REMEDIAL ACTION PLAN
SAN DIEGO SHIPYARD SEDIMENT SITE

Cleanup and Abatement Order No. R9-2012-0024

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June 12, 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

µg	microgram
BAE System	BAE Systems San Diego Ship Repair Facility
CAO	Cleanup and Abatement Order
CCA	California Coastal Act
City	City of San Diego
COC	contaminant of concern
CRP	Community Relations Plan
CWA	Clean Water Act
DCR	Design Criteria Report
EIR	Environmental Impact Report
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HASP	Health and Safety Plan
HPAH	high molecular weight polycyclic aromatic hydrocarbon
kg	kilogram
mg	milligram
NASSCO	National Steel and Shipbuilding Company Shipyard Facility
NEPA	National Environmental Policy Act
QAPP	Quality Assurance Project Plan
Port	San Diego Unified Port District
PCB	polychlorinated biphenyl
RAP	Remedial Monitoring Report
RMP	Remediation Monitoring Plan
Shipyard Sediment Site	San Diego Shipyard Sediment Site
SAP	Sampling and Analysis Plan
SWAC	surface-weighted average concentrations
TBT	tributylin
USACE	U.S. Army Corps of Engineers
Water Board	San Diego Regional Water Quality Control Board
WDR	Waste Discharge Requirements
WQC	Water Quality Certification

DULY AUTHORIZED REPRESENTATIVE

CERTIFICATION STATEMENT:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

T. MICHAEL CHEE		6/11/12
Print Name NASSCO	Signature	Date
S. HALVAX		6/11/2012
Print Name BAE Systems	Signature	Date

1 INTRODUCTION

In March 2012, the San Diego Regional Water Quality Control Board (Water Board) issued Cleanup and Abatement Order (CAO) No. R9-2012-0024 for the remediation of marine sediments containing elevated chemical concentrations within the San Diego Shipyard Sediment Site (Shipyard Sediment Site) in San Diego, California (Water Board 2012a). From the early 1900s through February 1963, the City of San Diego (City) was the trustee of all relevant portions of the San Diego Bay tidelands, which include the Shipyard Sediment Site, and leased the tidelands to various operators. By act of legislature in 1962, the San Diego Unified Port District (Port) was created and in 1963 became the Trustee to the tidelands. The Shipyard Sediment Site includes the waters adjacent to two adjoining, active shipyard facilities in San Diego Bay—the North Shipyard (owned BAE Systems San Diego Ship Repair Facility [BAE Systems]) and the South Shipyard (owned National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). Figure 1 depicts the location of the Shipyard Sediment Site and the layout of the North and South Shipyard Areas. The Shipyard Sediment Site remedial footprint extends from the U.S. Bulkhead Line (shoreline) to San Diego Bay's main shipping channel to the west.

This Remedial Action Plan (RAP) is submitted in compliance with CAO Directive B.1 and describes the process by which cleanup of the Shipyard Sediment Site will be managed, designed, planned, implemented, and monitored in accordance with the CAO (Water Board 2012a) and consistent with the U.S. Environmental Protection Agency's National Contingency Plan. It also provides detail on the timing and scoping of subsequent submittals that require Water Board approval. Implementation of activities set forth in this RAP may commence as soon as 60 calendar days after submittal, although elements may need to be adjusted or updated as project permits are received, if additional regulatory requirements are identified.

1.1 Structure of this Document

This RAP is a compilation of several inter-related documents. The various documents included in this compilation are:

- Appendix A: Design Criteria Report (DCR)
- Appendix B: Quality Assurance Project Plan (QAPP)
- Appendix C: Remedial Monitoring Plan (RMP)

- Appendix D: Sampling and Analysis Plan (SAP)
- Appendix E: Community Relations Plan (CRP)
- Appendix F: Health and Safety Plan (HASP)

1.1.1 Design Criteria Report

The DCR defines in detail the technical parameters upon which the remedial design will be based. These parameters include, among other factors, technical factors of importance to the project design and implementation, performance standards, waste characterization, anticipated equipment, and anticipated construction rates.

1.1.2 Quality Assurance Project Plan

The QAPP describes the project objectives and organization, functional activities, and quality assurance/quality control protocols as they relate to the remedial action.

1.1.3 Remediation Monitoring Plan

The RMP describes monitoring programs and procedures (such water quality monitoring and post-remediation confirmatory sampling) intended to demonstrate and document successful implementation of the remedial action.

1.1.4 Sampling and Analysis Plan

The SAP defines sample and data collection methods to be used for the work, a description of the media and parameters to be monitored or sampled during the remedial action, and a description of the analytical methods to be used and an appropriate reference for each.

