FINAL
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

FOR

PALOS VERDES SHELF
CAPPING DEMONSTRATION PROJECT
Pacific Ocean
Palos Verdes, California

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

May 2000

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

FINDING OF NO SIGNIFICANT IMPACT FOR THE PALOS VERDES SHELF CAPPING DEMONSTRATION PROJECT LOS ANGELES COUNTY, CALIFORNIA

I have reviewed the attached Supplemental Environmental Assessment (SEA) prepared for the project in Los Angeles County. The proposed project is a modification to the Port of Long Beach Main Channel Deepening Project which will transport dredged material to the Palos Verdes Shelf.

The proposed project is required as part of the U. S. Environmental Protection Agency's Engineering Evaluation/Cost Assessment process to select a response action under its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorities for the Palos Verdes Shelf Site. The proposed project will transport dredged material to the Palos Verdes Shelf where the U. S. Environmental Protection Agency will conduct a demonstration project to evaluate the feasibility of an in-situ capping option. A Negative Determination has been submitted in place of a Consistency Determination to the California Coastal Commission for project concurrence. Coastal Commission staff has concurred with the Negative Determination.

Project impacts on marine resources will be minor and short-term. No federally-listed species will be adversely affected by project implementation. Therefore, formal Section 7 consultation is not required pursuant to the Endangered Species Act of 1969, as amended.

The implementing regulations for Section 106 of the National Historic Preservation Act (NHPA, 36 CFR 800) allow a federal agency to proceed with a project without further consultation if the project does not have the potential to cause effects on historic properties. Compliance with Section 106 of the NHPA is completed without input from the State Historic Preservation Officer (SHPO). The proposed project meets this criteria.

Other resources analyzed, including oceanography and water quality, air quality, noise, and vessel transportation and safety, in this SEA are not expected to result in significant adverse impacts.

Hence, I have considered the available information contained in this Supplemental Environmental Assessment and determined that the impacts resulting from the implementation of the proposed project will not have a significant adverse impact upon the existing environment or

the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____ _____

DATE

John P. Carroll
Colonel, Corps of Engineers
District Engineer

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ACRONYMS

APE .....Area of Potential Effects
AQMP .....Air Quality Management Plan
ARB .....Air Resources Board
CAA .....Clean Air Act
CDFG .....California Department of Fish and Game
CEQ.....Council on Environmental Quality
CERCLA.....Comprehensive Environmental Response, Cleanup, and Liability Act
CZMA .....Coastal Zone Management Act
DEIS.....Draft Environmental Impact Statement
EA .....Environmental Assessment
EE/CA .....Engineering Evaluation/Cost Analysis
EFH .....Essential Fish Habitat
EIS/EIR .....Environmental Impact Statement/Environmental Impact Report
ESA .....Endangered Species Act
FEA .....Final Environmental Assessment
FMP.....Fisheries Management Plan
FONSI .....Finding of No Significant Impact
FWCA .....Fish and Wildlife Coordination Act
ISC .....In Situ Capping
LAD .....U.S. Army Corps of Engineers, Los Angeles District
mcy.....million cubic yards
MLLW .....Mean Lower Low Water
NAAQS.....National Ambient Air Quality Standards
NEPA .....National Environmental Policy Act
NHPA.....National Historic Preservation Act
NMFS.....National Marine Fisheries Service
NOAA .....National Oceanographic and Atmospheric Administration
PL.....Public Law
POLA .....Port of Los Angeles
POLB .....Port of Long Beach
PV Shelf.....Palos Verdes Shelf
ROD .....Record of Decision
SCAQMD .....South Coast Air Quality Management District
SEA .....Supplemental Environmental Assessment
SHPO .....State Historic Preservation Officer
SIP.....State Implementation Plan
USACE .....U. S. Army Corps of Engineers
USEPA.....U. S. Environmental Protection Agency
USFWS .....U. S. Fish and Wildlife Service
WES Waterways Experiment Station

SECTION 1 - INTRODUCTION

1.1 SUMMARY OF PROPOSED BENEFITS

The U.S. Army Corps of Engineers (USACE) Waterways Experiment Station (WES) performed technical studies for the National Oceanic and Atmospheric Administration (NOAA) in support of the Southern California Natural Resources Damage Assessment (Palermo, 1994). These studies focused on evaluation of sediment restoration alternatives for dichlorodiphenyltrichloroethane- (DDT) and polychlorinated biphenyl- (PCB)contaminated sediments on the PV Shelf off the coast of Los Angeles, California. The Palos Verdes Shelf (PV Shelf) is located approximately 25 miles southwest of Los Angeles in Los Angeles County, California (Figure 1).

A number of options for restoration were evaluated in the NOAA studies. One alternative, which does not involve removal of the sediments, was in situ capping (ISC) with clean materials. An initial determination of the feasibility of ISC was made as a part of the overall evaluation of options for sediment remediation performed for NOAA. The NOAA study concluded that in situ capping is a technically feasible alternative.

Region 9 of the U.S. Environmental Protection Agency (USEPA) is now considering response options for the site under its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorities. USEPA Region 9 has completed a screening evaluation of response actions that identified institutional controls and in situ capping as response actions, which satisfied screening criteria (USEPA 1997). Region 9 has relied heavily on WES technical support in conducting the necessary engineering and environmental analyses to determine the feasibility and effectiveness of in situ capping. An Engineering Evaluation/ Cost Analysis (EE/CA) has been prepared by USEPA Region 9 to evaluate the need for response actions such as in-situ capping and to evaluate the feasibility of capping options (USEPA, 2000). The EE/CA will be supplemented by information gained from this demonstration project.

The proposed project is to excavate and transport sediments to the PV Shelf site to be used for construction of a demonstration cap. The proposed project will allow the USEPA to evaluate the potential use of ISC in the field. WES technical studies have evaluated the feasibility of ISC (Palermo et.al., 1999), but there are many factors (i.e. depth of the site, slope in the site, and the soft-bottom nature of the site) that justify a demonstration project prior to commitment of funds to a full-scale capping project.

1.2 PROJECT PURPOSE

The overall objective of the field pilot study is to demonstrate that a cap can be placed on the PV Shelf as intended by the design and to obtain field data on the short-term processes and behavior of the cap as placed.

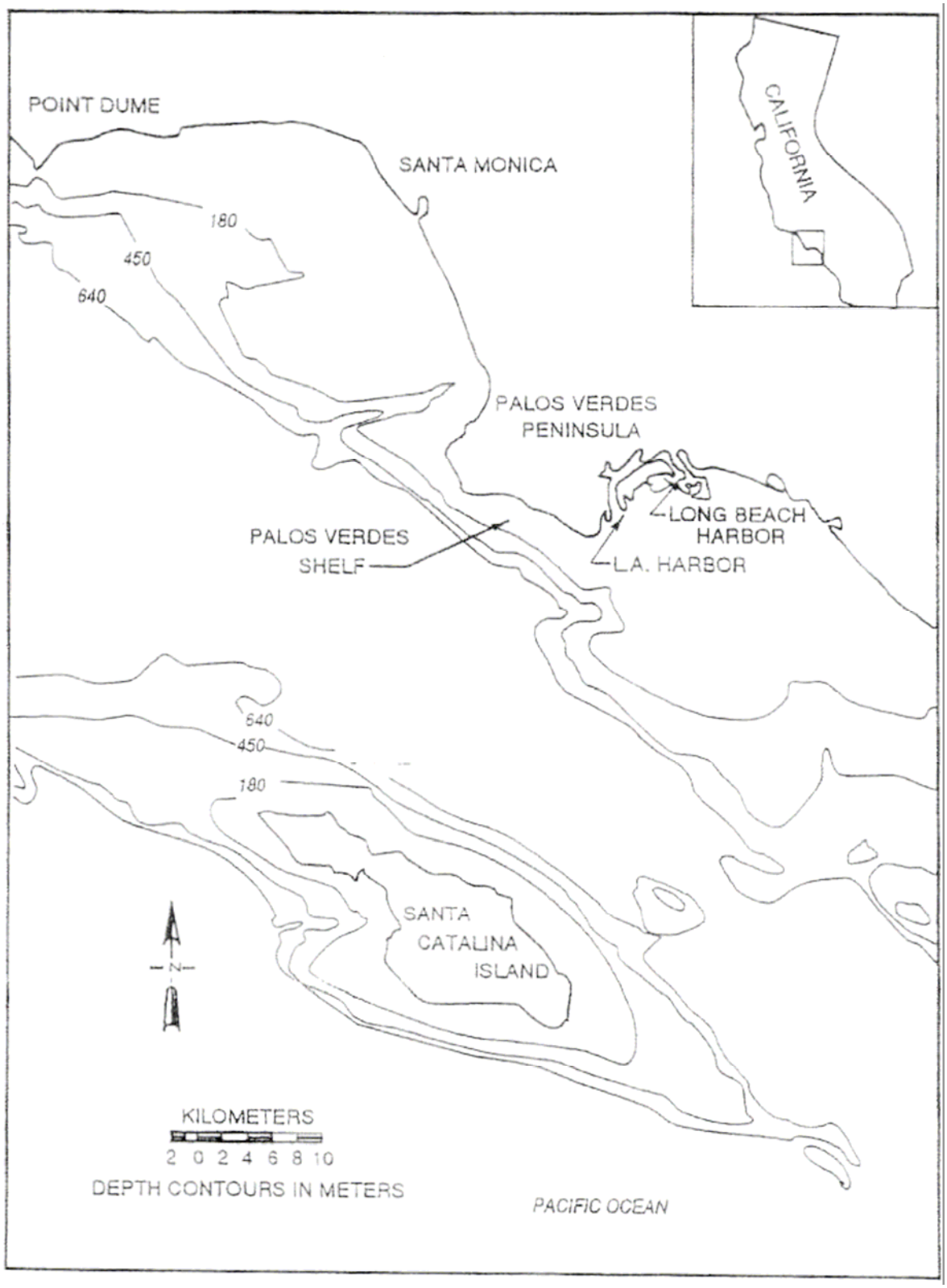

Figure 1. Project Location

1.3 PREVIOUSLY AUTHORIZED PROJECT

The Main Channel Deepening, Port of Long Beach (POLB), Long Beach, California, Record of Decision (ROD) was signed on March 4, 1997 by H. Martin Lancaster, Assistant Secretary of the Army. A copy of the signed ROD is in Appendix B. The Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) was completed and finalized by the U. S. Army Corps of Engineers, Los Angeles District (LAD) and the POLB in September 1995. The USACE is the federal and the POLB is the state lead agency for this project.

The Main Channel Deepening Project is to deepen and modify the approach channel outside the Queens Gate entrance to the POLB from –60 feet Mean Lower Low Water (MLLW) to –76 ft MLLW. At this depth, the total volume of dredge material is estimated at 5.6 million cubic yards (mcy). The initially authorized disposal plan was to place 2.0 mcy of material at the Port of Los Angeles (POLA) Pier 400 Landfill; 2.1 mcy at POLB Main Channel borrow pit; and 1.5 mcy at POLB Energy Island southeast borrow pit. The overall project area is shown in Figure 1.

The Main Channel Deepening Project was estimated at 18 months for completion. To allow construction to occur year-round, a material placement strategy was developed by the Resource Agencies, including the U. S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the USEPA, and the California Department of Fish and Game (CDFG) to minimize biological impacts on the federally-listed California least tern. The permitted plan allows disposal activities at Pier 400 landfill and Main Channel borrow pit year-round, and Energy Island southeast borrow pit between September 1 and April 1.

Project completion will accommodate large, deep-draft vessels transporting crude oil to the POLB, thereby improving cargo movement efficiencies, and reducing transportation costs.

A Final Supplement to the POLB Main Channel Deepening EIS/EIR was prepared to document revisions to disposal sites, circulated for public review, and approved with a Finding of No Significant Impact (FONSI) on 13 April 1998 by Robert L. Davis, Colonel, USACE, District Engineer. POLA informed POLB that the Pier 400 site was not available for use by the POLB Main Channel Deepening Project. The Final Supplement permitted disposal to the following disposal sites: 1.5 mcy at POLB Energy Island southeast borrow pit and 4.1 mcy in the Anchorage Area located north of the Middle Breakwater.

1.4 CAPPING PROJECT BACKGROUND

The demonstration project will consist of installation and monitoring of a partial cap utilizing approximately 500,000 cubic meters of sediments. Sediments used will consist of fine-grain sands and coarse-grain sands. Fine-grain sands will be taken predominantly from the POLB Main Channel Deepening Project. Coarse-grain sands will be taken from nearby borrow sites (identified as areas AII and AIII on Figure 2). Removal and transport of coarse-grained sediments will be evaluated separately once ongoing geotechnical studies to identify suitable materials are completed. The demonstration project will consist of a broad range of sediment types and sediment disposal strategies.
The exact location of the demonstration cap within the PV Shelf site will be determined in

consultation with WES. An extensive monitoring program will also be prepared and implemented in close coordination with the WES.

1.5 PROPOSED PROJECT MODIFICATIONS

Three sites associated with the POLB Main Channel Deepening Project have been identified as potential sources of fine-grain sands. The final determination as to how much material is taken from each potential borrow site will be made during construction. This EA will assess the best estimate given existing information on the various borrow sites.

Borrow site No. 1 is the POLB Main Channel Deepening Project. The dredge will remove fine-grain sands from the Queens Gate channel as part of the Channel Deepening Project, but will take approximately 300,000 to 500,000 cubic meters of sediments out to the PV Shelf for disposal. (It is anticipated that the vast majority of sediments used will be from this site.) For purposes of this assessment, collection of approximately 350,000 cubic meters is assumed.

Borrow site No. 2 is the West Anchorage Site in the outer harbor of the POLB. This site is one of the disposal sites identified for use by the POLB Main Channel Deepening Project. Material placed here was previously dredged from the Queens Gate area earlier this year. This site would be used for the PV Shelf if suitable material were needed and were found here. For purposes of this assessment, collection of approximately 50,000 cubic meters from this site is assumed.

Borrow site No. 3 is the Southeast Energy Island Borrow Pit. This site is another of the disposal sites identified for use by the POLB Main Channel Deepening Project. Material placed here was previously dredged from the Queens Gate area earlier this year. This site would be used for the PV Shelf if suitable material were needed and were found here. For purposes of this assessment, collection of approximately 50,000 cubic meters from this site is assumed.

The Manhattan-class hopper dredge planned for use in the POLB Main Channel Deepening Project will accomplish all dredging. Dredging impacts associated with POLB Main Channel Deepening Project have been evaluated in the POLB Channel Deepening EIS/EIR (USACE and POLB, 1995) which is hereby incorporated by reference. Impacts associated with the transport of dredged materials to the PV Shelf will be assessed herein for each borrow site. Impacts associated with the redredging of materials from the Anchorage Area and/or Southeast Energy Island Borrow Pit are also assessed. The USEPA is in the process of consulting with the various resource agencies regarding exemption from the provisions of the National Environmental Policy Act (NEPA) by Comprehensive Environmental Response Compensation and Liability Act (CERCLA) authorities for impacts associated with actual cap placement. Therefore, cap placement impacts are not assessed in this document.

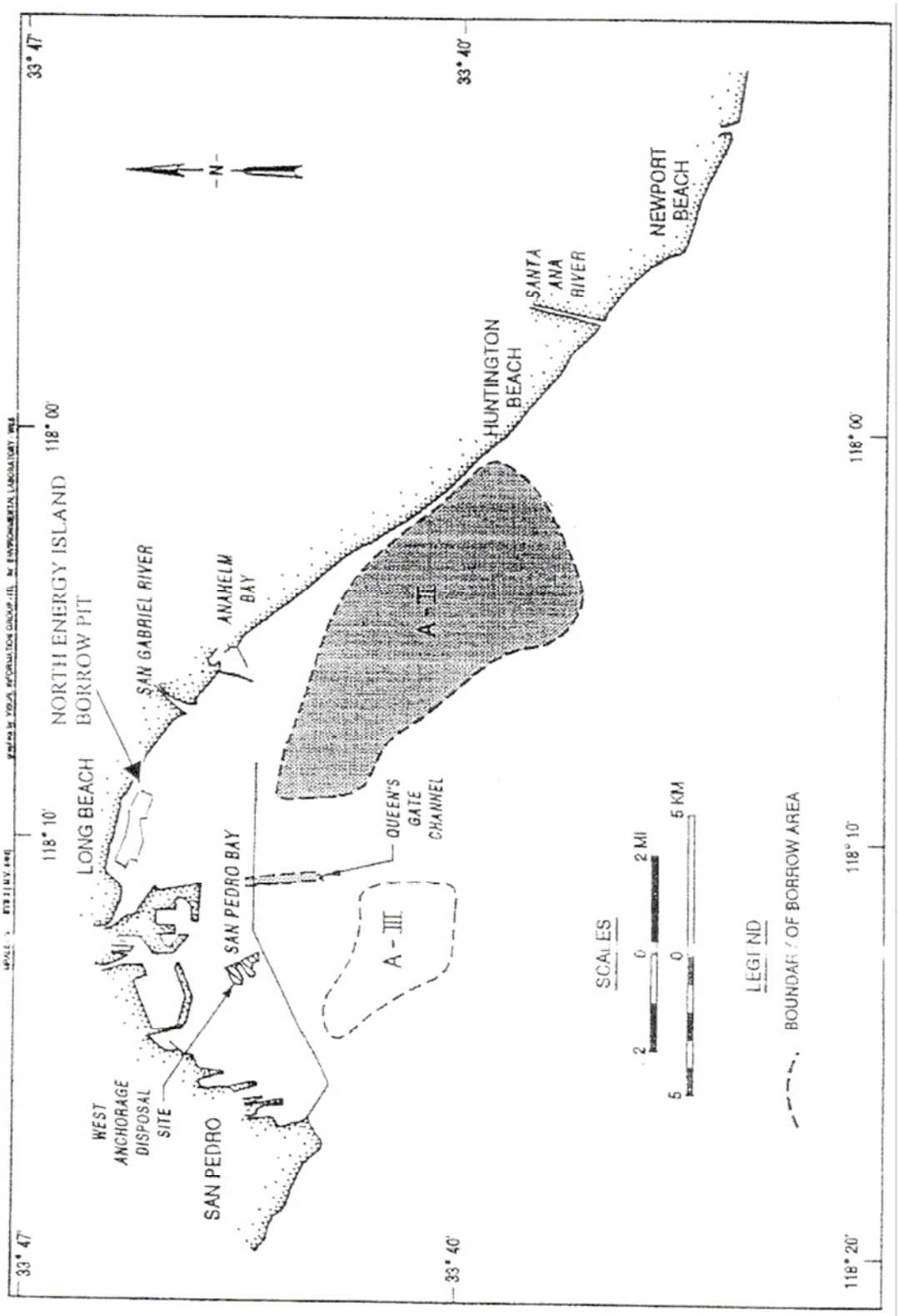

Figure 2. Potential Borrow Sites

1.6 ENVIRONMENTAL ASSESSMENT PROCESS

This Environmental Assessment (EA) shall address potential impacts associated with implementing the LAD discretionary actions as they relate to USACE policies, and those of other entities.

The USACE is the lead agency for this project. This EA complies with the NEPA of 1969, 42 U.S.C. 4321, as amended. The NEPA requires federal agencies to consider the environmental effects of their actions. When those actions significantly affect the quality of the human environment, an agency must prepare environmental documentation that provides full and fair discussion of impacts.

The EA process follows a series of prescribed steps. The first, scoping, has been completed with the purpose to solicit comments from other federal and state agencies as well as the general public. This EA is the second step, which is then sent out for a 30-day public review period; during which written and verbal comments on the adequacy of the EA will be received. The next step requires preparation of a Final EA (FEA) that incorporates and responds to comments received. The FEA will be furnished to all those who commented on the Draft EA and will be made available upon request. The final step is preparing a FONSI, if it is determined the project will not have a significant impact upon the existing environment or the quality of the human environment. This is a concise summary of the decision made by the USACE from among the alternatives presented in the FEA. If it is determined the project will have a significant impact upon the existing environment or the quality of the human environment, an EIS will be required.

1.7 RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES, PLANS, AND OTHER REQUIREMENTS

The USACE is required to comply with all pertinent federal and state policies; project compliance is summarized in Table 1.

Table 1
Summary of Environmental Compliance

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969, as amended Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-1508) dated July 1986	The EA will be completed and submitted for public review. Upon review of the FEA, the District Engineer will issue a FONSI or require preparation of an EIS and a ROD will be issued for this project.
Clean Air Act, 42 U.S.C. 740B	Appropriate documentation will be included in the Draft EA to show conformity with the Clean Air Act. A permit to construct will be obtained by contractor, if necessary.
Clean Water Act, 33 U.S.C. 1344 Rivers and Harbors Act of 1899, 33 U.S.C. 403	A section 404(b)(1) analysis will not be conducted for the recommended plan since the assessed project does not address disposal of dredged and/or fill materials; however a Section 401 waiver will be requested from the California Regional Water Quality Control Board.
National Oceanic and Atmospheric Administration Federal Consistency Regulation (15 CFR 930) Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq California Coastal Act of 1976	Either a Consistency or a Negative Determination, as appropriate, will be prepared by the Corps for concurrence by the California Coastal Commission prior to construction. A Negative Determination will be sought concurrent with review of the Draft EA.
Joint Regulations (U.S. Fish and Wildlife Service and National Marine Fisheries Service) Endangered Species Committee Regulations, 50 CFR 402 Interagency Cooperation Endangered Species Act of 1973, 16 U.S.C. 1531, as amended Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c Migratory Bird Treaty Act, 16 U.S.C. 703-711 Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1413 Marine Mammal Protection Act, 16 U.S.C. 1361 et seq Magnuson-Stevens Fishery Management and Conservation Act	An analysis has been conducted and coordination efforts are underway with the U. S. Fish and Wildlife Service and the National Marine Fisheries Service.
National Historic Preservation Act, 16 U.S.C. 470 and 36 CFR 800: Protection of Historic Properties Executive Order 11593: Protection and Enhancement of the Cultural Environment, May 13, 1971	A letter has been sent to the State Historic Preservation Officer (SHPO) with a determination that this project will not involve National Register eligible or listed properties. Upon receipt of concurrence, the project will be in compliance.

SECTION 2 –PROJECT ALTERNATIVES

2.1 ALTERNATIVES ANALYSIS

2.1.1 No Action Alternative

The No Action Alternative will not result in any transport of sediments for use in constructing and monitoring of a demonstration cap at the PV Shelf site. The PV Shelf site will remain as it currently is, greatly increasing the uncertainty and risk involved in reaching a determination regarding the feasibility of capping the entire PV Shelf site. Dredged sediments will go to currently approved disposal sites.

2.1.2 Alternatives Considered

Alternative sources of capping materials were considered. However, use of capping materials other than from an ongoing navigation dredging project would result in additional costs, time delays, and environmental consequences that render these materials infeasible in the time and budgetary constraints associated with this demonstration project. Use of disposal sites other than the PV Shelf site would not meet project objectives. Therefore, only the no-project alternative was carried forward for assessment.

SECTION 3 - ENVIRONMENTAL INVENTORY AND CONSEQUENCES

This section provides an assessment of potential impacts for the proposed project. If analyses show significant adverse impacts, then mitigation measures have been included to avoid the impact or reduce the level to insignificance

3.1 Oceanography and Water Quality

Oceanographic conditions and impacts will be similar to those presented in the EIS/EIR. Additional travel time to the PV Shelf site versus current designated sites is not expected to result in significant impacts. Additional dredging impacts would only occur at the Anchorage Area and the Energy Island southeast borrow pit where dredged materials previously removed from the Queens Gate area will be picked up for transportation to the PV Shelf site. Water quality impacts are expected to be less than those assessed in the EIS/EIR for placement of dredged materials at these locations. These impacts are also expected to be insignificant.

No action alternative Impacts would remain unchanged from the EIS/EIR, as Supplemented.

3.2 Marine Resources

Conditions and impacts will be similar to those presented in the EIS/EIR. Additional travel time to the PV Shelf site versus current designated sites is not expected to result in significant impacts to marine resources. Additional dredging impacts would only occur at the Anchorage Area and the Energy Island southeast borrow pit where dredged materials previously removed from the Queens Gate area will be picked up for transportation to the PV Shelf site. Impacts to marine resources are expected to be less than those assessed in the EIS/EIR for placement of dredged materials at these locations. These impacts are also expected to be insignificant.

Threatened and endangered species The following listed species may occur in the study area of this project:

- California least tern (*Stern antillarum browni*) - endangered
- Brown pelican (*Pelecanus occidentalis*) – endangered
- Bald eagle (*Haliaeetus leucocephalus*) - threatened
- Peregrine falcon (*Falco peregrinus*) – delisted, species of concern

The USACE has determined that redredging, if required, will take place in deep water sufficiently removed from the shallow water foraging areas used by the California least tern so as to have no affect on this listed species. Redredging would not affect any other listed species. The USACE has determined that the transport of dredged materials will not have an affect nor jeopardize the continued existence of any federal listed threatened or endangered species. Formal consultation pursuant to Section 7 of the Endangered Species Act is not required for project implementation.

Essential Fish Habitat In accordance with the 1996 amendments to the Magnuson-

Stevens Fishery Management and Conservation Act, an assessment of Essential Fish Habitat (EFH) has been conducted for the proposed project. The project is located within an area designated as EFH for two Fishery Management Plans (FMPs): Coastal Pelagics Plan and Pacific Groundfish Management Plan. Many of the 86 species federally-managed under these plans are known to occur in the area and could be affected by the proposed project.

The USACE has determined that the proposed project will not result in any significant, adverse impacts to any species on the Fishery Management Plan.

No action alternative Impacts would remain unchanged from the EIS/EIR, as Supplemented.

3.3 Air Quality

As materials are transported to the PV Shelf site, the overall transit time will be longer than required to transport material to the current disposal sites, and air quality impacts will be slightly higher than those presented in the EIS/EIR (USACE and POLB, 1995) and Final Supplemental (USACE, 1998). Up to 470 roundtrips will be made from the Queens Gate area with up to 70 roundtrips each from the anchorage Area and the Energy Island southeast borrow pit. Additional dredging impacts would only occur at the Anchorage Area and the Energy Island southeast borrow pit where dredged materials previously removed from the Queens Gate area will be picked up for transportation to the PV Shelf site. Air quality impacts are expected to be similar to those assessed in the EIS/EIR for placement of dredged materials at these locations. Air quality impacts for transportation alone and for transportation combined with redredging will exceed significance thresholds for carbon monoxide and nitrogen oxide emissions, as established by the South Coast Air Quality Management District (SCAQMD). Calculations are presented in Tables 1 through 3, Appendix C. Hence, all air quality mitigation measures developed for the authorized project, as presented in the EIS/EIR (Corps and POLB 1995), will also be implemented for the proposed modifications.

Although short-term impacts will be adverse, long-term impacts associated with the POLB Main channel Deepening Project will result in beneficial significant impacts. Long-term benefits will include air quality improvements, as vessel traffic decreases due to increased efficiencies in material and product transport. The increased efficiencies in vessel transport will decrease long-term emissions per ton of cargo throughput, and therefore, is determined consistent with the Air Quality Management Plan (AQMP) strategies to control emissions in the regional area. As the project (and modifications) will not affect population densities, locations and land use patterns, it is consistent with the Growth Management Plan, pursuant with the State Implementation Plan (SIP).

The authorized project, as presented in the EIS/EIR (USACE and POLB 1995) and as Supplemented (USACE, 1998), was determined to conform to Section 176(c)(1) of the Clean Air Act (CAA). The proposed modifications are determined to conform with the CAA also, as short- and long-term air impacts are projected to be similar to those described and assessed in the authorized project. 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.

No action alternative Impacts would remain unchanged from the EIS/EIR, as Supplemented.

3.4 Noise

All activities will take place within sites already evaluated or are well away from any potential sensitive receptors. No additional noise impacts are expected.

3.5 Cultural Resources

The area of potential effects (APE) for the Anchorage Area and the Energy Island southeast borrow pit were systematically surveyed for cultural resources in 1989 by Underwater Archeological Consortium during a magnetometer survey of the southwest Outer Harbor. During 1989 and 1990, the Ports contracted Macfarlane Archaeological Consultants (MAC) to conduct a relocation and identification survey for the Los Angeles Harbor Deepening project (USACE and POLA 1994). One magnetic anomaly, LB 11, is within the Anchorage Area (C-11); this anomaly was interpreted with sonar as rock scatter by MAC. The two cultural resource investigations did not locate any cultural resources within the Anchorage Area APE. Since previous cultural survey and records and literature searches were found negative for cultural resources, the USACE has determined the APE as described will not involve National Register eligible or listed properties.

3.6 Vessel Transportation and Safety

Like the EIS/EIR (USACE and POLB, 1995), dredging operations are not expected to require closure of any navigation channels. Up to 470 roundtrips will be diverted to the PV Shelf from Queens Gate. Up to an additional 140 roundtrips will be made from the Anchorage Area and Energy Island southeast borrow pit to the PV Shelf site. Thus, all applicable measures developed as a part of the EIS/EIR (USACE and POLB, 1995) and as Supplemented (USACE, 1998) to minimize potential vessel transportation conflicts and increase safety will be implemented for the proposed modifications also. That is, the dredging contractor will participate in safety orientations with Jacobsen Pilot Service prior to construction to develop a coordination strategy for all potential users of the area.

No action alternative. Impacts would remain unchanged from the EIS/EIR, as Supplemented.

SECTION 4 - ENVIRONMENTAL COMPLIANCE AND COMMITMENTS

4.1 COMPLIANCE

4.1.1 National Environmental Compliance Act of 1969 (Public Law (PL) 91-190); National Environmental Policy Act (NEPA) of 1969 (42USC4321 et seq., PL 91-190); Council on Environmental Quality Regulations for Implementing NEPA, 40 CFR Parts 1500 to 1508; USACE Regulations for Implementing NEPA, 33 CFR Part 220.

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. In accordance with NEPA, the Final EIS for the Main Channel Deepening project was completed September 1, 1995, and the ROD was signed on March 4, 1997 by H. Martin Lancaster, Assistant Secretary of the Army. A Final Supplement to the POLB Main Channel Deepening EIS/EIR was prepared to document revisions to disposal sites, circulated for public review, and approved with a FONSI on 13 April 1998 by Robert L. Davis, Colonel, USACE, District Engineer.

As the authorized project is proposed for modifications, this Supplemental EA has been prepared to address impacts and develop mitigation (if warranted) associated with proposed modifications --- material transport to the PV Shelf and redredging of previously placed sediments. Similar to the EIS process, the Draft SEA is circulated for public review and appropriate resource agencies, environmental groups and other interested parties (Section 5.3) provide comment on document adequacy. Comment responses are incorporated into the Final Supplemental EA and a FONSI is signed by the Corps, District Engineer, if it is determined the project will not have a significant impact upon the existing environment or the quality of the human environment. Following, the Final SEA and FONSI are made available and distributed to the public. If it is determined the project will have a significant impact upon the existing environment or the quality of the human environment, an EIS will be required.

4.1.2 Clean Water Act Of 1972 (33 USC 1251 et seq.)

The CWA was passed to restore and maintain chemical, physical, and biological integrity of the nation's waters. Specific sections of the Act control the discharge of pollutants and wastes into aquatic and marine environments. The major sections of the CWA that apply to dredging activities are Section 401, which requires certification that the permitted project complies 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. Subpart A, Section 230.1(c) of Section 404(b)(1) guidelines states the following: "Fundamental

to these guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern." Although Sections 401 and 404(b)(1) of the CWA apply, by their own terms, only to applications for Federal permits, the USACE has made a policy decision to apply them 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 has obtained a Section 401 Water Quality Waiver and an approved Section 404(b)(1) Analysis for the authorized project (EIS/EIR, USACE and POLB, 1995). As water quality impacts will be similar to those described and assessed in the authorized project and water quality measures developed as a part of the authorized project will be implemented for the proposed modifications, Sections 401 and 404(b)(1) requirements will be met. A separate 404(b)(1) analysis will not be prepared for this SEA. Application for a 401 Water Quality Waiver for the SEA will be prepared.

