Alameda Reuse and Redevelopment Authority

# Site Management Plan
# *Lawrence Berkeley National Laboratory Second Campus Portion of Alameda Point Alameda, California*

November 18, 2011

**FINAL**

**Russell Resources, Inc.**
440 Nova Albion Way, Suite 1
San Rafael, California 94903

**Subject:** Re: Approval of Final SMP for LBNL
**From:** Tran.Xuan-Mai@epamail.epa.gov
**Date:** 11/15/2011 6:38 PM
**To:** "Peter Russell" <peter@russellresources.com>
**CC:** JOtt@ci.alameda.ca.us

Hi Peter.

Thank you for the opportunity to review the SMP for the LBNL Second Campus. We have reviewed the Draft and the Draft Final versions of the SMP and all of our comments have been addressed adequately. Therefore, we have no further comments on the SMP.

Thanks.

Xuan-Mai Tran
(415) 972-3002
Tran.Xuan-Mai@epa.gov

-----Peter Russell <peter@russellresources.com> wrote: -----

> To: Xuan-Mai Tran/R9/USEPA/US@EPA
> From: Peter Russell <peter@russellresources.com>
> Date: 11/15/2011 04:28PM
> Cc: Jennifer Ott <JOtt@ci.alameda.ca.us>
> Subject: Approval of Final SMP for LBNL
>
> Dear Ms. Tran:
>
> Thank you, Xuan-Mai, for EPA's review and comments during my drafting of the Site Management Plan for a portion of Alameda Point that is proposed for the Lawrence Berkeley National Laboratory Second Campus.
>
> I would like to include in the SMP an acknowledgement of your involvement and that the final version satisfactorily addresses all of your constructive comments. Please reply to this email message to indicate your approval.
>
> Thank you.
>
> Sincerely,
>
> Peter Russell
> --
>
> Peter Russell, PhD, PE
> Russell Resources, Inc.
> (415) 902-3123

**Subject:** Re: Approval of Final SMP for LBNL Second Campus at Alameda Point
**From:** John West <jwest@waterboards.ca.gov>
**Date:** 11/16/2011 7:21 AM
**To:** <peter@russellresources.com>
**CC:** <JOtt@ci.alameda.ca.us>

Dr. Russell,

Water Board staff have reviewed the draft final SMP for LBNL, with edits to now make it the final version, and concur that it satisfactorily addresses previous comments and is now acceptable.

Thank you, John West

Peter Russell <peter@russellresources.com> 11/15/11 16:29 PM >>>

Dear Mr. West:

Thank you, John, for the Water Board's review and comments during my drafting of the Site Management Plan for a portion of Alameda Point that is proposed for the Lawrence Berkeley National Laboratory Second Campus.

I would like to include in the SMP an acknowledgement of your involvement and that the final version satisfactorily addresses all of your constructive comments. Please reply to this email message to indicate your approval.

Thank you.

Sincerely,

Peter Russell
--

Peter Russell, PhD, PE
Russell Resources, Inc.
(415) 902-3123

**Subject:** Re: Approval of Final SMP for LBNL Second Campus at Alameda Point
**From:** James Fyfe <JFyfe@dtsc.ca.gov>
**Date:** 11/17/2011 10:42 AM
**To:** Peter Russell <peter@russellresources.com>

Dear Dr. Russell,

Thank you for acknowledging my small contribution. The final version of the Site Management Plan satisfies all of my comments and I approve of you saying so in the SMP.

Very truly yours,
J. Fyfe

James R. Fyfe, P.E.
Project Manager
Brownfields and Environmental Restoration Program

California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710
Phone: (510) 540-3850
Fax: (510) 540-3819
jfyfe@dtsc.ca.gov

Peter Russell <peter@russellresources.com> 11/15/2011 4:29 PM >>>

Dear Mr. Fyfe:

Thank you, Jim, for DTSC's review and comments during my drafting of the Site Management Plan for a portion of Alameda Point that is proposed for the Lawrence Berkeley National Laboratory Second Campus.

I would like to include in the SMP an acknowledgement of your involvement and that the final version satisfactorily addresses all of your constructive comments. Please reply to this email message to indicate your approval.

Thank you.

Sincerely,

Peter Russell
--

Peter Russell, PhD, PE
Russell Resources, Inc.
(415) 902-3123

**Subject:** RE: Approval of Final SMP for LBNL Second Campus at Alameda Point
**From:** "Robinson, Derek J CIV NAVFACHQ, BRAC PMO" <derek.j.robinson1@navy.mil>
**Date:** 11/18/2011 10:40 AM
**To:** "Peter Russell" <peter@russellresources.com>
**CC:** "Jennifer Ott" <JOtt@ci.alameda.ca.us>

Peter,

Thank you for the opportunity to review the below mentioned SMP. The Navy has no further comments.

Best Regards,

Derek J. Robinson, PE
BRAC Environmental Coordinator
NAVFAC HQ, BRAC PMO
1455 Frazee Road; Suite 900
San Diego, CA 92108
(619) 532-0951

-----Original Message-----
From: Peter Russell [mailto:peter@russellresources.com]
Sent: Tuesday, November 15, 2011 16:30
To: Robinson, Derek J CIV NAVFACHQ, BRAC PMO
Cc: Jennifer Ott
Subject: Approval of Final SMP for LBNL Second Campus at Alameda Point

Dear Mr. Robinson:

Thank you, Derek, for the Navy's review and comments during my drafting of the Site Management Plan for a portion of Alameda Point that is proposed for the Lawrence Berkeley National Laboratory Second Campus.

I would like to include in the SMP an acknowledgement of your involvement and that the final version satisfactorily addresses all of your constructive comments. Please reply to this email message to indicate your approval.

Thank you.

Sincerely,

Peter Russell
--

Peter Russell, PhD, PE
Russell Resources, Inc.
(415) 902-3123

Alameda Reuse and Redevelopment Authority

# Site Management Plan
# *Lawrence Berkeley National Laboratory Second Campus Portion of Alameda Point*

## *Alameda, California*

November 18, 2011

***FINAL***

**Peter P. Russell, PhD, PE**
*Principal, Russell Resources, Inc.*

**Russell Resources, Inc.**
440 Nova Albion Way, Suite 1
San Rafael, California 94903

*TABLE OF CONTENTS*

*LIST OF TABLES*



**LIST OF FIGURES**



***APPENDICES***

***LIST OF ACRONYMS/ABBREVIATIONS***

| | |
|---|---|
| ACM | Asbestos-containing material |
| AMP | Air Monitoring Plan |
| AOC | Area of Concern |
| ARRA | Alameda Reuse and Redevelopment Authority |
| AST | Aboveground storage tank |
| ASTM | American Society for Testing and Materials |
| BAAQMD | Bay Area Air Quality Management District |
| B(a)P | Benzo(a)pyrene |
| BCT | BRAC Cleanup Team |
| bgs | Below ground surface |
| BMP | Best management practice |
| BRAC | Base Realignment and Closure |
| BTEX | Benzene, toluene, ethylbenzene, and xylenes |
| CAA | Corrective Action Area |
| Cal/EPA | California Environmental Protection Agency |
| CBO | Chief Building Official |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CHHSL | California human health screening level |
| DCA | Dichloroethane |
| DTSC | Department of Toxic Substances Control |
| DVE | Dual-phase vacuum extraction |
| EBS | Environmental Baseline Survey |
| EDC | Economic Development Conveyance |
| EH&S | Environmental health and safety |
| EPC | Exposure point concentration |
| ERM | Environmental Resources Management |
| ESL | Environmental screening level |
| FID | Flame-ionization detector |
| FL | Fuel line |
| FISCA | Fleet and Industrial Supply Center Oakland, Alameda Facility/Alameda Annex |
| FS | Feasibility Study |
| GAP | Generator accumulation point |
| HHRA | Human Health Risk Assessment |
| HI | Hazard Index |
| HSP | Health and Safety Plan |
| IC | Institutional control |
| IR | Installation Restoration |
| ISCO | In-situ chemical oxidation |
| IWTP | Industrial waste treatment plan |
| JP-5 | Jet propulsion fuel grade 5 |
| LBNL | Lawrence Berkeley National Laboratory |

| | |
|---|---|
| LBP | Lead-based paint |
| LIFOC | Lease in Furtherance of Conveyance |
| MCL | Maximum contaminant level |
| MCO | Marsh Crust Ordinance |
| mg/kg | Milligrams per kilogram |
| mg/L | Milligrams per liter |
| µg/kg | Micrograms per kilogram |
| µg/L | Micrograms per liter |
| MNA | Monitored natural attenuation |
| MTBE | Methyl tertiary butyl ether |
| NAS | Naval Air Station |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit |
| OWS | Oil-water separator |
| PAH | Polycyclic aromatic hydrocarbon |
| PCB | Polychlorinated biphenyl |
| PID | Photoionization detector |
| PMP | Petroleum Management Plan |
| $PM_{10}$ | Particulate matter 10 microns or less in diameter |
| PP | Proposed Plan |
| PRC | Preliminary remediation criteria |
| RAP | Remedial Action Plan |
| RCRA | Resource Conservation and Recovery Act |
| ROD | Record of Decision |
| RSL | Regional Screening Level |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SIM | Selective Ion Monitoring |
| SMP | Site Management Plan |
| SVOC | Semivolatile organic compound |
| SWMU | Solid Waste Management Unit |
| SWPPP | Storm water pollution prevention plan |
| TPH | Total petroleum hydrocarbon |
| TPHd | Diesel range TPH |
| TPHmo | Motor oil range TPH |
| TRW | Tarry refinery waste |
| TSCA | Toxic Substances Control Act |
| TTPH | Total TPH (sum of TPH fractions) |
| USC | United States Code |
| USEPA | United States Environmental Protection Agency |
| UST | Underground storage tank |
| VC | Vinyl chloride |
| VOC | Volatile organic compound |
| $yd^3$ | cubic yard |

## *1.0 INTRODUCTION*

This Site Management Plan (SMP) was prepared for the Alameda Reuse and Redevelopment Authority (ARRA) by Russell Resources, Inc. to mitigate potential risks associated with the planned Lawrence Berkeley National Laboratory (LBNL) Second Campus redevelopment project (the Site). The Site consists of 45 acres, located entirely within the 918-acre onshore portion of the former Naval Air Station (NAS) Alameda, now known as Alameda Point. ARRA plans to redevelop the Site as a second campus for the LBNL with research and administrative areas, a day care center, and open spaces. This SMP is an adaptation of the May 2008 SMP, prepared by ERM-West, Inc. (ERM) and Iris Environmental, entitled *Site Management Plan, Alameda Landing Site Portion of the Fleet and Industrial Supply Center Oakland, Alameda Facility/Alameda Annex (FISCA), Alameda, California,* which was approved by California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC). The approved FISCA SMP has been modified only in order to address the Site's unique conditions and proposed land uses, and to provide a stand-alone SMP that is applicable exclusively to the upcoming redevelopment of the LBNL Second Campus Site.

This SMP provides guidelines to help ensure that redevelopment of the Site is conducted in a manner protective of the health and safety of Site workers, future Site occupants, nearby residents, and the environment. This SMP will also be submitted to the City of Alameda pursuant to the developer's election under Section 13-56.8.c of City Ordinance No. 2824 regulating excavation into the marsh crust ("Marsh Crust Ordinance" [MCO]). Section 13-56.8.c. requires preparation of a SMP for handling materials excavated from below the marsh crust threshold depth. Furthermore, this SMP fulfills the worker health and safety and waste management procedures stipulated in the Marsh Crust Remedial Action Plan/Record of Decision (RAP/ROD) approved by the DTSC on 2 February 2001 (TTEMI, 2001).

This SMP does not set forth the scope of the active remedial measures the Navy conducts at the Site, nor does it include the criteria for confirming the adequacy of those measures or the mitigation measures required to be implemented to control air emissions, surface runoff, and similar environmental conditions occurring during the implementation of the remedies. Those management measures are instead detailed in the Navy's Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Petroleum Program documents.

## *1.1 REPORT ORGANIZATION*

This SMP is organized as follows:

- Section 1.0 presents Site background information and describes the objectives, implementation, and oversight of the SMP;
- Section 2.0 briefly summarizes the residual environmental conditions at the Site, and the estimated health risks associated with the development plans;
- Section 3.0 presents risk management measures to be implemented prior to Site development;
- Section 4.0 presents risk management measures to be implemented during Site development;
- Section 5.0 presents risk management measures to be implemented after Site development; and
- Section 6.0 lists references used to prepare this SMP.

Appendices to this SMP include:

- Appendix A – Marsh Crust Ordinance
- Appendix B – ASTM E1903-11: Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process
- Appendix C – ASTM Standard D4700-91: Guide for Soil Sampling from the Vadose Zone
- Appendix D – Air Monitoring Plan (AMP)

## *1.2 BACKGROUND*

The Site is located east of the Seaplane Lagoon, in the southeastern part of Alameda Point (formerly NAS Alameda) in Alameda, California. Alameda Point encompasses roughly 918 acres of land. Development of Alameda Point first began in 1930 under the ownership of the U.S. Army, and the majority of the former NAS Alameda was built on dredged fill that was placed over shallow open water. The average elevation of Alameda Point is about 15 feet above mean sea level.

Former NAS Alameda served as a base of operations for naval aviation from before World War II through its closure in 1997. Closure of former NAS Alameda was conducted pursuant to the Defense Base Realignment and Closure (BRAC) Act of 1990. During its long history of operations, former NAS Alameda was home to several thousand military and civilian personnel and supported operations of the Marine Corps, Navy, and other military entities. Hundreds of buildings and

an extensive network of roadways and utilities were constructed at former NAS Alameda, and much of this infrastructure still exists. Former NAS Alameda supported aviation and surface craft activities through extensive runway and tarmac infrastructure and an enclosed lagoon for seaplanes and also supported naval surface vessels (including aircraft carriers) through an extensive system of piers, berthing areas, and turning basins. Specific activities conducted historically at NAS Alameda include, but are not limited to, aircraft maintenance, ship maintenance, support and training for Navy and Marine air units, storage, rework, and distribution of weaponry, fuel storage and refueling, dry goods storage and distribution, pest control, plating, metal working and fabrication, parts washing, cleaning and routine maintenance, blasting and painting, testing jet engines, heavy equipment maintenance, woodworking, and photography.

Figure 1 presents a general location map showing Alameda Point and the surrounding San Francisco Bay Area. Figure 2 presents a more detailed view of the Site, including existing buildings and other Site features. To assist in distinguishing among the different environmental conditions at the Site, the SMP identifies and describes the various CERCLA and Petroleum Program remediation areas at the Site, as depicted on Figure 2. The distinguishing chemical and physical features, and the associated management measures for each area, are explained further in the SMP.