1.1.5 Community Relations Plan

The CRP describes measures for informing the public about activities related to the final remedial design, the schedule for the remedial action, the activities to be expected during construction and remediation, provisions for responding to emergency releases and spills during remediation, and any potential inconveniences such as excess traffic and noise that may affect the community during the remedial action.

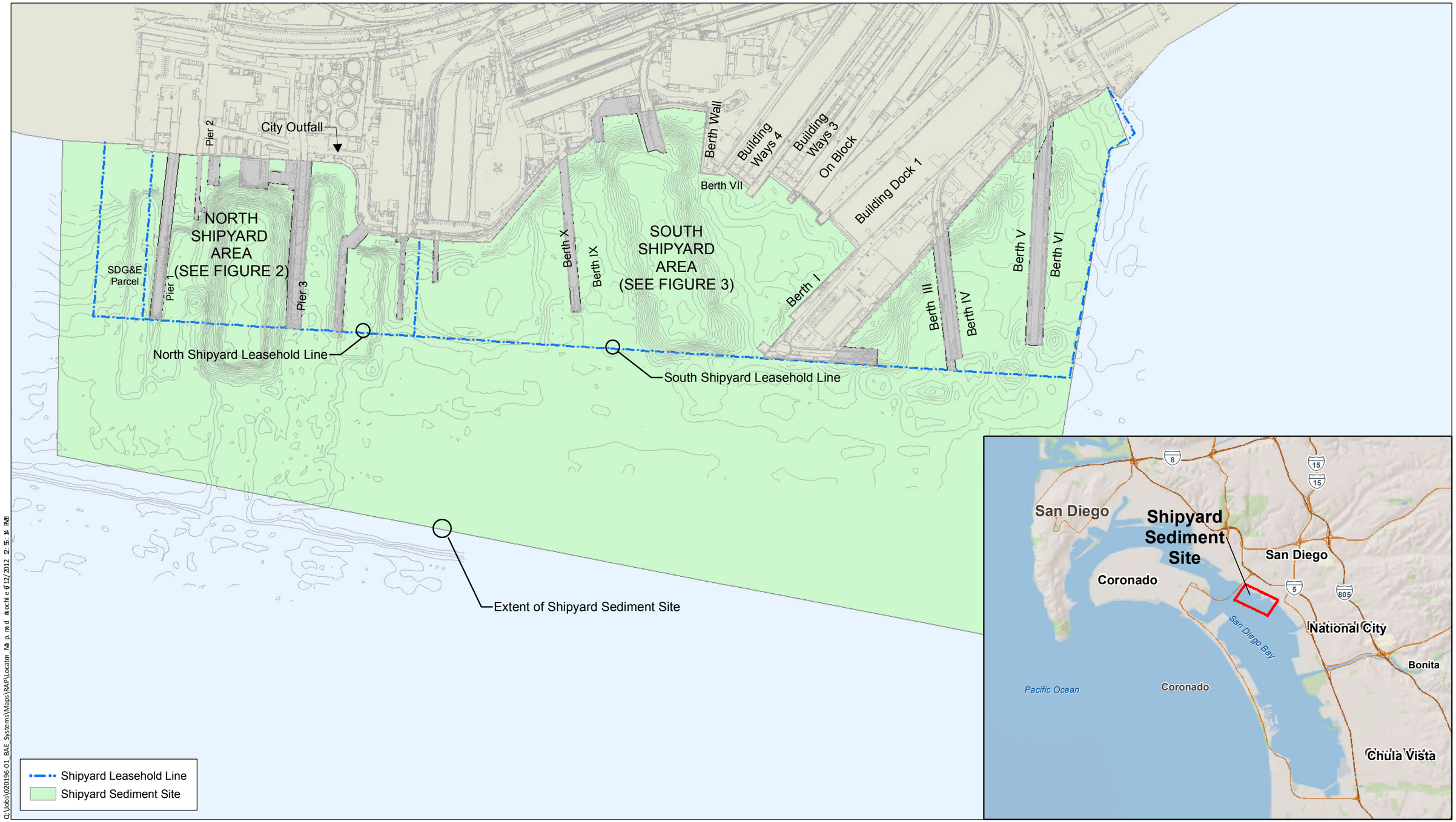

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Figure 1
Site Map
San Diego Shipyard Sediment Site

1.1.6 Health and Safety Plan

The HASP describes health and safety measures to be used during the design, construction, and post-construction monitoring phases of the work, including employee training, protective equipment, medical surveillance requirements, standard operating procedures, and contingency plans.