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

The Endangered Species Act (ESA) protects threatened and endangered species by prohibiting federal actions that would jeopardize continued existence of such species or result in destruction or adverse modification of any critical habitat of such species. Section 7 of the Act requires consultation regarding protection of such species be conducted with the USFWS and/or the NMFS prior to project implementation. During the planning process, the USFWS and the NMFS evaluate potential impacts of all aspects of the project on threatened or endangered species. Their findings are contained in letters that provide an opinion on whether a project will jeopardize the continued existence of endangered species or modify critical habitat. If a jeopardy opinion is issued, the resource agency will provide reasonable and prudent alternatives, if any, that will avoid jeopardy. A non-jeopardy opinion may be accompanied by reasonable and prudent measures to minimize incidental take caused by the project.

Preliminary determinations indicate that the proposed project will not affect any federally-listed endangered or threatened species, or their critical habitat, and formal consultation under Section 7 of the ESA is not required.

4.1.4 Coastal Zone Management Act of 1976 (PL 92-583; 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 will obtain concurrence from the California Coastal Commission for the necessary consistency determination.

4.1.5 Clean Air Act of 1969 (42USC7401 et seq.); CAA Amendments of 1990 (PL101-549)

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 National Ambient Air Quality Standards (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 which, for the proposed project, is the 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 state-specific 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 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 widevolatile organic compounds (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 USEPA-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 USEPA promulgated the final conformity rule for general Federal actions in the November 30, 1993 *Federal Register*.
Project emissions do not exceed conformity “de minimis” levels established as a criterium for a finding of conformity. Therefore, the project is consistent with the SIP and meets the requirements of Section 176(c).

4.1.6 National Historic Preservation Act of 1966 (16 USC 470 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.

A letter, dated March 6, 1998, was sent to the SHPO stating the proposed modifications as planned will not involve National Register listed or eligible properties. Studies indicate that no cultural resources exist in the APE. All project coordination with respect to Section 106 of the NHPA (36 CFR 800) will be completed prior to construction.

If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, are met.

4.1.7 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) requires the Corps to consult with the USFWS whenever the waters of any stream or other body of water are proposed to be impounded, diverted, or otherwise modified.

The USACE' coordination with the USFWS and the NMFS consisted of mail and telephone conversations regarding all aspects of the proposed project. Specific comments were solicited from the USFWS and the NMFS in March 2000. A formal response has not been received. Informal comments indicated support for the proposed project.

4.1.8 Magnuson-Stevens Fishery Management and Conservation Act

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act requires the USACE to consult with the NMFS whenever areas designated as Essential Fish Habitat (EFH) may be impacted.

An assessment of EFH has been conducted for the proposed project. The project is located within an area designated as EFH for two Fishery Management Plans (FMPs): Coastal Pelagics Plan and Pacific Groundfish Management Plan. Many of the 86 species federally managed under these plans are known to occur in the area and could be affected by the proposed project. The USACE has determined that the proposed project will not result in any significant, adverse impacts to any species on the FMP.

4.2 COMMITMENTS

Following is a proposed summary of future commitments:

1. All air quality mitigation measures developed for the authorized project, as presented in the EIS/EIR (USACE and POLB, 1995), will be implemented for the proposed modifications also.

2. Cease construction activities if unknown cultural resources are identified during project implementation until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, is met.

4.3 SUMMARY

The proposed modifications as outlined above have been designed and scheduled to avoid and/or minimize probable effects on the environment. Where avoidance cannot be used and significant impacts may result, mitigation measures have been designed to minimize impacts on resources. It is determined the proposed modifications will not have a significant impact upon the existing environment or the quality of the human environment, as documented in this SEA. As a result, preparation of an EIS is not required.

SECTION 5 - REFERENCES

Palermo, M.R. 1994. Feasibility Study of Sediment Restoration Alternatives for the Southern California Natural Resource Damage Assessment. Expert report prepared for the NOAA and the U.S. Department of Justice. U.S. Army Engineer Waterways Experiment station, Vicksburg, Mississippi.

Palermo, M.R., P. Schroeder, Y. Rivera, C. Ruiz, D. Clarke, J. Gailni, J. Clausner, M. Hynes, T. Fredette, B. Tardy, L. Peyman-Dove, and A. Risko. 1999. Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments. Waterwys Experiment Station, U. S. Army Corps of Engineers Technical Report EL-99-2. March 1999.

USACE (U.S. Army Corps of Engineers, Los Angeles District). 1998. Final Supplemental Assessment for Main Channel Deepening Project Port of Long Beach Long Beach, California.

USACE and POLA (U.S. Army Corps of Engineers, Los Angeles District and the Port of Los Angeles). 1994. Final Environmental Impact Statement/Environmental Impact Report for LA/LB Harbors Deep Draft Navigation Improvement Project, Los Angeles and Long Beach Harbors, San Pedro Bay, California.

USACE and POLB (U.S. Army Corps of Engineers, Los Angeles District and the Port of Long Beach). 1995. Final Feasibility Study with Final Environmental Impact Statement/Environmental Impact Report for Port of Long Beach Main Channel Deepening project, Los Angeles, California.

USEPA (U. S. Environmental Protection Agency). 1997. Screening Evaluation of Response Actions for contaminated sediment on the Palos Verdes Shelf. U. S. Environmental Protection Agency, Region IX, San Francisco, California.

_____. 1999. Engineering Evaluation/Cost Analysis for the Palos Verdes Shelf. U. S. Environmental Protection Agency – Region IX, San Francisco, California. March 2000.

SECTION 6 - DISTRIBUTION LIST

Federal Agencies:	U.S. Environmental Protection Agency, Region IX U.S. Fish and Wildlife Service National Marine Fisheries Service U.S. Coast Guard
State Agencies:	California Coastal Commission California Department of Fish and Game Regional Water Quality Control Board, Los Angeles Region Clearinghouse/Association of Governments State Historic Preservation Officer
Local Agencies:	Port of Long Beach

SECTION 7 - PREPARERS/REVIEWERS

7.1 Preparers

Larry Smith USACE LAD, Biological Sciences Environmental Manager, Ecosystem Planning Section
Richard Perry USACE LAD, Cultural Resources, Ecosystem Planning Section

7.2 Reviewers

Hayley Lovan USACE LAD, Ecosystem Planning Section
Steve Dibble USACE LAD, Cultural Resources, Ecosystem Planning Section
Ruth Villalobos USACE LAD, Chief, Environmental Resources Branch
Mamie Brouwer USACE NWS

APPENDIX A

MAILING LIST

APPENDIX B

RECORD OF DECISION LETTER FOR MAIN CHANNEL DEEPENING EIS/EIR

APPENDIX C

AIR QUALITY EMISSION DATA CALCULATIONS

Air Quality Emission Data Calculations

Short-Term Emissions

Dredging emissions were calculated for the Final Supplemental (USACE, 1998) and are incorporated in Table 3. Transportation emissions were calculated in a manner similar to the one used in the Final Supplemental as given below. We assumed a round trip time of 120 minutes at a speed between 9 and 10 knots, and 6-1/2 trips per day.

Table 1
Construction Source Data

Mode/Equipment	Power Rating (hp)	Load Factor (%)	Fuel Usage (gal/hr)	Fuel Usage (Gal/day)
Transporting				
Propulsion	3000	85	127.5	1657.5
Auxiliary & Misc.	2,265	25	28.3	367.9

Table 2
Construction Equipment Emissions Factors

Equipment Type	Fuel Type	Emission Factors (pounds/1000 gallons)					
		CO	NOx	PM10	ROC	SOx	Source
Propulsion Engines	D	70.20	407.50	31.68	43.87	28.50	(a)
Auxiliary & Misc.	D	102.00	469.00	16.75	32.10	31.20	(b)

Note: (a) ARB (1984), except Sox and PM10 from Scott Environmental Technology (1981).

Note: (b) Table A-9-3 from SCAQMD (1993) CEQA Air quality Handbook

Table 3
Daily Dredging and Placement Emissions

	Daily Emissions (lbs/day)				
Mode/Equipment	CO	NOx	PM10	ROC	SOx
Dredging	109.37	511.64	20.03	36.66	34.18
Transport					
Propulsion	116.36	675.43	52.51	72.71	47.24
Auxiliary & Misc.	37.53	172.55	6.16	11.81	11.48
Transport Total	153.88	847.98	58.67	84.52	58.72
Daily Total	263.25	1359.62	78.70	121.18	92.90

APPENDIX D

COMMENT LETTERS

RESPONSE TO COMMENTS

State of California, Department of Transportation letter dated 2 May 2000

This agency has no comment.

FINAL
ENVIRONMENTAL ASSESSMENT

FOR

BORROW SITE DREDGING AND TRANSPORTATION
PALOS VERDES SHELF
CAPPING DEMONSTRATION PROJECT
Pacific Ocean
Palos Verdes, California

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

August 2000

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

FINDING OF NO SIGNIFICANT IMPACT FOR THE BORROW SITE DREDGING AND TRANSPORTATION PALOS VERDES SHELF CAPPING DEMONSTRATION PROJECT LOS ANGELES COUNTY, CALIFORNIA

I have reviewed the attached Environmental Assessment (EA) prepared for the project in Los Angeles County. The proposed project is a dredging project within a dredge borrow area with transport of the dredged material to the Palos Verdes Shelf.

The proposed project is required as part of the U. S. Environmental Protection Agency's Engineering Evaluation/Cost Assessment process to select a response action under its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorities for the Palos Verdes Shelf Site. The proposed project will dredge and transport sediments to the Palos Verdes Shelf where the U. S. Environmental Protection Agency will conduct a demonstration project to evaluate the feasibility of an in-situ capping option. A Negative Determination has been submitted in place of a Consistency Determination to the California Coastal Commission for project concurrence. Coastal Commission staff has concurred with the Negative Determination.

Project impacts on marine resources will be minor and short-term. No federally listed species will be adversely affected by project implementation. Therefore, formal Section 7 consultation is not required pursuant to the Endangered Species Act of 1969, as amended.

The implementing regulations for Section 106 of the National Historic Preservation Act (NHPA, 36 CFR 800) allow a federal agency to proceed with a project without further consultation if the project does not have the potential to cause effects on historic properties. Compliance with Section 106 of the NHPA is completed without input from the State Historic Preservation Officer (SHPO). The proposed project meets these criteria.

Other resources analyzed, including oceanography and water quality, air quality, noise, and vessel transportation and safety, in this EA are not expected to result in significant adverse impacts.

Hence, I have considered the available information contained in this Environmental Assessment and determined that the impacts resulting from the implementation of the proposed project will not have a significant adverse impact upon the existing environment or the quality of

the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_8 August 2000_____ _____

DATE

John P. Carroll
Colonel, Corps of Engineers
District Engineer

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ACRONYMS

APE .....Area of Potential Effects
ARB .....Air Resources Board
CAA .....Clean Air Act
CEQ.....Council on Environmental Quality
CERCLA.....Comprehensive Environmental Response, Cleanup, and Liability Act
CWA .....Clean Water Act
CZMA .....Coastal Zone Management Act
DDT .....dichlorodiphenyltrichloroethane
EA .....Environmental Assessment
EE/CA .....Engineering Evaluation/Cost Analysis
EFH .....Essential Fish Habitat
EIS.....Environmental Impact Statement
EIS/EIR .....Environmental Impact Statement/Environmental Impact Report
ESA .....Endangered Species Act
FEA .....Final Environmental Assessment
FMP.....Fisheries Management Plan
FONSI .....Finding of No Significant Impact
FWCA .....Fish and Wildlife Coordination Act
ISC .....In Situ Capping
LAD .....U.S. Army Corps of Engineers, Los Angeles District
MAC .....Macfarlane Archaeological Consultants
NAAQS.....National Ambient Air Quality Standards
NEPA .....National Environmental Policy Act
NHPA.....National Historic Preservation Act
NMFS.....National Marine Fisheries Service
PCB .....polychlorinated biphenyl
PL.....Public Law
POLA .....Port of Los Angeles
POLB .....Port of Long Beach
PV Shelf.....Palos Verdes Shelf
SCAQMD .....South Coast Air Quality Management District
SHPO .....State Historic Preservation Officer
USACE .....U. S. Army Corps of Engineers
USEPA.....U. S. Environmental Protection Agency
USFWS .....U. S. Fish and Wildlife Service
VOC .....volatile organic compounds
WES .....Waterways Experiment Station

SECTION 1 - INTRODUCTION

1.1 SUMMARY OF PROPOSED BENEFITS

The U.S. Army Corps of Engineers (USACE) Waterways Experiment Station (WES) has performed two major technical studies to evaluate sediment restoration alternatives for dichlorodiphenyltrichloroethane- (DDT) and polychlorinated biphenyl- (PCB) contaminated sediments on the Palos Verdes Shelf (PV Shelf) off the coast of Los Angeles, California. The PV Shelf is located approximately 25 miles southwest of Los Angeles in Los Angeles County, California (Figure 1).

A number of options for restoration were evaluated in these studies. One alternative, which does not involve removal of the contaminated PV Shelf sediments, is in situ capping (ISC) with clean materials. An initial determination of the technical feasibility of ISC was made as a part of the overall evaluation of options for sediment remediation completed in 1994 as part of the Southern California Natural Resources Damage Assessment (Palermo, 1994).

In July 1996, Region 9 of the U.S. Environmental Protection Agency (USEPA) began a Superfund investigation at the PV Shelf under its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorities. USEPA has completed a screening evaluation of response actions that identified institutional controls and in situ capping as potential response actions to address human health and ecological risk at the site (USEPA, 1997). As part of its investigation, USEPA also had WES perform detailed engineering and environmental analyses to determine the feasibility and effectiveness of in situ capping on PV Shelf (Palermo et. al., 1999). The results of the WES study were incorporated into an Engineering Evaluation/Cost Analysis (EE/CA) report prepared by USEPA to evaluate the need for response actions such as in-situ capping and to evaluate the feasibility of capping options (USEPA, 2000). The EE/CA will be supplemented by information gained from this demonstration project.

The proposed project is to excavate and transport sediments to the PV Shelf site where they will be disposed in a controlled manner to construct a demonstration cap over contaminated sediments. The proposed project will allow the USEPA to evaluate the potential use of ISC in the field. WES technical studies have evaluated the technical feasibility of ISC at the PV Shelf (Palermo et. al., 1999), but there are many factors (i.e. depth of the site, slope in the site, and the soft-bottom nature of the site) that justify a demonstration project prior to commitment of funds to a full-scale capping project. The detailed monitoring that will be conducted as part of this demonstration project will enable the USEPA to resolve some of the uncertainties regarding the most effective cap placement methods and the suitability of fine-grained versus coarse-grained sediments for cap construction, as well as the extent of construction-related impacts on the marine environment.

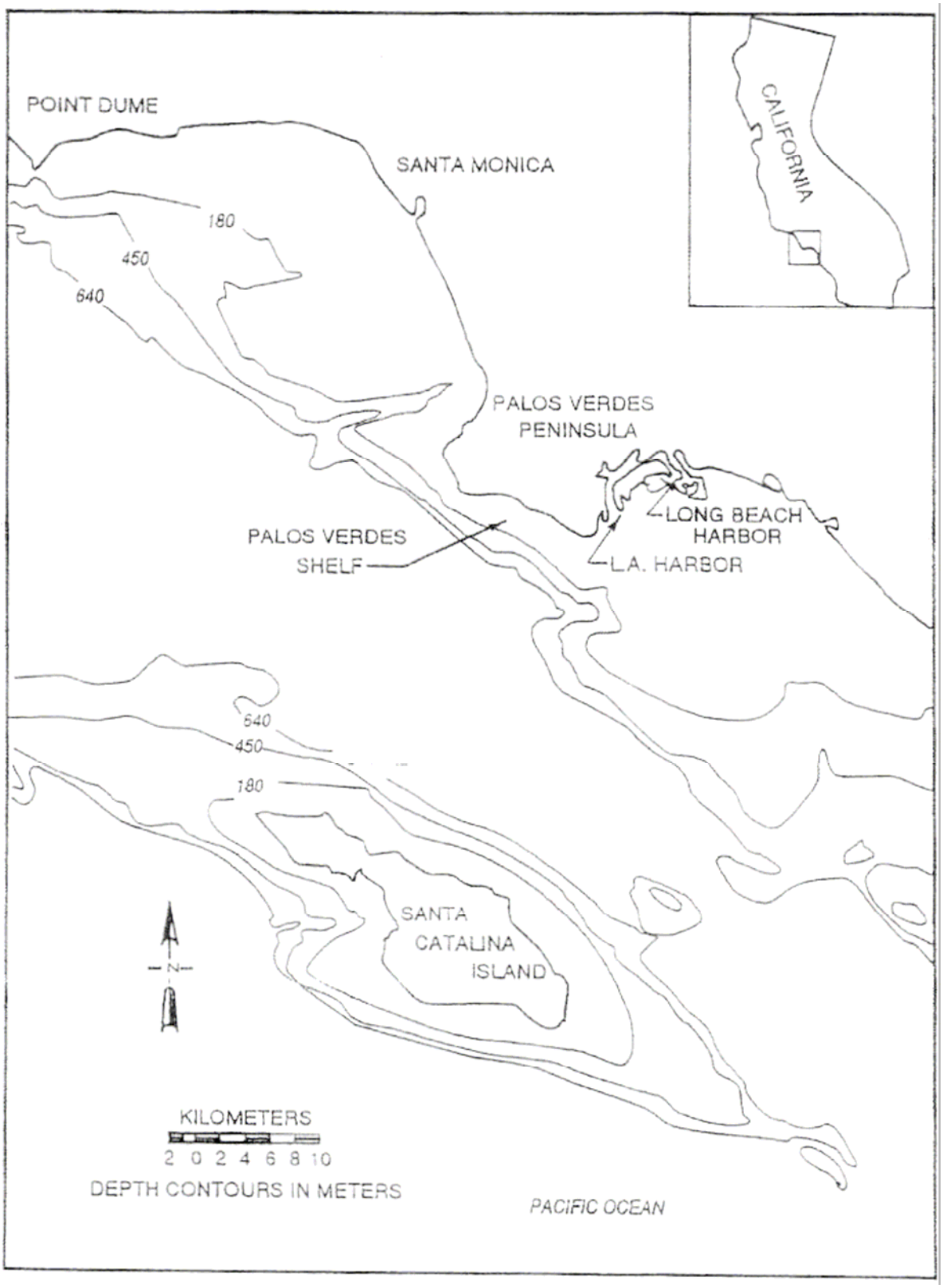

Figure 1. Project Location

1.2 PROJECT PURPOSE

The overall objective of the field pilot study is to demonstrate that a cap can be placed on the PV Shelf as intended by the design and to obtain field data on the short-term processes and behavior of the cap as placed.

1.3 PREVIOUSLY AUTHORIZED PROJECT

A Draft Supplement to the port of Long Beach (POLB) Main Channel Deepening EIS/EIR (USACE and POLB, 1995) has been prepared and is under public review to document revisions to disposal sites. A FONSI has been prepared, but has not yet been signed. The Draft Supplement would permit disposal of Queens Gate sediments at the PV Shelf as the fine-grain part of the demonstration project. The Draft Supplement assessed transport of approximately 350,000 cubic meters of sediments from the Queens Gate Channel as part of the POLB Main Channel Deepening Project, collection of approximately 50,000 cubic meters from the West Anchorage Site in the outer harbor of the POLB, and collection of approximately 50,000 cubic meters from the Southeast Energy Island Borrow Pit.

1.4 CAPPING PROJECT BACKGROUND

The PV Shelf site consists of a 43 square kilometer (17 square mile) area of DDT- and PCB-contaminated sediments in an offshore area between Point Fermin and Point Vicente (See Figure 1). The demonstration project will consist of placing cap material within a small area of the site (approximately 0.7 square kilometers or 180 acres) utilizing a maximum of 500,000 cubic meters of sediments. Sediments used will consist of fine-grain sands and coarse-grain sands. Fine-grain sands will be taken predominantly from the POLB Main Channel Deepening Project as discussed in the Draft Supplement (USACE, 2000). Coarse-grain sands will be taken from a nearby borrow site (identified as area AIII on Figure 2). The demonstration project will also use a variety of sediment disposal (i.e. cap placement) methodologies.

The overall approach to the pilot capping project is described in "Field Pilot Study of In-Situ Capping of Palos Verdes Contaminated Sediments – Operations and Monitoring Plan" (Palermo, 2000). The cap material will be placed in four distinct cells. The use of four cells is intended to allow careful evaluation of placement at different depths with both conventional (i.e. point dumping) and spreading placement methods. An extensive monitoring program has also been developed and will be implemented in close coordination with cap placement activities.

1.5 PROPOSED PROJECT

A maximum of 20,000 cubic meters will be dredged from Borrow Site AIII (Figure 2). Geotechnical studies of this site have identified sufficient quantities of clean sediment with grain size characteristics suitable for the coarse-grain portion of the Demonstration Project.

Prior to any actual placement of AIII sediments on the PV Shelf, placement of one hopper load (approximately 1,000 cubic meters) of coarse-grain sands with the spreading method of

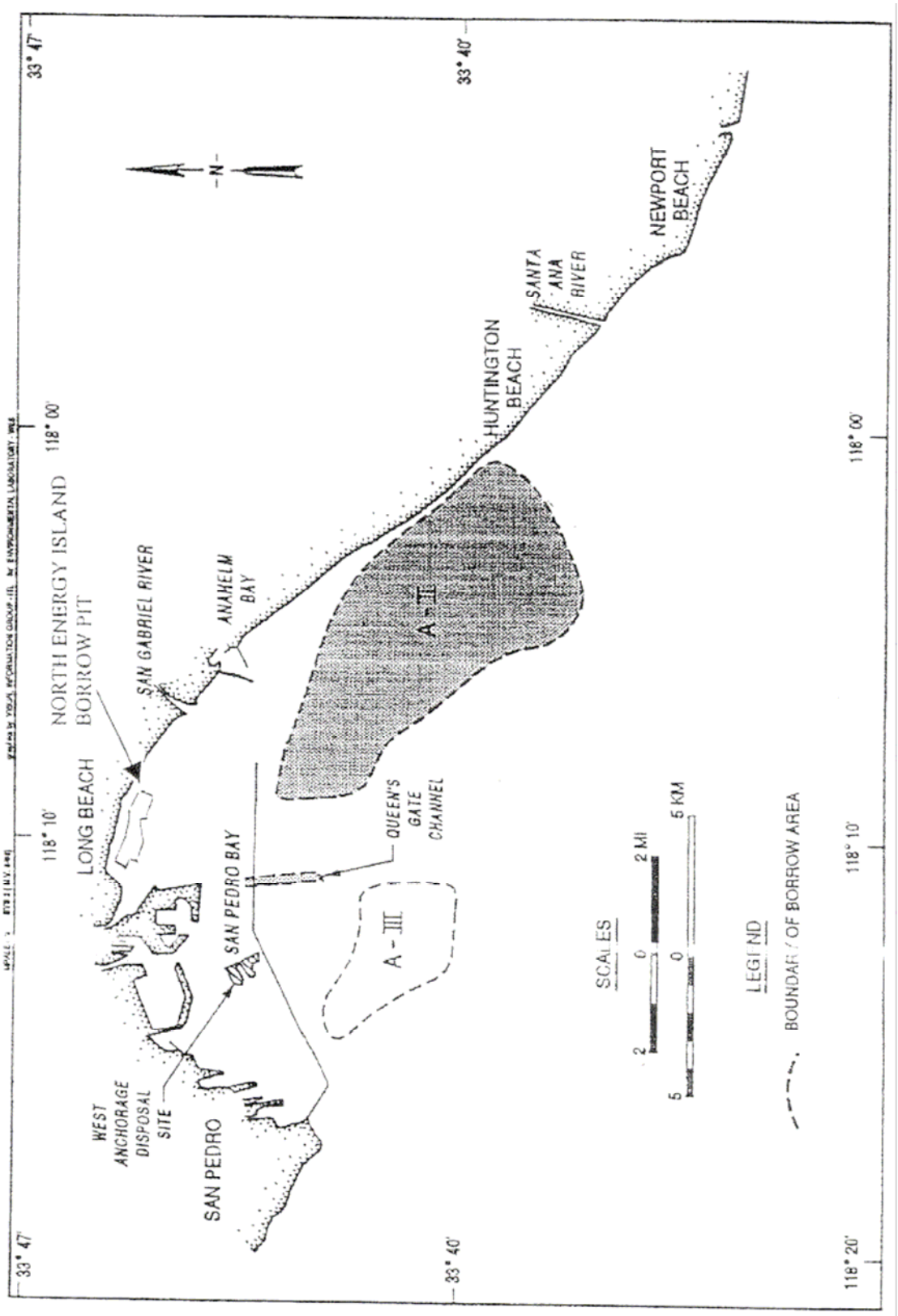

Figure 2. Potential Borrow Sites

placement will be observed at the West Anchorage Site, if acceptable to the POLB. If not acceptable to the POLB, this trial disposal will take place at the LA-2 Ocean Disposal Site. Disposal of this material will allow the USACE to determine the rate of release from the hopper and to assess any tendency of the material to bridge. The West Anchorage Site is a permitted disposal site for the POLB Main Channel Deepening Project.

Although unlikely there is the possibility of dredging a hopper load of sediment from the AIII Borrow Site that contains an unacceptable percentage of gravel. Gravel is unsuitable for use in constructing an ISC at the PV Shelf. Sampling will be conducted during dredging in the AIII Borrow Site in order to determine the suitability of each hopper load. Should a hopper load be determined to be unsuitable due to high gravel content, the load will be taken to the West Anchorage Site and disposed of there, if acceptable to the POLB. If not, this material will be disposed of at the LA-2 Ocean Disposal Site.

The Manhattan-class hopper dredge *Sugar Island* planned for use in the POLB Main Channel Deepening Project will accomplish all dredging for the pilot capping project. Hopper dredges were identified as a preferable placement equipment type in TR EL-99-2 (Palermo et. al. 1999), and use of a diesel-powered hopper dredge is anticipated for the pilot Capping project.

Dredging impacts associated with POLB Main Channel Deepening Project have been evaluated in the POLB Channel Deepening EIS/EIR (USACE and POLB, 1995), which is hereby incorporated by reference. Sediments that are proposed for disposal at the West Anchorage Site will be similar in composition to the Queens Gate sediments. They will be dredged from a nearby area that is contiguous with the Queens Gate Site. Therefore, the proposed project disposal in the West Anchorage Site is consistent with use of the West Anchorage Site as a disposal site for the POLB Main Channel Deepening Project. The USEPA is in the process of preparing and distributing to various resource agencies a separate environmental assessment regarding impacts associated with in-situ cap placement. Therefore, cap placement impacts are not assessed in this document.

1.6 ENVIRONMENTAL ASSESSMENT PROCESS

This Environmental Assessment (EA) addresses potential impacts associated with implementing the U. S. Army Corps of Engineers, Los Angeles District (LAD) discretionary actions as they relate to USACE policies, and those of other entities.

The USACE is the lead agency for this project. This EA complies with the NEPA of 1969, 42 U.S.C. 4321, as amended. The NEPA requires federal agencies to consider the environmental effects of their actions. When those actions significantly affect the quality of the human environment, an agency must prepare environmental documentation that provides full and fair discussion of impacts.

The EA process follows a series of prescribed steps. The first, scoping, has been completed with the purpose to solicit comments from other federal and state agencies as well as the general public. This EA is the second step, which will be sent out for a 15-day public review period; during which written and verbal comments on the adequacy of the EA will be received. The

next step requires preparation of a Final EA (FEA) that incorporates and responds to comments received. The FEA will be furnished to all those who commented on the Draft EA and will be made available upon request. The final step is preparing a FONSI; if it is determined the project will not have a significant impact upon the existing environment or the quality of the human environment. This is a concise summary of the decision made by the USACE from among the alternatives presented in the FEA. If it is determined the project will have a significant impact upon the existing environment or the quality of the human environment, an Environmental Impact Statement (EIS) will be required.

1.7 RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES, PLANS, AND OTHER REQUIREMENTS

The USACE is required to comply with all pertinent federal and state policies; project compliance is summarized in Table 1.

Table 1
Summary of Environmental Compliance

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969, as amended Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-1508) dated July 1986	The EA will be completed and submitted for public review. Upon review of the FEA, the District Engineer will issue a FONSI or require preparation of an EIS and a ROD will be issued for this project.
Clean Air Act, 42 U.S.C. 740B	Appropriate documentation will be included in the Draft EA to show conformity with the Clean Air Act. A permit to construct will be obtained by contractor, if necessary.
Clean Water Act, 33 U.S.C. 1344 Rivers and Harbors Act of 1899, 33 U.S.C. 403	A section 404(b)(1) analysis will not be conducted for the recommended plan since the assessed project does not address disposal of dredged and/or fill materials; however a Section 401 waiver will be requested from the California Regional Water Quality Control Board.
National Oceanic and Atmospheric Administration Federal Consistency Regulation (15 CFR 930) Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq California Coastal Act of 1976	Either a Consistency or a Negative Determination, as appropriate, will be prepared by the Corps for concurrence by the California Coastal Commission prior to construction. A Negative Determination will be sought concurrent with review of the Draft EA.
Joint Regulations (U.S. Fish and Wildlife Service and National Marine Fisheries Service) Endangered Species Committee Regulations, 50 CFR 402 Interagency Cooperation Endangered Species Act of 1973, 16 U.S.C. 1531, as amended Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c Migratory Bird Treaty Act, 16 U.S.C. 703-711 Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1413 Marine Mammal Protection Act, 16 U.S.C. 1361 et seq Magnuson-Stevens Fishery Management and Conservation Act	An analysis has been conducted and coordination efforts are underway with the U. S. Fish and Wildlife Service and the National Marine Fisheries Service.
National Historic Preservation Act, 16 U.S.C. 470 and 36 CFR 800: Protection of Historic Properties Executive Order 11593: Protection and Enhancement of the Cultural Environment, May 13, 1971	A letter will be sent to the State Historic Preservation Officer (SHPO) with a determination that this project will not involve National Register eligible or listed properties. Upon receipt of concurrence, the project will be in compliance.

SECTION 2 –PROJECT ALTERNATIVES

2.1 ALTERNATIVES ANALYSIS

2.1.1 No Action Alternative

The No Action Alternative will not result in any dredging or transport of sediments for use in constructing and monitoring of the coarse-sand portion for a demonstration cap at the PV Shelf site. The PV Shelf site will remain as it currently is, greatly increasing the uncertainty and risk involved in reaching a determination regarding the feasibility of capping at the PV Shelf site.

2.1.2 Alternatives Considered

Alternative sources of coarse-grained capping materials were considered, including Borrow Site AII (Figure 2), as was the option of undertaking a separate project for dredging and placing cap materials. Borrow Site AII is located further away from the PV Shelf Site than is AIII, which would require longer trips for the hopper dredge to and from the PV Shelf Site. Longer trips would result in increased emissions of air quality contaminants, increased fuel usage and associated costs, and greater expense in terms of time and money. Use of capping materials other than from an ongoing navigation dredging project would result in significant additional costs, time delays, and environmental consequences that render this approach infeasible in terms of the time and budgetary constraints associated with this demonstration project.

Use of disposal sites other than the PV Shelf would not meet project objectives. Therefore, only the No-Action Alternative along with the proposed project was carried forward for assessment.

SECTION 3 - ENVIRONMENTAL INVENTORY AND CONSEQUENCES

This section provides an assessment of potential impacts for the proposed project. If analyses show significant adverse impacts, then mitigation measures have been included to avoid the impact or reduce the level to insignificance

3.1 Oceanography and Water Quality

Oceanographic conditions and dredging impacts in the AIII Borrow Site will be similar to those presented in the EIS/EIR for the POLB Main Channel Deepening Project (USACE and POLB, 1995). Since the sediments to be dredged consist of coarse-grained sands, water quality impacts associated with dredging are expected to be minimal and short-term. Turbidity in the vicinity of the hopper dredge drag arm is expected to clear faster in the AIII Borrow Site than in the Queens Gate area owing to the coarse nature of the Borrow Site sediments. Coarser sediments tend to fall out of the water column faster than finer-grained sediments.

