes	Result	MDL	RL	DF	Date Analyzed
TOC	**0.28**	0.030	0.030	1	12/22/2017 13:19

Analyst(s): RB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OSHVC-17-C	**1712948-003A**	**Soil**	**12/12/2017 08:35**	**WC_CNS F122217-1_1710_**	**150715**

Analytes	Result	MDL	RL	DF	Date Analyzed
TOC	**0.11**	0.030	0.030	1	12/22/2017 13:30

Analyst(s): RB

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Quality Control Report

Client:	Eurofins Calscience, Inc.	**WorkOrder:**	1712948
Date Prepared:	12/22/17	**BatchID:**	150715
Date Analyzed:	12/22/17	**Extraction Method:**	SW9060A
Instrument:	WC_CNS	**Analytical Method:**	SW9060A
Matrix:	Soil	**Unit:**	mg/kg
Project:	17-12-1122; Oceanside Harbor	**Sample ID:**	MB/LCS/LCSD-150715

QC Summary Report for SW9060A

Analyte	MB Result	MDL	RL			
TOC	ND	200	200	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TOC	8110	8170	8200	99	100	80-120	0.682	20

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McCampbell Analytical, Inc.

1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1712948 **ClientCode: CSEL** **QuoteID: 8189**

☐ WaterTrax ☐ WriteOn ☐ EDF ☑ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Carla Hollowell
Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841
(714) 895-5494 FAX: (714) 894-7501

Email: carlahollowell@eurofinsUS.com
cc/3rd Party:
PO:
Project: 17-12-1122; Oceanside Harbor

Bill to:
Accounts Payable
Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841
CynthiaChen@eurofinsUS.com; US26_

Requested TAT: 5 days;

Date Received: 12/20/2017
Date Logged: 12/20/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1712948-001	OSHVC-17-A	Soil	12/13/2017 08:15	☐	A											
1712948-002	OSHVC-17-B	Soil	12/12/2017 15:20	☐	A											
1712948-003	OSHVC-17-C	Soil	12/12/2017 08:35	☐	A											

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Test Legend:

1	cnsTOC_S	2		3		4	
5		6		7		8	
9		10		11		12	

Prepared by: Nancy Palacios

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: EUROFINS CALSCIENCE, INC. **Project:** 17-12-1122; Oceanside Harbor **Work Order:** 1712948
Client Contact: Carla Hollowell **QC Level:**
Contact's Email: carlahollowell@eurofinsUS.com **Comments:** **Date Logged:** 12/20/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☑ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1712948-001A	OSHVC-17-A	Soil	SW9060A (TOC)	1	4OZ GJ, Unpres	☐	12/13/2017 8:15	5 days		☐	
1712948-002A	OSHVC-17-B	Soil	SW9060A (TOC)	1	4OZ GJ, Unpres	☐	12/12/2017 15:20	5 days		☐	
1712948-003A	OSHVC-17-C	Soil	SW9060A (TOC)	1	4OZ GJ, Unpres	☐	12/12/2017 8:35	5 days		☐	

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NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

eurofins Calscience

1712948

MCCAMPBELL PITTSBURG

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY

DATE: 12/19/17

PAGE: 1 OF 1

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
For courier service / sample drop off information, contact us26_sales@eurofinsus.com or call us.

LABORATORY CLIENT: EUROFINS CALSCIENCE

ADDRESS:

CITY: GARDEN GROVE STATE: ZIP:

TEL: E-MAIL: carlahollowell@eurofinsus.com

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS: Please J Flag results

Normal 5 day TAT (per Quote # 8189)
Please provide DMMO EDD ; Please report in %;
We will supply Total Solids value for dry weight calc

CLIENT PROJECT NAME / NUMBER: 17-12-1122 / Oceanside Harbor

P.O. NO.:

PROJECT CONTACT: CARLA LEE HOLLOWELL

SAMPLER(S): (PRINT)

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☐ TPH(g) ☐ GRO	☐ TPH(d) ☐ DRO	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☐ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM	T22 Metals ☐ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6	TOC / EPA 9060			ECI SAMPLE NUMBER
	OSHVC-17-A	12/13/17	815	SED	1	X																	X			1
	OSHVC-17-B	12/12/17	1520	SED	1	X																	X			2
	OSHVC-17-C	12/12/17	835	SED	1	X																	X			3

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
[signature]	GSO 538817570	12/19/17	1530
Relinquished by: (Signature)	Received by: (Signature/Affiliation) Nancy Palacios	Date: 12/20/17	Time: 0928
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

2.2 WET

06/02/14 Revision

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1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**Eurofins Calscience, Inc.**	Date and Time Received	**12/20/2017 09:28**
Project:	**17-12-1122; Oceanside Harbor**	Date Logged:	**12/20/2017**
		Received by:	Nancy Palacios
WorkOrder №:	**1712948** Matrix: Soil	Logged by:	Nancy Palacios
Carrier:	Golden State Overnight		

Chain of Custody (COC) Information

	Yes	No	NA
Chain of custody present?	✔		
Chain of custody signed when relinquished and received?	✔		
Chain of custody agrees with sample labels?	✔		
Sample IDs noted by Client on COC?	✔		
Date and Time of collection noted by Client on COC?	✔		
Sampler's name noted on COC?		✔	
COC agrees with Quote?	✔		☐

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	✔		☐
Shipping container/cooler in good condition?	✔		
Samples in proper containers/bottles?	✔		
Sample containers intact?	✔		
Sufficient sample volume for indicated test?	✔		

Sample Preservation and Hold Time (HT) Information

	Yes	No	NA
All samples received within holding time?	✔		☐
Sample/Temp Blank temperature	Temp: 2.2°C		☐
Water - VOA vials have zero headspace / no bubbles?			✔
Sample labels checked for correct preservation?	✔		
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?			✔
Samples Received on Ice?	✔		

(Ice Type: WET ICE)

UCMR Samples:

	Yes	No	NA
Total Chlorine tested and acceptable upon receipt for EPA 522?			✔
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?			✔

Comments:

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Appendix F

Sediment Logs

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Key to Logs

Elevation, feet	Depth, feet	SAMPLES Type	Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Dry Density, pcf	Dry Density, pcf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to NAVD88 or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Penetration Rate:** Vibracore sampler penetration rate in Minutes/foot.

6 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

7 **Material Description:** Description of material encountered; may include relative density/consistency, moisture, color, particle size; texture, weathering, and strength of formation material. If shown, designation in parentheses denotes Munsell color classification.

8 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

9 **Dry Unit Weight:** Dry unit weight of soil sample measured in laboratory, in pounds per cubic foot.

10 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel.

SA Sieve analysis, %<#200 sieve
WA Three-point wash sieve, %<#200 sieve
LL Liquid limit (from Atterberg limits test), %
PI Plasticity Index [LL - PL], %; NP=nonplastic
HYD Hydrometer Analysis

TYPICAL MATERIAL GRAPHIC SYMBOLS

Poorly-graded SAND (SP)

Poorly-graded SAND with silt (SP-SM)

Silty SAND (SM)

SILT (ML)

Clay (CL)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Grab sample from core for laboratory analysis

Core Sampler

OTHER GRAPHIC SYMBOLS

Minor change in material properties within a stratum

Geologic contact between soil strata

Project overdepth elevation and bottom of bulk chemistry sample

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.
3. Boring location coordinates were taken with a Garmin GPSMAP 840xs Chartplotter/Sonar w/ transducer port. Map datum NAD83.

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-A-01

Date(s) Drilled	12/13/2017	Logged By	A. Avakian	Checked By	D. Schug
Sampler Method	Vibracore	Drill Bit Size/Type	4" Core Barrel	Penetration (feet)	12.0 feet
Drill Rig Type	Boat Supported Vibracore (DW Hood)	Drilling Contractor	KLI	Approximate Mudline Elevation	-18.8 MLLW
Water Depth (feet)	23.5	Sampling Method(s)	Continuous Core and Grab Samples From Core	Recovered Core Length (feet)	11.3
Tidal Stage (feet)	+4.7 MLLW	Location	N 33° 12.505' W 117° 24.224' Map Datum NAD83		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, very dark gray, interbedded silty SAND (SM) and sandy SILT (ML)			
			1				36		SA(14)
-20									--- Design Depth (-20 ft MLLW)
	2					Wet, very dark gray, silty SAND (SM), trace shells			
			2				42		SA(24), LL(29), PI(0)
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
	4								
						Wet, dark gray, poorly-graded SAND (SP), micaceous			
-25	6								
						becomes finer grained			
	8		3				33		SA(5)
	10								
-30				0.15					
	12					Bottom of boring at 12.0 feet below mudline			
	14								
-35	16								
	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-A-02

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-19.6 MLLW**
Water Depth (feet)	**23.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.4**
Tidal Stage (feet)	**+3.9 MLLW**	Location	**N 33° 12.546' W 117° 24.186' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
-20	0					**Harbor Channel Sediments** Wet, very dark gray to black, silty SAND (SM), few organics, moderate organic odor			--- Design Depth (-20 ft MLLW)
			1				44		HYD(47)
	2					***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-22 ft MLLW)
						decrease fines content			
	4					3-inch thick interbed of sandier material			
-25			2				41		SA(26), LL(28), PI(0)
	6					interbed of sandier material			
						Wet, dark gray, poorly graded SAND with silt (SP-SM), micaceous			
	8								
			3				36		SA(9)
-30	10								
				0.14					
	12					Bottom of boring at 12.0 feet below mudline			
	14								
-35	16								
	18								
	20								

AECOM

Figure F-3

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-A-03

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-16.4 MLLW**
Water Depth (feet)	**19.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.6**
Tidal Stage (feet)	**+3.1 MLLW**	Location	**N 33° 12.627' W 117° 24.302' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, poorly graded SAND (SP), micaceous			
			1				31		SA(3)
	2								
							29		SA(5)
-20			2						--- Design Depth (-20 ft MLLW)
	4					2-inch SILT (ML) interbed			
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
	6								
			3				30		SA(5)
	8		4			SILT (ML) interbed	51		SA(50)
-25									
	10								
				0.18					
	12					Bottom of boring at 12.0 feet below mudline. Moved slightly from original location to find more shoaled area.			
-30	14								
	16								
-35	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-A-04

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-16.3 MLLW**
Water Depth (feet)	**19.0**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.1**
Tidal Stage (feet)	**+2.7 MLLW**	Location	**N 33° 12.716' W 117° 24.306' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					<u>Harbor Channel Sediments</u> Wet, gray, poorly graded SAND (SP), micaceous			
	2		1				29		SA(2)
-20	4								--- Design Depth (-20 ft MLLW)
			2			Wet, very dark gray, poorly graded SAND with silt (SP-SM), micaceous	32		SA(12)
						<u>Project Overdepth / Bottom of Bulk Chemistry Sample</u>			--- Overdepth (-22 ft MLLW)
	6								
	8					2-inch silty SAND (SM) interbed			
-25			3			coloration lightens 2" thick silty SAND (SM) interbed	29		SA(11)
	10					2" thick SILT (ML) interbed			
				0.11					
						Bottom of boring at 11.0 feet below mudline			
	12								
-30	14								
	16								
	18								
-35									
	20								

AECOM

Figure F-5

Project: Oceanside Harbor Dredge Analysis - USACE **Project Location: Oceanside, CA** **Project Number: 60555449**	**Log of Boring OSHVC-17-A-05** Sheet 1 of 1

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-19.3 MLLW**
Water Depth (feet)	**21.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.8**
Tidal Stage (feet)	**+2.2 MLLW**	Location	**N 33° 12.695' W 117° 24.252' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0		1			**Harbor Channel Sediments** Wet, very dark gray, poorly graded SAND with silt (SP-SM), micaceous	28		SA(6)
-20						Wet, very dark gray to black, silty SAND (SM), trace trash, slight organic odor			--- Design Depth (-20 ft MLLW)
			2			← trash deposit	36		HYD(15), LL(30), PI(1)
	2								
						Wet, dark gray, poorly graded SAND with silt (SP-SM) ***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-22 ft MLLW)
			3				34		SA(7)
	4					Wet, gray, poorly graded SAND (SP), micaceous			
-25	6								
			4				27		SA(4)
	8					← 1-foot thick shell bed			
						Wet, dark gray, silty SAND (SM), trace shells			
	10		5				29		SA(15)
-30				0.19					
						Bottom of boring at 11.0 feet below mudline. Moved slightly from original location to find more shoaled area.			
	12								
	14								
-35	16								
	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-A-06

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.5 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-17.0 MLLW**
Water Depth (feet)	**18.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.3**
Tidal Stage (feet)	**+1.5 MLLW**	Location	**N 33° 12.885' W 117° 24.173' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, poorly graded SAND (SP), micaceous			
	2		1				28		SA(3)
-20									--- Design Depth (-20 ft MLLW)
	4		2			Wet, dark gray, clayey SAND (SC)	38		HYD(41), LL(36), PI(13)
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
	6		3			Wet, dark gray, poorly graded SAND with silt (SP-SM), micaceous	35		SA(11)
						Wet, gray, poorly graded SAND (SP)			
-25	8								
			4			Shell bed	29		SA(4)
	10								
				0.16					
	12					Bottom of boring at 11.5 feet below mudline			
-30									
	14								
	16								
-35	18								
	20								

Project: Oceanside Harbor Dredge Analysis - USACE Project Location: Oceanside, CA Project Number: 60555449	**Log of Boring OSHVC-17-A-07** Sheet 1 of 1

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.5 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-17.2 MLLW**
Water Depth (feet)	**18.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.1**
Tidal Stage (feet)	**+1.3 MLLW**	Location	**N 33° 12.816' W 117° 24.199' Map Datum NAD83**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, poorly graded SAND (SP), micaceous			
			1				29		SA(4)
	2								
-20									--- Design Depth (-20 ft MLLW)
			2				29		SA(3)
	4								
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
						becomes gray			
	6								
-25	8					very thin interbeds of SILT (ML) material coarsens (mostly fine to medium sand)			
			3				22		SA(2)
	10								
				0.17					
	12					Bottom of boring at 11.5 feet below mudline. Moved slightly from original location for more shoaled area.			
-30									
	14								
	16								
-35	18								
	20								

Project: Oceanside Harbor Dredge Analysis - USACE **Project Location: Oceanside, CA** **Project Number: 60555449**	**Log of Boring OSHVC-17-B-01** Sheet 1 of 1

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-19.4 MLLW**
Water Depth (feet)	**22.0**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.3**
Tidal Stage (feet)	**+2.6 MLLW**	Location	**N 33° 12.471' W 117° 24.094' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, poorly graded SAND with silt (SP-SM)			
-20									--- Design Depth (-20 ft MLLW)
			1						
	2						33		SA(9)
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
	4								
						Wet, very dark gray, silty SAND (SM), few organics, trace shells, moderate organic odor			
-25			2				42		SA(38)
	6					Wet, dark gray, poorly graded SAND with silt (SP-SM)			
			3						
	8						35		SA(9)
			4			8-inch gray CLAY (CL)	57		SA(90)
	10								
-30				0.21					
						Bottom of boring at 11.0 feet below mudline			
	12								
	14								
-35									
	16								
	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE **Project Location: Oceanside, CA** **Project Number: 60555449**	**Log of Boring OSHVC-17-B-02** Sheet 1 of 1

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.5 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-17.2 MLLW**
Water Depth (feet)	**20.0**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.9**
Tidal Stage (feet)	**+2.8 MLLW**	Location	**N 33° 12.456' W 117° 24.003' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, gray, poorly graded SAND (SP)			
			1				28		SA(1)
	2								
-20									--- Design Depth (-20 ft MLLW)
			2				28		SA(2)
	4								
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
						← single fine gravel			
	6								
			3						
-25	8						26		SA(1)
						Wet, very dark gray, silty SAND (SM), few organics, slight organic odor			
	10		4				33		SA(21)
				0.15					
	12					Bottom of boring at 11.5 feet below mudline			
-30									
	14								
	16								
-35	18								
	20								

Report: GEO_10_SNA_OSIDE_HARBOR; File: 60555449.GPJ; 3/13/2018 OSHVC-17-B-02

AECOM

Figure F-10

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-B-03

Sheet 1 of 1

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.5 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-18.3 MLLW**
Water Depth (feet)	**21.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.6**
Tidal Stage (feet)	**+3.2 MLLW**	Location	**N 33° 12.491' W 117° 23.931' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0		1			**Harbor Channel Sediments** Wet, very dark gray, poorly graded SAND with silt (SP-SM), trace shells	30		SA(11)
						Wet, very dark gray, silty SAND (SM), trace shells			
-20	2		2						--- Design Depth (-20 ft MLLW)
							42		HYD(36)
						Project Overdepth / Bottom of Bulk Chemistry Sample			--- Overdepth (-22 ft MLLW)
	4								
						Wet, very dark gray, poorly graded SAND with silt (SP-SM), micaceous			
	6		3				32		SA(8)
-25									
	8					Wet, gray, poorly graded SAND (SP), trace shells, micaceous			
			4				27		SA(3)
	10			N/A					
-30	12					Bottom of boring at 11.5 feet below mudline			
	14								
	16								
-35	18								
	20								

AECOM

Figure F-11

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-B-04

Date(s) Drilled	**12/13/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-19.7 MLLW**
Water Depth (feet)	**24.7**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.1**
Tidal Stage (feet)	**+5.0 MLLW**	Location	**N 33° 12.469' W 117° 24.740' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
-20	0					**Harbor Channel Sediments** Wet, very dark gray to black, lean CLAY (CL)			--- Design Depth (-20 ft MLLW)
			1				95		HYD(91), LL(69), PI(40)
	2					***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-22 ft MLLW)
						clay content decreases			
	4					few organics, slight organic odor			
-25									
	6		2				92		SA(90)
						Wet, gray, poorly graded SAND (SP)			
	8								
			3				29		SA(5)
-30	10								
				0.15					
	12					Bottom of boring at 12.0 feet below mudline			
	14								
-35									
	16								
	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-C-01

Date(s) Drilled	12/12/2017	Logged By	A. Avakian	Checked By	D. Schug
Sampler Method	Vibracore	Drill Bit Size/Type	4" Core Barrel	Penetration (feet)	14.0 feet
Drill Rig Type	Boat Supported Vibracore (DW Hood)	Drilling Contractor	KLI	Approximate Mudline Elevation	-21.5 MLLW
Water Depth (feet)	24.0	Sampling Method(s)	Continuous Core and Grab Samples From Core	Recovered Core Length (feet)	13.5
Tidal Stage (feet)	+2.5 MLLW	Location	N 33° 12.237' W 117° 24.048' Map Datum NAD83		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					<u>Harbor Channel Sediments</u> Wet, dark gray, poorly graded SAND with silt (SP-SM), micaceous, trace shells, trace very thin to laminated interbeds of finer grained material (increased mica content)			
			1				33		SA(6)
	2								
-25	4								
							32		SA(10)
			2						--- Design Depth (-27 ft MLLW)
	6								
	8					*<u>Project Overdepth / Bottom of Bulk Chemistry Sample</u>*			
-30									--- Overdepth (-30 ft MLLW)
	10								
			3				28		SA(5)
	12								
-35				0.09					
	14					Bottom of boring at 14.0 feet below mudline			
	16								
	18								
-40									
	20								

AECOM

Figure F-13

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-C-02

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-24.5 MLLW**
Water Depth (feet)	**26.0**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.1**
Tidal Stage (feet)	**+1.5 MLLW**	Location	**N 33° 12.250' W 117° 24.121' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, silty SAND (SM), trace shells, micaceous			
-25			1				34		SA(15)
	2								--- Design Depth (-27 ft MLLW)
						decrease fines content			
	4		2				33		SA(7)
-30						***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-30 ft MLLW)
	6					Wet, dark gray, poorly graded SAND with silt (SP-SM), trace shells, micaceous			
	8		3				27		SA(6)
-35	10								
				0.15					
	12					Bottom of boring at 12.0 feet below mudline			
	14								
-40	16								
	18								
	20								

AECOM

Project: Oceanside Harbor Dredge Analysis - USACE **Project Location: Oceanside, CA** **Project Number: 60555449**	**Log of Boring OSHVC-17-C-03** Sheet 1 of 1