1.2 Summary of RAP Elements Required by CAO

CAO Directive B.1 presents required elements of the RAP. Each required element is included in this document and/or its appendices. Table 1 identifies each element required by the CAO and the location of the element in this compilation.

Table 1
Elements Required by the CAO

Required Element	Location
Introduction	Sections 1 and 2 of the RAP
Selected Remedy	Section 2 of the RAP
HASP	Appendix F
CRP	Appendix E
QAPP	Appendix B
Sampling and Analysis Plan	Attachment D
Wastes Generated	Discussed in Sections 2.4.2 and 3.4.2 of the DCR (Appendix A)
Pilot Testing	Section 3.3 of the DCR (Appendix A)
Design Criteria Report	Appendix A
Equipment, Services, and Utilities	Discussed in Sections 2.4.1 and 3.4.1 of the DCR (Appendix A)
Regulatory Permits and Approvals	Section 5 of the RAP
Remediation Monitoring Plan	Appendix C
Site Map	Figures 1 through 4 of the RAP
Contingencies	Sections 2.3 and 3.3 of the DCR (Appendix A)
Remediation Schedule	Section 6 of the RAP

1.3 Duty to Use Registered Professional

This RAP was prepared under the direction of qualified professionals in accordance with the California Business and Professions Code Sections 6735, 7835, and 7835.1.

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Project Coordinator

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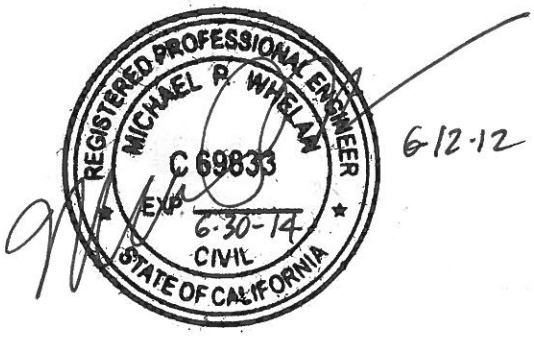
Project Engineer



2 SELECTED REMEDY

2.1 Cleanup Objectives and Cleanup Levels

The cleanup of sediments with primary contaminants of concern (COCs) must be completed to comply with cleanup objectives stipulated by the Water Board in the CAO (Water Board 2012a). COCs with established cleanup levels include mercury, copper, high molecular weight polycyclic aromatic hydrocarbons (HPAHs), total polychlorinated biphenyls (PCBs), and tributylin (TBT).

After implementation of the remedial action, the post-remedial surface-weighted average concentrations (SWACs) of the COCs are anticipated to meet the cleanup objectives set forth in the CAO (Water Board 2012a) and detailed in Table 2.

Table 2
Cleanup Objectives Mandated by the CAO

Chemical	Units (dry weight)	Targeted Post-Remedial Dredge Area Concentrations	Estimated Post-Remedial SWAC	Post-Remedial Trigger Concentrations
Copper	mg/kg	121	159	185
Mercury	mg/kg	0.57	0.68	0.78
HPAH[1]	µg/kg	663	2,451	3,208
Total PCB Congeners[2]	µg/kg	84	194	253
TBT	µg/kg	22	110	156

Notes:
Table taken from the CAO (RWQCB 2012a).
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
1 HPAHs = sum of six PAHs: Fluoranthene, Perylene, Benzo(a)anthracene, Chrysene, Benzo(a)pyrene, and Dibenzo(a,h)anthracene.
2 Total PCBs = sum of 41 congeners: 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.

2.2 Remedial Footprint

The Shipyard Sediment Site was characterized in 2002 through a series of 65 sampling stations (surface samples and sediment cores) that were subjected to chemical and biological testing as part of a detailed sediment investigation (Exponent 2003). A limited set of supplementary samples were also obtained in July 2009. As a means of facilitating

comparative evaluations of feasibility, environmental protectiveness, and cost, the Shipyard Sediment Site was subdivided into a set of Thiessen polygons (bounded by half the distance between adjacent sampling stations), each of which is represented by a single sampling station at or near its mid-point. The distribution and extents of Thiessen polygons at the Shipyard Sediment Site are depicted on Figure 2.

Based on considerations of chemical and biological exposure and risk detailed in the Water Board's Detailed Technical Report (Water Board 2012b), 23 individual sampling stations and their accompanying Thiessen polygon areas have been targeted for cleanup, with the goal of achieving the desired SWAC values across the Shipyard Sediment Site (see Table 2). Five areas are located within the South Shipyard Area, 17 areas are located within the North Shipyard Area, and one area is shared by both areas. Based on the available data, the proposed cleanup is intended to meet the cleanup levels for the primary COCs.

