Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-12-D-2006
CTO NO. 0003

FINAL

REMEDIAL ACTION WORK PLAN

July 2013

DCN: UMAC-2006-0003-0004

REMEDIAL ACTION AT
INSTALLATION RESTORATION SITE 27
FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

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DCN: UMAC-2006-0003-0004

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TABLE OF CONTENTS

PAGE

ABBREVIATIONS AND ACRONYMS v

1.0 INTRODUCTION 1-1
- 1.1 SELECTED REMEDIAL ACTION 1-1
- 1.2 SCOPE OF WORK 1-2
- 1.3 ORGANIZATION OF THE WORK PLAN 1-2
- 1.4 POINTS OF CONTACT 1-3
- 1.5 PROJECT SCHEDULE 1-5

2.0 SITE CONDITIONS 2-1
- 2.1 SITE LOCATION AND BACKGROUND 2-1
- 2.2 CLIMATE AND TIDES 2-1
- 2.3 MARINE SETTING AND SEDIMENT DEPOSITION 2-2
- 2.4 HISTORICAL INVESTIGATIONS 2-3
  - 2.4.1 1993 Phase I Remedial Investigation Offshore Sampling 2-4
  - 2.4.2 1996 IR Site 27 Clipper Cove Skeet Range Offshore Investigation 2-4
  - 2.4.3 1997 Phase II Remedial Investigation 2-4
  - 2.4.4 2005 Evaluation of Sediment Deposition 2-4
  - 2.4.5 2008 Field Investigation of Lead Shot in Nearshore Area 2-5
- 2.5 WATER QUALITY 2-5
- 2.6 SUMMARY OF SITE RISKS 2-5
- 2.7 UTILITY LOCATIONS 2-6

3.0 REGULATORY FRAMEWORK 3-1
- 3.1 ROD/FINAL RAP REQUIREMENTS 3-1
- 3.2 REMEDIAL ACTION OBJECTIVES 3-1
- 3.3 ROD/FINAL RAP ARARS SUMMARY 3-2
  - 3.3.1 Chemical-Specific ARARs 3-2
  - 3.3.2 Location-Specific ARARs 3-3
  - 3.3.3 Action-Specific ARARs 3-3
- 3.4 PROJECT WASTE STREAMS 3-3

4.0 APPLICABLE PROJECT PLANS 4-1
- 4.1 ACCIDENT PREVENTION PLAN 4-1
- 4.2 SAMPLING AND ANALYSIS PLAN 4-1
- 4.3 PROJECT CONTRACTOR QUALITY CONTROL PLAN 4-1
- 4.4 ENVIRONMENTAL PROTECTION PLAN 4-1
- 4.5 STORMWATER MANAGEMENT PLAN 4-1
- 4.6 WASTE MANAGEMENT AND TRANSPORTATION AND DISPOSAL PLAN 4-1
- 4.7 ANNUAL MONITORING PLAN AND 5-YEAR INTERVAL MONITORING PLAN 4-2

5.0 PRE-REMEDIAL ACTION ACTIVITIES 5-1
- 5.1 PRECONSTRUCTION MEETING 5-1

TABLE OF CONTENTS
(Continued)

5.2 NOTIFICATIONS AND PERMITS 5-1
5.3 ACCESS AGREEMENTS 5-1
5.4 SITE UTILITY SURVEY 5-1
5.5 PREDREDGE CONFIRMATION CORE SAMPLING 5-2
5.5.1 Predredge Confirmation Core Sampling Locations 5-2
5.5.2 Predredge Confirmation Core Sampling Location Positioning 5-2
5.5.3 Predredge Confirmation Core Sampling Methodology 5-3
5.6 PREDREDGE WASTE CHARACTERIZATION CORE SAMPLING 5-3
5.6.1 Predredge Waste Characterization Core Sampling Locations 5-3
5.6.2 Predredge Waste Characterization Core Sampling Methodology 5-4
5.7 DECONTAMINATION PROCEDURES 5-4
5.8 PREDREDGE BATHYMETRIC SURVEY 5-4

6.0 REMEDIAL ACTION IMPLEMENTATION 6-1
6.1 MOBILIZATION AND TEMPORARY FACILITIES 6-1
6.1.1 Site Access Controls 6-1
6.1.2 Temporary Facilities and Utility Connections 6-1
6.1.3 Sediment Dewatering Pad 6-1
6.1.4 Sediment Offloading and Backfill Material Loading Plant 6-2
6.1.5 Turbidity Curtain Installation 6-2
6.1.6 Water Quality Monitoring Equipment 6-2
6.1.7 Offloading, Loading, Dredging, and Backfilling Equipment 6-2
6.2 REMEDIAL ACTION ACTIVITIES 6-3
6.2.1 Sediment Dredging 6-3
6.2.2 Material Barge Transportation 6-4
6.2.3 Material Barge Offloading 6-4
6.2.4 Postdredge Bathymetric Survey 6-5
6.2.5 Filter Layer Backfill Operations 6-5
6.2.6 Filter Layer Postbackfill Bathymetry 6-6
6.2.7 Protective Armor Layer Backfill Operations 6-6
6.2.8 Protective Armor Layer Postbackfill Bathymetry 6-6
6.2.9 Sediment Dewatering 6-6
6.2.10 Beneficial Reuse Site Transportation and Disposal 6-7
6.3 DEMOBILIZATION 6-7

7.0 SEDIMENT RESUSPENSION CONTROL PLAN 7-1
7.1 TURBIDITY CURTAIN 7-1
7.2 TURBIDITY MONITORING PLAN 7-1
7.3 ENVIRONMENTAL CLAMSHELL BUCKET 7-2
7.4 BARGE MANEUVERING 7-2
7.5 RESUSPENSION CONTROL DURING BACKFILL OPERATIONS 7-2
7.6 RESUSPENSION CONTROL DURING LOADING AND UNLOADING OPERATIONS 7-2

8.0 REFERENCES 8-1

TABLE OF CONTENTS
(Continued)

TABLES

Table 2-1 Record Temperatures by Location

Table 2-2 Oakland Area Rainfall Data

Table 2-3 Record Wind Speeds and Directions by Month and Location

Table 2-4 Average Wind Speeds by Month and Location

Table 2-5 Mean Sea Level Information

Table 3-1 Federal Chemical-Specific ARARs

Table 3-2 Federal Location-Specific ARARs

Table 3-3 Federal Action-Specific ARARs

Table 3-4 State Chemical-Specific ARARs

Table 3-5 State Location-Specific ARARs

Table 3-6 State Action-Specific ARARs

Table 6-1 Filter Layer Grading Specifications

Table 6-2 Protective Armor Layer Grading Specifications

Table 7-1 Preliminary Requirements for the Turbidity Curtain

Table 7-2 Turbidity Monitoring Criteria

Table 7-3 Water Monitoring Regime

FIGURES

Figure 1-1 Regional Location Map

Figure 1-2 Project Organization Chart

Figure 1-3 Project Schedule

Figure 2-1 IR Site 27 Location Map

Figure 2-2 IR Site 27 Utility Locations

Figure 5-1 Predredge Confirmation Core Sampling Locations

Figure 5-2 Predredge Waste Characterization Core Sampling Locations

Figure 6-1 IR Site 27 Support Facilities

Figure 6-2 Former NAS Alameda IR Site 17 Sediment Offloading Plant

TABLE OF CONTENTS
(Continued)

Figure 6-3 Former NAS Alameda IR Site 17 Sediment Dewatering Pad

Figure 6-4 Photograph of Environmental Clamshell Bucket

ATTACHMENTS

Attachment 1 Sampling and Analysis Plan

Attachment 2 Project Contractor Quality Control Plan

Attachment 3 Environmental Protection Plan

Attachment 4 Stormwater Management Plan

Attachment 5 Waste Management and Transportation and Disposal Plan

Attachment 6 Annual Monitoring Plan and 5-Year Interval Monitoring Plans

Attachment 7 Response to Comments on Draft Remedial Action Work Plan

ABBREVIATIONS AND ACRONYMS

§	section
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BMP	best management practice
Cal. Code Regs.	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSO	Caretaker Site Office
CTO	contract task order
DGPS	differential global positioning system
DON	Department of the Navy
DTSC	Department of Toxic Substances Control
EBMUD	East Bay Municipal Utility District
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ER-L	effects range-low
FS	Feasibility Study
GPS	global positioning system
IC	institutional control
IR	Installation Restoration
IRP	Installation Restoration Program
LLRW	low-level radioactive waste
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NAVSTA	Naval Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCQC	project contractor quality control
POTW	publicly owned treatment works

ABBREVIATIONS AND ACRONYMS
(Continued)

PQCM	Project Quality Control Manager
PRG	residential preliminary goal
QA	quality assurance
QC	quality control
RACR	Remedial Action Completion Report
RAO	remedial action objective
RAP	Remedial Action Plan
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RI	remedial investigation
ROD	Record of Decision
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SMP	Stormwater Management Plan
TI	Treasure Island
tit.	title
TtEC	Tetra Tech EC, Inc.
Water Board	California Regional Water Quality Control Board San Francisco Bay Region
WMTDP	Waste Management and Transportation and Disposal Plan
YBI	Yerba Buena Island

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) provides the procedures for implementing remedial action fieldwork to address the objectives of the Record of Decision (ROD)/Final Remedial Action Plan (RAP) for Installation Restoration (IR) Site 27 at former Naval Station (NAVSTA) Treasure Island (TI). IR Site 27 is also referred to as the former Clipper Cove Skeet Range. Figure 1-1 is a regional vicinity map.

The Remedial Design (RD) (TriEcoTt 2013) presents the selected remedy and design details for implementing the ROD/Final RAP remedy. This RAWP expands on the RD by describing the specific activities required to implement the remedy at the site and accomplish the remedial action objectives (RAOs), which are:

- Prevent or minimize ingestion of lead shot by diving ducks within 75 feet of the shoreline, where there is a complete exposure pathway under current conditions.
- Prevent or minimize ingestion of lead shot by diving ducks sitewide, where there is a potentially complete exposure pathway for diving ducks under future conditions where lead shot is currently buried below at least 2 feet of sediment.

Additional objectives include the following:

- Comply with applicable Navy and regulatory agency policies and regulations
- Protect human health and the environment
- Provide remedial action that can achieve the IR Site 27 RAOs

Tetra Tech EC, Inc. (TtEC) prepared this RAWP under Unrestricted Environmental Multiple Award Contract No. N62473-12-D-2006, Contract Task Order 0003. Regulatory oversight and guidance during development and implementation of this RAWP will be provided by the U.S. Environmental Protection Agency (EPA), the California Environmental Protection Agency Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board San Francisco Bay Region (Water Board).

1.1 SELECTED REMEDIAL ACTION

The Department of the Navy (the Navy) conducted a Feasibility Study (FS) (TtEM 2010) to evaluate potential remedial alternatives for IR Site 27 and prepared a ROD/Final RAP (DON 2012) to document the selected remedy for the site. The selected remedy, as outlined in the ROD/Final RAP, is Alternative 2b, which consists of focused dredging and backfilling, off-site disposal of sediment at a beneficial reuse site, institutional controls (ICs), and sediment monitoring.

The ROD/Final RAP specifies the removal of sediment located within 75 feet of the shoreline to a depth of approximately 2.5 feet (the focused dredging area). Recent bathymetry shows that the depth of accretion ranges from 0.5 to 1.5 feet within 110 feet from the toe of the riprap. There are areas within 75 feet of the toe of the riprap where lead shot is not covered with 2.0 feet of sediment. Lead shot, however, would be covered with more than 2.0 feet of sediment beyond 75 feet from the toe of the riprap where higher accretion depths were observed. As a result, the design depth of removal was reduced to 1.5 feet, and approximately 6,300 bank cubic yards of sediment will be dredged from an approximately 1,400-foot-long by 75-foot-wide area. Following sediment removal, placement of a protective armor layer will eliminate a complete pathway to diving ducks. Lead shot in the remaining offshore area of IR Site 27 is buried under at least 2 feet of sediment and therefore is not accessible by diving ducks.

1.2 SCOPE OF WORK

This project will consist of the following primary tasks:

- Collect 17 predredge sediment core samples from around the perimeter of the design dredge footprint and analyze the sediment for lead shot.
- Collect 20 predredge sediment core samples from within the design dredge footprint and analyze the sediment for radiological waste characterization.
- Dredge approximately 6,300 bank cubic yards of sediment from an approximately 1,400-foot-long by 75-foot-wide area.
- Transport the dredged material to the existing dewatering pad at former Naval Air Station (NAS) Alameda (currently known as Alameda Point) IR Site 17 for dewatering and characterization sampling for appropriate disposal option evaluation.
- After the dredged material is dewatered and characterized, transport it to IR Sites 1 and/or 2 at Alameda Point for beneficial reuse as subgrade fill in landfill remediation projects, or to an off-site disposal facility, depending on the analytical results.
- Backfill the dredged area with sand and gravel to create a filter layer with an approximate thickness of 0.5 foot.
- Backfill the dredged area with rock to create a protective armor layer having an approximate thickness of 1.0 foot.
- Perform predredge, postdredge, post-filter layer backfill, and post-protective armor layer backfill bathymetric surveys.

Following the completion of remedial action fieldwork, TtEC will prepare a Remedial Action Completion Report (RACR). The RACR will document that the selected remedy has been completed and that all RAOs have been met.

1.3 ORGANIZATION OF THE WORK PLAN

This RAWP has been structured to provide details on the major aspects of the planned remedial action, as follows:

- Section 2.0 describes general site conditions.
- Section 3.0 discusses the regulatory framework involved in successfully completing the remedial action.
- Section 4.0 briefly discusses the applicable project plans.
- Section 5.0 summarizes the pre-remedial action activities.
- Section 6.0 discusses implementation of the remedial action activities, including supporting plans, mobilization, setup of temporary site facilities, predredge confirmation sampling, sediment and wastewater management, backfill activities, and demobilization.
- Section 7.0 addresses the sediment resuspension controls to be implemented during remedial action activities.
- Section 8.0 includes a list of references cited in this document.

This document includes the following supplemental plans as attachments:

- Attachment 1 Sampling and Analysis Plan (SAP)
- Attachment 2 Project Contractor Quality Control (PCQC) Plan
- Attachment 3 Environmental Protection Plan (EPP)
- Attachment 4 Stormwater Management Plan (SMP)
- Attachment 5 Waste Management and Transportation and Disposal Plan (WMTDP)
- Attachment 6 Annual Monitoring Plan and 5-Year Interval Monitoring Plans
- Attachment 7 Response to Comments on Draft Remedial Action Work Plan

1.4 POINTS OF CONTACT

The following is a list of the key TtEC, Navy, and regulatory points of contact:

Entity	Project Title	Contact Information
BRAC PMO West 1455 Frazee Road, Ste. 900 San Diego, CA 92108-4310	BEC	Keith Forman (619) 532-0913 keith.s.forman@navy.mil
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BRAC PMO West 1455 Frazee Road, Ste. 900 San Diego, CA 92108-4310	RPM	Ms. Lora Battaglia (619) 532-0968 lora.battaglia.ctr@navy.mil

Entity	Project Title	Contact Information
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NAVFAC SW RIOCC San Francisco Bay Area PO Box 68 Moffett Field, CA 94035	ROICC Engineering Technician	Mr. David R. Smith (650) 603-9836 david.r.smith2@navy.mil
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BRAC PMO West CSO – San Francisco Bay Area 1 Ave of the Palms, Suite 161 San Francisco, CA 94130-1806	CSO for Facilities	Mr. Glen Nelson (415) 743-4703 glen.nelson.ctr@navy.mil
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Abbreviations and Acronyms:

BEC – BRAC Environmental Coordinator
BRAC – Base Realignment and Closure
Cal/EPA – California Environmental Protection Agency
CDFW – California Department of Fish and Wildlife
CDPH – California Department of Public Health
CIH – Certified Industrial Hygienist
CSO – Caretaker Site Office
CSP – Certified Safety Professional
DTSC – Department of Toxic Substances Control
ECM – Environmental Compliance Manager
EPA – U.S. Environmental Protection Agency
NAVFAC SW – Naval Facilities Engineering Command Southwest
PjM – Project Manager
PMO – Program Management Office
PQCM – Project Quality Control Manager
QAO – Quality Assurance Officer
QCPM – Quality Control Program Manager
ROICC – Resident Officer in Charge of Construction
RPM – Remedial Project Manager
SHM – Safety and Health Manager
SSHO – Site Safety and Health Officer
TtEC – Tetra Tech EC, Inc.
Water Board – California Regional Water Quality Control Board San Francisco Bay Region

Figure 1-2 is a project organization chart providing the contact and relational information for the key project personnel.

1.5 PROJECT SCHEDULE

Figure 1-3 is the project schedule. Field activities are expected to begin in the summer of 2013.

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2.0 SITE CONDITIONS

The following sections describe the physical setting of IR Site 27, the former Clipper Cove Skeet Range at TI. Local data were collected to provide information on geography, climate, hydrographic conditions, geologic conditions, water quality, ecological risk, and utility locations.

2.1 SITE LOCATION AND BACKGROUND

Former NAVSTA TI is situated directly north of Yerba Buena Island (YBI) in the middle of San Francisco Bay, between Oakland and San Francisco and is connected to YBI by a small isthmus (Figure 2-1). YBI is accessible via the San Francisco-Oakland Bay Bridge. Clipper Cove is situated between former NAVSTA TI and YBI and includes the area of IR Site 27 (Figure 2-1). IR Site 27 projects outward into Clipper Cove in a fan shape from the middle of the southern shoreline of TI (Figure 2-2).

NAVSTA TI was created in 1936 and 1937 for the Golden Gate International Exposition using material dredged from the bay. YBI and former NAVSTA TI have a combined land area of 550 acres. Former NAVSTA TI is currently entirely within the city and county limits of San Francisco. During World War II, TI became part of the Treasure Island Naval Base and served as a training center for nuclear decontamination, an electronics and radio communications training school, and the major Navy departure point for sailors in the Pacific. During the 1980s, the Navy used former NAVSTA TI for shipboard firefighting and damage control training for Hull Maintenance Technicians and other sailors. In 1993, the naval station was selected for closure, and Navy operations ended in 1997.

Between 1979 and 1989, a portion of Clipper Cove was used as a naval skeet range; this area is currently known as IR Site 27. As clay targets (skeet) were launched from the shoreline, naval personnel fired lead shot over the water. The lead shot contamination was determined to extend no more than 750 feet from the firing point (DON 2004). Clipper Cove consists of approximately 130 acres, which includes the 19-acre IR Site 27.