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-23.4 MLLW**
Water Depth (feet)	**24.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**12.0**
Tidal Stage (feet)	**+1.1 MLLW**	Location	**N 33° 12.280' W 117° 24.188' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, gray to dark gray, poorly-graded SAND with silt (SP-SM)			
			1				33		SA(9)
-25	2								
									--- Design Depth (-27 ft MLLW)
	4		2				32		SA(8)
	6					***Project Overdepth / Bottom of Bulk Chemistry Sample***			
-30						decrease fines content			--- Overdepth (-30 ft MLLW)
	8								
			3				28		SA(4)
	10								
-35				0.14					
	12					Bottom of boring at 12 feet below mudline. Moved sample point from original location due to safety reasons.			
	14								
	16								
-40									
	18								
	20								

AECOM

Figure F-15

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-C-04

Sheet 1 of 1

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**12.0 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-23.0 MLLW**
Water Depth (feet)	**24.0**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**11.8**
Tidal Stage (feet)	**+1.0 MLLW**	Location	**N 33° 12.355' W 117° 24.119' Map Datum NAD83**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Penetration Rate	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0		1		**Harbor Channel Sediments** Wet, gray, poorly-graded SAND (SP)	33		SA(5)
-25	2		2		Wet, dark gray, poorly-graded SAND with silt (SP-SM), few very thin interbeds of silty SAND (SM), trace shells	32		SA(6)
	4							--- Design Depth (-27 ft MLLW)
	6							
-30			3		***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-30 ft MLLW)
	8							
	10					31		SA(5)
				0.14				
-35	12				Bottom of boring at 12.0 feet below mudline			
	14							
	16							
-40								
	18							
	20							

Project: Oceanside Harbor Dredge Analysis - USACE Project Location: Oceanside, CA Project Number: 60555449	Log of Boring OSHVC-17-C-05 Sheet 1 of 1

Date(s) Drilled	12/12/2017	Logged By	A. Avakian	Checked By	D. Schug
Sampler Method	Vibracore	Drill Bit Size/Type	4" Core Barrel	Penetration (feet)	12.0 feet
Drill Rig Type	Boat Supported Vibracore (DW Hood)	Drilling Contractor	KLI	Approximate Mudline Elevation	-21.6 MLLW
Water Depth (feet)	22.5	Sampling Method(s)	Continuous Core and Grab Samples From Core	Recovered Core Length (feet)	10.7
Tidal Stage (feet)	+0.9 MLLW	Location	N 33° 12.334' W 117° 24.069' Map Datum NAD83		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0		1			**Harbor Channel Sediments** Wet, gray, poorly-graded SAND (SP)	32		SA(3)
	2		2			Wet, dark gray, poorly-graded SAND with silt (SP-SM)	33		SA(6) --- Design Depth (-27 ft MLLW)
-25	4								
	6								
-30	8		3			***Project Overdepth / Bottom of Bulk Chemistry Sample*** decrease fines content	29		--- Overdepth (-30 ft MLLW) SA(3)
	10			0.13					
	12					Bottom of boring at 12.0 feet below mudline			
-35	14								
	16								
-40	18								
	20								

Project: Oceanside Harbor Dredge Analysis - USACE
Project Location: Oceanside, CA
Project Number: 60555449

Log of Boring OSHVC-17-C-06

Date(s) Drilled	**12/12/2017**	Logged By	**A. Avakian**	Checked By	**D. Schug**
Sampler Method	**Vibracore**	Drill Bit Size/Type	**4" Core Barrel**	Penetration (feet)	**11.5 feet**
Drill Rig Type	**Boat Supported Vibracore (DW Hood)**	Drilling Contractor	**KLI**	Approximate Mudline Elevation	**-22.8 MLLW**
Water Depth (feet)	**23.5**	Sampling Method(s)	**Continuous Core and Grab Samples From Core**	Recovered Core Length (feet)	**10.2**
Tidal Stage (feet)	**+0.7 MLLW**	Location	**N 33° 12.288' W 117° 24.053' Map Datum NAD83**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0					**Harbor Channel Sediments** Wet, dark gray, poorly-graded SAND with silt (SP-SM), few very thin interbeds of silty SAND (SM), very dark gray, micaceous			
			1				35		SA(5)
-25	2								
	4								--- Design Depth (-27 ft MLLW)
			2				32		SA(5)
	6								
-30						***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-30 ft MLLW)
	8								
			3			SILT (ML) interbed, very dark gray	69		SA(61)
							33		SA(8)
	10								
				0.14					
-35	12					Bottom of boring at 11.5 feet below mudline. Moved location from original location for safety reasons.			
	14								
	16								
-40									
	18								
	20								

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Project: Oceanside Harbor Dredge Analysis - USACE	Log of Boring OSHVC-17-C-07
Project Location: Oceanside, CA	
Project Number: 60555449	Sheet 1 of 1

Date(s) Drilled	12/12/2017	Logged By	A. Avakian	Checked By	D. Schug
Sampler Method	Vibracore	Drill Bit Size/Type	4" Core Barrel	Penetration (feet)	12.0 feet
Drill Rig Type	Boat Supported Vibracore (DW Hood)	Drilling Contractor	KLI	Approximate Mudline Elevation	-25.9 MLLW
Water Depth (feet)	27.5	Sampling Method(s)	Continuous Core and Grab Samples From Core	Recovered Core Length (feet)	11.6
Tidal Stage (feet)	+1.6 MLLW	Location	N 33° 12.411' W 117° 24.051' Map Datum NAD83		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Penetration Rate	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Density, pcf	REMARKS AND OTHER TESTS
	0		1			**Harbor Channel Sediments** Wet, very dark gray, silty SAND (SM), some organics, strong organic odor	40		SA(14)
						Wet, dark gray, poorly-graded SAND with silt (SP-SM)			--- Design Depth (-27 ft MLLW)
	2		2				32		SA(9)
-30	4					***Project Overdepth / Bottom of Bulk Chemistry Sample***			--- Overdepth (-30 ft MLLW)
			3			Wet, gray, poorly-graded SAND (SP)	31		SA(4)
	6					Wet, very dark gray, silty SAND (SM), trace organics, trace shells			
	8		4				40		SA(29)
-35	10								
				0.15					
	12					Bottom of boring at 12.0 feet below mudline			
-40	14								
	16								
	18								
-45	20								

Report: GEO_10_SNA_OSIDE_HARBOR; File: 60555449.GPJ; 3/13/2018 OSHVC-17-C-07

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Figure F-19

Appendix G

Analytical Chemistry QA/QC Report

APPENDIX G
OCEANSIDE HARBOR 2017
QUALITY ASSURANCE/QUALITY CONTROL EVALUATION REPORT

February 2018

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1.0 INTRODUCTION

Kinnetic Laboratories conducts its activities in accordance with formal QA/QC procedures. The objectives of this QA/QC Program are to fully document the field and laboratory data collected, to maintain data integrity from the time of field collection to storage at the end of the project, and to produce the highest quality data possible. This program was designed to allow data to be assessed by the following parameters: Precision, Accuracy, Comparability, Representativeness, and Completeness. These parameters were controlled by adhering to documented methods and procedures (SOPs), and by the analysis of quality control (QC) samples on a routine basis.

QC checks such as method blanks, laboratory control sample/laboratory control sample duplicates (LCS/LCSDs), matrix spike/spike duplicates (MS/MSDs), and surrogates were performed on the samples. Post digestion spike/spike duplicates (PDS/PDSDs) were also run for the metals analyses. Table G-1 summarizes laboratory QC performed for the chemical analyses.

All analytical data collected for Oceanside Harbor sediment-testing program underwent QA/QC evaluation according to EPA National Functional Guidelines for inorganic and organic data review (USEPA, 2017; 2017). Established laboratory QC objectives were used in the evaluation of data.

Table G-1. Summary of Quality Control Performed on the Bulk Sediment Chemistry Samples.

Analyte	Blanks	Duplicates[1]	LCS[2]	MS/ MSDs[3]	PDS/ PDSD[4]	Surrogates
Sediment Matrices						
Percent Solids	✓	✓	—	—	—	—
Ammonia	✓	—	✓	✓	—	—
Total Organic Carbon	✓	—	✓	—	—	—
Total Volatile Solids	✓	✓	—	—	—	—
O&G	✓	—	✓	✓	—	—
TRPH	✓	—	✓	✓	—	—
Total Sulfides	✓	✓	✓	—	—	—
Dissolved Sulfides	✓	✓	✓	—	—	—
Total Metals including Hg	✓	—	✓	✓	✓	—
PAH's, Phthalates & Phenols	✓	—	✓	✓	—	✓
Chlorinated Pesticides	✓	—	✓	✓	—	✓
PCB Congeners	✓	—	✓	✓	—	✓
Butyltins	✓	—	✓	✓	—	✓
Pyrethroid pesticides	✓	—	✓	✓	—	✓

1. Laboratory duplicates.
2. Laboratory Control Sample
3. Matrix Spike/Matrix Spike Duplicate
4. Post Digestion Spike/Spike Duplicate

2.0 QA/QC METHODS

The overall quality of the dataset is determined to a large degree by the thoroughness, accuracy and precision of the laboratory QC records. That explains why the majority of this section is devoted to examining them in detail. The QC is discussed individually by topic. Table G-2 summarizes QA/QC Objectives for this project.

2.1 Precision

Precision provides an assessment of mutual agreement between repeated measurements. These measures may apply to matrix spike duplicates (MSD), post digestion spike duplicates (PDSD), laboratory control sample duplicates (LCSD) and lab duplicates (DUP). Monitoring of precision through the process allows for the evaluation of the consistency of laboratory analyses.

The Relative Percent Difference (RPD) is used to evaluate duplicate samples. The RPD is the difference between the two samples divided by their average expressed as percent and is calculated as:

$$RPD = 100 * \left(\frac{|x_1 - x_2|}{\frac{1}{2}(x_1 + x_2)} \right)$$

where:
x_1 = Concentration of sample 1
x_2 = Concentration of sample 2

RPDs can be large when analyzing differences between small numbers, a situation that is common when analyzing DUPs with values near the reporting limit. When one or both concentrations are less than five times the reporting limit, replication is assessed by determining if the two values differ by more than one times the reporting limit. When one or both values are less than the reporting limit, then precision cannot be ascertained.

2.2 Accuracy

An assessment of the accuracy of measurements is based on determining the difference between measured values and the known or "true" value and is applied to MS/MSDs, LCS/LCSDs, and PDS/PDSDs.

In general, Percent Recovery is calculated as:

$$\%R = 100 * \left(\frac{Measured\_Value}{True\_Value} \right)$$

Matrix Spike recoveries take into account the concentration of the source sample:

$$\%R_{MS} = 100 * \left(\frac{Measured\_Value - Sample\_Value}{True\_Value} \right)$$

2.3 Representativeness, Comparability and Completeness

Representativeness is the degree to which data accurately and precisely represents the natural environment.

Table G-2. Sediment Quality Assurance/Quality Control Objectives.

Analyte	Accuracy		Precision	
	Spike Recovery (%)	LCS Recovery (mg/kg – dry)	Max. Blank or Matrix Spike RPDs (%)	Max. Laboratory Duplicate or LCS RPDs (%)
CONVENTIONALS				
Percent Solids				10
Total Volatile Solids				20
Total Dissolved Solids				10
TRPH	78 - 114	64 - 122	20	30
Oil and Grease	78 - 114	80 - 120	20	20
Total Organic Carbon	75 - 125	80 - 120	25	20
Total Ammonia	70 - 130	80 - 120	25	20
SPECIATED BUTYLTINS				
Dibutyltin	50 - 130	50 - 130	40	20
Monobutyltin	MDL - 110	50 - 130	50	20
Tetrabutyltin	33 - 129	40 - 142	40	20
Tributyltin	34 - 142	33 - 147	50	20
METALS				
Arsenic	80 - 120	80 - 120	20	20
Cadmium	80 - 120	80 - 120	20	20
Chromium	80 - 120	80 - 120	20	20
Copper	80 - 120	80 - 120	20	20
Lead	80 - 120	80 - 120	20	20
Mercury	76 - 136	82 - 124	16	16
Nickel	80 - 120	80 - 120	20	20
Selenium	80 - 120	80 - 120	20	20
Silver	80 - 120	80 - 120	20	20
Zinc	80 - 120	80 - 120	20	20
ORGANICS – CHLORINATED PESTICIDES				
2,4'-DDD	25 - 200	25 - 200	25	25
2,4'-DDE	25 - 200	25 - 200	25	25
2,4'-DDT	25 - 200	25 - 200	25	25
4,4'-DDD	25 - 200	25 - 200	25	25
4,4'-DDE	25 - 200	25 - 200	25	25
4,4'-DDT	25 - 200	25 - 200	25	25
Aldrin	25 - 200	25 - 200	25	25
BHC-alpha	25 - 200	25 - 200	25	25
BHC-beta	25 - 200	25 - 200	25	25
BHC-delta	25 - 200	25 - 200	25	25
BHC-gamma	25 - 200	25 - 200	25	25
Chlordane-alpha	25 - 200	25 - 200	25	25
Chlordane-gamma	25 - 200	25 - 200	25	25
cis-Nonachlor	25 - 200	25 - 200	25	25
Dieldrin	25 - 200	25 - 200	25	25
Endosulfan Sulfate	25 - 200	25 - 200	25	25
Endosulfan-I	25 - 200	25 - 200	25	25
Endosulfan-II	25 - 200	25 - 200	25	25
Endrin	25 - 200	25 - 200	25	25
Endrin Ketone	25 - 200	25 - 200	25	25
Heptachlor	25 - 200	25 - 200	25	25
Heptachlor Epoxide	25 - 200	25 - 200	25	25
Methoxychlor	25 - 200	25 - 200	25	25
Mirex	25 - 200	25 - 200	25	25
Oxychlordane	25 - 200	25 - 200	25	25
Perthane	25 - 200	25 - 200	25	25

Table G-2. Sediment Quality Assurance/Quality Control Objectives (Continued).

Analyte	Accuracy		Precision	
	Spike Recovery (%)	LCS/SRM[a] Recovery (mg/kg – dry)	Blank or Matrix Spike RPDs (%)	Laboratory Duplicate RPDs (%)
Toxaphene	25 - 200	25 - 200	25	25
trans-Nonachlor	25 - 200	25 - 200	25	25
ORGANICS-Pyrethroid Pesticides				
Allethrin (Bioallethrin)	10 - 148	10 - 148	30	30
Bifenthrin	26 - 128	26 - 128	30	30
Cyfluthrin-beta (Baythroid)	10 - 131	10 - 131	30	30
Cyhalothrin-Lamba	10 - 123	10 - 123	30	30
Cypermethrin	10 - 136	10 - 136	30	30
Deltamethrin (Decamethrin)	13 - 190	13 - 190	30	30
Esfenvalerate	10 - 149	10 - 149	30	30
Fenpropathrin (Danitol)	10 - 148	10 - 148	30	30
Fenvalerate (sanmarton)	10 - 149	10 - 149	30	30
Fluvalinate	10 - 121	10 - 121	30	30
Permethrin (cis and trans)	45 - 123	45 - 123	30	30
Resmethrin (Bioresmethrin)	38 - 164	38 - 164	30	30
Resmethrin	38 - 164	38 - 164	30	30
Sumithrin (Phenothrin)	45 - 165	45 - 165	30	30
Tetramethrin	15 - 153	15 - 153	30	30
Tralomethrin	13 - 190	13 - 190	30	30
ORGANICS - PHTHALATES				
Bis(2-Ethylhexyl) Phthalate	40-160	40-160	20	20
Butylbenzyl Phthalate	40-160	40-160	20	20
Diethyl Phthalate	40-160	40-160	20	20
Dimethyl Phthalate	40-160	40-160	20	20
Di-n-butyl Phthalate	40-160	40-160	20	20
Di-n-octyl Phthalate	40-160	40-160	20	20
ORGANICS - PHENOLS				
2,4,6-Trichlorophenol	40-160	40-160	20	20
2,4-Dichlorophenol	40-160	40-160	20	20
2,4-Dimethyphenol	40-160	40-160	20	20
2,4-Dinitrophenol	40-160	40-160	20	20
2-Methylphenol	40-160	40-160	20	20
4-Methylphenol	40-160	40-160	20	20
2-Methyl-4,6-dinitrophenol	40-160	40-160	20	20
2-Chlorophenol	40-160	40-160	20	20
4-Chloro-3-methylphenol	40-160	40-160	20	20
2-Nitrophenol	40-160	40-160	20	20
4-Nitrophenol	40-160	40-160	20	20
Pentachlorophenol	40-160	40-160	20	20
Phenol	40-160	40-160	20	20
ORGANICS – PCB CONGENERS				
All Congeners	50 - 150	50-150	25	25

Table G-2. Sediment Quality Assurance/Quality Control Objectives (Continued).

Analyte	Accuracy		Precision	
	Spike Recovery (%)	LCS/SRM[a] Recovery (mg/kg – dry)	Blank or Matrix Spike RPDs (%)	Laboratory Duplicate RPDs (%)
ORGANICS – PAHs				
1-Methylnaphthalene	40 - 160	40-160	20	20
1-Methylphenanthrene	40 - 160	40-160	20	20
2,3,5-Trimethylnaphthalene	40 - 160	40-160	20	20
2,6-Dimethylnaphthalene	40 - 160	40-160	20	20
2-Methylnaphthalene	40 - 160	40-160	20	20
Acenaphthene	40 - 106	48-108	20	20
Acenaphthylene	40 - 106	48-108	20	20
Anthracene	40 - 160	40-160	20	20
Benz[a]anthracene	40 - 160	40-160	20	20
Benzo[a]pyrene	17 - 163	17-163	20	20
Benzo[b]fluoranthene	40 - 160	40-160	20	20
Benzo[e]pyrene	40 - 160	40-160	20	20
Benzo[g,h,i]perylene	40 - 160	40-160	20	20
Benzo[k]fluoranthene	40 - 160	40-160	20	20
Biphenyl	40 - 160	40-160	20	20
Chrysene	17 - 168	17-168	20	20
Dibenz[a,h]anthracene	40 - 160	40-160	20	20
Dibenzothiophene	40 - 160	40-160	20	20
Fluoranthene	26 - 137	26-137	20	20
Fluorene	59 - 121	59-121	20	20
Indeno[1,2,3-c,d]pyrene	40 - 160	40-160	20	20
Naphthalene	21 - 133	21 -133	20	20
Perylene	40 - 160	40-160	20	20
Phenanthrene	54 - 120	54 - 120	20	20
Pyrene	6 - 156	28 - 106	20	20

Comparability is the measure of confidence with which one dataset can be compared to another. The use of standardized methods of chemical analysis and field sampling and processing are ways of assuring comparability. The implementation of thorough QA/QC methods such as laboratory QC is essential.

Completeness is a measure of the percentage of the data judged valid after comparison with specific validation criteria. This includes data lost through accidental breakage of sample containers or other activities that result in irreparable loss of samples. Implementation of standardized Chain-of-Custody procedures which track samples as they are transferred between custodians is one method of maintaining a high level of completeness

A high level of completeness is essential to all phases of this study due to the limited number of samples. Of course, the overall goal is to obtain completeness of 100 percent. However, a realistic data quality objective of 95% will insure an adequate level of data return.

Close adherence to ‘Standard Operating Procedures’ (SOPs) assures that the resulting data is representative, complete and comparable. The results are further assessed with a thorough validation process.

2.4 Data Qualifier Codes

Where appropriate, data qualifiers were associated with the results using the following standard notations from the EPA guidance documents:

Data Review Qualifiers

<	Not detected above the MDL The compound was analyzed for but was not detected above method detection limits. The associated value is the sample MDL
UJ	Estimated Detection Limit The compound was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise
J-	Estimated Value The associated value is a low estimate
J	Estimated Value The associate value is an estimated quantity
J+	Estimated Value The associated value is a high estimate
R	Rejected The data are unusable. The analyte may or may not be present

EPA guidance documents are clear that data review and qualification rules are to be tempered using professional judgment. The specific data qualifications as they apply to this project are discussed in the following section.

3.0 QA/QC RESULTS

This project generated a count of 456 sediment sample results with an additional 476 supporting QC records for a total sample count of 932. The counts of each type per chemical category can be found in Table G-3.

Generally, the QC data were within limits with the exceptions fully noted below. A total of 6 sediment sample results (1.3%) were qualified as a result of the QC review and those are summarized in Table G-4. All of the sediment qualifications were a result of method blank detections. The details of the entire review follows.