The individual cleanup areas were converted from their Thiessen polygon geometry to more realistic design/construction boundaries within the two Shipyard Areas. Figures 3 and 4 depict the relevant Thiessen polygons and assumed equivalent remedial extents for the North and South Shipyard Areas, respectively. These figures show the remedial footprint and include open-water areas in red and underpier areas in green.

2.3 Corrective Actions

Mechanical dredging is the selected remedial action for cleanup of the remedial footprint. Dredging will be conducted to remove impacted sediments from all accessible portions of the Shipyard Sediment Site. Dredged material will be offloaded to an onshore stockpiling location where it will be dewatered, loaded into trucks, and transported to one or more off-site disposal locations. Mechanical dredging will be supplemented, where necessary, by localized placement of clean sand cover in cleanup areas (depending on various factors, including the results of post-remediation confirmatory sampling) as a mechanism for further enhancing the sediment surface. Cleanup areas below overwater structures will receive a cover layer of clean sand rather than being dredged, owing to accessibility issues and the need to maintain stability of the structures.

The target depth for remediation is the maximum depth of chemical exceedance relative to CAO target cleanup levels. Based on preliminary calculations, dredging to a point where the target sediment levels are achieved will result in the removal of approximately 143,400 cubic yards (cy) of material. Further design-level evaluations (e.g., calculation of structural setback distances and dredged side slopes) will better refine this estimated dredge volume. All dredged material will be offloaded to an onshore stockpiling location where it will be dewatered, loaded into trucks, and transported to one or more off-site disposal locations. Following sediment removal, the stability of existing marine structures, seawalls, and side slopes will be maintained, if needed, by placing a ridge or blanket of protective rock material adjacent to the structure in question, thereby replacing the stabilizing effect of sediment removal.