Investigation and cleanup activities have been performed at the facility under the Comprehensive Long-Term Environmental Action Navy Program, administered by the Naval Facilities Engineering Command Southwest Division in San Diego, California, as well as under CERCLA, administered by the United States Environmental Protection Agency (USEPA) and DTSC.

## *1.3 OBJECTIVES*

The objective of this SMP is to document the following:

- Historical Site investigation activities and the nature and extent of residual contamination in Site soils and groundwater;
- Mitigation efforts to be implemented to minimize exposure of human health or environmental receptors to contaminants that may be present at the Site prior to, during, and following redevelopment; and
- Protocols for ensuring that work conducted at the Site is performed in accordance with applicable state and federal environmental health and safety (EH&S) regulations.

## *1.4 IMPLEMENTATION AND OVERSIGHT*

Oversight of cleanup at Alameda Point has been shared by USEPA, the DTSC, and the Water Board. With the Navy, these agencies constitute the BRAC Cleanup Team (BCT), which provides ongoing oversight at the Site for CERCLA cleanup activities. Cleanup under the Petroleum Program is overseen by the Water Board.

The risk mitigation efforts specified in this SMP are to be implemented by the designated contractor performing SMP-covered work at the Site on behalf of the entity undertaking development and/or the ARRA. These construction activities will include demolition of existing structures and any earth moving or dewatering activities performed to support Site development. As described in applicable sections of this SMP, implementation of the SMP will be overseen by a licensed engineer, geologist, or other environmental professional familiar with environmental monitoring equipment, EH&S regulations, and general industrial hygiene practices.

Regulatory oversight of SMP implementation will be provided by the BCT and the ARRA. As further discussed in Section 4.3.1, the City's Chief Building Official (CBO), as designated by the City Building Department, will oversee permitting of excavations in accordance with the provisions of the MCO.

## *1.5 APPLICABLE INSTITUTIONAL CONTROLS, STATUTES, AND REGULATIONS*

Following is a list of identified institutional controls (ICs) and local, state, and federal laws and regulations that may apply to Site redevelopment activities.

### *1.5.1 Federal Statutes and Regulations*

*National Environmental Policy Act (NEPA), 42 United States Code (USC) 4321* – Administered by the Council on Environmental Quality and the USEPA, this act addresses projects that constitute major federal actions with the potential to significantly impact the environment.

The NEPA process often invokes one or several other federal statutes as described further in this section. In California, NEPA requirements are often addressed under the California Environmental Quality Act (CEQA), discussed in Section 1.5.2.

*Section 404, Clean Water Act, 33 USC 1344* – Administered by the U.S. Army Corps of Engineers, this act addresses discharges to navigable waters of the

United States (including wetlands and streams that are tributaries to navigable waters), and may apply to discharges of excavated soil or groundwater generated by construction and dewatering.

*Endangered Species Act, 16 USC 1536* – Administered by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, this act regulates activities affecting federally protected species. It also protects listed species from harm or "take," which is broadly defined as *"harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."* The definition of "take" further includes unintentional, or incidental take, which might be associated with construction or other activities.

*Coastal Zone Management Act, 16 USC 1451* – Administered by the National Oceanic and Atmospheric Administration, this act regulates projects in the coastal zone.

*Resource Conservation and Recovery Act of 1976 (RCRA), 42 USC 692* – Administered by the USEPA, this act manages hazardous wastes from "cradle to grave," governing the generation, storage, transportation, and disposal of hazardous waste. This includes excavated soil and/or groundwater that exceeds threshold criteria. RCRA also governs underground storage tanks (USTs).

*Toxic Substances Control Act of 1976 (TSCA), 15 USC 2601 et seq.* – Administered by the USEPA, this act governs the introduction, manufacture, and importation/exportation of chemicals produced in the United States. Relevant to this SMP, TSCA also governs asbestos and lead-based paint hazards.

*CERCLA, 42 USC 9601 et seq., and Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 USC 9601* – Known as the Superfund Law, these acts direct the USEPA to develop the National Priority List, a federal list of the most highly contaminated, abandoned hazardous waste sites in the nation, and gives the USEPA jurisdiction over funds to identify potentially responsible parties and implement remediation at those sites.

*Emergency Planning and Citizen's Right to Know Act of 1986, 42 USC 11001* – Also known as Title III of SARA, this act is designed to help communities protect public health, safety, and the environment from chemical hazards. Through the Toxics Release Inventory, a list of all chemicals used and emitted by businesses small and large, it also gives individuals the right to obtain information regarding chemical hazards in their communities. It established the State Emergency Response Commission, responsible for the development of emergency action plans.

*Occupational Safety and Health Administration (OSHA) Regulations, 29 Code of Federal Regulations (CFR) Sections 1910.120 and 1926.65* – These regulations govern the applicability and scope of training requirements for personnel involved in the handling of hazardous wastes.

### *1.5.2 State Statutes and Regulations*

*CEQA, California Public Resources Code 21000 et seq. and the CEQA Guidelines, 14 California Code of Regulations (CCR) 15000 et seq.* – This act creates the state companion to the federal NEPA process, and is invoked by any nonexempt development project that requires public agency approval. This process can require, among other things, an Environmental Impact Report evaluating potentially significant environmental impacts related to the proposed project, as well as associated mitigation measures.

*Porter-Cologne Water Quality Control Act of 1969, California Water Code, Division 7, Section 13000 et seq.* – This act authorizes the Water Boards as the lead agencies in protecting the waters of the state. This is accomplished through implementation of the National Pollutant Discharge Elimination System permitting program for surface waters, and through issuing Waste Discharge Requirements for discharges potentially affecting groundwater quality.

*Safe Drinking Water and Toxic Enforcement Act of 1986, California Health and Safety Code Section 25249.6 et seq. (Proposition 65), 22 CCR Section 12000 et seq.* – Proposition 65 is a voter ballot initiative passed in 1986 that requires the Governor to publish and update at least annually a list of chemicals known by the State of California to cause cancer or reproductive harm. The law prohibits businesses from discharging such chemicals into sources of drinking water and requires that warnings be given to potentially exposed individuals. Section 25249.6 of Proposition 65 requires "clear and reasonable warning" for specified potential chemical exposures.

*Air Toxic Hot Spots Information and Assessment Act of 1987, AB 2588* – This requires the Air Resources Board to inventory sources of over 700 toxic air contaminants to assess the health risks of toxic air releases, and notify potentially exposed populations.

*California Health and Safety Code Section 39000 et seq.* – The California Clean Air Act empowers regional air quality districts to enact rules and regulations that bring sources of air pollution into compliance with state and federal requirements. Section 41700 prohibits *"discharge from any source whatsoever of such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to…the public."*

*California Endangered Species Act, Fish and Game Code, Sections 2050 et seq.* – This act mirrors the Federal Endangered Species Act and is implemented by the California Department of Fish and Wildlife.

*California Code of Regulations, Section 8* – These regulations, implemented and enforced by the California Division of OSHA, complement the federal statutes governing worker health and safety in hazardous environments and in the presence of hazardous materials.

### *1.5.3 Local Statutes, Regulations, and Institutional Controls*

*Bay Area Air Quality Management District (BAAQMD) Rules and Regulations* – Local regulations regarding discharge of air contaminants in the BAAQMD, which includes the Site. Particularly germane with respect to redevelopment of the Site are BAAQMD Regulation 6, which addresses "Particulate Matter and Visible Emissions," and Regulation 8, Rule 40, which addresses "Aeration of Contaminated Soil."

*City of Alameda Ordinance No. 2824 (Alameda Municipal Code Chapter XIII, Article XVII, Section 13-56)* – Informally known as the MCO, this is an excavation ordinance that defines the depth to which anyone may excavate site soil within the former NAS Alameda without taking special measures. Any excavations at or below the specified depth would require a permit from the City's CBO, an approved site-specific Health and Safety Plan (HSP), and special material handling procedures. A copy of the MCO is attached as Appendix A.

This SMP is submitted pursuant to Section 13-56.8.c of the MCO and is intended to comply fully with the requirements of the MCO for construction site management plans. Section 4.3.1.1 and Section 4.3.1.2 of this SMP detail material sampling and handling protocols for soils excavated from below the threshold depth. However, this SMP also applies to those excavations above the depths that trigger compliance with the MCO.

*Environmental Restrictions and Covenants* - The Site is currently subject to certain environmental restrictions that place restrictions on excavation into the marsh crust.

*City of Alameda Community Noise Ordinance* – This ordinance affects the development project in that it restricts the hours of operation for heavy construction machinery.

*Marsh Crust RAP/ROD* – The Marsh Crust RAP/ROD, approved by the San Francisco Bay Regional Water Quality Control Board on January 12, 2001, DTSC on February 2, 2001, requires that excavations below the threshold depth conform

to the City of Alameda's MCO. Should the MCO be repealed or invalidated, the RAP/ROD specifies that such excavations can be performed only with prior DTSC approval.

## *2.0 ENVIRONMENTAL CONDITIONS*

This section briefly summarizes the nature and extent of residual chemical occurrence in soils and groundwater at the Site, and the estimated potential health risks associated with the redevelopment plans.

## *2.1 SITE-WIDE CONDITIONS*

### *2.1.1 Marsh Crust*

The marsh crust is a subsurface soil horizon that lies between the native Bay mud sediment and the overlying imported fill material within the former intertidal zone throughout much of this portion of Alameda. Heavy industrial activity in the vicinity of the Site prior to the time artificial fill was placed in Alameda (between 1930 and 1946) resulted in significant discharges of petroleum waste to the surrounding marshlands. These wastes, often rich in semivolatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs), were spread over much of the surface of the surrounding marshes through tidal action. As artificial fill was later placed over the native marshes to create what is now Alameda, it is postulated that a thin, contaminated soil horizon (i.e., the marsh crust) was formed between the former high tide and low tide elevations.

The marsh crust is present only in some areas, and it is absent from many boring logs for the vicinity of the Site. The fill/native soil interface at which the marsh crust may be present increases in depth at the Site from northeast to southwest, ranging from 4 feet to 15 feet or more below ground surface (bgs). Figure 3 presents a conceptual model of the marsh crust. The site-specific threshold depths from current City of Alameda Marsh Crust Threshold Depth Map is presented as Figure 4. The MCO threshold depth map is provided in Appendix A. As indicated on the MCO map, the Marsh Crust threshold depth is as great as 10 feet bgs over the southwestern portion of the Site, with the more northeasterly portions of the Site being shallower than 10 feet bgs. Because a small area in the northeast of the Site was part of the original (prefill) Alameda land mass, the MCO does not apply there.

## *2.2 CERCLA-SPECIFIC CONDITIONS*

The Navy has performed investigations of Alameda Point since the late 1980s and identified potential areas of concern based on past activities and/or releases. Thirty-four of these areas are being carried through to the CERCLA Program as Installation Restoration (IR) sites, because historical information suggests these

areas could be impacted with chemicals. Extensive sampling is being (or has been) conducted within each of the IR sites, as these were the identified potential 'source areas' at Alameda Point. Soil sampling conducted at each of the IR sites was comprehensive, in that generally samples were analyzed for metals, total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), SVOCs, PAHs, and pesticides.

The following discussion is organized around the three IR sites that partially coincide with portions of the Site: IR Sites 9, 13, and 27. In addition, part or all of six Areas of Concern (AOCs) in Economic Development Conveyance (EDC) Parcel 12 coincide with portions of the Site: AOCs 1, 2, 4, 5, 6, and the Aircraft Parking and Staining Evaluation area. The IR sites and AOCs are delineated in Figure 2. The purpose of the IR Site and AOC descriptions presented below is to summarize their potential residual environmental conditions and associated human health risks. Further information regarding chemical analyses and remedial activities previously implemented at each of the sites is presented in applicable Navy reports.

### *2.2.1 IR Site 9 – Paint Stripping Facility*

IR Site 9 occupies approximately 2.9 acres along the eastern border of the Site. Almost all of IR Site 9 is within the Site. Two buildings (Buildings 410 and 351) covering approximately 37,000 square feet are still present at IR Site 9. Building 410 was constructed in 1958 as an aircraft paint stripping facility, and has been used for storage since the early 1990s. According to the initial assessment study conducted at NAS Alameda in 1983, paint stripping and aircraft cleaning activities included the use of phenol, methylene chloride, trichloroethane, chromium, detergents, wipe-down solvents, and parts cleaners. Anecdotal evidence suggests that numerous undocumented releases of aircraft fuel have occurred inside Building 410. Based on activities performed inside Building 410, other industrial solvents likely included naphthalene and tetrachloroethene.

Building 351, located immediately north of Building 410, was a support building that served as a lunch room/locker room for Building 410 staff. Both buildings are inactive and scheduled for demolition.

The Industrial Waste Treatment Plant (IWTP) 410, known as Structure 588, was located east of Building 351 and treated paint stripping wastes. This facility and 11 associated aboveground storage tanks (ASTs) have been removed from IR Site 9. AST 410A was a 10,000-gallon methylene chloride tank. AST 410B was a 10,000-gallon phenol tank, and AST 410C was a 1,500 gallon surfactant tank. The remaining eight ASTs were directly associated with industrial waste treatment processes at IWTP 410. Acids, bases, coagulants, and other IWTP-related chemicals were stored in these tanks. One oil water separator (OWS) was also

associated with IWTP 410. Two additional OWSs were operated at IR Site 9. There is no historical evidence of USTs at IR Site 9.

IR Site 9 is mostly paved and is currently occupied by a commercial tenant that provides boat and recreational vehicle storage.

The Navy has treated VOCs in groundwater at IR Site 9 using in-situ chemical oxidation (ISCO).

The Navy's final feasibility study (FS) for Operable Unit (OU) 2A summarizes current soil and groundwater conditions at IR Site 9 relative to residential land use screening criteria (OTIE, 2011). None of the reported concentrations of VOCs, SVOCs, pesticides, PAHs, PCBs and metals in IR Site 9 soil exceeded screening criteria. The likely sources of impacted groundwater at IR Site 9 include paint stripping operations, and releases of petroleum fuel from storage and defueling activities within or near Building 410. The following constituents exceeded their respective federal or more stringent state maximum contaminant levels (MCLs) during groundwater sampling conducted by the Navy:

- vinyl chloride (VC) (0.57 – 11 µg/L)
- 1,1-dichloroethane (DCA, 30 – 440 µg/L)
- 1,1-dichloroethene (8.4 – 12 µg/L)
- cis-1,2-dichloroethene (6.1 - 21 µg/L)
- benzene (1.6 – 2.1 µg/L)
- methyl tertiary butyl ether (MTBE) (0.1 – 25 µg/L)
- arsenic (19.4 – 35.3 µg/L)

In addition to the above chemicals, 1,2,3-trichloropropane was reported at concentrations ranging from 0.1 to 31 µg/L in samples collected from monitoring wells at IR Site 9. Diesel range TPH (TPHd) was reported at 8,800 µg/L in a HydroPunch sample and free product was observed in a HydroPunch sample east of Building 410. This area was part of dual-phase vapor extraction (DVE) corrective actions conducted in the Petroleum Program and are discussed in Section 2.3.4.1.