Table G-3. Counts of QC records per Chemical Category

Analyte Group	BLK	DUP	LCS / LCSD	MS / MSD	PDS	SURR	Total
			Sediment				
Conventionals							
Percent Solids	1	1					2
Ammonia	1		2	2			5
Total Organic Carbon	1		2				3
Total Volatile Solids	1	1					2
O&G	1		2	2			5
TRPH	1		2	2			5
Total Sulfides	1	1	2				4
Dissolved Sulfides	1	1	2				4
Total Metals	10		10	20	9		49
PAH's, Phthalates & Phenols	48		17	34		24	123
Chlorinated Pesticides	29		22	44		16	111
PCB Congeners	40		15	30		8	93
Butyltins	4		2	4		4	14
Pyrethroids	13		13	26		4	56
Sediment Totals	152	4	91	164	9	56	476

Table G-4. Final QC Qualification Applied to Sample Results.

Analyte	# Samples Qualified	Final Qualifier	BLK	DUP	LCS	MS	PDS	SURR
Phthalates – Sediment								
Bis(2-Ethylhexyl) Phthalate	3	U	U					
Butyl Benzyl Phthalate	3	U	U					
Total number of affected samples	6							
Percentage of all samples	1.3%							

3.1 Sediment Quality Control Records

Quality control results for the sediment composite samples are discussed in subsections that follow.

3.1.1 Completeness and Holding Times

All sediment samples for this project were received intact and within proper temperature range and were analyzed within EPA holding times.

3.1.2 Reporting Limits

Sediment reporting limits (RLs) and method detection limits (MDLs) were compared to the SC-DMMT target limits. Low percent solids results cause reporting limits to be elevated once they are dry weight adjusted. Analytes that exceeded the limits specified by the SC-DMMT had the limits achieved in the method blank compared to the SC-DDMT. If the target limit was achieved in the method blank, the excursions are dismissed due to dry weight conversions. Minor fluctuations to the MDL are normal as the MDL is a continuing study performed by the laboratory with no effect to the reporting limit of the constituent.

Details of the remaining six constituents that exceeded target limits in both the sample results and the method blank have been summarized in Table G-5. Ranges are reported for sample quantification limits because of variations in percent solids. Bis(2-Ethylhexyl) phthalate and butyl benzyl phthalate both had a method blank detection making all values non-detect at the RL. Diethyl phthalate was found below the reporting limit at a range of 3.5J – 3.8J, all the rest of the values were non-detect in the sample result. The Oceanside Harbor target reporting limits were not met for 18 data records.

Table G-5. Summary of Samples with Elevated Reporting Limits.

Analyte Group	Number Exceeded	Target RL	Lab RL Range	Lab MDL Range
PAH's (µg/kg)				
Bis(2-Ethylhexyl) Phthalate	3	10	66 - 69	2.0 – 2.1
Butyl Benzyl Phthalate	3	10	66 - 69	2.6 – 2.7
Di-n-Octyl Phthalate	3	10	66 - 69	2.5 – 2.6
Diethyl Phthalate	3	10	66 - 69	2.1 – 2.2
Dimethyl Phthalate	3	10	66 - 69	2.7 – 2.8
OC Pesticides (µg/kg)				
Toxaphene	3	10	26 - 28	12 - 13
Total number exceeding target RL	18			

All units of concentration are dry weight corrected.

3.1.3 Method Blanks

Method blanks were prepared and run alongside all sediment samples and were evaluated down to the MDL. Two phthalates, Bis(2-Ethylhexyl) Phthalate and Butyl Benzyl Phthalate, were detected in the blank samples below the reporting limit. As a result, the blank results for these are considered an estimate and denoted with a "J" qualifier. As all the sediment sample values were also detected below the RL, the sample results were raised to the RL and qualified with a "U", making them non-detect at the RL level. These results are summarized in Table G-6.

Table G-6. Sediment Method Blank QC Review Detail

Sediment Analyte	Batch	Blank Result	MDL	RL	Qualifier	No. of Qualified Samples
Phthalate's						
Bis(2-Ethylhexyl) Phthalate	171219L08	3.5J	1.5	50	U	3
Butyl Benzyl Phthalate	171219L08	3.1J	2	50	U	3

3.1.4 Laboratory Duplicates

Laboratory duplicates were performed on percent solids and volatile solids, all results were within acceptable QC limits.

3.1.5 Laboratory Control Sample

All sediment LCS/LCSD samples for this project were recovered within the acceptable range with the exception of permethrin. The LCS for permethrin was found at 139%, which is above the upper limit of 123%, there were no LCSDs performed on the pyrethroids. This deviation was considered minor as all sample values were non-detect, no qualifications to the data were necessary.

3.1.6 Matrix Spikes

Two MS/MSD pairs were reported outside of their respective QC limits. Details of these excursions and assigned preliminary qualifier codes are summarized in Table G-7. High spike recoveries indicate a possibly high bias and low recoveries a possible low bias. As all results for permethrin were non-detect. As such, the high recovery did not affect the results. Therefore, no final qualification to the data was necessary. The RPD for Resmethrin/Bioresmethrin was above the RPD control limits. This excursions was minor and the results were not qualified.

Table G-7. Summary of Sediment Matrix Spike Results Outside QC Limits.

Sediment Analyte	Control Range	Final Qualifier	Control Limit Excursion	Details
Pyrethroids (Batch 171218L05)				
Permethrin (cis/trans)	45-123	None	MS > UCL	**MS: 135%,** MSD: 114%, RPD: 17
Resmethrin/Bioresmethrin	38-164	None	RPD > CL	MS: 119%, MSD: 79%, **RPD: 40**

CL = Control Limit, LCL = Lower control Limit, UCL = Upper control Limit

3.1.7 Post Digestion Spikes

QC run on the metals samples included the analysis of Post Digestion Spikes and Post Digestion Spike Duplicates (PDS/PDSD). All PDS/PDSD results for this project were recovered within the acceptable range.

3.1.8 Surrogates

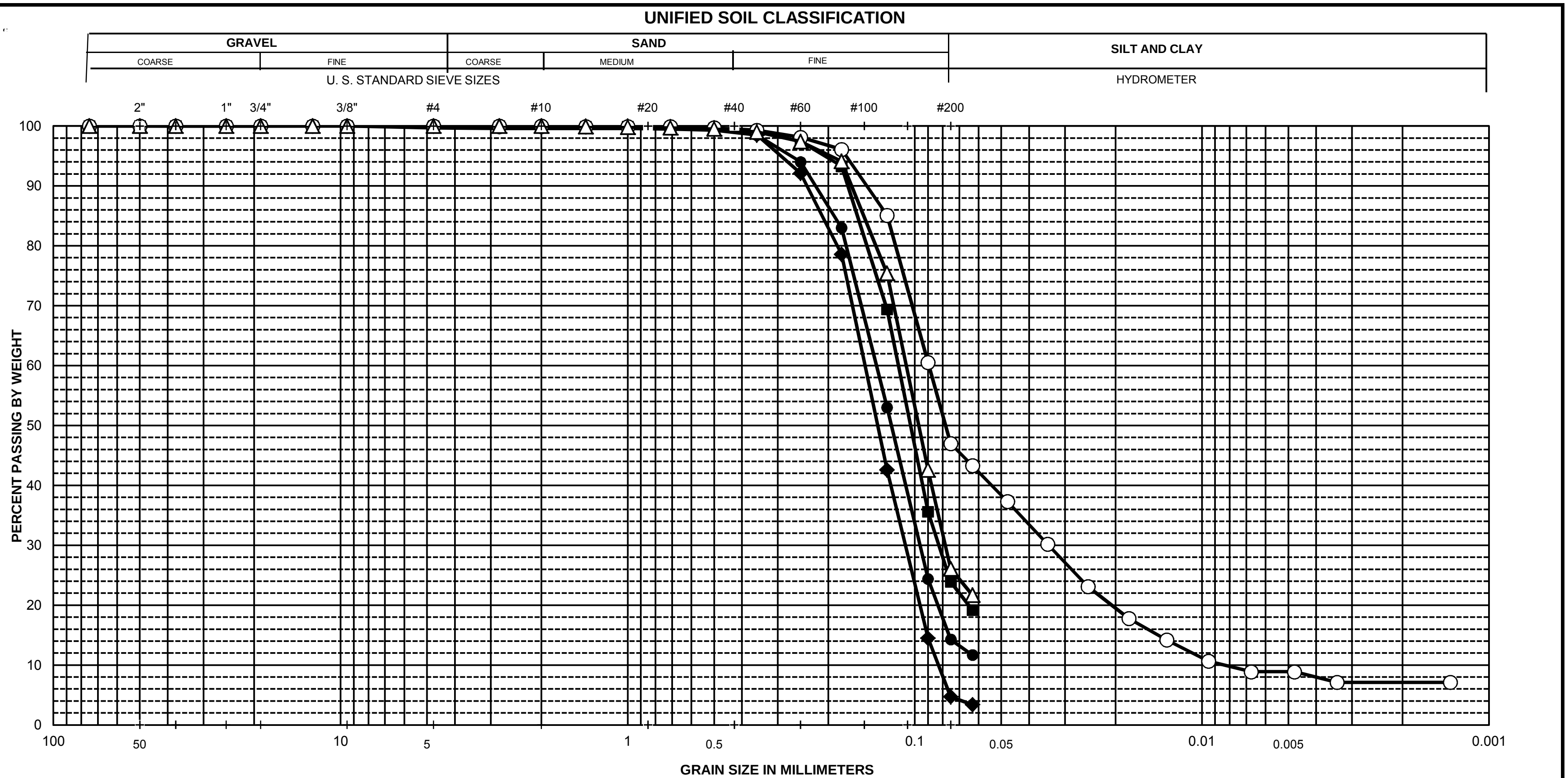
All surrogates for this project that were run for the organic analyses were recovered within the acceptable range.

4.0 QA/QC CONCLUSIONS

A careful review of the results confirmed that the laboratories met most QA/QC requirements. Six sediment samples required qualification, all of which were due to method blank detections. This resulted in 1.3% of the data being qualified. Overall evaluation of the analytical QA/QC data indicates that the chemical data are within established performance criteria and can be used for characterization of sediments in the proposed project area.

Appendix H

Grain Size Data



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-A-01	1	0-1.5	●	35.9	---	---	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-A-01	2	1.5-3.2	■	42.2	29	0	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-A-01	3	5.0-11.0	◆	33.3	---	---	**Light gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-02	1	0.0-2.4	O	43.6	---	---	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-A-02	2	3.0-7.0	Δ	41.2	28	0	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments

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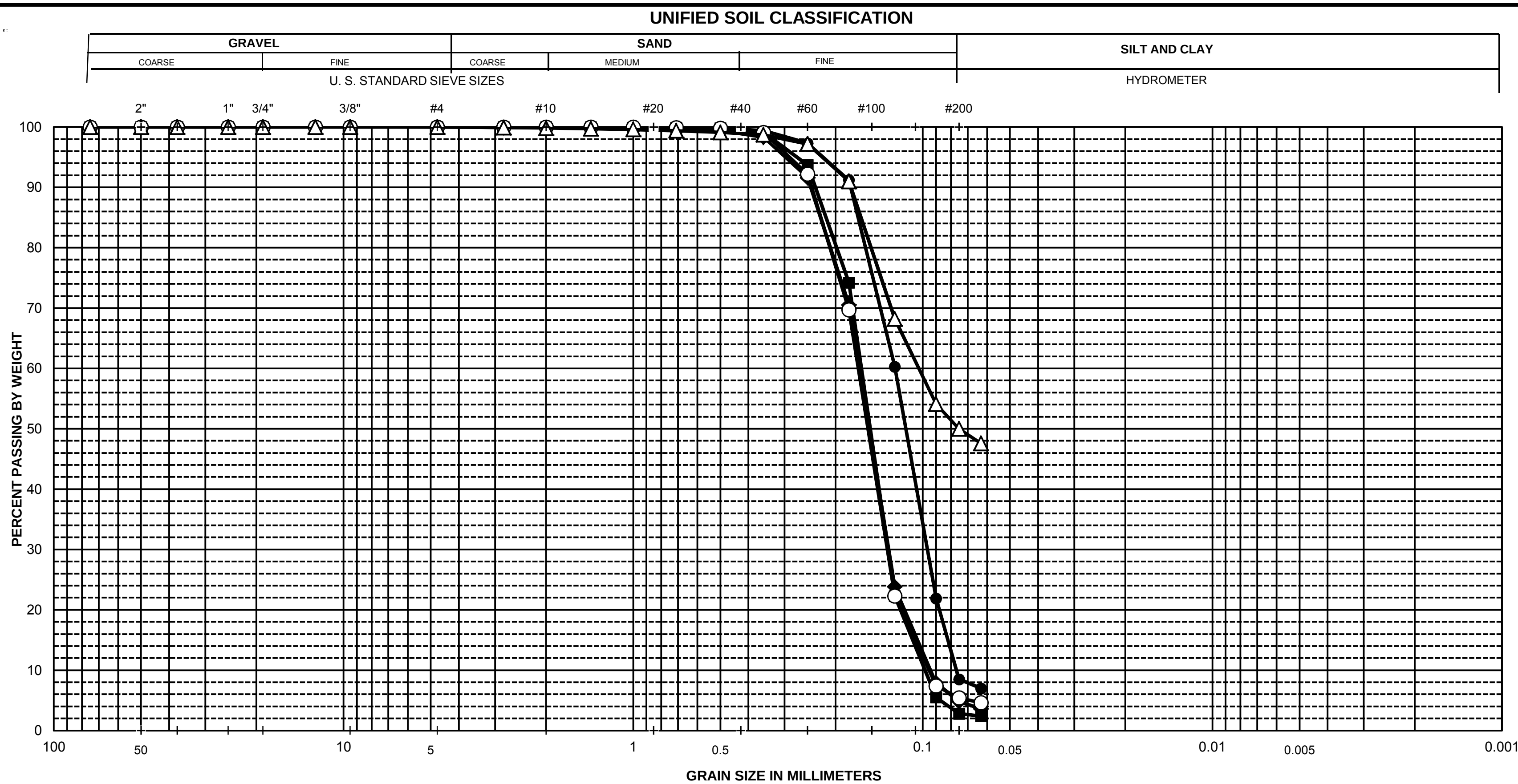
PARTICLE-SIZE DISTRIBUTION CURVES
AREA A

Figure No. H- 1

U:\Projects_Jobs\60555449 USACE_Oceanside Harbor\400-Technical\440-Field and Laboratory Data\Oceanside Harbor Compiled SAs - Areas A-C.xls



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-A-02	3	8.0-10.0	●	35.8	---	---	**Very dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-03	1	0.0-2.0	■	30.7	---	---	**Light olive gray to very dark gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-03	2	2.0-5.5	◆	29.0	---	---	**Light gray to very dark gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-03	3	6.0-7.5	O	29.9	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-03	4	7.5-8.6	Δ	51.2	---	---	**Very dark gray Sandy SILT (ML)**	Harbor Channel Sediments

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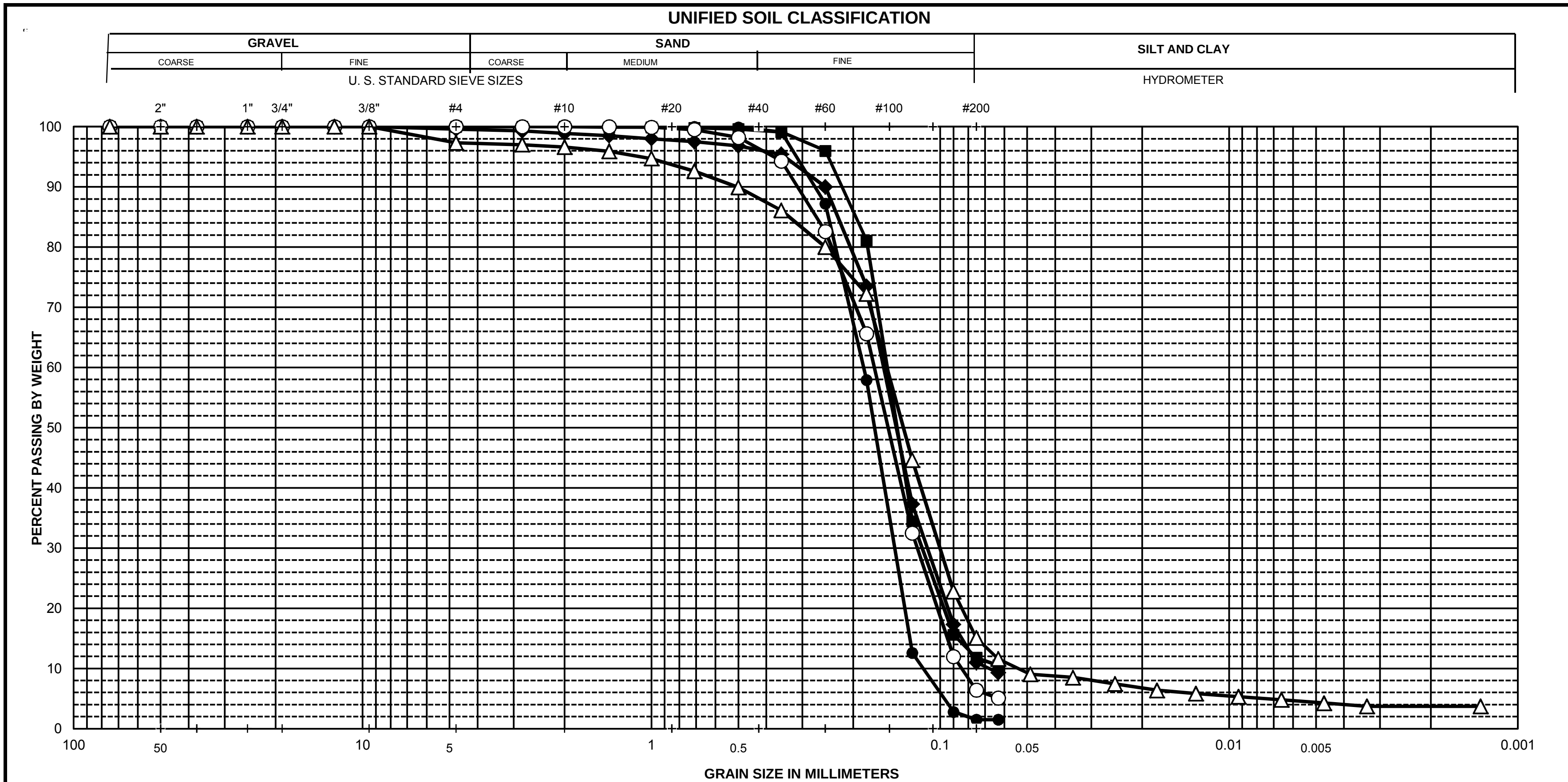
PARTICLE-SIZE DISTRIBUTION CURVES
AREA A

Figure No. H- 2



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-A-04	1	0.0-4.5	●	29.2	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-04	2	4.5-5.7	■	32.2	---	---	**Very dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-04	3	8.0-10.0	◆	28.7	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-05	1	0.0-0.6	O	28.4	---	---	**Very dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-05	2	0.6-2.5	Δ	36.0	30	1	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments

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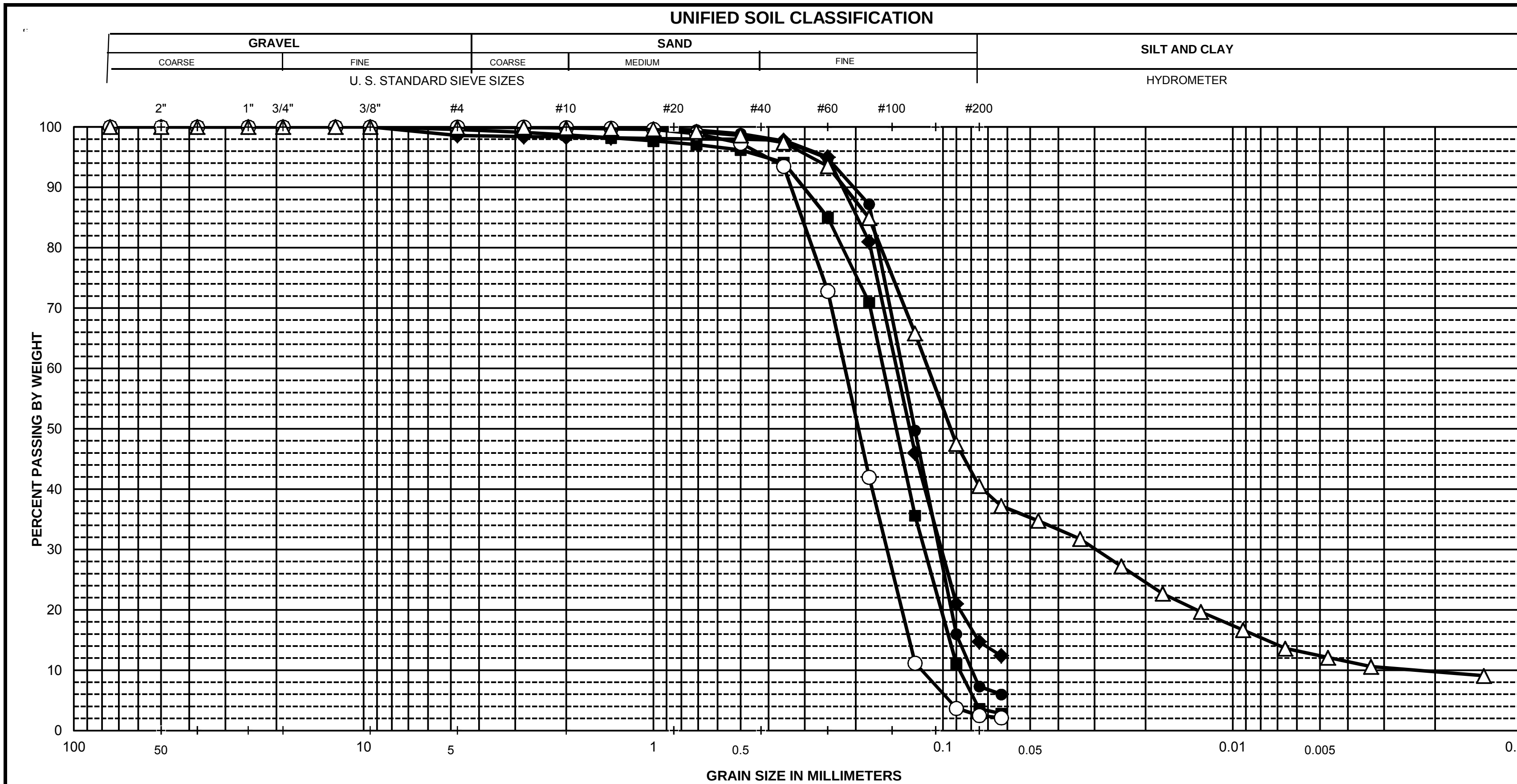
PARTICLE-SIZE DISTRIBUTION CURVES
AREA A

Figure No. H- 3



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-A-05	3	2.5-4.2	●	33.8	---	---	**Light olive gray to dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-05	4	5.0-8.0	■	26.5	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-05	5	9.0-10.0	◆	28.6	---	---	**Light olive gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-A-06	1	0.0-3.1	O	27.9	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-06	2	3.1-5.0	Δ	38.4	36	13	**Very dark gray Clayey SAND (SC)**	Harbor Channel Sediments

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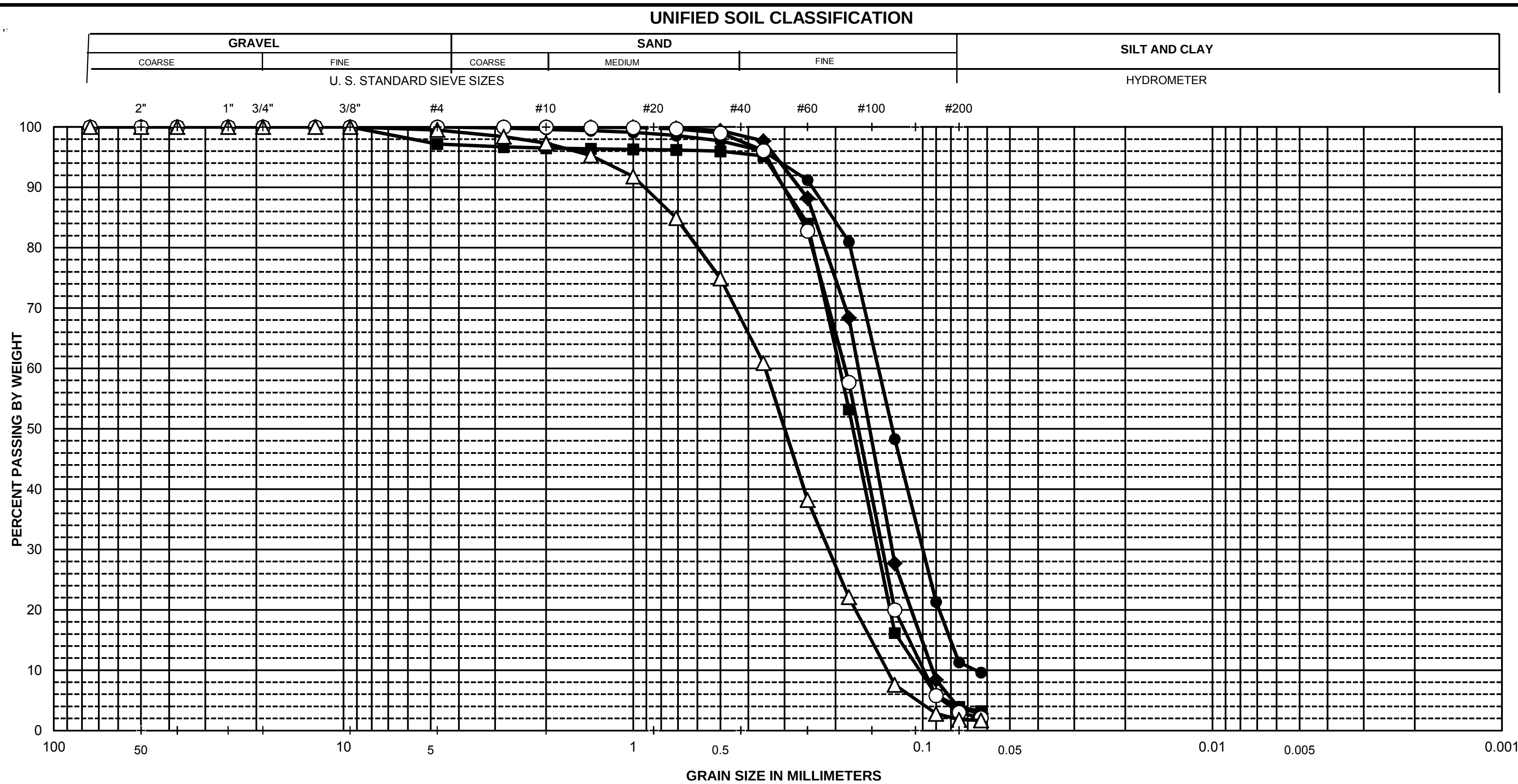
PARTICLE-SIZE DISTRIBUTION CURVES AREA A

Figure No. H- 4



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-A-06	3	5.7-7.0	●	35.3	---	---	**Dark olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-A-06	4	8.0-10.0	■	28.6	---	---	**Gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-07	1	0.0-2.0	◆	29.0	---	---	**Very dark gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-07	2	2.0-4.8	O	28.8	---	---	**Light olive gray to very dark gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-A-07	3	9.0-10.0	Δ	22.1	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments

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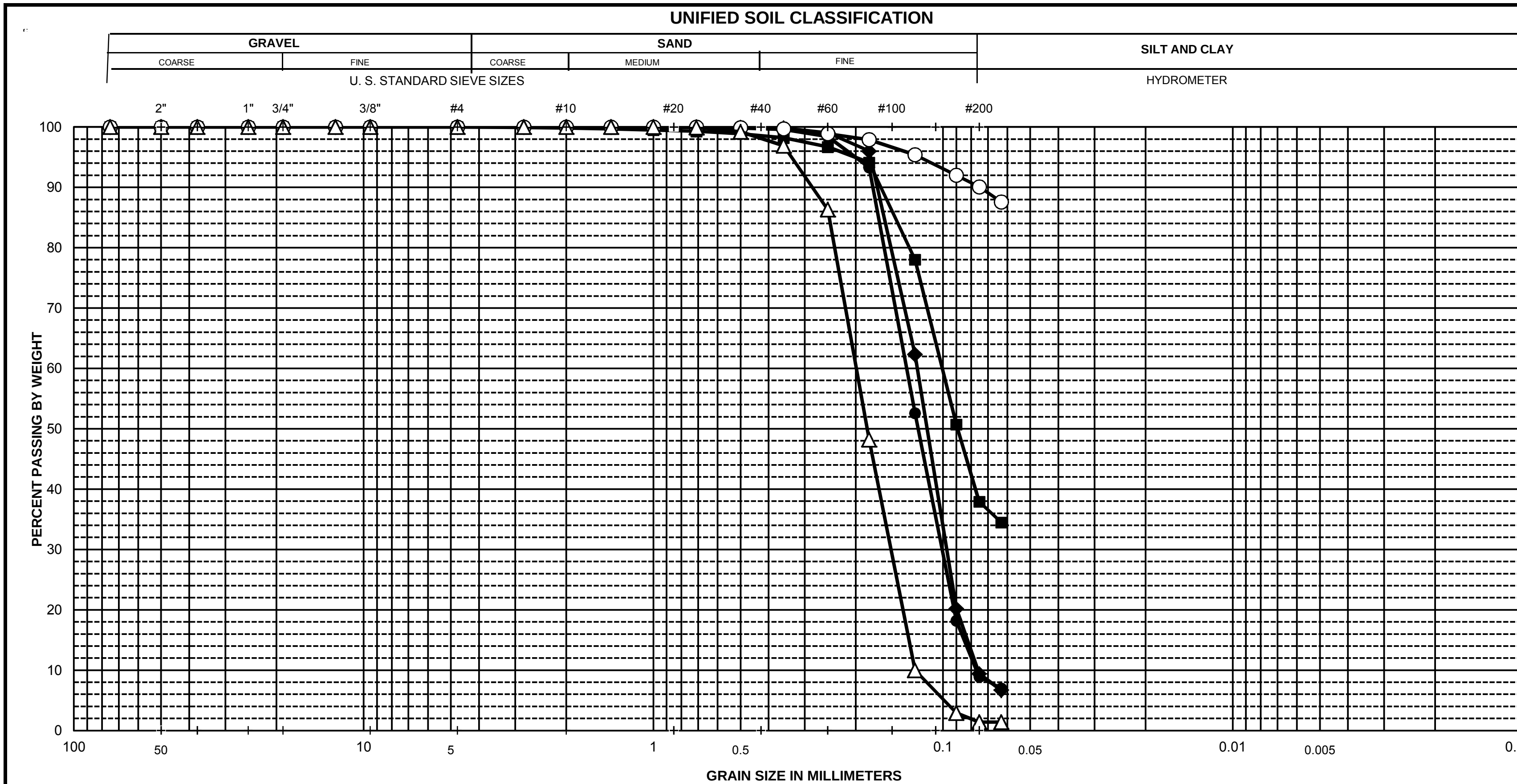
PARTICLE-SIZE DISTRIBUTION CURVES
AREA A

Figure No. H- 5



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-B-01	1	0.0-2.6	●	32.7	---	---	**Very dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-B-01	2	5.0-6.1	■	42.2	---	---	**Dark gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-B-01	3	7.0-8.0	◆	34.7	---	---	**Dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-B-01	4	9.1-9.7	O	56.9	---	---	**Dark olive gray Lean CLAY (CL)**	Harbor Channel Sediments
OSHVC-17-B-02	1	0.0-2.0	Δ	28.0	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments

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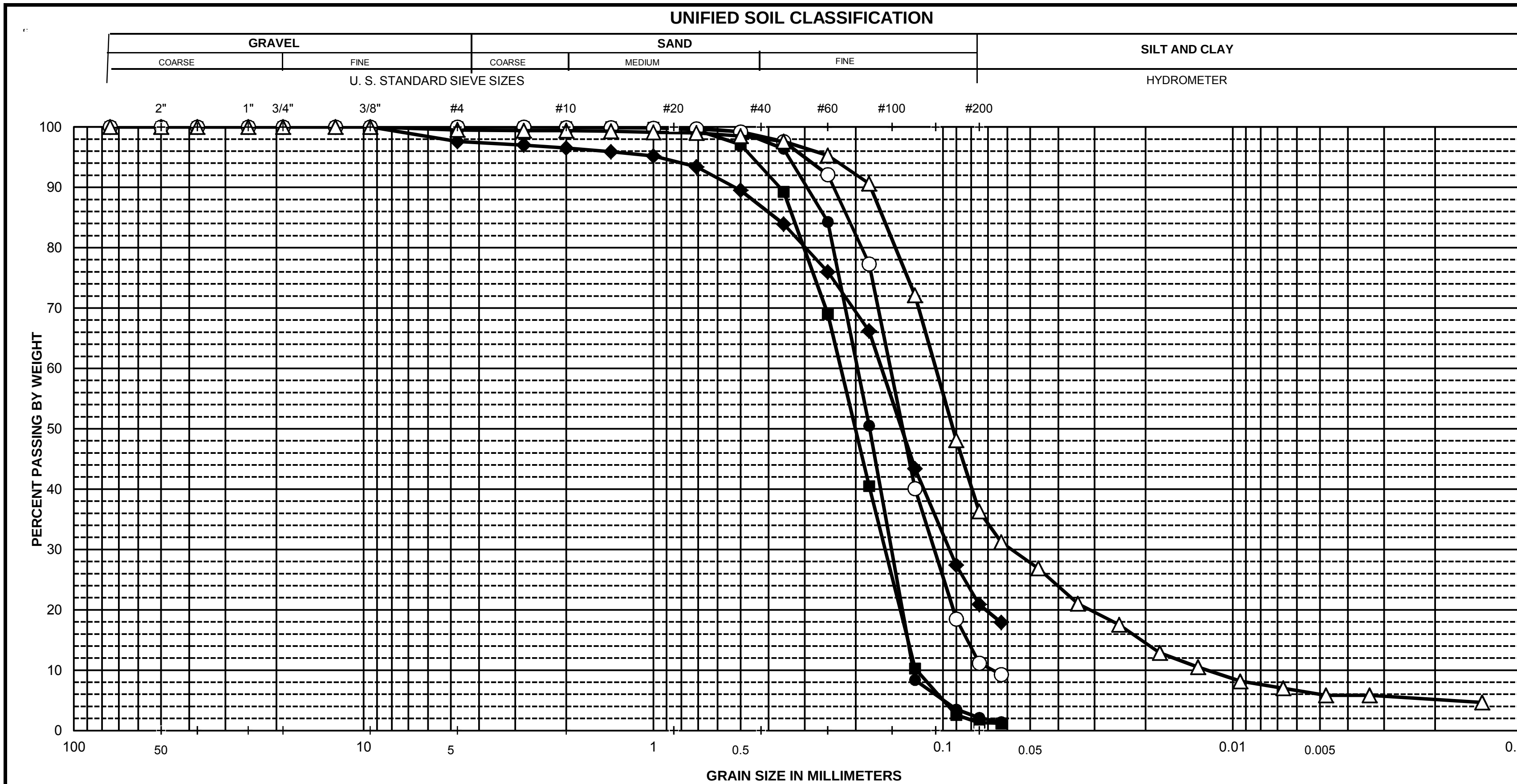
PARTICLE-SIZE DISTRIBUTION CURVES AREA B

Figure No. H- 6



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-B-02	2	2.0-4.8	●	27.8	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-B-02	3	7.0-8.0	■	26.1	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-B-02	4	9.4-10.9	◆	32.9	---	---	**Olive gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-B-03	1	0.0-0.8	O	29.9	---	---	**Very dark Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-B-03	2	0.8-3.7	Δ	41.8	---	---	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments

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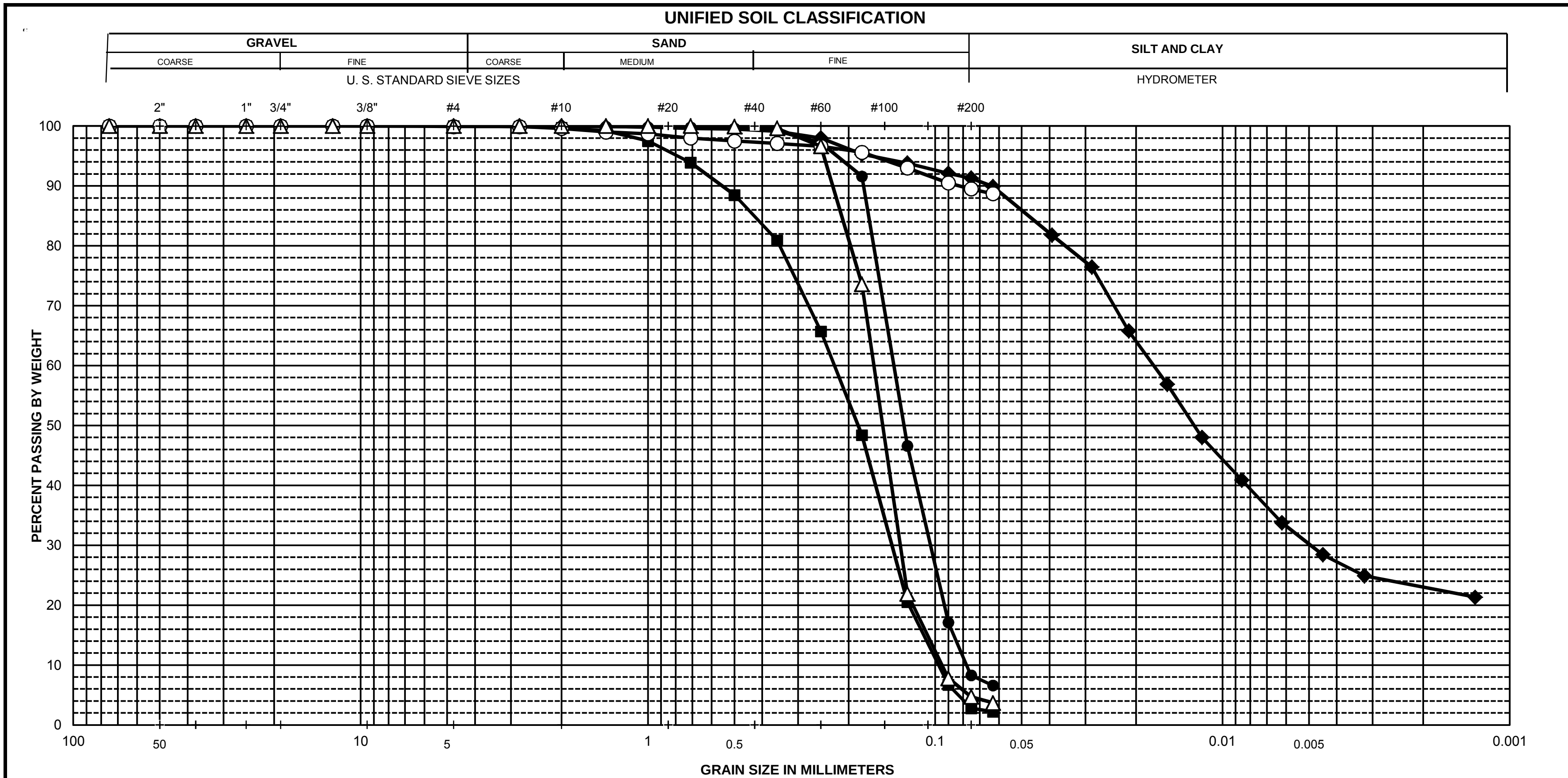
PARTICLE-SIZE DISTRIBUTION CURVES
AREA B