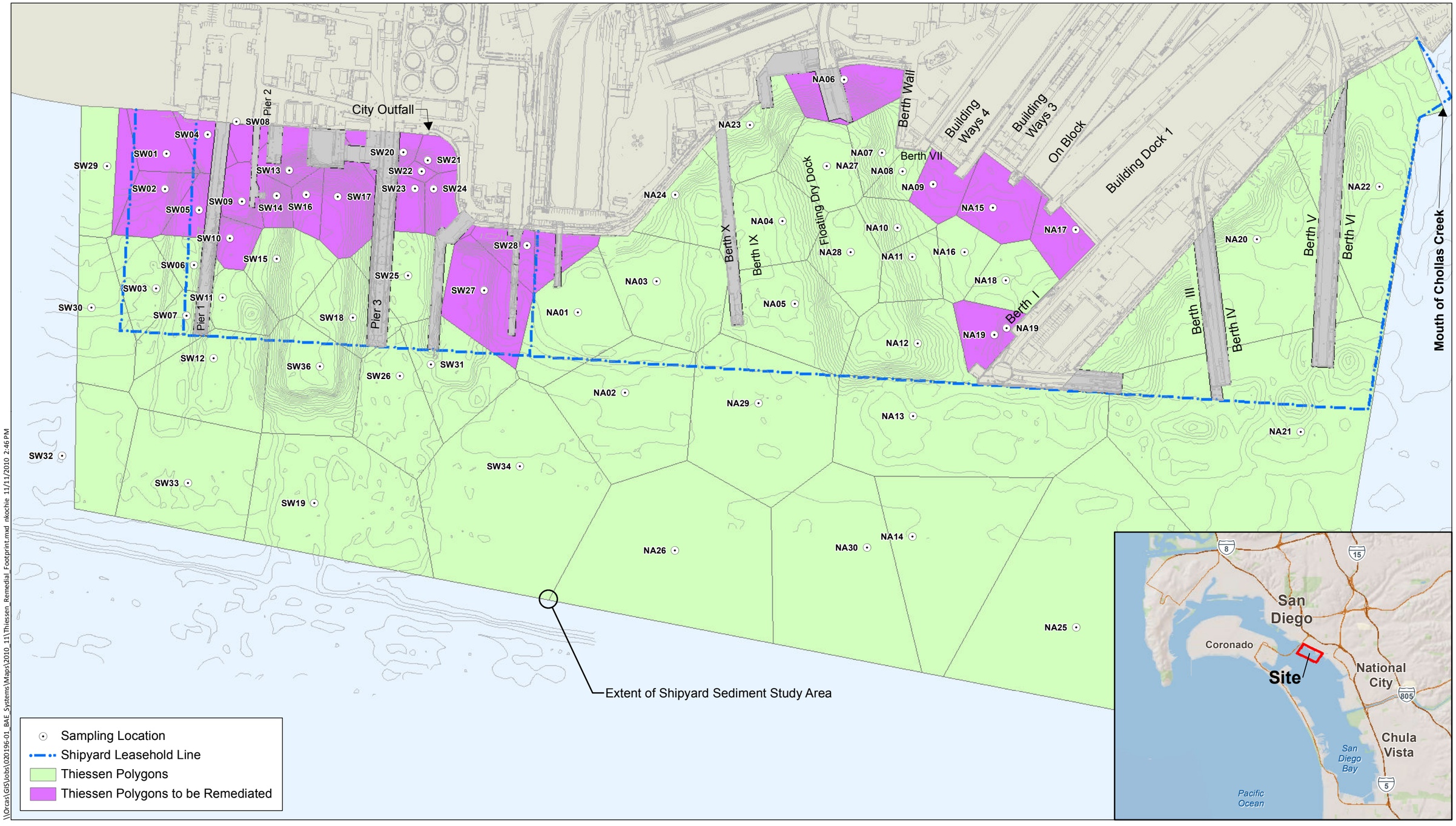


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Figure 2
Thiessen Polygon and Required Cleanup Areas
San Diego Shipyard Sediment Site

North Shipyard Area

SW04 Outfall Area

SW29 3'

SW01 4'

SW02 5'

SW04 5'

SW05 3'

SW08 6'

SW09 3'

SW10 3'

SW06

SW03

SW30

SW07

SW11

SW12

SW13 3'

SW14 3'

SW15

SW16 3'

SW17 7'

SW18

SW36

SW20 3'

SW21 3'

SW22 3'

SW23 3'

SW24 3'

SW25

SW26

SW27 5'

SW28 6'

SW31

NA01

PIER 1

PIER 2

PIER 3

PIER 4 - To be removed prior to remedial action

PIER 5 (To be demolished)

SDG&E Parcel

Sampling Location (Exponent 2003)

4' Estimated Dredging Depths (not including 1-foot overdepth)

Remedial Footprint

Shipyard Leasehold Line

Overwater Structure

Thiessen Polygon Boundary

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San Diego Shipyard Sediment Site Group

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Feet

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Figure 3
Remedial Footprint within North Shipyard Area
San Diego Shipyard Sediment Site

South Shipyard Area

NA06 5'
NA23
NA07
NA27
NA08
NA09 9'
NA24
NA15 7'
NA04
NA10
NA17 5'
NA28
SW28 6'
NA11
NA16
NA03
NA18
SW27
NA05
NA01
NA19 7'
NA12
NA29
NA13

Timber pier (To be demolished)
Berth X
Berth IX
Floating Dry Dock
Berth Wall
Building Ways 4
Building Ways 3
On Block
Building Dock 1
Berth I
Berth III

Sampling Location (Exponent 2003)
3' Estimated Dredging Depths (not including 1-foot overdepth)
Remedial Footprint
Overwater Structure
Thiessen Polygon Boundary
Shipyard Leasehold Line