The human health risk assessment (HHRA) in the OU-2A FS estimates the IR Site 9 residential cancer risk to be 2 x $10^{-5}$ to 6 x $10^{-5}$, and the non-cancer hazard index to be 3 to 6.[1] Although not quantified in the HHRA, health risks and hazards with commercial/industrial and construction workers would be much lower.

[1] Cancer risk of 1 x $10^{-6}$ or less is considered *de minimis*, and greater than 1 x $10^{-4}$ generally must be remediated. Non-cancer hazard index of 1 or less is considered acceptable.

The draft CERCLA Proposed Plan (PP) for OU-2A concludes no remedial action is needed for soil at IR Site 9 (DON, 2011a). For groundwater, the preferred remedial alternative is monitored natural attenuation (MNA) with ICs to prohibit use of groundwater for most purposes and to protect monitoring wells until remedial goals are achieved through natural processes.

### *2.2.2 IR Site 13 – Former Oil Refinery*

IR Site 13, which covers approximately 17.5 acres, occupies approximately 3.1 acres of the eastern of the Site. This discussion, summarized from the final FS for OU-2A, of which IR Site 13 is a part, focuses on the details that are relevant to the SMP Site. IR Site 13 includes Building 397, a 17,400 square foot aircraft overhaul plant and engine test facility constructed in 1958. Materials stored during Building 397 operations included petroleum products, halogenated and non-halogenated solvents, and aircraft fuel. The building is currently leased to the City of Alameda for storage of equipment from various municipal entities. The majority of the rest of IR Site 13 that is within the Site is paved or open space.

The historic Alameda shoreline passed diagonally through the portion of IR Site 13 that coincides with the Site, from southeast to northwest. Historic IR Site 13 features include the former location of the Pacific Coast Oil Works Company Refinery, which operated from 1879 to 1903. The former refinery's structures were east of the Site. The refinery used an acid-sludge process for refining fresh crude oil. In the late 1800s, petroleum refinery operations included distilling crude oil to kerosene, lubricating, and fuel oils. Common oil refining practices also included mixing strong acid with the crude oil to "crack" the oil to increase yields of kerosene. Sulfuric acid was a relatively inexpensive strong acid available in bulk quantities. Wastes from this type of operation would be expected to include heavier-end hydrocarbons. Although the type and quantity of wastes and the disposal locations are not documented, it is assumed that the refinery wastes and asphaltic residues were disposed at IR Site 13 and the surrounding tidal lands.

The tarry refinery waste (TRW) reported in subsurface soil at some locations in IR Site 13 is believed to have originated during the operation of Pacific Coast Oil Works. The TRW was believed to have been dumped at the surface near the former shoreline during refinery operations. The TRW area was the subject of an investigation in 2007 to define the lateral and vertical extent of TRW in subsurface soil. Based on this investigation, the lateral extent of the TRW is approximately as shown in Figure 2 and extends to depths of approximately 18 feet bgs.

No structures from the refinery remain at IR Site 13. There is no historical record of USTs at IR Site 13. In addition, four OWSs and a waste generator accumulation point (GAP) (NADEP GAP 62) were operated at IR Site 13.

Additional investigations and remediation are being performed at IR Site 13 under the Petroleum Program. IR Site 13 is known as Corrective Action Area (CAA) 13 under the Petroleum Program (Section 2.3.3).

The Navy's final FS for OU-2A summarizes current soil and groundwater conditions at IR Site 13 relative to residential land use screening criteria (OTIE, 2011). The summary below focuses on details that are related to areas the SMP Site.

Historical investigation results indicated the following:

- None of the reported SVOCs, pesticides, and PCBs in IR Site 13 soil exceeded the screening levels.
- Concentrations of the metals arsenic, chromium, cobalt, iron, lead, and vanadium in IR Site 13 soil exceeded residential screening levels at limited number of locations.
    - Four out of 192 soil samples (4 to 4.5 feet bgs) reported arsenic at concentrations exceeding the statistically derived background value of 16.55 milligrams per kilogram (mg/kg). These reported concentrations were within the concentration ranges reported in the background dataset. The reasonable maximum exposure point concentration (EPC) based on the 192 soil samples analyzed for arsenic was estimated to be 3.9 mg/kg, which is less than the background value of 16.55 mg/kg. Elevated concentrations of arsenic in soil are unrelated to storm sewers, buildings, or other site features, which suggests that these elevated concentrations of arsenic occur randomly across the site with no apparent site related source and may be naturally occurring.
    - One out of 192 soil samples reported chromium, cobalt, iron (112 soil samples), and vanadium at concentrations exceeding their residential screening level at only one location. The reasonable maximum EPC of these soil samples analyzed for chromium (35 mg/kg), cobalt (5.5 mg/kg), iron (12,552 mg/kg), and vanadium (51 mg/kg) was estimated to be less than their respective screening levels.
    - Seven out of 215 soil samples reported lead at concentrations greater than its screening level of 207 mg/kg (all are east of the Site). The reasonable maximum EPC of the 215 soil samples analyzed for lead was estimated to be 91 mg/kg.
- PAHs, expressed as benzo(a)pyrene [B(a)P] equivalent concentrations, ranged from non-detect to a maximum reported value of 7.6 mg/kg in IR Site 13 soil. The PAH results also include samples collected within areas associated with the TRW. These results indicate relatively low PAH concentrations are present within the TRW with the majority of the waste characterized as highly degraded, solid long chain alkanes with a very low volatile fraction. The reasonable maximum EPC based on the 382 soil samples computed for B(a)P equivalent concentrations was estimated to be 0.27 mg/kg, which is less than the Alameda Point screening level of

0.62 mg/kg. The exceedances of PAHs, expressed as B(a)P equivalent concentrations, mainly occur at depths greater than or up to 4 feet bgs which may be associated with the use of fill material to construct the island. These exceedances have cleaner shallow soil samples and adjacent samples with B(a)P equivalent concentrations less than the screening level of 0.62 mg/kg. Only one soil sample from the portion of IR Site 13 that coincides with the SMP Site had B(a)P equivalents greater than the screening level (3.5 mg/kg at 0.5-2 feet bgs).

- The Site Characterization and Analysis Penetrometer System (SCAPS) laser induced fluorescence TRW investigation reported TPHd (17,000 mg/kg), TPH in the motor oil range (TPHmo) (24,000 mg/kg), and PAHs in soil in the area east of the TRW boundary (and all east of the Site). In addition, benzene and ethylbenzene were reported at maximum concentrations in soil of 14 mg/kg and 13 mg/kg, respectively at a depth of 8 feet to 9.5 feet bgs at a location east of the Site and east of the inferred TRW boundary. VOCs were not reported above their respective screening levels within the TRW area.
- The soil samples collected within the TRW-impacted mass during SCAPS TRW investigation reported TPHd (6,000 mg/kg). None of the reported soil samples within the TRW area contained PAHs expressed as B(a)P equivalents above the screening level of 0.62 mg/kg. Metals were not reported above their respective screening levels. Soil samples were analyzed for pH as a part of SCAPS TRW investigation based on historic refinery operations and the occurrence of low pH in soil samples previously collected at OU-2A. Near neutral pH values were reported between 6.75 and 8.97 in 15 of the 16 soil samples collected during this investigation. One sample had a pH of 4.09, but it was collected from east of the Site and east of the TRW. Thus it appears the low pH conditions reported in previous investigations are localized and may have been removed during previous trenching operations at the site. Based on the results of SCAPS TRW investigation and previous investigations at the site, it was concluded that the TRW contains very low volatile or semivolatile fraction as expected from a refinery waste that has been in-place for over 100 years. The TRW appears to be mainly comprised of solid long chain alkanes. In addition, it should be noted that based on boring logs prepared during basewide soil PAH investigation conducted in 2003 as part of the CERCLA remedial investigation, TRW occurs mainly at a depth greater than 5 feet bgs and is mainly below the water table. Depth to water at IR Site 13 generally ranges from 4 to 6.5 feet bgs, with water table as high as 0.25 feet bgs as observed at a location east of the Site in March 2005. Although TRW mainly occurs at depth and below the water table, surface manifestations of this asphalt-like refining residue have been observed at several locations within IR Site 13.

The HHRA in the FS for OU-2A estimates the residential cancer risk for soil throughout IR Site 13 to be $5 \times 10^{-5}$ to $8 \times 10^{-5}$, and the non-cancer hazard index to be 3. The human health risk due to residential vapor intrusion from

groundwater is 1 x $10^{-5}$, most of which is due to benzene occurring east of the Site. Although not quantified in the HHRA, health risks and hazards with commercial/industrial and construction worker scenarios would be much lower.

The draft CERCLA PP for OU-2A concludes no remedial action is needed for soil at IR Site 13 (DON, 2011a). For groundwater, the draft PP proposes groundwater remediation only for contamination that is east of the Site. The CERCLA process considered health risks associated with petroleum-related constituents, such as, benzene, toluene, PAHs, and lead. However, CAA-13 is not yet closed under the Petroleum Program. Petroleum residues many need special handling, even though no unacceptable human health risks are involved.

### *2.2.3 IR Site 27 – Dock Zone*

IR Site 27, approximately 15.8 acres, is located in the northern half of the Site (DON, 2008). Most of the site is paved or covered by buildings. The major features of IR Site 27 include Buildings 68, 168, 555, and 601 (Building 601 is west of the Site); inactive railroad tracks and sidings; and fenced open space between Building 168 and Ferry Point Road (Figure 2).

During the operational period of NAS Alameda, the area east of Seaplane Lagoon was designated as the Dock Zone, the Dock Support Services Zone, and the Engine Testing Zone. Reportedly, historical activities within the western portion of IR Site 27 included ship docking, ship repair, and marine painting activities. Historical activities in the eastern portion of IR Site 27 included materials storage and equipment and vehicle parking in open space areas; warehouse operations in Building 168; and waterfront services, including welding, in Building 68. Historically, the open space served as an aircraft parking area. The southern portion of a former fuel farm area (CAA-11, discussed with the Petroleum Program sites – Section 2.3.2) is located in the northwestern portion of IR Site 27. Building 555 was used as an electrical substation.

Currently, Buildings 68 and 168 are used by tenants for operations similar to historical activities. The fenced open space west of Building 168 is being used by the U.S. Department of Transportation for maintenance equipment and vehicle parking, chemical storage, and drum storage. A washdown area (WD-166) with two OWSs (OWS-166A and -166B, discussed with the Petroleum Program sites – Section 2.3.4.2) is located at the southern margin of the site to the north of Building 166 (Building 166 is not within the boundaries of IR Site 27).

Potential sources of contaminants in soil gas, soil, and groundwater at IR Site 27 include dredged fill material used to create the site, historical activities conducted within the boundaries of the site, and VOCs which may have been released historically to groundwater upgradient of the site.

Pre-remediation occupational cancer risk at IR Site 27 was $6 \times 10^{-6}$, and construction worker cancer risk was $1 \times 10^{-6}$. The respective non-cancer hazard indices were 0.3 and 0.2. Although cleanup is not warranted for these exposures, the higher risk and health hazard for residential exposures is the basis for the ROD's selection of active groundwater remediation using ISCO, followed by MNA, with ICs.

The Navy completed ISCO treatment and began post-ISCO groundwater monitoring (MNA) in July 2010.

### *2.2.4 EDC-12 AOC 1 – Former Storage Yards*

AOC 1 is an approximately 0.5-acre area that was established to further evaluate two former storage yards north of Building 168 (Figure 2). The exact location and what was stored in these storage yards are unknown. During a 1994 open space survey, the only staining observed at AOC 1 was associated with vehicle parking; however, the southernmost storage yard north of Building 168 was noted to have been paved. Historically, Building 168 has been used for storage of fuel transfer and loading equipment, cable storage, and an area for preparing and packaging of chemicals for transport to ships.

The Navy's 2010 investigation of AOC 1 found no soil samples that exceeded the Alameda Point–specific screening criterion for B(a)P equivalence (CH2M Hill, 2010). None of the soil samples collected in AOC 1 were found to contain concentrations of PCBs, VOCs, petroleum constituents, or pesticides greater than screening levels. All four of the sampling locations had exceedances of metals in the soil. The highest concentrations of arsenic and cobalt were 158 mg/kg and 58 mg/kg, respectively. The arsenic concentration exceeded the industrial Regional Screening Level (RSL) (1.6 mg/kg), whereas cobalt exceeded the residential RSL (23 mg/kg) but not the industrial RSL (300 mg/kg).

None of the groundwater samples collected in AOC 1 were found to contain concentrations of PCBs, VOCs, petroleum constituents, pesticides, metals, PAHs or SVOCs greater than screening levels.

Using industrial guidelines, the total cancer risk for soil is $1 \times 10^{-4}$ and the total hazard index (HI) is 0.9. Arsenic contributes 97% of the total risk. Since the risk is in the risk management range ($10^{-6}$ to $10^{-4}$), the Navy recommends no further investigation of AOC 1.

### *2.2.5 EDC-12 AOC 2 – SWMU GAP 621/Drum Storage Area Evaluation and TPH Delineation EBS Parcels 150A/150B*

AOC 2 is an approximately 1.4-acre area, the westernmost approximately 0.8 acres of which coincides with the eastern side of the Site, as shown on Figure 2 (CH2M Hill, 2010). AOC 2 was established to further evaluate hazardous waste accumulation area Solid Waste Management Unit (SWMU) GAP 621 and a drum storage area south of Building 621, and to delineate elevated TPH concentrations in soil adjacent to Environmental Baseline Survey (EBS) Parcel 150B (EBS Parcel 150B is east of the Site). Historical use of EBS Parcel 150A included aircraft parking, material and equipment storage, industrial machine shop, and a hazardous material storage area SWMU GAP 621, which contained paint cans and oil-soaked rags. SWMU GAP 621 was located in the northeastern corner of EBS Parcel 150A, outside Building 621. A drum storage area was located on the south side of Building 621; the drums contained oil-soaked rags and unknown materials.