Figure No. H- 7



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-B-03	3	4.5-7.0	●	32.2	---	---	**Very dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-B-03	4	8.0-10.0	■	27.3	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-B-04	1	0.0-2.3	◆	95.2	69	40	**Very dark gray Fat CLAY (CH)**	Harbor Channel Sediments
OSHVC-17-B-04	2	5.0-7.2	O	92.1	---	---	**Very dark gray Lean CLAY (CL)**	Harbor Channel Sediments
OSHVC-17-B-04	3	8.0-10.0	Δ	29.0	---	---	**Very dark gray Poorly Graded SAND (SP)**	Harbor Channel Sediments

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AREA B

Figure No. H- 8

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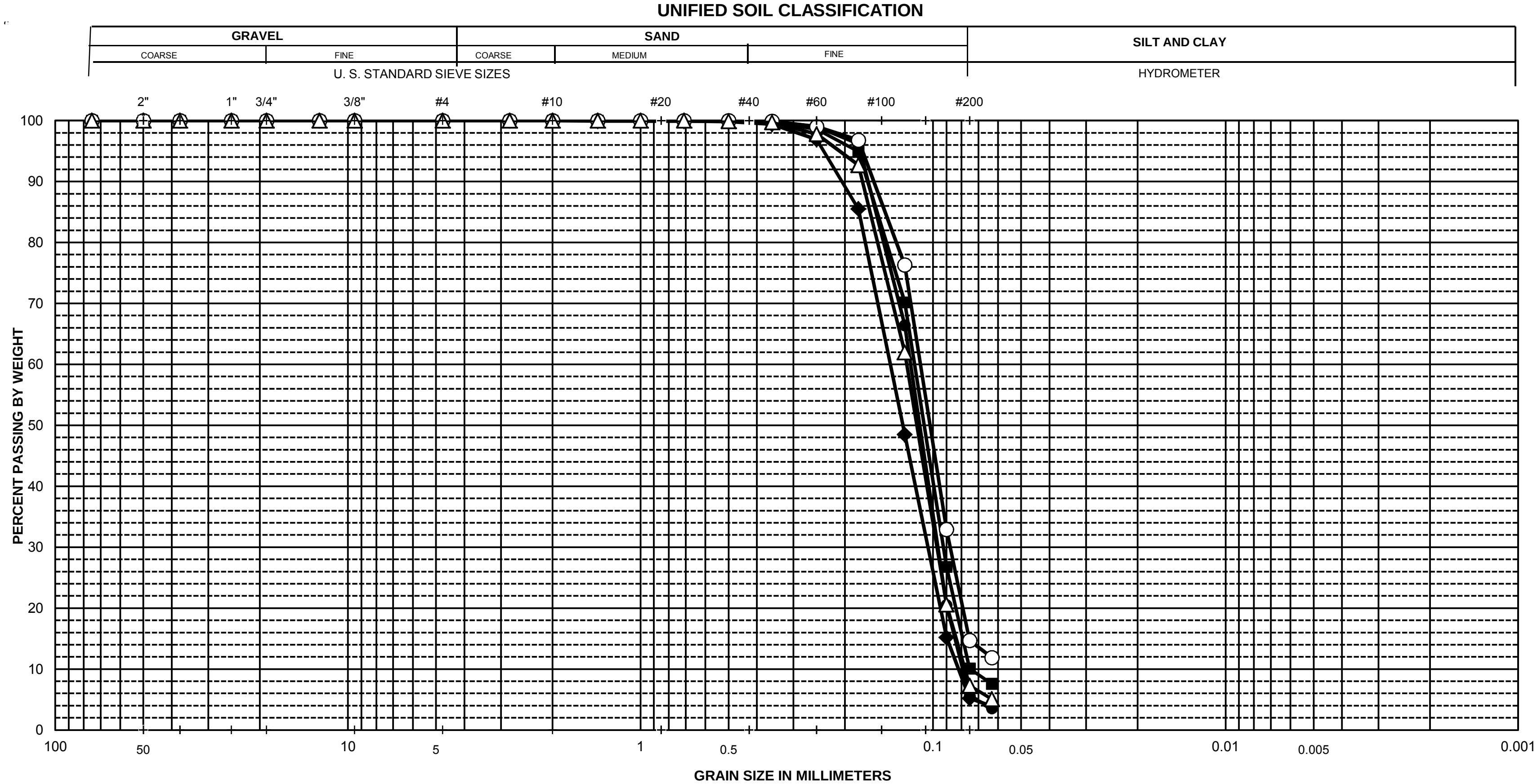

Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-C-01	1	0.0-2.0	●	33.2	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-01	2	2.0-8.5	■	31.9	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-01	3	8.5-13.5	◆	28.0	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-02	1	0.0-2.0	O	33.7	---	---	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments
OSHVC-17-C-02	2	2.0-5.5	Δ	32.7	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments

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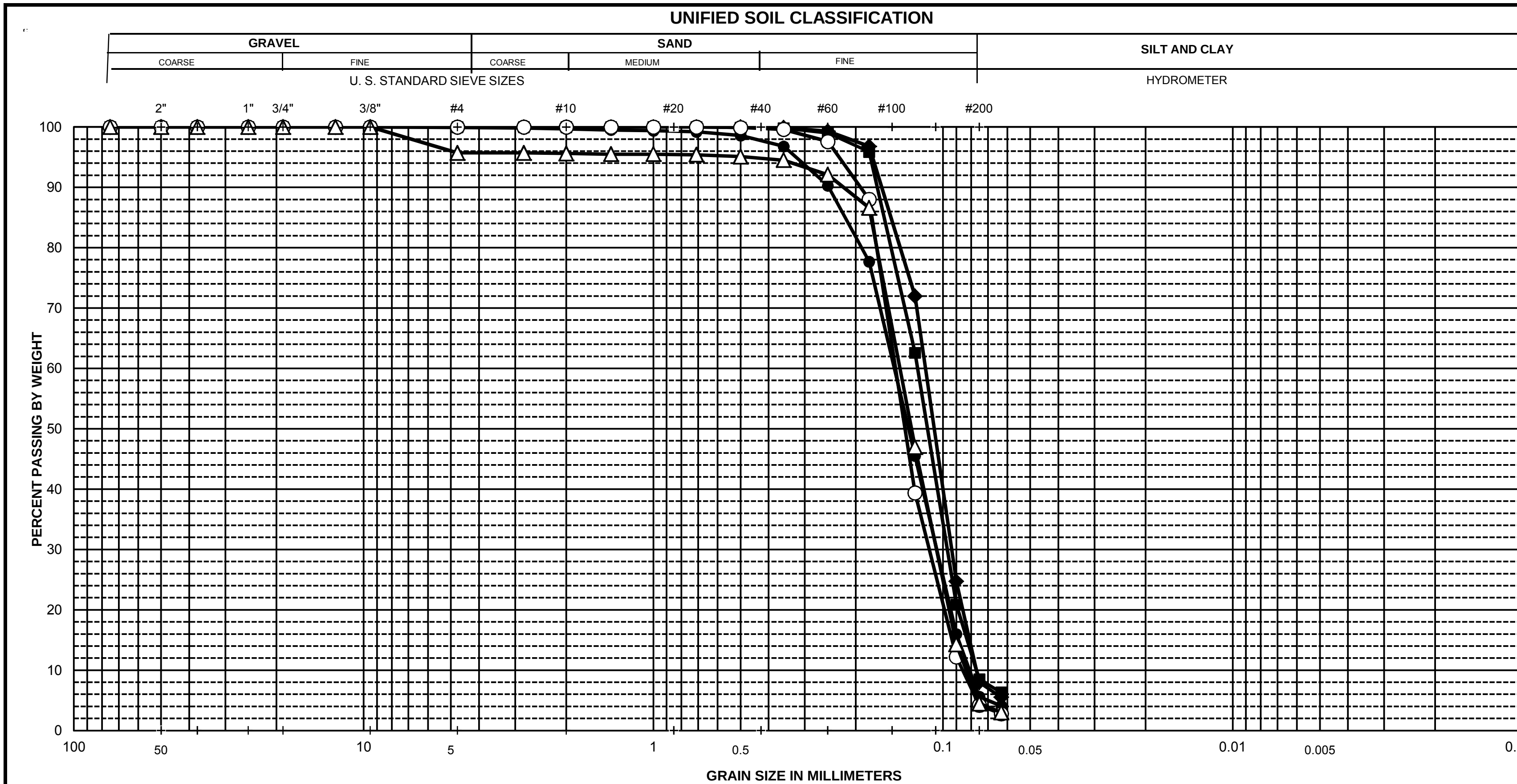
PARTICLE-SIZE DISTRIBUTION CURVES
AREA C

Figure No. H- 9



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-C-02	3	5.5-11.1	●	27.0	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-03	1	0.0-2.0	■	32.6	---	---	**Dark gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-03	2	2.0-6.6	◆	32.1	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-03	3	6.6-12.0	O	28.4	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-C-04	1	0.0-2.0	Δ	32.9	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments

AECOM	**Oceanside Harbor Dredge Analysis - USACE** **Oceanside, California**	**PARTICLE-SIZE DISTRIBUTION CURVES** **AREA C**	**Figure No.** **H- 10**
	Project: 60555449 / **Date:** February 2018		

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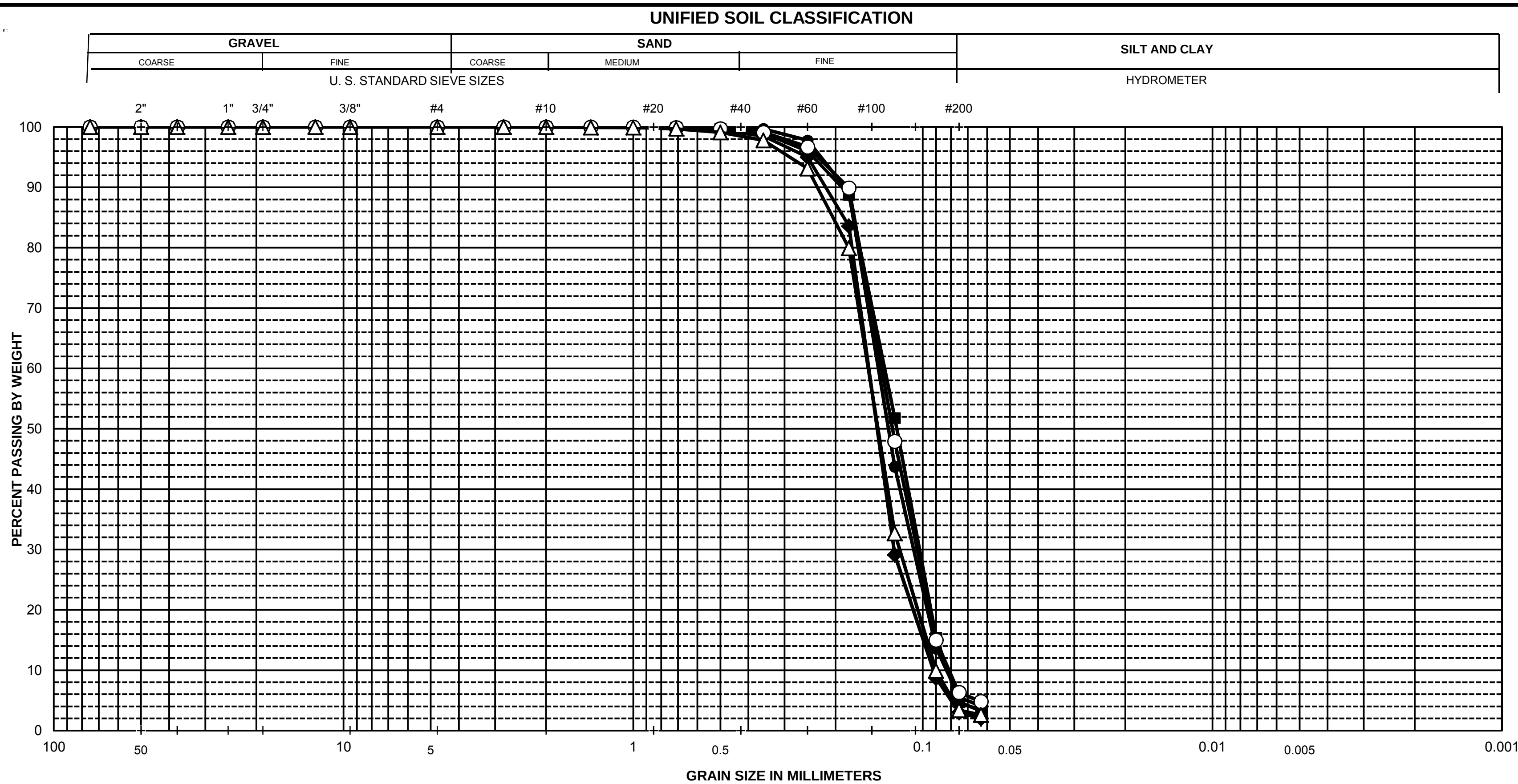

Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-C-04	2	2.0-7.0	●	32.4	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-04	3	7.0-11.8	■	30.7	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-C-05	1	0.0-2.0	◆	31.6	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-C-05	2	2.0-8.4	O	32.7	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-05	3	8.4-10.7	Δ	29.3	---	---	**Light olive gray Poorly Graded SAND (SP)**	Harbor Channel Sediments

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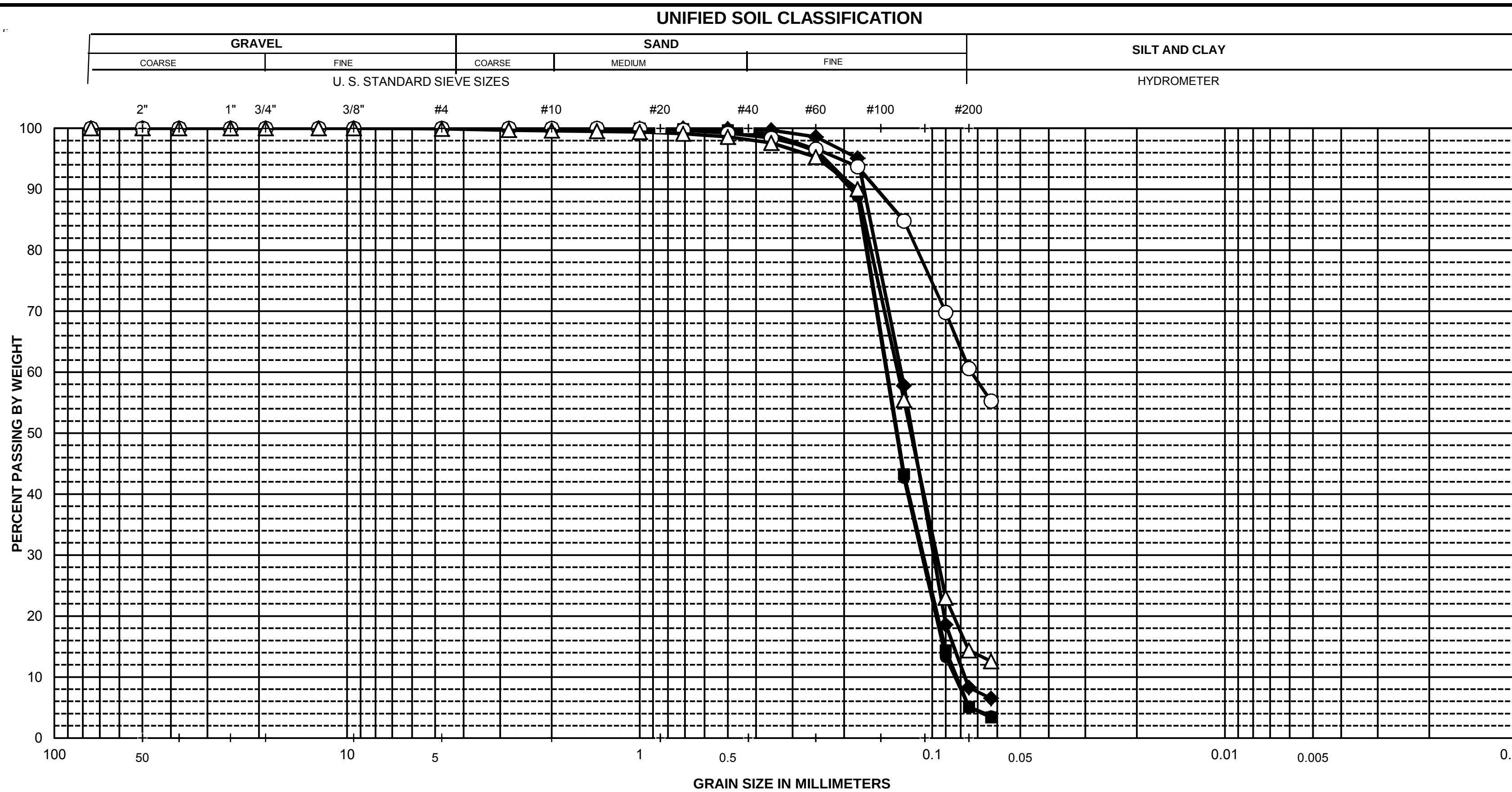
PARTICLE-SIZE DISTRIBUTION CURVES
AREA C

Figure No. H- 11



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-C-06	1	0.0-2.0	●	34.9	---	---	**Greenish gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-06	2	2.0-7.2	■	31.5	---	---	**Greenish gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-06	3	7.2-10.2	◆	32.9	---	---	**Greenish gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-06	4	8.7	O	68.5	---	---	**Very dark gray Sand SILT (ML)**	Harbor Channel Sediments
OSHVC-17-C-07	1	0.0-0.7	Δ	39.8	---	---	**Very dark gray Silty SAND (SM)**	Harbor Channel Sediments

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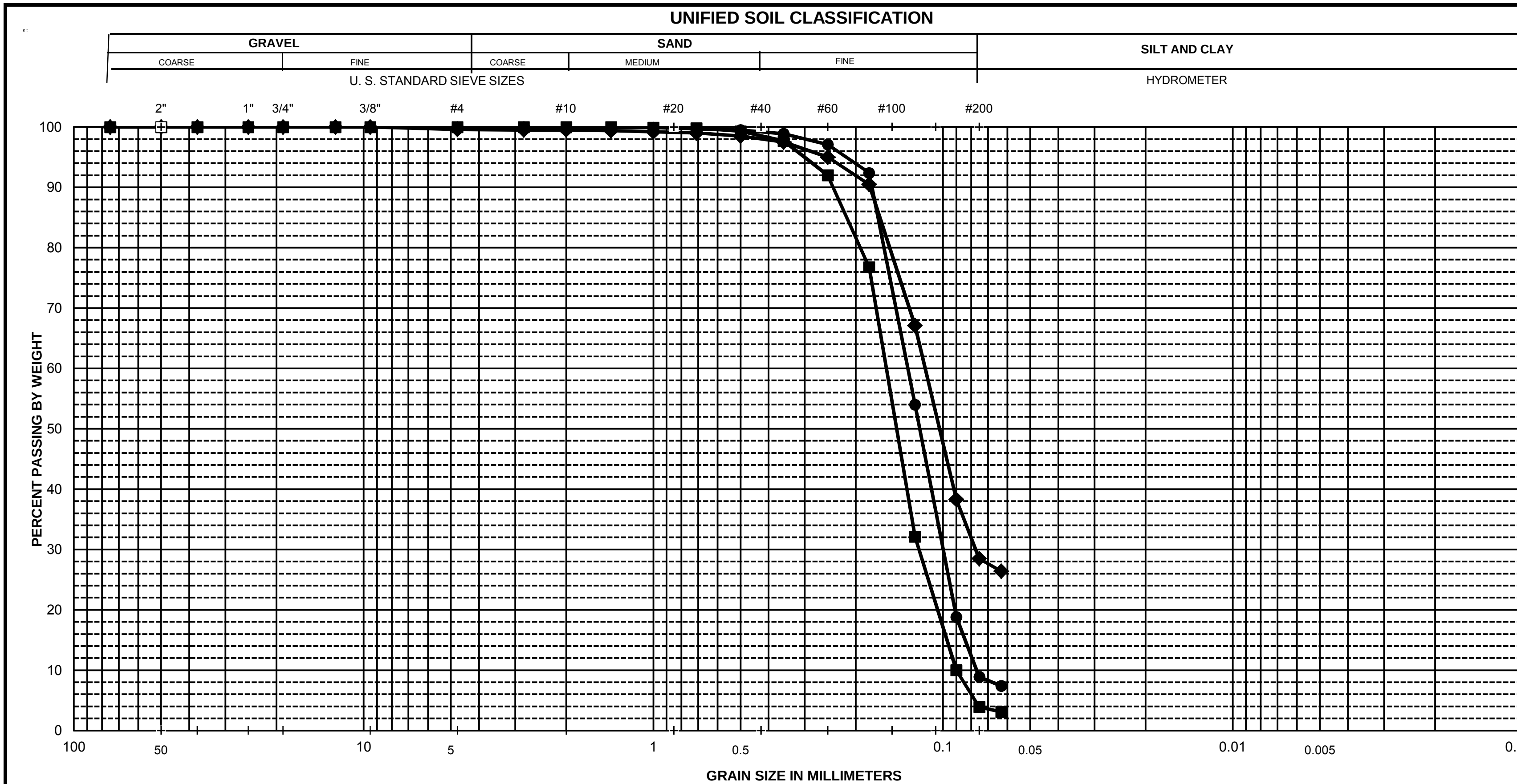
PARTICLE-SIZE DISTRIBUTION CURVES
AREA C