2.2 CLIMATE AND TIDES

TI weather is strongly influenced by the cool currents of the Pacific Ocean, which moderate temperature swings and produce a mild year-round climate with little seasonal temperature variation. The average annual temperature is 56 to 58 degrees Fahrenheit with an annual frost-free period ranging from 300 to 330 days.

The prevailing wind direction for the San Francisco Bay area is northwesterly. Wind speed is less than 6 miles per hour for more than 50 percent of the time and exceeds 12 miles per hour for approximately 10 percent of the time. The strongest winds are associated with winter storms. In the winter, winds from the north and east sometimes bring low temperatures to the San Francisco

Bay area. Westerly winds predominate during the summer, when cool marine air flows east toward the warm Central Valley region of California. The rising hot air in California's interior valley creates a low pressure area that draws winds from the North Pacific High through the Golden Gate, which creates the city's characteristic cool winds and fog. Consequently, the city of San Francisco has the coldest daily mean, maximum, and minimum temperatures for June, July, and August among major United States cities.

Temperatures exceed 75 degrees Fahrenheit on average only 28 days a year. The dry period of May to October is mild to warm, with average high temperatures of 64 to 71 degrees Fahrenheit and lows of 51 to 56 degrees Fahrenheit. The rainy period of November to April is slightly cooler, with high temperatures of 58 to 64 degrees Fahrenheit and lows of 46 to 51 degrees Fahrenheit. On average, there are 67 rainy days a year, and annual precipitation averages from 25 to 30 inches. Snow is extraordinarily rare, with only 10 instances recorded in the city of San Francisco since 1852, most recently in 1976. About 90 percent of the annual precipitation occurs from November to April. Localized showers are infrequent, and storms are moderate in duration and intensity. Mean annual evaporation is 48 inches. The greatest evaporation is during July.

The highest recorded temperature at the official National Weather Service office was 103 degrees Fahrenheit on July 17, 1988, and on June 14, 2000. The lowest recorded temperature was 27 degrees Fahrenheit on December 11, 1932. Table 2-1 shows record temperatures near TI by location, Table 2-2 shows Oakland rainfall data, Table 2-3 shows record wind speeds and directions by month and location, and Table 2-4 shows average wind speeds by month and location.

Relative humidity during the winter is approximately 50 to 60 percent during the day, increasing to approximately 80 to 90 percent at night. Humidity decreases in spring; however, by summer, it increases, particularly at night or in the morning, when frequent fogs occur. Humidity is lowest in the fall, ranging from approximately 50 percent during the day and 70 percent at night (DON 1987).

Tidal information for IR Site 27 can be obtained from multiple tidal gauges within the San Francisco Bay. No National Oceanic and Atmospheric Administration (NOAA) tidal gauge is located at TI or YBI. A 2009 tidal study for the redevelopment of TI concluded that accurate tidal information for TI can be obtained by averaging the water level statistics at the tidal gauge located at the San Francisco Presidio (NOAA 9414290) and Alameda (NOAA 9414750) (Moffat and Nichol 2009). Table 2-5 shows local tide data.

2.3 MARINE SETTING AND SEDIMENT DEPOSITION

Data collected from the April 2012 bathymetric study at IR Site 27 indicates that the water depth ranges from less than 5 feet near the shore to approximately 18 feet along the southwestern border. Within the first 150 feet from shore, water depths drop from approximately 3 feet to 13

feet. The majority of the shot fall zone from the skeet range is in water that is between 6 and 8 feet deep. The construction drawing for TI shows a typical slope of the protected seawall of 2 horizontal and 1 vertical (DON 1984), which would place the edge of the riprap approximately 30 feet into the bay from the seawall.

Sediment deposition in the San Francisco Bay is a dynamic process, where sediment inflow, outflow, and redistribution depend on numerous variables such as sediment loading rates, particle sizes, and energy gradients. Comparisons of past hydrographic surveys indicate that IR Site 27 is a low-energy depositional environment (SulTech 2005). However, deposition is minimal in the area of IR Site 27 nearest the shore. Deposition in the nearshore area may be limited by wave action and currents as a result of the shallower water.

According to the FS (TtEM 2010) and based on the available hydrographic data at the time, the sediment deposition rate was approximately 0.17 to 0.21 foot per year of operation, for a total of 1.7 feet to 2.1 feet. The total amount of sediment deposited between 1979 to 2005 is expected to be about 2.4 to 6.3 feet. A hydrographic survey conducted in 2005 indicated the nearshore area (within 150 feet of the shoreline) of Clipper Cove was an area of minimal sediment deposition. The remainder of Clipper Cove is depositional environment where sediment accumulates at a rate of approximately 1 to 2 inches each year (SulTech 2005).

2.4 HISTORICAL INVESTIGATIONS

In 1993, the Water Board issued Order 93-130, requiring the Navy to investigate and manage contamination attributable to the skeet range in the Clipper Cove area of former NAVSTA TI (Water Board 1993). The order set forth specific compliance requirements and tasks. The Navy has complied with this order through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. This RAWP is the final document required by the Water Board as listed in Water Board Order 93-130 before implementing the remedial action.

Numerous investigations and risk assessments have been conducted at or near IR Site 27. Some of these investigations focused directly on IR Site 27 and some were not specific; however, samples collected within Clipper Cove during the non-specific investigations were used to help further delineate the nature and extent of contamination at IR Site 27. Below is a summary of investigations and risk assessments.

Although Phase I and Phase II investigations were not limited to IR Site 27, samples collected within Clipper Cove were evaluated to assist in characterizing the lead and polynuclear aromatic hydrocarbons (PAHs) related to the area associated with the former skeet range. Analytical results for sediment samples at IR Site 27 were compared with ambient chemical concentrations in San Francisco Bay sediment and found to be below screening levels.

2.4.1 1993 Phase I Remedial Investigation Offshore Sampling

In 1993, a Phase I investigation was completed by PRC Environmental Management, Inc. (PRC 1993) under the stormwater pollution prevention project. Fourteen samples were collected directly in front of or near stormwater outfalls, and nine stormwater samples were collected from storm drainage outfalls. Lead was reported in four of eight sediment samples within Clipper Cove; however, none of the four samples had concentrations above the effects range-low (ER-L) (46.7 milligrams per kilogram [mg/kg]).

2.4.2 1996 IR Site 27 Clipper Cove Skeet Range Offshore Investigation

Samples were collected in 1996 to define the vertical and horizontal extent of lead and lead shot in offshore sediments that may have resulted from the skeet range. Samples included 4 surface and 12 subsurface sediment locations (TtEM 2001). Lead was reported in all core samples from 6.3 mg/kg to 54.4 mg/kg. All detected concentrations were below the effects-range median (218 mg/kg). Eight samples had lead reported at concentrations higher than the ambient value (43.2 mg/kg) (Water Board 1998). Of those eight, six samples had lead reported at concentrations higher than the ER-L (46.7 mg/kg). The highest concentrations of lead were generally in the deeper core samples at depths of 3 to 5 feet. Detected lead concentrations in skeet range sediments are within the range of concentrations detected in other offshore areas of TI outside Clipper Cove (TtEM 2010). Lead pellets were sieved from a portion of each 1-foot section of 10 skeet range cores. Pellets were weighed and compared with the wet weight of the sample portion. The lead fraction ranged from 0.0 to 0.081 percent. The highest lead fraction was found in the 3- to 4-foot depth of one of the cores.

2.4.3 1997 Phase II Remedial Investigation

Additional data were collected in 1997 during the Phase II Remedial Investigation (RI) in offshore sediments at IR Site 13. Nineteen sediment surface samples and four sediment core samples (8 feet below mudline) were collected. Lead concentrations in sediment were below ER-L (46.7 mg/kg) at all Phase II locations except for three core samples where lead was reported slightly above the ER-L in the 4-to-6-foot and 6-to-8-foot sediment intervals. The maximum concentration of lead detected within these intervals was 63.3 mg/kg. It was concluded that toxicity was attributable to chemicals other than lead or PAHs, because of no or low concentrations of lead and PAHs detected in sediment and water samples (DON 2012).

2.4.4 2005 Evaluation of Sediment Deposition

Recent hydrographic surveys were reviewed to obtain a better understanding of sediment deposition rates in Clipper Cove. The evaluation found that (1) the nearshore area of Clipper Cove (within 150 feet of the shoreline) is a dynamic area where sediment both accretes and erodes, resulting in limited sediment accumulation; and (2) the remainder of Clipper Cove is a depositional environment, where sediment accumulates at a rate of about 1 to 2 inches each year. A layer of sediment more than 2 feet thick has been deposited in Clipper Cove (excluding the

nearshore area) since skeet range operations ceased in 1989. This sediment deposition has effectively covered the lead shot, eliminating the ingestion exposure pathway to diving ducks over most of the site. However, it was not known whether an ingestion pathway was complete within 150 feet of the shoreline (DON 2012).

2.4.5 2008 Field Investigation of Lead Shot in Nearshore Area

The Navy investigated lead shot in the nearshore area (within 150 feet of the shoreline) of Clipper Cove in 2008 (SulTech 2008). Two-foot-long core samples were collected from 30 locations within 10 equal grids, 3 locations per grid. Also, one grab sample was collected in the middle of each of the 10 grids and analyzed for biomass, total carbon, and grain size. Lead shot was reported within the top 2 feet of the sediment within 75 feet of the shoreline where it could be ingested by waterfowl foraging for food or grit. The concentrations of total lead, not including the lead shot, in sediment were consistent with ambient levels and were similar to other locations around TI. Benthic organisms were recovered from the grab samples, indicating there is a good food source for diving ducks in the nearshore area (TriEcoTt 2013).

2.5 WATER QUALITY

During the 1996 IR Site 27 Clipper Cove Skeet Range Offshore Investigation, four bay water samples were collected from 1 to 2 feet above the water-sediment interface at a water depth of approximately 22 feet. Water samples were analyzed for total lead and PAHs, but neither was detected.

2.6 SUMMARY OF SITE RISKS

Human health and ecological risks were summarized in the ROD/Final RAP (DON 2012). Lead shot is the only contaminant of ecological concern at IR Site 27. An Ecological Risk Assessment was conducted as part of the RI for the Offshore Sediments Operable Unit. Lead shot, lead in sediment, and PAHs, which are associated with skeet range activities, were targeted for evaluation at IR Site 27. PAHs were not detected in skeet range sediment at concentrations exceeding screening values and were not detected in any of the pore water or surface water samples. The results of the 2008 investigation of lead shot in the nearshore area showed that the primary fate and transport mechanism was incidental ingestion of lead shot within the top 2 feet of sediment by diving ducks.

For humans, there is no pathway for exposure to lead, lead shot, or PAHs in sediment; therefore, a human health risk assessment was not conducted.

The response action documented in the ROD/Final RAP is based on:

- Lead shot in sediment is buried under as little as 1 foot of sediment within 75 feet of the shoreline, which is within the reach of diving ducks. Therefore, there is current

potential risk to diving ducks from lead shot in sediment within 75 feet of the shoreline.

- Lead shot buried beneath 2 feet of sediment in the rest of the site poses a potential future risk to diving ducks if exposed by dredging or other sediment-disturbing activities.

2.7 UTILITY LOCATIONS

There are multiple utility lines that either feed into IR Site 27 or pass through IR Site 27 connecting utilities from TI to YBI. There are two storm system outfalls discharging into IR Site 27, an underground sanitary sewer force main directed toward YBI through Clipper Cove, an unknown utility directed to YBI through Clipper Cove, and an underground three-phase 12.5-kilovolt electrical line directed toward YBI through Clipper Cove. See Figure 2-2 for the locations of these utilities based on utility location figures supplied to TtEC by the Navy. TtEC will complete the following before remedial action begins:

- Obtain and review all pertinent utility drawings and develop a map of known utilities in the area of the proposed intrusive work.
- Obtain a CSO utilities clearance permit for intrusive work.
- Directly contact other utility companies that have markers, signs, or otherwise indicated marking in the area.
- Arrange for a third-party geophysical survey to locate and mark known utility locations, and any unknown utility locations before intrusive work begins.
- Mark utilities with uniform colors and markings as per APWA codes or applicable marine and water standards.
- Contact the TI San Francisco City utility department concerning permits and utility locations.

Underground Service Alert of Northern California and Nevada will be notified 48 hours before any intrusive work begins. During site work, TtEC will keep a safe distance from overhead utilities and structures. Electrical lines shall have a minimum distance of 10 feet.

3.0 REGULATORY FRAMEWORK

This section presents the ROD/Final RAP requirements with respect to the selected remedy for IR Site 27, including the RAOs and a description of the site-specific applicable or relevant and appropriate requirements (ARARs). This remedial action is being conducted under the Installation Restoration Program (IRP). Activities conducted under the IRP are to be performed in accordance with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). As established in the Federal Facility Site Remediation Agreement (DTSC 1992), the State of California is represented by the California DTSC as lead agency and the California Regional Water Quality Control Board as support agency. The United States Fish and Wildlife Service will provide guidance on sensitive species issues.

3.1 ROD/FINAL RAP REQUIREMENTS

The ROD/Final RAP presents the remedy selected by the Navy. This remedy includes the following:

- Focused dredging would be conducted for an area within 75 feet of the shoreline or toe of the riprap to remove contaminated sediments that present a current, complete exposure pathway to diving ducks.
- The dredge sediment would be transported by barge to an upland beneficial reuse site.
- The dredged area would be backfilled.
- ICs would be implemented to reduce the likelihood of activities that may cause sediment disturbance.
- Sediment monitoring consisting of bathymetric surveys would be conducted before the remedy is implemented, 1 year after backfilling is complete, and 5 years after to ensure the sediment profile is stable in the backfill area.

This alternative meets the threshold criteria and complies with statutory requirements of the NCP. These requirements include protection of human health and the environment, compliance with ARARs, cost-effectiveness, use of permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, preference for treatment as a principal element, and five-year review requirements.

3.2 REMEDIAL ACTION OBJECTIVES

The remedial action alternative described above will mitigate the two risks stated in the ROD/Final RAP, namely, incidental ingestion of lead shot by diving ducks under current conditions and incidental ingestion of lead shot by diving ducks under future conditions. There are two RAOs identified in the ROD/Final RAP to mitigate these risks. The first RAO is:

1. Prevent or minimize ingestion of lead shot by diving ducks within 75 feet of the shoreline, where there is a complete exposure pathway under current conditions.

The selected remedial action alternative will allow the Navy to achieve the above RAO through focused dredging and placement of a protective armor layer within 75 feet of the shoreline.

The second RAO is:

2. Prevent or minimize ingestion of lead shot by diving ducks sitewide, where there is a potentially complete exposure pathway for diving ducks under future conditions where lead shot is currently buried below at least 2 feet of sediment.

The selected remedial action alternative will allow the Navy to achieve the above RAO through implementation of ICs after focused dredging and backfilling are complete. The selected ICs will restrict activities sitewide that could disturb sediment and resuspend lead shot. A postconstruction bathymetric survey, followed by sediment monitoring 1 year after and every 5 years after the start of mobilization for site remedial action, will verify the integrity of the backfill material and sediment profile. The monitoring results for the first year will be presented in an annual monitoring report, and subsequent 5-year monitoring results will be summarized and presented in 5-year review reports.

3.3 ROD/FINAL RAP ARARs SUMMARY

The selected remedial action will comply with the substantive provisions of the ARARs under federal and state laws unless a statutory waiver is justified. Section 121(e) of CERCLA, 42 *United States Code* Section (§) 9621(e), states that no federal, state, or local permit is required for remedial actions selected and carried out in compliance with Section 121 of CERCLA and conducted entirely on-site. Any action that takes place off-site is subject to the full requirements of federal, state, and local regulations. The following sections and Tables 3-1 through 3-6 summarize the chemical-specific, location-specific, and action-specific ARARs for this remedial action.

3.3.1 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, establish the acceptable amount of concentration of a chemical that may be found in, or discharged into, the ambient environment. Sediment is the only medium of concern at IR Site 27, and contains no chemical contaminants. However, since the remedial action includes dredging, ARARs include the requirements for other media that may be affected by the dredging action and are addressed under action-specific ARARs.

3.3.2 Location-Specific ARARs

Location-specific ARARs are restrictions on the concentrations of hazardous substances or on conducting activities solely because they are in specific locations. Specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. The selected remedial action will be implemented in compliance with location-specific ARARs.

3.3.3 Action-Specific ARARs

Action-specific ARARs are technology- or activity-based requirements or limitations for remedial activities. These requirements are triggered by the particular remedial activities conducted at the site.

Sediment will remain in the dewatering pad until it is not flowing. Sediment will be arranged into approximately 400- to 500-cubic-yard staging piles to await waste characterization as described in the SAP. After sediment has been characterized, it will be transported and disposed of in accordance with the WMTDP. All excess water from the dredged sediment or storm events will be allowed to evaporate. No water treatment or water disposal is anticipated during the remedial action. In the event wastewater is required to be taken off-site, the water will be sampled and analyzed in accordance with the disposal facility requirements.

3.4 PROJECT WASTE STREAMS

During the remedial activities, various waste streams may be generated. These wastes may be characterized as RCRA-hazardous waste, non-RCRA hazardous waste, and nonhazardous wastes. The activities associated with this remedial action consist of excavating sediment that will require dewatering and stockpiling, followed by restoration of the areas where dewatering and staging activities have occurred.

Wastes generated as a result of remedial activities are expected to include, but not be limited to, dewatered sediment, debris, used personal protective equipment, and wastewater. The following disposal options will be applied to the wastes described above:

- Sediment, debris, and wastewater intended for off-site disposal classified as a Toxic Substances Control Act-hazardous, RCRA-hazardous, or non-RCRA (California) hazardous waste will be transported to a CERCLA off-site rule-approved hazardous waste facility for treatment and/or disposal.
- Nonhazardous sediment or debris that does not contain any chemical or radiological contaminants may be disposed of at IR Site 1 and/or IR Site 2 located at Alameda Point.

In accordance with the ARARs, the substantive requirements of state and federal hazardous waste generation, characterization, storage, treatment, and management regulations of Cal. Code Regs. tit. 22, §§ 66261, 66262, and 66264, and 40 *Code of Federal Regulations* Parts 261, 262,

and 264, are applicable to the management of hazardous wastes generated during the remedial activities.