None of the soil samples collected in AOC 2 in the Navy's 2010 investigation were found to contain concentrations of PCBs, metals, PAHs, or pesticides greater than screening levels. There are two locations in AOC 2 that reported exceedances of the TPHmo preliminary remediation criteria (PRC) at the ground surface (0 to 0.5 feet bgs); both were from east of the Site.

For all of AOC 2, the Navy estimates the total residential cancer risk to be $1 \times 10^{-5}$ and the non-cancer HI to be 2. After subtracting background metals and PAHs, which are below their target risk level, the residential cancer risk and HI are estimated to be $6 \times 10^{-8}$ and 0.6, respectively. The Navy recommends no further evaluation of AOC 2

### *2.2.6 EDC-12 AOC 4 – Building 167 and Surrounding Area in EBS Parcel 154*

AOC 4 is an approximately 5.8-acre area, the south-easternmost approximately 1.9 acres of which coincides with the western side of the Site, as shown on Figure 2 (CH2M Hill, 2010). AOC 4 was established to address the following concerns:

- Delineate TPH concentrations in soil exceeding screening criteria around Building 167 (Building 167 is just outside the Site's western boundary)
- Collect soil samples at two SWMUs located at Building 167 where no historical samples have been collected (both SWMUs are west of the Site)
- Assess potential impacts to soil and groundwater from historical maintenance and washdown of aircraft and other vehicles that may have occurred in the vicinity of Building 167

Historical use of EBS Parcel 154 encompassed by AOC 4 included chemical, equipment, and materials storage, vehicle parking, administrative offices, and

aircraft maintenance hangar (Building 167). Activities conducted in Building 167, the aircraft maintenance hangar, reportedly included painting, resin mixing, parts washing in solvent dip tanks, metals treatment, metals machining, paint stripping/sandblasting, aircraft defueling, and replacing or filling of lubrication and hydraulic fluids. Several aboveground dip tanks containing various oils, acids, and solvent were identified. A hazardous materials locker containing acids, bases, and halogenated and non-halogenated solvents was also present. Wastes generated in the building were transferred to SWMUs located outside the building, including NAS GAP 28.

The open space south of Building 167 was noted to be heavily stained in aerial photographs.

Navy's 2010 investigation results with specific emphasis on commercial/ industrial screening levels in the portion of AOC 4 that is within the Site are as follows. None of the soil samples collected in AOC 4 were reported to have concentrations exceeding screening levels for B(a)P equivalence, PCBs, petroleum constituents, or pesticides. Metals were reported in soil samples at concentrations greater than background levels but not industrial RSLs.

Metals were reported in groundwater samples at concentrations greater than both background levels and either the California or federal MCL. Three of the 8 locations in AOC 4 returned concentrations for VOCs in groundwater that exceeded screening levels. The only exceedance from a location on the Site was methylene chloride, which has both California and federal MCLs of 5 micrograms per liter (µg/L). A sample from immediately south of Building 167 had a concentration of 50.2 µg/L.

Concentrations of B(a)P at levels that exceeded the California and federal MCLs of 0.2 µg/L and the Petroleum Strategy Plan environmental screening level ESL of 0.014 µg/L were returned at 6 of the 8 groundwater locations (3 of these are from location on the Site). The maximum concentration returned (from a Site location) was 0.363 µg/L, and all of the exceeding samples were collected between 18 and 20 feet bgs. None of the groundwater samples collected in AOC 4 were found to contain concentrations of PCBs, petroleum constituents or pesticides greater than screening levels.

For all of AOC 4, the Navy estimates the total commercial/industrial cancer risk to be $2 \times 10^{-6}$ and the non-cancer HI to be 0.2. After subtracting background metals and PAHs, which are below their target risk level, the incremental cancer risk is estimated to be $4 \times 10^{-8}$. The Navy recommends no further evaluation of AOC 4.

### *2.2.7 EDC-12 AOC 5 – Washdown Area in Southern Portion of EBS Parcel 159*

AOC 5 is an approximately 3.4-acre area, the north-easternmost approximately 2.7 acres of which coincides with the southwestern corner of the Site, as shown on Figure 2 (CH2M Hill, 2010). AOC 5 was established to assess possible impact to groundwater as a result of historical aircraft and other vehicle maintenance and *washdown* activities in the southern portion of EBS Parcel 159. Historical use of EBS Parcels 159 and 160 encompassed by AOC 5 included aircraft parking and general open space. The Navy used historical aerial photographs to identify areas of significant staining within EBS Parcels 159 and 160 with the highest likelihood of impact from historical use of aircraft parking and possibly maintenance, and washdown.

Navy's 2010 investigation results with specific emphasis on commercial/ industrial screening levels in the portion of AOC 5 that is within the Site are as follows. B(a)P equivalent concentrations calculated for PAHs exceeded the Alameda Point-specific screening criterion of 620 micrograms per kilogram (µg/kg) at three sampling locations. The maximum B(a)P equivalent concentration calculated was 6,700 µg/kg from a surface sample.

AOC 5 had a total cancer risk that exceeds target levels, including exposure to both soil and groundwater. The total industrial soil cancer risk was $3 \times 10^{-7}$ and the total soil HI was 0.0009, which are below target levels.

VOCs were reported at concentrations in groundwater that exceeded both California MCLs and federal MCLs in two locations. At one location, the concentration of 1,2-dibromo-3-chloropropane was reported at 1.5 µg/L, which exceeds the MCL value of 0.2 µg/L. VC was reported at a maximum concentration of 4.33 µg/L at a different location, which exceeded its California MCL of 0.5 µg/L and its federal MCL of 2 µg/L. The Navy recommends no further evaluation of 1,2-dibromo-3-chloropropane and VC in AOC 5.

Although VOCs were reported in groundwater samples above MCLs, the groundwater residential exposure cancer risk was $1 \times 10^{-6}$ and the total HI was 0.007. The evaluation of groundwater risks and hazards from vapor intrusion concerns indicated risks and hazards below target levels.

TPHd in soil samples exceeded the Petroleum Strategy Plan ESL of 83 mg/kg at 6 sample locations (5 within the Site), with a maximum concentration of 510 mg/kg. TPHmo was also not reported at concentrations exceeding its commercial soil ESL of 2,500 mg/kg. Using PRCs for nonresidential soil (1,914 mg/kg for TPHd), the maximum TPHd concentration does not exceed remediation criteria. Therefore, the Navy recommends no further action for TPHd in soil at AOC 5.

TPHmo was the only petroleum constituent in groundwater reported to exceed the Petroleum Strategy Plan ESL of 100 µg/L at several sample locations in AOC 5. The Alameda Point PRC is 1,400 µg/L for Total TPH (TTPH). The reported maximum concentration was collected from a location with a TTPH value of 296

µg/L (no other petroleum constituents were reported), which is below the Alameda Point groundwater PRC.

The Navy recommends no further evaluation of AOC 5.

### *2.2.8 EDC-12 AOC 6 – SWMU AST 584*

AOC 6 is a less than 0.1-acre area in the southeastern corner of the Site, as shown in Figure 2 (CH2M Hill, 2010). AOC 6 was established to assess possible release of corrosion-inhibiting chemicals that may have been used at SWMU AST 584. SWMU AST 584 was used to store industrial wastewater, specifically condensate from a heater that contained corrosion-resistant chemicals.

Hexavalent chromium was reported at both of the soil sampling locations in AOC 6 at levels below the industrial RSL of 5.6 mg/kg. The maximum concentration reported was 1.74 mg/kg.

Under industrial conditions, the total cancer risk from exposure to soil was $2 \times 10^{-6}$. After subtracting metals that are present below background levels, the incremental risk was $3 \times 10^{-7}$, which is below target levels.

B(a)P was reported in one groundwater sample in AOC 5 at 0.45 µg/L, which was greater than both the California and federal MCLs of 0.2 µg/L and the Petroleum Strategy Plan ESL of 0.014 µg/L.

The groundwater residential vapor intrusion exposure cancer risk was $3 \times 10^{-11}$ and the groundwater HI was 0.001. The evaluation of groundwater risks and hazards from vapor intrusion concerns indicated risks and hazards below target levels.

The Navy recommends no further evaluation of AOC 6.

### *2.2.9 EDC-12 – Aircraft Parking/Staining Areas*

Historical use of EDC-12 included material, fuel, and aircraft storage; aircraft parking; aircraft maintenance; and utility supply (air and steam plant) (CH2M Hill, 2010).

The following is a summary of conclusions from a study of aerial photographs taken between 1930 and 1963. The northern and eastern portions of EDC-12 likely were used solely for aircraft parking, with no significant staining observed. Maintenance activities appear to have been conducted south of Building 167 (EBS Parcel 154) and in the area to the west and south of IR Site 9. Additionally, significant staining was observed in the southern portions of EBS Parcels 159 and 160. Based on these findings, the highest likelihood of impact from historic

aircraft washdown and maintenance activities was identified as being located in EBS Parcels 154, 159, and 160.

Areas of aircraft parking and staining were investigated. This section discusses such areas in EDC-12 that do not fall within an AOC. Much of the area identified from the aerial photograph review is included in AOCs 4 and 5. Additional sampling was conducted east of AOC 4 and between AOCs 4 and 5.

Cobalt was reported in soil at two locations in the aircraft parking/staining areas exceeding both the background concentration for cobalt (12.04 mg/kg) and the residential RSL (23 mg/kg). The maximum concentration of cobalt was 103 mg/kg, which is well below the industrial RSL of 300 mg/kg. In addition, the maximum reported lead concentration in soil of 130 mg/kg is below the residential Cal-modified Preliminary Remediation Goal.

Under industrial conditions, the soil exposure total HI was 0.4, which is below target levels. The soil exposure total cancer risk was $2 \times 10^{-6}$. However, the non-PAH incremental cancer risk was $6 \times 10^{-8}$ and the cancer risk from exposure to PAHs was $4 \times 10^{-8}$, which are both below target levels. The total soil exposure exceeds target levels because of concentrations of arsenic, which do not exceed the background levels for Alameda Point.

The evaluation of groundwater risks and hazards from vapor intrusion concerns indicated risks and hazards below target levels. The groundwater vapor intrusion exposure cancer risk was $5 \times 10^{-9}$ and the HI was 0.01.

TPHd and TPHmo were reported at concentrations exceeding their respective Petroleum Strategy Plan ESLs at four locations. The maximum concentrations of TPHd (112 mg/kg) and of TPHmo (905 mg/kg) are both below the Alameda Point PRCs for nonresidential soil, which has values of 2,680 mg/kg for TPHmo and 1,914 mg/kg for TPHd.

The Navy recommends no further evaluation of the Aircraft Parking/Staining Areas.

## *2.3 PETROLEUM PROGRAM-SPECIFIC CONDITIONS*

The Navy addresses petroleum related contamination at Alameda Point through the Petroleum Program. CERCLA generally does not consider petroleum contamination unless it is comingled with non-petroleum contamination, so the Petroleum Program fills the regulatory gap at Alameda Point. The sections below discuss the history and environmental status of petroleum sites that coincide with the Site.

### *2.3.1 CAA-9A, USTs 584-1 & 584-2, and NAS GAP 04/SWMU 584*

CAA-9A, USTs 584-1 & 584-2, and NAS GAP 04/SWMU 584 are all colocated in the southeast corner of the Site (Figure 2). EDC-12's AOC 6—SWMU AST 584 is in the northwest corner of CAA-9A (Section 2.2.8). The information provided below is condensed from two Navy reports (Battelle, 2010a; TTEMI, 2002).

CAA-9A is an approximately 0.9-acre site, of which approximately 0.7 acres is within the southeast corner of the Site. It is overlain by paved and gravel areas and contains Building 584. The area was the site of an air and steam plant, with surrounding grounds mostly used for vehicle parking. Three large combustion gas exhaust stacks were located south of Building 584. Corrosives, lubricating oil, and water treatment chemicals were stored in Building 584. Railroad tracks enter CAA-9A from the east and are located in the southeastern area of the site. CAA-9A contained USTs 584-1 and 584-2, each with a capacity of 4,000 gallons and constructed of fiberglass, which were used to store diesel fuel for a boiler located within Building 584. The date the tanks were installed is unknown; however, Building 584 was constructed between 1975 and 1981.

The Navy removed USTs 584-1 and 584-2 in November 1994. The vent lines associated with the USTs were removed in January 1995, and product lines were removed up to the building where they were capped.

A RCRA site is present at CAA-9A: SWMU/GAP 4. GAP 4 consisted of one waste oil drum located south of Building 584. Another SWMU was identified as a 1993 250-gallon diesel spill, located in a ditch south of the USTs and associated with overfilling the USTs. The spill was cleaned up using absorbent pads and a vacuum truck, and 10 cubic yards ($yd^3$) of soil were removed.

Navy investigations at CAA-9A indicate that diesel fuel and motor oil were released into soil near USTs 584-1 and 584-2 and along the railroad tracks. TPHd was detected in 8 of 25 soil samples and TPHmo was detected in 10 of 21 soil samples. TPHmo concentrations were highest along the railroad tracks. It is possible that this area was impacted by historical releases of TPHmo from railroad cars and engines. These sample locations are also located near an access road. From about 1957 to the early 1970s, waste oils were reportedly released directly onto road surfaces from waste oil tankers and baker tanks in order to control dust. TPHd and TPHmo concentrations were also elevated in the excavation of USTs 584-1 and 584-2. These detections may be a result of spilling the contents of UST 584-2 during removal. TPHd range was not detected in the soil samples collected during installation of the monitoring wells located between 25 to 60 feet from the former UST locations.

Groundwater samples collected in 1995 indicate that TPH-related constituents were present in groundwater. However, based on monitoring well data from April 1999 and September 2001, the TPH concentration has decreased, and the plume is shrinking, probably due to natural biodegradation processes. Floating product has not been detected at CAA-9A. TPH and TPH-related constituents have not been detected near the storm drain, with the exception of lead in one well.

The risk evaluation screening results indicate that based on data collected from 1994 to 1997, floating product may have been present. A floating product investigation conducted in 1999 reported that floating product was not present in any of the three monitoring wells. An additional investigation was conducted in 2000, which found no floating product at CAA-9A. Sampling events in 1999, 2000, and 2001 indicate benzene is below the PRC and is likely passively biodegrading.