Figure No. H- 12



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSHVC-17-C-07	2	0.7-4.1	●	32.3	---	---	**Greenish gray Poorly Graded SAND with Silt (SP-SM)**	Harbor Channel Sediments
OSHVC-17-C-07	3	4.1-6.0	■	31.2	---	---	**Greenish gray Poorly Graded SAND (SP)**	Harbor Channel Sediments
OSHVC-17-C-07	4	6.0-11.0	◆	39.9	---	---	**Greenish gray to very dark gray Silty SAND (SM)**	Harbor Channel Sediments

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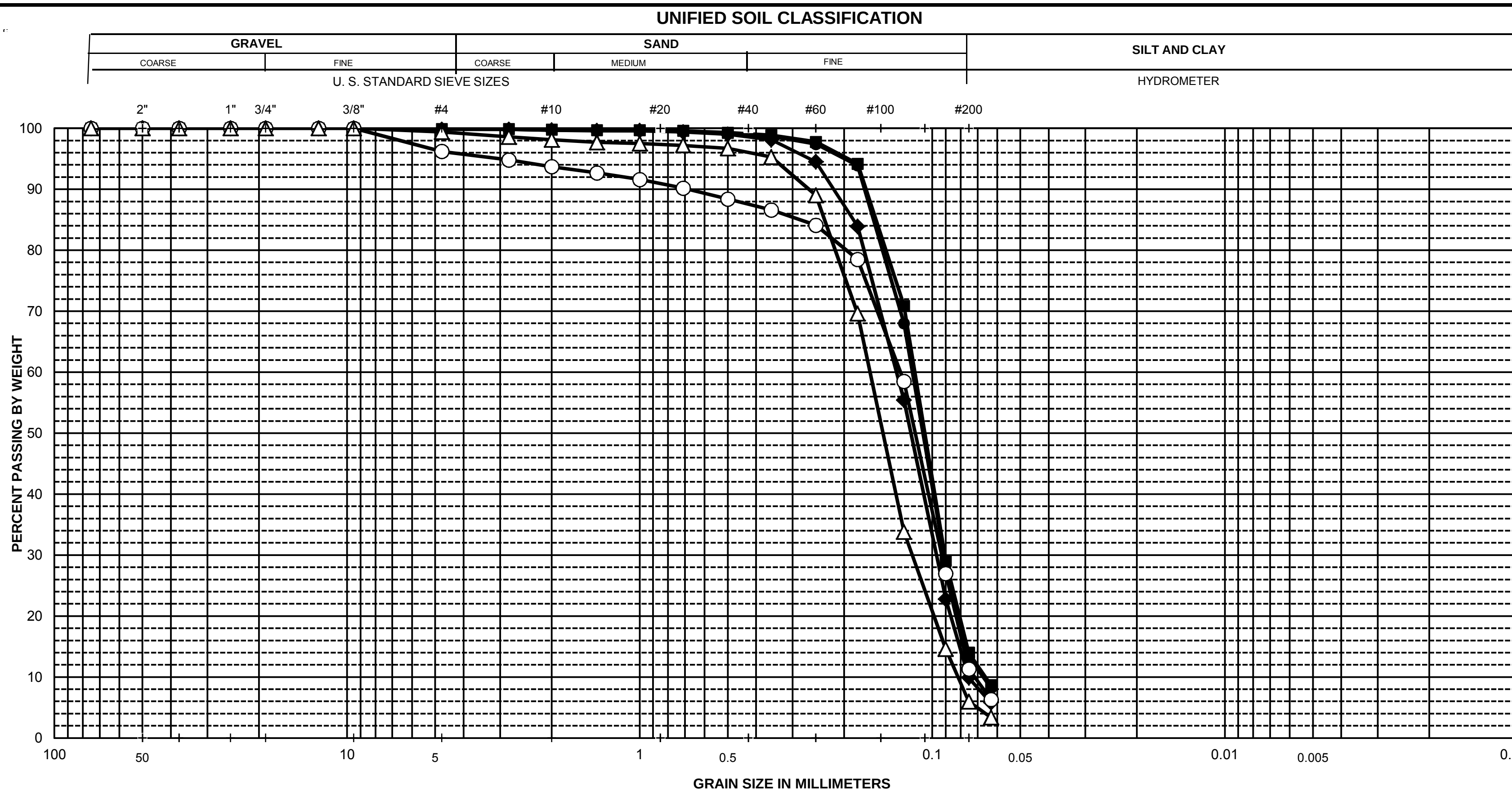
PARTICLE-SIZE DISTRIBUTION CURVES
AREA C

Figure No. H- 13



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBNS17-D	1	---	●	31.7	---	---	**Dark olive gray Silty SAND (SM)**	Beach Sediments
OSCBNS17-D	2	---	■	28.5	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments
OSCBNS17-D	3	---	◆	28.1	---	---	**Olive Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBNS17-D	4	---	O	26.5	---	---	**Olive Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBNS17-D	5	---	Δ	25.2	---	---	**Olive Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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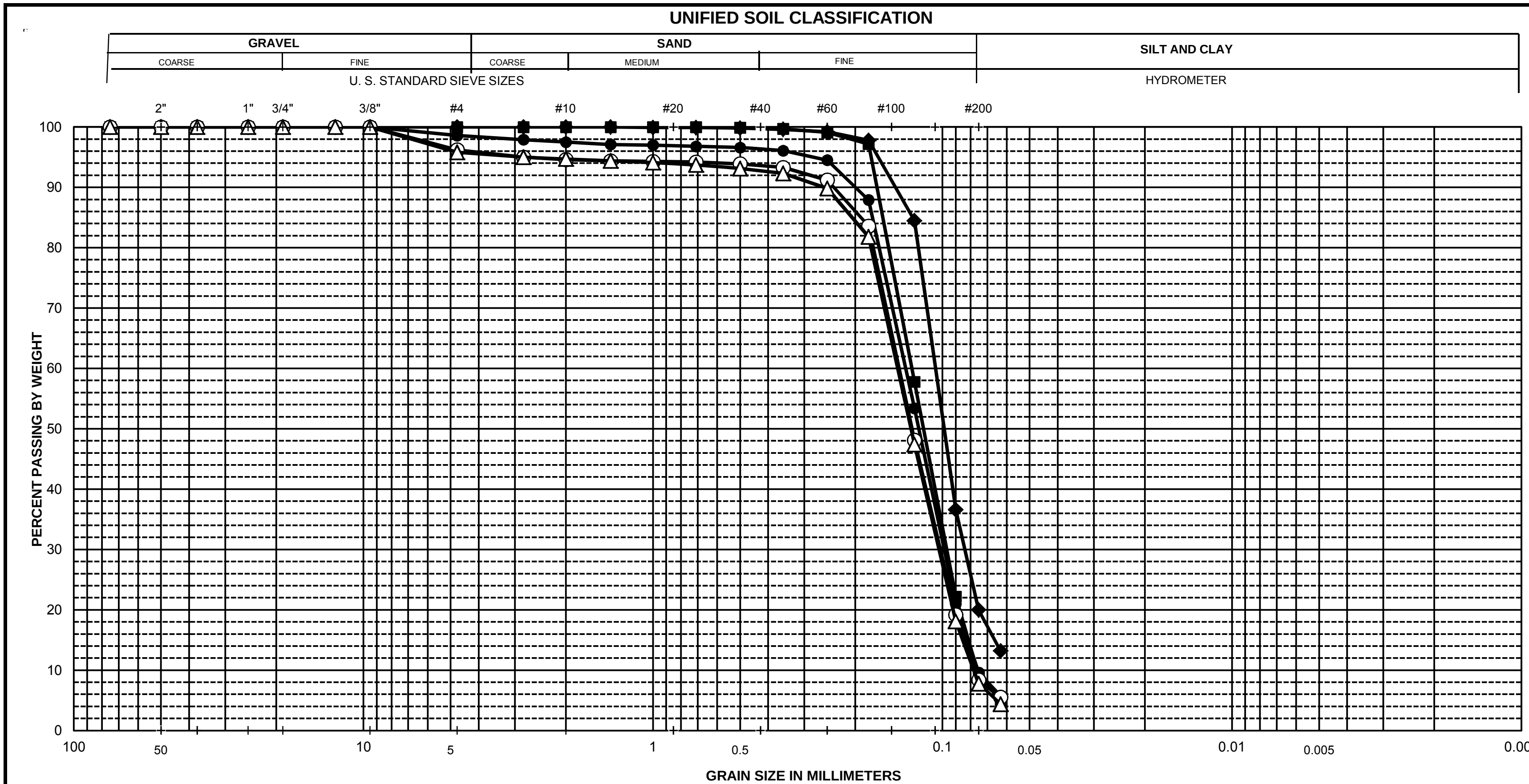
PARTICLE-SIZE DISTRIBUTION CURVES NEARSHORE

Figure No. H- 14



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBNS17-D	6	---	●	35.3	---	---	**Dark olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBNS17-D	7	---	■	29.2	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBNS17-D	8	---	◆	32.3	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments
OSCBNS17-D	9	---	O	33.2	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBNS17-D	10	---	Δ	28.7	---	---	**Gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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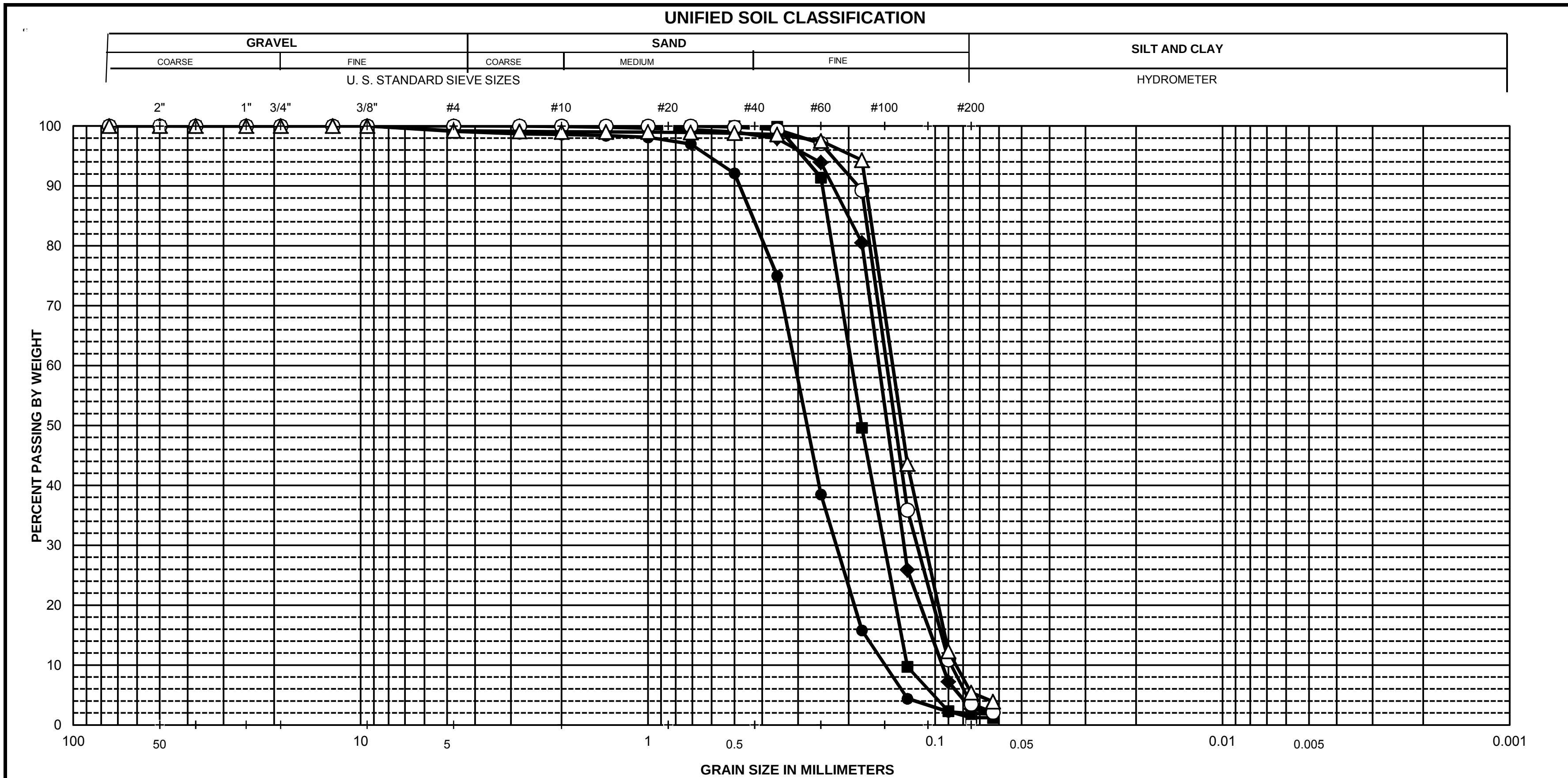
PARTICLE-SIZE DISTRIBUTION CURVES
NEARSHORE

Figure No. H- 15



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-A	1	EL +12	●	1.6	---	---	**White Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-A	2	EL +6	■	21.8	---	---	**Light greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-A	3	EL 0	◆	28.2	---	---	**Greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-A	4	EL -6	O	32.2	---	---	**Greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-A	5	EL -12	Δ	33.5	---	---	**Greenish gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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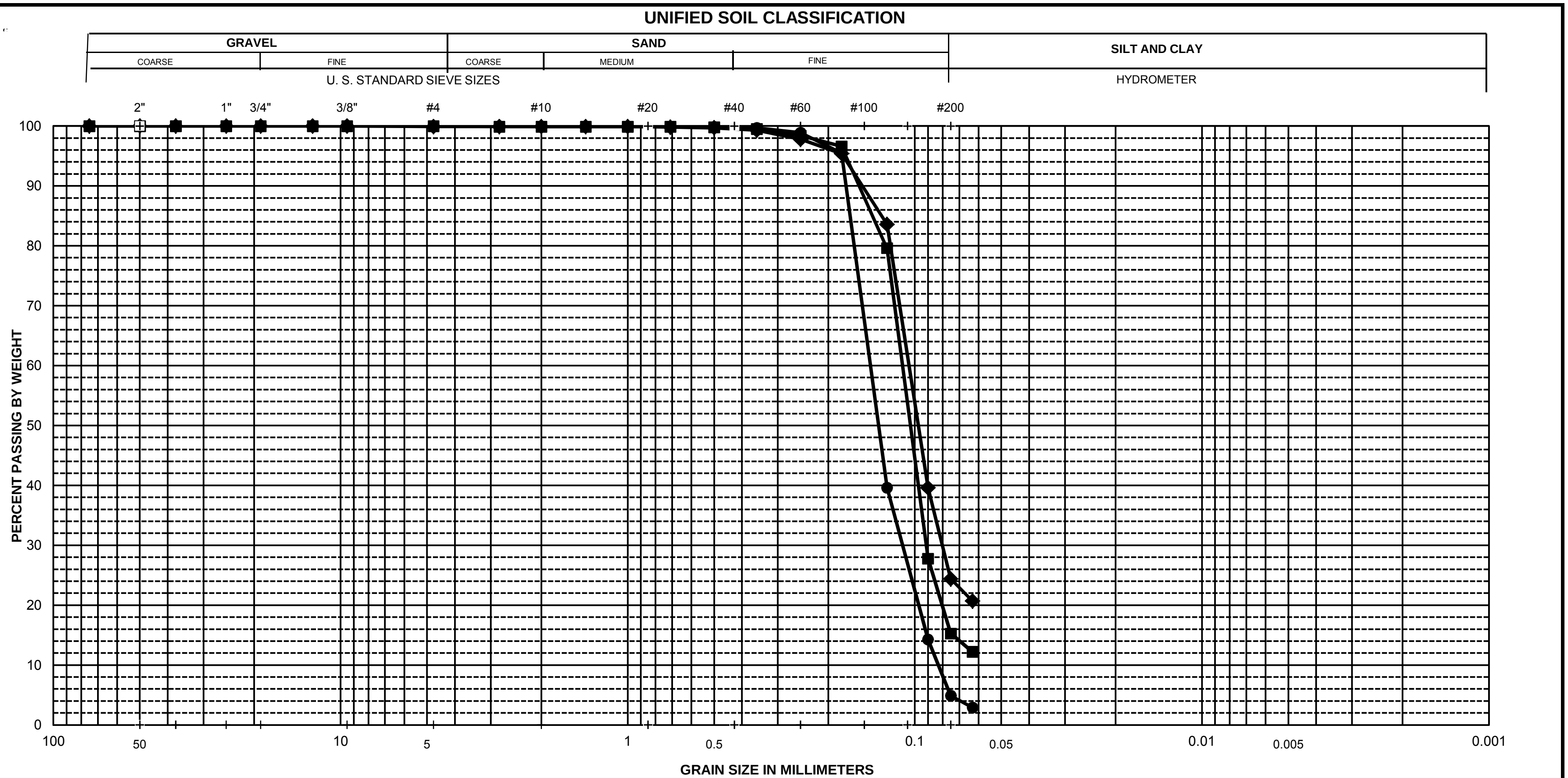
PARTICLE-SIZE DISTRIBUTION CURVES
TRANSECT A

Figure No. H- 16



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-A	6	EL -18	●	39.7	---	---	**Greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-A	7	EL -24	■	38.7	---	---	**Dark greenish gray Silty SAND (SM)**	Beach Sediments
OSCBTS17-A	8	EL -30	◆	27.2	---	---	**Dark greenish gray Silty SAND (SM)**	Beach Sediments