Details and further explanation of waste management and transportation are provided in the WMTDP, which is Attachment 5 of this RAWP.

4.0 APPLICABLE PROJECT PLANS

Remedial action activities will be implemented in accordance with this RAWP and the attached supporting plans briefly discussed below, as well as a standalone Accident Prevention Plan/Site Safety and Health Plan. Controlled copies of all plans will be maintained at the project site and available to all personnel during the execution of the remedial action.

4.1 ACCIDENT PREVENTION PLAN

A standalone Accident Prevention Plan, containing a Site Safety and Health Plan and Activity Hazard Analyses, has been developed for the project. The plan discusses health and safety procedures to be followed while conducting activities associated with this remedial action. It addresses worker health and safety; chemical, physical, and biological hazards and associated mitigation measures; training requirements; and general spill prevention and response procedures.

4.2 SAMPLING AND ANALYSIS PLAN

The SAP (Attachment 1) specifies the field sampling and laboratory analytical and reporting requirements for the project.

4.3 PROJECT CONTRACTOR QUALITY CONTROL PLAN

The PCQC Plan (Attachment 2) provides project-specific quality assurance (QA)/quality control (QC) information. This plan discusses the QA/QC organization and management system and includes the requirements for handling and managing project-related QC records, certifying physical test laboratories, QC inspection and testing, reporting, and documentation.

4.4 ENVIRONMENTAL PROTECTION PLAN

The EPP (Attachment 3) describes the requirements to minimize environmental pollution and damage that may occur as the result of construction activities.

4.5 STORMWATER MANAGEMENT PLAN

The SMP (Attachment 4) and associated best management practices (BMPs) (Appendix A of Attachment 4) describe the measures that will be implemented to protect against adverse impacts to stormwater quality and to prevent or control spills or releases.

4.6 WASTE MANAGEMENT AND TRANSPORTATION AND DISPOSAL PLAN

The WMTDP (Attachment 5) describes the requirements governing the classification, characterization, management, transportation, and disposal of project-generated wastes.

4.7 ANNUAL MONITORING PLAN AND 5-YEAR INTERVAL MONITORING PLAN

The Annual Monitoring Plan and 5-Year Interval Monitoring Plan (Attachment 6) is a plan for postconstruction sediment monitoring. A postremedy bathymetric survey will be followed by monitoring 1 year after the start of mobilization for site remedial action and every 5 years thereafter to confirm the continued effectiveness of the remedy. This plan follows the EPA's Guidance for Monitoring at Hazardous Waste Sites (EPA 2004) and details the hydrographic survey method to be used during monitoring activities.

5.0 PRE-REMEDIAL ACTION ACTIVITIES

This section describes activities that will be performed before remedial action begins. TtEC will conduct a preconstruction meeting with the Navy, provide required notifications and obtain necessary permits, establish access agreements, perform a site utility survey, collect 17 sediment cores along the perimeter of the design dredge footprint, and collect 20 sediment cores from the interior of the design dredge footprint.

5.1 PRECONSTRUCTION MEETING

Before field activities are begun, a preconstruction meeting will be held at the project site, as described in the PCQC Plan (Attachment 2). The purpose of the preconstruction meeting, which is typically attended by key contractor site management personnel, the RPM, the Resident Officer in Charge of Construction (ROICC), and the CSO representative, is to discuss and develop a mutual understanding of the project requirements. Minutes of the meeting will be prepared by TtEC and submitted to the Navy.

5.2 NOTIFICATIONS AND PERMITS

Before field activities are begun, TtEC will notify the Navy Remedial Project Manager (RPM), the former NAVSTA TI Caretaker Site Office (CSO), and other appropriate former NAVSTA TI representatives of its planned field activities and the associated schedule. An excavation permit from the California Occupational Safety and Health Administration will be secured and maintained, and the required 5-day notification will be provided before sediment removal activities begin.

Because site activities are being conducted under Section 121(e) of CERCLA, administrative requirements such as permits are not necessary; however, site activities will comply with substantive requirements of the permits. In particular, appropriate BMPs for controlling stormwater and nonstormwater discharges will be implemented as necessary.

5.3 ACCESS AGREEMENTS

TtEC will coordinate with the Navy to secure necessary access agreements from the occupants of site areas potentially affected by the IR Site 27 remedial activities, including the upland area adjacent to IR Site 27 and the boat mooring slips located west of the dredge footprint. Areas requiring access are detailed on Figure 2-2.

5.4 SITE UTILITY SURVEY

TtEC will complete the following before remedial action begins:

- Obtain and review all pertinent utility drawings and develop a map of known utilities in the area of the proposed intrusive work.

- Obtain a CSO utilities clearance permit for intrusive work.
- Directly contact other utility companies that have markers, signs, or otherwise indicated marking in the area.
- Contact the TI San Francisco City utility department concerning permits and utility locations.

Before intrusive activities are begun, the nationwide "Call Before You Dig" number (811) will be called. Dialing the 811 number directs calls to the local One Call Center that contacts the area utility providers, who will then identify and mark any known underground utilities within the work area. In coordination with the Navy, a records search will also be undertaken to determine if there are utility drawings available for the site that were not already provided to TtEC by the Navy. TtEC will also employ an independent utility locating service to use geophysical methods to determine the locations of utilities. Figure 2-2 shows locations of utilities that are expected to exist at the site based on figures provided to TtEC by the Navy.

5.5 PREDREDGE CONFIRMATION CORE SAMPLING

The objective of the predredge confirmation core sampling is to collect supplemental data. The data will be used to verify the adequacy of the lateral limits for sediment removal specified by the design by confirming that there is no lead shot outside the design dredge footprint within the upper 2 feet of sediment. The sampling rational for the core locations was developed using the guidelines established in the RD.

5.5.1 Predredge Confirmation Core Sampling Locations

Seventeen sediment cores will be collected just outside the perimeter of the design dredge footprint as defined by the RD and shown on Figure 5-1. The cores will penetrate the sediment to a minimum depth of 3 feet to ensure 2 feet of sediment is recovered. Cores spacing will be 100 feet along the long side of the design dredge footprint. Two cores will be collected along each of the shorter sides. After sample results are confirmed, the dredge footprint will be expanded, if needed, in accordance with the RD.

5.5.2 Predredge Confirmation Core Sampling Location Positioning

Target sampling locations will be acquired using a Trimble Ag132 differential global positioning system (DGPS) or equivalent. The DGPS includes a global positioning system (GPS) receiver unit on board the sampling vessel and a U.S. Coast Guard differential beacon receiver. The GPS unit will receive radio broadcasts of GPS signals from satellites. The U.S. Coast Guard beacon receiver will provide differential corrections to the GPS, providing positioning accuracy to within approximately 1 meter. Northing and easting coordinates of the vessel will be updated every second and displayed directly on a computer on board the vessel using HYPACK® navigation software. The coordinates will then be processed in real time and stored at the time of sampling using the HYPACK software package. North American Datum 83 State Plane,

California Zone 3 will be used for the horizontal reference measured in U.S. survey feet. Water depth at each sampling location will be measured using an onboard depth finder or 8-pound mushroom anchor. Depth measurements will be corrected to mean lower low water (for tidal influence) using NOAA-predicted tides for TI.

5.5.3 Predredge Confirmation Core Sampling Methodology

Sediment will be collected using a vibracore deployed from a sampling vessel. The vibracore collects subsurface sediment by vibrating a 4-inch-diameter barrel into the sediment. A catcher connected to the bottom of the barrel retains sediment in the barrel as the sample is extracted and brought on board the sampling vessel for processing. Further details on vibracore sampling are presented in the SAP (Attachment 1), Worksheet #14.

A sediment core will be collected from each sampling location to a depth of 3 feet below the sediment surface or to refusal. In the event that refusal is encountered at a specific location, the sampling location will be offset up to 5 feet and a second attempt will be made. A total of three attempts will be performed, as necessary, at any given location where refusal is encountered. In the event of refusal, sediment recovered during each attempt (regardless of depth of penetration) will be retained on board the sampling vessel. If 3 feet of subsurface penetration at a specific location is unattainable after three attempts, a subsurface sediment sample will be accepted from the location where the deepest penetration was achieved. After acceptance of a core at each location, the core will be transported to the processing area and logged as described in the SAP (Attachment 1).

Further details on subsurface core processing are presented in the SAP (Attachment 1). Samples will be passed through a sieve and visually inspected for lead shot. Any debris within the core will be removed and visually examined for lead shot. Results will be logged by the sampler into a field logbook.

5.6 PREDREDGE WASTE CHARACTERIZATION CORE SAMPLING

Before dredging begins, waste characterization sediment sampling will be performed within the dredge footprint to determine whether the sediment to be removed contains radioactive constituents at concentrations exceeding the background levels for IR Sites 1 and 2 at Alameda Point. One sample will be collected for every 400 to 500 cubic yards of sediment to be removed (approximately 20 samples).

5.6.1 Predredge Waste Characterization Core Sampling Locations

The dredge footprint has been divided into 20 equal areas, and a sediment core will be collected from the center of each area as shown on Figure 5-2. The cores will penetrate the sediment at a minimum of 4 feet to ensure 3 feet of sediment is recovered.

5.6.2 Predredge Waste Characterization Core Sampling Methodology

The predredge waste characterization sediment cores will be collected and processed in the same manner as described in Section 5.5.3 for predredge confirmation core sampling, including the procedure to be followed in the event that refusal is encountered.

From each core location, a composite sample of the sediment recovered from 0 to 3 feet bgs will be collected. Further details on sediment core processing, including sample collection, labeling, packaging, shipping, and analysis, are provided in the SAP (Attachment 1).

The results of radiological analysis will be compared to the acceptance criteria for reuse at Alameda Point IR Sites 1 and/or 2. If the acceptance criteria are met, the sediment will be transported to Alameda Point IR Site 17 for dewatering and further chemical waste characterization. If those criteria are met, the sediment may be used as subgrade fill for IR Sites 1 and/or 2 landfill projects at Alameda Point.

5.7 DECONTAMINATION PROCEDURES

Equipment used during collection of sediment samples will be decontaminated before its use at each sample location to minimize the potential for any cross-contamination. Whenever possible, disposable sampling equipment will be used to avoid the need for equipment decontamination. Decontamination procedures for sampling equipment are detailed in the SAP (Attachment 1). Clean gloves will be worn at each sampling location.

5.8 PREDREDGE BATHYMETRIC SURVEY

A predredge bathymetric survey will be completed to map the sediment surface and establish a baseline for comparison with subsequent survey results during the remedial action. Standard operating procedures as described in the U.S. Army Corps of Engineers' Hydrographic Surveying (USACE 2004) Manual and International Hydrographic Association Manual on Hydrography (IHA 2010) will be followed to ensure the bathymetric survey complies with the specifications.

The horizontal reference for this survey will be the North American Datum 83 State Plane, California Zone 3, with U.S. survey feet as the unit of measure. The vertical datum will be North American Vertical Datum 88 geoid, measured in US survey feet. HYPACK acquisition software will provide the real-time datum conversion from the GPS latitude/longitude to the specified coordinate system during the survey. Real-time kinematic GPS will be used to provide horizontal and vertical positioning of the vessel.

After the survey data are collected, hydrographers will process the data, which consists of navigation editing, attitude editing, swath editing, and subset editing. Navigation edits will include reviewing the data for time jumps and removing abrupt vessel turns. Attitude data will be reviewed for gaps and consistency. Depth filtering will be used to eliminate large outliers in the water column; minimum and maximum values will vary by survey area. If there is adequate

coverage from neighboring swaths, across-track filters will also be used to limit the swath's outer beams.

Data will be used to determine the amount of dredged material removed, as well as the depth of removal, by comparing the data to postdredge bathymetric survey data. Postbackfill bathymetric survey data will be compared to the baseline data to verify that the backfill was placed to within tolerance specified in the RD. Predredge bathymetric survey data will also be used to produce topographic difference figures to be presented to the Navy after remedial tasks are completed. The topographic difference figures will also be presented in the RACR, which will be prepared following completion of field activities (Figure 1-3).

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6.0 REMEDIAL ACTION IMPLEMENTATION

6.1 MOBILIZATION AND TEMPORARY FACILITIES

Once authorization to proceed has been received and the requirements of Section 2.0 have been addressed, equipment, materials, and personnel will be mobilized to the site and temporary constructions facilities will be established to prepare for remedial activities. Setup of temporary facilities includes establishing site access controls; inspecting and repairing, if necessary, the Alameda Point IR Site 17 northwest dewatering pad for containing and drying dredged sediment; and establishing a barge sediment offloading plant. A turbidity curtain will also be deployed in the water around the area where dredging will take place, and turbidity monitoring stations will be installed in accordance with the remedial design.

6.1.1 Site Access Controls

Access to the support and work areas will be controlled by fences, barricades, and signage to prevent entry by unauthorized personnel and vehicles. All site personnel and visitors will be required to sign in upon arrival. Figure 6-1 reflects the plan for IR Site 27 support facilities, and Figure 6-2 shows the location of Alameda Point's IR Site 17 sediment offloading plant.

6.1.2 Temporary Facilities and Utility Connections

A site trailer will be installed and connected to a local power supply as shown on Figure 6-1. Before mobilization begins, TtEC will work closely with the Navy CSO and Treasure Island Development Authority to ensure that the placement of temporary facilities will cause minimal impact to local tenants. Temporary restroom facilities and conex boxes will be positioned near work areas. Temporary fencing will surround material, equipment storage, and parking areas.

6.1.3 Sediment Dewatering Pad

Dredged sediment will be temporarily held in the dewatering pad already constructed for the IR Site 17 dredge project in Alameda Point. This dewatering pad was constructed to hold potential radiologically impacted sediment during the Seaplane Lagoon remedial action dredging project. The dewatering pad was initially divided into two sections to contain probable low-level radioactive waste (LLRW) and possible LLRW. During processing of the sediment, 100 percent of the sediment within the probable LLRW area of the dewatering pad was found to be radiologically impacted; therefore, TtEC will place only the dredged sediment coming from NAVSTA TI onto the area of the dewatering pad containing the possible LLRW. A k-rail barrier will be installed to separate the two areas. The area formerly designed to hold possible LLRW will accommodate sediment dewatering prior to disposal and will contain approximately 27,000 cubic yards of material, which is sufficient for this project.

Figure 6-3 shows details of the dewatering pad construction. The berms of the dewatering pad are formed using concrete K-rails, which rest on top of compacted aggregate base. The area bounded by the K-rails is covered with an impermeable liner, which laps up over the berms. The impermeable liner is covered with a protective concrete slurry layer, which was designed to support heavy equipment. A partition may be installed within the dewatering pad to assist in the separation and recovery of water from the sediment. TtEC will inspect and repair the dewatering pad, as necessary, before it is used to hold any dredged material.

6.1.4 Sediment OffloadingPlant

After the dredged sediment is placed into hopper barges and transferred to IR Site 17 at Alameda Point, the dredged sediment will be offloaded into the sediment dewatering pad described above. A sediment offloading plant will be mobilized in the northwest corner of Seaplane Lagoon as shown on Figure 6-2. See Section 6.1.7 for details on dredging and backfilling equipment. Before mobilization occurs, sounding data will be collected in the berthing area to verify that the water depth is sufficient to accommodate the plant and loaded material barges.

6.1.5 Turbidity Curtain Installation

A turbidity curtain will be installed around the in-water work area to control the migration of suspended sediment during dredging and backfilling operations in accordance with the RD. The turbidity curtain will be held in position using cable and anchors. The turbidity curtain will extend to 2 feet above the sediment surface during low tide to allow for the passage of marine life and prohibit stirring of sediment resulting from drag.

6.1.6 Water Quality Monitoring Equipment

Two water quality monitoring stations will be installed after the turbidity curtain is in place. These stations are solar-powered floating platforms secured using anchors. One station will be positioned near the turbidity curtain (outside), and the other station will be positioned at least 500 feet outside the curtain. Approximate locations of the platforms are shown on Figure 6-1.

6.1.7 Offloading, Loading, Dredging, and Backfilling Equipment

The following in-water equipment will be mobilized to support the remedial action.

Dredging, Offloading, and Backfilling Equipment:

- Dredge Columbia – This dredge is a conventional lattice boom heavy-duty cycle crane mounted on a 160-foot-long by 40-foot-wide deck barge. The dredge is equipped with spuds or through-deck piles, which penetrate into the sediment and stabilize the barge. The Dredge Columbia will be used to remove sediment, offload dredge sediment at Alameda, and place backfill material.

- Environmental Clamshell Bucket – To minimize resuspension during dredging activities, TtEC will employ a 5-cubic-yard, cable-arm-operated environmental clamshell bucket. A photograph of this bucket is provided on Figure 6-4.
- Hopper Barges – Two hopper barges or scows will be used during the dredging to hold and transport dredged material from TI to Alameda Point. Both hopper barges measure 180 feet long by 40 feet wide and have a draft, when loaded, of 10 feet. Each barge has a material capacity of 1,100 cubic yards.
- Backfill Material Barges – Two deck barges will be used to import backfill material to the site. Both deck barges are 132 feet long by 35 feet wide. Each barge is capable of holding approximately 2,000 tons of backfill material and has a draft, when loaded, of 10 feet.

6.2 REMEDIAL ACTION ACTIVITIES

6.2.1 Sediment Dredging

Sediment removal will begin at one end of the dredge footprint and progress systematically to the other. The dredge footprint is shown on Figure 6-1 and in the detailed drawings. Electronic files created by the designer, which define the dredge prism, will be loaded onto the onboard GPS. This system will provide real-time position of two points on the dredge, one point in a fixed position on the barge and another on the boom tip directly above the dredge bucket. Positions will be updated every second. GPS accuracy is sub-meter. All necessary measurements of the dredge in the x, y, and z planes will be referenced to this position. The Vector GPS will also provide a dredge heading. Combining the dredge heading with the horizontal location of the dredge provided by the GPS will provide a position of all critical points on the dredge.

Two calibration checks will be performed to verify the accuracy of the dredge positioning system. These are the bucket horizontal position calibration and the dredge heading calibration. These checks ensure that the dredge operator has accurate positioning information. A second accuracy check is provided by the progress surveys that will identify any indication of position shifts.