During the removal of UST 584-2 in November 1994, contents of the tank (mostly water) spilled into the excavation, which created a RCRA site referred to as “SWMU/unknown”. In one historic figure, there was reference to the approximate former location of a drum and containment area very close to former USTs 584-1 and 584-2. Reportedly, the drum and containment area contained waste oil and diesel and were assigned the RCRA designation of “SWMU/GAP 04”. Because the drum and containment area (“SWMU/GAP 04”) was located near the former UST location and product stored in the drum (and spilled into the UST 584-2 tank excavation [“SWMU/unknown”]) was the same as that in the UST, the data identified and used to evaluate UST 584-1 and 584-2 also were used to assess SWMU/GAP 04. Therefore, additional data collection is used to satisfy data gaps for both petroleum sites.

While there is a significant amount of data that have been collected from the area in and around former UST 584-1 and 584-2, an up to date understanding of the nature and extent of TPH impacts could not be deduced. Therefore, the 2010 data gap investigation was conducted. There was a very high TPHd detection of 180,000 µg/L in the sample collected next to the former UST 584-1 pit, which was well above the floating product screening criteria for TTPH of 20,000 µg/L. Although this contamination does not appear to be migrating away from the site as evident by the non-detected TPH concentration in the two permanent monitoring wells located downgradient and crossgradient of the former UST, the presence of this contamination suggests that free product may be present in the area of the former UST 584-1 pit. Concentrations of TPH (all fractions) detected in soil were below respective residential PRCs in both soil samples. Concentrations of VOCs, lead, and PAHs if detected in soil were detected below the drinking water residential shallow soil ESLs and residential PRCs.

The arsenic concentration of 50 µg/L detected in the downgradient sample was higher than the background threshold value of 21 µg/L, and outside the range of background concentrations (1.4 to 41 µg/L); however, arsenic concentrations in all other groundwater samples collected downgradient of the former UST excavation were all below background concentrations. Concentrations of all heavy metals in soil were less than their respective background concentrations.

In the second half of 2011, the Navy plans an additional Petroleum Program investigation that will include an evaluation of free product at USTs 584-1 and 584-2 and NAS GAP 04/SWMU 584.

### *2.3.2 CAA-11*

The southeastern portion of CAA-11 overlaps the northwest corner of the Site (Figure 2). The discussion provided below is condensed from the Navy corrective action summary report for CAA-11 (Shaw, 2008) . Most CAA-11 issues that relate to areas outside the Site have been omitted from the discussion. Nevertheless, the discussion covers some CAA-11 issues that are outside the Site boundary to maintain the discussion's logic.

CAA-11 consists of approximately 14 acres located between Seaplane Lagoon and Viking Street, approximately 1.9 of which coincide with the northwest corner of the Site. Included in CAA-11 are portions of IR Site 27 (Section 2.2.3); the remains of a RCRA permitted Structure 598/HW04; an extensive former fuel storage and transfer facility referred to as Area 37; and various smaller former fuel storage and transfer facilities. Thirty underground storage tanks, used primarily for fuel storage and their associated fuel distribution networks, were removed at various times after the base was scheduled for closure.

Previous environmental investigations found the following conditions of environmental concern:

- Several areas, not associated with an underlying groundwater condition, where fuel hydrocarbon concentrations in soil exceeded the PRC for residential use.
- Four general areas where fuel hydrocarbons in groundwater exceeded PRCs for ecological receptors. Several shallow soil PRC exceedances were located over these groundwater features.

Mid- or high-boiling point hydrocarbons (TPHd, jet fuel, or TPHmo) were the dominant hydrocarbon fraction found in the free product, and in the soil and groundwater samples that exceeded PRCs.

Six shallow soil areas, which lie outside of the groundwater remedial areas and which contained jet fuel and motor oil concentrations above the residential PRC, were addressed by excavation. Side and bottom samples collected from five of these six excavated areas showed remaining fuel hydrocarbon levels below the residential PRC. The remaining excavation was situated within tankpit backfill, thus no sidewall samples were taken. The soil sample collected from the excavation bottom, which was below the valving and piping backfill, also showed hydrocarbon levels below the residential PRC for soil.

In several areas of CAA-11, dissolved fuel hydrocarbons in groundwater were detected above PRCs for ecological receptors and for residential PRC for soil overlying the impacted groundwater plumes. An eight-well biosparging pilot test was conducted in the area exhibiting the greatest concentration of dissolved hydrocarbons (20 milligrams per liter [mg/L] TTPH). This pilot test area was located near the southeast side of CAA-11. The pilot biosparge system was operated in 2003. In December 2003, a full-scale biosparge system began operation, which consisted of 34 biosparging wells manifolded into several branches. The system was shut down in September 2004, after interim groundwater monitoring showed no dissolved levels within the Site above PRCs.

Groundwater was collected from 26 wells and piezometers in 2004 to evaluate groundwater conditions in biosparging areas after termination of remediation activities. The greatest concentration of TTPH in the biosparging areas was 1.13 mg/L. No fuel-related volatile hydrocarbons were detected above the laboratory reporting limit, except for MTBE in one well at 23.6 µg/L and 0.6 µg/L in one piezometer. Various low levels of chlorinated hydrocarbons were detected in some wells.

A post-corrective action soil and soil gas sampling event was conducted in 2006 to evaluate the post-remediation soil conditions in and adjacent to the biosparging areas. Four historic elevated soil sample areas within the biosparging area that exceeded PRCs for TPHd or TPHmo were resampled, and all showed current levels of TPHd or TPHmo in soil well below residential PRCs.

Environmental concerns still exist at CAA-11 after termination of corrective action activities, but none of these are likely relevant to the Site. Four Petroleum Program sites within CAA-11 are wholly or partially within the Site: Fuel Line (FL)-139, FL-140, USTs 37-9 through 37-12, and USTs 37-13 through 37-16. Each of these site is discussed below.

#### *2.3.2.1 FL-139*

This discussion of FL-139 is condensed from the Navy's 2010 Petroleum Management Plan (PMP) (Battelle, 2010b). Most of the 8-inch diameter jet

propulsion fuel grade 5 (JP-5), gasoline, or diesel oil fuel line FL-139 coincides with the northeast corner of the Site (see Figure 2, Inset 1). The portion of FL-139 that was within the Second Campus footprint lies partially within IR Site 27.

The piping has been removed. During removal, overexcavation of soil was conducted. There is no record of the pipeline's condition when it was removed in September 1998. There is no documentation of a historical release from FL-139.

Soil and groundwater contamination above ESL and PRC has been detected along FL-139 during previous site activities. Remedial activities (excavation, biosparging, and pure oxygen injection) have been conducted to treat groundwater impacts to the west of FL-139 (Section 2.3.2.4); however, too few soil and groundwater samples were collected along this length of the fuel line. No groundwater samples have been collected in the vicinity of the sample in which TPHmo was detected above the ESL. Groundwater samples and soil samples with elevated TPH detections were not analyzed for PAH. The limited amount of soil and groundwater data surrounding FL-139 do not adequately characterize this length of fuel line.

The Navy recommends no further action for FL-139, because the former fuel line has been removed and residual environmental issues associated with FL-139 will be addressed along with ongoing remedial actions for CAA-11.

The Water Board will close FL-139 after further work is completed regarding CAA-11. However, extensive soil or groundwater contamination associated with FL-139 is unlikely, and any needed remediation likely will be completed long before construction begins on the Site.

#### *2.3.2.2 FL-140*

This discussion of FL-140 is condensed from the PMP (Battelle, 2010b). The southwestern half of the 6-inch diameter JP-5, gasoline, or diesel oil fuel line FL-140 coincides with the Site (see Figure 2, Inset 1). FL-140 was within CAA-11 and was a northeastward continuation of FL-139.

The piping has been removed. There is no record of its condition when it was removed in 1998. There is no documentation of a historical release from FL-140.

Biosparging was used to address hydrocarbon impacted groundwater in CAA-11's Source Area 2, near USTs 37-9, 37-10, 37-11, and 37-12 (Section 2.3.2.3). These USTs are located approximately 80 feet west of FL-140.

There are insufficient soil and groundwater analytical data to assess the potential presence of free product in the vicinity of this fuel line. Only five soil samples

were collected along the length of the fuel line, some up to 80 feet apart, during removal activities. Soil samples were analyzed for TPH and VOCs, but were not analyzed for PAH. The soil sample results for the five samples collected along FL-140 indicated groundwater sampling was not required, but there are insufficient groundwater sampling locations and sampling data to evaluate the groundwater conditions near FL-140.

Environmental issues associated with FL-140 will be addressed along with ongoing remedial actions for CAA-11. The Water Board will close FL-140 after further work is completed regarding CAA-11. However, extensive soil or groundwater contamination associated with FL-140 is unlikely, and any needed remediation likely will be completed long before construction begins on the Site.

#### *2.3.2.3 USTs 37-9 Through 37-12*

This discussion of USTs 37-9 through 37-12 is condensed from the Navy's draft site closure summary for these four USTs (DON, 2011b). These four former 25,000-gallon jet fuel USTs were located within (or immediately adjacent to) the northwest corner of the Site(see Figure 2, Inset 1). These USTs were located northwest of FL-140, which is discussed in Section 2.3.2.2.

No release from these USTs is recorded. USTs 37-9 through 37-12 were removed in 1995. All four tanks were in the same excavation. Soil and groundwater sampling conducted during tank removal activities indicated the presence of petroleum contamination.

Biosparge operations that included the area of these USTs was completed in 2003. Soil sampling found no PRC exceedances. Although there are no PAH data, low concentrations of TPH fractions in soil indicates that PAHs are not likely present at levels that would exceed the PRC. The soil samples confirm that there is no ongoing source of contamination from soil at this site, and that there are no risks to human health or the environment. In post-biosparge groundwater sampling, TTPH concentrations have fluctuated but the overall concentrations are decreasing and most recent samples from each well were below the TTPH PRC. As with soil, although there are no PAH data, the low concentrations of TPH fractions in the most recent round of groundwater sampling indicates that PAHs are not present at levels that would exceed the PRC.

Based on the results of the soil and groundwater samples, the Navy's draft site closure summary concludes USTs 37-9 through 37-12 do not pose significant risk to human health, the environment, or water quality based on non-residential land use. In accordance with the 2009 Petroleum Strategy for Alameda Point and the "Regional Board Supplemental Instructions to State Water Board December 8,

1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites" (SF Water Board January 5, 1996), this site is considered a low-risk fuel site.

#### *2.3.2.4 USTs 37-13 Through 37-16*

This discussion of USTs 37-12 through 37-16 is condensed from the PMP (Battelle, 2010b). These four former 25,000-gallon jet fuel USTs were located within (or immediately adjacent to) the Site (Figure 2, Inset 1). These USTs were located northwest of FL-139, which is discussed above in Section 2.3.2.1. UST 37-13 through UST 37-16 were installed in 1941 and removed in 1998.

A reported JP-5 spill occurred in 1983 impacting an unknown 10-foot by 10-foot area of soil. There is no documentation of a specific historical release from any of these USTs, and they were in good condition with no holes or corrosion at the time of removal.

Biosparge operations within the area around USTs 37-12 through 37-16 were conducted in 2003 and 2004. In 2004, two excavation trenches (approximately 5-feet by 5-feet by 3 feet deep) were dug around areas where TPH exceeded soil PRCs. In 2005, pure oxygen injections were initiated through sparge wells in the area that encompasses USTs 37-12 through 37-16, but west of the Site. Free product continues to be present periodically in groundwater west of the Site. The TPHd fraction is the primary component of TPH exceeding the free product screening criterion.

In the second half of 2011, the Navy plans an additional Petroleum Program investigation that will include an evaluation of middle petroleum distillates and PAHs at USTs 37-13 through 37-16 (Shaw, 2011a).

### ***2.3.3 CAA-13***

CAA-13 addresses petroleum issues within IR Site 13 and IR Site 23. The approximately 3.1 acres of IR Site 13 that coincide with the second campus Site is also part of CAA-13 (Figure 2). These same 3.1 acres are the only portion of CAA-13 that overlaps the Site. Two CAA-13 petroleum issues are relevant to the Site: TRW and Building 397. Details of TRW are included in the IR Site 13 discussion (Section 2.2.2). Five CAA-13 sites around Building 397 are managed as a group. These sites (AOC 397, OWS 397A, OWS 397B, OWS 397C, and OWS 397D) are discussed in Section 2.3.3.1.

#### *2.3.3.1 AOC 397, OWS 397A, OWS 397B, OWS 397C, OWS 397D*

This discussion of AOC 397, OWS 397A, OWS 397B, OWS 397C, and OWS 397D is condensed from the PMP and the final corrective action summary report

for Building 397 (Battelle, 2010b; Shaw, 2011b). Building 397 was used to test jet engines. OWS 397A, OWS 397B, OWS 397C, and OWS 397D were located at the east end of Building 397 and were used to separate JP-5 from oily wastewater.

In February 1991, 3,500 to 17,000 gallons of JP-5 was reportedly released during a fuel line leak inside Building 397 as a result of a valve that was left open. This release created AOC 397. The spill flowed into the waste stream causing the four oil-water separators to overflow. The release impacted utilities, soil, and groundwater beneath and adjacent to the site. OWS 397B was removed in 1993; the other three oil-water separators were filled with grout and abandoned in place in 1991. Liquid phase JP-5 was observed in 12 manholes in the subsurface utilities. In 1991, subsurface utilities were removed or reconfigured and approximately 33,750 gallons of fluids (product and groundwater) were removed. An additional 72,000 gallons of fluids were removed from the two augmenter trenches. Approximately 1,300 tons of hydrocarbon-impacted soil was removed in 1993, and an additional 300 gallons of fluids were removed. These initial remedial actions removed a preponderance of the JP-5 released. Subsequent environmental investigations estimated the remaining volume of JP-5 not recovered by initial Navy actions to be on the order of 200 gallons. The JP-5 fuel lines were removed in 1998.

In 2001, the Navy operated a DVE system at the site to remove residual separate phase JP-5 from groundwater. Full-scale DVE operations for free-product removal began in March 2002 and were terminated in September 2003. Approximately 1,150 pounds (about 170 gallons) of hydrocarbon were removed from the subsurface, and the system was shut down after it had reached a practical limit for efficient extraction of about 0.1 pounds of hydrocarbon per day. No free product was observed in any onsite wells at shut down of the system.

In October 2003, groundwater samples were analyzed to evaluate groundwater conditions at the end of system operations. Of the 25 wells/piezometers sampled, dissolved mid-ranged hydrocarbons (JP-5 and TPHd) exceeded the TTPH PRC of 1,400 µg/L for ecological point of reception at five locations. No benzene, toluene, ethylbenzene, xylenes (collectively, BTEX), 1,2-DCA, or MTBE were detected above their corresponding drinking water or residential PRCs. Naphthalene was detected at one location in excess of the PRC for drinking water; however, the detection limit for naphthalene was greater than the PRC for all samples. No PAHs other than naphthalene were detected.