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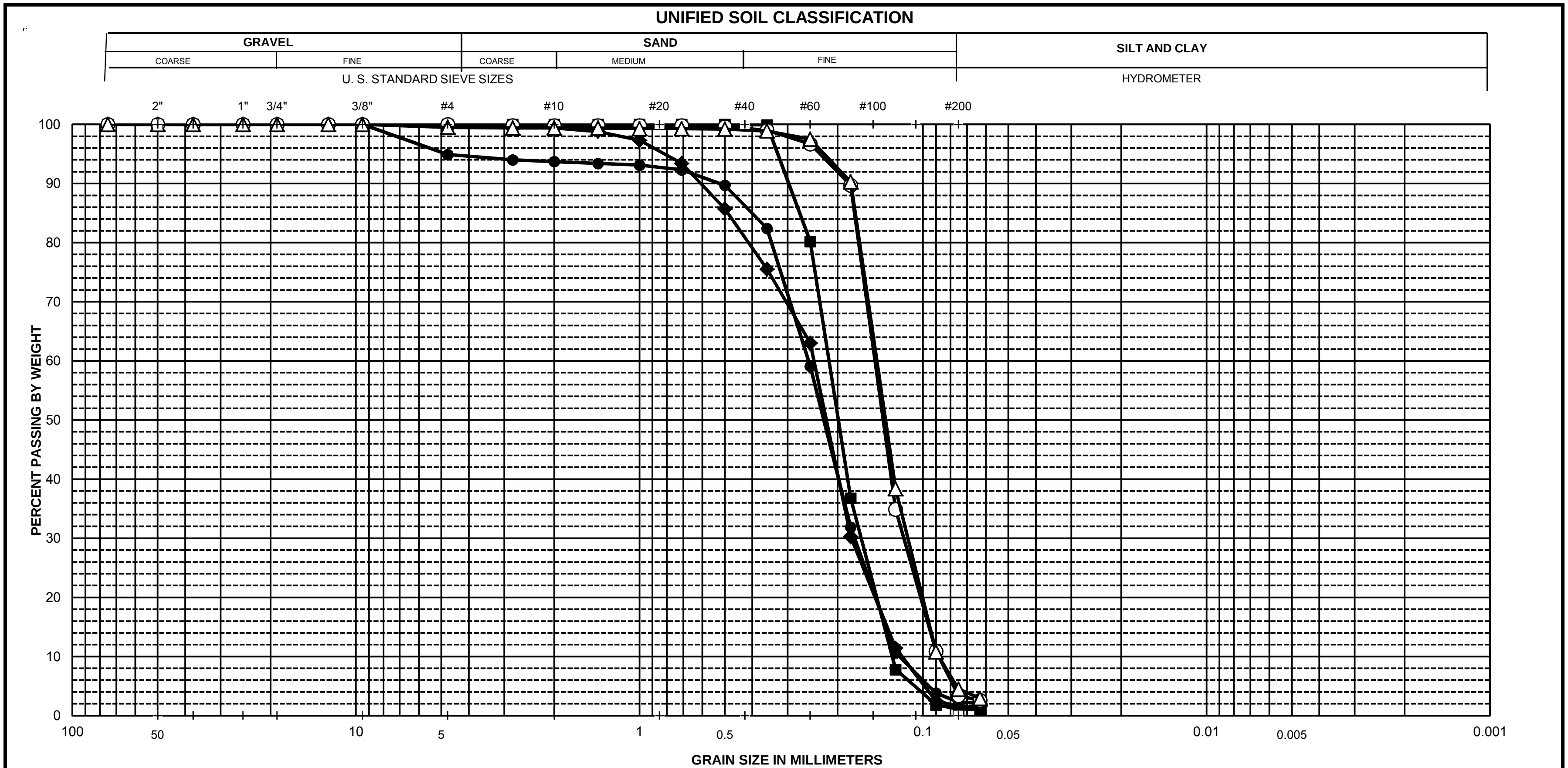
TRANSECT A

Figure No. H- 17

U:\Projects_Jobs\60555449 USACE_Oceanside Harbor\400-Technical\440-Field and Laboratory Data\Oceanside Harbor Compiled SAs - Transects A-F.xls



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-B	1	EL +12	●	0.7	---	---	**White Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-B	2	EL +6	■	16.2	---	---	**Light greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-B	3	EL 0	◆	23.8	---	---	**Light greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-B	4	EL -6	O	32.3	---	---	**Greenish gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-B	5	EL -12	Δ	28.3	---	---	**Greenish gray Poorly Graded SAND (SP)**	Beach Sediments

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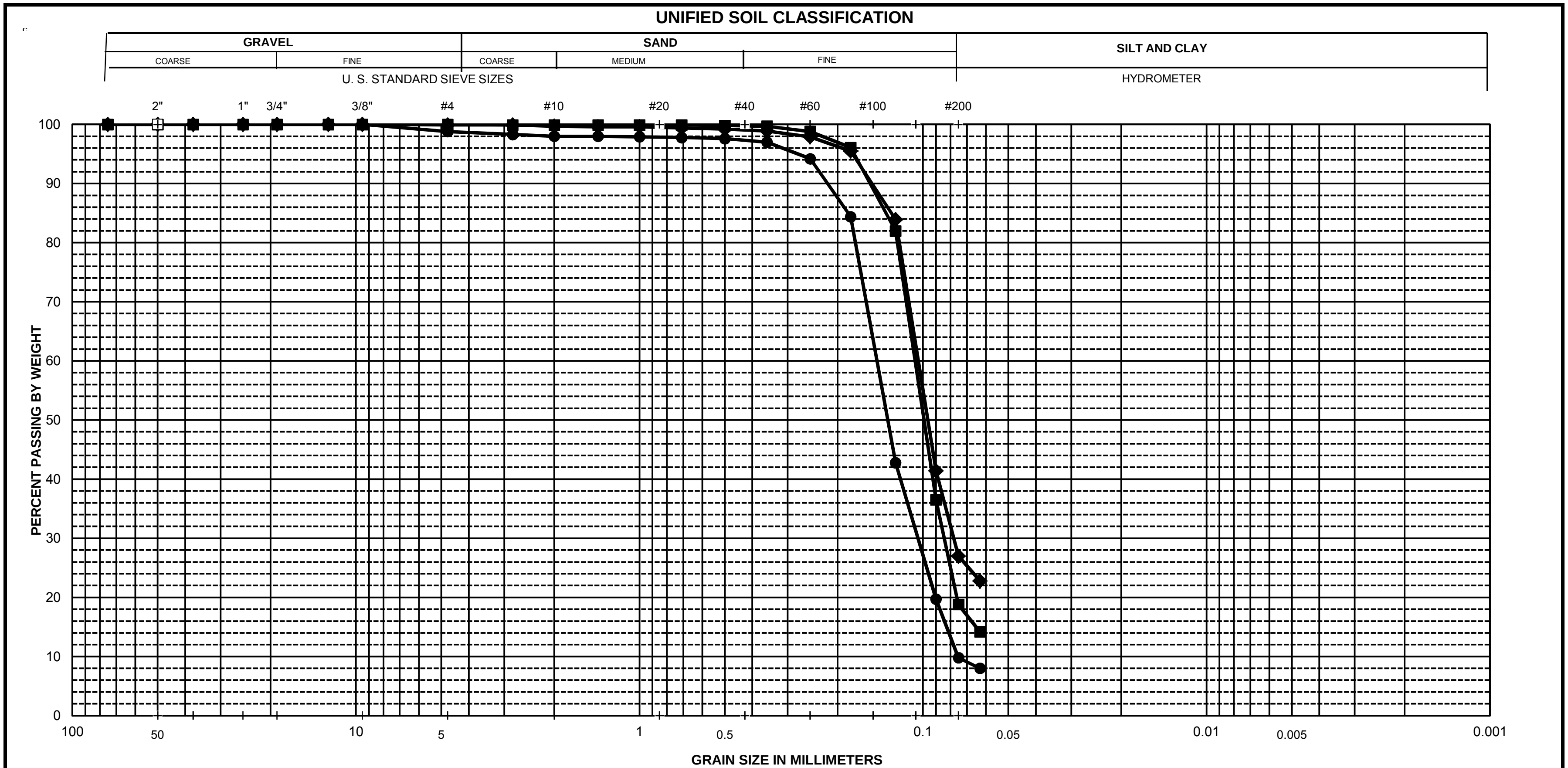
	Project: 60555449	**Date:** February 2018		



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-B	6	EL -18	●	33.0	---	---	**Dark greenish gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-B	7	EL -24	■	38.2	---	---	**Very dark greenish gray Silty SAND (SM)**	Beach Sediments
OSCBTS17-B	8	EL -30	◆	37.3	---	---	**Very dark greenish gray Silty SAND (SM)**	Beach Sediments

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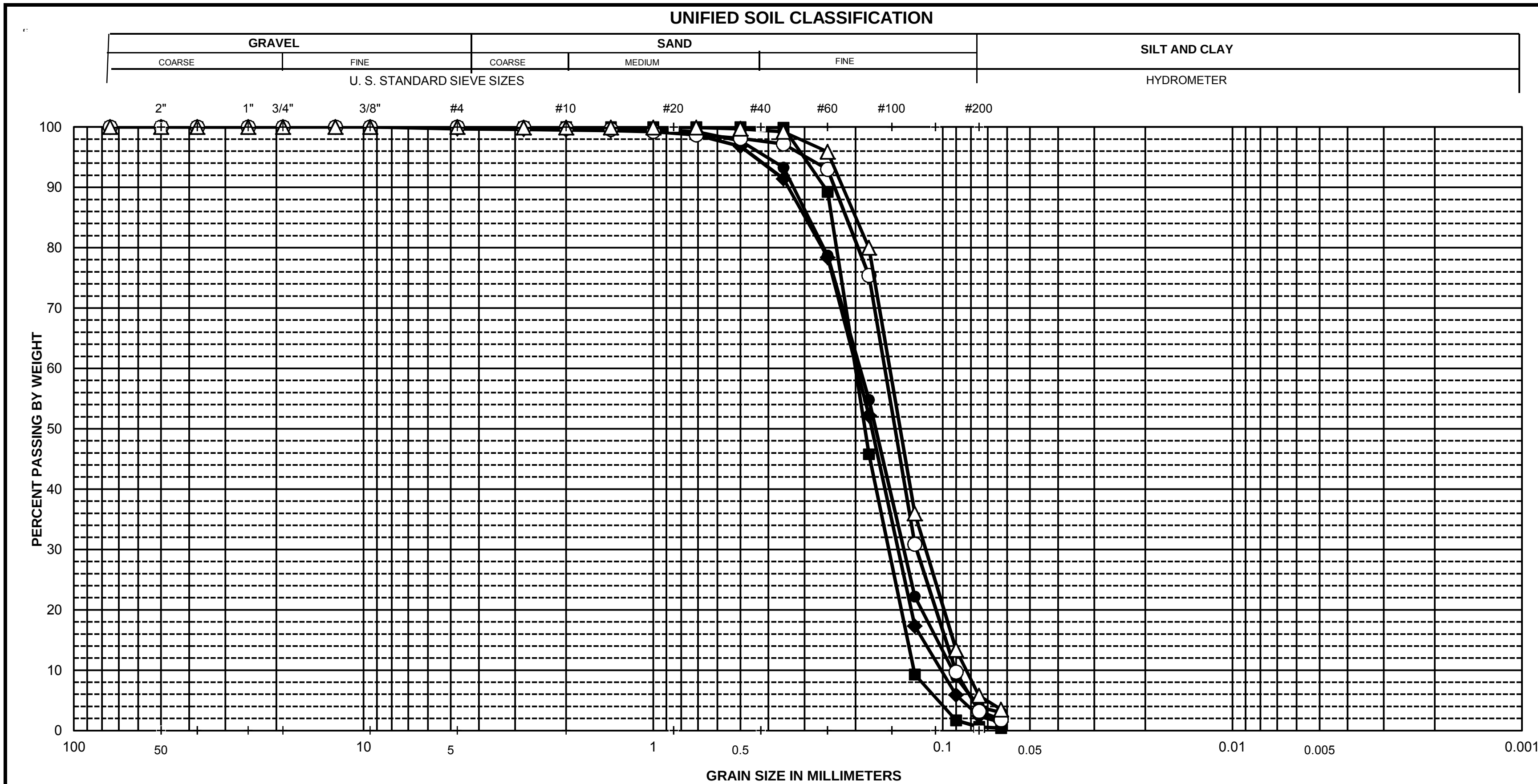
PARTICLE-SIZE DISTRIBUTION CURVES
TRANSECT B

Figure No. H- 19



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-C	1	EL +12	●	4.4	---	---	**Light olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-C	2	EL +6	■	7.4	---	---	**Light gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-C	3	EL 0	◆	24.0	---	---	**Gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-C	4	EL -6	O	28.1	---	---	**Gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-C	5	EL -12	Δ	35.4	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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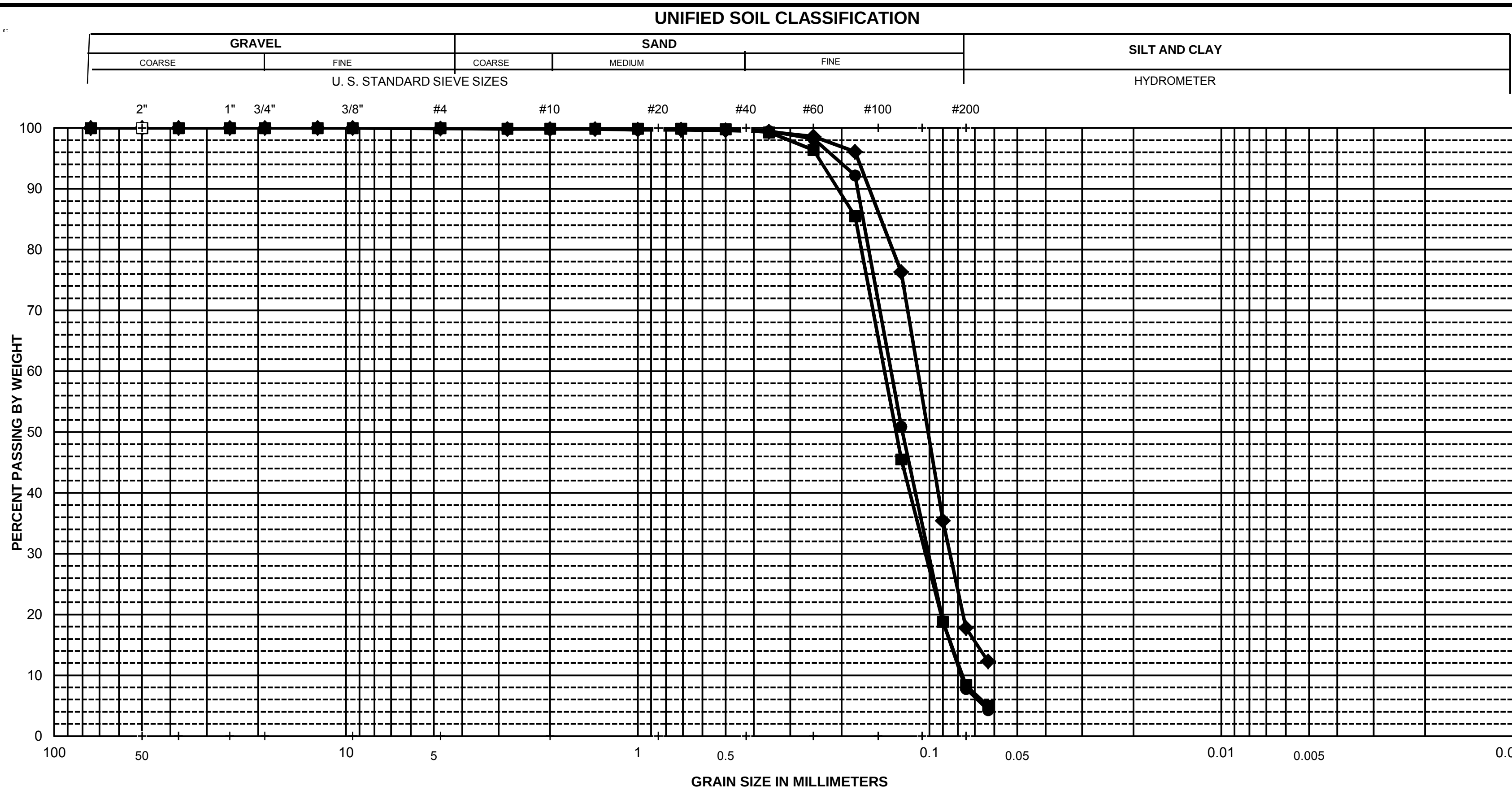
PARTICLE-SIZE DISTRIBUTION CURVES
TRANSECT C

Figure No. H- 20



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-C	6	EL -18	●	31.2	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-C	7	EL -24	■	36.0	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-C	8	EL -30	◆	30.9	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments

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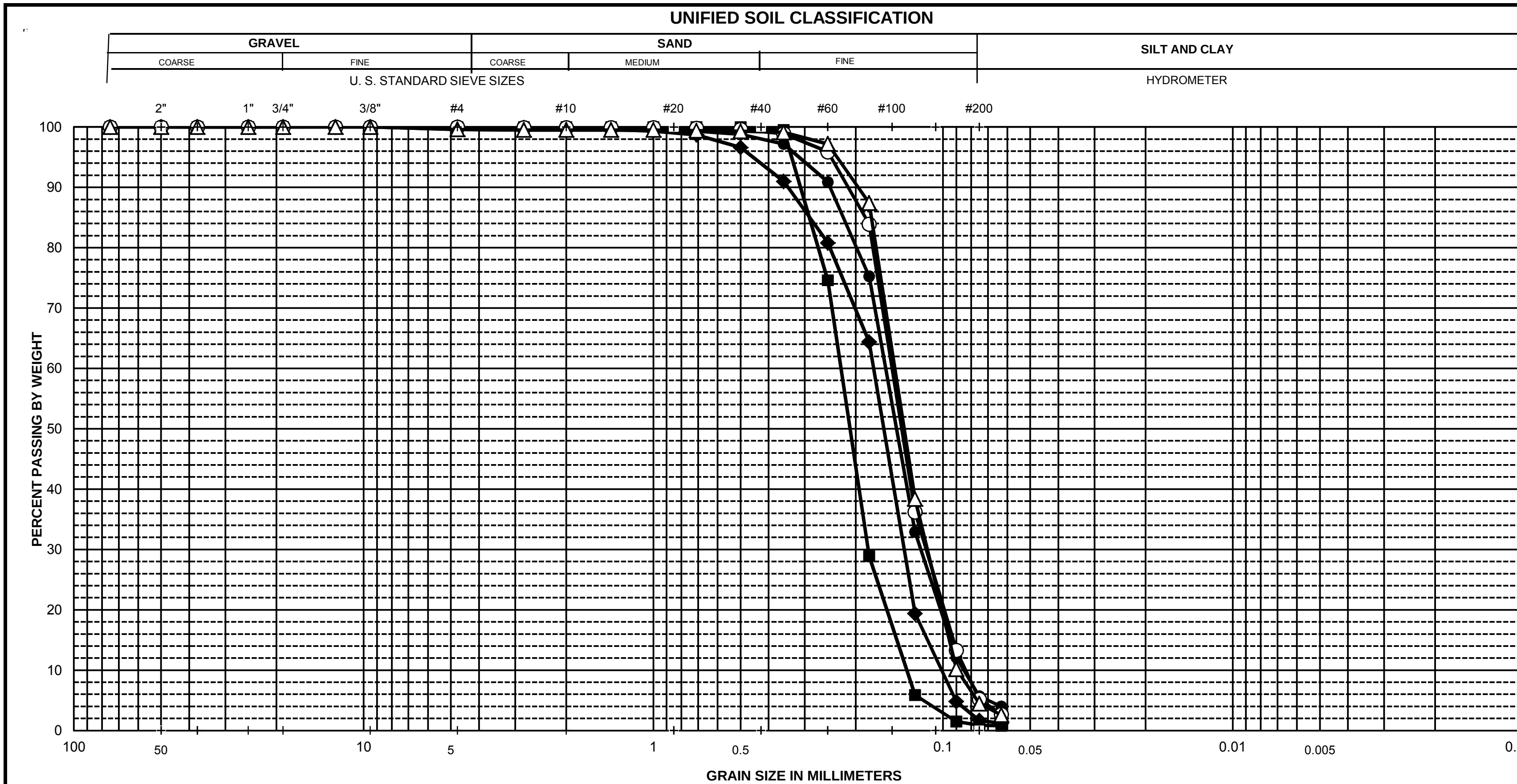
PARTICLE-SIZE DISTRIBUTION CURVES
TRANSECT C

Figure No. H- 21



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-D	1	EL +12	●	1.2	---	---	**Light gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-D	2	EL +6	■	18.3	---	---	**Gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-D	3	EL 0	◆	28.7	---	---	**Light olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-D	4	EL -6	O	28.5	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-D	5	EL -12	Δ	36.4	---	---	**Olive gray Poorly Graded SAND (SP)**	Beach Sediments