A geotechnical investigation was conducted in Borrow Site AIII. The geotechnical investigation was conducted in accordance with a Sampling and Analysis Plan (USEPA and USACE, 2000) prepared according to CERCLA Guidelines. Preliminary results are included in Appendix C. Table 2 shows general sediment size characteristics for the Borrow Site.

Table 2. Borrow Site AIII Grain Size Distribution

	Maximum Fine	*Average*	*Minimum Fine*
% Coarse Gravel	0	1	26
% Fine Gravel	0	2	0
% Coarse Gravel	0	2	4
% Medium Sand	16	31	41
% Fine Sand	80	62	29
% Fines	2	1	0
D 50		0.33 mm	

Chemical analyses were performed on two composite samples made from individual cores from within the Borrow Site. All detectable metals concentrations were well below ER-L levels. Organic compounds (i.e. butyltins, DDT, other pesticides, PCBs, and PAHs) were all below detection levels. Preliminary results are in Appendix C. Based on the physical and chemical characterization, the AIII sediments are considered suitable for unconfined ocean disposal.

Impacts at the West Anchorage Site for the trial spreading of AIII sediments and for any disposal of sediments unsuitable for use in capping because of gravel content are expected to be similar to those assessed in the POLB Main Channel Deepening Project EIS/EIR as supplemented (USACE, 1998). Impacts most likely will be confined to disposal of approximately 1,000 cubic meters of sand. These impacts are expected to be negligible and insignificant.

No action alternative Conditions at the AIII Borrow Site and the PV Shelf would remain unchanged. Impacts at the West Anchorage Site would remain unchanged from the POLB Main Channel Deepening Project EIS/EIR, as supplemented.

3.2 Marine Resources

Conditions and impacts at the AIII Borrow Site and West Anchorage Site will be similar to those presented in the POLB Main Channel Deepening Project EIS/EIR (USACE and POLB, 1995). Additional dredging impacts would occur at the AIII Borrow Site. Impacts to marine resources are expected to be similar to those assessed in the POLB Main Channel Deepening Project EIS/EIR for dredging. Sites of particular importance, including rock reefs, will be avoided. The removal of, at most, 20,000 cubic meters using a 1-meter cut is not expected to significantly impact existing benthic communities. Recolonization from adjacent areas is expected to occur rapidly, with some deep-burrowing organisms being able to survive the shallow dredging being proposed. These impacts are expected to be insignificant.

Conditions at the West Anchorage Site for the trial spreading of AIII sediments and for any disposal of sediments unsuitable for use in capping because of gravel content are expected to be similar to those assessed in the POLB Main Channel Deepening Project EIS/EIR as supplemented (USACE, 1998). Impacts most likely will be confined to disposal of approximately 1,000 cubic meters of sand. These impacts are expected to be negligible and insignificant.

Threatened and endangered species The following listed species may occur in the study area of this project:

- California least tern (*Stern antillarum browni*) - endangered
- Brown pelican (*Pelecanus occidentalis*) – endangered
- Bald eagle (*Haliaeetus leucocephalus*) - threatened

The USACE has determined that dredging will take place in deep water sufficiently removed from the shallow water foraging areas used by the California least tern so as to have no affect on this listed species. Dredging would not affect any other listed species. The USACE has determined that the transport of dredged materials will not have an affect nor jeopardize the continued existence of any federal listed threatened or endangered species. Informal consultation with the USFWS resulted in a no adverse impact finding for the project. Formal consultation pursuant to Section 7 of the Endangered Species Act is not required for project implementation.

Essential Fish Habitat In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act, an assessment of Essential Fish Habitat (EFH) has been conducted for the proposed project. The project is located within an area designated as EFH for two Fishery Management Plans (FMPs): Coastal Pelagics Plan and Pacific Groundfish Management Plan. Many of the 86 species federally managed under these plans are known to occur in the area and could be affected by the proposed project.
The USACE has determined that the proposed project will not result in any significant, adverse

impacts to any species on the Fishery Management Plan or their associated habitat.

No action alternative Conditions at the AIII Borrow Site and the PV Shelf would remain unchanged. Impacts at the West Anchorage Site would remain unchanged from the POLB Main Channel Deepening Project EIS/EIR, as supplemented.

3.3 Air Quality

As materials are transported to the PV Shelf Site from the AIII Borrow Site, the overall transit time will be longer than required to transport a similar volume of material from the Queens Gate Channel to the current disposal sites. As a result, air quality impacts per unit volume of material transported to the PV Shelf will be slightly higher than those presented in the POLB Main Channel Deepening Project EIS/EIR (USACE and POLB, 1995) and Supplements (USACE, 1998 and 2000). Up to 20 roundtrips will be made from the AIII Borrow Site to the PV Shelf. Air quality impacts associated with dredging in AIII are expected to be similar to those assessed in the POLB Main Channel Deepening Project EIS/EIR for dredging a like amount of sediment in the channel. Air quality impacts for transportation alone and for transportation combined with dredging will exceed significance thresholds for carbon monoxide and nitrogen oxide emissions, as established by the South Coast Air Quality Management District (SCAQMD). Calculations are presented in Tables 1 through 3, Appendix B. Hence, all air quality mitigation measures developed for the authorized project, as presented in the POLB Main Channel Deepening Project EIS/EIR, will also be implemented for the proposed modifications.

The authorized project, as presented in the POLB Main Channel Deepening Project EIS/EIR and as supplemented (USACE, 1998), was determined to conform to Section 176(c)(1) of the Clean Air Act (CAA). The proposed project is determined to conform with the CAA also, as short- and long-term air impacts are projected to be similar to those described and assessed in the authorized project. 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.

No action alternative Impacts would remain unchanged from the POLB Main Channel Deepening Project EIS/EIR, as supplemented.

3.4 Noise

All activities will take place within sites that are well away from any potential sensitive receptors. No additional noise impacts are expected.

3.5 Cultural Resources

The area of potential effects (APE) for the AIII Borrow Site was the subject of a records search by Macfarlane Archaeological Consultants (MAC). The records search showed a single shipwreck identified as BLM 574. This single site will be avoided during dredging (refer to the map in Appendix C for approximate locations of this shipwreck and of the Borrow Site). Prior

to the start of construction, MAC will survey the dredge site to confirm that no further shipwrecks are present. Should any anomalous sites be identified, dredge operations will be modified to avoid those sites. Since previous cultural survey and records and literature searches were found negative for cultural resources, the USACE has determined the APE as described will not involve National Register eligible or listed properties.

No action alternative. Impacts would remain unchanged from the POLB Main Channel Deepening Project EIS/EIR, as supplemented.

3.6 Vessel Transportation and Safety

Like the POLB Main Channel Deepening Project EIS/EIR (USACE and POLB, 1995), dredging operations are not expected to require closure of any navigation channels. Up to 20 roundtrips will be made from the AIII Borrow Site to the PV Shelf. A minimum of one roundtrip will be made to the West Anchorage Site for the monitored disposal of one hopper load of sediments. All applicable measures developed as a part of the POLB Main Channel Deepening Project EIS/EIR and as supplemented (USACE, 1998) to minimize potential vessel transportation conflicts and increase safety will be implemented for the proposed modifications also. That is, the dredging contractor will participate in safety orientations with Jacobsen Pilot Service prior to construction to develop a coordination strategy for all potential users of the area. Due to the negligible amount of trips involved, this is considered an insignificant impact

No action alternative. Impacts would remain unchanged from the POLB Main Channel Deepening Project EIS/EIR, as supplemented.

SECTION 4 - ENVIRONMENTAL COMPLIANCE AND COMMITMENTS

4.1 COMPLIANCE

4.1.1 National Environmental Compliance Act of 1969 (Public Law (PL) 91-190); National Environmental Policy Act (NEPA) of 1969 (42USC4321 et seq., PL 91-190); Council on Environmental Quality Regulations for Implementing NEPA, 40 CFR Parts 1500 to 1508; USACE Regulations for Implementing NEPA, 33 CFR Part 220.

The NEPA 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 EA has been prepared to address impacts and develop mitigation (if warranted) associated with the proposed project. Similar to the EIS process, the Draft EA 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 EA and the LAD District Engineer signs a Finding of No Significant Impact (FONSI), if it is determined the project will not have a significant impact upon the existing environment or the quality of the human environment. Subsequently, the Final EA and FONSI are made available and distributed to the public. If it is determined the project will have a significant impact upon the existing environment or the quality of the human environment, an EIS would be required.

4.1.2 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 Act control the discharge of pollutants and wastes into aquatic and marine environments. The major sections of the CWA that apply to dredging activities are Section 401, which requires certification that the permitted project complies 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. Subpart A, Section 230.1(c) of Section 404(b)(1) guidelines states the following: "Fundamental to these guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern." Although Sections 401 and 404(b)(1) of the CWA apply, by their own terms, only to applications for Federal permits, the USACE has made a policy decision to apply them 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." A 404(b)(1) analysis will not be required for this EA. Application for a 401 Water Quality Waiver for the EA will be prepared.

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

The Endangered Species Act (ESA) protects threatened and endangered species by prohibiting federal actions that would jeopardize continued existence of such species or result in destruction or adverse modification of any critical habitat of such species. Section 7 of the Act requires consultation regarding protection of such species be conducted with the U. S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) prior to project implementation. During the planning process, the USFWS and the NMFS evaluate potential impacts of all aspects of the project on threatened or endangered species. Their findings are contained in letters that provide an opinion on whether a project will jeopardize the continued existence of endangered species or modify critical habitat. If a jeopardy opinion is issued, the resource agency will provide reasonable and prudent alternatives, if any, that will avoid jeopardy. A non-jeopardy opinion may be accompanied by reasonable and prudent measures to minimize incidental take caused by the project.

Preliminary determinations indicate that the proposed project will not affect any federally listed endangered or threatened species, or their critical habitat, and formal consultation under Section 7 of the ESA is not required.

4.1.4 Coastal Zone Management Act of 1976 (PL 92-583; 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 will obtain concurrence from the California Coastal Commission for the necessary consistency determination.

4.1.5 Clean Air Act of 1969 (42USC7401 et seq.); CAA Amendments of 1990 (PL101-549)

Air quality regulations were first promulgated with the 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 National Ambient Air Quality Standards (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, which, for the proposed project, is the 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 state-specific 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 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 volatile organic compounds (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 USEPA-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 USEPA promulgated the final conformity rule for general Federal actions in the November 30, 1993 *Federal Register*.
Project emissions do not exceed conformity "de minimis" levels established as a criterium for a finding of conformity. Therefore, the project is consistent with the SIP and meets the requirements of Section 176(c).

4.1.6 National Historic Preservation Act of 1966 (16 USC 470 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.

A letter will be sent to the SHPO stating the proposed project, as planned, will not involve National Register listed or eligible properties. Studies indicate that no cultural resources exist in

the APE. All project coordination with respect to Section 106 of the NHPA (36 CFR 800) will be completed prior to construction.

If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, are met.

4.1.7 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) requires the Corps to consult with the USFWS whenever the waters of any stream or other body of water are proposed to be impounded, diverted, or otherwise modified.

The USACE' coordination with the USFWS and the NMFS consisted of mail and telephone conversations regarding all aspects of the proposed project. Specific comments were solicited from the USFWS and the NMFS in March 2000. Comments and a species list were received from the USFWS. Comments were received from the NMFS. Copies of resource agency comments are included in Appendix D.

4.1.8 Magnuson-Stevens Fishery Management and Conservation Act

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act requires the USACE to consult with the NMFS whenever areas designated as EFH may be impacted.

An assessment of EFH has been conducted for the proposed project. The project is located within an area designated as EFH for two FMPs: Coastal Pelagics Plan and Pacific Groundfish Management Plan. Many of the 86 species federally managed under these plans are known to occur in the area and could be affected by the proposed project. The USACE has determined that the proposed project will not result in any significant, adverse impacts to any species on the FMP or to their habitat.

4.2 COMMITMENTS

Following is a proposed summary of future commitments:

1. All air quality, and vessel transportation and safety mitigation measures developed for the authorized project, as presented in the POLB Main Channel Deepening Project EIS/EIR (USACE and POLB, 1995), will be implemented for the proposed modifications also.

2. Cease construction activities if cultural resources are identified during project implementation until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, is met.

3. Unless specifically allowed by the USFWS, the POLB/USACE shall not allow turbidity from disposal activities at the West Anchorage Disposal Site to extend into shallow water adjacent to the Pier 400 Transportation Corridor during the April-September breeding season of the California least tern. This requirement shall be monitored as provided for below and shall be based on visually observed differences between ambient surface water conditions and any disposal turbidity plume.

4. The POLB/USACE shall provide a qualified biologist, acceptable to the USFWS, to monitor the new POLB shallow water habitat during the 2000 nesting season. The biologist shall coordinate with the USFWS and shall visually monitor and report to the dredging contractor or POLB/USACE contract manager and USFWS any turbidity from project disposal operations at the West Anchorage Disposal Site which enters the shallow water habitat to the east of the Pier 400 Transportation Corridor.

4.3 SUMMARY

The proposed project as outlined above have been designed and scheduled to avoid and/or minimize probable effects on the environment. Where avoidance cannot be used and significant impacts may result, mitigation measures have been designed to minimize impacts on resources. It is determined the proposed project will not have a significant impact upon the existing environment or the quality of the human environment, as documented in this EA. As a result, preparation of an EIS is not required.

SECTION 5 - REFERENCES

Fredette, T.J. 2000. Palos Verdes Shelf Pilot Project Monitoring Scope of Work (Working Draft 2.2). New England Division, U. S. Army Corps of Engineers. March 29, 2000.

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Palermo, M.R., P. Schroeder, Y. Rivera, C. Ruiz, D. Clarke, J. Gailni, J. Clausner, M. Hynes, T. Fredette, B. Tardy, L. Peyman-Dove, and A. Risko. 1999. Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments. Waterwys Experiment Station, U. S. Army Corps of Engineers Technical Report EL-99-2. March 1999. (Available via the WES web site at http://www.wes.army.mil/el/elpubs/pdf/trel99-2.pdf)

USACE (U.S. Army Corps of Engineers, Los Angeles District). 1998. Final Supplemental Assessment for Main Channel Deepening Project Port of Long Beach Long Beach, California.

_____. 2000. Draft Supplemental Environmental Assessment for Palos Verdes Shelf Capping Demonstration Project, Pacific Ocean, Palos Verdes, California.

USACE and POLB (U.S. Army Corps of Engineers, Los Angeles District and the Port of Long Beach). 1995. Final Feasibility Study with Final Environmental Impact Statement/Environmental Impact Report for Port of Long Beach Main Channel Deepening project, Los Angeles, California.

USEPA (U. S. Environmental Protection Agency). 1997. Screening Evaluation of Response Actions for contaminated sediment on the Palos Verdes Shelf. U. S. Environmental Protection Agency, Region IX, San Francisco, California.

_____. 1999. Engineering Evaluation/Cost Analysis for the Palos Verdes Shelf. U. S. Environmental Protection Agency – Region IX, San Francisco, California. March 2000.

USEPA and USACE (U. S. Environmental Protection Agency and U. S. Army Corps of Engineers). 2000. Final Sampling and Analysis Plan for Characterization of the A-2 & A-3 Borrow Areas for the Pilot In-Situ Capping Project Palos Verdes Shelf Superfund Investigation. March 27, 2000.

SECTION 6 - DISTRIBUTION LIST

Federal Agencies:	U.S. Environmental Protection Agency, Region IX U.S. Fish and Wildlife Service National Marine Fisheries Service U.S. Coast Guard
State Agencies:	California Coastal Commission California Department of Fish and Game Regional Water Quality Control Board, Los Angeles Region Clearinghouse/Association of Governments State Historic Preservation Officer
Local Agencies:	Port of Long Beach

SECTION 7 - PREPARERS/REVIEWERS

7.1 Preparers

Larry Smith USACE LAD, Biological Sciences Environmental Manager, Ecosystem Planning Section
Richard Perry USACE LAD, Cultural Resources, Ecosystem Planning Section

7.2 Reviewers

Steve Dibble USACE LAD, Cultural Resources, Ecosystem Planning Section
Ruth Villalobos USACE LAD, Chief, Environmental Resources Branch
Mamie Brouwer USACE NWS
Fred Schauffler USEPA

APPENDIX A

MAILING LIST

APPENDIX B

AIR QUALITY EMISSION DATA CALCULATIONS

Air Quality Emission Data Calculations

Short-Term Emissions

Dredging emissions were calculated for the Final Supplemental (USACE, 1998) and are incorporated in Table 3. Transportation emissions were calculated in a manner similar to the one used in the Final Supplemental as given below. We assumed a round trip time of 120 minutes at a speed between 9 and 10 knots, and 6-1/2 trips per day.

Table 1
Construction Source Data

Mode/Equipment	Power Rating (hp)	Load Factor (%)	Fuel Usage (gal/hr)	Fuel Usage (Gal/day)
Transporting				
Propulsion	3000	85	127.5	1657.5
Auxiliary & Misc.	2,265	25	28.3	367.9

Table 2
Construction Equipment Emissions Factors

Equipment Type	Fuel Type	Emission Factors (pounds/1000 gallons)					
		CO	NOx	PM10	ROC	SOx	Source
Propulsion Engines	D	70.20	407.50	31.68	43.87	28.50	(a)
Auxiliary & Misc.	D	102.00	469.00	16.75	32.10	31.20	(b)

Note: (a) ARB (1984), except Sox and PM10 from Scott Environmental Technology (1981).

Note: (b) Table A-9-3 from SCAQMD (1993) CEQA Air quality Handbook

Table 3
Daily Dredging and Placement Emissions

	Daily Emissions (lbs/day)				
Mode/Equipment	CO	NOx	PM10	ROC	SOx
Dredging	109.37	511.64	20.03	36.66	34.18
Transport					
Propulsion	116.36	675.43	52.51	72.71	47.24
Auxiliary & Misc.	37.53	172.55	6.16	11.81	11.48
Transport Total	153.88	847.98	58.67	84.52	58.72
Daily Total	263.25	1359.62	78.70	121.18	92.90

APPENDIX C

SEDIMENT TEST RESULTS

APPENDIX D

COMMENT LETTERS

RESPONSE TO COMMENTS

State of California, Department of Transportation letter dated 24 May 2000

This agency has no comment.

U. S. Fish and Wildlife Service letter dated 23 May 2000

The U. S. Fish and Wildlife Service expressed concerns that disposal of material at the West Anchorage Site could result in excessive turbidity in nearshore waters which, in turn, could impair California least tern foraging and nesting success. The U. S. Army Corps of Engineers prepared a response letter dated 2 June 2000 that responded directly to this concern. The Port of Long Beach's (POLB) Channel Deepening Plan was amended to include year round disposal of dredged materials at the West Anchorage Site. This conclusion was based on the depth of the water at the West Anchorage Site and the distance to the nearest shallow water foraging habitat. The U. S. Fish and Wildlife Service concurred with the finding that year-round disposal operations would not impact California least tern foraging or nesting.

U. S. Fish and Wildlife Service letter dated 15 June 2000

The U. S. Fish and Wildlife Service reiterated their conclusion that consultation is required under the Endangered Species Act for disposal of sediments at the West Anchorage Site. Telephone discussions showed that the concern was for surface turbidity impacts to the new Port of Long Beach shallow water habitat located immediately adjacent to the Pier 400 Transportation Corridor.

The new shallow water habitat is located approximately 700 m northwest from the West Anchorage Site. Existing disposal operations from the Queens Gate dredging have not resulted in surface turbidity impacts to the new shallow water habitat. The proposed project will actually provide fewer impacts, in terms of quantities of material to be placed here (1,300 cubic yards versus 4.1 million cubic yards for the POLB project) and in quality of material. The proposed project would discharge sediments consisting of coarse sands versus fine sands for the POLB project. Sediments would thus cause a smaller turbidity plume, which would settle quicker than POLB sediments.

The U. S. Army Corps of Engineers has determined therefore, and U. S. Fish and Wildlife Service has concurred (U. S. Fish and Wildlife Service letter dated July 21, 2000), following informal consultation, with the finding, that the proposed project will not adversely affect the California least tern and that formal consultation in accordance with the Endangered Species Act is not required.

State of California Resources Agency letter dated 8 June 2000

The Resources Agency states in part "since the revised borrow project activity depicted in the EA entails the extraction of native material, the project may now be subject to SMARA [the 1975 Surface Mining and Reclamation Act]." The U. S. Army Corps of Engineers feels that the proposed project is not subject to SMARA. Section 2770(a) of SMARA states that "no person shall conduct surface mining operations". Section 2004 of SMARA defines a "person" as "any individual, firm, association, corporation, organization, limited liability company, or partnership, or any city, county, district, or the state or any department or agency thereof." The federal government is not included in this definition. Further, the federal government has not waived sovereign immunity for SMARA. The proposed project, therefore, is not subject to the provisions of SMARA.

California Coastal Commission letter dated 19 June 2000

The California Coastal Commission concurs with the determination made by the U. S. Army Corps of Engineers that a negative determination is suitable for the proposed project.

CHEMICAL TESTING

Chemical testing was conducted on two composite samples from within the proposed A-III Borrow Area. The following holes were used in each composite:

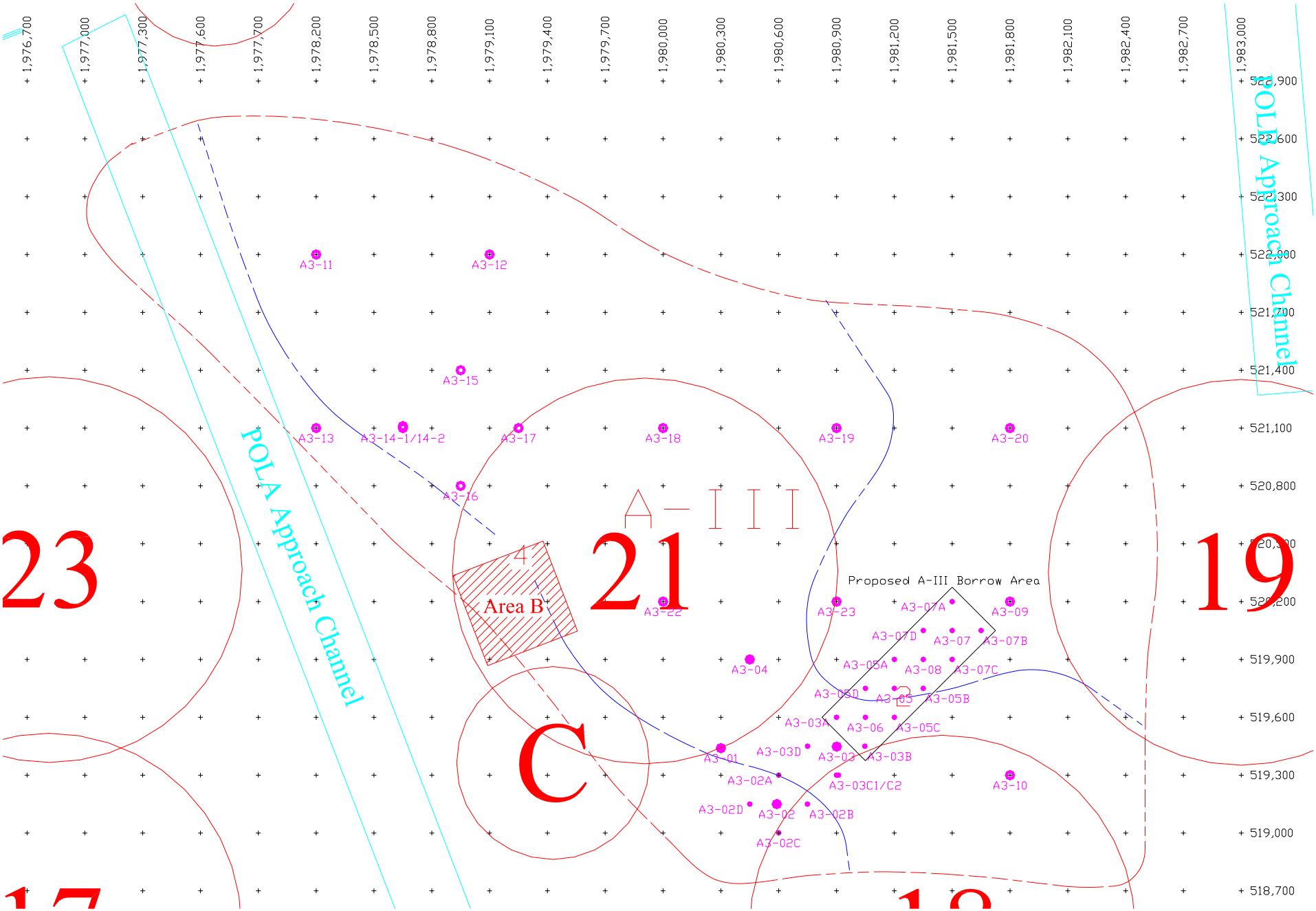
TEST DESIGNATION	HOLES USED IN COMPOSITE
A3-05 Comp	A3-05, A3-05A, A3-05B, A3-05C, A3-05D
A3-07 Comp	A3-07, A3-07A, A3-07B, A3-07C, A3-07D

Representative sediment samples were collected for each of the hole locations above between the mudline and a depth of 1 m. These samples were then mixed together as indicated above, to create the composite samples.

OTHER ITEMS ON MAP

17	Shipwreck Alaskan (lower left hand corner of map
18	Shipwreck Georgia Straits (lower right portion of map)
19	Shipwreck Benita
21	Unknown Wreckage (BLM No. 574)
23	Unknown (BLM No. 350)
C	Rock (shown on nav chart)
Area B	Port of Los Angeles (POLA) Pier 400, Stage 2 reef construction

NOTE: The circle diameter is related to the uncertainty in the exact location of the shipwreck/obstruction (The larger the circle, the larger the uncertainty of the actual location).


+ 1,976,700
+ 1,977,000
+ 1,977,300
+ 1,977,600
+ 1,977,700
+ 1,978,200
+ 1,978,500
+ 1,978,800
+ 1,979,100
+ 1,979,400
+ 1,979,700
+ 1,980,000
+ 1,980,300
+ 1,980,600
+ 1,980,900
+ 1,981,200
+ 1,981,500
+ 1,981,800
+ 1,982,100
+ 1,982,400
+ 1,982,700
+ 1,983,000
+ 522,900
+ 522,600
+ 522,300
+ 522,000
+ 521,700
+ 521,400
+ 521,100
+ 520,800
+ 520,500
+ 520,200
+ 519,900
+ 519,600
+ 519,300
+ 519,000
+ 518,700
POLA Approach Channel
POLA Approach Channel
A3-11
A3-12
A3-15
A3-13
A3-14-1/14-2
A3-17
A3-18
A3-19
A3-20
A3-16
A-III
23
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19
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A3-22
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A3-04
Proposed A-III Borrow Area
A3-07A
A3-09
A3-07D
A3-07
A3-07B
A3-05A
A3-08
A3-07C
A3-05D
A3-05
A3-05B
A3-03A
A3-06
A3-05C
C
A3-01
A3-03D
A3-03
A3-03B
A3-02A
A3-03C1/C2
A3-10
A3-02D
A3-02
A3-02B
A3-02C

ENVIRONMENTAL INFORMATION DOCUMENT

FOR

PILOT CAP PLACEMENT

PALOS VERDES SHELF
CAPPING DEMONSTRATION PROJECT
Pacific Ocean
Palos Verdes, California

PREPARED BY

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 9
SUPERFUND DIVISION

for submission to the

California Coastal Commission

May 2000

TABLE OF CONTENTS

Acronyms

APE .....Area of Potential Effects
CERCLA.....Comprehensive Environmental Response, Cleanup, and Liability Act
DDT .....dichloro-diphenyl-trichloroethane
DEA .....Draft Environmental Assessment
EA .....Environmental Assessment
EE/CA .....Engineering Evaluation/Cost Analysis
EFH .....Essential Fish Habitat
EIS/EIR.....Environmental Impact Statement/Environmental Impact Report
EPA .....U. S. Environmental Protection Agency
FMP.....Fisheries Management Plan
FONSI.....Finding of No Significant Impact
LACSD .....Los Angeles County Sanitation Districts
LAD .....U.S. Army Corps of Engineers, Los Angeles District
mcy.....million cubic yards
NEPA .....National Environmental Policy Act
NOAA .....National Oceanographic and Atmospheric Administration
PCB .....polychlorinated biphenyl
POLB .....Port of Long Beach
PV Shelf.....Palos Verdes Shelf
ROD .....Record of Decision
USACE .....U. S. Army Corps of Engineers
USEPA.....U. S. Environmental Protection Agency
WES .....Waterways Experiment Station

SECTION 1 - INTRODUCTION

EPA has recently decided to undertake a field pilot study of in-situ capping as part of its ongoing Superfund investigation of the Palos Verdes Shelf, pursuant to the Agency's authorities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The cap construction phase of the pilot capping study is the subject of this environmental information document. This document has been prepared at the request of the California Coastal Commission to facilitate their comments on the pilot project. It is not intended to serve as an Environmental Assessment under the National Environmental Policy Act (NEPA).

In July 1996, the U.S. Environmental Protection Agency (EPA) began a Superfund investigation of the large area of dichloro-diphenyl-trichloroethane (DDT)- and polychlorinated biphenyl (PCB)-contaminated sediments on the Palos Verdes (PV) Shelf off the coast of the Palos Verdes peninsula near Los Angeles, California (see Figure 1). This investigation has included an evaluation of human health and ecological risks posed by the contaminated sediments as well as an evaluation of potential clean-up actions. Based on existing risks to human health associated with the consumption of contaminated fish from this area, EPA recently proposed various institutional controls (i.e., enforcement of the commercial fishing ban, public outreach and education about the fish consumption advisory, and monitoring) as an interim response action. In the meantime, EPA is continuing its investigation of the feasibility of in-situ (i.e., in-place) capping for all or a portion of the site.

In-situ capping is defined as the placement of a covering or cap of clean material over the deposit of contaminated sediment, thereby isolating it from the environment and preventing DDT and PCBs in the sediment from diffusing into the water column and/or entering the food web. An initial assessment of the technical feasibility of in-situ capping was included in the overall evaluation of options for sediment remediation completed in 1994 as part of the Southern California Natural Resources Damage Assessment (Palermo, 1994). A number of options for sediment restoration have been evaluated as part of EPA's investigation of the PV Shelf (USEPA, 1997), and EPA has identified in-situ capping as the most feasible response action that could be taken in the near term to address human health and ecological risks at the site. In-situ capping is a proven technology that is effective for isolating contaminated sediments.

As part of EPA's investigation, the U.S. Army Corps of Engineers (USACE) Waterways Experiment Station (WES) performed a detailed evaluation of the feasibility and effectiveness of in-situ capping options for the Palos Verdes Shelf. The evaluation included prioritizing areas of the PV Shelf to be capped, determining appropriate cap designs, developing a general operations plan for placement of the cap, developing a monitoring plan to ensure successful cap placement and assess long term cap effectiveness, and developing preliminary cost estimates. The complete capping options study is published as a WES report titled "Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments" (report number TR-EL-99-2, available via the WES web site at http://www.wes.army.mil/el/elpubs/pdf/trel99-2.pdf) (Palermo et al., 1999). The results of the WES study were incorporated into an Engineering Evaluation/ Cost Analysis (EE/CA) report prepared by EPA to evaluate the need for response actions such as in-situ capping and to evaluate the feasibility of capping options (USEPA, 2000).