In November 2003, periodic DVE operations on select wells resumed to reduce the dissolved concentration of hydrocarbons in groundwater at Building 397, and an interim groundwater monitoring program was implemented. These renewed DVE operations were terminated in February 2006, and only one piezometer showed dissolved mid-boiling point hydrocarbons that exceeded the ecological

PRC upon termination of interim groundwater monitoring in June 2006. Soil gas samples were collected from eight locations about Building 397 in November 2005, and the results of analyses showed no soil gas levels for BTEX exceeded their corresponding 2008 Water Board ESLs. The Method Reporting Limit for 1,2-DCA and naphthalene were greater than the residential ESLs values, but not greater than their corresponding commercial ESLs.

To confirm low levels of residual JP-5 in groundwater at Building 397, samples were collected from 12 wells in January and February of 2010. Results of the sampling event showed no PRCs were exceeded; however, the Reporting Limits for several PAHs were greater than their corresponding drinking water standards. The groundwater sampling of early 2010 shows that residual dissolved petroleum hydrocarbons are below PRCs for future residential use and ecological receptors. In addition, no petroleum related VOCs, lead, or PAHs of concern were detected in groundwater. Additional soil sampling should be conducted in support of closing the petroleum features at Building 397 listed in the PMP including existing and removed fuel water separators.

### *2.3.4 MISCELLANEOUS PETROLEUM SITES*

A few Petroleum Program sites coincide with the Site, but are not associated with corrective action areas: IR9 FP1 and FP2 and OWSs 166A and 166B. The sites are discussed in the following sections.

#### *2.3.4.1 IR9 FP1 and IR9 FP2*

This discussion of IR9 FP1 and IR9 FP2 is condensed from the PMP (Battelle, 2010b). IR9 FP1 and IR9 FP2 are free product petroleum releases, likely the result of former aircraft defueling activities that took place east of Building 410 or former activities associated with Building 410. These sites are along the eastern border of the Site, within IR Site 9, which is discussed above in Section 2.2.1 (Figure 2).

Corrective actions specifically related to IR9 FP1 and IR9 FP2 include a multi-well liquid/vapor extraction system that was installed and operated from June 2005 through February 2006, which removed about 8,000 pounds of free product. Between January and May 2006, three oxidant injection events were conducted through ISCO wells in the first water-bearing zone.

The free product has rebounded since termination of recovery operations in 2006. In 2007, free product was observed in soil borings while tracking the IR Site 9 VOC plume. The extent of free product appears limited to the storm drain area, and recent groundwater monitoring at IR Site 9 indicates the dissolved hydrocarbon plume is not migrating appreciably.

Further DVE for IR Site 9 began in 2011 (in progress). Soil and groundwater sampling is recommended to evaluate site conditions after these corrective actions. The Water Board will close IR9 FP1 and IR9 FP2 after further work is completed regarding traces of floating product and other residual petroleum contamination. However, the remaining petroleum contamination that may need remediation is minor enough that active cleanup likely will be completed long before construction begins on the Site.

#### *2.3.4.2 OWS 166A and OWS 166B*

This discussion of OWS 166A and OWS 166B is condensed from the PMP (Battelle, 2010b). OWS 166A and OWS 166B are two oil-water separators, an estimated 630 gallons and 500 gallons, respectively. These sites are roughly in the Center of the Site, in the southeastern corner of IR Site 27, which is discussed above in Section 2.2.3 (Figure 2).

OWS 166A and OWS 166B contained oily wastewater from a washdown area and were routinely emptied. Minimal petroleum-associated contamination in groundwater indicates that there is no ongoing source. No corrective actions have been taken at these OWSs.

OWS 166A and OWS 166B have not been fully assessed, but there is no indication a release has occurred. Additional soil and groundwater data are needed to comply with the Petroleum Strategy for heavy and middle petroleum distillates to adequately characterize the site to support formal closure. However, little or no petroleum contamination that may need remediation is anticipated and, if present, is expected to be minor enough that active cleanup likely will be completed long before construction begins on the Second Campus.

## *3.0 RISK MANAGEMENT MEASURES TO BE IMPLEMENTED AT THE SITE PRIOR TO REDEVELOPMENT*

In the FISCA SMP, which was used as a template for this SMP, the following sections describe the risk management measures to be implemented at the Site, prior to Site redevelopment, to minimize the potential for human exposures to chemicals that are present at the Site. In the case of Alameda Point, the Site is currently used pursuant to the Lease in Furtherance of Conveyance (LIFOC) between the Navy and the ARRA. The LIFOC describes measures that allow some uses before conveyance, which are protective of human health and the environment. Accordingly, the limited, current commercial uses at the Site are not discussed in this SMP.

The section also includes procedural guidelines to ensure that redevelopment activities at the Site are conducted in accordance with applicable federal, state, and local EH&S regulations.

This SMP does not set forth the scope of the active remedial measures required to be implemented by the Navy, nor does it include the criteria for confirming the adequacy of those measures or the mitigation measures required to be implemented to control air emissions, surface runoff, and similar environmental conditions occurring during the implementation of the remedy. Those management measures are detailed in applicable Navy documents.

### *3.1 WORKER HEALTH AND SAFETY*

#### *3.1.1 Site-Specific Health and Safety Plan*

Site-specific HSPs are designed to ensure that site construction activities are performed in a manner protective of the health and safety of site construction workers and of interim site users in the construction zone (i.e., within the fence that is erected at the beginning of construction activities to demarcate those areas where access needs to be restricted, discussed in Section 4.2). This SMP is designed primarily to ensure the health and safety of current and future Site users outside the immediate vicinity of construction; the development of a Site-specific HSP is the responsibility of the contractor and is beyond the scope of this SMP. The Site-specific HSP provides one mechanism through which all workers involved in the development of the Site are informed of the presence of chemicals in the area prior to initiating work. Site contractors are required to submit their Site-specific HSP to the BCT for review.

Following is a list of minimum requirements that any contractor's Site-specific HSP must meet for that contractor to perform or oversee redevelopment:

- The HSP must be certified by a Certified Industrial Hygienist;

The HSP must contain:

- A background section containing description of the project, including work tasks, objectives, and personnel requirements;
- A discussion of project personnel organization and responsibilities, including names, assignments, responsibilities, reporting pathways, and contact information.
- A discussion of chemical hazards at the site, including acute and chronic health effects, and established occupational exposure limits of chemicals of potential concern identified at the site;
- A discussion of physical hazards known or reasonably expected to be present at the site based on proposed construction, including but not limited to hazards associated with equipment use, environmental hazards (heat stress, etc.), and noise;
- A discussion of engineering controls that will be employed to minimize exposure of site workers and adjacent populations to chemicals in soil and groundwater;
- A discussion of required worker qualifications, including training requirements, medical surveillance, and recordkeeping (see also Section 3.1.2);
- An exposure monitoring plan, including personal workspace monitoring and sampling protocols, appropriate action levels, field monitoring logs, and monitoring equipment calibration specifications;
- A discussion of general safe work procedures, including site control and security measures, sanitation facilities, illumination, required personal protective equipment (types and rationale for selection), establishment of work zones and decontamination procedures, and documented daily tailgate safety meetings (during which the above information, particularly the information regarding the presence of chemicals and chemical hazards, is disseminated to all workers);
- A discussion of confined space entry locations, risks, and specific safety precautions and training requirements.
- Monitoring and general safety protocols to be used in the event of the discovery of areas of unknown contamination or subsurface structures; and
- Emergency response procedures, including a map to the nearest hospital, an evacuation plan, first aid procedures, fire protection and response procedures, spill containment procedures, and emergency references (key telephone numbers, addresses, etc.).

### *3.1.2 Health and Safety Training and Certification*

Based on known environmental conditions at the Site, the use of personnel trained and certified in EH&S procedures pursuant to OSHA 29 CFR 1910.120, HazWoper Training requirements (OSHA-certified), is advisable in certain areas during intrusive construction activities. Intrusive construction activities include excavating, trenching, grading, drilling, and pile driving. In order to comply with OSHA rules and regulations, which is the responsibility of all contractors at the Site, OSHA-certified workers would likely be required to be used in the following areas if intrusive construction activities are to be performed:

- IR Site 9 and IR Site 27, for intrusive activities that may encounter groundwater, until the groundwater has been effectively remediated and until the ROD remedial goals have been attained;
- Petroleum sites, until the soil and groundwater have been effectively remediated and until the sites have been closed by the Water Board;
- EDC-12 AOCs 1, 2, 4, 5, and 6, until the CERCLA site inspection process concludes no remedial action is needed or until soil and groundwater have been effectively remediated and until the BCT concurs remedial goals have been attained;
- The area below the marsh crust threshold depth, where material below the threshold depth is hazardous or uncharacterized (Section 4.3.1.2).

This SMP does not require the use of OSHA-certified workers for intrusive construction activities at locations within the Site, unless such workers are required to comply with requirements under Cal/OSHA rules and regulations. If unknown areas of contamination or subsurface structures are identified pursuant to Section 4.3.3, compliance with OSHA rules and regulations would likely indicate that OSHA-certified employees should perform all remaining intrusive construction at the area in question.

## *3.2 RISK MANAGEMENT TO BE IMPLEMENTED DURING DEMOLITION*

### *3.2.1 Asbestos Abatement*

Asbestos surveys conducted at Alameda Point have identified buildings in which asbestos-containing materials (ACM) are present. ACM removal is regulated by the USEPA and BAAQMD pursuant to the National Emission Standards for Hazardous Air Pollutants (NESHAP) portion of the Clean Air Act and BAAQMD regulations. The following regulations apply to asbestos abatement:

- 29 CFR Sections 1910.12, 1910.20, 1910.134, 1910.145, and 1910.1001;
- 29 CFR Section 1926.1101;

- 34 CFR Section 231;
- 40 CFR Section 61, Subparts A and M;
- CCR Title 8, Sections 1529 and 5208;
- CCR Title 8, Article 2.5;
- CCR Title 22, Division 4; and
- BAAQMD Regulation 11, Hazardous Pollutants Rule 2;

Removal of ACMs at the Site must be performed in accordance with NESHAP requirements, BAAQMD regulations, and the AMP, attached as Appendix D to this SMP, and any other applicable rules and regulations. Collectively, these requirements include provisions for worker health and safety, prevention of releases to the environment, and material handling and disposal.

### *3.2.2 Lead-Based Paint Abatement*

Because most buildings at the Alameda Point were constructed prior to 1978, lead-based paint (LBP) is likely present.

According to CCR Title 8, Section 1532.1 and CCR Title 17, Sections 35000-36100, loose and flaking LBP must be removed prior to demolition of impacted structures. Appropriate measures to control the generation of dust particles during building demolition must then be implemented prior to demolition. LBP abatement will be performed according to all applicable regulations and statutes. General dust control measures to be employed during redevelopment, including demolition, are discussed in Section 4.4.1.

### *3.2.3 Subsurface Structure Demolition*

Subsurface structures harboring impacted soils may be brought to the surface during demolition activities. If the location of these structures is known and anticipated, then demolition will be conducted in accordance with the soil management guidelines presented in Section 4.3.1 and Section 4.3.2.

In the event that unknown subsurface structures are encountered, demolition activities will be conducted in accordance with the contingency protocols set forth in Section 4.3.3.

## *3.3 STRUCTURAL DESIGN CONSIDERATIONS*

Future buildings at the Site that potentially would be underlain by VOCs in soil or groundwater may need to be constructed in a manner that mitigates the potential for organic vapors to infiltrate into occupied spaces. This applies to buildings in

CERCLA and Petroleum Program sites, until the sites are closed (Section 2.2 and Section 2.3). These areas of concern are addressed below.

Vapor mitigation described in this section is not needed for buildings at any site with a final decision document that does not include a requirement to mitigate vapor intrusion. For example, ICs in the ROD for IR Site 27 do not include a requirement for vapor intrusion mitigation (DON, 2008). However, one of the IC objectives listed in Section 12.2.3 of the ROD is to restrict sensitive land uses, including day-care facilities, until remediation is complete and remedial goals are achieved. Accordingly, vapor intrusion mitigation would not be needed for commercial/industrial buildings, except at a day-care facility, if any.

### *3.3.1 Vapor Intrusion Risk Management in Areas of VOCs in Soil or Groundwater*

In certain areas, vapor mitigation measures will need to be implemented to help ensure protection against the infiltration of organic vapors into future buildings. According to the DTSC Vapor Intrusion Mitigation Advisory of April 2009, acceptable vapor mitigation measures should include, but are not limited to:

- A vapor barrier liner incorporated into the design of the building foundation of sufficient size to cover the entire footprint of the structure; and
- A passive collection and venting system for new buildings, such as the installation of a soil gas collection blanket and piping system installed under the proposed floor slabs of any future building.

Vapor mitigation measures generally are not needed for buildings (or portions of buildings) whose lowest floor is below the water table in all seasons. Furthermore, the DTSC allows for podium level garages and mechanically ventilated basement garages as an alternative to the prescriptive mitigation measures, depending on site specific conditions and garage construction and operation details. Once construction of the mitigation system is completed, operation, maintenance and monitoring of the system should be implemented in general accordance with the DTSC advisory. Exceptions, depending on site specific vapor intrusion risk levels, may include measuring air flow and vacuum in the system as an alternative to collecting and analyzing indoor air samples.

All remedial measures associated with VOC contamination of soil and groundwater, including but not limited to groundwater remedial activities and monitoring, will be addressed and implemented by the Navy through the applicable Alameda Point documents. The development and implementation of the vapor mitigation remedy will be coordinated with the ongoing CERCLA remedial activities to ensure that access to and operation of the groundwater remedial system is not impeded.

### *3.3.2 Vapor Intrusion Risk Management Outside Areas of VOCs in Soil or Groundwater*

Generally, structural designs for buildings outside open CERCLA or Petroleum Program sites with VOCs in soil or groundwater are not required to include vapor intrusion mitigation. However, buildings less than 100 feet from such a site are subject to the same vapor intrusion mitigation requirements as buildings within the site (Section 3.3.1).

## *3.4 RISK MITIGATING CONSTRUCTION TECHNIQUES*

Redevelopment has the potential to bring impacted subsurface soil and groundwater to the surface where Site users could potentially be exposed. This SMP addresses requirements for Site-specific construction techniques that minimize the transport of impacted material to the surface, where practicable. Site-specific conditions that may warrant mitigating construction efforts include chemical presence in subsurface soil and groundwater and a shallow groundwater table.