A tide gauge will provide real-time water level data to account for tide level variations. The electronic tide gauge is calibrated to a tide board and checked daily to ensure accuracy. Electronic tide gauge data are transmitted to the dredge via a radio modem. Real-time water level data are imported from the radio modem into the Dredgepack® positioning software. The operator's display reads out the corrected elevation, accounting for changes in water level; thus, the operator can maintain a constant depth without the need to convert data.

Bucket depth will be measured by observing marks painted on the bucket holding wire in 1-foot increments up to the maximum tide level to occur on the project. The dredge operator will count marks on the wire to lower the bucket to the required depth.

The positioning software to be used on this project is the Dredgepack program produced by HYPACK, Inc. This software combines all of the inputs described above with bathymetric data and channel template data entered by the engineering staff to provide the operator with a detailed view of the dredge location, dredging limits, required depth, and existing conditions. The operator will view a monitor conveniently placed at the dredge's control station.

Sediment dredging will be conducted to the limits established by the RD. The dredging tolerances are plus zero inches and minus 12 inches from the slope lines and grades shown on the design drawings. The dredge area sidewalls may either be stepped, sloped, or vertical. The dredging unit will be equipped with a GPS system to accurately locate and map the dredging work as it progresses. Periodic bathymetric progress checks or conditional surveys will be performed to monitor dredging progress compared to the limits established in the RD.

The digging pattern will be an arc. The swing radius of the dredge will change as the boom is raised and lowered. The bucket pattern includes a planned overlap to account for any material that falls behind the bucket. An initial digging pattern will be selected at the start of the project, and adjustments will be made based on the results of daily conditional surveys. Conditional surveys are presented as bathymetry maps showing the bottom resolved to a 1-foot by 1-foot sounding density, as well as cross-sectional views of the bottom. Using these tools, the team can determine if the digging pattern is optimized.

Tugboats will not be allowed within the IR Site 27 boundary to maneuver equipment. Dredge equipment maneuvering is described in Section 7.0. The Sediment Resuspension Control Plan outlines the methods to be used to minimize resuspension during remedial activities.

When dredging is complete, a figure will be produced to demonstrate that the topography of the dredge footprint is in accordance with the RD.

6.2.2 Material Barge Transportation

Material barges will be transported between Alameda Point and TI using a tugboat when outside the TI IR Site 27 area. The tugboat will not be allowed inside the IR Site 27 area in accordance with the RD and Sediment Resuspension Control Plan (Section 7.0). TtEC will adhere to all maritime and United States Coast Guard rules and regulations and attain any required permits for transporting material on San Francisco Bay.

6.2.3 Material Barge Offloading

After a hopper barge has been loaded with dredged material, the hopper barge and the dredge barge will be transported to Alameda Point IR Site 17, and berthed next to the seawall. At that time, offloading will begin. Spill trays constructed of I-beams, wooden crane mats, plastic liners, and side railing will be installed between the seawall and the dredge barge and between the dredge barge and the hopper barge to prevent dredged material from falling into the water.

The dredge, which is resting on top of a deck barge and equipped with a clamshell bucket, will transfer the dredged material from the hopper barge to the dewatering pad. When material transfer is complete, a tugboat will transport the dredge and hopper barges back to TI IR Site 27 for reloading, as necessary. This cycle will continue until the dredging is complete. Approximately 20 round trips are anticipated.

6.2.4 Postdredge Bathymetric Survey

A postdredge bathymetric survey will be performed in the remediation area. The survey will be carried out following the procedures described in in Section 5.8 (Predredge Bathymetric Survey). The survey data will be compared to the predredge bathymetric survey data to demonstrate that the dredging to the limits specified in the RD has been achieved and to measure the volume of dredged material that was removed. Hydrographers will compare the actual elevations to the design elevations and, if any area within the dredge footprint has not met grade, additional dredging will be required.

6.2.5 Filter Layer Backfill Operations

After sediment removal is complete and the postdredge grades have been verified, a filter layer consisting of a sand and gravel mixture will be spread over the dredged area, as specified in the RD. The filter layer material will be placed to the grades specified in the RD. The minimum design thickness of the filter layer is 0.5 foot. Because overdredging can be expected to occur, the actual filter layer thickness will likely exceed 0.5 foot. The material to be used to construct the filter layer must be sampled and analyzed to verify that it meets the acceptance criteria specified in the SAP (Attachment 1) before importing begins.

The design gradation for the filter layer material is provided in Table 6-1 and, as stated in the RD, the performance requirements for the filter layer include:

- Clean backfill protective of the environment
- Minimal consolidation over time
- Able to support the protective armor layer
- Prevent movement of particles through the protective layer

The filter layer material will be transported from the source to TI on backfill material barges using tugboats as described in Section 6.2.2. Tugboats will not be allowed within the IR Site 27 boundary to maneuver equipment. Backfill equipment maneuvering is described in the Section 7.0, the Sediment Resuspension Control Plan, as are the methods for minimizing resuspension during remedial activities. Positioning methods, equipment, and software will be the same as described in Section 6.2.1 for dredging.

6.2.6 Filter Layer Postbackfill Bathymetry

Once the filter layer is in place, a bathymetric survey will be performed following the procedures described in in Section 5.8 (Predredge Bathymetric Survey). The survey data will be compared to the design elevation data for the filter layer to verify that the grades specified in the RD have been achieved. The data will also be compared to the postdredge data to determine the volume of filter layer material placed. The allowable filter layer placement tolerances are plus 10 inches and minus 3 inches from the slope lines and grades shown on the design drawings. Hydrographers will compare the actual filter layer elevations to the design elevations. If these tolerances are exceeded, the elevations will be adjusted by either adding or removing material.

6.2.7 Protective Armor Layer Backfill Operations

Once the filter layer is complete, it will be covered with a protective armor layer in accordance with the RD. The armor layer material gradation specifications are provided in Table 6-2. The design thickness of the protective armor layer is 12 inches as described in the RD specification and detailed design drawings.

The protective armor material will be transported in the same manner as the filter layer material. Once on-site at TI, the requirements of Section 7.0 will apply. Positioning methods, equipment, and software will be the same as described in Section 6.2.1 for dredging.

6.2.8 Protective Armor Layer Postbackfill Bathymetry

A bathymetric survey will be performed over the completed armor layer following the procedures described in in Section 5.8. The survey results will be compared to the design elevation data to verify compliance. The data will also be compared to as-built filter layer data to determine the volume of armor material placed. The allowable armor layer placement tolerances are plus 10 inches and minus 3 inches from the slope lines and grades shown on the design drawings. Hydrographers will compare the actual elevations to the design elevations. If these tolerances are exceeded, the elevations will be adjusted by either adding or removing material.

6.2.9 Sediment Dewatering

Wastewater generated during dredging activities will be transferred to the sediment dewatering pad along with the dredged material. The wastewater will be allowed to evaporate before sediment is transferred from the dewatering pad. If unexpected heavy storms occur and more capacity is needed, wastewater from the dewatering pad will be pumped into the existing 350,000-gallon water storage tank. Collected water will eventually be transferred back to the dewatering pad during a dry period for evaporation. Wastewater will not be treated or discharged during sediment dewatering activities.

6.2.10 Beneficial Reuse Site Transportation and Disposal

When the dredged material is dry enough to transport (i.e., passes a paint filter test), it will be divided into piles of approximately 500 cubic yards and sampled for the purpose of waste characterization as described in the WMTDP (Attachment 5). The analytical results will be compared with Alameda Point's IR Sites 1 and/or 2 import material acceptance criteria. If the criteria are met, the material will be transported via truck to a designated stockpile area near Alameda Point IR Sites 1 and/or 2 and used as subgrade fill for the landfill capping projects. If the criteria are not met, the stockpiled material will be transported to an appropriate landfill.

6.3 DEMOBILIZATION

Following verification that remedial activities are complete, all support facilities, equipment, and personnel will be demobilized. Remaining wastes, including those generated by site restoration and demobilization activities, will be transported off-site for disposal or recycling in accordance with the WMTDP (Attachment 5).

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7.0 SEDIMENT RESUSPENSION CONTROL PLAN

This section describes the methods to be used to control turbidity levels, resuspension, sediment scouring, and sediment migration within the IR Site 27 area during remedial activities. Because of the nature of this project, control of sediment within IR Site 27 is a critical element. The primary environmental concern during execution of the remedial action is increased turbidity caused by suspended sediment within Clipper Cove that could diffuse into the bay. Turbidity is the measure of how suspended particles affect water clarity. Disturbance of the sediments during dredging and backfill operations could cause temporary turbidity increase and allow suspended sediment to be transported to adjacent areas. Protective measures such as use of a turbidity curtain and an enclosed mechanical dredge bucket (environmental clamshell bucket) will be implemented during dredging and backfilling operations

7.1 TURBIDITY CURTAIN

TtEC will install a turbidity curtain to surround the area where dredging and backfilling will occur (Figure 6-1). The purpose of the turbidity curtain is to reduce the spread of suspended sediment outside the work area. The turbidity curtain will be anchored both onshore and in the water. The ends of the turbidity curtain will extend well up into the shoreline to hold the curtain in place during high tide conditions. The curtain will extend from the surface of the water to 1 to 2 feet above the sediment surface at low tide and will be tapered to account for variation in the elevation of the sediment surface. Table 7-1 details the material specifications for the turbidity curtain.

The turbidity curtain will be regularly inspected and maintained, as necessary. The gate of the turbidity curtain will be situated outside the IR Site 27 area to avoid sediment disturbance within the IR Site 27 boundary when entering and leaving the area. Dredging and backfilling operations will be allowed only when the turbidity curtain gate is closed.

7.2 TURBIDITY MONITORING PLAN

Deployment of the turbidity curtain will minimize the potential for increased turbidity outside of the active dredging area, and the effectiveness will be monitored during dredging and backfill operations. Continuous real time turbidity monitors will be employed to monitor turbidity just outside the work area and at a background location. Table 7-2 provides the criteria for the point of compliance, which was determined in the RD (TriEcoTt 2013). Two floating turbidity monitoring platforms will be installed as shown on Figure 6-1. Sondes attached to the floating platforms and hanging in the water will gather the turbidity data. Turbidity readings will be published online every 10 minutes. Data gathered near the turbidity curtain will be compared to data gathered at the background location, and an alarm will sound if the data near the turbidity curtain reach 30 nephelometric turbidity units above background.

The range of resulting actions in sequence includes: 1) continuation of dredging with no additional controls or monitoring; 2) additional monitoring; 3) additional engineering solutions; 4) operational solutions; or 5) temporary work stoppage. Turbidity monitoring readings will be collected at 3 feet below the water surface as specified in the RD (TriEcoTt 2013). Table 7-3 indicates the trigger levels and resulting actions for turbidity monitoring (TriEcoTt 2013).

7.3 ENVIRONMENTAL CLAMSHELL BUCKET

When dredging, sediment resuspension will be minimized by employing an environmental clamshell bucket. A photograph of the bucket to be used is provided as Figure 6-4. Environmental clamshell buckets are designed to make level cuts and completely close to retain sediment and water using overlapping sides and a rubber seal. The environmental clamshell buckets are designed to match the bucket capacity to the bucket footprint and desired depth of sediment penetration. At design capacity, sediment fills the bucket to the bottom of the vent when closed. This design allows the bucket to be filled with sediment to capacity, at design depth, minimizing water accumulation, and reducing sediment resuspension, which could occur by over-filling the bucket.

7.4 BARGE MANEUVERING

To prevent sediment resuspension, motorized vessels will not be allowed within the IR Site 27 boundary. To eliminate displacement of sediment and resulting turbidity, one or more techniques will be used to move the dredge into and reposition it within the turbidity curtained area or the work area. These methods include using positioning lines from the barge to the shore and/or pin piles driven outside the IR Site 27 boundary; using a line stretched between two pin piles situated at each end of the dredge footprint to assist in repositioning the barges along the length of the work area; and/or planting the dredge bucket on the sediment surface within the remediation area while maneuvering the crane boom to move the barges. Barges may also be towed by attaching a cable to a tugboat located outside the IR Site 27 area.

7.5 RESUSPENSION CONTROL DURING BACKFILL OPERATIONS

The backfill material will be placed using a clamshell bucket. The bucket will be lowered to near the point of intended placement before the material is released. The material will not be allowed to free fall into place. The operator will slowly and cautiously open the bucket to release the backfill material as near as is feasible to the sediment surface.

7.6 RESUSPENSION CONTROL DURING LOADING AND UNLOADING OPERATIONS

Spill trays will be used during loading and offloading operations. These trays will be constructed using I-beams, crane mats, a plastic covering, and handrails to support personnel. The spill tray will be positioned below the excavator bucket path and will be cleaned and maintained throughout the project.

8.0 REFERENCES

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TABLES

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TABLE 2-1

RECORD TEMPERATURES BY LOCATION

Location	Record High	Record Low
San Francisco AP, CA	106 ˚F	20 ˚F
San Francisco CO, CA	103 ˚F	28 ˚F

Source: Weather Underground 2006

Abbreviations and Acronyms:
˚F – degrees Fahrenheit
AP – airport
CA – California
CO – county

TABLE 2-2

OAKLAND AREA RAINFALL DATA

Storm Frequency	Tenths of Inches	Inches	Feet
25 yr – 6-hr	20	2.0	0.167
100 yr – 6-hr	25	2.5	0.208
25 yr – 24-hr	40	4.0	0.333
100 yr – 24-hr	50	5.0	0.416

Source: NOAA 2006

Abbreviations and Acronyms:
hr – hour
NOAA – National Oceanic and Atmospheric Administration
yr – year

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TABLE 2-3

RECORD WIND SPEEDS AND DIRECTIONS BY MONTH AND LOCATION

RECORD WIND SPEEDS BY MONTH (mph)												
	January		**February**		**March**		**April**		**May**		**June**	
Location	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**
San Francisco CO, CA	SE	47	SW	47	S	44	W	38	W	38	W	40
	July		**August**		**September**		**October**		**November**		**December**	
Location	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**	**Dir.**	**Spd.**
San Francisco CO, CA	W	38	W	34	W	32	SE	43	S	41	SE	45

Source: NNDC 2006

Abbreviations and Acronyms:

CA – California
CO – county
Dir. – direction
mph – miles per hour
NNDC – NOAA National Data Center
NOAA – National Oceanic and Atmospheric Administration
S – south
SE – southeast
Spd. – speed
SW – southwest
W – west

TABLE 2-4

AVERAGE WIND SPEEDS BY MONTH AND LOCATION

AVERAGE WIND SPEEDS BY MONTH (mph)						
Location	**January**	**February**	**March**	**April**	**May**	**June**
San Francisco CO, CA	6.7	7.5	8.5	9.5	10.4	10.9
Location	**July**	**August**	**September**	**October**	**November**	**December**
San Francisco CO, CA	11.2	10.5	9.1	7.6	6.3	6.5

Source: NNDC 2006

Abbreviations and Acronyms

CA – California
CO – county
NNDC – NOAA National Data Center
NOAA – National Oceanic and Atmospheric Administration
mph – miles per hour

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TABLE 2-5

MEAN SEA LEVEL INFORMATION

Station ID	9414290	
Name	San Francisco, California	
Datum	**Description**	**Value (Feet)**
MHHW	Mean Higher-High Water	11.82
MHW	Mean High Water	11.21
MSL	Mean Sea Level	9.10
MLW	Mean Low Water	7.11
MLLW	Mean Lower-Low Water	5.98
GT	Great Diurnal Range	5.84
MN	Mean Range of Tide	4.10
Maximum	Highest Observed Water Level	14.64
Max Date	Highest Observed Water Level Date	1983/01/27
Minimum	Lowest Observed Water Level	3.10
Min Date	Lowest Observed Water Level Date	1933/12/17
NAVD88	North American Vertical Datum of 1988	5.92
STND	Station Datum	0.00

Reference:

NOAA (National Oceanic and Atmospheric Administration). 2012. Tidal data from the San Francisco Bay, California Tide Benchmark Station ID: 9414290. Accessed online at: http://tidesandcurrents.noaa.gov/station_info.shtml?stn=9414290+San+Francisco+,+CA

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TABLE 3-1

FEDERAL CHEMICAL-SPECIFIC[a] ARARs

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
Sediment				
Resource Conservation and Recovery Act (42 U.S.C. ch. 82, §§ 6901–6991[i])[c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs. tit. 22, § 6261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	These regulations are applicable to activities that generate waste to determine if the waste is hazardous. Waste will be generated during dredging. Whether the waste meets the definition of RCRA hazardous waste will be determined when it is generated.
LDRs prohibit disposal of hazardous waste unless treatment standards are met.	Hazardous waste land disposal	Cal. Code Regs. tit. 22, § 66268.1(f)	Applicable	The substantive provision of this section are ARARs if any hazardous waste is disposed of off-site.

Source: DON 2012

Notes:

[a] Many action-specific ARARs containing chemical-specific limitations are addressed in the action-specific ARARs tables.

[b] Only the substantive provisions of the requirements cited in this table are ARARs.

[c] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Cal. Code Regs. – *California Code of Regulations*
ch. – chapter
DON – Department of the Navy
LDR – Land disposal restriction
RCRA – Resource Conservation and Recovery Act
TCLP – Toxicity characteristic leaching procedure
tit. – title
U.S.C. – *United States Code*

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TABLE 3-2

FEDERAL LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comments
Coastal Zone Management Act (16 U.S.C. §§ 1451–1464) [b]					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone including lands thereunder and adjacent shore land.	16 U.S.C. § 1456(c) 15 C.F.R. pt. 930	Relevant and appropriate	The CZMA requires federal agency activities outside the coastal zone (i.e., activities on federal lands) that may affect any land or water use or natural resources of the coastal zone be conducted in a manner that is consistent to the maximum extent practicable with enforceable policies of an approved state management program. The San Francisco Bay Plan is an approved state program. The selected remedial action will comply with the broad goals of the San Francisco Bay Plan.
Migratory Bird Treaty Act of 1972 (16 U.S.C. §§ 703–712) [b]					
Migratory bird areas	Protects almost all species of migrating birds in the U.S. from unregulated "take," which can include poisoning at hazardous waste sites.	Presence of migratory birds.	16 U.S.C. § 703	Relevant and appropriate	The substantive provisions of this requirement are ARARs because migratory birds are present on-site.