1.1 SUMMARY OF PROPOSED BENEFITS

The proposed pilot project involves dredging and transporting clean sediments to the PV Shelf site where they will be disposed in a controlled manner to construct a demonstration cap over a small area within the contaminated sediment deposit. The proposed pilot project will allow EPA to evaluate cap construction methodologies and short-term impacts in the field. WES technical studies have evaluated the feasibility of in-situ capping at the Palos Verdes Shelf (Palermo et.al., 1999), but there are many site-specific factors (e.g., water depth, slope, and the soft-bottom nature of the site) that justify a demonstration project prior to commitment of funds to a full-scale capping project. The detailed monitoring that will be conducted as part of this demonstration project will enable EPA to evaluate some of the uncertainties regarding the most effective cap placement methods and the suitability of fine-grained versus coarse-grained sediments for cap construction, as well as the extent of construction-related impacts on the marine environment.

The EE/CA will be supplemented by information gained from this demonstration project. If the pilot project is successful, EPA may propose capping as a response action for the PV Shelf, in which case (pursuant to the requirements of the Superfund program), a proposed plan would be issued for public comment and EPA would consider all comments received before deciding whether to proceed with a cap.

1.2 PROJECT PURPOSE

The overall objective of the field pilot study is to demonstrate that a cap can be placed on the PV Shelf as intended by the design and to obtain field data on the short-term processes and behavior of the cap as placed. Specific objectives to be addressed as a part of the pilot include:

1. Demonstrate that an appropriate cap thickness can be placed with an acceptable level of variability in cap thickness.
2. Demonstrate that excessive resuspension of existing sediments and excessive mixing of cap and contaminated sediments can be avoided.
3. Demonstrate that excessive losses of cap materials can be avoided.
4. Determine, to the degree possible, the effect of variable cap material type, bottom slope, water depth, and placement method (e.g., conventional versus spreading) on cap thickness and sediment displacement and resuspension.
5. Demonstrate the effectiveness of the cap with respect to short-term isolation of contaminants during the initial advective flow resulting from sediment consolidation.
6. Demonstrate the ability to monitor operations and assess cap placement impacts.
7. Evaluate and modify, where needed, all operational and monitoring approaches.

1.3 RELATED PROJECTS/ENVIRONMENTAL ASSESSMENTS

In the pilot project, EPA plans to use cap material from two primary sources: 1) the sediments dredged from Queen's Gate channel and 2) the AIII borrow area located to the

southeast/northwest of the Queen's Gate channel (see Figure 2). The dredging and transportation impacts associated with these two sources have been addressed in separate environmental reviews as described below.

The primary source of clean sediment (i.e., cap material) for the pilot capping project will be the main channel (Queen's Gate) deepening project for the Port of Long Beach (POLB). As described below, EPA anticipates that the primary (and possibly the only) sequence of events for using the Queen's Gate sediments will be to take them as they are dredged from the channel and use them as cap material (i.e., with no "rehandling"). However, as a contingency for obtaining a limited volume of sediments with a somewhat higher median grain size (D_{50}), EPA is also considering redredging Queen's Gate sediments that have already been disposed at either the West Anchorage disposal site and/or the Southeast Energy Island Borrow Pit.

The Main Channel Deepening, Port of Long Beach, Long Beach, California, Record of Decision (ROD) was signed on March 4, 1997 by H. Martin Lancaster, Assistant Secretary of the Army. The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was completed and finalized by the U. S. Army Corps of Engineers, Los Angeles District (LAD) and the POLB in September 1995. The USACE is the federal and the POLB is the state lead agency for this project. The overall project area is shown in Figure 1.

The Main Channel Deepening Project will deepen and modify the approach channel outside the Queens Gate entrance to the POLB. Project completion will accommodate large, deep-draft vessels transporting crude oil to the POLB, thereby improving cargo movement efficiencies and reducing transportation costs.

A Final Supplement to the POLB Main Channel Deepening EIS/EIR was prepared to document revisions to disposal sites, circulated for public review, and approved with a Finding of No Significant Impact (FONSI) on 13 April 1998 by Robert L. Davis, Colonel, USACE, District Engineer. The Final Supplement permitted disposal to the following disposal sites: 1.5 million cubic yards (mcy) at POLB Energy Island southeast borrow pit and 4.1 mcy in the West Anchorage Area located north of the Middle Breakwater.

A Draft Supplemental EA (USACE, 2000a) to the POLB Main Channel Deepening EIS/EIR has been prepared to document further revisions to disposal sites. A FONSI has been prepared, but has not yet been signed. The Draft Supplemental EA was prepared to assess one element of the PV Shelf pilot capping project that is interlinked with the Queen's Gate project, namely the transport to the PV Shelf of approximately 350,000 cubic meters of sediments dredged from the Queen's Gate Channel as part of the Channel Deepening Project. The Draft Supplemental EA also evaluates the option of dredging and transporting to the PV Shelf limited volumes of Queen's Gate sediment that have already been disposed in one or both of two areas: approximately 50,000 cubic meters from the West Anchorage Site in the outer harbor of the POLB, and approximately 50,000 cubic meters from the Southeast Energy Island Borrow Pit.

USACE sent the Draft Supplemental EA to interested parties, including the California Coastal Commission, on April 5, 2000, for review and comments.

As described below, EPA also plans to use cap material from the AIII borrow area located to the southeast/northwest of the Queen's Gate channel (see Figure 2). A separate Draft Environmental Assessment (DEA) (USACE, 2000b) for dredging and transporting sediments from the AIII Borrow Site has been prepared and distributed by USACE concurrent with this document. The DEA for AIII evaluates the dredging of approximately 20,000 cubic meters of coarse-grained sands from the AIII Borrow Site and transport of those sediments to the PV Shelf. That DEA also address the disposal of a small volume of AIII sediments at either the West Anchorage disposal site that is being used in the Queen's Gate channel deepening project or at LA-2. Both the Draft Supplemental EA for Queen's Gate and the DEA for AIII are incorporated herein by reference.

1.4 PILOT CAPPING PROJECT BACKGROUND

The Palos Verdes Shelf site consists of a 43 square kilometer (17 square mile) area of DDT- and PCB-contaminated sediments in an offshore area between Point Fermin and Point Vicente (see Figure 1). The demonstration project will consist of placing cap material within a small area of the site (approximately 0.7 square kilometers or 180 acres) using a maximum of 500,000 cubic meters of clean sediment. Sediments used will consist of fine-grain sands and coarse-grain sands. Fine-grain sands will be taken predominantly from the POLB Main Channel Deepening Project as discussed in the Draft Supplemental EA (USACE, 2000a). Coarse-grain sands will be taken from a nearby borrow site (identified as area AIII on Figure 2) as discussed in the Draft EA (USACE, 2000b). The demonstration project will also use a variety of sediment disposal (i.e., cap placement) methodologies.

The 1999 WES report evaluating in-situ capping for the Palos Verdes Shelf contains a detailed analysis of cap design criteria, construction methodology, and cap effectiveness. Design criteria for the cap addressed in the report include erosion potential, seismic stability, consolidation of the cap and underlying sediments, and thickness required for minimizing or eliminating biological mixing (i.e., bioturbation) that could transport contaminants up through the cap. Several computer models, combined with experience in capping other sites, were used to predict cap effectiveness, impacts associated with cap placement (e.g., bottom surges and the potential for resuspension of contaminated sediments) and cap placement methodologies. This large body of specific information and analysis was used in designing the pilot capping project.

The overall approach to the pilot capping project is described in "Field Pilot Study of In-Situ Capping of Palos Verdes Contaminated Sediments – Operations and Monitoring Plan" (Palermo, 2000 - see Appendix B). The cap material will be placed in four distinct cells in order to allow careful evaluation of placement at different depths with both conventional (i.e., point dumping) and spreading placement methods. An extensive monitoring program has also been developed (Fredette, 2000 - see Appendix C) and will be implemented in close coordination with cap placement activities.

1.5 PROPOSED PILOT PROJECT

The major actions associated with the pilot capping project are 1) dredging clean sediment (cap material) and transporting it to the Palos Verdes Shelf, 2) constructing caps of varying thickness in the pilot capping cells through controlled placement of cap material, and 3) environmental monitoring before, during and after cap placement.

For the purposes of this environmental information document, the proposed pilot project consists of the placement of sediments from all sources at the Palos Verdes Shelf as part of the pilot capping project.

The Manhattan-class hopper dredge *Sugar Island*, which will be used to complete the POLB Main Channel Deepening Project, will accomplish all dredging and cap placement for the pilot capping project. A hopper dredge was identified as the preferable placement equipment type in the WES report (Palermo et al, 1999) and is the equipment of choice for the pilot capping on the PV Shelf for several reasons, including:

1. Hopper dredges provide better control of placement in the open ocean environment and allow for more flexibility in placement options to include pumpout capabilities; and

2. Hopper dredges remove material from channels by hydraulic means, resulting in a breakdown of any hardpacked material and addition of water as material is stored in the hopper for transport. Material from hopper dredges is therefore more easily dispersed in the water column, and would settle to the seafloor with less energy and less potential for resuspension of the contaminated sediment.

The *Sugar Island* utilizes a split-hull hopper opening mechanism that can be used to control the rate of release. In addition, this dredge is equipped with a hopper pumpout capability over the bow and water jets to aid in pumpout operations. Pumpout can also be accomplished through the adjustable skimmers within the hopper or through one of the two dragarms, allowing for a submerged point of discharge. Any of these methods of placement could potentially be used during the pilot.

The pilot capping project will be conducted within four 300-by-600 meter placement cells located about midway between Point Fermin and Point Vicente. One pair of cells would be located along the landward edge of the site where the water depth is approximately 40 to 45 meters (m), and the second cell pair would be located adjacent to the seaward limit of the continental shelf in a comparatively deeper area where water depths are 60 to 70 m. The two cells within each pair would be separated by a full cell length in the along-shore direction and by a full cell width in the perpendicular direction (see Figure 3). The cell grid may be adjusted slightly following the collection and evaluation of baseline data. During the pilot project, placement of cap material would occur within the limits of these four cells, but the area monitored would extend to adjacent areas.

The location of the pilot capping cells within the site was determined based on criteria in the Operations and Monitoring Plan (see discussion in Palermo 2000). One of the primary criteria used to select the location of the pilot cells was their location with respect to the sewer outfall system owned and operated by the Los Angeles County Sanitation Districts (LACSD). The LACSD outfalls discharge 350± million gallons per day of treated wastewater from the

County treatment plant in Carson. The pilot cells were placed in a location that (with respect to bottom current on Palos Verdes Shelf) is downstream of the outfalls. This decision, as well as the development of the Operations Plan, was made to ensure that the pilot capping project does not have any adverse impact on the outfall system (e.g., accumulation of cap material on top, of or against the side of, the pipes).

Placement of cap material for the pilot project is scheduled to begin in July 2000 and will be completed within a period of approximately three months. This schedule is based to a large degree on the availability of the *Sugar Island*, which is currently in the area to complete the Queen's Gate channel deepening project. Although the initial placement of cap material will occur during daylight hours (to facilitate the associated monitoring work), the bulk of the dredging (from either Queen's Gate or the AIII borrow area) and cap material placement at Palos Verdes Shelf will occur in the course of round-the-clock operations.

Modeling to date indicates that the Queen's Gate material can be used for cap construction if the conventional method of placement (i.e., point dumping) is used. Use of spreading methods of placement with Queen's Gate sediments (other than possibly pumpout through submerged dragarms) is not expected to be an efficient method of cap construction due to stripping losses of finer sized particles that would occur (stripping loss refers to the current-driven movement and "off-target" accumulation of slow-settling cap material). However, the coarser grained materials in the AIII borrow area are appropriate for demonstration of spreading placement techniques and will be used for that purpose.

The environmental monitoring program will collect data before, during and after cap placement. Monitoring of the pilot project will enable the EPA to address key short and intermediate term questions relative to capping on the Palos Verdes Shelf. These questions include:

1. Does placement occur as modeled (e.g., how far does the cap material spread, how many loads does it take to achieve a desired cap thickness, what are the effects of water depth, slope and material type, and are there any indications of turbidity flows or mudwaves)?
2. Can a uniform cap be constructed?
3. Can disturbance to in-place sediments be kept within tolerable limits?
4. Does the cap remain clean?
5. Does the cap remain stable during and after placement?

The monitoring/sampling techniques will include sediment cores, vane shear strength measurements on sediment core subsamples, side-scan sonar, sediment profile camera photographs, fixed (bottom-moored) and ship-deployed optical back scatter (OBS)/acoustic Doppler current profile (ADCP) meter arrays, and water column samples. EPA will also collect hopper dredge operation data that includes positioning during placement, load volume, time to release material, and samples of hopper inflow and overflow for grain size and other geotechnical properties.

The Operations and Monitoring Plan (Appendix B) and the Monitoring Scope of Work (Appendix C) describe the overall scope and objectives of the cap placement monitoring plan,

and the details of that effort (including field sampling plans and quality assurance plans) will be described in plans being prepared by USACE contractors.

In March 2000, EPA distributed the Operations and Monitoring Plan (Appendix B) and the Monitoring Scope of Work (Appendix C) to the Palos Verdes Shelf Technical Advisory Committee for their review and comment. In addition, USACE distributed an overall project description for the pilot capping project to interested parties on March 9, 2000. Written comments received to date are included in Appendix D.

SECTION 2 - ENVIRONMENTAL INVENTORY AND CONSEQUENCES

This section provides an assessment of potential impacts for the proposed pilot project. If analyses show significant adverse impacts, then mitigation measures have been included to avoid the impact or reduce the level to insignificance

2.1 Oceanography and Water Quality

The pilot capping project will result in impacts to the area where the pilot cap is constructed (i.e., the Palos Verdes Shelf). Temporary physical and chemical changes in water quality characteristics will occur because of stripping losses during placement of cap material, resuspension of cap material when it impacts the ocean floor, and the potential resuspension of the contaminated Palos Verdes Shelf sediments. Impacts may include increases in turbidity and suspended solids levels in the immediate vicinity of capping operations. Increased turbidity would result in a decrease in light penetration. High levels of turbidity are usually restricted to the immediate vicinity of the capping area and tend to dissipate rapidly.

Stripping losses (i.e., the slow settling of finer grain size particles) would be greater for Queen's Gate sediments than for the AIII sediments. The primary method of placing Queen's Gate sediments will be through conventional disposal (i.e., point dumping) in order to minimize stripping losses. If a spreading method of placement is used with these sediments, it will be by pumping out the hopper through the lowered drag arm of the hopper dredge. Such an approach will make the effective point of release approximately 80 feet below the water surface, thereby minimizing any water quality impacts in the upper water column.

The DDT- and PCB-contaminated sediments on the Palos Verdes Shelf are present as a result of the discharge of these contaminants in partially-treated wastewater, or effluent, from the Los Angeles County sewer system through the ocean outfall pipes off Whites Point. The resulting effluent-affected sediment is fine-grained, with a higher organic carbon content than native sediments. DDT and PCB levels in the water over the Palos Verdes Shelf, although very low due to the hydrophobic nature of these contaminants, are still above both the California Ocean Plan water quality objectives and federal water quality criteria. Resuspension of contaminated sediments may result in desorption and a temporary increase in DDT and PCB levels in the water column in the immediate vicinity of the capping cell.

It is our best professional judgment that resuspension and/or desorption of contaminants as a result of capping activities will be negligible in magnitude and highly localized. One of the

objectives of the pilot capping project is to assess the scope and extent of resuspension and/or desorption prior to committing resources to a full-scale capping effort. Monitoring and cap placement have been designed so that if significant resuspension and/or desorption occurs, it will be detected early and either measures will be taken to prevent such resuspension/desorption, or the project will be halted pending further analysis of monitoring data and consultation with the appropriate agencies.

2.2 Marine Resources

Cap placement activities will cause a disturbance and some redistribution of bottom sediments in the vicinity of the cap placement cells during the period of cap placement (approximately 3 months). Some invertebrates within the cap footprint, especially small crustaceans and benthic infauna, may be smothered, while motile organisms would relocate to areas outside the zone of impact. Invertebrates, epifauna and infauna may be exposed to elevated suspended sediment concentrations during cap placement. These conditions may cause some clogging of gills and suspension feeding apparatuses, resulting in smothering of invertebrates outside the cap footprint but within the immediate vicinity. Invertebrate populations are expected to recover upon completion of the pilot project, although the distribution of species in the cap footprint may be somewhat altered because of the different physical and chemical nature of the cap material. To the extent that benthic organisms in the pilot cell area are serving as a mechanism for DDT and PCB in the sediments to enter the food chain, their elimination and replacement with organisms living in the cleaner cap material will have a positive effect on the marine ecosystem.

Suspended solids from the pilot capping project may be carried by onshore currents towards the kelp beds that are present along the Palos Verdes peninsula. As part of its Feasibility Study of options to control impacts from the ongoing Portuguese Bend landslide, USACE has studied the kelp beds and determined that, due to the landslide, they are somewhat degraded. The landslide is a constant source of turbidity to those kelp beds. Nevertheless, the kelp beds are still doing well. Due to the distance and short-term nature of the pilot capping project, EPA believes that the there will not be any significant impacts to kelp beds. However, as part of the monitoring program, EPA will be evaluating the transport of suspended solids from the pilot capping area to the kelp beds.

Threatened and endangered species: The following listed species may occur in the study area of this project:

- California least tern (*Stern antillarum browni*) - endangered
- Brown pelican (*Pelecanus occidentalis*) – endangered
- Bald eagle (*Haliaeetus leucocephalus*) - threatened
- Peregrine falcon (*Falco peregrinus*) – delisted, species of concern

EPA has determined that cap placement will take place in deep water sufficiently removed from the shallow water foraging areas used by the California least tern so as to have no affect on this listed species. EPA has also determined that the placement of dredged materials at the Palos Verdes Shelf will not have an affect nor jeopardize the continued existence of any other federal

listed threatened or endangered species. Formal consultation pursuant to Section 7 of the Endangered Species Act is not required for this pilot project implementation.

Essential Fish Habitat: In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act, an assessment of Essential Fish Habitat (EFH) has been conducted for the proposed project. The project is located within an area designated as EFH for two Fishery Management Plans (FMPs): Coastal Pelagics Plan and Pacific Groundfish Management Plan. Many of the 86 species federally-managed under these plans are known to occur in the area and could be affected by the proposed project.

EPA has determined that the proposed pilot project will not result in any significant, adverse impacts to any species on the Fishery Management Plan or their associated habitat.

2.3 Air Quality

Air quality impacts will occur as a result of dredging, transportation and placement of cap materials at the Palos Verdes Shelf. The time required for (and thus the air quality impacts of) placement of cap material is significantly less than that involved in dredging the material and transporting it from either Queen's Gate or the AIII Borrow Site. In the Draft Supplemental EA for the Queen's Gate Project (USACE, 2000a) and the Draft EA for the AIII Borrow Site (USACE, 2000b), the hopper dredge cycle times used to calculate air quality impacts included the amount of time involved in the placement of the cap material. Therefore those documents should be consulted for a quantitative assessment of the air quality impacts associated with all phases of the pilot capping project. In general, the short- and long-term air impacts associated with the pilot project are projected to be similar to (i.e., only marginally greater than) those described and assessed in the authorized Queen's Gate project. 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.

2.4 Noise

All activities will take place within sites which are well away from any potential sensitive receptors. No additional noise impacts are expected.

2.5 Cultural Resources

No cultural resources are known to exist within the area of potential effects (APE) encompassing the four placement cells at the Palos Verdes Shelf. As part of the baseline monitoring that will be conducted prior to cap construction, subbottom profiling will be conducted over the APE and will be used to confirm the absence of cultural resources.

2.6 Vessel Transportation and Safety

Disposal (i.e., cap placement) operations are not expected to require closure of any navigation channels. Up to 20 round trips will be made from the AIII Borrow Site to the PV Shelf. Approximately 350 round trips will be made from the Queens Gate channel area to the PV Shelf. All applicable measures developed as a part of the Main Channel Deepening EIS/EIR (USACE and POLB, 1995) and first Supplement (USACE, 1998) to minimize potential vessel transportation conflicts and increase safety will be implemented for the pilot capping project. That is, the dredging contractor will participate in safety orientations with Jacobsen Pilot Service prior to cap placement to develop a coordination strategy for all potential users of the area.

SECTION 3 - REFERENCES

Fredette, T.J. 2000. *Palos Verdes Shelf Pilot Project Monitoring Scope of Work* (Working Draft 2.2). New England Division, U.S. Army Corps of Engineers. March 29, 2000.

Palermo, M.R. 1994. *Feasibility Study of Sediment Restoration Alternatives for the Southern California Natural Resource Damage Assessment*. Expert report prepared for the NOAA and the U.S. Department of Justice. U.S. Army Engineer Waterways Experiment station, Vicksburg, Mississippi.

Palermo, M.R., P. Schroeder, Y. Rivera, C. Ruiz, D. Clarke, J. Gailani, J. Clausner, M. Hynes, T. Fredette, B. Tardy, L. Peyman-Dove, and A. Risko. 1999. *Options for In-Situ Capping of Palos Verdes Shelf Contaminated Sediments*. Waterways Experiment Station, U. S. Army Corps of Engineers Technical Report EL-99-2. March 1999. (available via the WES web site at http://www.wes.army.mil/el/elpubs/pdf/trel99-2.pdf).

Palermo, M.R. 2000. *Field Study of In-Situ Capping of Palos Verdes Shelf Contaminated Sediments – Operations and Monitoring Plan*. Waterways Experiment Station, U.S. Army Corps of Engineers. March 2000.

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_____. 2000a. *Draft Supplemental Environmental Assessment for Palos Verdes Shelf Capping Demonstration Project, Pacific Ocean, Palos Verdes, California.* April 2000.

_____. 2000b. *Draft Environmental Assessment for Borrow Site Dredging and Transportation, Palos Verdes Shelf Capping Demonstration Project, Pacific Ocean, Palos Verdes, California.* May 2000.

USACE and POLB (U.S. Army Corps of Engineers, Los Angeles District and the Port of Long Beach). 1995. *Final Feasibility Study with Final Environmental Impact Statement/Environmental Impact Report for Port of Long Beach Main Channel Deepening Project, Los Angeles, California*.

USEPA (U. S. Environmental Protection Agency). 1997. *Screening Evaluation of Response Actions for Contaminated Sediment on the Palos Verdes Shelf*. U. S. Environmental Protection Agency, Region IX, San Francisco, California.

_____. 1999. *Engineering Evaluation/Cost Analysis for the Palos Verdes Shelf*. U. S. Environmental Protection Agency – Region IX, San Francisco, California. March 2000.

SECTION 4 - DISTRIBUTION LIST

Federal Agencies:	U.S. Army Corps of Engineers U.S. Fish and Wildlife Service National Marine Fisheries Service
State Agencies:	California Coastal Commission California Department of Fish and Game Regional Water Quality Control Board, Los Angeles Region
Local Agencies:	Port of Long Beach

SECTION 5 - PREPARERS/REVIEWERS

5.1 Preparers

Fred Schauffler	Remedial Project Manager, U.S. Environmental Protection Agency, Region 9, Superfund Division

5.2 Reviewers

Larry Smith	USACE LAD, Biological Sciences Environmental Manager, Ecosystem Planning Section

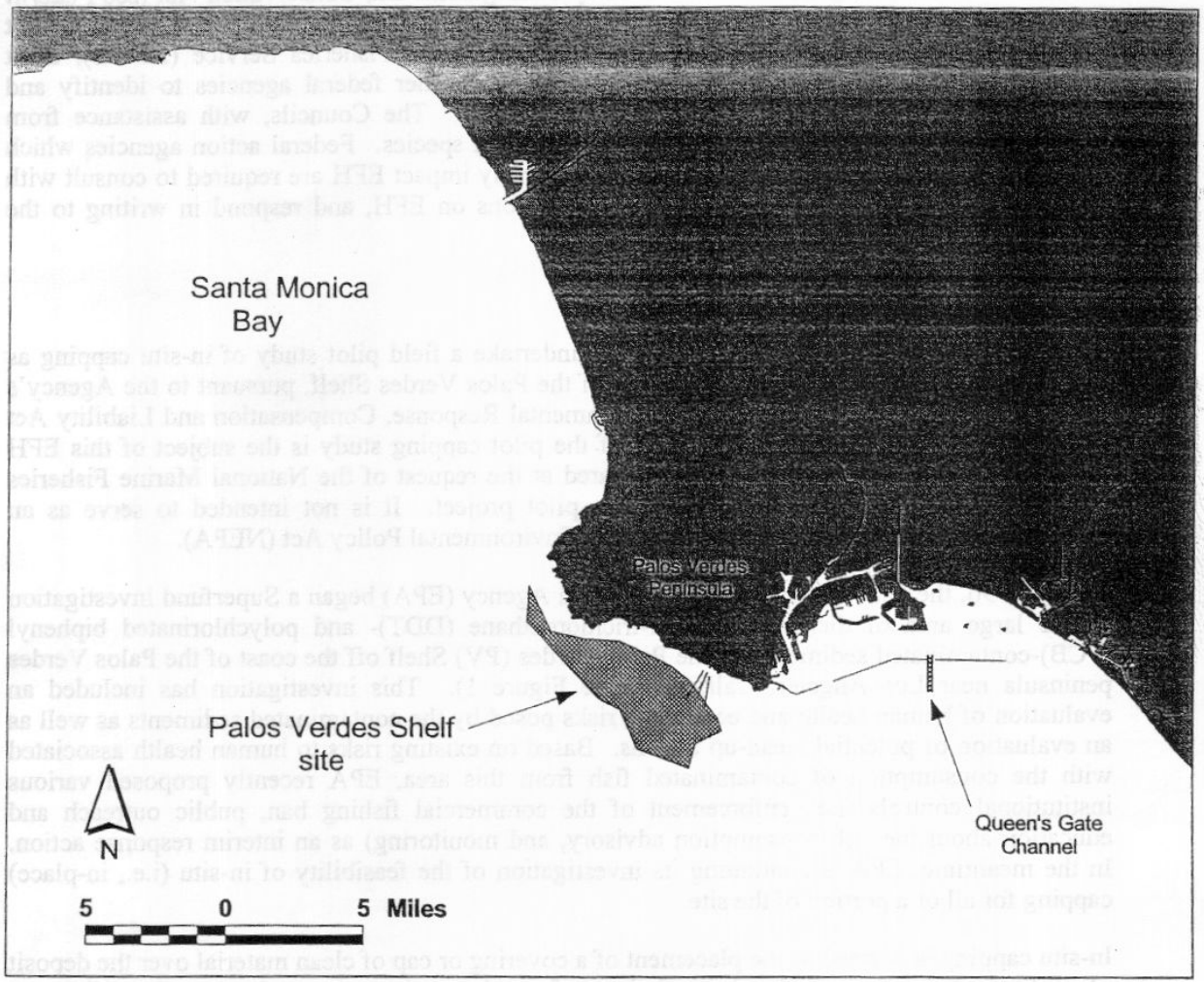
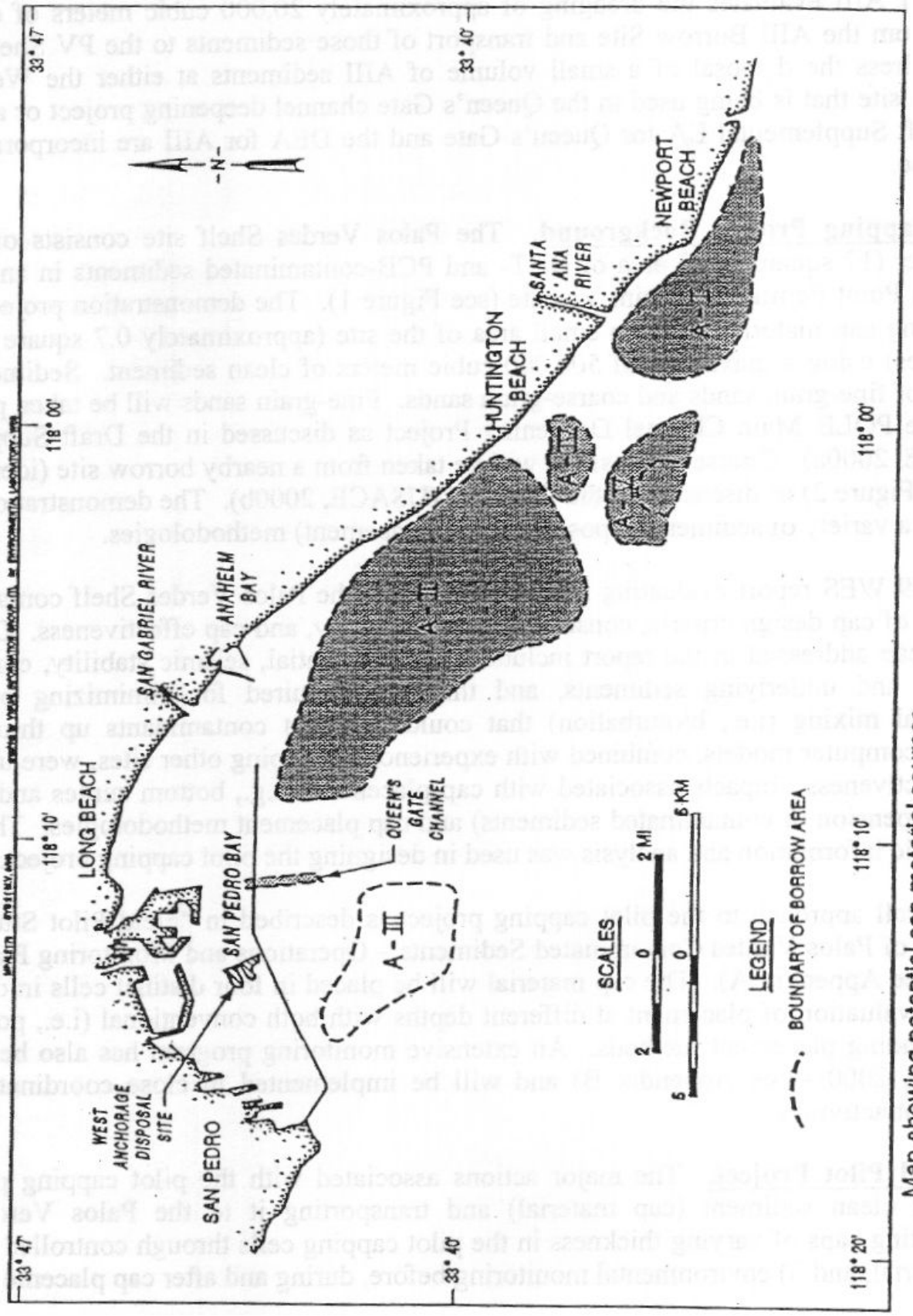


Figure 1. Project Location



Map showing potential cap material sources

Figure 2. Potential Borrow Sites

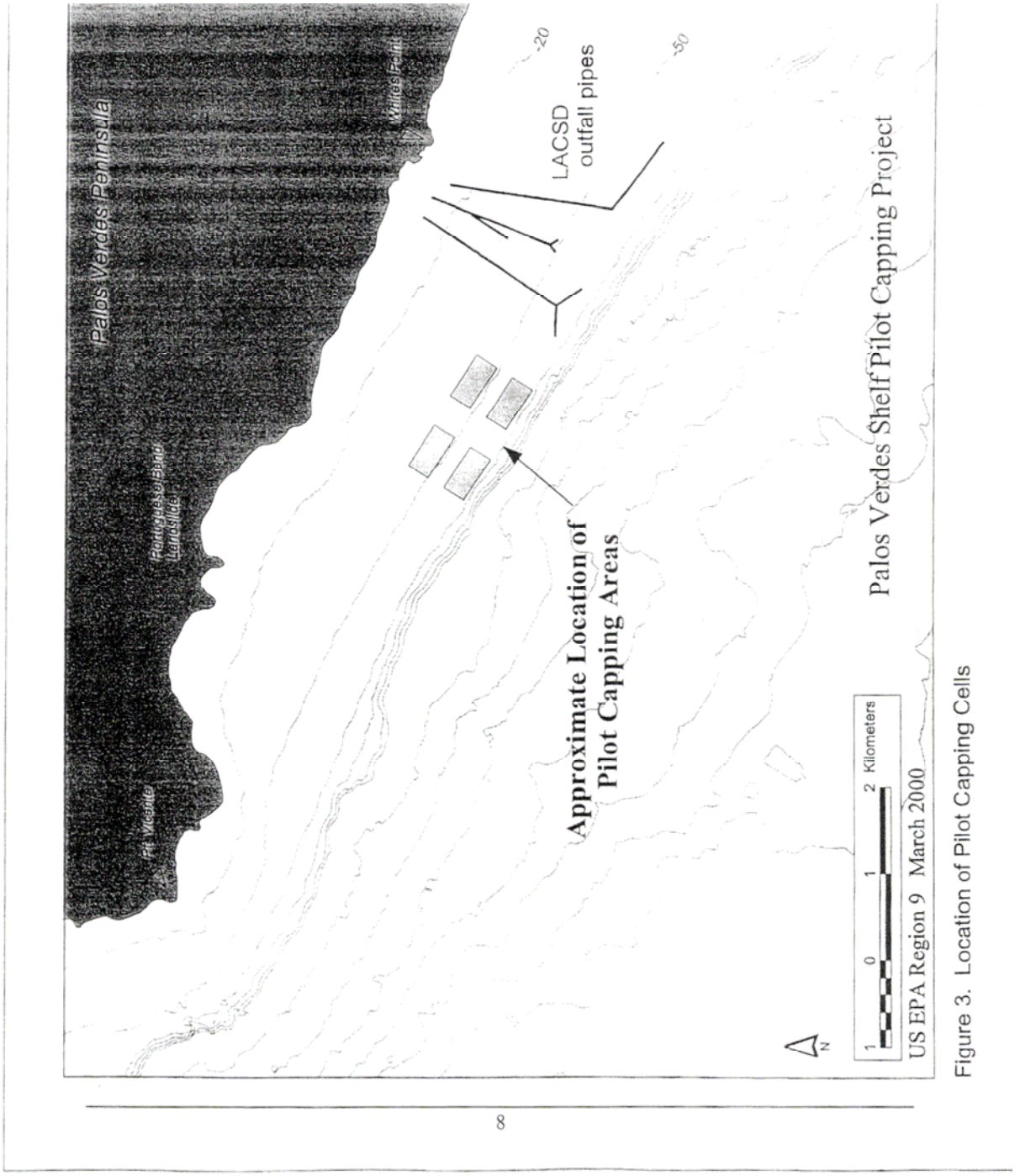


Figure 3. Proposed Capping Cell Locations

APPENDIX A

MAILING LIST

APPENDIX B

OPERATIONS AND MONITORING PLAN - FIELD STUDY OF IN-SITU CAPPING OF PALOS VERDES SHELF CONTAMINATED SEDIMENTS

APPENDIX C

PALOS VERDES SHELF PILOT PROJECT - MONITORING SCOPE OF WORK

APPENDIX D

CORRESPONDENCE & COMMENT LETTERS FROM OTHER AGENCIES

1. Transmittal Memo from EPA to the Palos Verdes Shelf Technical Advisory Committee for the draft Operations & Monitoring Plan and the draft Monitoring Scope of Work.