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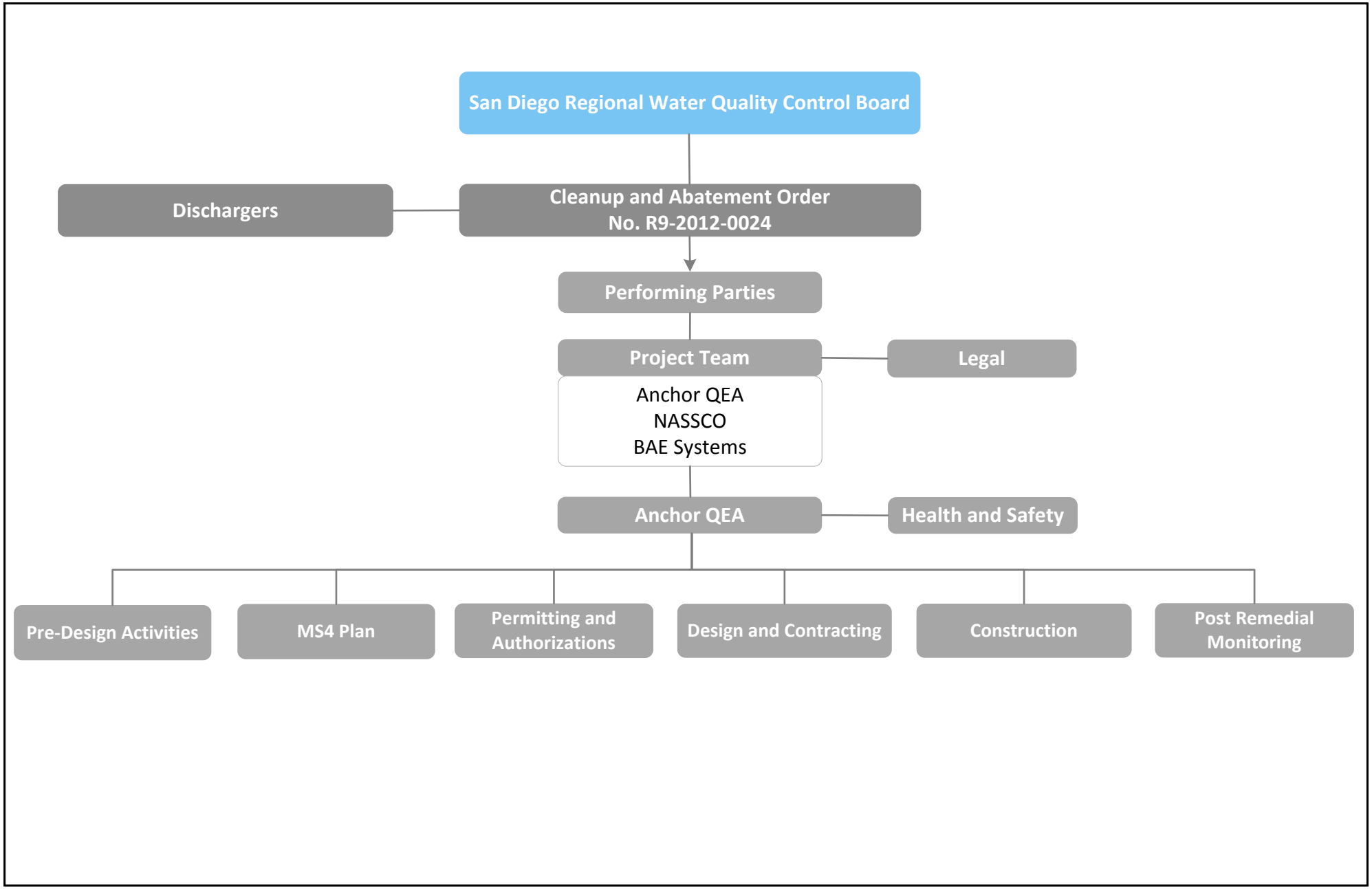
Figure 4
Remedial Footprint within South Shipyard Area
San Diego Shipyard Sediment Site

3 PROJECT TEAM AND ORGANIZATION

The CAO identifies "Persons Responsible" as those parties that "caused or permitted the discharge of waste to the Shipyard Sediment Site resulting in the accumulation of waste in the marine sediment" (Water Board 2012a). The parties listed in the CAO are NASSCO; BAE Systems; the City; Campbell Industries; San Diego Gas and Electric, a subsidiary of Sempra Energy Company; the U.S. Navy; and the Port. Collectively, these parties are referred to as the "Dischargers."

Figure 5 presents an organizational chart for the Project Team, which will consist of representatives from NASSCO and BAE Systems, their respective Project Coordinator, and other representatives of the Dischargers.

For matters of CAO compliance, the Water Board will serve as a point of communications and information dissemination for other governmental agencies (as necessary), including the U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration, and California Department of Fish and Game. Separate matters of permit compliance may be communicated and managed directly with individual agencies.



San Diego Shipyard Sediment Site Group

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Figure 5
Project Team Organizational Chart
San Diego Shipyard Sediment Site

4 IMPLEMENTATION PLAN FOR REMEDIAL ACTION

The Dischargers, both directly and through their Project Coordinator, will maintain close and regular communication and coordination with the Water Board regarding project progress and success. At a minimum, communications will include:

- Attending briefings with Water Board representatives as necessary
- Sending notifications to the Water Board as required under the CAO
- Submitting quarterly progress reports
- Reviewing and approving of various permit applications necessary to attain required permits and approvals
- Reviewing and approving various technical memoranda developed during the design and permitting
- Reviewing and approving the Cleanup and Abatement Completion Report

4.1 Design Activities and Site Studies

A number of additional site studies will be required to support the first step of the remedial action: project design and permitting. Pre-design investigations and the subsequent technical design activities are discussed in detail in the DCR (Appendix A).

4.2 Apply for and Obtain Project Permits

The work will require a series of permits to be applied for concurrent with the design process. Section 5 provides details on the state and federal permits and approvals that must be received prior to implementation of the remedial action.

4.3 Coordination with the Public

Public coordination will be an important component of implementing the remedial action. The CRP (Appendix E) provides detail on coordination with the public.