Construction techniques designed to minimize the amount of subsurface soil and groundwater brought to the surface include:

- Abandonment in place of utility lines that are deeper than approximately 4 feet below finished grade rather than excavation and disposal; and
- Driving support piles directly into the underlying soil without pre-boring, where practicable.

## *4.0 RISK MANAGEMENT MEASURES TO BE IMPLEMENTED AT THE SITE DURING DEVELOPMENT*

This section identifies appropriate risk management measures to be implemented at the Site to minimize the potential for human or environmental exposure to chemicals mobilized by construction activities. Where applicable, the risk management activities address each individual environmental medium, and provide risk mitigation efforts for each.

## *4.1 IDENTIFICATION OF CONSTRUCTION/DEVELOPMENT ACTIVITIES THAT COULD IMPACT HUMAN AND/OR ENVIRONMENTAL HEALTH*

Construction and development at the Site are likely to include various site preparation activities that will disturb soils. The following activities have the potential to impact human or environmental receptors:

- Unauthorized access to the Site during construction;
- Dust generation associated with intrusive construction, movement of construction and transportation equipment, and winds traversing exposed soils or stockpiles;
- Off-Site transport of sediment by surface runoff;
- Contaminated groundwater migration via preferential groundwater flow pathways associated with subsurface utility conduits;
- Contamination of groundwater from the stockpiling of saturated, contaminated soil;
- Stockpiling and potential reuse of soil whose chemical concentrations would characterize the soil as “hazardous waste” if the soil were deemed a waste (but only as approved by BCT pursuant to the process set forth in the last sentence of the second paragraph of Section 4.3.2.6);
- Inadvertent off-Site transport of soils on truck wheels or from unsecured truck beds; and
- Dewatering.

## *4.2 ACCESS CONTROL DURING CONSTRUCTION*

The potential for unauthorized access to the construction site and the accompanying risk of exposure to contaminated soil shall be managed as follows:

- A 6-foot-high chain-link fence shall be erected around the construction site perimeter, unless site conditions warrant the use of a taller fence. Access to

the Site will be restricted by control points (i.e., gates) that will be monitored, and locked during non-construction hours.

- "No Trespassing" signs in both English and Spanish shall be posted every 500 linear feet along the fence line.
- If required pursuant to Proposition 65, public notices shall be posted along the fence line alerting the public that chemicals with known adverse health effects have been found in soil and groundwater at the Site.

These are standard construction site security measures that are required to be implemented even in the absence of any chemicals in soil and/or groundwater.

## *4.3 RISK MITIGATION TO ADDRESS CONTAMINANTS IN SOIL*

### *4.3.1 Excavations Below the Marsh Crust Threshold Depth*

The marsh crust is a potentially contaminated subsurface soil horizon between the native Bay Mud sediment and the overlying imported fill material, which has been identified in borings throughout Alameda. Section 2.1.1 contains a more detailed discussion, and Figure 4 presents the City of Alameda Marsh Crust Threshold Depth contours. To address concerns associated with contaminants in the marsh crust, the City enacted the MCO (Alameda Ordinance No. 2824) on February 15, 2000, regulating excavation activities in areas suspected to contain the marsh crust. The MCO, which is attached as Appendix A, requires the following:

- An excavation permit for any excavations performed below a specified threshold depth;
- Adequate measures to protect worker health and safety;
- Handling of soils excavated from below the threshold depth as hazardous waste (if the soil were deemed a waste), unless reconnaissance sampling proves it to be non-hazardous waste to the satisfaction of the CBO.
- Adequate characterization of excavated soils to ensure that they are handled in accordance with all applicable environmental laws and regulations; and
- Construction site Best Management Practices (BMPs).

The MCO is regulated by the City's CBO, under DTSC oversight. The following provides contact information for the City's current CBO:

Mr. Greg McFann, Chief Building Official
City of Alameda Department of Planning and Building
2263 Santa Clara Avenue, Room 190
Alameda, California 94501
(510) 747-6820

This SMP is intended to complement the MCO, while Section 4.3.1.1 and Section 4.3.1.2 fulfill the requirements of Sections 13-56.8a and 13-56.8c of the MCO, respectively. Compliance with Sections 4.3.1.1 and 4.3.1.2 of this SMP does not relieve the contractor from fulfilling the permitting, health and safety, or other obligations promulgated in the MCO.

It is important to make future property owners at the Site aware of the presence and location of the marsh crust. Hence, as required under Section 13-56.8, any analytical data or observations regarding the marsh crust shall be submitted to the City for use by the CBO in amending the marsh crust map to reflect actual Site conditions. Prior to excavations that might extend below the threshold depth, the excavation contractor shall contact the CBO to obtain the most recent Marsh Crust Threshold Depth Map.

### *4.3.1.1 Reconnaissance Sampling*

Section 13-56.8a of the MCO allows soils from below the threshold depth to be treated as non-hazardous waste provided that the implementation of a reconnaissance sampling plan rules out, to the satisfaction of the CBO, the presence of soil that would be "hazardous waste" if the soil were deemed a waste. The CBO shall use the RCRA and CCR definitions of hazardous waste in making this determination. This section stipulates the reconnaissance sampling plan for excavations that will continue below the threshold depth pursuant to Section 13-56.8a of the MCO. Pursuant to the MCO, the CBO, under DTSC supervision, is the lead regulator overseeing implementation of these provisions of this SMP.

The results of previous environmental investigations conducted in the proposed area of excavation may be used to confirm the presence or absence of the marsh crust only following submission of these results to the CBO, and following approval by the CBO of their use for this purpose.

Unless redundant with the use of previous assessment results, or any specific requirements stipulated in the excavation permit by the CBO, the following shall be considered minimum requirements to provide adequate confirmation of the presence or absence of the marsh crust, though more refined characterization may be conducted at the contractor's discretion:

- A minimum of one continuous-core soil boring shall be advanced to 20 feet bgs via direct-push or hollow-stem auger methodology in the proposed excavation area. For excavations generating more than 1,000 $yd^3$ of soil, multiple borings shall be advanced to achieve one boring per 1,000 $yd^3$ of soil generated. Boring spacing closer than 50-foot centers is not required.
- Lithological logging of each boring shall be performed under the supervision of a geologist registered in the State of California, and shall include, at a minimum, a description of soils per the Unified Soil Classification System, color, odor, appearance, facies changes, and headspace reading of major soil units obtained via photo- or flame-ionization detector (PID/FID).
- A minimum of two soil samples shall be collected from each boring. One composite sample shall be collected from above the threshold depth. The other sample should be collected from within the suspected marsh crust interval, and should target the depth exhibiting the highest headspace reading or an interval exhibiting characteristics associated with the marsh crust (i.e., black discoloration, petroleum odor). The samples shall be placed in a cooler on ice and shall be submitted to a state-certified laboratory under chain-of-custody tracking for the following analyses:
    - ♦ TPH by USEPA Methods 3550, 8015B;
    - ♦ VOCs by USEPA Methods, 5035, 8260B;
    - ♦ PAHs (acenaphthene, acenaphthylene, anthracene, B(a)P, benzo(b,k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene) by USEPA Method 8270C with selection ion monitoring (SIM) or USEPA Method 8310;
    - ♦ PCBs by USEPA Methods 3550, 8082; and
    - ♦ Title 22 Metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc) by USEPA Methods 3050B, 6020/6010B and 7471A (for mercury).

Should no marsh crust be encountered, or should the analyses described above indicate that soils below the threshold depth do not contain concentrations of chemicals that would cause the soil to be defined as "hazardous waste" if the soil were deemed a waste, under federal or state law, the soil handling protocols set forth in Section 4.3.2 shall apply to these soils. In the event that "hazardous soils" are identified, soils excavated from at or below the marsh crust depth (as established by the reconnaissance boring(s) or previous environmental work) shall be subject to the soil handling protocols established in Section 4.3.1.2. In the event that soils exhibiting characteristics consistent with the marsh crust are encountered where reconnaissance sampling previously failed to detect these

soils, the provisions of Section 4.3.1.2 shall apply until these soils are properly characterized.

*4.3.1.2 Excavation of Uncharacterized Soils Below the Threshold Depth or Marsh Crust Soils*

Section 13-56.8c of the MCO allows uncharacterized soils to be excavated from below the threshold depth and stockpiled while characterization takes place, provided a site-specific construction SMP has been implemented to ensure proper handling, characterization, and disposal of these soils as hazardous waste (unless demonstrated otherwise). This section is intended to fulfill the requirements of Section 13-56.8c of the MCO, and also provides handling protocols for soils proven to be hazardous by reconnaissance sampling or previous environmental investigations. Under the MCO, handling of material excavated below the threshold depth is to be overseen by a registered geologist or engineer licensed in the State of California.

Should excavation of soils below the threshold depth occur without prior reconnaissance sampling that rules out the presence of marsh crust soils per Section 4.3.1.1, or should soils known or suspected to be "hazardous waste" under law, be excavated, the material should be managed as hazardous waste pursuant to CCR Title 22, Division 4.5 and the following handling protocols shall be implemented:

- Excavation and transportation shall be performed by OSHA-certified personnel;
- Soils shall remain on Site until characterization is complete, unless disposed of as hazardous waste within 90 days (with the exception of soil qualifying for on-Site reuse in commercial areas, where such reuse is approved by the BCT pursuant to the process set forth in the last sentence of the second paragraph of Section 4.3.2.6);
- Breathing zones shall be monitored for dust and VOC concentrations;
- Trucks transporting these soils shall be loaded atop polyethylene sheeting and decontaminated, as necessary, prior to departing the loading area, and all loads shall be covered during transport;
- Soil stockpiles shall be:
  - Segregated from soils of a different origin
  - Placed atop and under anchored, impermeable sheeting
  - Limited in volume to 1,000 $yd^3$
  - Surrounded by hay bales, a filter fabric fence, and access-restricted via erection of a 6-foot-high chain link fence with locked access points

  - Inspected daily, with inspection records maintained pursuant to Section 4.3.2.5
  - Posted with appropriate signage indicating the presence of potentially hazardous waste
- Drainage basins within 250 feet of the stockpiles shall be protected with silt sacks;
- Soils shall be either characterized as non-hazardous waste or disposed of as hazardous waste within 90 days (with the exception of soil qualifying for on-Site reuse in commercial areas, where such reuse is approved by BCT pursuant to the process set forth in the last sentence of the second paragraph of Section 4.3.2.6); and
- Should soils be determined to be hazardous waste, transportation shall be manifested under the appropriate RCRA or California regulations; off-site disposal shall be at a federally- or state-licensed hazardous waste treatment or disposal facility, as appropriate; and disposal documentation shall be provided to both the BCT and City's CBO.

Additional sampling for waste profiling may be required by the disposal facility prior to acceptance of the waste stream, and contractors may wish to collect these samples concurrently with reconnaissance sampling.

### *4.3.2 Soil Management Protocols During Site Development*

All handling, movement, stockpiling, and reuse of soils within the Site is subject to protocols delineated in this section, except for soils addressed in Section 4.3.1. Section 4.3.3 specifies contingency protocols to manage risk in the event that unknown contamination or structures are discovered.

#### *4.3.2.1 Soil Movement and Handling*

Soil may be handled and moved from one portion of the Site to another, as needed, within the limitations established in Section 4.3.2.6. Potential impacts associated with movement and handling are addressed through adherence to the soil stockpile management procedures, (Sections 4.3.2.2 through 4.3.2.5), the dust control measures (Section 4.4), and the storm water pollution prevention control measures (Section 4.5.1) detailed in this SMP. Additionally, soil movement shall be conducted pursuant to the Traffic Management Plan.

#### *4.3.2.2 Soil Stockpiles and Associated Dust Generation*

Soils excavated from the Site may require stockpiling prior to reuse. The risk management measures discussed below will address potential risks from wind transport, surface erosion, and unauthorized access to these stockpiles.

All stockpiles shall be placed atop water-impermeable plastic sheeting within a soil berm, or equivalent sediment trapping mechanism, as per the Storm Water Pollution Prevention Plan (SWPPP). Several alternatives minimize the generation of dust from soil stockpiles:

- Cover the stockpiles with anchored impermeable sheeting;
- Enclose the stockpiles in a covered structure;
- Hydroseed the stockpiles;
- Apply a non-toxic soil stabilizer to the surface of the stockpiles; or
- Regularly spray stockpiles with water to control dust.

One or more of these dust mitigation methods shall be selected based on field conditions such as weather and the size of the stockpile(s). Selection of stabilization efforts shall be at the contractor's discretion, provided compliance with the AMP and BAAQMD regulations is ensured. These soil stockpile management protocols are consistent with what is required by BAAQMD for the management of any soil stockpiles in a Bay Area construction setting.

Soils whose chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste shall not be stockpiled for longer than 90 days. Should the soils meet any of the hazardous waste criteria, they will be disposed of offsite accordingly within 90 days of generation, unless the reuse of such soils in commercial areas is approved by BCT pursuant to the process set forth in the last sentence of the second paragraph of Section 4.3.2.6.

#### *4.3.2.3 Soil Stockpiles and Erosion Management*

This section applies to the following types of stockpiles:

- Stockpiles left in place for more than 30 days;
- Any stockpile left in place during the rainy season (15 October through 1 April);
- Soil stockpiles containing unknown contamination encountered during development and/or excavation, as described in Section 4.3.3; and
- Soils whose chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste.

The guidelines below will help ensure that stockpiled soils do not erode and potentially impact off-Site receptors. The guidelines are consistent with the State Water Resources Control Board Construction Activities Storm Water General Permit Order No. 99-08-DWQ, and associated BMPs for sediment control (regardless of the presence of potential contaminants). For stockpiles meeting any of the criteria listed above, erosion control measures shall be implemented and maintained, and shall include the following:

- Construction of a geotextile (filter) fence, hay bale barrier, or equivalent sediment trapping device, around the stockpile;
- Use of a secured, impermeable stockpile cover;
- Use of drainage basin silt sacks in drainage basins in the near vicinity of the stockpile; and
- Collection, containerization, waste characterization, and disposal in accordance with applicable regulations of any water that collects within any soil berm surrounding the stockpile.

#### *4.3.2.4 Soil Stockpiles and Access Management*

Provided that stockpiles will be located within active construction zones, the access restrictions set forth in Section 4.2 will be sufficient to control stockpile access. However, should the stockpile be located outside an active construction zone, access will be controlled using a chain-link fence with locked gates and appropriate warning signs in English and Spanish.