2. Letter from U.S. Fish and Wildlife Service, USDOI, to U.S. Army Corps of Engineers dated March 27, 2000 re: Draft Environmental Assessment for the Palos Verdes Shelf Capping Demonstration Project.

3. Letter from National Marine Fisheries Service, NOAA, USDOC, to U.S. Army Corps of Engineers dated March 28, 2000 re: Draft Environmental Assessment for the Palos Verdes Shelf Capping Demonstration Project.

4. Letter from Los Angeles County Sanitation Districts to U.S. Environmental Protection Agency dated March 28, 2000 re: Field Pilot Study of In-Situ Capping, Palos Verdes Shelf Contaminated Sediments - Operations and Monitoring Plan, and Monitoring Scope of Work.

5. Letter from California Dept. of Fish and Game to U.S. Environmental Protection Agency dated April 5, 2000 re: Operations and Monitoring Plan: Field Pilot Study of In-Situ Capping - Palos Verdes Shelf Contaminated Sediments, and Appendix A - Monitoring Scope of Work 09 Mar 00.

ESSENTIAL FISH HABITAT ASSESSMENT

FOR

PILOT CAP PLACEMENT

PALOS VERDES SHELF
CAPPING DEMONSTRATION PROJECT
Pacific Ocean
Palos Verdes, California

June 2000

This assessment of Essential Fish Habitat (EFH) for Pilot Cap Placement, Palos Verdes Shelf Capping Demonstration Project (Project) is being provided in conformance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (see *Federal Register* 62(244): December 19, 1997). The 1996 amendments to the Magnuson-Stevens Act set forth a number of new mandates for the National Marine Fisheries Service (NMFS), eight regional fishery management councils (Councils), and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate EFH for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to the fisheries service's recommendations.

PROPOSED ACTION

Introduction. EPA has recently decided to undertake a field pilot study of in-situ capping as part of its ongoing Superfund investigation of the Palos Verdes Shelf, pursuant to the Agency's authorities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The cap construction phase of the pilot capping study is the subject of this EFH assessment. This document has been prepared at the request of the National Marine Fisheries Service to facilitate their comments on the pilot project. It is not intended to serve as an Environmental Assessment under the National Environmental Policy Act (NEPA).

In July 1996, the U.S. Environmental Protection Agency (EPA) began a Superfund investigation of the large area of dichloro-diphenyl-trichloroethane (DDT)- and polychlorinated biphenyl (PCB)-contaminated sediments on the Palos Verdes (PV) Shelf off the coast of the Palos Verdes peninsula near Los Angeles, California (see Figure 1). This investigation has included an evaluation of human health and ecological risks posed by the contaminated sediments as well as an evaluation of potential clean-up actions. Based on existing risks to human health associated with the consumption of contaminated fish from this area, EPA recently proposed various institutional controls (i.e., enforcement of the commercial fishing ban, public outreach and education about the fish consumption advisory, and monitoring) as an interim response action. In the meantime, EPA is continuing its investigation of the feasibility of in-situ (i.e., in-place) capping for all or a portion of the site.

In-situ capping is defined as the placement of a covering or cap of clean material over the deposit of contaminated sediment, thereby isolating it from the environment and preventing DDT and PCBs in the sediment from diffusing into the water column and/or entering the food web. An initial assessment of the technical feasibility of in-situ capping was included in the overall evaluation of options for sediment remediation completed in 1994 as part of the Southern California Natural Resources Damage Assessment (Palermo, 1994). A number of options for sediment restoration have been evaluated as part of EPA's investigation of the PV Shelf (USEPA, 1997), and EPA has identified in-situ capping as the most feasible response action that could be taken in the near term to address human health and ecological risks at the site. In-situ capping is a proven technology that is effective for isolating contaminated sediments.

As part of EPA's investigation, the U.S. Army Corps of Engineers (USACE) Waterways Experiment Station (WES) performed a detailed evaluation of the feasibility and effectiveness of in-situ capping options for the Palos Verdes Shelf. The evaluation included prioritizing areas of the PV Shelf to be capped, determining appropriate cap designs, developing a general operations

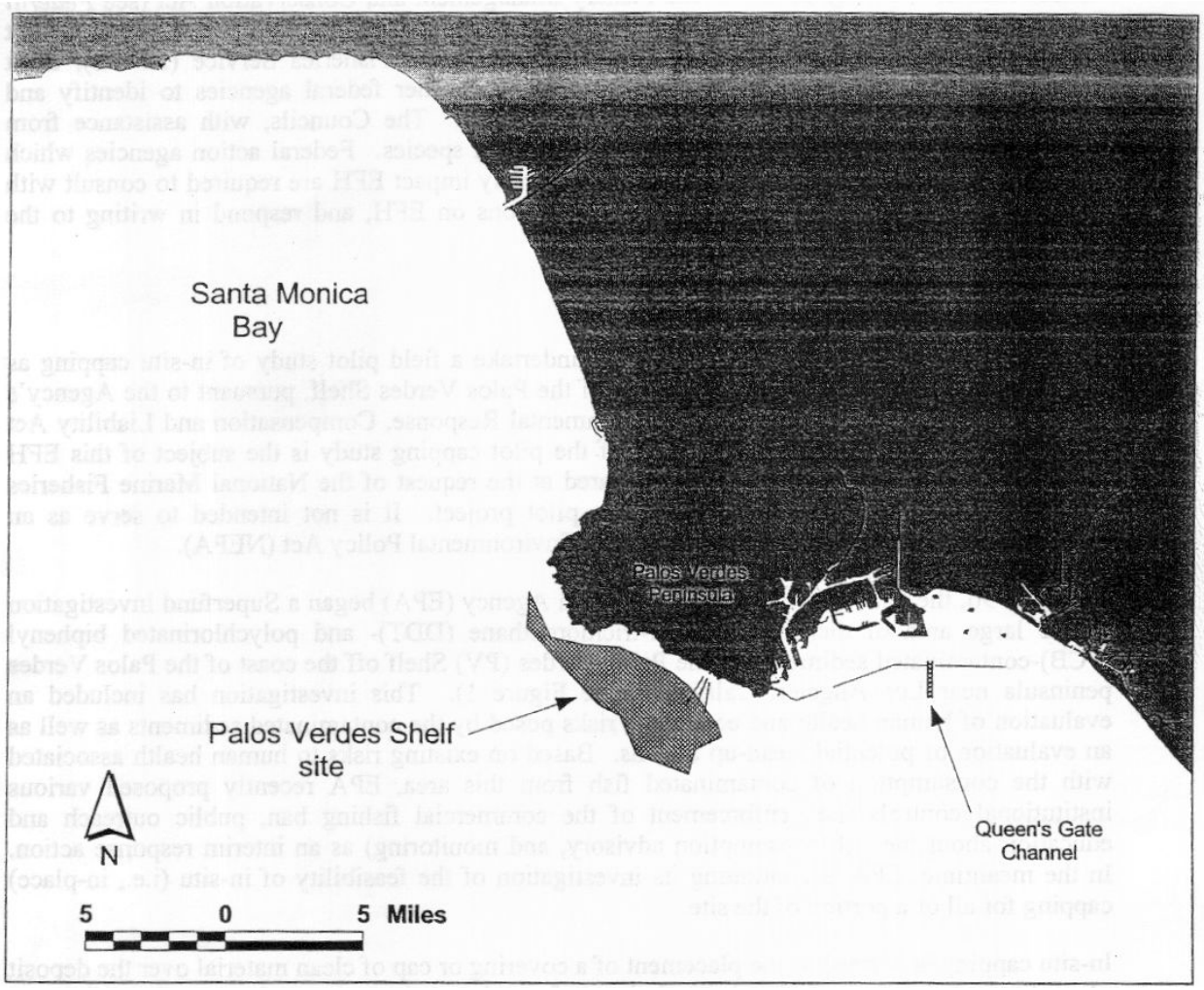


Figure 1. Project Location

plan for placement of the cap, developing a monitoring plan to ensure successful cap placement and assess long-term cap effectiveness, and developing preliminary cost estimates. The complete capping options study is published as a WES report titled "Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments" (report number TR-EL-99-2, available via the WES web site at http://www.wes.army.mil/el/elpubs/pdf/trel99-2.pdf) (Palermo et al., 1999). The results of the WES study were incorporated into an Engineering Evaluation/Cost Analysis (EE/CA) report prepared by EPA to evaluate the need for response actions such as in-situ capping and to evaluate the feasibility of capping options (USEPA, 2000).

Summary of proposed Benefits. The proposed pilot project involves dredging and transporting clean sediments to the PV Shelf site where they will be disposed in a controlled manner to construct a demonstration cap over a small area within the contaminated sediment deposit. The proposed pilot project will allow EPA to evaluate cap construction methodologies and short-term impacts in the field. WES technical studies have evaluated the feasibility of in-situ capping at the Palos Verdes Shelf (Palermo et.al., 1999), but there are many site-specific factors (e.g., water depth, slope, and the soft-bottom nature of the site) that justify a demonstration project prior to commitment of funds to a full-scale capping project. The detailed monitoring that will be conducted as part of this demonstration project will enable EPA to evaluate some of the uncertainties regarding the most effective cap placement methods and the suitability of fine-grained versus coarse-grained sediments for cap construction, as well as the extent of construction-related impacts on the marine environment.

The EE/CA will be supplemented by information gained from this demonstration project. If the pilot project is successful, EPA may propose capping as a response action for the PV Shelf, in which case (pursuant to the requirements of the Superfund program), a proposed plan would be issued for public comment and EPA would consider all comments received before deciding whether to proceed with a cap.

Project Purpose. The overall objective of the field pilot study is to demonstrate that a cap can be placed on the PV Shelf as intended by the design and to obtain field data on the short-term processes and behavior of the cap as placed. Specific objectives to be addressed as a part of the pilot include:

1. Demonstrate that an appropriate cap thickness can be placed with an acceptable level of variability in cap thickness.

2. Demonstrate that excessive resuspension of existing sediments and excessive mixing of cap and contaminated sediments can be avoided.

3. Demonstrate that excessive losses of cap materials can be avoided.

4. Determine, to the degree possible, the effect of variable cap material type, bottom slope, water depth, and placement method (e.g., conventional versus spreading) on cap thickness and sediment displacement and resuspension.

5. Demonstrate the effectiveness of the cap with respect to short-term isolation of contaminants during the initial advective flow resulting from sediment consolidation.

6. Demonstrate the ability to monitor operations and assess cap placement impacts.

7. Evaluate and modify, where needed, all operational and monitoring approaches.

Related Projects/Environmental Assessments. In the pilot project, EPA plans to use cap material from two primary sources: 1) the sediments dredged from Queen's Gate channel and 2) the AIII borrow area located to the southeast/northwest of the Queen's Gate channel (see Figure 2). The dredging and transportation impacts associated with these two sources have been addressed in separate environmental reviews as described below.

The primary source of clean sediment (i.e., cap material) for the pilot capping project will be the Main Channel (Queen's Gate) Deepening Project for the Port of Long Beach (POLB). As described below, EPA anticipates that the primary (and possibly the only) sequence of events for using the Queen's Gate sediments will be to take them as they are dredged from the channel and use them as cap material (i.e., with no "rehandling"). However, as a contingency for obtaining a limited volume of sediments with a somewhat higher median grain size (D_{50}), EPA is also considering redredging Queen's Gate sediments that have already been disposed at either the West Anchorage disposal site and/or the Southeast Energy Island Borrow Pit.

The Main Channel Deepening, Port of Long Beach, Long Beach, California, Record of Decision (ROD) was signed on March 4, 1997 by H. Martin Lancaster, Assistant Secretary of the Army. The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was completed and finalized by the U. S. Army Corps of Engineers, Los Angeles District (LAD), and the POLB in September 1995. The USACE is the federal and the POLB is the state lead agency for this project USACE & POLB, 1995). The overall project area is shown in Figure 1.

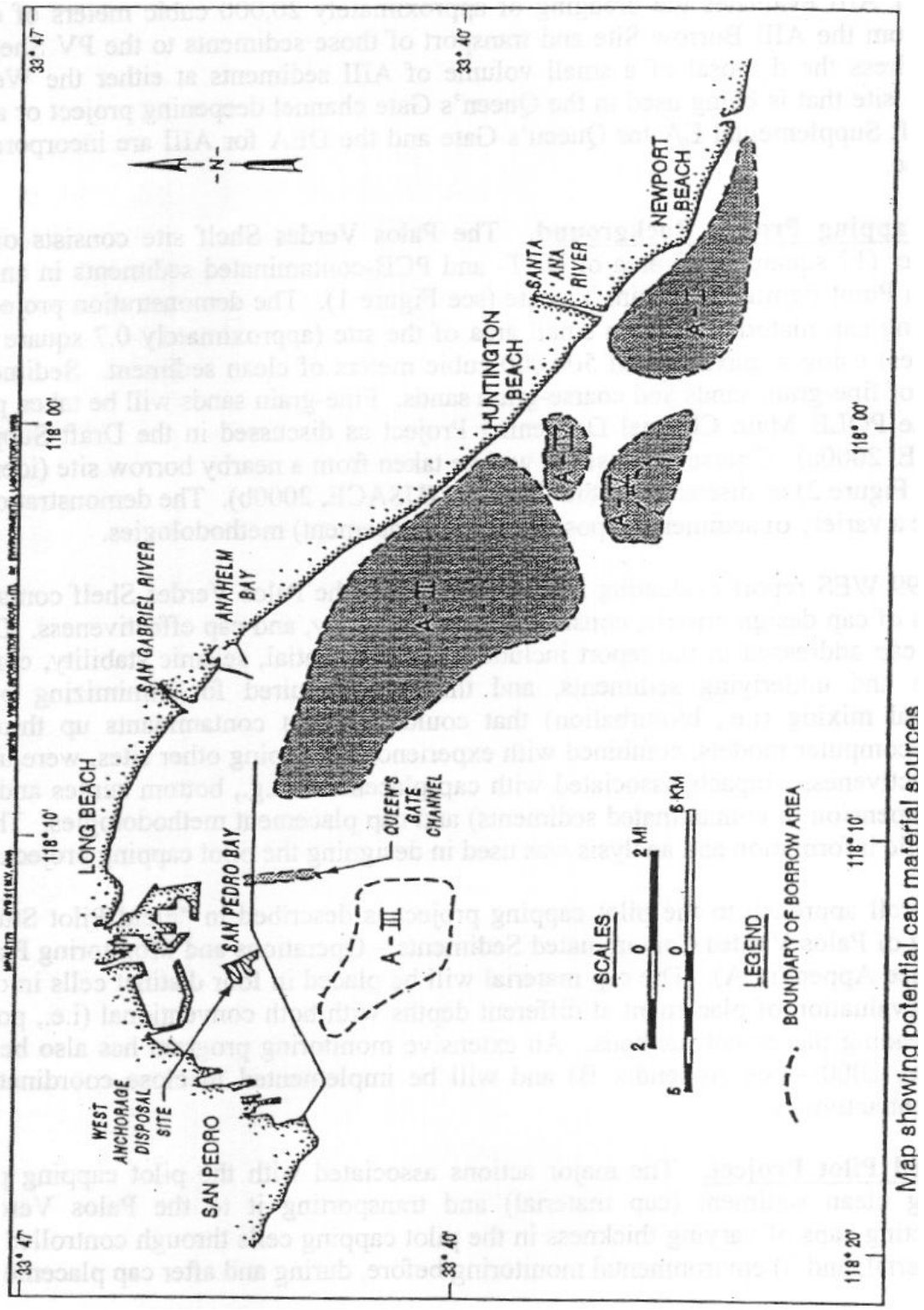
The Main Channel Deepening Project will deepen and modify the approach channel outside the Queens Gate entrance to the POLB. Project completion will accommodate large, deep-draft vessels transporting crude oil to the POLB, thereby improving cargo movement efficiencies and reducing transportation costs.

A Final Supplement to the POLB Main Channel Deepening EIS/EIR (USACE, 1998) was prepared to document revisions to disposal sites, circulated for public review, and approved with a Finding of No Significant Impact (FONSI) on 13 April 1998 by Robert L. Davis, Colonel, USACE, District Engineer. The Final Supplement permitted disposal to the following disposal sites: 1.5 million cubic yards (mcy) at POLB Energy Island southeast borrow pit and 4.1 mcy in the West Anchorage Area located north of the Middle Breakwater.

A Draft Supplemental EA (USACE, 2000a) to the POLB Main Channel Deepening EIS/EIR has been prepared to document further revisions to disposal sites. A FONSI has been prepared, but has not yet been signed. The Draft Supplemental EA was prepared to assess one element of the PV Shelf pilot capping project that is interlinked with the Queen's Gate project, namely the transport to the PV Shelf of approximately 350,000 cubic meters of sediments dredged from the Queen's Gate Channel as part of the Channel Deepening Project. The Draft Supplemental EA also evaluates the option of dredging and transporting to the PV Shelf limited volumes of Queen's Gate sediment that have already been disposed in one or both of two areas: approximately 50,000 cubic meters from the West Anchorage Site in the outer harbor of the POLB, and approximately 50,000 cubic meters from the Southeast Energy Island Borrow Pit.

USACE sent the Draft Supplemental EA to interested parties, including the California Coastal Commission, on April 5, 2000, for review and comments.

Figure 2. Potential Borrow Sites



Map showing potential cap material sources

As described below, EPA also plans to use cap material from the AIII borrow area located to the southeast/northwest of the Queen's Gate channel (see Figure 2). A separate Draft Environmental Assessment (DEA) (USACE, 2000b) for dredging and transporting sediments from the AIII Borrow Site has been prepared and distributed by USACE concurrent with this document. The DEA for AIII evaluates the dredging of approximately 20,000 cubic meters of coarse-grained sands from the AIII Borrow Site and transport of those sediments to the PV Shelf. That DEA also address the disposal of a small volume of AIII sediments at either the West Anchorage disposal site that is being used in the Queen's Gate channel deepening project or at LA-2. Both the Draft Supplemental EA for Queen's Gate and the DEA for AIII are incorporated herein by reference.

Pilot Capping Project Background. The Palos Verdes Shelf site consists of a 43 square kilometer (17 square mile) area of DDT- and PCB-contaminated sediments in an offshore area between Point Fermin and Point Vicente (see Figure 1). The demonstration project will consist of placing cap material within a small area of the site (approximately 0.7 square kilometers or 180 acres) using a maximum of 500,000 cubic meters of clean sediment. Sediments used will consist of fine-grain sands and coarse-grain sands. Fine-grain sands will be taken predominantly from the POLB Main Channel Deepening Project as discussed in the Draft Supplemental EA (USACE, 2000a). Coarse-grain sands will be taken from a nearby borrow site (identified as area AIII on Figure 2) as discussed in the Draft EA (USACE, 2000b). The demonstration project will also use a variety of sediment disposal (i.e., cap placement) methodologies.

The 1999 WES report evaluating in-situ capping for the Palos Verdes Shelf contains a detailed analysis of cap design criteria, construction methodology, and cap effectiveness. Design criteria for the cap addressed in the report include erosion potential, seismic stability, consolidation of the cap and underlying sediments, and thickness required for minimizing or eliminating biological mixing (i.e., bioturbation) that could transport contaminants up through the cap. Several computer models, combined with experience in capping other sites, were used to predict cap effectiveness, impacts associated with cap placement (e.g., bottom surges and the potential for resuspension of contaminated sediments) and cap placement methodologies. This large body of specific information and analysis was used in designing the pilot capping project.

The overall approach to the pilot capping project is described in "Field Pilot Study of In-Situ Capping of Palos Verdes Contaminated Sediments – Operations and Monitoring Plan" (Palermo, 2000 - see Appendix A). The cap material will be placed in four distinct cells in order to allow careful evaluation of placement at different depths with both conventional (i.e., point dumping) and spreading placement methods. An extensive monitoring program has also been developed (Fredette, 2000 - see Appendix B) and will be implemented in close coordination with cap placement activities.

Proposed Pilot Project. The major actions associated with the pilot capping project are 1) dredging clean sediment (cap material) and transporting it to the Palos Verdes Shelf, 2) constructing caps of varying thickness in the pilot capping cells through controlled placement of cap material, and 3) environmental monitoring before, during and after cap placement.

For the purposes of this environmental information document, the proposed pilot project consists of the placement of sediments from all sources at the Palos Verdes Shelf as part of the pilot capping project.

The Manhattan-class hopper dredge *Sugar Island*, which will be used to complete the POLB Main Channel Deepening Project, will accomplish all dredging and cap placement for the pilot

capping project. A hopper dredge was identified as the preferable placement equipment type in the WES report (Palermo et al, 1999) and is the equipment of choice for the pilot capping on the PV Shelf for several reasons, including:

1. Hopper dredges provide better control of placement in the open ocean environment and allow for more flexibility in placement options to include pumpout capabilities; and

2. Hopper dredges remove material from channels by hydraulic means, resulting in a breakdown of any hardpacked material and addition of water as material is stored in the hopper for transport. Material from hopper dredges is therefore more easily dispersed in the water column, and would settle to the seafloor with less energy and less potential for resuspension of the contaminated sediment.

The *Sugar Island* utilizes a split-hull hopper opening mechanism that can be used to control the rate of release. In addition, this dredge is equipped with a hopper pumpout capability over the bow and water jets to aid in pumpout operations. Pumpout can also be accomplished through the adjustable skimmers within the hopper or through one of the two drag arms, allowing for a submerged point of discharge. Any of these methods of placement could potentially be used during the pilot.

The pilot capping project will be conducted within four 300-by-600 meter placement cells located about midway between Point Fermin and Point Vicente. One pair of cells would be located along the landward edge of the site where the water depth is approximately 40 to 45 meters (m), and the second cell pair would be located adjacent to the seaward limit of the continental shelf in a comparatively deeper area where water depths are 60 to 70 m. The two cells within each pair would be separated by a full cell length in the along-shore direction and by a full cell width in the perpendicular direction (see Figure 3). The cell grid may be adjusted slightly following the collection and evaluation of baseline data. During the pilot project, placement of cap material would occur within the limits of these four cells, but the area monitored would extend to adjacent areas.

The location of the pilot capping cells within the site was determined based on criteria in the Operations and Monitoring Plan (see discussion in Palermo 2000). One of the primary criteria used to select the location of the pilot cells was their location with respect to the sewer outfall system owned and operated by the Los Angeles County Sanitation Districts (LACSD). The LACSD outfalls discharge 350± million gallons per day of treated wastewater from the County treatment plant in Carson. The pilot cells were placed in a location that (with respect to bottom current on Palos Verdes Shelf) is downstream of the outfalls. This decision, as well as the development of the Operations Plan, was made to ensure that the pilot capping project does not have any adverse impact on the outfall system (e.g., accumulation of cap material on top, of or against the side of, the pipes).

Placement of cap material for the pilot project is scheduled to begin in July 2000 and will be completed within a period of approximately three months. This schedule is based to a large degree on the availability of the *Sugar Island*, which is currently in the area to complete the Queen's Gate channel deepening project. Although the initial placement of cap material will occur during daylight hours (to facilitate the associated monitoring work), the bulk of the dredging (from either Queen's Gate or the AIII borrow area) and cap material placement at Palos Verdes Shelf will occur in the course of round-the-clock operations.

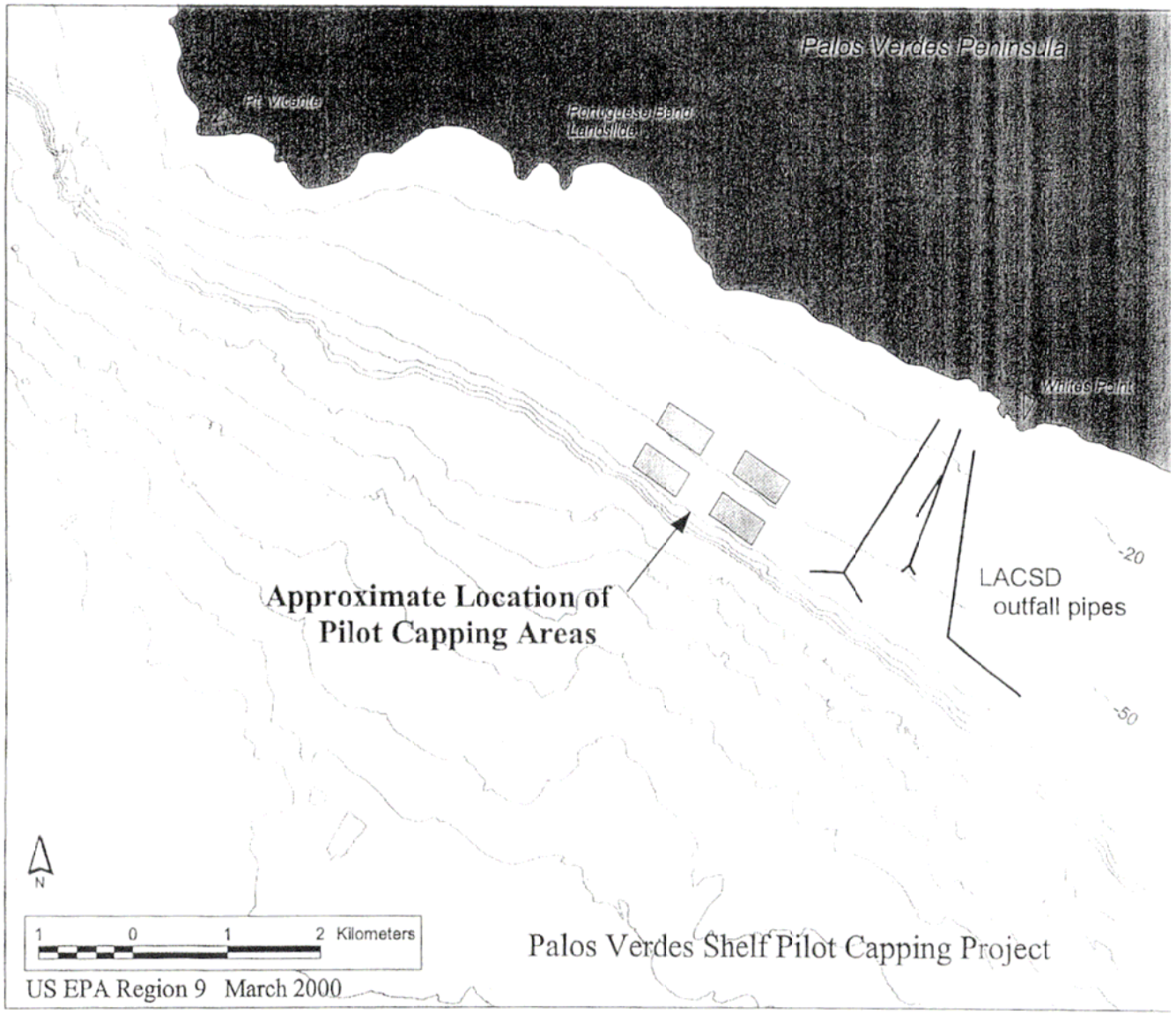


Figure 3. Location of Pilot Capping Cells

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Modeling to date indicates that the Queen's Gate material can be used for cap construction if the conventional method of placement (i.e., point dumping) is used. Use of spreading methods of placement with Queen's Gate sediments (other than possibly pumpout through submerged drag arms) is not expected to be an efficient method of cap construction due to stripping losses of finer sized particles that would occur (stripping loss refers to the current-driven movement and "off-target" accumulation of slow-settling cap material). However, the coarser grained materials in the AIII borrow area are appropriate for demonstration of spreading placement techniques and will be used for that purpose.

The environmental monitoring program will collect data before, during, and after cap placement. Monitoring of the pilot project will enable the EPA to address key short and intermediate term questions relative to capping on the Palos Verdes Shelf. These questions include:

1. Does placement occur as modeled (e.g., how far does the cap material spread, how many loads does it take to achieve a desired cap thickness, what are the effects of water depth, slope and material type, and are there any indications of turbidity flows or mud waves)?

2. Can a uniform cap be constructed?

3. Can disturbance to in-place sediments be kept within tolerable limits?

4. Does the cap remain clean?

5. Does the cap remain stable during and after placement?

The monitoring/sampling techniques will include sediment cores, vane shear strength measurements on sediment core subsamples, side-scan sonar, sediment profile camera photographs, fixed (bottom-moored) and ship-deployed optical back scatter (OBS)/acoustic Doppler current profile (ADCP) meter arrays, and water column samples. EPA will also collect hopper dredge operation data that includes positioning during placement, load volume, time to release material, and samples of hopper inflow and overflow for grain size and other geotechnical properties.

The Operations and Monitoring Plan (Appendix A) and the Monitoring Scope of Work (Appendix B) describe the overall scope and objectives of the cap placement monitoring plan, and the details of that effort (including field sampling plans and quality assurance plans) will be described in plans being prepared by USACE contractors.

EFFECTS OF THE PROPOSED ACTION ON EFH

Direct Impacts. The shelf varies in width from approximately 1 to 6 km and extends offshore to the shelf break at water depths of approximately 70 to 100 m. The bottom slope on the shelf generally increases with water depth, with slopes of approximately 1 to 2 deg at water depths of 30 to 70 m. The slope increases to approximately 6 to 7 deg at depths of 70 to 100 m. At the 100-m depth, the slope increases to 13 to 18 deg.