4.4 Prepare Contract Documents

Once engineering design tasks have been completed, all technical design details, including performance and monitoring requirements described in this report and the accompanying QAPP (Appendix B), will be documented in a set of construction plans and technical specifications. These documents, in conjunction with legal contract language, will comprise

a set of contract documents that will be used by the contractor(s) in preparing bids for the work and that will then form the basis for the execution, monitoring, approval, and payment for the work.

The construction plans and technical specifications will be prepared as a bid-ready set of contract documents that can be distributed to potential site contractor(s).

4.5 Award Contract

The construction plans and technical specifications previously described will be used to create a bid-ready set of contract documents that will be made available to selected, qualified contractors. The Project Team will select a responsive and responsible contractor for the work based on the value of their bid and on their capabilities to perform the work.

4.6 Oversee and Monitor Construction

Construction performance standards are described in the CDR (Appendix A). Elements of construction management, construction oversight, and remedial monitoring are described in the CQAP (Appendix B) and the RMP (Appendix C).

4.7 Final Cleanup and Abatement Completion Report

After the work has been completed, a Final Cleanup and Abatement Completion Report will be prepared to verify completion of the remedial action. The report will include the following information:

- Compilation of results of all confirmatory sampling that demonstrates that cleanup areas have been remediated in compliance with the CAO
- Demonstration that all underpier areas have been remediated in compliance with the CAO
- Compilation of results of all confirmatory sampling that demonstrate compliance with required post-remedial SWACs

4.8 Post-Remedial Monitoring Plan

The CAO requires that post-remedial monitoring be conducted at the Shipyard Sediment Site. Details are provided in the Post-Remedial Monitoring Plan (Exponent 2012).

5 REGULATORY PERMITS AND APPROVALS

The following state and federal permits and approvals must be received prior to implementation of the remedial action.

5.1 California Environmental Quality Act

The Water Board has determined that an Environmental Impact Report (EIR) is required to comply with the California Environmental Quality Act, with the Water Board acting as the lead agency. On November 16, 2011, the Water Board certified the Final Program EIR and adopted the Findings of Fact, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Plan as incorporated within the Resolution. The work will comply with the preferred alternative selected in the EIR.

5.2 Rivers and Harbors Act Section 10 and Clean Water Act Section 404 Permits

Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permits are needed for the work. The USACE will act as the lead agency for obtaining these permits and will be the lead agency for required Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations. Because construction activities are a required component of the CAO, the USACE has the ability to issue a letter of verification for Nationwide Permit 38, which applies to "containment stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority (notice)" (Federal Register 77:34). The USACE does, however, also have the discretion to require a Standard Individual Permit.

The USACE will act as the lead National Environmental Policy Act (NEPA) agency. The USACE's decision on permit forms affects the form of the NEPA review. An Environmental Impact Statement is not anticipated to be required.

5.3 Endangered Species Act/Magnusson-Stevens Fishery Conservation and Management Act

Consultation under Section 7 of the ESA and under the Magnusson-Stevens Fishery Conservation and Management Act is required for this work. Consultations concern

potential effects to federally listed, threatened, or endangered species and EFH issues. The USACE will act as the lead agency for consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service and will make the final determination on requirements to comply with these regulations. Project construction activities may be limited to the period between September 15 and March 31 in order to protect the endangered California least tern (*Sterna antillarum browni*); although work within the least tern season may be requested per the terms of the EIR (Water Board 2012c). A Biological Assessment and EFH Evaluation Report will be required to support the consultation, and work windows may be confirmed during that process. Some other sensitive species, such as sea turtles, are known to be present near the Shipyard Sediment Site, and an eelgrass survey will be required.

5.4 Section 401 Water Quality Certification and Waste Discharge Requirements

A Water Quality Certification and Waste Discharge Requirements (WQC/WDRs) permits are needed for the work. After a review of the QAPP, the Water Board will publish their WQC/WDRs.

5.5 California Coastal Act Consistency

A California Coastal Act (CCA) consistency determination will be needed for the work. The Port is anticipated to act as the CCA agency through the Port's environmental process, as NASSCO and BAE Systems are Port tenants. The Port can consider the work under its approved California Coastal Commission approved Port Master Plan.

5.6 Other Reports and Entitlements

A project Stormwater Pollution Prevention Plan and construction and stormwater National Pollutant Discharge Elimination System permits may be required as a result of the upland sediment dewatering facility. The need for these items will be confirmed through discussions with the Water Board. Additionally, access agreements (right-of-entry, easements, etc.) and some form of a Memorandum of Understanding or lease for the use of an onshore dewatering facility may also be required by the Port or other land owners adjacent to the Shipyard Sediment Site.