TABLE 3-2

FEDERAL LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comments
Endangered Species Act of 1973 (16 U.S.C. §§ 1531–1543) [b]					
Habitat on which endangered species or threatened species depend	Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. The Endangered Species Committee may grant an exemption for agency action if reasonable mitigation and enhancement measures such as propagation, transplantation, and habitat acquisition and improvement are implemented.	Determination of effect upon endangered or threatened species or its habitat. Critical habitat upon which endangered species or threatened species depend.	16 U.S.C. § 1536(a), (h)(1)(B); 16 U.S.C. § 1538(a)(1)(B) and (G); and 16 U.S.C.	Applicable	Consultation regulations at 50 C.F.R. Part 402 are administrative in nature and are therefore not ARARs. However, they may be TBCs to comply with the substantive provisions of the Endangered Species Act. The substantive provisions of 16 U.S.C §§ 1531–1543 are ARARs for endangered species present at the site and for response actions at or near threatened or endangered species habitats. The California Least Tern and the Chinook Salmon are federally listed endangered species that may be present at the site.

TABLE 3-2

FEDERAL LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comments
Marine Mammal Protection Act (16 U.S.C. §§ 1361–1421h) [b]					
Marine mammal area	Protects any marine mammal in the U.S. except as provided by international treaties from unregulated "take."	Presence of marine mammals.	16 U.S.C. § 1372 (a)(2)	Applicable	The substantive provisions are ARARs because marine mammals are likely to be found at Clipper Cove.
Rivers and Harbors Act of 1899 (33 U.S.C. §§ 401 through 413) [b]					
Navigable waters	Permits required for structures or work in or affecting navigable waters.	Activities affecting navigable waters.	33 U.S.C. § 403; and 33 C.F.R. § 322	Relevant and appropriate	The substantive provisions of these requirements are relevant and appropriate for the excavation and backfilling at IR Site 27. CERCLA § 121(e) exempts remedial actions conducted entirely on-site from administrative or procedural permit requirements. However, the Navy will comply with the substantive provisions of these ARARs because it will not deposit excavated sediment in the bay and it will not affect the course, action, location, condition, or capacity of the bay.

TABLE 3-2

FEDERAL LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comments
Clean Water Act of 1977, as Amended, § 404 (33 U.S.C. Section 1344) [b]					
Bay	Action to prohibit discharge of dredged or fill material into waters of the United States without permit.	Waters of the United States	33 U.S.C. § 1344	Applicable	The substantive provisions of these requirements are ARARs for excavating and backfilling in the bay. CERCLA § 121(e) exempts remedial actions conducted entirely on-site from obtaining a dredge or fill permit. Therefore, the Navy will not obtain a permit before IR Site 27 is excavated and backfilled. The Navy will comply with the substantive provisions of the permit as a means to ensure compliance with the substantive provisions of these ARARs.

Notes:

[a] Only the substantive provisions of the requirements cited in this table are ARARs.

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Bay – San Francisco Bay
CERCLA – Comprehensive, Environmental, Response, Compensation and Liability Act
C.F.R. – *Code of Federal Regulations*
CZMA – Coastal Zone Management Act
IR – Installation Restoration (Program)
TBC – to be considered
U.S. – United States
U.S.C. – *United States Code*

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Resource Conservation and Recovery Act (42 U.S.C. §§ 6901–6991[i]) [a]					
On-site generation of waste	Person who generates waste shall determine if that waste is a hazardous waste.	Generator of waste	Cal. Code Regs. tit. 22, § 66262.10(a), 66262.11	Applicable	These regulations are applicable to any operation that generates waste. The Navy will generate waste during excavation. The Navy will determine whether the waste is RCRA hazardous waste when it is generated.
On-site generation of waste	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste	Cal. Code Regs. tit. 22, § 66264.13 (a) and (b)	Applicable	These regulations are applicable to any operation that generates waste. The Navy will generate waste during excavation. The Navy will determine whether the waste is RCRA hazardous waste when it is generated.
On-site generation of waste	On-site hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers in accordance with § 66262.171–178 or in tanks, on drip pads, inside buildings, is labeled and dated, etc.	Accumulate hazardous waste	Cal. Code Regs. tit. 22, § 66262.34	Not provided in ROD/Final RAP	Applicable for any operation where hazardous waste is generated and transported in containers. Not an ARAR for staging piles.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
On-site generation of waste	Containers of RCRA hazardous waste must be: • maintained in good condition, • compatible with hazardous waste to be stored, and • closed during storage except to add or remove waste.	Storage of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere, in a container	Cal. Code Regs. tit. 22, § 66264.171, 66264.172, and 66264.173	Not provided in ROD/Final RAP	If excavated material has been characterized as hazardous waste and is to be stored in containers, this regulation would be applicable. It is not applicable to material that has been characterized as nonhazardous waste or to dewatered material that is managed in staging piles.
On-site generation of waste	Inspect container storage areas weekly for deterioration.	Storage of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere, in a container	Cal. Code Regs. tit. 22, § 66264.174	Not provided in ROD/Final RAP	If excavated material has been characterized as hazardous waste and is to be stored in containers, this regulation would be applicable. It is not applicable to material that has been characterized as nonhazardous waste or to dewatered material that is managed in staging piles.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
On-site generation of waste	Place containers on a sloped, crackfree base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.175(a) and (b)	Not provided in ROD/Final RAP	If excavated material has been characterized as hazardous waste and is to be stored in containers, this regulation would be applicable. It is not applicable to material that has been characterized as nonhazardous waste or to dewatered material that is managed in staging piles.
On-site generation of waste	Keep incompatible materials separate. Separate noncompatible materials stored near each other by a dike or other barrier.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.177	Not provided in ROD/Final RAP	If excavated material has been characterized as hazardous waste and is to be stored in containers, this regulation would be applicable. It is not applicable to material that has been characterized as nonhazardous waste or to dewatered material that is managed in staging piles.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
On-site generation of waste	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.178	Not provided in ROD/Final RAP	If excavated material has been characterized as hazardous waste and is to be stored in containers, this regulation would be applicable. It is not applicable to material that has been characterized as nonhazardous waste or to dewatered material that is managed in staging piles.
On-site generation of waste	Alternative requirements that are protective of human health or the environment may replace design, operating, or closure standards for temporary tanks and container storage areas.	RCRA hazardous waste, noncontainerized accumulation of solid, nonflammable hazardous waste that is used for treatment or storage	Cal. Code Regs. tit. 22, § 66264.553 (b), (d), (e), and (f)	Not provided in ROD/Final RAP	Substantive requirements are applicable if waste is stored on-site in containers. Not an ARAR for staging piles.
On-site generation of waste	Allows generators to accumulate solid remediation waste in a U.S. EPA–designated pile for storage only, up to 2 years, during remedial operations without triggering LDRs.	Hazardous remediation waste temporarily stored in piles	40 C.F.R. § 264.554(d)(1) (i–ii) and (d)(2), (e), (f), (h), (i), (j), and (k)	Not provided in ROD/Final RAP	Substantive provisions are applicable for dredged sediment storage. May be relevant and appropriate if dredged sediment is not hazardous but is similar to hazardous waste.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
On-site generation of waste	Minimize the need for further maintenance controls and minimize or eliminate, to the extent necessary to protect human health and the environment, postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to groundwater or surface water to the atmosphere.	Staging pile closure	Cal. Code Regs. tit. 22, § 66264.111	Not provided in ROD/Final RAP	Substantive provisions are applicable for dredged sediment storage in staging piles. May be relevant and appropriate if dredged sediment is not hazardous but is similar to hazardous waste.
On-site generation of waste	Remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste.	Staging pile closure	Cal. Code Regs. tit. 22, § 66264.258(a)	Not provided in ROD/Final RAP	Substantive provisions are applicable for dredged sediment storage in staging piles. May be relevant and appropriate if dredged sediment is not hazardous but is similar to hazardous waste.
On-site generation of waste	Guidelines for specification of disposal sites for dredged material. The discharge must represent the least damaging, practicable alternative. The discharge of dredged material must not result in significant degradation of the aquatic ecosystem. All practicable means must be utilized to minimize adverse environmental impacts.	Discharge of dredged or fill material to waters of the United States	40 C.F.R. § 230.10(a), (c), and (d)	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
On-site generation of waste	Factual determinations.	Discharge of dredged or fill material to waters of the United States	40 C.F.R. § 230.11	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging. Not an ARAR during dredging.
On-site generation of waste	Potential impacts on physical and chemical characteristics of the aquatic ecosystem that should be considered for factual determinations and when determining whether the discharge is allowed.	Discharge of dredged or fill material to waters of the United States	40 C.F.R. § 230.20–230.25	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging.
On-site generation of waste	Potential impacts on biological characteristics of the aquatic ecosystem should be considered for factual determinations and when determining whether the discharge is allowed.	Discharge of dredged or fill material to waters of the United States	40 C.F.R. § 230.31–230.32	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging.
On-site generation of waste	Potential effects on human use characteristics should be considered for factual determinations and when determining whether the discharge is allowed.	Discharge of dredged or fill material to waters of the United States	40 C.F.R. § 230.53	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging.
On-site generation of waste	General policies for evaluating permit applications.	Discharge of dredged or fill material to waters of the United States	33 C.F.R. § 320.4	Not provided in ROD/Final RAP	Substantive provisions are applicable for backfilling after dredging.

TABLE 3-3

FEDERAL ACTION-SPECIFIC[a] ARARs

Source: DON 2012

Notes:

[a] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Cal. Code Regs. – *California Code of Regulations*
C.F.R. – *Code of Federal Regulations*
DON – Department of the Navy
EPA – U.S. Environmental Protection Agency
LDR – land disposal restriction
RAP – Remedial Action Plan
RCRA – Resource Conservation and Recovery Act
ROD – Record of Decision
tit. – title
U.S.C. – *United States Code*

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TABLE 3-4

STATE CHEMICAL-SPECIFIC[a] ARARs

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
Department of Toxic Substances Control [b]				
Definition of non-RCRA, state regulated hazardous waste.	Waste	Cal. Code Regs. tit. 22, §§ 66261.3(a)(2)(C) or 66261.3(a)(2)(F), 66261.22(a)(3) and (a)(4), 66261.24(a)(2)–(a)(8), 66261.101	Applicable	These regulations are applicable to activities that generate waste to determine if the waste in non-RCRA, state-regulated hazardous waste. The Navy accepts the substantive provisions of these requirements as state ARARs and will determine if the excavated sediment meets the definition of non-RCRA, state-regulated hazardous waste when it is generated.
State Water Resources Control Board				
Definition of designated waste and nonhazardous waste	Waste	Cal. Code Regs. tit. 27, §§ 20210 & 20220	Applicable	These regulations are applicable to activities that generate waste to determine if the waste is a regulated waste. The Navy accepts the substantive provisions of these requirements as state ARARs and will determine if the excavated sediment meets these definitions when it is generated.

Source: DON 2012

Notes:

[a] Many action-specific ARARs containing chemical-specific limitations are addressed in the action-specific ARAR tables.

[b] Only the substantive provisions of the requirements cited in this table are ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Cal. Code Regs. – *California Code of Regulations*
DON – Department of the Navy
RCRA – Resource Conservation and Recovery Act
tit. – title

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TABLE 3-5

STATE LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comment
McAteer-Petris Act (Cal. Gov't. Code §§ 66600–66661) [b]					
Within the San Francisco Bay (Bay) coastal zone	Reduce fill and disposal of dredged material in the Bay, maintain marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the Bay.	Activities affecting San Francisco Bay and 100 feet of the shoreline.	San Francisco Bay Plan at Cal. Code Regs. tit. 14, §§ 10110–11990	Relevant and appropriate	The Navy has determined that the substantive provisions of the CZMA are relevant and appropriate federal location-specific requirements for IR Site 27. The CZMA requires federal agency activity be conducted in a manner consistent with approved state management programs to the maximum extent practicable. The McAteer-Petris Act is enabling legislation for the San Francisco Bay Plan, an approved state management program for the Bay. Substantive provisions of the McAteer-Petris Act and the San Francisco Bay Plan are relevant and appropriate because their authority is derived from the CZMA, a relevant and appropriate federal requirement. The Navy will conduct its remedial actions in accordance with the substantive provisions of the San Francisco Bay Plan.
California Fish and Game Code [b]					
Area used by endangered or threated species	No person shall take any endangered or threatened species	Threatened or endangered species are presents.	Cal Fish & Game Code § 2080	Relevant and appropriate	Substantive provisions of this requirement are relevant and appropriate. The California least tern and the Chinook salmon are state listed endangered species that may be present at the site.

TABLE 3-5

STATE LOCATION-SPECIFIC[a] ARARs

Location	Requirement	Prerequisite	Citation[a]	ARAR Determination	Comment
Fully protected bird species/habitat	Prohibits the take or possession of listed fully protected birds	Taking of protected birds	Cal. Fish & Game Code § 3511	Relevant and appropriate	Substantive provisions of this requirement are relevant and appropriate. The California least tern and the California brown pelican are fully protected birds that may be present at the site.
Aquatic Habitat	Action must be taken if toxic materials are placed where they can enter the waters of the state.	Materials entering the waters of the state	Cal. Fish & Game Code § 5650(a) & (b)	Relevant and appropriate	*California Fish and Game Code* § 5650 is not applicable because the United States of America has not waived sovereign immunity for this State of California requirement. However, the Navy has identified the substantive provisions of these requirements as relevant and appropriate because the remedial action will take place in the waters of the state.

Source: DON 2012

Notes:

[a] Only the substantive provisions of the requirements cited in this table are ARARs.

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Bay – San Francisco Bay
Cal. Code Regs. – *California Code of Regulations*
Cal. Fish & Game Code – *California Fish and Game Code*
Cal. Gov't Code – *California Government Code*
CZMA – Coastal Zone Management Act
DON – Department of the Navy
IR – Installation Restoration
tit. – title

TABLE 3-6

STATE ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
State Water Resources Control Board					
Excavation and off-site disposal of sediment	Dischargers shall be responsible for accurate characterization of wastes.	Waste.	Cal. Code Regs. tit. 27 § 20200(c)	Applicable	Applicable to operations that generate waste. The Navy will generate waste during excavation. The Navy will accurately characterize waste at the time it is generated.
Off-site disposal of sediment	Requires that designated waste as defined at Cal. Water Code § 13173 be discharged to Class I or Class II waste management units.	Discharge of designated waste after July 18, 1997 (nonhazardous waste that could cause degradation of surface or ground waters), to land for treatment, storage, or disposal.	Cal. Code Regs. tit. 27 § 20210	Applicable	Applicable to operations that generate waste. The Navy will generate waste during excavation. The Navy will accurately characterize waste at the time it is generated.
Off-site disposal of sediment	Requires that nonhazardous solid waste as defined at § 20220(a) be discharged to a classified waste management unit.	Discharge of nonhazardous solid waste after July 18, 1997, to land for treatment, storage, or disposal	Cal. Code Regs. tit. 27 § 20220(b), (c), and (d)	Applicable	Applicable to operations that generate waste. The Navy will generate waste during excavation. The Navy will accurately characterize waste at the time it is generated.
Institutional Controls					
California Civil Code [a]					
Land Use Controls	Provides conditions under which land use restrictions will apply to successive owners of land.	Transfer of property to a non-federal agency.	Cal. Civil Code § 1471	Relevant and appropriate	The Navy will implement land use controls for sediment. This section is an ARAR because IR Site 27 is federal property that may be transferred to a non-federal agency.

TABLE 3-6

STATE ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Land Use Controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer of property to a non-federal agency	Cal. Health & Safety Code § 25202.5	Relevant and appropriate	This section is an ARAR because IR Site 27 is federal land that may be transferred to a non-federal agency. The substantive provisions of Cal. Health & Safety Code § 25202.5 are the general narrative standards to restrict "present and future uses of all or part of the land on which the…facility…is located…"
Land Use Controls	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health & Safety Code § 25232(b)(1)(A)-(E).	Transfer of property to a non-federal agency.	Cal. Health & Safety Code § 25355.5(a)(1)(C)	Relevant and appropriate	This section is an ARAR because IR Site 27 is federal land that may be transferred to a non-federal agency. Generally, Cal. Health & Safety Code §§ 25222.1 and 25355.5(a)(1)(C) provide the authority for DTSC to enter into voluntary agreements with land owners to restrict the use of property. The agreements run with the land, restricting present and future uses of the land. The substantive requirements of the following Cal. Health & Safety Code § 25222.1 provisions are "relevant and appropriate": (1) the general narrative standard: "restricting specified uses of the property…" and (2) "…the agreement is irrevocable, and shall be recorded by the owner,…and hazardous waste easement, covenant, restriction or servitude, or

TABLE 3-6

STATE ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
					any combination thereof, as appropriate, upon the present and future uses of the land." The substantive requirement of the following Cal. Health & Safety Code § 25355.5(a)(1)(C) provisions are "relevant and appropriate". "…execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land."
Land Use Controls	Provides processes and criteria for obtaining written variances from a land use restriction and for removing a land use restriction	Transfer of property to a non-federal entity	Cal. Health & Safety Code § 25233(c) and 25234	Relevant and appropriate	Cal. Health & Safety Code § 25233(c) sets forth substantive criteria for granting variances based on specified environmental and health criteria. Cal. Health & Safety Code § 25234 sets forth the substantive criteria for the removal of a land use restriction on the grounds the "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety."
California Environmental Protection Agency, Department of Toxic Substances Control [a]					
Land Use Controls	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when facility closure, corrective action,	Transfer of property to a non-federal entity.	Cal. Code Regs. tit.22 § 67391.1	Relevant and appropriate	The substantive provisions of this regulation are relevant and appropriate state requirements because IR Site 27 is federal land that may be transferred to a non-federal agency. This section

TABLE 3-6

STATE ACTION-SPECIFIC[a] ARARs

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
	remedial or removal action, or other response actions are undertaken; and hazardous materials, hazardous wastes, or constituents, or hazardous substances will remain at the property at levels that are not suitable for unrestricted use of the land.				provides for a land use covenant to be executed and recorded when remedial actions are taken and hazardous substances will remain at the property at concentrations that are unsuitable for unrestricted use of the land.

Source: DON 2012

Notes:

[a] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.