The native sediments of the shelf are comprised of silty sand. Since the first outfall diffusers became operational in 1937, particulate matter discharged through the outfalls has settled out and built up an effluent-affected (EA) sediment deposit on the shelf and slope. This EA deposit contains levels of organic matter and chemical contaminants higher than the native sediments and provides the focus of sediment restoration/ remediation efforts on the shelf and slope.

The EA deposit forms a band that extends from approximately the 30-m isobath offshore to water depths in excess of 400 m at a distance of approximately 3 to 4 km offshore and alongshore from Point Fermin to an area northwest of Point Vicente, a distance of 12 to 15 km (Figure 3 and Figure 4). The EA deposit is absent from approximately the 30-m water depth shoreward because of the higher wave energy. The most contaminated sediments on the shelf occur as a lens approximately 10 to 30 cm below the sediment-water interface. On the slope, the zone of maximum contamination is closer to the sediment-water interface than on the shelf. Strong currents at the shelf break have resulted in a patchy, thin sediment layer with areas of bare rock. A detailed characterization of the shelf and slope has been prepared by Lee (1994).

The volume of the entire mapped EA layer has been estimated at approximately 9 million cubic meters, and the mapped layer covers a surface area of approximately 40 square kilometers. The volume of the contaminated sediment is large and well in excess of those volumes which would provide economies of scale for potential restoration/ remediation alternatives.

Evaluations made for NOAA (Palermo 1994) assumed that the entire effluent deposit on the shelf and slope would potentially be restored. However, given the different focus of the EPA Superfund program (allowing for an incremental approach), areas to be restored are prioritized as a part of this study.

The pilot capping project will be conducted within four 300-by-600 meter placement cells located about midway between Point Fermin and Point Vicente (see Figure 3). The proposed project is located within an area designated as EFH for three Fishery Management Plans (FMP): the Coastal Pelagics Pelagic, and Pacific Groundfish Management Plans (NMFS 1998).

Soft bottom fish. The Los Angeles County Sanitation Districts (LACSD) conduct annual monitoring of the sewer outfalls located within the project site. Monitoring reports indicate that three species listed on the Pacific Groundfish FMP are known to occur on the project site (LACSD, 1998) and could be affected by the proposed project. The three species are the Dover sole (*Microstomus pacificus*), Pacific sanddab (*Citharichthys sordidus*), and the shortspine thornyhead (*Sebastolobus alascanus*).

Cap placement activities will cause a disturbance and some redistribution of bottom sediments in the vicinity of the cap placement cells during the period of cap placement (approximately 3 months). Fish would relocate to areas outside the zone of impact. Elevated suspended sediment concentrations during cap placement may cause some clogging of gills and suspension feeding apparatuses, resulting in smothering outside the cap footprint but within the immediate vicinity. Populations are expected to recover upon completion of the pilot project. To the extent that benthic organisms in the pilot cell area are serving as a mechanism for DDT and PCB in the sediments to enter the food chain, their elimination and replacement with organisms living in the cleaner cap material will have a positive effect on the marine ecosystem.

Pelagic Fish. These open ocean marine fishes move and/or migrate through the area and are not identified with either soft or hard bottom habitat. In the Southern California Bight, these species include: jack mackerel (*Trachurus symmetricus*), northern anchovy (*Engraulis mordax*), Pacific bonito (*Sarda chiliensis*), yellowtail (*Seriola lalandi*), blue shark (*Prionace glauca*), white seabass (*Atractoscion nobilis*), and swordfish (*Xiphias gladius*). Surveys (USACE, 1996) indicate that topsmelt (*Atherinops affinis*), queenfish (*Seriphus politus*), and grey smoothhound (*Mustelus californicus*) were also abundant pelagic fish that move through the area.

Two species are listed on the Coastal Pelagics FMP; they are the jack mackerel and northern anchovy. Three species are listed on the Pelagic FMP; they are the blue shark, grey smoothhound, and the swordfish.

Cap placement activities will cause a disturbance during the period of cap placement (approximately 3 months). Pelagic fish would relocate to areas outside the zone of impact. Impacts would thus be negligible both in scope and in duration.

Indirect Impacts. Turbidity impacts outside the project area may extend to rocky habitat and kelp beds located along the edge of the Palos Verdes Peninsula. Modeling performed by the WES has indicated that turbidity impacts are expected to be short-term in duration and highly localized (Palermo et. al., 1999). One of the objectives of this pilot study is to monitor and document turbidity impacts resulting from placement of cap materials. Plume characteristics (including size, makeup, and drift) are an aspect of cap placement that the pilot project is intended to verify. Each of the two habitat types and potential impacts are discussed below.

Rocky Habitat. The hard rock subtidal community is dominated by giant kelp and its biological community is best categorized as a kelp forest community. In areas not adversely affected by heavy sedimentation and turbidity, the marine fish found in the Study Area are typical of those found in southern California kelp forests.

A diverse and abundant fish fauna inhabits the giant kelp forest. More than 120 species are known to occur in southern California kelp beds; this represents almost 23% of the known marine fishes of California.

Fedler et al. (1974) and Foster and Schiel (1985:69) provide an overview of the marine fish that are common in the kelp forest. The following is a brief summary of those reports and the results of surveys performed for this Study (USACE, 1996).

Foster and Schiel (1985) categorize kelp forest fish into two general categories: canopy/midwater orienting fish and bottom-orienting fish. They further sub-divide the fish of these groups as browsers, planktivores, and predators (see Table 1).

Table 1. Common kelp fish of Southern California by sub-habitat type.

Sub-habitat	Browsers	Planktivores	Predators
Canopy-midwater	Senorita Kelp surfperch Halfmoon	Blue rockfish Blacksmith	Giant kelpfish Kelp bass Black rockfish
Bottom	Garibaldi Surfperch Opaleye		Surfperch Rockfish Cabezon Sculpin
From Forest and Schiel (1985:71)			

The nearest rocky habitat to the pilot capping cells is approximately 1,000 meters north of the most northerly cell (see Figure 3, roughly equivalent to the 20-meter contour line).

Subsurface currents on the shelf are generally low. During fair weather, they range from 7-10 cm/sec, with maximum alongshelf currents of 40 cm/sec and cross shelf currents of 20 cm/sec (Palermo et. al. 1999). The north-south current component, which is closely comparable to the cross shelf flow component, almost never exceeded 10 cm/sec. The alongshelf current has greater speeds and shows strong energy peaks at 1 and 2 cycles per day, an indication that much of the current flow is tidally influenced. The majority of the time currents flow in directions closely parallel to the coast; currents flow directly towards or away from the cost a much smaller percentage of the time.

Currents are therefore expected to carry any turbidity either parallel to the coast or away from the coast the large majority of the time. Current velocities during the small percentage of the time that currents flow toward the coast are considered insufficient to allow sediments traverse the gap before settling out (which, at maximum flow observed, would take slightly more than 1 hour and 20 minutes). Therefore, no impacts to rocky habitat are expected from the Project.

Kelp beds. Surveys performed in the rocky subtidal areas (USACE, 1996) confirm that kelp beds are dominated by the giant kelp (*Macrocystis pyrifera*) and have understory plants that are typical of the giant kelp forest community as described in Foster and Schiel (1985) and Murray and Bray (1993:332). The giant kelp forms a dense overstory with other marine plants like feather boa kelp, bladder chain kelp (*Cystoseira osmundacea*), palm kelp (*Pterygophora californica*), and the brown algae (*Pachydictyon coriaceum*) forming the understory plants.

The nearest kelp beds to the pilot capping cells are approximately 1,000 meters north of the most northerly cell (see Figure 3, roughly equivalent to the 20-meter contour line). Similarly, to the rocky habitat discussed above; currents are expected to carry any turbidity either parallel to the coast or away from the coast the large majority of the time. Current velocities during the small percentage of the time that currents flow toward the coast are considered insufficient to allow

sediments to traverse the gap between cells and the kelp beds before settling out. Therefore, no impacts to kelp beds are expected from the Project.

Proposed Mitigation. No mitigation measures are required since EFH impacts are considered insignificant. However, since the Project is a demonstration project to evaluate the engineering feasibility of creating a deep-water, level cap there are a number of monitoring activities associated with it. In addition to monitoring for engineering feasibility, these activities can and will also be used to monitor for turbidity effects on kelp beds and rocky habitat located adjacent to the Palos Verdes Peninsula.

Monitoring is designed (see Appendix B) to allow thorough evaluation of each placement technique for each sediment type and depth of disposal. Each combination will place a single hopper load (approximately 1,000 cubic meters of sediment) that will be extensively monitored followed by a week of no further placements to allow full evaluation of that particular combination. Movement of the turbidity plume is one of the characteristics to be monitored and evaluated. Should this monitoring show, contrary to our predictions above, impacts to kelp beds and/or rocky habitat, placement will cease until placement plans can be evaluated and modified to prevent further impacts. This will limit impacts to, at most, the single placement event.

SUMMARY

Direct impacts to fish in the placement cells will be minor and short-term and are expected to be offset by habitat improvements resulting from the burial of effected sediments. Sequestration and removal of contaminants from the benthic habitat is the goal of a capping operation. While this project is a demonstration project for engineering feasibility, the capped cells will experience some of the benefits for which capping is being assessed as a long-term solution to the Palos Verdes Site.

Indirect impacts to kelp beds and rocky habitat located along the edge of the Palos Verdes Peninsula as a result of turbidity generated by sediment placement are expected to be negligible. However, this is a demonstration project to assess engineering feasibility of in-situ capping. Extensive monitoring will be conducted of placement operations to ensure that, among other things, turbidity does not result in significant adverse impacts to the environment. A separate task in the monitoring plan (Task 11) will assess the plume transport to determine if the plume could reach the kelp beds and to assess the extent and level of turbidity in the kelp beds, if needed.

We have determined therefore that the proposed pilot project will not result in any significant, adverse impacts to any species on the Fishery Management Plans or their associated habitat.

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APPENDIX A

OPERATIONS AND MONITORING PLAN - FIELD STUDY OF IN-SITU CAPPING OF PALOS VERDES SHELF CONTAMINATED SEDIMENTS

Field Pilot Study of In-Situ Capping of Palos Verdes Shelf Contaminated Sediments- Operations and Monitoring Plan

BACKGROUND

The U.S. Environmental Protection Agency (EPA) is continuing its investigation regarding the feasibility of in-situ capping all or a portion of the dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyl hydrocarbons (PCB) contaminated sediments on the Palos Verdes (PV) shelf off the coast of Los Angeles, California. In-situ capping is defined as the placement of a covering or cap of clean material over the in-situ deposit of contaminated sediment.

The U.S. Army Corps of Engineers (USACE) has performed an evaluation of in-situ capping options for Region 9. The evaluation included prioritizing areas of the PV shelf to be capped, determining appropriate cap designs, developing an equipment selection and operations plan for placement of the cap, developing a monitoring plan to ensure successful cap placement and long term cap effectiveness, and developing preliminary cost estimates. The complete capping options study is published as USACE Waterways Experiment Station report TR-EL-99-2 (http://www.wes.army.mil/el/elpubs/pdf/trel99-2.pdf).

EPA region 9 has recently entered into an interagency agreement with the USACE Los Angeles District (LAD) to provide technical support for ongoing needs at the PV Shelf Site to include tasks related to Pre-Design Data Collection & Studies. One aspect of the pre-design studies is a field pilot study of cap placement on the shelf. This document serves as the operations and monitoring plan for the field pilot study.

Description of In-Situ Capping Options

Two capping approaches were considered in TR EL-99-2 for selected areas of the shelf: 1) placement of a Thin Cap (design thickness of 15 cm) which would isolate the contaminated material from shallow burrowing benthic organisms, providing a reduction in both the surficial sediment concentration and contaminant flux, and 2) placement of an Isolation Cap (design thickness of 45 cm) which would be of sufficient thickness to effectively isolate the majority of benthic organisms from the contaminated sediments, prevent bioaccumulation of contaminants and effectively prevent contaminant flux for the long term.

The shelf area presently under consideration for capping lies between the 40- and 70-m depth contours (in TR EL-99-2, this area was defined as two separate capping prisms: prism A centered over the “hot spot”, and prism B located northwest of the “hot spot"). If capping is selected as a remedy for the PV Shelf, the operations would be done in an incremental fashion until the total selected area was capped. Since the area that is being considered for capping is large (on the order of several square kilometers), capping placement cells 300 by 600 m have

been defined for purposes of managing the placement of material and monitoring[1].

Pilot Study Objectives and Approach

The overall objective of the field pilot study is to demonstrate that a cap can be placed on the shelf as intended by the design and to obtain field data on the short-term processes and behavior of the cap as placed.

Specific objectives to be addressed as a part of the pilot include:

1. Demonstrate that an appropriate cap thickness can be placed with an acceptable level of variability in cap thickness.
2. Demonstrate that excessive resuspension of existing sediments and excessive mixing of cap and contaminated sediments can be avoided.
3. Demonstrate that excessive losses of cap materials can be avoided.
4. Determine, to the degree possible, the effect of variable cap material type, bottom slope, water depth, and placement method (e.g., conventional versus spreading) on cap thickness and sediment displacement and resuspension.
5. Demonstrate the effectiveness of the cap with respect to short-term isolation of contaminants during the initial advective flow resulting from sediment consolidation.
6. Demonstrate the ability to monitor operations and success.
7. Evaluate and modify, where needed, all operational and monitoring approaches.
8. Improve the knowledge base contributing to decisions on implementation of a full scale cap.

The construction of the field pilot study cap is anticipated to occur over a time period of several weeks, and the associated monitoring effort will focus on short term processes associated with cap construction. The pilot study would therefore meet several objectives related to capping operations and processes occurring during and shortly after cap material placement. A full-scale monitoring program to be conducted during any placement of a full-scale cap and in the years to follow would additionally include activities aimed at long-term processes which could not be easily observed during the time period available for a pilot study (e.g. erosion during storm events or migration of contaminants due to diffusive processes). Depending on the time scales in which the pilot cap is left in place prior to any full scale cap placement, there may be opportunity to obtain data from the pilot area related to such long-term processes, but such activities are not included in the present pilot scope.

The pilot study approach consists of controlled operations for placement of capping material within selected areas on the PV shelf and associated monitoring prior to, during, and following the placements. Operational aspects for the pilot include the selection of appropriate placement areas for the pilot, capping materials, and placement techniques. Monitoring aspects for the pilot include cap thickness as placed, mixing of cap and contaminated sediments, resuspension of contaminated sediments during cap placement, short term cap benthic recolonization, and short term physical and chemical characteristics of the cap and underlying sediments immediately after

[1] It should be noted that a grid of 56 capping placement cell locations was defined in TR EL-99-2 for purposes of volume and cost estimates for various capping options, however, these cell locations are not considered "cast in concrete" for purposes of either the pilot or any full scale capping operation. A new grid has been defined for purposes of the pilot with cells as shown in Figure 1.

capping and following initial sediment consolidation.

The remainder of this Operations and Monitoring Plan is divided into the following sections:

- Selection of Pilot Capping Placement Areas
- Selection of Cap Material Sources
- Placement Equipment and Contract Arrangements
- Pilot Cap Thickness and Volume
- Refined Model Predictions
- Sequence of Placement Operations
- GIS-Based Project Management Tools
- Monitoring Requirements
- Reports and Interpretation
- References
- Appendix A - Monitoring Scope of Work

Selection of Pilot Capping Placement Areas

Specific considerations for selection of the pilot placement locations include:

1. To the extent possible, placement locations for the pilot should be representative of the overall range of conditions within the total anticipated capping prism for a full scale remediation.
2. Different pilot placement locations will be necessary to demonstrate the effect of water depth, bottom slope, cap material type, and placement method on cap thickness and sediment resuspension.
3. Physical bottom material type in the pilot placement areas should be clearly distinguishable from capping material. This requirement would be met by any location with surficial fine-grained effluent-affected (EA)sediment, since the capping material is anticipated to be composed of fine sandy sediment.
4. The thickness of the EA sediment in the pilot placement areas should be greater than the maximum depth of EA sediment resuspension that will occur during placement. The thickness must also be sufficient to measure the effects of advection due to consolidation. The mixing thickness requirement with respect to resuspension would be met with any location with surficial fine-grained EA sediment thickness in excess of 10 cm. The thicker the EA deposit, the easier the measurement of advection effects.
5. The level of surficial EA sediment contamination (upper few cm) for the pilot placement areas will affect whether water column measurements of contaminants (DDT and/or PCBs) can be used to evaluate resuspension and transport. Areas with lower ranges of surficial contamination (i.e. a few mg/kg DDT) have low potential for water column release. Areas with higher ranges of surficial contamination (i.e. 10 to 20 mg/kg DDT) would provide conservative (worst-case) data on resuspension and water column release.
6. There are concerns related to placement of capping materials directly over or immediately adjacent to the LACSD outfall pipes. Until the nature of cap accumulation is demonstrated, cap placements should NOT be located directly over or immediately adjacent to LACSD outfall pipes.

7. Recontamination of the pilot cap during cap placement may complicate the interpretation of pilot study results, and if such recontamination occurs following placement (e.g., due to transport of contaminated sediments from uncapped areas "upcurrent " of the pilot cap), the area may have to be capped a second time if EPA decides to proceed with a full-scale capping remedy. The potential for such recontamination will vary depending on pilot cell locations (among other things). The prevailing bottom current is from southeast to northwest, so locations to the southeast are preferable from this standpoint.
8. The southeastern boundary of capping Prism A as defined in TR EL-99-2 is currently based on the EA sediment footprint as defined by the 1994 USGS box core data. LACSD data indicate that EA sediment extends well to the southeast of this boundary, although thickness and contaminant concentrations decrease as well. This area is not well characterized in terms of sediment core data. Additional data is needed to further define the most appropriate boundary which should be considered for capping, including any decision to locate the pilot capping cells in this area.
9. The size of the pilot capping area(s) should be sufficiently large to avoid interference between intentionally separate placements (using different placement methods and/or cap materials) and to allow for demonstrating the effect of multiple placements in building the desired cap thickness. Modeling results indicate the size of a footprint of measurable cap thickness accumulation resulting from a single conventional placement is about the size of a single 300 by 600 meter capping cell. Therefore a buffer of approximately 300 to 600 m between capping cells and/or separate placements should be sufficient to avoid interference between intentionally separate placement events (whether they are single hopper loads or multiple loads within a cell). Also, mulitple placements within a single capping cell would result in deposits sufficiently large to observe the buildup effect.

Based on the above considerations, four 300 by 600 meter capping placement cells are recommended for the pilot. One pair of cells would be located adjacent to the landward limit of the capping area in a comparatively shallow site with comparatively flat bottom slope (40 m to 45m depth contour with an average slope across the cell of about 1.5 degrees). A second cell pair would be located adjacent to the seaward limit in a comparatively deeper site with steeper bottom slope (60 to 70 m depth contour with average slope across the cell of about 2 degrees). The two cells within each pair would be separated by a full cell length in the along-shore direction and by a full cell width in the perpendicular direction to avoid the potential for interferences during monitoring.

No one area within the identified capping prisms is ideal with respect to all the considerations listed, therefore two potential locales with differing conditions were identified and compared in selecting the pilot cell locations. One locale evaluated for the placement cells is at the southeastern end of capping prism A, in the area roughly bounded by the 40 and 70 m depth contours and between LACSD transects 9 and 10. This area is to the southeast of the terminus of the outfalls, on the "upcurrent" end of the capping area with respect to prevailing bottom currents. There is little USGS boxcore data for this area, however, available LACSD data indicates the EA sediment thickness in this area easily exceeds 10 cm (refer to Figure 60 in Lee et al 1994) and the surficial dichlorodiphenyldichlorothene (DDE) concentration is about 2 mg/kg (refer to Figure 5 in Lee et al 1994). This locale has the advantage of "upstream" location with respect to bottom currents, but the disadvantage of thin EA sediment thickness and low DDE concentration with respect to the overall area.

A second locale evaluated for pilot placement is to the northwest of the terminus of the outfalls. This area is on the "upcurrent" end of the outfalls with respect to prevailing bottom currents. There is good USGS boxcore data coverage for this area. The EA sediment thickness in this area is in excess of 50 cm (refer to Figure 60 in Lee et al 1994) and the surficial DDE concentration is 10 to 20 mg/kg (refer to Figure 5 in Lee et al 1994). This locale has the disadvantage of being "downstream" with respect to bottom currents, with a higher potential for surface recontamination. But the sediment thickness is greater, with easier interpretation of consolidation effects, and the surficial DDE is high, yielding better resolution potential for cores and worst-case resuspension data. This locale is □downstream□ with respect to the outfalls, thus minimizing the possibility for interference with outfall operations.

In evaluating and comparing these two locales, the potential disadvantages of recontamination during placement for the northwest locale were deemed acceptable, and this locale was therefore selected for the pilot placements. The four cell locations recommended in this locale are labeled LU (Landward Upcurrent) at cell location F4 in Figure 1, LD (Landward Downcurrent) at cell location F2, SU (Seaward Upcurrent) at cell location H4, and SD (Seaward Downcurrent) at cell location H2. The cell grid in Figure 1 may be adjusted following the collection of baseline data as described below. Pilot placements would occur within the limits of these four cells, but the area monitored would extend to adjacent cells as described below.

Selection of Cap Material Sources

LAD surveyed the region for potential cap material sources as a part of the capping options study and is currently updating available information on borrow sources. Dredged sediments from navigation channels (primarily the Queen's Gate deepening project) and sand borrow areas were identified as the two primary borrow sources, and the cap designs and placement approaches were developed based on those potential sources. Available data for these sources indicate that the materials are variable and are mixtures of fine sands, silts and clays. LAD is currently arranging for additional exploration of both the Queen's Gate and Borrow Areas.

The cap material used for the pilot study must be representative of the materials which would be available for a full scale capping remedy. Other drivers in selection of pilot capping materials are cost and schedule. Use of dredged material from on-going navigation projects will be far less expensive than excavation from borrow sites, since the operational cost attributable to the pilot would be limited to the difference in transportation and disposal cost to the PV shelf as compared to the selected disposal sites. But use of dredged material from the on-going project is dependent on close coordination of navigation dredging schedules and contracts. Use of dredged material from an approved navigation project can also be advantageous for the overall schedule, since the dredging impacts in the channel areas and ocean disposal of the sediments will have already been evaluated, thus making the National Environmental Policy Act (NEPA) process and other regulatory considerations for the pilot project more straight-forward.

The Queen's Gate project is the only on-going navigation project identified to date with sufficient volumes of clean material to conduct the pilot project described in this plan. The material has an in-situ mean grain size of approximately 0.1 mm. Recent sampling has indicated that there may be localized areas with coarser mean grain size. Also, dredging operations for Queen's Gate and any subsequent placement of the materials in rehandling sites such as the West Anchorage site, results in some losses of fines during overflow and placement, with a subsequent "coarsening" of the material. Modeling to date indicates that the Queen's Gate material can be used for cap construction if the conventional method of placement is used. LAD has indicated

that the finer material mixtures from Queen's Gate may be representative of much of the material available from the borrow areas. Therefore, in the context of the pilot, use of Queen's Gate is appropriate for demonstration of conventional placement techniques with a finer material type available in the Los Angeles region. LAD is currently considering additional borings in selected areas within and adjacent to the present navigation project to locate coarser grained materials. If such areas are found, they would be appropriate for demonstration of spreading placement techniques with a coarser material type.

Sand borrow areas outside the harbor breakwaters (designated as AII and AIII) have in-situ mean grain sizes in excess of 0.2 mm based on available data. However, these materials are also highly variable, and available data do not allow for fine resolution of grain size distributions within the larger borrow areas. There are also environmentally sensitive areas located within the larger borrow areas corresponding to submerged aquatic vegetation (SAV) and rock "pinnacles" with high fisheries values. LAD is planning to obtain borings in selected portions of borrow areas AII and AIII (water depths less than 80 ft and outside known sensitive areas) to define a source of coarser material for the pilot.

Modeling conducted to date indicates that use of mixtures of fine sand and silt/clay cap material (such as material from Queen's Gate) results in a larger proportional dispersion off-site, and potentially greater spread downslope as compared to a coarser sand (such as from the sand borrow areas). The finer materials will initially be placed using conventional release from the hopper dredge. The coarser materials will initially be placed using a spreading method of placement.

Placement Equipment and Contract Arrangements

Hopper dredges were identified as a preferable placement equipment type in TR EL-99-2, and use of a hopper dredge is anticipated for the pilot. A hopper dredge is the equipment of choice for the pilot capping on the PV shelf for the following reasons:

a. Hopper dredges are currently the most readily available equipment for the pilot work.
b. Hopper dredges provide better control of placement in the open ocean environment and allow for more flexibility in placement options to include pumpout capabilities.
c. Hopper dredges remove material from channels by hydraulic means, resulting in a breakdown of any hardpacked material and addition of water as material is stored in the hopper for transport. Material from hopper dredges is therefore more easily dispersed in the water column, and would therefore settle to the seafloor with less energy and less potential for resuspension of the contaminated sediment.

Current plans call for use of the NATCO Manhattan-class dredge *Sugar Island* for the pilot placements. The *Sugar Island* utilizes a split-hull hopper opening mechanism that can be used to control the rate of release. This dredge is also equipped with a hopper pumpout capability over the bow and water jets to aid in pumpout operations. Pumpout can also be accomplished through the adjustable skimmers within the hopper. NATCO has indicated that, with minor modifications, pumpout can be accomplished through one of the two dragarms, allowing for a submerged point of discharge. Any of these methods of placement could potentially be utilized during the pilot.

Pilot Cap Thickness and Volume

Two objectives of the pilot are drivers in determining the volumes of material necessary for placement for the pilot: 1) the need to determine differences in cap material behavior for differing placement options, and 2) the need to determine the volume of material required to construct a full design cap thickness over a given area. Time and cost limitations for the pilot make it impractical to undertake construction of the full design thickness for each possible combination of cap material type, water depth, bottom slope, and placement technique. Therefore the pilot should include some combination of small placement volumes and larger placed volumes. Data on various placement methods and variable material types can be obtained from a few hopper placements with small placement volumes. The most likely placement method and material type to be employed full scale should be evaluated for construction of a full cap design thickness over a sufficient area to determine the process of cap thickness buildup for adjacent placements. Since the bottom slope only slightly increases with water depth for areas between the 40 and 70 meter depth contours, a comparison of shallow and deeper placement areas for the pilot would provide the needed information for both depth and slope.

Based on these considerations, a total of four types of pilot placements are anticipated:

Fine material/ conventional placement/ shallow cell
Coarse material/ spreading placement/ shallow cell
Fine material/ conventional placement/ deep cell
Coarse material/ spreading placement/ deep cell

Small Volume Pilot Placements

Placement of a relatively small volume should be sufficient to observe the differences between conventional versus spreading placement methods, finer vs. coarser material types (cap material sources) and shallow versus. deeper cells. Based on the modeling conducted to date, the spreading method of placement is appropriate for the coarser material type. Placement of coarser material using conventional methods is not considered desirable, at least for the initial layer of cap material, because of the higher potential for sediment displacement and resuspension.

Removal of large volumes from the sand borrow area may require extensive and time-consuming studies. Large volumes of coarse material have not be identified within the scope of the current Queen's Gate project. For these reasons, placement of coarser material for a full cap thickness over a large area is not anticipated for the pilot, and the placement of coarse material will be evaluated with small volume placements. The small volume placements should be at least a few hopper loads (say five to ten hopper loads) to confirm the rate of buildup of cap thickness and spreading and dispersion behavior.

The anticipated hopper load for a Manhattan class dredge is approximately 1200 cubic meters (hopper or "bin" volume)[2]. Coarse cap material should be placed using spreading methods only, but placed in both shallow and deep cells, so multiple small volume placements would be required. Therefore, on the order of 20,000 cubic meters (in hopper volume) is required from a coarse grained site.

[2] Personnal communication with Bill Pagendarm, NATCO.

Full Design Cap Placements

Designs of 15 cm for a thin cap and 45 cm for an isolation cap were recommended in TR EL-99-2. Sufficient material should therefore be placed during the pilot to determine if these cap thicknesses can be constructed over a larger area with acceptable rates of buildup and acceptable variability in cap thickness, considering the overlapping effect of adjacent placements. The major consideration here is to observe the rate of sediment accumulation as a function of distance from clusters of individual hopper dredge placements. It may not be necessary to construct a full 45 cm cap thickness to obtain the needed field data on full design cap placement. If a 15 cm cap can be constructed over a larger area, then the same methods of placement can be used to construct a 45 cm cap. However, the pilot scope should allow for the possible construction of the full 45 cm thickness.

Data on placement behavior for the full design cap thickness are needed for both shallow and deep pilot cap placement areas. The source of fine grained cap material will be Queen's Gate and this material source would be used to build the design cap thickness in both shallow and deep locations. Data for cap buildup can be obtained from a minimum thickness of 15 cm, but a 45 cm thickness would be desirable over at least a portion of the area. A 15 cm coverage over one 300 by 600 m cap cell equates to 27000 cubic meters in-cap volume. For Queen's Gate sediment, 27000 cubic meters in-cap is equivalent to approximately 58000 cubic meters in-hopper or approximately 42000 cubic meters in-source volume. For a 45 cm coverage over one cell, approximately 174,000 cubic meters in-hopper would be needed. To accumulate these thicknesses uniformly over a total cell, a larger volume must be placed, with some of that material going onto adjacent cells and some being lost during placement. So, the required total volume of Queen's Gate material placed on the shelf for two cells capped at 45 cm would be in the range of 300,000 to 500,000 cubic meters in-hopper volume[3].

The present cap designs and recommended operational approaches call for placement of the needed volumes uniformly over each of the capping cells, to include those adjacent to the seaward capping limit at the 70 m depth contour. However, there are concerns regarding the potential for flow of cap material over the shelf break during placement. The need for placement of materials uniformly over a deeper cap cell may depend on the observed behavior of cap placements at the shallower depths. The limits of seaward placement locations may be established at depths landward of the 70 m depth contour, and this may limit the cap thickness which can be constructed down to 70 m.

REFINED MODEL PREDICTIONS

The USACE MDFATE model was used to predict the rate of cap material buildup for specific sediment characteristics, various water depths over the shelf and various placement approaches. The USACE STFATE and SURGE models were used to predict cap material dispersion during

[3] A detailed discussion of the volumes required to construct the design cap thicknesses is found in Appendix E of TR-EL-99-2. The ratios of in-channel, in-source, in-hopper, and in-cap volumes used here are given in Table E6 of TR EL-99-2. Note that NATCO currently estimates an average in-situ density for Queen's Gate material of 1.936, and an average in-hopper density of 1.4, and these represent volume relationships similar to those in Table E6.

placement and evaluate the velocities of bottom impact on spreading behavior, respectively. These predictions were based on a broad range of assumed properties for the cap material. Once specific cap material sources are selected, refined predictions using the specific site conditions and cap material properties should be made. Results of the refined predictions will determine any needed adjustments in the operational approach and monitoring station placement for the initial placements for the pilot. The models will also be used during the course of the pilot placements to refine operational methods for full cap placements constructed as a part of the pilot.

Sequence of Placement Operations

A sequence of the pilot placements must consider the need to observe the basic behavior of single hopper dredge placements for finer versus. coarser cap material, seaward versus. shoreward cell locations, and spreading versus. conventional placement methods. In this way, if the behavior of a given placement exceeds acceptable limits on spread or dispersion or resuspension, adjustments can be made to the operation prior to placement of larger volumes over a larger area during the pilot.

The proposed Placement/ Monitoring sequence is summarized in Table 1 and is described as follows:

Event #0: Verifying Release Rates - Prior to any actual pilot placement on the site, releases of the Queen's Gate material with conventional placement methods at the disposal sites now in use should be observed to determine the nature and rate of release from the hopper. Placements of coarser material with the spreading method of placement should also be observed at the disposal sites now in use or at the borrow source to determine the rate of release from the hopper and any tendency of the material to bridge. These can be considered “practice releases” for purposes of the pilot and must be conducted outside the potential capping prism.