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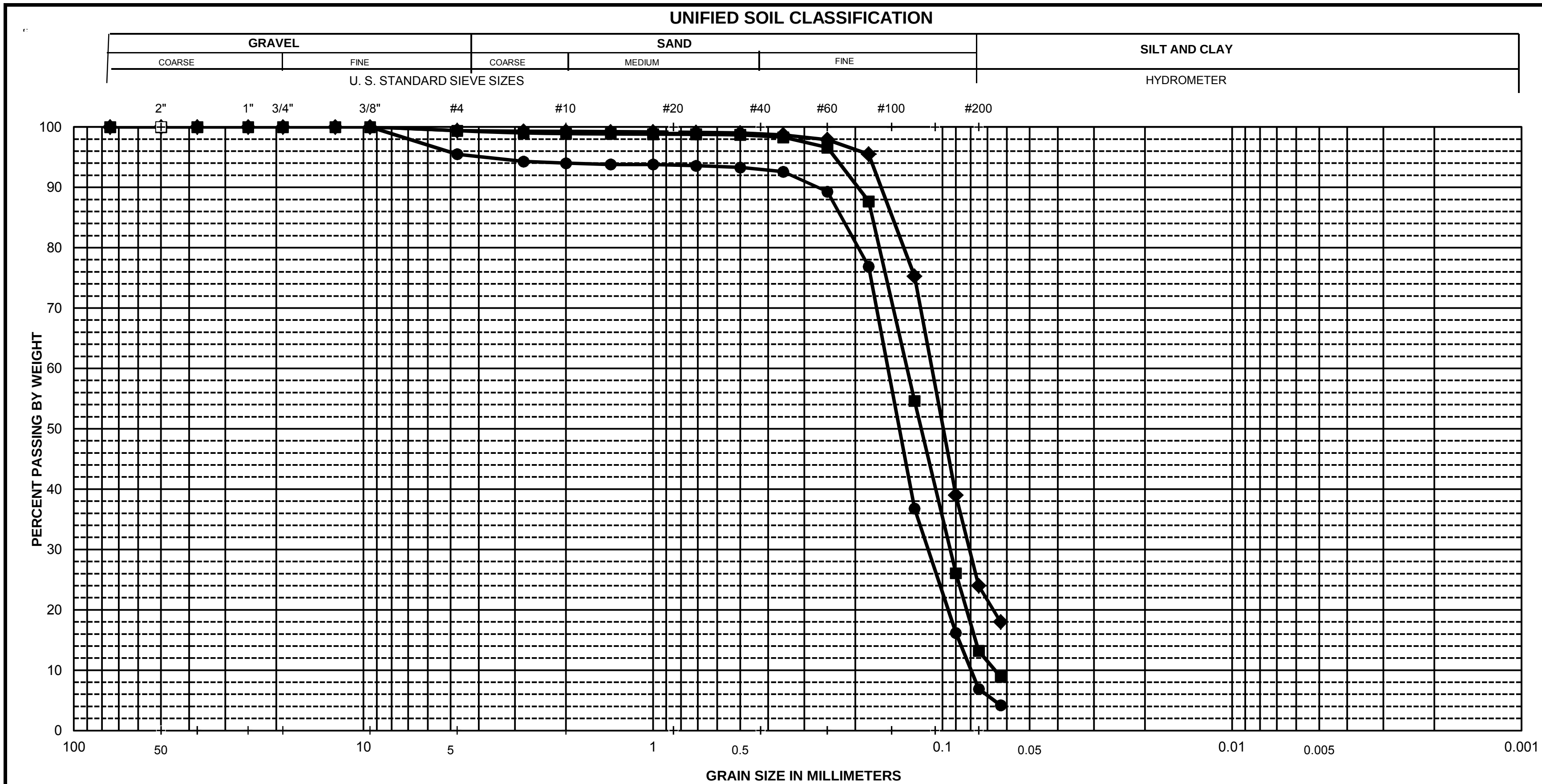
TRANSECT D

Figure No. H- 22

U:\Projects_Jobs\60555449 USACE_Oceanside Harbor\400-Technical\440-Field and Laboratory Data\Oceanside Harbor Compiled SAs - Transects A-F.xls



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-D	6	EL -18	●	32.3	---	---	**Light olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-D	7	EL -24	■	37.5	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments
OSCBTS17-D	8	EL -30	◆	39.3	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments

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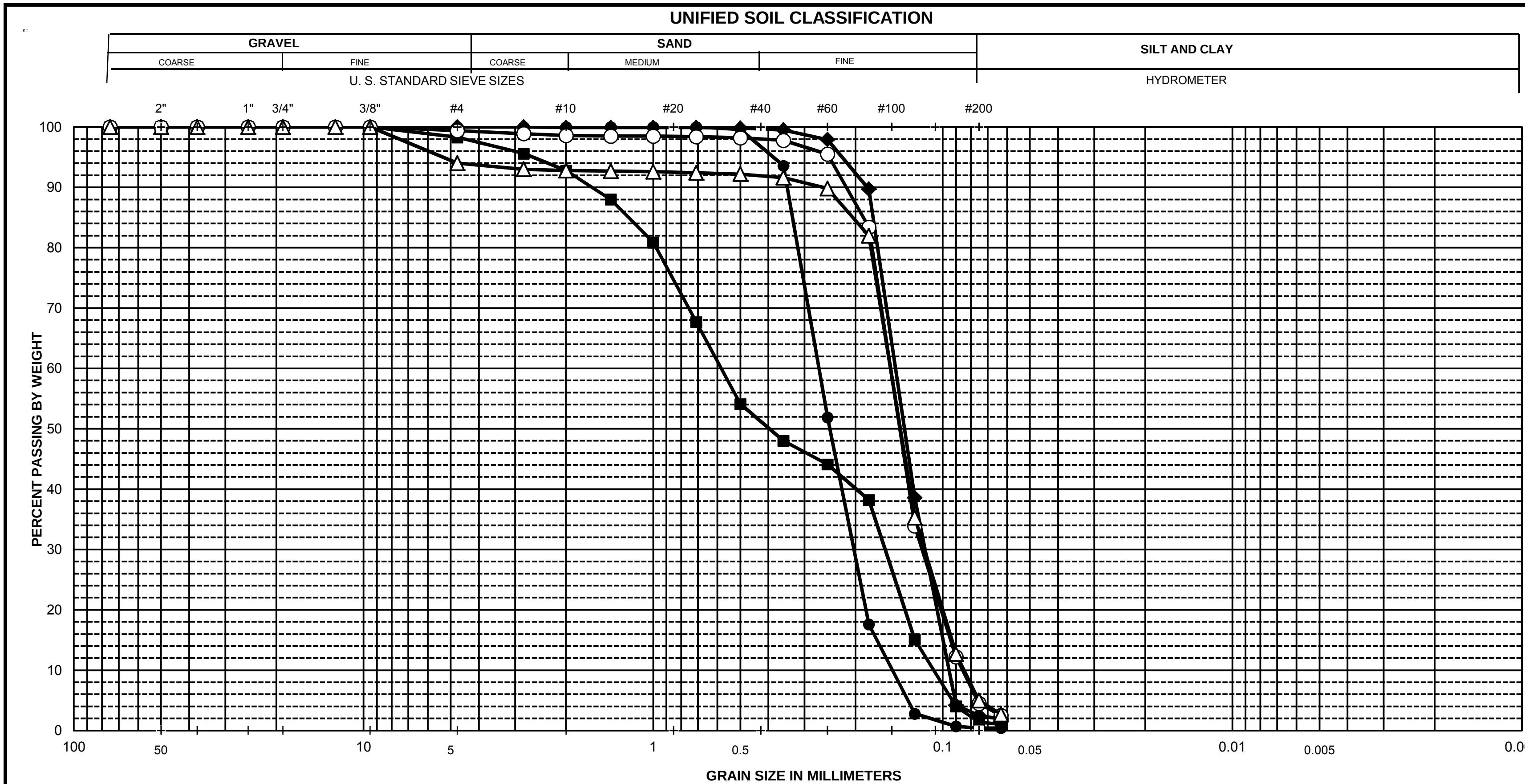
Figure No. H- 23

U:\Projects_Jobs\60555449 USACE_Oceanside Harbor\400-Technical\440-Field and Laboratory Data\Oceanside Harbor Compiled SAs - Transects A-F.xls



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-E	1	EL +6	●	4.9	---	---	**Light gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-E	2	EL 0	■	19.8	---	---	**Light olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-E	3	EL -6	◆	32.3	---	---	**Olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-E	4	EL -12	O	31.5	---	---	**Olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-E	5	EL -18	Δ	29.3	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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PARTICLE-SIZE DISTRIBUTION CURVES
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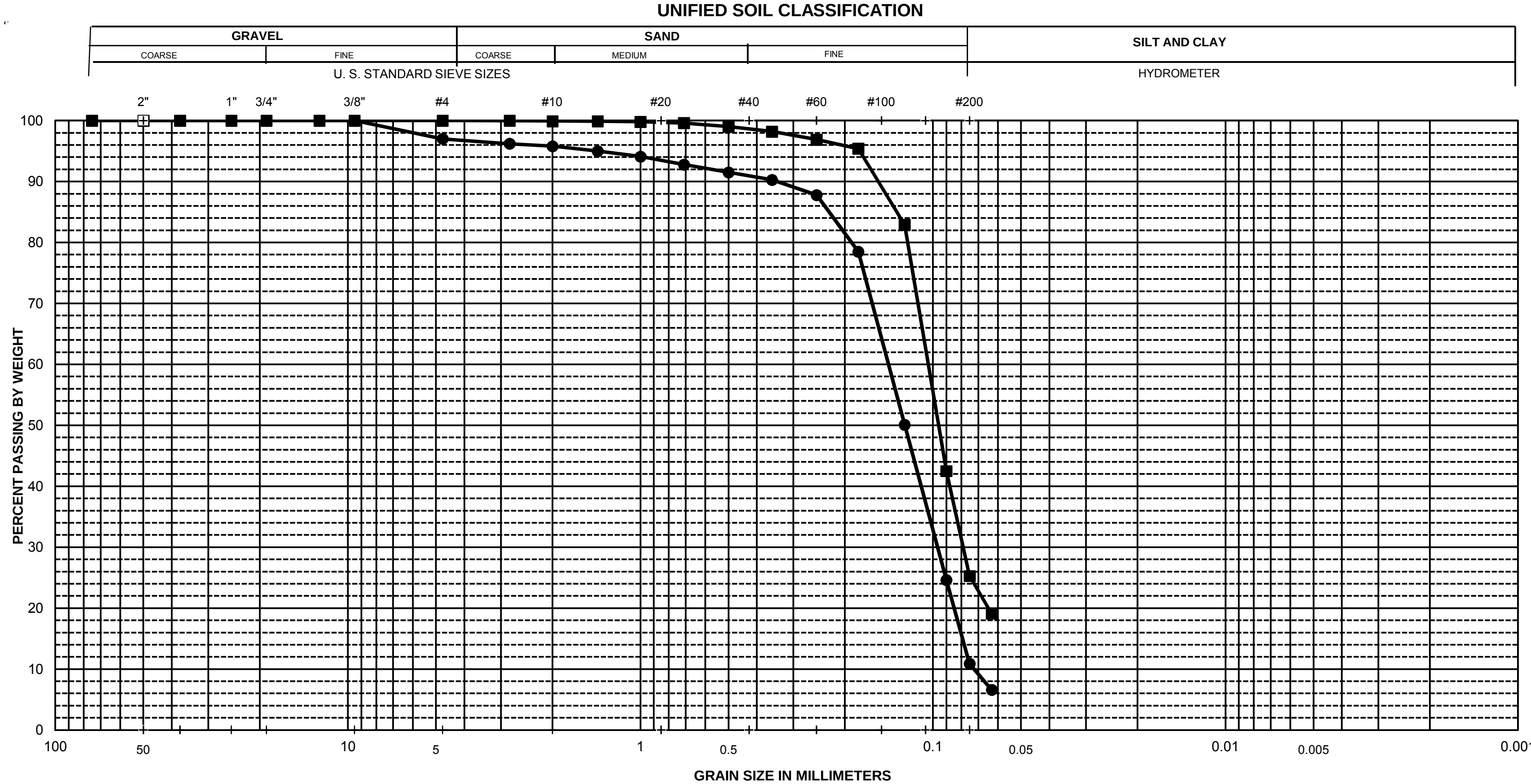
Figure No. H- 24



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-E	6	EL -24	●	26.9	---	---	**Olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-E	7	EL -30	■	35.8	---	---	**Dark olive gray Silty SAND (SM)**	Beach Sediments

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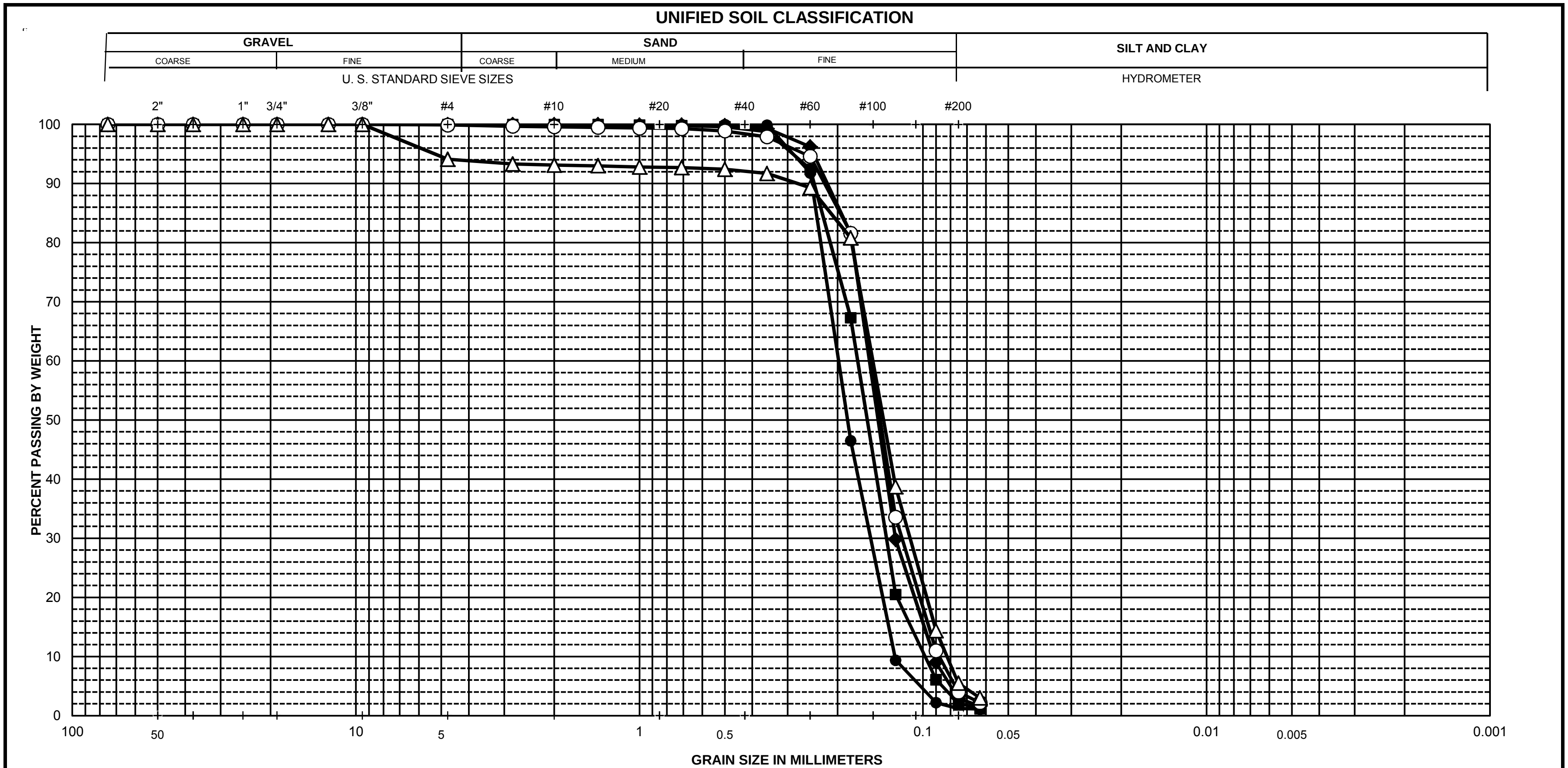
TRANSECT E

Figure No. H- 25



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-F	1	EL +2.3	●	22.2	---	---	**Gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-F	2	EL 0	■	26.9	---	---	**Light olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-F	3	EL -6	◆	29.6	---	---	**Olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-F	4	EL -12	O	29.0	---	---	**Olive gray Poorly Graded SAND (SP)**	Beach Sediments
OSCBTS17-F	5	EL -18	Δ	32.4	---	---	**Dark olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments

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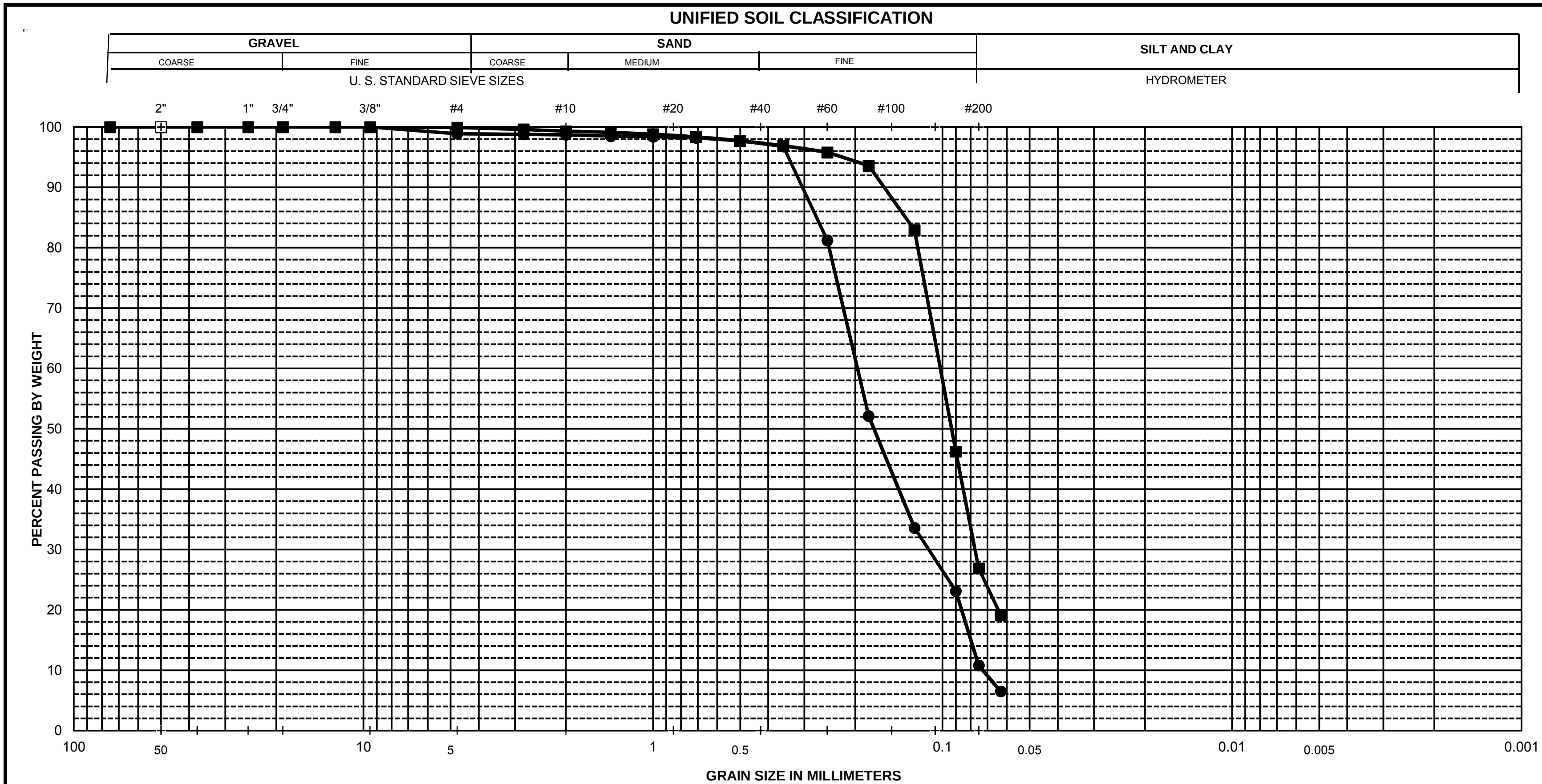
PARTICLE-SIZE DISTRIBUTION CURVES
TRANSECT F

Figure No. H- 26



Exploration	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	Description and Classification	Geologic Unit
OSCBTS17-F	6	EL -24	●	33.4	---	---	**Dark olive gray Poorly Graded SAND with Silt (SP-SM)**	Beach Sediments
OSCBTS17-F	7	EL -30	■	41.7	---	---	**Olive gray Silty SAND (SM)**	Beach Sediments

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TRANSECT F

Figure No. H- 27