Abbreviations and Acronyms:

§ – section
ARAR – applicable or relevant and appropriate requirement
Cal. Civil Code – *California Civil Code*
Cal. Code Regs. – *California Code of Regulations*
Cal. Health & Safety Code – *California Health and Safety Code*
Cal Water Code – *California Water Code*
DTSC – Department of Toxic Substances Control
DON – Department of the Navy
IR – Installation Restoration
tit. – title

TABLE 6-1

FILTER LAYER GRADING SPECIFICATIONS

Sieve Sizes	Percentage Passing
1 inch	100
1/4 inch	85–100
No. 14	40–85
No. 30	15–40
No. 200	0–15

TABLE 6-2

PROTECTIVE ARMOR LAYER GRADING SPECIFICATIONS

Sieve Sizes	Percentage Passing
4 inch	100
3 inch	91–100
2 inch	25–40
1 inch	0–10

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TABLE 7-1

PRELIMINARY REQUIREMENTS FOR THE TURBIDITY CURTAIN

Property	Requirement
Thickness	45 millimeters
Weight	Type II Fabric, 18 ounces per square yard
Grab tensile strength	300 pounds
Ultraviolet light inhibitor	Must be included
Barriers	Bright yellow or “international” orange
Flotation devices	Buoyancy shall be sufficient to support the weight of the curtain and maintain at least 3-inch freeboard
Load lines	Fabricated into the bottom and top of the fabric
Bottom anchors	Weighted mushroom type located outside of dredge area attached to floating anchor buoy
Length	Curtain length will take into account tidal action
Warning indicators	Anchor buoys shall extend 2 feet from the water surface with automatic flashing lights 100 feet on center

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TABLE 7-2

TURBIDITY MONITORING CRITERIA

Parameter	Criteria	Compliance Point
Turbidity	50 NTU above background	500 feet from active dredging and backfill operations Entrance to San Francisco Bay 3 feet below surface

Abbreviations and Acronyms:
NTU – nephelometric turbidity unit

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TABLE 7-3

WATER MONITORING REGIME

Sampling Location	Sampling Frequency	Action Level	Action
Near-field sampling point	Two times per day	Single result greater than 30 NTU above background	Implement operational controls Increase sampling frequency to four times per day Sample far-field sampling point at a frequency of three times per day
	Four times per day	Four consecutive results greater than 30 NTU above background	Implement secondary silt curtain Stop work if turbidity exceeds 75 NTUs
Far-field sampling point	Two times per day in the afternoon	Greater than 50 NTU above background	Stop work. Work will not resume until turbidity levels are below 50 NTU at the far-field sampling point and below 30 NTU at the near-field sampling point
	Three times per day	Greater than 50 NTU above background	Stop work immediately. Work will not resume until turbidity levels are below 50 NTU at the far-field sampling point and below 30 NTU at the near-field sampling point

Abbreviations and Acronyms:
NTU – nephelometric turbidity unit

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FIGURES

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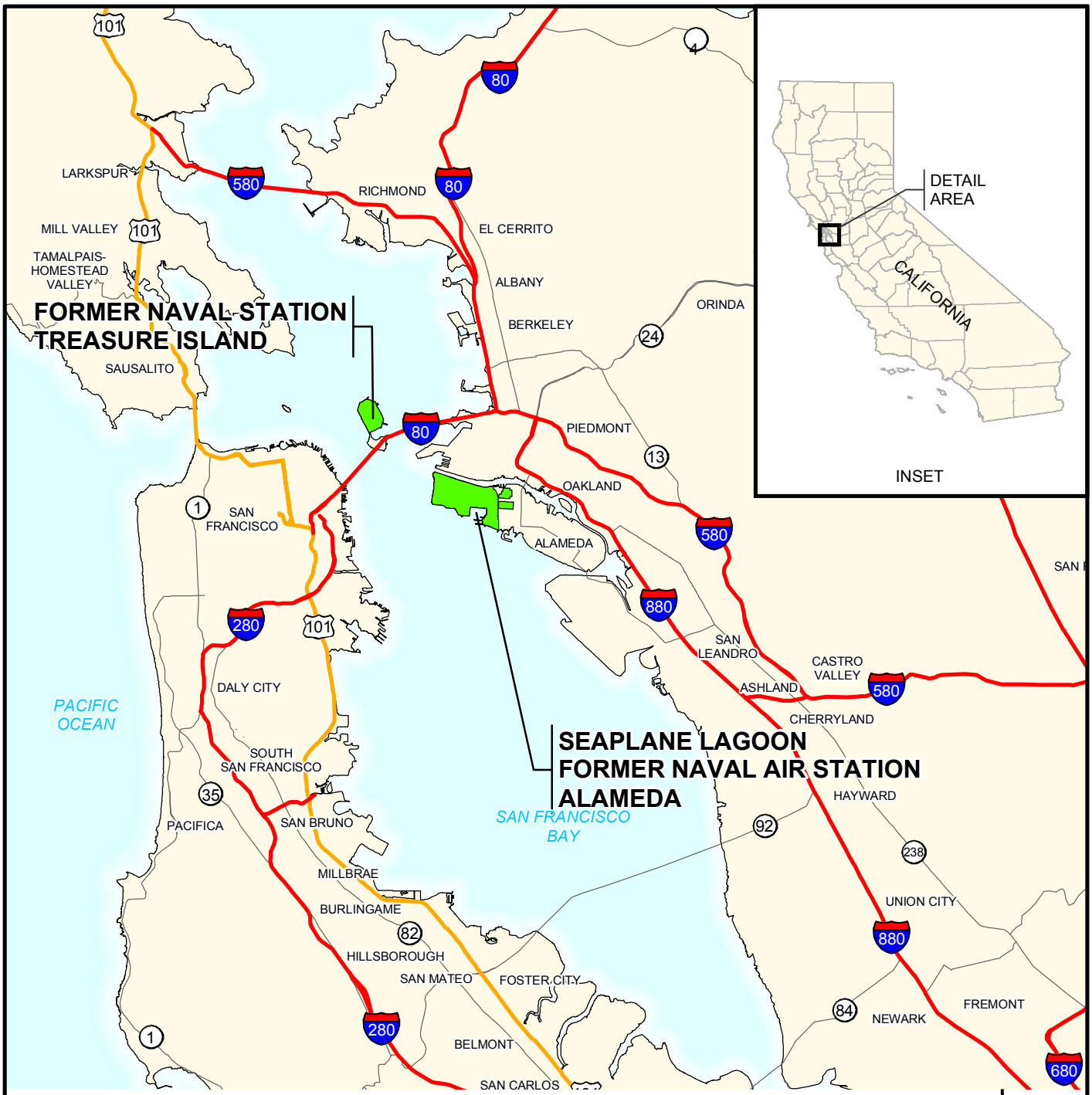


LEGEND

- STATE HIGHWAY
- US HIGHWAY
- INTERSTATE HIGHWAY
- WATER

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

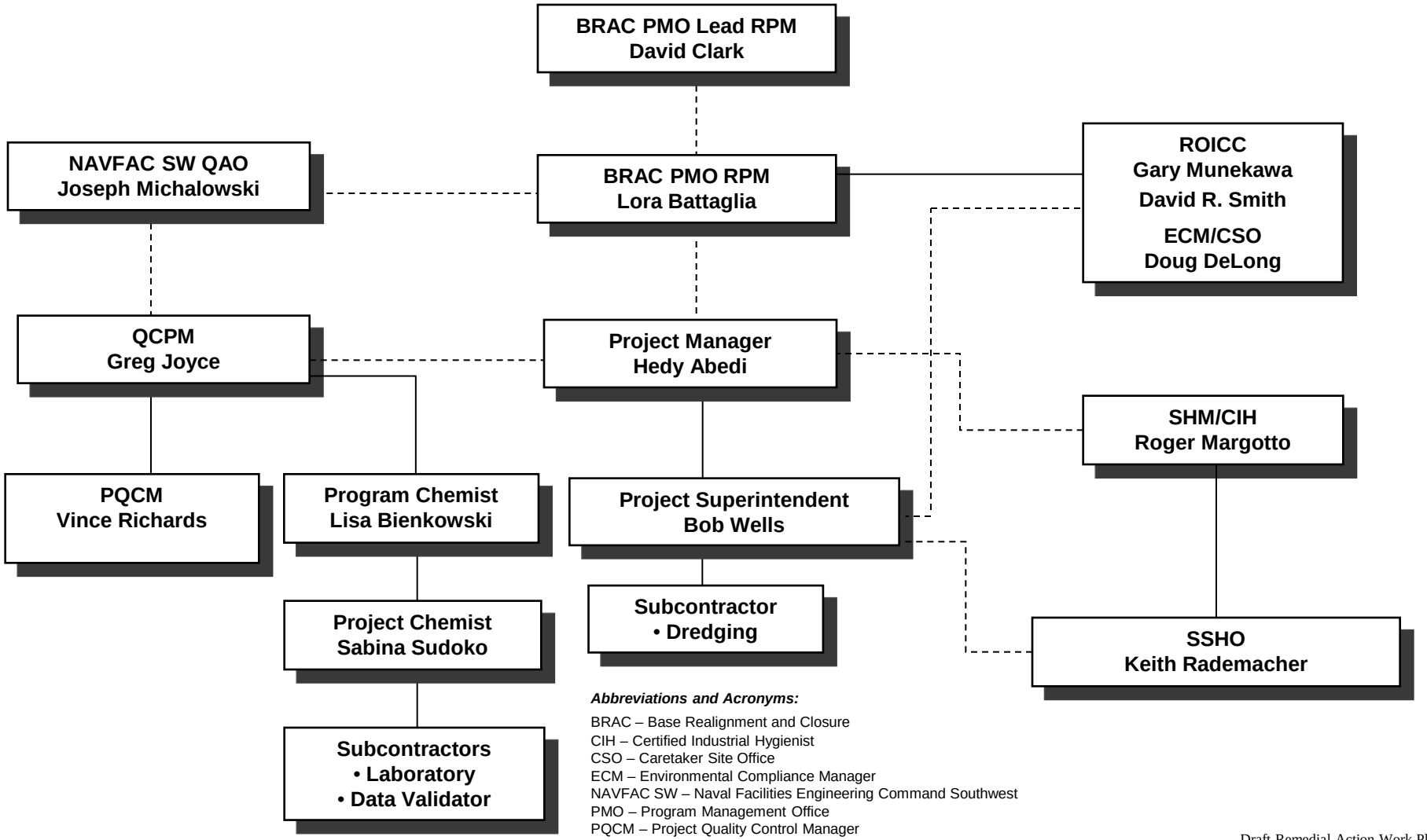
FIGURE 1-1
REGIONAL LOCATION MAP
FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: MS
FILE NUMBER: R7707.mxd

TETRA TECH EC, INC.

File Path (IRVSRVR): P:\GIS\Projects\SanDiego\TreasureIsland\IRSite27\ArcGIS\R7707.mxd

Figure 1-2
Project Organization Chart



Abbreviations and Acronyms:

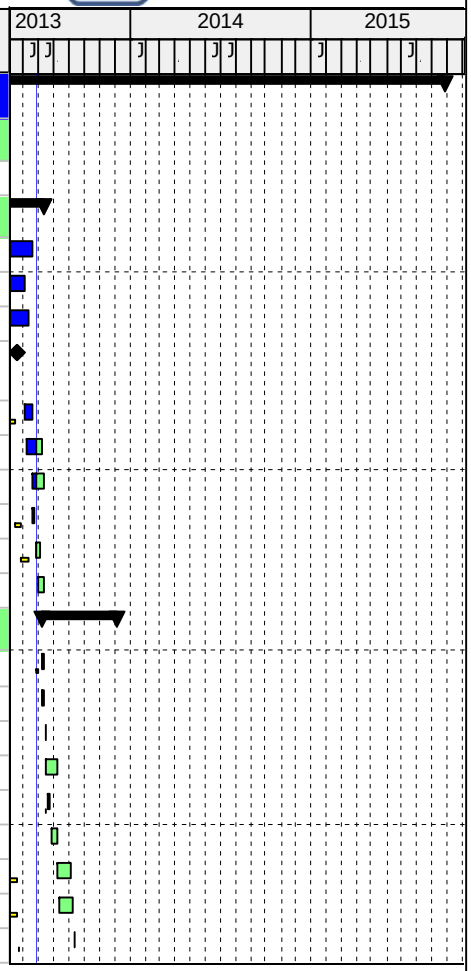
BRAC – Base Realignment and Closure
CIH – Certified Industrial Hygienist
CSO – Caretaker Site Office
ECM – Environmental Compliance Manager
NAVFAC SW – Naval Facilities Engineering Command Southwest
PMO – Program Management Office
PQCM – Project Quality Control Manager
QAO – Quality Assurance Officer
QCPM – Quality Control Program Manager
ROICC – Resident Officer in Charge of Construction
RPM – Remedial Project Manager
SHM – Safety and Health Manager
SSHO – Site Safety and Health Officer

Legend
- - - - - - = In regular contact and coordination
——— = Directly reports to above

Contract No. N62473-12-D-2006
106-45490003

TETRA TECH EC, INC.

Activity ID	Activity Name	At Completion Duration	Start	Finish
CTO 3 - Treasure Island IR Site 27 RA		761	27-Sep-12 A	25-Sep-15
CTO Award		0	27-Sep-12 A	27-Sep-12 A
A1000	CTO Award	0	27-Sep-12 A	
Project Plans		85	14-Mar-13 A	12-Jul-13
A1170	Navy Review of Int Draft Fact Sheet	68	14-Mar-13 A	18-Jun-13 A
A1080	Agency Review Draft RAWP (Primary Doc)	40	08-Apr-13 A	03-Jun-13 A
A1140	Navy Review Int Draft SSHP	42	11-Apr-13 A	10-Jun-13 A
A1040	Remedial Design Completion Date (to be Completed by Another Contractor)	0	22-May-13 A	
A1390	Prepare Preliminary RTCs (Draft RAWP)	14	03-Jun-13 A	20-Jun-13 A
A1150	Final SSHP	20	10-Jun-13 A	08-Jul-13
A1180	Final Fact Sheet	18	18-Jun-13 A	12-Jul-13
A1400	Prepare Internal Final RAWP	3	21-Jun-13 A	25-Jun-13 A
A1410	Navy Review Internal Final RAWP	6	26-Jun-13 A	03-Jul-13
A1090	Final RAWP	7	03-Jul-13	12-Jul-13
Remedial Action		104	09-Jul-13	04-Dec-13
A1185	Mobilization	4	09-Jul-13	12-Jul-13
A1190	Waste Characterization Core Sampling	4	09-Jul-13	12-Jul-13
A1210	Pre-Dredge Confirmation Sampling (17 Cores)	4	15-Jul-13	18-Jul-13
A1200	Waste Characterization Core Sampling Radiological Analysis	19	15-Jul-13	08-Aug-13
A1205	Pre-dredge Bathymetry	3	19-Jul-13	23-Jul-13
A1220	Installation of Turbidity Curtain and Turbidity Monitoring Stations	8	30-Jul-13	08-Aug-13
A1240	Focused Dredge	19	08-Aug-13	04-Sep-13
A1250	Dredge Material Transportation to Alameda Pt	20	13-Aug-13	10-Sep-13
A1260	Post-Dredge Bathymetry	2	11-Sep-13	12-Sep-13



Project Baseline Bar
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Figure 1-3

Project Schedule
UREMAC CTO 3

Treasure Island IR Site 27 RA
Former Naval Station Treasure Island
San Francisco, CA

Data Date: 28-Jun-13

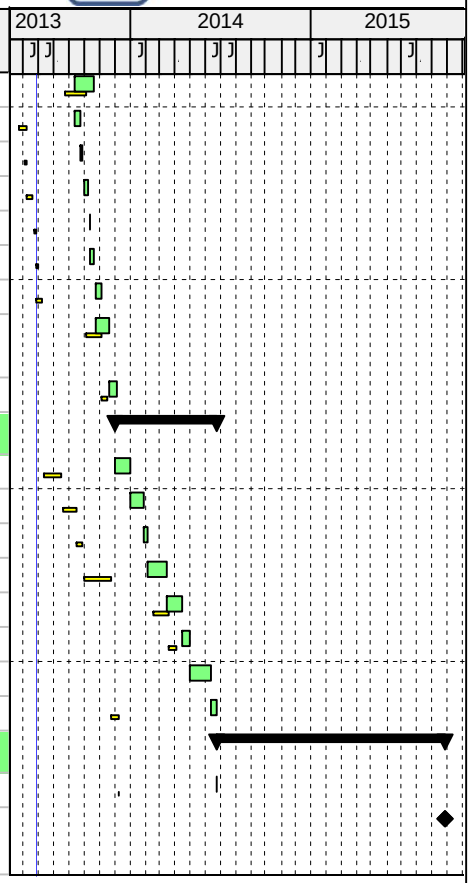
Layout: 45490003_1
TASK filter: 45490003 MPR

28-Jun-13 11:13

Contract No. N62473-12-D-2006
106-45490003

TETRA TECH EC, INC.

Activity ID	Activity Name	At Completion Duration	Start	Finish
A1420	Sediment Dewatering & Analysis (Pending weather)	30	11-Sep-13	22-Oct-13
A1270	Placement of Filter Layer	9	12-Sep-13	24-Sep-13
A1280	Post-Filter Layer Bathymetry	4	24-Sep-13	27-Sep-13
A1290	Placement of Rock Armor	10	30-Sep-13	11-Oct-13
A1300	Post-Rock Armor Placement Bathymetry	1	14-Oct-13	14-Oct-13
A1310	Post-Dredge Confirmation Sampling (if needed)	6	15-Oct-13	22-Oct-13
A1320	Demobilization from Treasure Island	9	23-Oct-13	04-Nov-13
A1430	Transfer of Sediment to Sites 1 or 2 or an Off-site Disposal Facility	18	25-Oct-13	19-Nov-13
A1440	Demobilization from Alameda	10	19-Nov-13	04-Dec-13
Remedial Action Completion Report (RACR)		144	04-Dec-13	26-Jun-14
A1330	Prepare Internal Draft RACR	20	04-Dec-13	02-Jan-14
A1340	Navy Review of Internal Draft RACR	20	02-Jan-14	29-Jan-14
A1350	Prepare Draft RACR	5	29-Jan-14	04-Feb-14
A1360	Agency Review of Draft RACR	30	04-Feb-14	17-Mar-14
A1450	Prepare Internal Final RACR	24	17-Mar-14	17-Apr-14
A1460	Navy Review Internal Final RACR	11	17-Apr-14	01-May-14
A1470	Agency Review of Internal Final RACR	30	01-May-14	12-Jun-14
A1370	Prepare Final RACR	11	12-Jun-14	26-Jun-14
Project Completion		318	26-Jun-14	25-Sep-15
A1380	Forecasted Completion Date	1	26-Jun-14	26-Jun-14
A1010	CTO Completion Date per Award (contractual completion date is actually a Sunday, 9/27/15)	0		25-Sep-15



Project Baseline Bar
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Figure 1-3

Project Schedule
UREMAC CTO 3

Treasure Island IR Site 27 RA
Former Naval Station Treasure Island
San Francisco, CA

Data Date: 28-Jun-13

Layout: 45490003_1
TASK filter: 45490003 MPR

28-Jun-13 11:13
2 of 2

700 0 700 1,400 Feet

N

Legend

- IR SITE 27, CLIPPER COVE SKEET RANGE
- BUILDINGS
- SHORELINE
- ROADS

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 2-1

IR SITE 27 LOCATION MAP
FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: MS
FILE NUMBER: R7708.mxd

TETRA TECH EC, INC.