Event #1: Single Conventional Discharge in Cell LU - The first pilot placement would be a single hopper load of the finer material from Queen's Gate discharged at the center of cell LU (see Figure 1). This load would be placed using the conventional placement method. Approximately one week of downtime following this single placement should be planned to assess the adequacy of the monitoring equipment and techniques, shift instrumentation for the next placement, and analyze the monitoring results for this single placement. This single hopperload would be followed later (in Event #3) by a full 15 cm cap over cell LU.

Event #2: Single Spreading Discharge in Cell LD - If a suitable coarse material source is available, this event would be a single hopper load discharged ~~at~~ along the centerline of cell LD (see Figure 1). A single load would be placed using a spreading method of placement. The direction of travel of the hopper should be in a direction away from the outfallsto allow for any overshoot of the placement away from the outfalls. Once the data from a single hopper placement have been assessed, placement of up to 10 additional hopper/barge loads will occur later (as part of Event #3), with the intent of creating a thicker cap using this method. Once it has been determined that data collection is complete for Event #2, (i.e. data such as SPC images are captured), Event #3 could

proceed from a scheduling standpoint prior to complete initial analysis of data from Event #2.

Event #3: Full 15 cm Cap Thickness in Cell LU/ Small Volume in Cell LD - Event #3a is the essentially uninterrupted placement of a full 15 cm cap thickness over cell LU. Event #3b is the additional spreading of coarse material in cell LD. Event #3 can proceed if the spreading and dispersion observed for the Event #1 single placement is acceptable, and the initial placements for Event #3 would not interfere with Events #4 and #5 in the seaward cells SU and SD located downslope from cell LU. The Event #3a would be conducted using conventional placement techniques and finer material from Queen's Gate. Additional hopper placements would be made at the same release point as used for Event #1 until a cap thickness of ~ 15 cm is constructed. Then placement locations would be shifted to the next placement point and the process repeated to build the thickness over a larger area. Spacing between placements of 60 meters is recommended in TR EL-99-2, and this spacing will be refined based on additional modeling. Once placements are completed along the entire landward lane, the placements would be shifted to the next lane. Spacing between lanes would initially be set at 60 meters. Both the lane and placement spacings may be adjusted, during the cap placement, depending upon observed rates of buildup. Event #3b consists of the placement of additional hopper loads of coarser material in cell LD using the spreading method to evaluate the buildup of cap thickness using this method of placement.

Event #4: Single Conventional Discharge in Cell SU- This placement is similar to Event #1 except in a deeper seaward cell. A single hopper load of the finer material from Queen's Gate would be discharged at the center of cell SUwhich is at the ~60 to 65 m depth. This load would be placed using the conventional placement method. Essentially no dredge downtime would be needed to analyze the monitoring results for this single placement if previous data from Event #1 indicates no interference from on-going cap placement during Event #3. Once it has been determined that data collection is accomplished for this event, and instrumentation is shifted, the next event could begin.

Event #5: Single Spreading Discharge in Cell SD - Event #5 would be similar to Event #2 except in a deeper seaward cell. If a suitable coarse material source is available, this event would be a single hopper load discharged along the centerline of cellSD. This load would be placed using a spreading method of placement. The direction of travel of the hopper should be away from the outfalls to allow for any overshoot of the placement away from the outfalls. Once the data from a single hopper placement have been assessed, placement of up to 10 additional hopper/barge loads will occur as a part of Event #6 with the intent of creating a thicker cap using this method. Once it has been determined that data collection is accomplished for this event, and instrumentation is shifted, the next event could begin. Once the data from a single hopper placement have been assessed, placement of up to 10 additional hopper/barge loads will occur later (as part of Event #6), with the intent of creating a thicker cap using this method.

Event #6: Full 15 cm Cap Thickness in Cell SU/ Small Volume in Cell SD- Event #6a is the essentially uninterrupted placement of a full 15 cm cap thickness over cell SU. Event #6b is the additional spreading of coarse material in cell SD. Event #6 can proceed if the spreading and dispersion observed for the Event #4 single placement is acceptable. Event #6a would be conducted using conventional placement techniques and finer material from Queen's Gate. Initial placements start at landward boundary of cell SU.

Spacing between placements would initially be set at 60 meters. Once placements are completed along the entire landward lane, the placements would be shifted to the next lane. Spacing between lanes would initially be set at 60 meters. Both the lane and placement spacings may be adjusted, during the cap placement, depending upon observed rates of buildup. Depending on observed behavior, placements on lanes near the 70m depth contour (near the seaward boundary of cell SU) may be limited to avoid excessive buildup of capping material in areas with steeper slopes. Event #6b consists of the placement of additional hopper loads of coarser material in cell SD using the spreading method to evaluate the buildup of cap thickness using this method of placement.

Event #7: Full 45 cm Cap in Cell LU/ Cell SU - Event 7 is the additional placement of material in cell LU and SU to build a 45 cm design cap thickness. The methods of placement would be similar to those used for the construction of the 15 cm cap thickness in Events #3a and #6a. The area over which the 45 cm cap thickness is constructed would depend on the availability of capping material and the results obtained during construction of the 15cm thickness within the respective cells.

GIS-Based Project Management Tools

Once the placement operations begin, data will be available from side-scan surveys, sediment profile surveys, etc. within hours to a day. Decisions to continue placement with an initial operational approach or to change the approach must be made in a matter of days throughout the period of the pilot. This will require a reliable and flexible data management tool. GIS-based approaches are proving to be invaluable in such project environment. Such a system is now in use in management of the Historic Area Remediation Site off New York Harbor. Similar approaches will be developed and used for the PV Shelf pilot project and could be later used for a full scale cap placement.

Monitoring Requirements

Key Questions to be Addressed

Monitoring of the Pilot project will enable the EPA to address five key short and intermediate term questions relative to capping on the Palos Verdes Shelf. These questions are:

- Does placement occur as modeled?
- Can a uniform cap be constructed?
- Can disturbance to in-place sediments be kept within tolerable limits?
- Does the cap remain clean?
- Does the cap remain stable during placement?

Each of these questions (with slight variation in wording) and the generic monitoring approach was addressed in Appendix F of TR EL-99-2, but the environmental concerns that relate to these issues are summarized here. The detailed scope of work to accomplish this monitoring is attached as Appendix A to this document.

Does placement occur as modeled? This question and its associated monitoring will incorporate several concerns that have been raised about the placement of sediments from vessels at the ocean surface onto the seafloor below. These concerns include:

- how far the sediments spread,
- how thick the material is once it comes to rest on the bottom,
- the effect of depth, slope, and material type,
- and the potential for the creation of turbidity flows or mudwaves.

For example, modeling predicts that one hopper load of sediment placed by split-hull methods will produce a deposit approximately 500 meters in diameter with a maximum thickness of 3 cm at the center and thinning to 0.1 cm at the edge.

Several monitoring tools will be used to measure the actual distribution and thickness of the deposit during the Pilot project (Table 2). Combined these will allow an assessment of how actual field conditions reflect those predicted by the model.

Can a uniform cap be constructed? This question involves the ability to place multiple loads of sediment over an area without exceeding an acceptable range of variation in cap thickness. At issue is how effectively we can adjust parameters under our control (such as placement method or type of cap material) in order to overcome any adverse effects on construction that are a function of things we can't control (such as water depth, EA sediment characteristics or bottom slope). The ability to control placement will be assessed both during the series of hopper placements and once they are complete. Many of the same tools used for the above effort will be utilized in these interim surveys with the addition of sub-bottom profiling and possibly bathymetric surveys.

Can disturbance to in-place sediments be kept within tolerable limits? Sediments released from the placement vessel will fall through the water column, reach the bottom, and then spread laterally. This process has the potential to disturb the in-place sediments both at the direct point of impact, and to a lesser degree in the area where lateral spread occurs. The Operations Plan is intended to minimize potential disturbance by only disposing directly on the EA sediment with the initial hopper load. Following this first hopper load, the next several will be directed to the same location so that disturbance of the EA sediment will be insulated by the sediments already in place from the first load. From that point on, all subsequent disposal will always occur over cap sediments that have already reached their position on the seafloor through lateral spreading.

The amount of disturbance to the EA sediments will be assessed both at the point of impact and in the area of lateral spreading. The sediment profile camera and coring will be the principal methods used to assess this level of disturbance. In particular, the absence or thickness of the sediment's oxidized layer, which will be measured prior to disposal, will provide a very good marker for this assessment.

A second concern regarding mixing is the effect on water quality. Again, because of the operational approach, resuspension of EA sediment should be greatly reduced after the initial placement, but the amount of contaminant in the plume will be monitored to assess this expectation. This effort will involve tracking the plume and measuring suspended solids and contaminant concentration relative to background.

Does the cap remain clean? In the short and intermediate term this question will be addressed as part of the assessment of mixing of the EA and cap sediments. Both direct coring with chemical analyses and the sediment profile photographs will be useful for evaluating whether the cap was placed with minimal mixing. Some presence of contaminants in the cap can be expected,

because of the natural resuspension and transport of EA sediments that will occur during the cap construction process, along with resuspension caused by the operations themselves. However, the monitoring will allow measurement of what levels can be expected immediately after capping. These data will then be useful for determining any changes in the sediment or contaminant profiles in future cores.

Does the cap remain stable during placement? The stability of the cap both during and immediately after construction will be determined by the combination of surveys that are being conducted to assess the distribution of the cap over the EA deposit. The bottom mounted arrays will document the changes in bottom lateral surge speeds that occur during the placement process. Side-scan, sediment profile photography, and coring will all be used to map the actual extent of the deposit. Side-scan in particular, will be useful for assessing the down slope spread of material in assessing the potential for turbidity flow.

Monitoring Program Components

The monitoring program, as detailed in the appendix, consists of several integrated components. The lists below provide a summary of these components, the tools, and the data that will be collected.

Baseline Data Collection

Vane shear strength for in-situ sediments
Side scan sonar
Relative density/ water content of in-situ sediments
Grain size
Chemistry (total DDT and total PCBs) from cores
Sediment profile camera photographs

Hopper Dredge Operation Data

Transit route
Positioning during placement
Time to release material

Hopper Load Monitoring

Hopper load curves for all loads
Samples of hopper inflow and overflow for GSD, TSS, and TOC
(Samples for each load for small placements; 5% of loads for full cap)

Data Collection During Placement

OBS/ADCP bottom array
Ship deployed OBS/ADCP
Water column samples
Sediment profile camera photographs (for cap buildup and extend of accumulation)
Sediment cores
Side-scan sonar survey

Post Cap Construction Monitoring

Subbottom profiling
Sediment profile camera photographs
Bathymetry (pending technical evaluation)
Sediment cores

Post Consolidation Monitoring

Subbottom profiling
Sediment profile camera photographs
Bathymetry (pending technical evaluation)
Sediment cores
Vane shear and relative density

Longer Term Questions

The monitoring scope that has been developed for the Pilot project does not include far field or long term monitoring, though this scope will be prepared when requested by the EPA project managers. TR EL-99-2 provides the outline for that effort, but briefly, it would include coring, sediment profile camera surveys, and sub-bottom profiles.

Several other items related to monitoring are not explicitly addressed in this plan. This includes determination of the abundance of deep burrowers, reductions in water column contaminant concentrations, verification of the diffusion model, and reductions in tissue levels in resident benthic or fishery species. If EPA decides to proceed with a full-scale capping remedy, a detailed monitoring program to address long term questions would be included.

Reports and Interpretation

Data reports from the monitoring contractor should be provided as data are collected.
A post-cap comprehensive report will be prepared (joint effort USACE/ Contractor).
An addendum following the 6 mos/ 1 year monitoring will be prepared (joint effort USACE/ Contractor).

References

USACE Los Angeles District. "Project Management Plan (PMP) For U.S. Environmental Protection Agency, Region IX on Palos Verdes Shelf Superfund Site, Los Angeles County, California," Prepared by U.S. Army Corps of Engineers, Los Angeles District.

Palermo, Michael, Paul Schroeder, Yilda Rivera, Carlos Ruiz, Doug Clarke, Joe Gailani, James Clausner, Mary Hynes, Thomas Fredette, Barbara Tardy, Linda Peyman-Dove, and Anthony Risko. 1999. "Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments," Technical Report EL-99-2, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. http://www.wes.army.mil/el/elpubs/pdf/trel-99-2.pdf

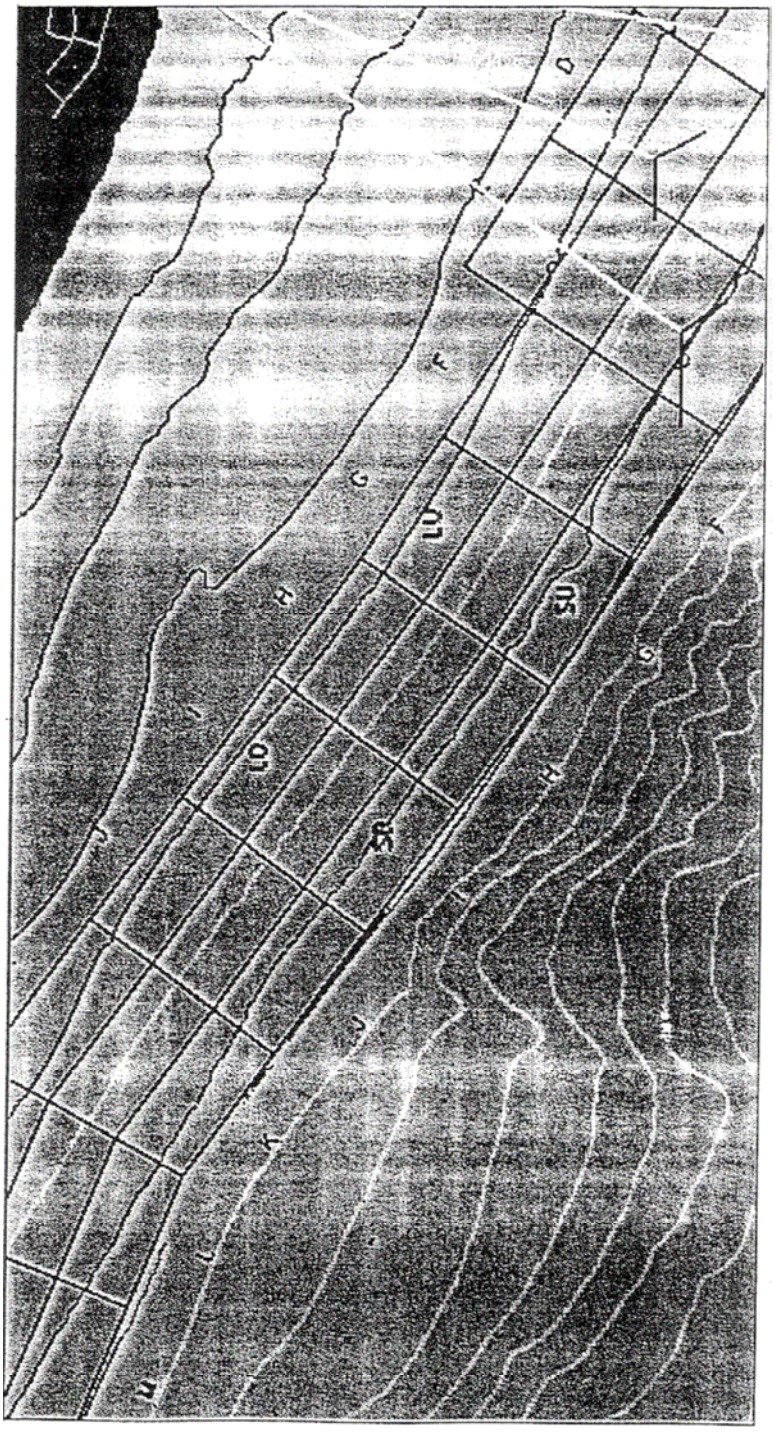
Table 1. Sequence of Placement Operations

Event #	Location	Placement Activity
0	off-site	Verifying Release Rates
1	LU	Single Conventional Discharge
2	LD	Single Spreading Discharge
3	LU	Full Cap Thickness - Conventional Discharge
	LD	Small Volume - Spreading Discharge
4	SU	Single Conventional Discharge
5	SD	Single Spreading Discharge
6	SU	Full Cap Thickness - Conventional Discharge
	SD	Small Volume - Spreading Discharge

Table 2. Monitoring Tools and Applications

Monitoring Tool	**APPLICATIONS**
Sediment Profile Camera	Sediment layer thickness, lateral extent, layer mixing, grain size, biological condition
Coring	Sediment layer thickness, layer mixing, grain size, chemical profile, cap stability
Side-scan sonar	Sediment distribution, bottom disturbance features, bottom topography
Sub-bottom chirp profiler	Cap thickness
Bathymetry	Cap thickness
Acoustic Doppler Current Profiler (ADCP)	Current speed, surge speed, plume location
Optical Back Scatter	Plume location and relative concentration
Water samples	Suspended solids, contaminant concentrations

Figure 1.



APPENDIX B

PALOS VERDES SHELF PILOT PROJECT - MONITORING SCOPE OF WORK

Palos Verdes Shelf Pilot Project Monitoring Scope of Work

Background

The contractor is to become familiar with the monitoring sections of Palermo et al. (1999). In particular, the contractor should become familiar with the objectives of the work and the purpose (null hypotheses) of the monitoring (Chapter 5 and Appendix F). The objectives of this monitoring work are to assist in constructing, evaluating and demonstrating the ability to cap in-place, effluent affected (EA) sediments on the Palos Verdes Shelf during the pilot project. The contractor is also to become familiar with the Operations and Monitoring Plan prepared for this effort. The contractor is to review additional information collected for this Pilot Project (e.g., sediment physical and chemical data) and recommend modifications to the monitoring plan if necessary. This will include identification of needed changes to the null hypotheses. This is an experimental effort and the contractor is to build flexibility into the monitoring schedule and approaches in order to incorporate necessary adjustments in placement schedule or approaches.

Task 1. Collection of Additional Background Data and SOW Revision
Task 2. Placement Surge Video Documentation
Task 3. Hopper Dredge Operation Data
Task 4. In-hopper Sediment Data
Task 5. Flex Surveys
Task 6. Monitoring of Cell LU (Events #1 and#3a)
Task 7. Monitoring of Cell LD (Events #2 and 3b)
Task 8. Monitoring of Cell SU (Events #4 and #6a)
Task 9. Monitoring of Cell SD (Events #5 and #6b)
Task 10. Evaluation of Bathymetry Surveying
Task 11. Disposal Plume Transport Survey
Task 12. Cap Erosion Analysis Samples
Task 13. Reporting
Optional Task 14. Water Current Monitoring

Task 1. Collection of Additional Background Data and SOW Revision

Background: The distribution of the effluent affected (EA) deposit has been studied by both the USGS and the LACSD. Conceptual cap prism design is described in Palermo et al. (1999). The Field Pilot Study Operations and Monitoring Plan (Palermo et al. 2000) recommends that the pilot project be carried out on four cells to the north-west of the outfalls. Prior to conducting the pilot project there is a need to more fully characterize these pilot cells to provide a well-defined baseline to which post-capping samples can be compared. These investigations will be carried out in the weeks and days prior to cap placement.

Objectives:

1. Provide baseline sediment chemistry and physical characteristics in the target pilot cells.

2. Re-evaluate this scope of work in response to the new information collected, review of relevant documents provided by the Corps Project Manager, and the approved Project Work Plan (developed under a separate scope). Based on those reviews the contractor will recommend changes to this SOW.

Approach:

A. The contractor will collect 9 gravity cores or vibracores (minimum 20 cm length) from each of the four pilot cells for analysis of sediment chemistry and physical data. Note that these locations will be at points where the sub-bottom profile lanes will cross (see figure 1). Repeating these stations in the post-cap monitoring will assist in the interpretation of the sub-bottom data. Cores will be sectioned into 4 cm increments (0-4, 4-8, 8-12, 12-16, 16-20 cm). The increments will be analyzed for p,p' DDE, bulk density, and grain size. The Contractor will collect field QC samples (i.e., duplicates, ambient conditions and equipment rinsate blanks, and matrix spike/matrix spike duplicates [MS/MSDs]) using the methods and in the frequencies described in the *Draft Project Work Plan for the Palos Verdes Pilot Capping Project: Baseline Monitoring Activities* (SAIC, 2000).

B. From the nine core stations (above) the contractor will randomly select two of these stations at which a second core will be taken for each cell. Vane shear measurements will be made on these two cores at for the full length of the core. Subsamples of the cores from 0-20 cm will be taken to create a composite sample on which bulk density and Atterberg limits will be determined. If the core penetrates into a visually distinctive sediment horizon (e.g., change in color, consistency or visually apparent grain size) a sample of this sediment will be taken for bulk density and Atterberg limits and up to four vane shear measurements will be taken, evenly distributed along the length of the horizon.

C. The raw data from the top 2 increments of the cores in Task A, above, will be submitted in a report to the Corps Project Manager 4 weeks after field collection. A full data report will be submitted to the Corps Project Manager 8 weeks after field collection. The data will be added to the project GIS at the time of the full report submission.

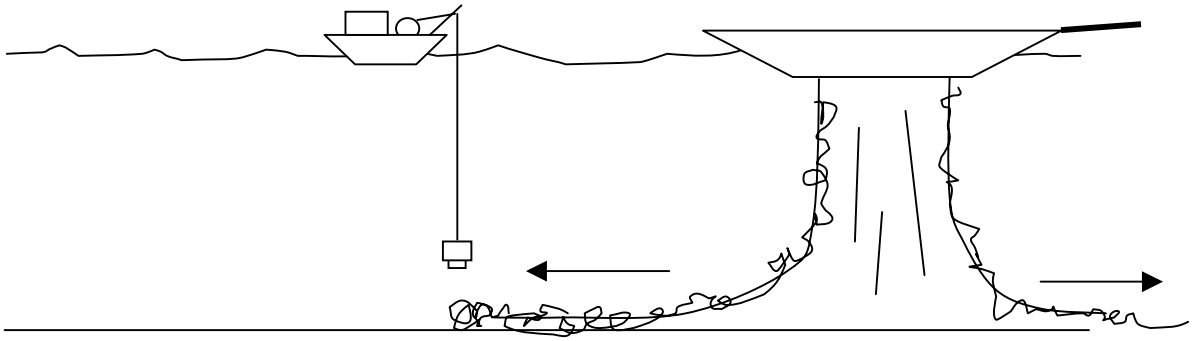
D. The contractor will perform a base-line, high resolution sub-bottom profiler and high resolution, dual frequency digital side scan survey at each of the four pilot cells (figure 3). The sub-bottom profiler should be adjusted to maximize resolution in the

top meter of the sediment column. Later surveys will be compared to these surveys as part of the tools used to assess cap thickness and distribution.

E. The contractor will evaluate the new data collected in the previous approaches, review relevant documents provided by the Corps Project Manager, and the approved Project Work Plan (developed under a separate scope). Based on those reviews the contractor will recommend changes to this SOW by reallocating survey effort within the overall level of effort already planned (including the flex surveys identified in Task 5). These changes may include modifications to the approaches, station numbers, sampling methods, and so on. The contractor may also recommend modifications to the monitoring effort beyond the existing level of effort, but these will require thorough explanation as to why they can not be achieved through reallocation of effort.

Task 2. Placement Surge Video Documentation

Objective: Provide video documentation of the bottom surge that occurs during placement of cap material during conventional placement operations.



Approach: The contractor will use a video camera to record the bottom surge as it moves past fixed points varying distances from the release point of the capping sediments. This array should be capable of operating both when resting on the bottom and suspended above the bottom from the survey vessel. The contractor will need to adjust the camera position, through field trials, based on visibility and the thickness of the surge along the bottom. This information will be used to complement the quantitative data that are being collected by bottom instrument arrays measuring current speed, suspended sediment, and other surge characteristics.

The contractor will deploy a video camera array/sled equipped with lights over 4 days of effort to visually document the lateral spread of the bottom surge during placement events. The Contractor will visually document the plume varying distances from the point of sediment release (e.g., 50 m, 75m, 100m, 200m). One half of these documentation efforts will occur during conventional placement in the landward cell (LU) and the other half in the conventional placement seaward cell (SU). The intent will be to illustrate the characteristics (speed, thickness) of the surge with increasing distance from the point of release out to the point where the surge is minimal or not present. At

least 25% of the documentation events are to coincide with placement events that are also monitored with the bottom mounted instrument arrays.

The contractor will provide an edited, annotated videotape of these placement events along with a narrative report. In addition, at least 6 video clips (30-60 second duration) will be provided in digital format for use in PowerPoint presentations or other media.

Task 3. Hopper Dredge Operation Data

Objective: The contractor will collect hopper dredge positioning data during transit to and during the cap placement operations. The contractor also will collect information on the time and rate of material discharge to monitor where sediment placement occurs.

Approach: The contractor will coordinate with the dredging contractor to install and maintain an automated electronic tracking system on the placement vessel during the pilot project operations. This system will acquire and store DGPS vessel positions at regular intervals (i.e., 10-min intervals) during loading and transit to the PV Shelf placement locations. Upon approach to the placement location(s), the system will automatically increase the rate of position recording (i.e., to 6-sec intervals). Additionally, hopper dredge draft and/or tonnage data will be acquired from the dredging contractor during all placements events (updated every 10 seconds or less during placement events). This time series information will be merged with the dredge position data to yield an accurate record of placement location/volume/rate for each load. Further, for all intensively monitored placement events (single hopper placement surveys, first four loads of the interim placements), the contractor will coordinate with the dredging contractor to obtain hopper filling tonnage data.

Associated data services will include: 1) daily data updates presenting the start time/position and end time/position for each placement event, optionally on a Web Site, 2) weekly reports presenting tabular data and graphic plots of dredge sediment release positions for each event, 3) weekly updates of placement data on DAN-LA to provide the project team with access to placement results for MDFATE modeling. Additionally, the DAN-LA database will maintain a record of loading position for each load of cap material.

Task 4. In-hopper Sediment Data

Objective: Data on the physical characteristics of the sediment in the placement vessels will be needed as part of the evaluation of how well actual field results compare to the expected spread and thickness of sediments at the capping cells. Additionally, data on the chemical characteristics of sediments that may be dredged from borrow areas (e.g., A2 and A3) will need to be acquired for later comparison of chemical concentrations

within the cap and underlying EA sediment, if borrow area sediments are used for capping.

Approach: The contractor will obtain assistance from the dredging contractor for collection of sediment samples from the hopper for the following events during the pilot cap monitoring program: 1) the first three loads of cap material transported to each cell of the capping area, 2) up to 50 of the loads during continuous capping operations, and 3) the first three loads of any cap material originating from borrow areas. For each load, three samples will be collected (one each from bow, center and stern of hopper) and composited to achieve a single composite sediment sample from each load.

The contractor will be responsible for providing sample containers, instructions to the dredging contractor for sample collection, sample custody, and laboratory analysis of geotechnical properties (grain size, bulk density, specific gravity, water content, and atterberg limits) of each composite sediment sample. Additionally, chemical analysis of p,p' DDE will be conducted for composite sediment samples from the first three loads acquired from the borrow areas. Raw sediment grain-size data from the first three loads for each cell will be provided to the Corps Project Manager within 24 hours of sample collection.

All the results will be presented in a report upon completion of the pilot cap monitoring program. The data also will be entered into the database of DAN-LA within one week as the results become available.

Task 5. Flex Surveys

Approach: In addition to the survey efforts requested in Tasks 6-9, the contractor will plan on 60 additional SPC/PVC stations, 20 additional sediment cores (all for visual core descriptions, 8 for p,p' DDE sampled at five intervals as described in the Post Cap sections below), and 25 additional water samples (all for TSS, 5 for p,p' DDE). These extra samples will be used to augment, as needed, the surveys already planned in Tasks 6-9 or to conduct separate supplementary surveys during the course of the placement operations. This will permit maximum survey flexibility and allow immediate investigation of areas of uncertainty. Collection of these additional samples will be at the request of the Corps Project Manager and may be based on recommendations of the contractor.

Task 6. Monitoring of Cell LU (Landward – upstream) (Events #1 and #3a)

Background: This portion of the project will involve the conventional placement of hopper loads of sediment from the Queen's Gate entrance channel. Initially, the placement vessel will be directed to the center point of the capping cell that has been denoted as the landward and upstream cell (LU). Following the first placement, approximately 7 days will be provided for collection and analysis of the monitoring data before any additional placement occurs (figure 2). Once the data have been assessed,

additional placement will occur with the intent of creating a 15 cm cap over the entire cell.

Objectives

Objective 1: Assess the thickness and lateral distribution of capping sediments during placement operations.

Objective 2: Assess plume TSS and p,p' DDE concentrations and extent for two hours following hopper placement.

Objective 3: Assess extent of surge during placement operations.

Objective 4: Assess mixing of cap sediments with the in-situ sediments.

Objective 5: Evaluate monitoring approaches.

Approach

A. Baseline Survey. The contractor will conduct a 25 station pre-placement sediment profile camera/plan view camera (SPC/PVC) survey at the cell named LU(#1) (Figure 1). Three replicate photographs will be obtained from each station (75 photographs total) for full analysis of infaunal successional status and sediment physical conditions.

B. Single Hopper Placement Survey **(Event #1).**

i.) Prior to the first placement event the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments after the placement event, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement event will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval.

ii.) The contractor will use acoustic Doppler current profiler (ADCP) and optical back scatter (OBS) equipment to map the location and extent of the

plume created by the placement of cap material for two hours. The contractor will take up to 27 water samples for total suspended solids (TSS) analysis and 6 samples for total (combined particulate and dissolved) p,p' DDE. The p,p' DDE samples will be taken in the centroid of the plume within 2 meters of the bottom (where concentrations can be expected to be greatest) at 5, 20, 40, 60, 90, and 120 minutes after placement. Prior to the placement event the contractor will take 3 background samples from within 2 meters of the bottom. Samples will be analyzed for total p,p' DDE and TSS.

iii.) After the placement event the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

iv.) The contractor will take gravity cores at 5 stations (figure 1). The contractor will randomly select these 5 stations from among the 37 SPC/PVC stations in the previous task. Four of the five will be selected from inner stations expected to have cap accumulation and one selected from the outer stations expected to be free of cap. These cores will be used as an independent check on the SPC measurements. Cores will be extracted, vertically split, photographed, and visually described within 24 hours of collection to assess the thickness of cap material and the degree of mixing between the cap and EA sediment. The contractor will also collect sufficient cap material from either one core or a composite of the cores and analyze the sample for grain size and bulk density.

v.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

C. Interim Placement Surveys (Creation of 15cm Cap) **(Event #3a).**

i.) Prior to the next series of four placement events the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array

at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments once the four placement events have occurred, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement events will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval.

ii.) The contractor will map the location, concentration, and extent of the plume created by the placement of cap material of the second and third placement for two hours. The contractor will repeat the approach used for the Single Hopper Placement Survey.

iii.) The contractor will conduct two 14 station sediment profile camera/plan view camera surveys, one after the predicted number of loads to create a 10 cm cap have been placed at the first disposal point, and the second two thirds of the way through the 15 cm cap placement (figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 2 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

vi.) The contractor will take gravity cores at 5 stations (figure 1), one after the predicted number of loads to create a 10 cm cap have been placed at the first disposal point, and the second two thirds of the way through the 15 cm cap placement. Cores will be extracted, vertically split, photographed, and visually described as for the Single Hopper Placement Survey. The contractor will also collect sufficient cap material from either one core or a composite of the cores at the first interim survey and analyze the sample for grain size and bulk density.