6 Remediation **SCHEDULE**

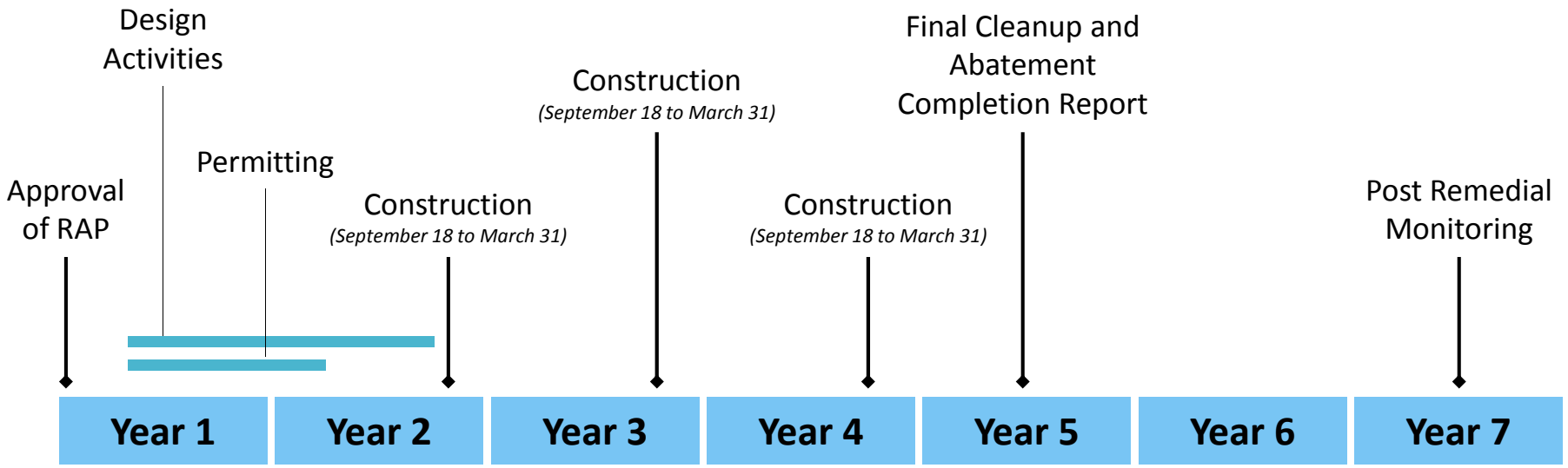
The CAO states that implementation of the RAP may commence 60 calendar days after it has been submitted to the Water Board (unless otherwise directed in writing by the Water Board). The official timeline for the implementation of the remedial action will begin when the Project Team receives notification from the Water Board that the RAP has been approved.

Figure 6 presents a schedule detailing the sequence of events and the timeframe for each activity based on the shortest practicable time required to complete each activity. This schedule reflects the implementation of the remedial action required by the CAO (Water Board 2012a), as detailed in this document. The timeline for implementation of the remedial action officially began with the adoption of the final CAO.

Initial implementation steps include applying for and securing project permits, conducting design analysis, and preparing a bid-ready set of contract documents.

Once construction is underway, the project schedule may be constrained by the limited dredging window (September 15 through March 31) to protect the endangered California least tern (unless and except as authorized by resource agencies, as provided for in the EIR [Water Board 2012c]). As a result, dredging and marine construction work is typically restricted to the months of September through March. Further scheduling impacts are expected to result from the variety of ongoing and planned shipyard operations. Because of the reduced dredging window, three annual dredging episodes are anticipated to complete the required remedial action.

Once remedial construction activities have been completed and the CAO objectives have been met, the Dischargers will prepare and submit a Final Cleanup and Abatement Completion Report (CAO Directive C) to document the closure of construction activities. Implementation of the RAP will be followed by post-remedial monitoring activities (CAO Directive D) to ensure long-term compliance with the objectives of the CAO. These activities will begin 2 years after the remedial action implementation activities are completed.



San Diego Shipyard Sediment Site Group

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Figure 6
Remediation Schedule
San Diego Shipyard Sediment Site

7 REFERENCES

Exponent, 2003. *NASSCO and Southwest Marina Detailed Sediment Investigation.* Volume 1. Prepared for NASSCO and Southwest Marina, San Diego, California. October 2003.

Exponent, 2012. *Post-Remediation Monitoring Plan, San Diego Shipyard Sediment Site*. Prepared for the Regional Water Quality Control Board. June 2012.

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