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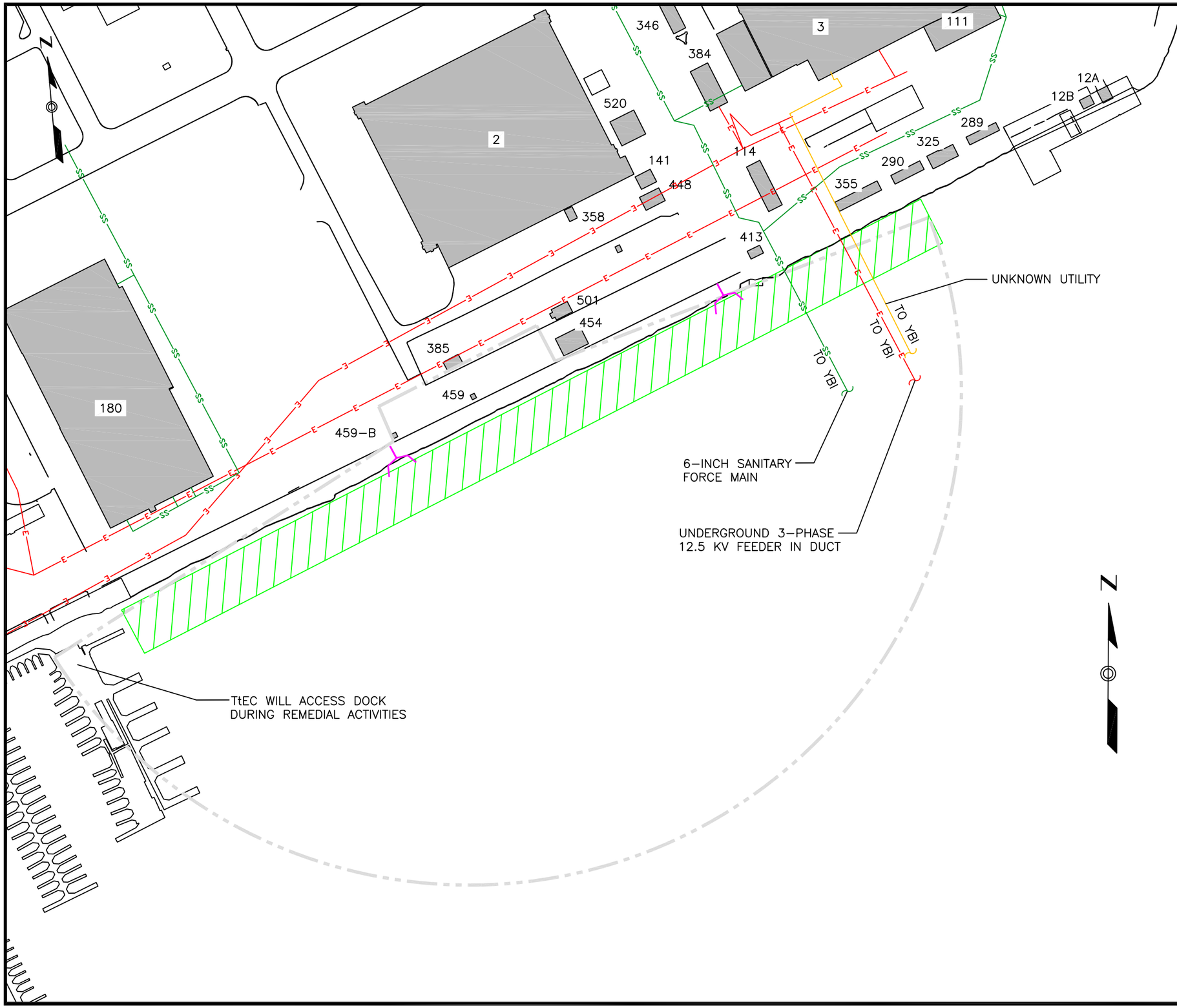
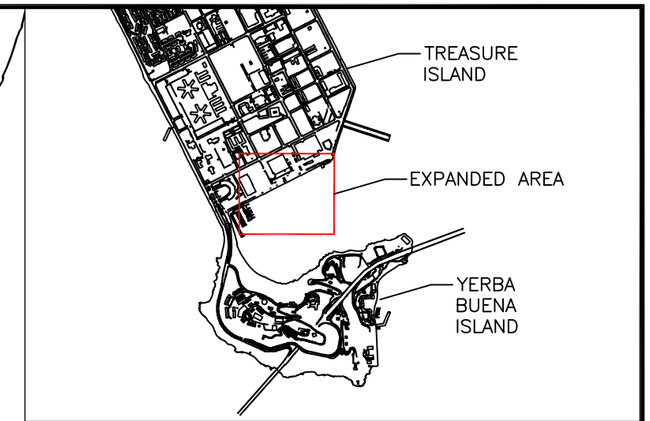




LOCATION MAP

LEGEND

- IR SITE 27 BOUNDARY
- BUILDINGS
- DREDGE AREA
- ELECTRICAL UTILITY
- SANITARY SEWER UTILITY
- UNKNOWN UTILITY
- STORM SYSTEM OUTFALL

ABBREVIATIONS:

IR = INSTALLATION RESTORATION
KV = KILOVOLT
TtEC = TETRA TECH EC INC.
YBI = YERBA BUENA ISLAND

75 0 75 150
(FEET)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

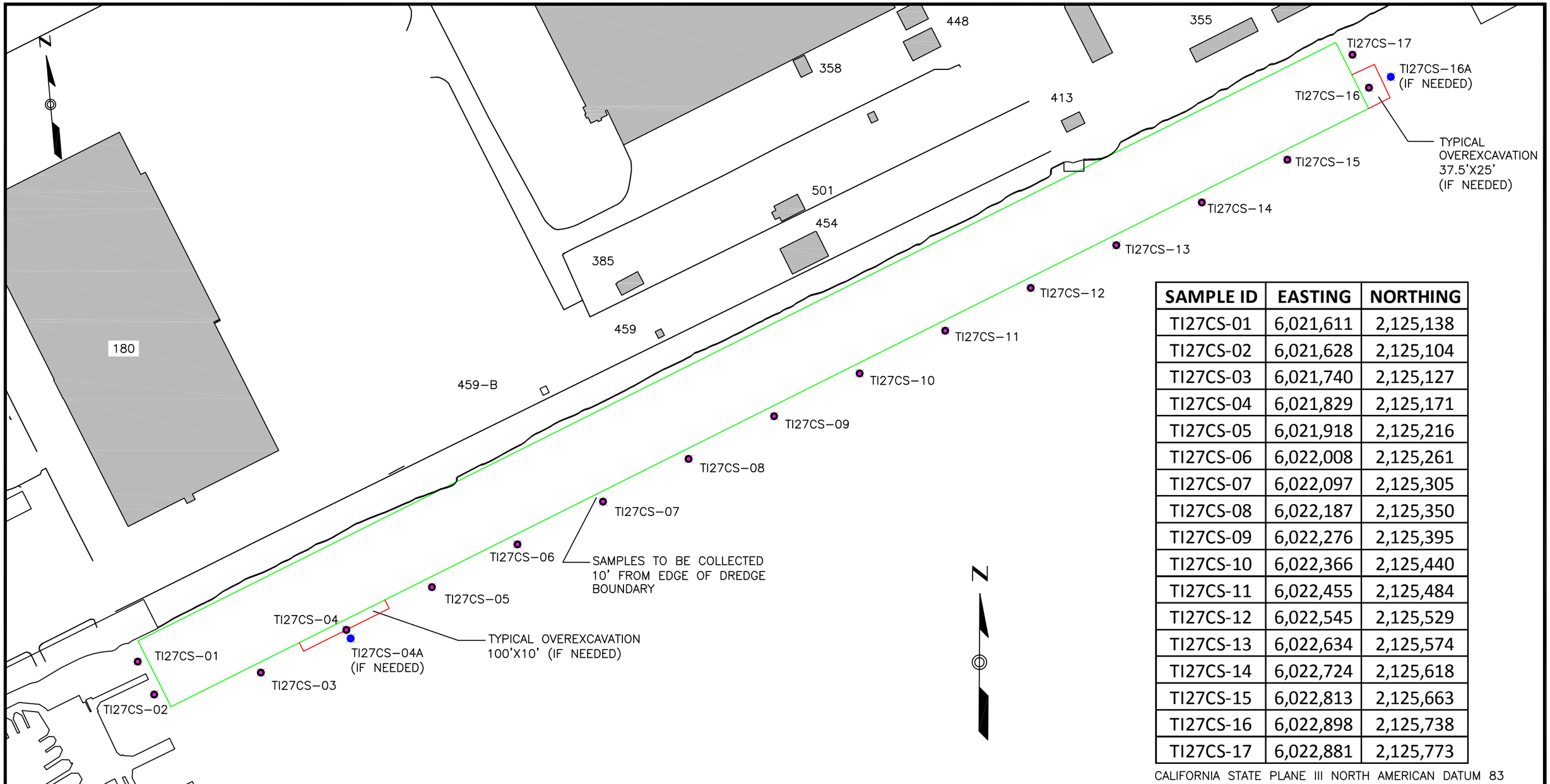
REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 2-2
IR SITE 27 UTILITY LOCATIONS

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: APRIL 5, 2013
FILE NUMBER: FIGURE 2–2

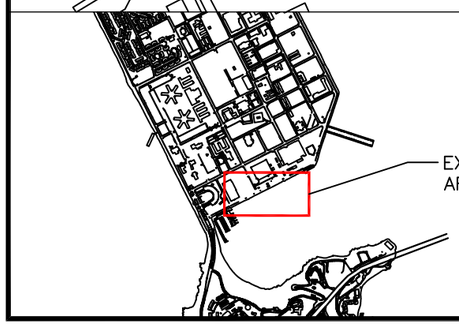
TETRA TECH EC, INC.



SAMPLE ID	EASTING	NORTHING
TI27CS-01	6,021,611	2,125,138
TI27CS-02	6,021,628	2,125,104
TI27CS-03	6,021,740	2,125,127
TI27CS-04	6,021,829	2,125,171
TI27CS-05	6,021,918	2,125,216
TI27CS-06	6,022,008	2,125,261
TI27CS-07	6,022,097	2,125,305
TI27CS-08	6,022,187	2,125,350
TI27CS-09	6,022,276	2,125,395
TI27CS-10	6,022,366	2,125,440
TI27CS-11	6,022,455	2,125,484
TI27CS-12	6,022,545	2,125,529
TI27CS-13	6,022,634	2,125,574
TI27CS-14	6,022,724	2,125,618
TI27CS-15	6,022,813	2,125,663
TI27CS-16	6,022,898	2,125,738
TI27CS-17	6,022,881	2,125,773

CALIFORNIA STATE PLANE III NORTH AMERICAN DATUM 83

LOCATION MAP



LEGEND

- CORE SAMPLE LOCATION
- CORE SAMPLE LOCATION IF STEP-OUT IS NECESSARY
- DREDGE BOUNDARY
- EXTENDED DREDGE BOUNDARY
- BUILDINGS

50 0 50 100
(FEET)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

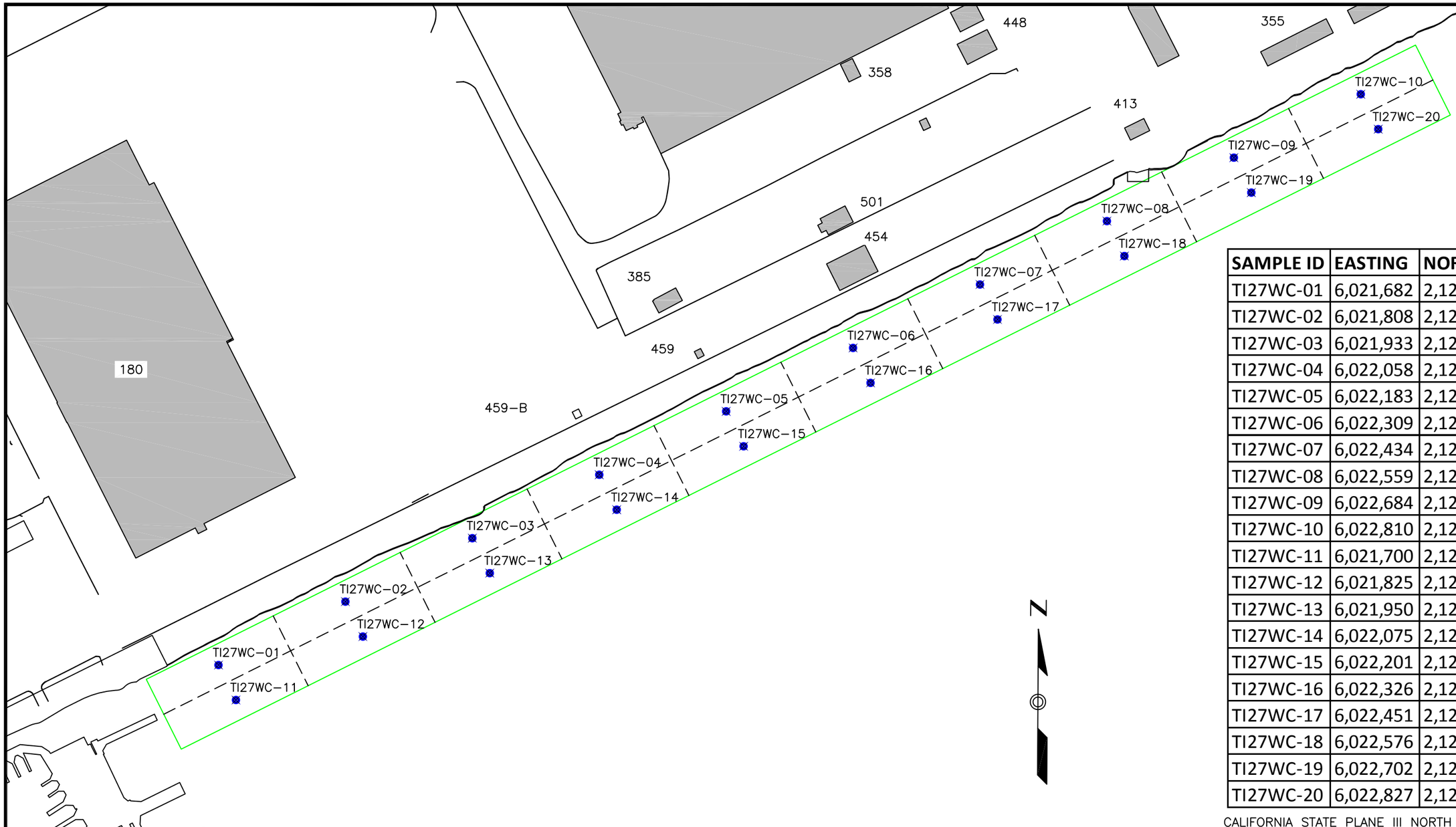
REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 5-1
PREDREDGE CONFIRMATION CORE SAMPLE LOCATIONS

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: JANUARY 29, 2013
FILE NUMBER: FIGURE 5-1

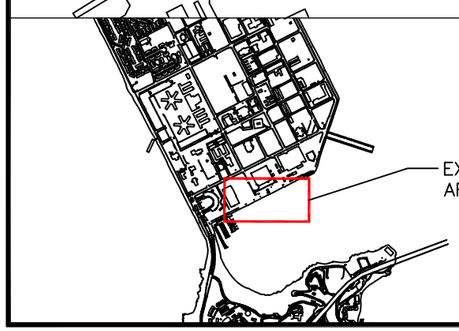
TETRA TECH EC, INC.