D. Post Cap Monitoring

i.) After the placement event the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

ii.) The contractor will conduct a sub-bottom, chirp acoustic profile of the capping cell to assess cap thickness. The survey should consist of 3 longitudinal transects and 7 cross sections (figure 1).

iii.) The contractor will collect 9 gravity cores or vibracores from the capping cell. These cores will penetrate at least 20 cm into the EA sediment. The cores will be split, photographed, visually described, and sampled. Particular attention should be given to the condition of the transition between the EA and cap sediments. Sediment grain size, bulk density, specific gravity, water content, atterberg limits (if sufficient fines), and chemistry samples will be taken from four of these cores (randomly selected from the nine). Samples will be taken at the sediment/water interface (top of core), 3 cm and 7 cm above the interface/mixed layer and 4 cm and 8 cm below the interface/mixed layer. The "7 cm" and "8 cm" samples will be archived. The "0, 3 and 4 cm" samples will be analyzed for the physical parameters listed above and p,p' DDE.

iv.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

Task 7. Monitoring of Cell LD **(Landward, downstream) (Events #2 and #3b)**

Background: This portion of the project will involve the **spreading placement** of a single hopper load of sediment from the coarse sediment borrow site. The placement vessel will be directed to the center lane of the capping cell that has been denoted as the landward and downstream cell (LD). Following placement of the first hopper load in this cell, approximately 7 days will be provided for collection and analysis of the monitoring data, though if the data from the first LU event provides good confirmation of predictions, placement Event #3a will begin during this 7 days (figure 2). Once the data have been assessed, additional placement of several hopper loads will occur (**Event #3b**), with the intent of creating a thicker cap, using this method.

Objectives: As in described for Task 6.

Approach

A. Baseline Survey. The contractor will conduct a 25 station pre-placement sediment profile camera/plan view camera survey at the cell named LD(#2) (Figure 1). Three replicate photographs will be obtained from each station (75 photographs total) for full analysis of infaunal successional status and sediment physical conditions.

B. Single Hopper Placement Survey **(Event #2).**

i.) Prior to the first placement event the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of

these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments after the placement event, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement event will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval. If the spreading occurs as planned, there will be no bottom surge associated with the particle settling. Also the path the dredge takes will be quite long. Therefore the need for the bottom mounted current meters and OBS gages will be primarily to document the negative, i.e., to show that in fact individual particle settling did occur.

ii.) The contractor will use acoustic doppler current profiler (ADCP) and optical back scatter (OBS) equipment to map the location and extent of the plume created by the placement of cap material for two hours. For this scenario, the ADCP will be used to estimate the fall velocity of the individual particles and estimate the point at which they impact the bottom. A 0.2 mm particle should reach the bottom in about 30 minutes. The contractor will take up to 27 water samples for total suspended solids (TSS) analysis and 6 samples for total (combined particulate and dissolved) p,p' DDE. The p,p' DDE samples will be taken in the centroid of the plume within 2 meters of the bottom (where concentrations can be expected to be greatest) at 5, 20, 40, 60, 90, and 120 minutes after placement. Prior to the placement event the contractor will take 3 background samples from within 2 meters of the bottom. Samples will be analyzed for total p,p' DDE and TSS.

iii.) After the placement event the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

iv.) The contractor will take gravity cores at 5 stations (figure 1). Four will be selected randomly from among the SPC stations in the cell and one randomly selected from among the SPC stations outside the cell. Cores will be processed and analyzed for visual descriptions as in previous tasks.

v.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

C. Interim Placement Surveys. **(Event #3b)**

i.) Prior to the next four placement events, the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments once the four placement events have occurred, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement events will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval.

ii.) The contractor will map the location, concentration, and extent of the plume created by the placement of cap material of the second and third placement for two hours. The contractor will repeat the approach used for the Single Hopper Placement Survey.

D. Post Cap Monitoring

i.) After all placement events the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell named LD(#2) (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

ii.) The contractor will conduct a sub-bottom, chirp acoustic profile of the capping cell to assess cap thickness. The survey should consist of 3 longitudinal transects and 7 cross sections.

iii.) The contractor will collect 9 gravity cores or vibracores from the capping cell. These cores will penetrate at least 20 cm into the EA sediment. The cores will be split, photographed, visually described, and sampled. Particular attention should be given to the condition of the transition between the EA and cap sediments. Sediment grain size, bulk density, specific gravity, water content, atterberg limits (if sufficient fines),and chemistry samples will be taken from four of these cores (randomly selected from the nine). Samples will be taken at the sediment/water interface (top of core), 3 cm and 7 cm above the interface/mixed layer and 3 cm and 8 cm below the interface/mixed layer (because this cell will not be receiving a full 15 cm cap the location of these sample locations will be coordinated with the Corps Project Manager during the survey). The "7 cm" and "8 cm" samples will be archived. The "0, 3 and 4 cm" samples will be analyzed for the physical parameters listed above and p,p' DDE. The contractor will also collect sufficient cap material from either one core or a composite of the cores and analyze the sample for grain size and bulk density.

iv.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

Task 8. Monitoring of Cell SU (Seaward, Upstream) (Events #4 and #6a)

Background: This portion of the project will involve the conventional placement of hopper loads of sediment from the Queen's Gate channel. Initially, the placement vessel will be directed to the center point of the capping cell that has been denoted as the seaward and upstream cell (SU). Following placement of the first hopper load in this cell, approximately 6 days will be provided for collection and analysis of the monitoring data, during which time other placement may occur concurrently (figure 2). Once the data have been assessed, additional placement will occur with the intent of creating a 15 cm cap over the entire cell.

Approach: The contractor will repeat all surveys conducted for cell LU during the placement of cap at this cell.

Task 9. Monitoring of Cell SD (Seaward, Downstream) (Events #5 and #6b)

Background: This portion of the project will involve the **spreading placement** of hopper loads of sediment from the coarse sediment borrow site. Initially, the placement vessel will be directed to the center lane of the capping cell that has been denoted as the seaward and downstream cell (SD). Following placement of the first hopper load in this cell, approximately 3 days will be provided for collection and analysis of the monitoring data, with continued placement anticipated to be occurring at cell LU (figure 2). Once the data have been assessed, additional placement of several hopper loads will occur, with the intent of creating a thicker cap, using this method.

Approach

A. Baseline Survey. The contractor will conduct a 25 station pre-placement sediment profile camera/plan view camera survey at the cell named SD(#4) (Figure 1). Three replicate photographs will be obtained from each station (75 photographs total) for full analysis of infaunal successional status and sediment physical conditions.

B. Single Hopper Placement Survey **(Event #5).**

i.) Prior to the first placement event, the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments after the placement event, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement event will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval. If the spreading occurs as planned, there will be no bottom surge associated with the particle settling. Also the path the dredge takes will be quite long. Therefore the need for the bottom mounted current meters and OBS gages will be primarily to document the negative, i.e., to show that in fact individual particle settling did occur.

ii.) The contractor will use acoustic doppler current profiler (ADCP) and optical back scatter (OBS) equipment to map the location and extent of the plume created by the placement of cap material for two hours. For this scenario, the ADCP will be used to estimate the fall velocity of the individual particles and estimate the point at which they impact the bottom. A 0.2 mm particle should reach the bottom in about 30 minutes. The contractor will take up to 27 water samples for total suspended solids (TSS) analysis and 6 samples for total (combined particulate and

dissolved) p,p' DDE. The p,p' DDE samples will be taken in the centroid of the plume within 2 meters of the bottom (where concentrations can be expected to be greatest) at 5, 20, 40, 60, 90, and 120 minutes after placement. Prior to the placement event the contractor will take 3 background samples from within 2 meters of the bottom. Samples will be analyzed for total p,p' DDE and TSS.

iii.) After the placement event the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

iv.) The contractor will take gravity cores at 5 stations (figure 1). Four will be selected randomly from among the SPC stations in the cell and one randomly selected from among the SPC stations outside the cell. Cores will be processed and analyzed for visual descriptions as in previous tasks.

v.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

C. Interim Placement Surveys. **(Event #6b)**

i.) Prior to the next four placement events, the contractor will deploy four (4) bottom-moored arrays (see figure 4) consisting of a recording current meter [Nortek Aquadopp current meters (see www.NortekUSA.com for more information) or equivalent] and a self-recording OBS gage. One of these arrays will also be outfitted with an upward-looking ADCP to augment assessment of plume behavior. Three of these arrays will be deployed in a transect down slope of the planned placement point at distances of 75, 150, and 250 meters. The fourth will be placed up slope 75 meters from the planned placement point. The array at 150 m will have the upward looking ADCP. The instruments will be set to record once per second. The contractor will retrieve the instruments once the four placement events have occurred, download, and analyze the data to assess the surge from sediment placement. The raw data from the hour around the cap placement events will be graphed and provided to the Corps Project Manager within 48 hours of array retrieval.

ii.) The contractor will map the location, concentration, and extent of the plume created by the placement of cap material of the second and third

placement for two hours. The contractor will repeat the approach used for the Single Hopper Placement Survey.

D. Post Cap Monitoring

i.) After all placement events the contractor will conduct a 37 station sediment profile camera/plan view camera survey at the cell named SD(#4) (Figure 1). One photograph will be obtained from each station, though triplicates will be obtained at 4 randomly selected stations. These photographs will be analyzed for thickness of cap material and evidence of mixing or erosion of the EA sediments.

ii.) The contractor will conduct a sub-bottom, chirp acoustic profile of the capping cell to assess cap thickness. The survey should consist of 3 longitudinal transects and 7 cross sections.

v.) The contractor will collect 9 gravity cores or vibracores from the capping cell. These cores will penetrate at least 20 cm into the EA sediment. The cores will be split, photographed, visually described, and sampled. Particular attention should be given to the condition of the transition between the EA and cap sediments. Sediment grain size, bulk density, specific gravity, water content, atterberg limits (if sufficient fines),and chemistry samples will be taken from four of these cores (randomly selected from the nine). Samples will be taken at the sediment/water interface (top of core), 3 cm and 7 cm above the interface/mixed layer and 3 cm and 8 cm below the interface/mixed layer (because this cell will not be receiving a full 15 cm cap the location of these sample locations will be coordinated with the Corps Project Manager during the survey). The “7 cm” and “8 cm” samples will be archived. The “0, 3 and 4 cm” samples will be analyzed for the physical parameters listed above and p,p’ DDE. The contractor will also collect sufficient cap material from either one core or a composite of the cores and analyze the sample for grain size and bulk density.

iii.) The contractor will conduct a high resolution, dual frequency digital side-scan survey over the cell to assess distribution of cap sediment. Preliminary results on cap distribution will be provided to the Corps Project Manager within 24 hours of survey completion.

Task 10. Evaluation of Bathymetry Surveying

Background: Because of the planned 15 to 45 cm cap thickness for the Pilot Cap placement, it is believed that the use of precision bathymetry to evaluate cap thickness will be of little value. However, before this decision is made there is merit to evaluating the feasibility of various methods and their associated costs.

Objective: Determine whether there are bathymetric survey methods that may be feasible for use in assessing cap thickness (both 15 and 45 cm caps) at the Palos Verdes shelf.

Approach

A. The contractor will assess the value of different bathymetric survey methods for detecting both a 15 cm and 45 cm cap at the Palos Verdes shelf. The contractor should evaluate the errors, precision, and accuracy of methods such as multi-beam equipment and systems based on towed transducers, coupled with *in situ* navigation beacons. The contractor should evaluate modifications to survey procedures that may improve accuracy.

B. The contractor will prepare a report evaluating the feasibility of using bathymetry as a survey tool for the Palos Verdes capping project. The report should describe the systems evaluated, their limitations, and advantages. The report will include recommendations for the use of bathymetric systems and will detail any approaches that may make their use feasible.

C. The contractor will prepare a proposed scope of work to evaluate any recommended system(s) during the Pilot Project. This scope should include an estimate of the cost that such a test would require.

Task 11. Disposal Plume Transport Survey

Background: Potential transport of suspended solids towards regional kelp forests is a concern. An assessment as to whether plumes would reach these locations and their extent and level of turbidity if they reach the kelp forests is needed.

Objectives: The contractor will contact local experts to determine the known location of the kelp forests nearest to the pilot demonstration area. The contractor will determine and map the extent and concentration of plume suspended sediments in the upper water column during expected on-shore transport events.

Approach:

1. The contractor will contact local experts to determine the location and extent of kelp forests near to the pilot study area. The contractor will acquire or develop a GIS data layer to contain this information.

2. The contractor will use an acoustic Doppler current profiler (ADCP) and optical back scatter (OBS) equipment to map the location and extent of the upper water column plume (upper 30 m) created by the placement of cap material for two hours. This will be accomplished 3 separate times during the period of the pilot study when placement of finer cap sediments are being placed in the Land ward cells. This will also occur when oceanographic conditions are expected to move the surface waters towards shore. The contractor will select these times in coordination with the Corps Project Manager. The contractor will take up to 27 water samples for total suspended solids (TSS) analysis in each plume to assist in mapping plume concentration.

Task 12. Cap Erosion Analysis Samples

Background: The potential for the cap to be susceptible to erosion is one of the concerns that has been raised with the planned capping. One means of evaluating this possibility, will be to take samples of the in-place cap and test them in an erosion flume. The contractor will be responsible for collection of the samples for delivery to the analytical labs as specified. The actual testing of these samples is not a responsibility of the contractor under this scope of work.

Objective: Collect sediments for evaluation of the relative erosion potential of the in-place cap sediments.

Approach

A. After the completion of all other post-capping pilot surveys identified in this scope the contractor will collect sediment samples from near the center of cells LU and SU. At each of the two cells, the contractor will collect 120 liters of sediment using a Smith- McIntyre Grab and 3 cores (5 to 9 cm diameter by minimum 60 cm long, maximum 100 cm long). The 120 liter samples will be stored in sealed 12-liter buckets. Each bucket will be labeled to indicate location of samples.

B. The buckets and two cores from each of the two sites will be palletized and shipped to:

Dr. Rich Jepsen
Department of Energy
Sandia National Laboratory
4100 National Parks Highway
Carlsbad, NM 88220
(505) 234-0072
rajepse@sandia.gov

A brief letter will be submitted at completion of task to document samples collected including Latitude, Longitude, Area, Date, Time, and Water Depth at sample locations. The cores should remain upright and be padded to reduce vibrations. The samples should

not be frozen and should be kept between 4 and 20 degrees centigrade. The cores should be split into 20 cm sections prior to shipping, and recapped and sealed.

One core from each site and a second copy of the letter documenting the sample locations, etc., should be sent to:

Dr. Marian Rollings
USAERDC
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
ATTN: CEERD-GP
(601) 634-2952
rollingm@wes.army.mil

Task 13. Reporting

A. The contractor will provide daily updates via phone, e-mail, or fax to the Corps Project Manager during the operational portion of the Pilot capping. Weekly project meetings will be held with the Corps Project Manager to discuss progress and issues.

B. Within 3 weeks of the completion of monitoring the contractor will provide a cruise report to the Corps Project Manager. This report should provide a log of monitoring operations and a compilation of the data that are immediately available (qualified, as appropriate, regarding their preliminary or final validated status).

C. The contractor will prepare a detailed report (divided into chapters as appropriate) evaluating the results of the surveys. Methods used and data produced will be presented and analyzed. The report will address the objectives of the work and the purpose (null hypotheses). This report will include identification of needed changes to the null hypotheses, evaluation of the monitoring and operational approaches used, and recommendations. The contractor will produce both a final and draft report. The report will include an Executive Summary, Table of Contents, List of Figures, List of Tables, Introduction, Methods, Results, Discussion, Recommendations, References, Index, and Appendices. Ten copies of the draft report will be delivered to the Corps Project Manager 10 weeks following completion of all field work. The report will be delivered both in paper format and on electronic disk in MSWord 97 SR-2 format. Six (6) weeks following receipt of comments from the Corps Project Manager, the contractor will submit a ten copies of the final report. In addition to the paper and MS Word versions, the final report will also be submitted in PDF format on CD-ROM.

D. All data will be entered into the project GIS/Database and submitted to the Corps Project Manager on CD-ROM at the time of draft report submission.

Optional Task 14. Water Current Monitoring

Objective

Document the water current behavior in the area of the pilot capping cells for a 30 day period during the cap placement operations. These data will be used as input for hindcast modeling that may be done following the pilot project as part of the evaluation of field observations.

Approach

The contractor will deploy a bottom-moored, upward-looking ADCP on the Palos Verdes Shelf at a location near the pilot cells in coordination with the Project Manager. This instrument will be programmed to collect water column current data in multiple horizons (4 minimum) for a 30 day deployment period during the time that active placement of cap is occurring. Data will be burst sampled on a minimum of an hourly basis. At a minimum the unit will be serviced once during the deployment period to assure the equipment is operating. Sampling rates, horizons, and service schedule will be finalized and coordinated with the Project Manager. Data will be incorporated into the overall project report described in Task 13.

Palermo, M., P. Schroeder, Y. Rivera, C. Ruiz, D. Clarke, J. Gailani, J. Clausner, M. Hynes, T. Fredette, B. Tardy, L. Peyman-Dove, and A. Risko. 1999. Options for In Situ Capping of Palos Verdes Shelf Contaminated Sediments.

Palermo, et al. 2000. Field pilot study of in situ capping of Palos Verdes Shelf contaminated sediments – Operations and Monitoring Plan.

Lee, H. J. (1994). "The distribution and character of contaminated effluent-affected sediment, Palos Verdes Margin, Southern California," Expert Report.

Figure 1.

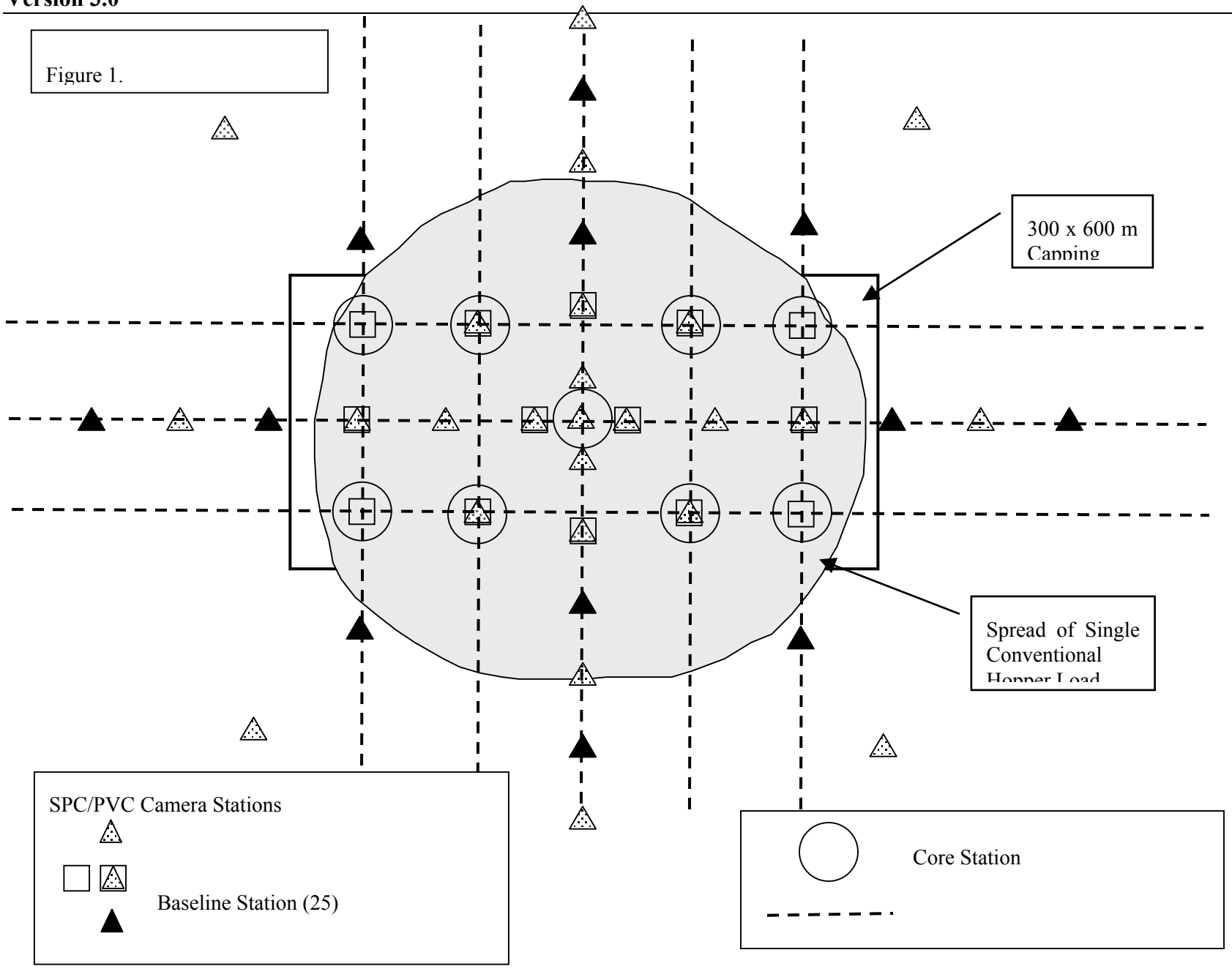

300 x 600 m
Capping
Spread of Single
Conventional
Hopper Load
SPC/PVC Camera Stations
Baseline Station (25)
Core Station

Figure 2.

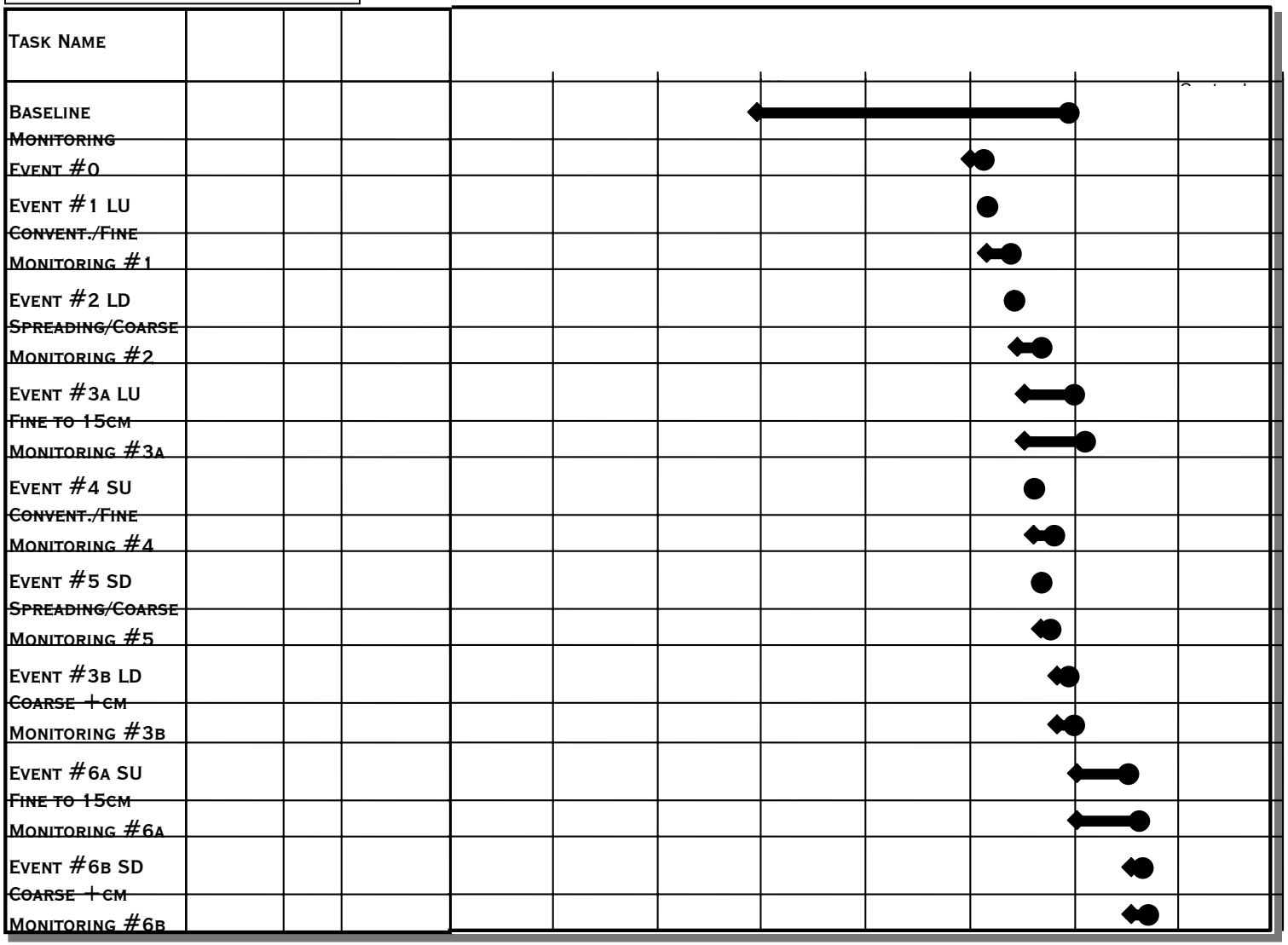
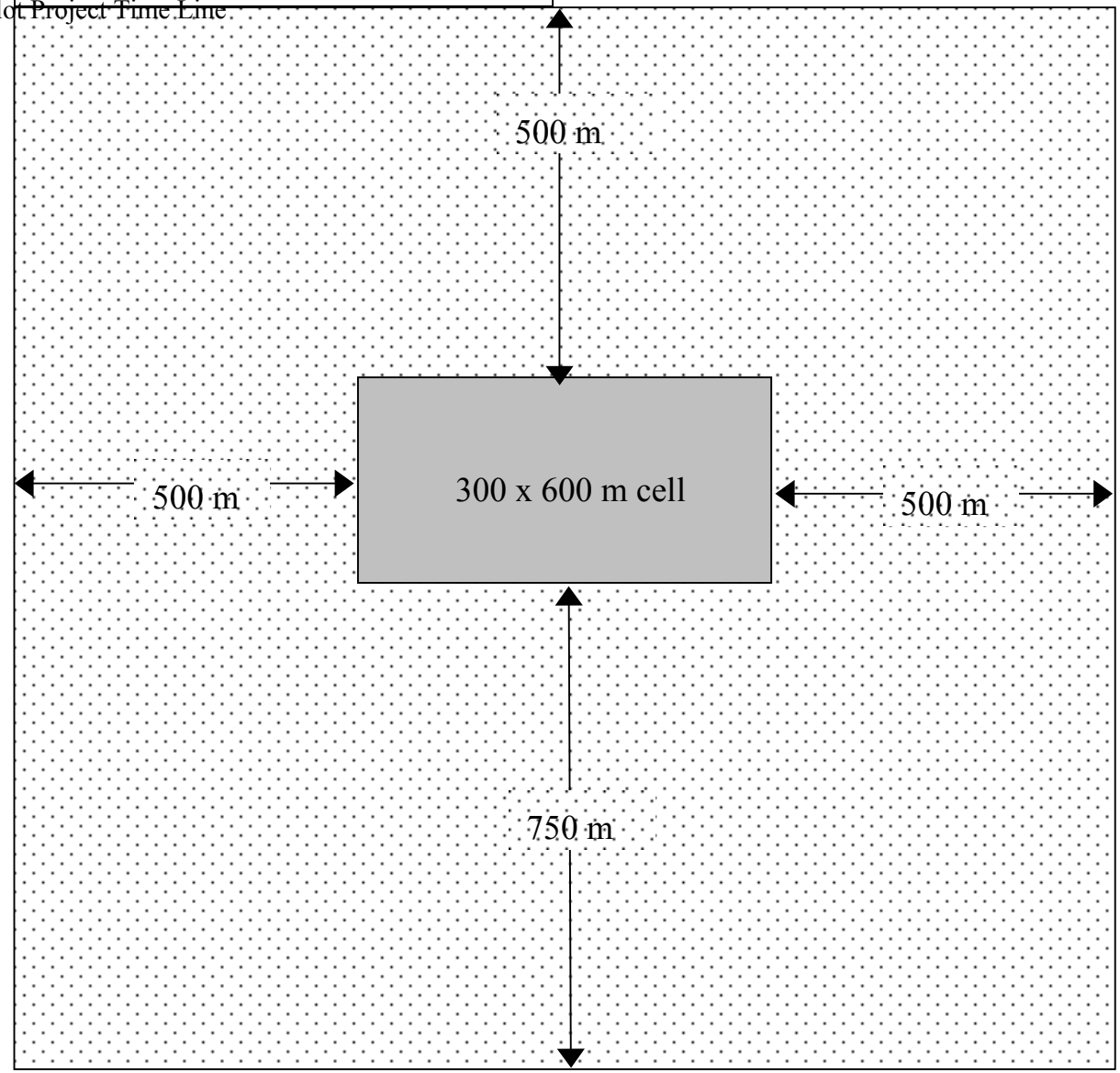

Task Name
Baseline Monitoring
Event #0
Event #1 LU
Convent./Fine Monitoring #1
Event #2 LD
Spreading/Coarse Monitoring #2
Event #3A LU
Fine to 15cm Monitoring #3A
Event #4 SU
Convent./Fine Monitoring #4
Event #5 SD
Spreading/Coarse Monitoring #5
Event #3B LD
Coarse +cm Monitoring #3B
Event #6A SU
Fine to 15cm Monitoring #6A
Event #6B SD
Coarse +cm Monitoring #6B

Figure 3. Side-scan survey area.

Conceptual Pilot Project Time Line



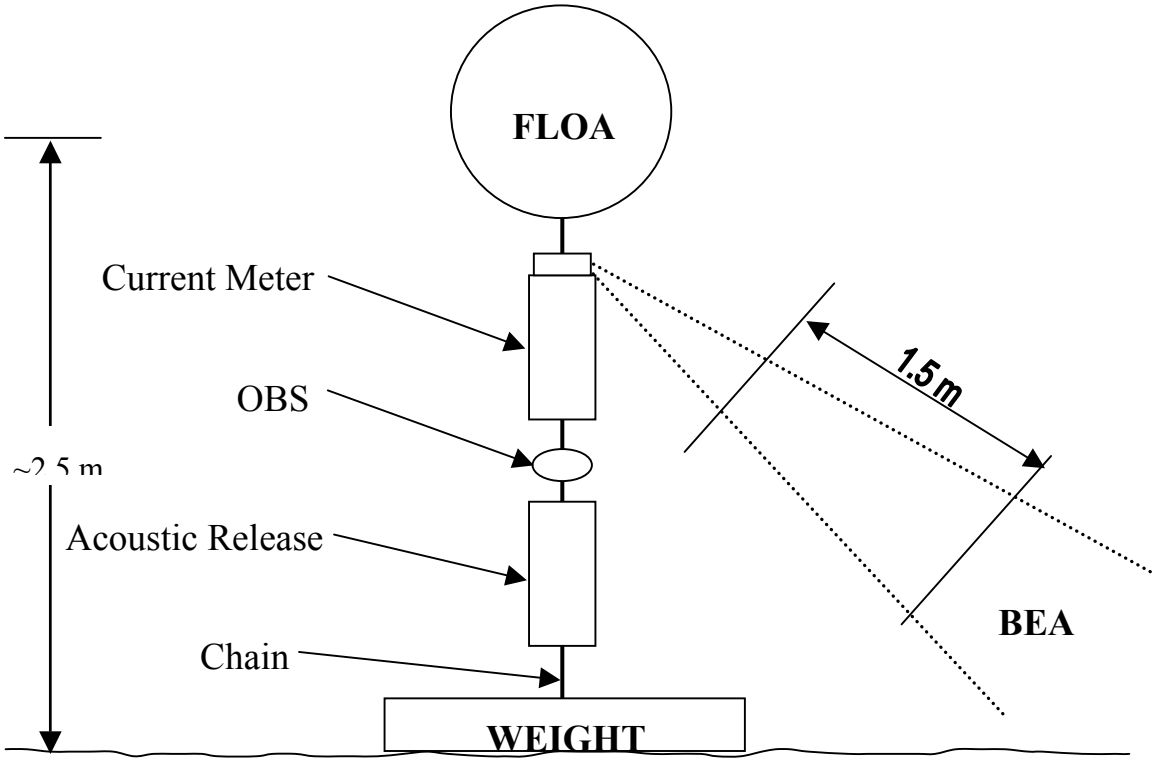


Figure 4. Schematic of Bottom Array.