SAMPLE ID	EASTING	NORTHING
TI27WC-01	6,021,682	2,125,174
TI27WC-02	6,021,808	2,125,236
TI27WC-03	6,021,933	2,125,299
TI27WC-04	6,022,058	2,125,362
TI27WC-05	6,022,183	2,125,424
TI27WC-06	6,022,309	2,125,424
TI27WC-07	6,022,434	2,125,549
TI27WC-08	6,022,559	2,125,612
TI27WC-09	6,022,684	2,125,675
TI27WC-10	6,022,810	2,125,737
TI27WC-11	6,021,700	2,125,139
TI27WC-12	6,021,825	2,125,202
TI27WC-13	6,021,950	2,125,265
TI27WC-14	6,022,075	2,125,327
TI27WC-15	6,022,201	2,125,390
TI27WC-16	6,022,326	2,125,452
TI27WC-17	6,022,451	2,125,515
TI27WC-18	6,022,576	2,125,578
TI27WC-19	6,022,702	2,125,640
TI27WC-20	6,022,827	2,125,703

CALIFORNIA STATE PLANE III NORTH AMERICAN DATUM 83

LOCATION MAP



LEGEND

- CORE SAMPLE LOCATION
- DREDGE BOUNDARY
- REPRESENTATIVE SAMPLE AREA BOUNDARY
- BUILDINGS

50 0 50 100
(FEET)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

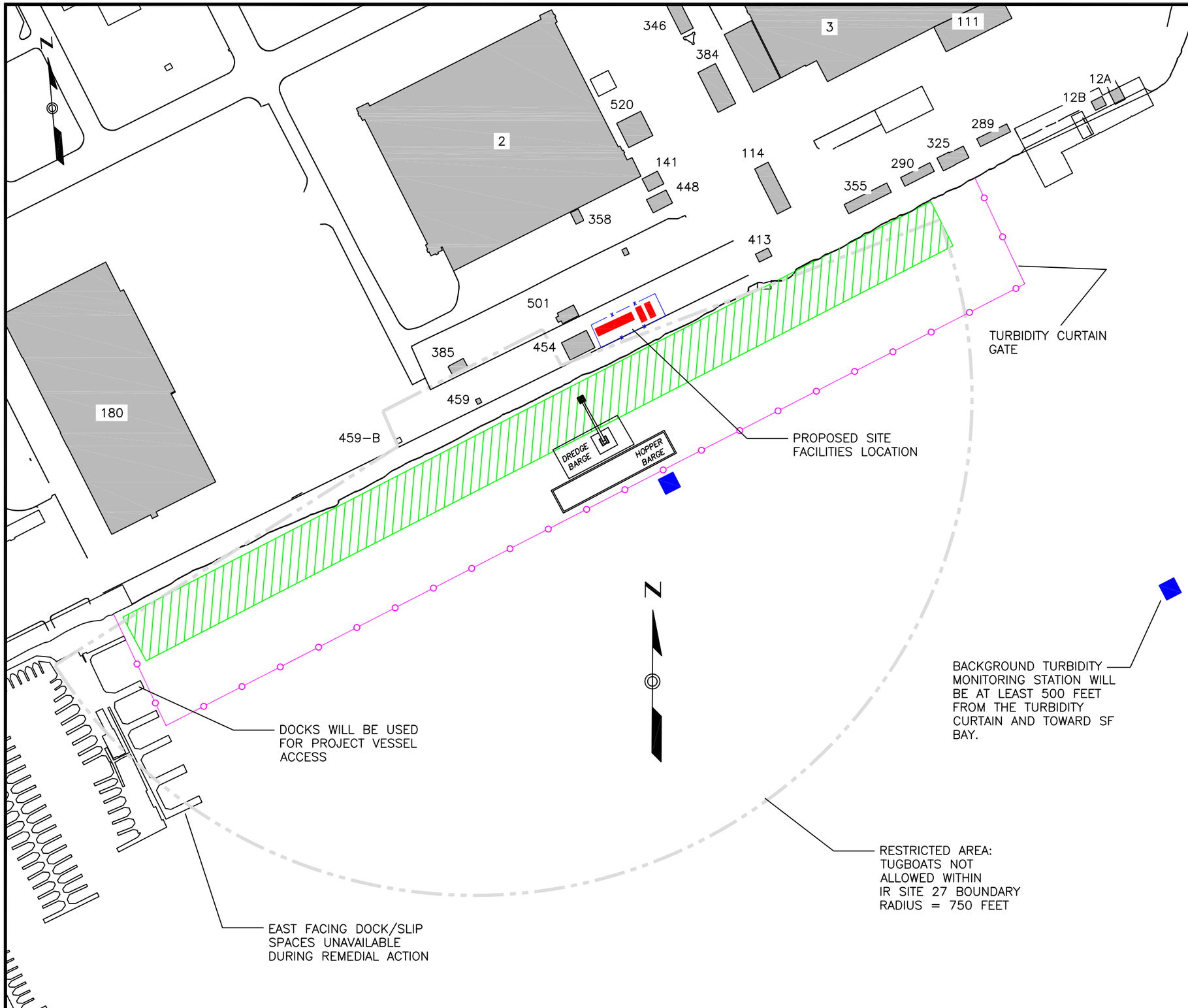
REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

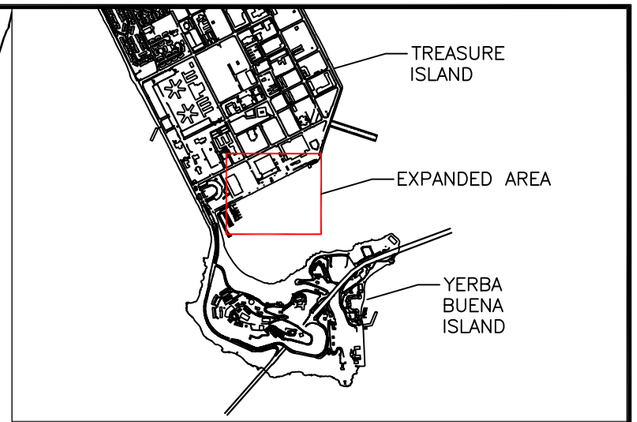
FIGURE 5-2
PREDREDGE WASTE CHARACTERIZATION CORE SAMPLING LOCATIONS

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: JANUARY 29, 2013
FILE NUMBER: FIGURE 5-2

TETRA TECH EC, INC.





LOCATION MAP

LEGEND

- TEMPORARY FENCING
- IR SITE 27 BOUNDARY
- TURBIDITY CURTAIN
- DREDGE AREA
- APPROXIMATE LOCATION OF TURBIDITY MONITORING STATION
- SITE TRAILER AND STORAGE FACILITIES
- BUILDINGS

NOTES:

1. TtEC WILL PROVIDE POWER POLE AND STEP–DOWN TRANSFORMER FOR TRAILER POWER. PG&E WILL PROVIDE POWER AT A NEARBY PG&E TRANSFORMER LOCATION.

ABBREVIATIONS:

IR = INSTALLATION RESTORATION
PG&E = PACIFIC GAS AND ELECTRIC COMPANY
SF = SAN FRANCISCO
TtEC = TETRA TECH EC INC.

75 0 75 150
(FEET)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

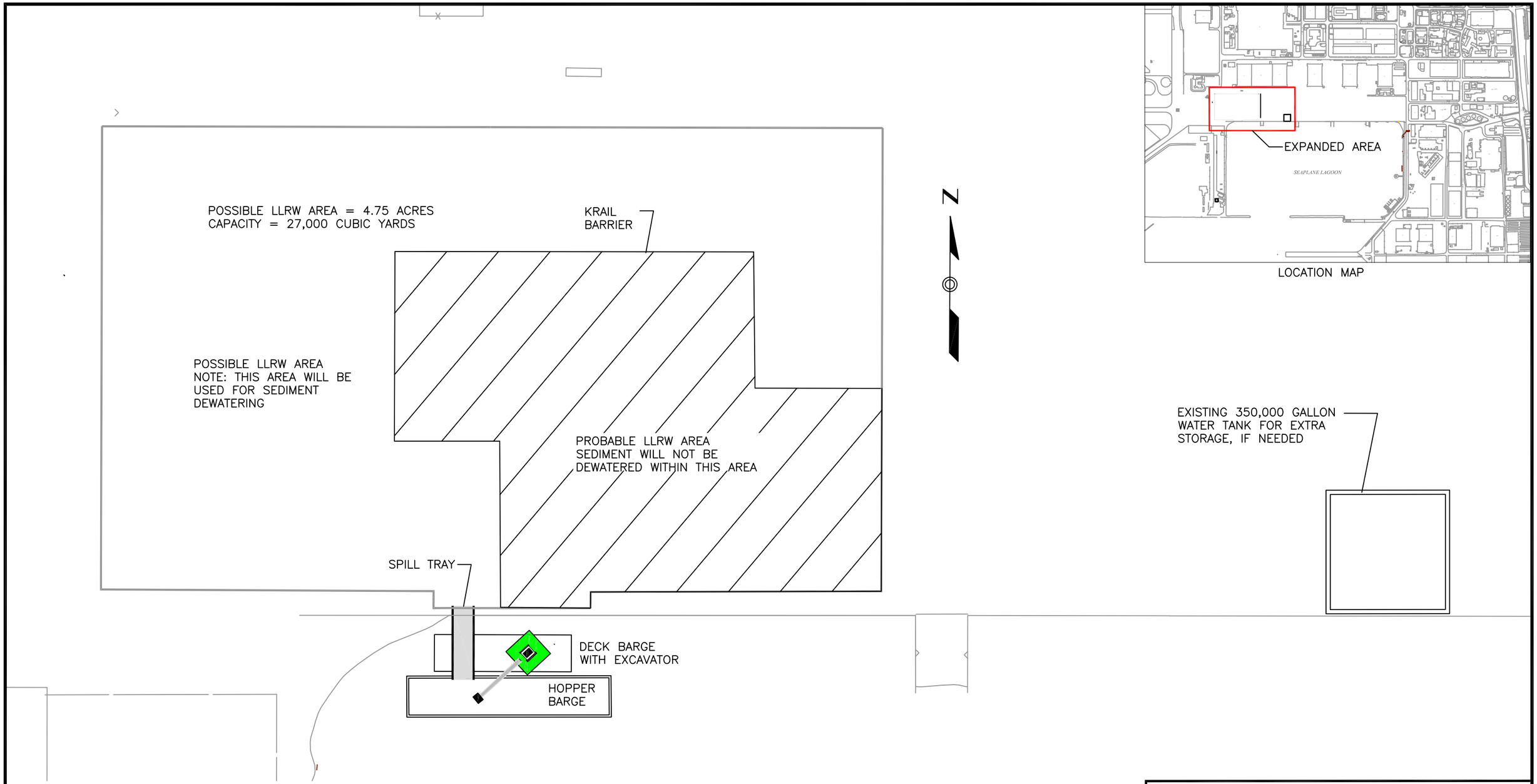
REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 6-1
IR SITE 27 SUPPORT FACILITIES

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: APRIL 3, 2013
FILE NUMBER: FIGURE 6–1

TETRA TECH EC, INC.



ABBREVIATIONS:

LLRW = LOW-LEVEL RADIOACTIVE WASTE

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

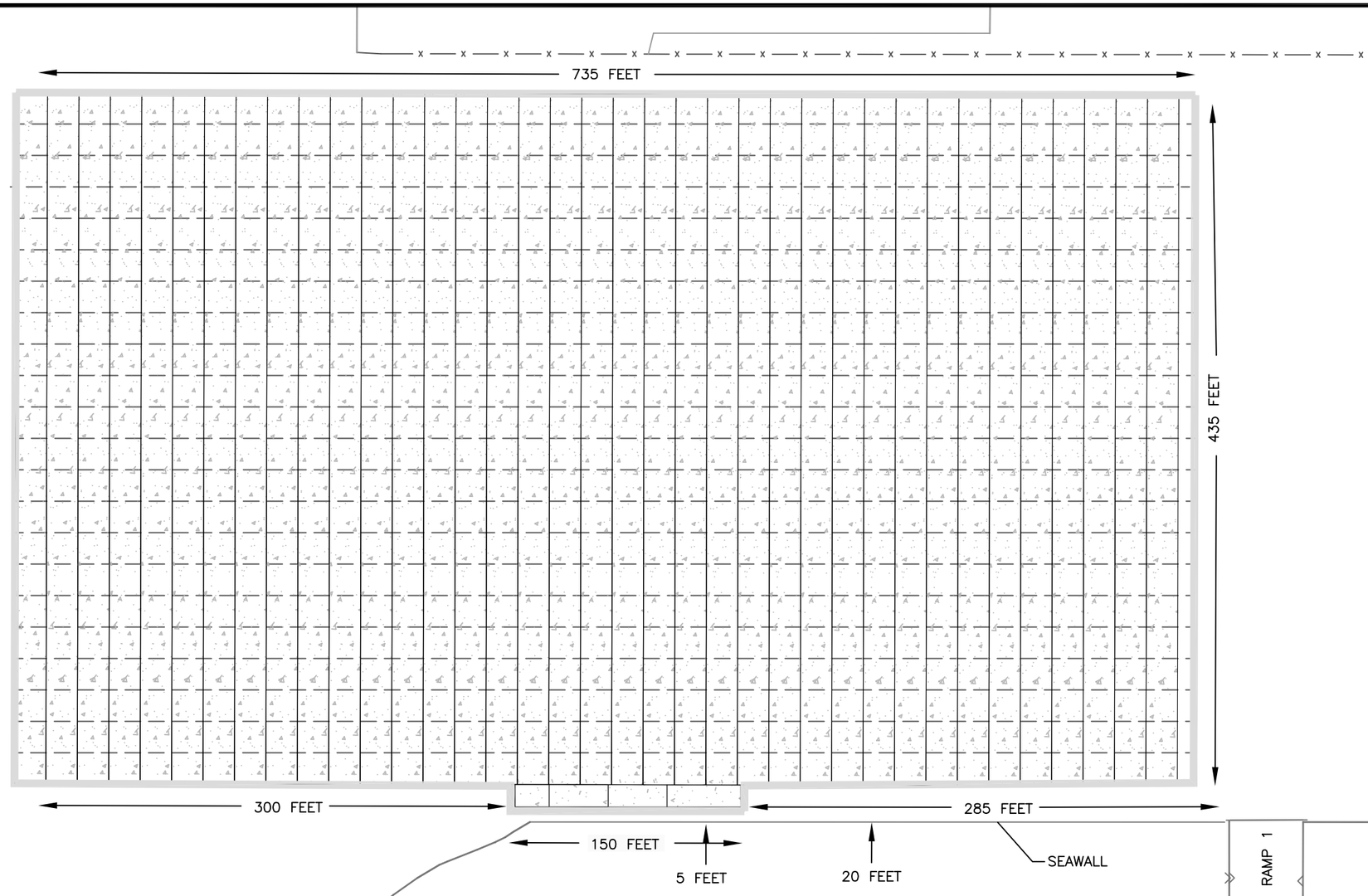
REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

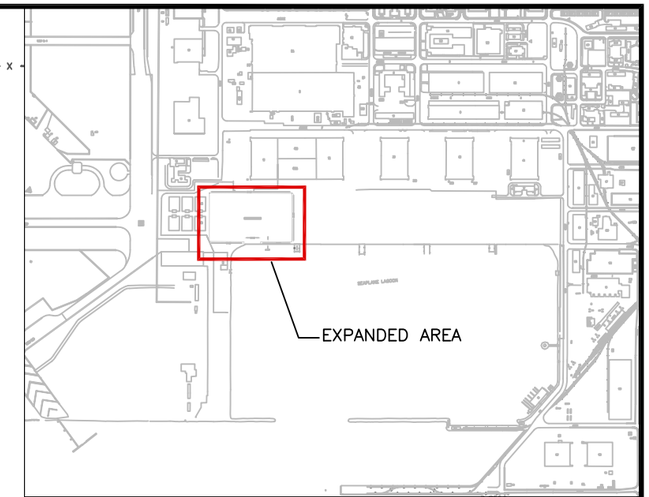
FIGURE 6-2
FORMER NAS ALAMEDA IR SITE 17 SEDIMENT OFFLOADING PLANT

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 1
AUTHOR: RS
DATE: APRIL 3, 2013
FILE NUMBER: FIGURE 6-2

TETRA TECH EC, INC.

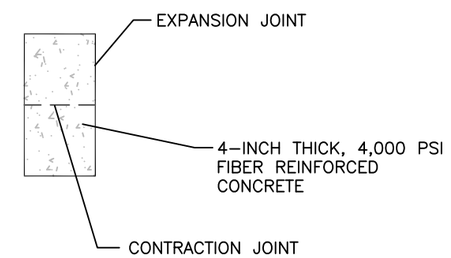




LOCATION MAP

LEGEND

NORTHWEST DEWATERING PAD PERIMETER BERM

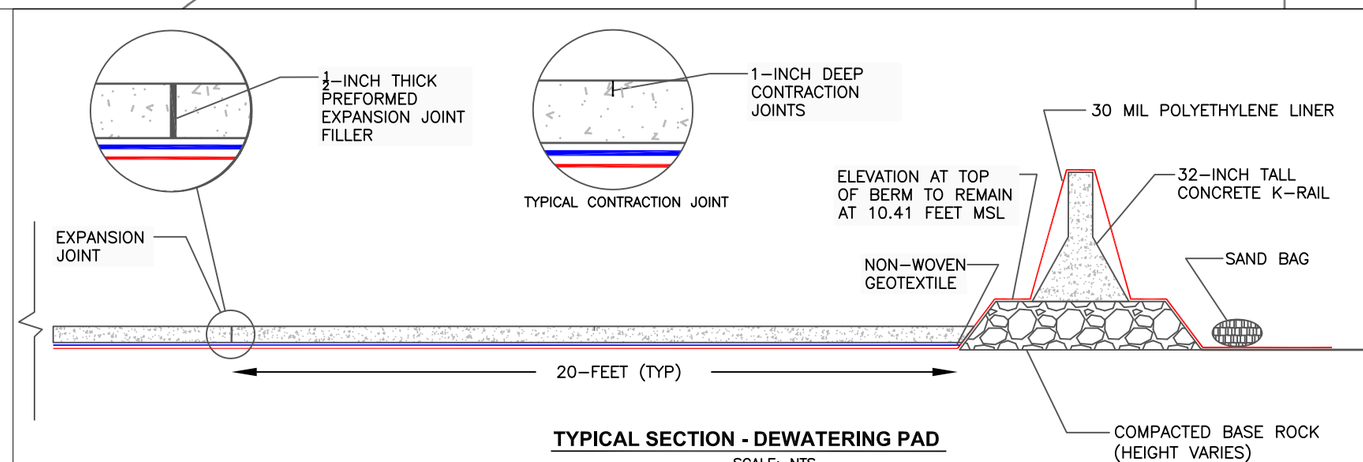


ABBREVIATIONS

PSI = POUNDS PER SQUARE INCH

40 0 40 80

(FEET)



TYPICAL SECTION - DEWATERING PAD

SCALE: NTS

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 6-3
FORMER NAS ALAMEDA IR SITE 17 SEDIMENT DEWATERING PAD

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: JANUARY 30, 2013
FILE NUMBER: FIGURE 6–3

TETRA TECH EC, INC.

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

REMEDIAL ACTION WORK PLAN
INSTALLATION RESTORATION SITE 27

FIGURE 6-4
PHOTOGRAPH OF ENVIRONMENTAL CLAMSHELL BUCKET

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVIEW: 0
AUTHOR: RS
DATE: JANUARY 31, 2013
FILE NUMBER: FIGURE 6-4

TETRA TECH EC, INC.

ATTACHMENT 1

SAMPLING AND ANALYSIS PLAN

ATTACHMENT 2

PROJECT CONTRACTOR QUALITY CONTROL PLAN

ATTACHMENT 3

ENVIRONMENTAL PROTECTION PLAN

ATTACHMENT 4

STORMWATER MANAGEMENT PLAN

ATTACHMENT 5

WASTE MANAGEMENT AND TRANSPORTATION AND DISPOSAL PLAN

ATTACHMENT 6

ANNUAL MONITORING AND 5-YEAR INTERVAL MONITORING PLAN

ATTACHMENT 7

RESPONSE TO COMMENTS ON DRAFT REMEDIAL ACTION WORK PLAN