Unless alternative stockpile management protocols are expressly approved by the BCT, stockpiles of the following types of soil shall be segregated from soils of different origin and surrounded by a 6-foot-high, locked, chain-link fence until determined to be non-hazardous or disposed of off-Site within 90 days:

- Soil stockpiles containing unknown contamination encountered during development and/or excavation, as described in Section 4.3.3;
- Soils excavated from below the marsh crust threshold depth, unless sampling has shown them to be non-hazardous; and
- Soils whose chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste.

#### *4.3.2.5 Soil Stockpiles and Monitoring*

Daily inspection of stockpiles shall be conducted for stockpiles of contaminated or uncharacterized materials, any stockpile located outside an active construction zone, any stockpile in place during a storm event lasting longer than 48 hours, and on the day following a storm event. Weekly inspections shall be conducted for 4 weeks after generation of the stockpile, and weekly for 4 weeks following the implementation of any erosion control device or observance of a failure thereof. Quarterly inspections shall be conducted in all other cases. Inspections of the integrity of the stockpile shall include an assessment of the following:

- The integrity of erosion control efforts;
- The effectiveness of access control measures; and
- The need for repairs to maintain erosion or access control.

Tears in a stockpile cover shall be repaired, or the cover replaced, if the tears exceed 6 inches in length and one-eighth inch in width. Soil washouts are to be replaced and recovered.

To facilitate adherence to the SMP, a stockpile log shall be kept by the developer's designated environmental professional, and shall be made available to the City upon request. The log shall include the following information:

- Date(s) of soil generation;
- Approximate location of excavation(s) generating stockpiled soils;
- Location of stockpile;
- Final destination of stockpiled soils;
- Log of any erosion control measures implemented or modifications made; and
- Stockpile inspection documentation.

#### *4.3.2.6 Soil Reuse*

Subject to the provisions of the MCO, excavated soils may be relocated and reused at the Site. However, soils described below *are* restricted from relocation and reuse at the Site:

- Soils excavated from an open CERCLA or Petroleum Program site or from below the MCO threshold depth cannot be reused as fill in areas with no restrictions on residential land use, unless such soils are analyzed and determined to be appropriate for residential use as described below (not applicable with respect to CERCLA sites with RODs that have no soil remediation requirements or ICs; see Table 2);
- Soils excavated from an open CERCLA or Petroleum Program site or from below the MCO threshold depth cannot be reused as fill in areas with restrictions on residential land use, unless such soils are analyzed and determined to be appropriate for commercial use as described below (not applicable with respect to CERCLA sites with RODs that have no soil remediation requirements or ICs; see Table 2);
- Soil containing unknown contamination, such as unexpected staining or odor, encountered during development and/or excavation, as described in Section 4.3.3;
- Soils whose chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste.

Contractors shall avoid commingling soils meeting any of the above-referenced criteria with soils excavated from other areas. Soils meeting any of the above criteria shall be stockpiled in accordance with Section 4.3.2.4. Soils whose

chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste shall not be reused in any areas where residential land use is not restricted. Soils exhibiting staining or odor shall not be reused in any areas where residential land use is not restricted. Except as provided in the succeeding sentence, soils may be relocated from any area of the Site that is not part of an open CERCLA or Petroleum Program site or from below the MCO threshold depth and reused in the commercial areas of the Site without additional characterization, subject to compliance with the requirements set forth in Section 4.3.3. Soils whose chemical concentrations would characterize the soil as "hazardous waste" if the soil were deemed a waste shall not be reused in the commercial areas of the Site, unless the Site owner or entity proposing to do so submits to the BCT a written proposal demonstrating how such soil reuse complies with regulatory criteria for movement of soil within an area of contamination and/or other applicable regulatory guidelines, and the BCT approves such proposal.

Soils excavated from the open CERCLA or Petroleum Program sites or from below the MCO threshold depth to be used as backfill shall be sampled according to American Society for Testing and Materials (ASTM) E1903-11, *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process,* and ASTM D4700-91, *Standard Guide for Soil Sampling from the Vadose Zone*. Citations to these documents appear as Appendices B and C, respectively. Excavated soils intended for reuse are subject to the following analytical requirements:

- No less than one sample from every 50 $yd^3$ for VOCs (including BTEX and naphthalene) by USEPA Method 8260B;
- No less than one composite sample from every 250 $yd^3$ for Title 22 metals by USEPA Methods 6020/6010B and 7471A, and SVOCs (including PAHs) by USEPA Method 8270C SIM; and
- No less than one composite sample from every 500 $yd^3$ for TPH by USEPA Method 8015B, PCBs by USEPA Method 8082, and asbestos by OSHA Method ID-191.

Composite soil samples shall be created from no less than one subsample from every 50 $yd^3$.

The analytical requirements for excavated soils intended for reuse from an open CERCLA site that has a ROD consist only of analytes with remedial goals. The analytical requirements for excavated soils intended for reuse from an open Petroleum Program site consist only of analytes that have an Alameda Point PRC.

Composite sampling from unanalyzed stockpiled soil is unacceptable, unless it is stockpiled at the borrow area and originates from the same source area. In

addition, if samples are composited, they should be from the same soil layer, and not from different soil layers.

These analytical results will be screened using the following criteria to determine whether soils are appropriate for reuse as fill in residential or commercial areas, as applicable, in the order listed:

- Remedial goals for soil contained in any final ROD for the fill destination
- Latest update of Alameda Point PRCs for soil, which is attached as Table 1 (Battelle, 2009)
- California Human Health Screening Levels (CHHSLs) for soil, published by Cal/EPA's Office of Environmental Health Hazard Assessment (Cal/EPA, 2010)
- USEPA RSLs for soils (USEPA, 2011)
- Other BCT-approved risk-based screening criteria.

If stockpiled soils fail the residential or commercial screening criteria for any analyte, they will not be reused in a residential or commercial area, respectively, but shall be disposed of in accordance with the protocols described in Section 4.3.2.7. Except for remedial goals contained in RODs, the criteria for VOCs in soil do not account for the vapor intrusion pathway (vapor intrusion impacts are based on soil gas data), detections of VOCs in soil that is proposed to be reused will require further evaluation to verify that vapor intrusion issues are not of concern.

#### *4.3.2.7 Offsite Soil Disposal*

Excavated soils that are not reused at the Site must be fully profiled for off-site disposal and managed accordingly. If profiling determines that soils are hazardous waste under RCRA or California hazardous waste regulations, such materials will require appropriate handling and disposal at a licensed hazardous waste treatment, storage, and disposal facility.

#### *4.3.2.8 Soil Transportation*

Soils requiring off-Site transportation must be fully profiled prior to removal from the Site. If profiling determines the material is hazardous waste under RCRA or California hazardous waste regulations, the materials must be managed in accordance with RCRA and/or California waste tracking protocols. If profiling determines that the material is a designated waste, it will be managed and transported under Bill of Lading protocols.

### *4.3.3 Contingency Protocols for the Discovery and Management of Unknown Contamination or Structures*

During construction at the Site, it is assumed that unknown contamination and/or structures may be encountered, especially during excavation. If such unknown contamination and/or structures are encountered, the risk mitigation measures described in Sections 4.3.3.1 and 4.3.3.2 should be implemented in these areas.

#### *4.3.3.1 Identification and Management of Unknown Contamination*

Prior to commencement of construction at the Site, the contractor shall review available data to identify any known areas of chemical presence, including chemical location, type, and concentration. As described in Section 3.1.1, the site-specific HSP, to be prepared by contractors at the Site, shall incorporate a summary of the specific chemical constituents present at the Site to which the workers may be exposed.

Contingency monitoring protocols will be triggered by the identification of any nonconforming soil or groundwater conditions that are not consistent with the review of available data. Such conditions may be noted by visual or olfactory differences, or differences in physical composition from surrounding soils, and shall include, but not be limited to, the following:

- Oily or shiny soils;
- Soils saturated with a liquid other than water (i.e., free-phase liquids);
- Soils with an appreciable chemical or hydrocarbon odor;
- Soils with elevated organic vapor measurements (as measured with a PID or FID); and
- Soil discoloration not related to lithologic facies changes.

If areas of previously unidentified apparent contamination are encountered, work shall cease in that area immediately and the BCT shall be contacted and their assistance requested in determining further sampling or mitigation. Further construction in the area shall not proceed until authorized by the regulatory representative. Materials that trigger these protocols shall be handled pursuant to Section 4.3.1.2 until proven to be non-hazardous waste.

To minimize down time, samples should be collected immediately and analyzed by a state-certified laboratory for any suspected contaminants. Target analytes should be determined with input from the BCT and shall be based on a review of field evidence, as well as existing analytical data from the area. Should the unidentified material prove to be contaminated, further actions shall be undertaken consistent with applicable Cal/OSHA rules and regulations, and under proper regulatory oversight.

#### *4.3.3.2 Identification and Management of Unknown Structures*

During intrusive construction activities at the Site, it is possible that pipelines, USTs, sumps, drainage structures, or other previously unidentified subsurface structures may be encountered.

Chapter 6.7 of the California Health and Safety Code governs the removal and remediation of contamination associated with USTs. The Water Board is responsible for oversight of UST removal and any associated remediation activities. In the event that a UST or associated vents or piping are discovered, the Water Board staff shall be contacted and their assistance requested.

Other underground structures shall be assessed as follows:

1. The structure shall be inspected to assess whether it contains any indication of chemical residuals or free-phase liquids other than water. This assessment shall be conducted by the contractor's designated environmental professional, and shall be based on visual evidence and the results of vapor monitoring using a PID or FID. Under no circumstances shall any personnel enter an unknown subsurface structure at any time. If chemicals are not indicated within the structure by the above-referenced means, the structure may be removed or abandoned in place in a safe manner by the contractor.
2. If liquids are present in the structure, samples shall be collected and submitted to a state-certified laboratory for analysis. Liquids may be temporarily drummed or collected by vacuum truck while analysis is pending. Based on analytical results, the liquids shall be disposed of under the direction of the contractor's environmental professional in accordance with all applicable environmental laws and disposal requirements.
3. If solids are present in the structure and contamination is suspected, they are to be sampled and managed as described above.
4. If contaminated liquid or solid media are present in the structure, the structure shall be inspected for physical integrity following removal of the contaminated media. The contractor's environmental professional shall document the results of this inspection, including an estimation of the volume and former use of the structure. The structure shall then be excavated and disposed of at the direction of the environmental professional.
5. Once the structure is removed, soils adjacent to and beneath the structure shall be assessed for contamination through visual observation and organic vapor analysis and the results documented. If contamination is suspected, soils should be managed as discussed in Section 4.3.1.2.

## *4.4 RISK MITIGATION EFFORTS TO ADDRESS CONTAMINANTS IN AIR*

### *4.4.1 Dust Control*

Contractors shall implement one or more of the following dust control measures during construction to minimize dust generation, and to maintain compliance with the AMP (described in Section 4.4.2 and attached as Appendix D). Successful dust mitigation will accomplish the following goals:

- Reduce the potential for health impacts to construction workers;
- Prevent violations of ambient air quality standards;
- Minimize nuisance dust complaints from Site neighbors; and
- Minimize the migration of contaminants adhered to fugitive dust particles outside the Site.

#### *4.4.1.1 Specific Dust Control Measures*

Dust control measures to be implemented at the Site during construction are identified below. These dust control measures were developed in accordance with BAAQMD particulate matter ($PM_{10}$) control measures. These dust control measures shall include the following:

- Water all active construction areas twice daily, or more frequently if needed, to prevent visible dust plumes from leaving the Site;
- Mist or spray water while loading or unloading soil transportation vehicles as needed to prevent dust generation;
- Minimize drop heights when loading transportation vehicles carrying sand, soil, or other loose materials;
- Use tarpaulins or other effective covers for trucks carrying sand, soil, or other granular loose material, or maintain 2 feet of freeboard in all such trucks;
- Pave, apply water 3 times per day, or apply non-toxic soil binders on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweep all paved access routes, parking areas, and staging areas daily if soil is visible;
- Sweep public streets daily if visible soil material is carried into the street;
- Limit vehicular and equipment traffic speeds on all unpaved roads to 15 miles per hour;
- Line all boundaries between construction areas and public roadways with hay bales or silt fencing;

- Establish stationary downwind monitoring points and implement a monitoring program to determine whether fugitive dust levels leaving the property are below Site-specific thresholds at all times;
- Hydroseed or apply non-toxic soil stabilizers to inactive[2], unvegetated construction areas where native soil was disturbed, if such areas have been inactive for 2 weeks;
- Enclose, cover, stabilize, or water any stockpiles in accordance with Section 4.3.2.2;
- Implement erosion control measures to prevent soil from migrating off Site in surface runoff in accordance with Section 4.5.1; and
- Replant vegetation in disturbed areas immediately following completion of earth moving.

Should mitigation efforts prove inadequate to prevent visible dust plumes from leaving the Site, one or more of the following additional dust control measures shall be implemented at the contractor's discretion:

- Wash all truck and equipment wheels and tracks prior to leaving the Site;
- Install wind breakers or plant trees or vegetative barriers at the windward sides of construction areas;
- Suspend excavation and grading activities when instantaneous wind gusts exceed 25 miles per hour; and/or
- Limit the area subject to excavation, grading, or other dust-generating activity to one area at a time.

Should these dust control measures prove inadequate to prevent visible dust plumes from leaving the Site, excavation and grading activities shall be suspended until wind speeds have diminished.

To minimize the creation of additional exhaust emissions, the following protocols shall be followed:

- Construction equipment shall be stored at the Site, except when not in continuous use;
- Alternative-fueled vehicles and equipment shall be used as practicable;
- Idling times shall be minimized, and not more than 5 minutes;

[2]Construction sites shall be shut down during storm events; in such situations, dust palliatives and/or hydroseeding would not be necessary to control dust levels.

- Equipment shall be tuned and maintained per manufacturer's instructions; and
- Heavy equipment usage shall be restricted from 7 AM to 7 PM from Monday through Friday, and from 8 AM to 5 PM on Saturday, as specified in the City of Alameda Community Noise Ordinance.

#### *4.4.1.2 Documentation of Dust Control Measures*

Contractors will be required to record all dust mitigation activities daily. Logs are to be maintained for 60 days following the completion of construction where dust mitigation was implemented.

### *4.4.2 Air Monitoring Plan*

In addition to dust control measures, an AMP has been developed to ensure the health and safety of off-Site populations during construction. The AMP uses downwind perimeter air monitoring action levels to ensure that constituents migrating off Site, including dust, do not exceed state or federal ambient air quality standards. The AMP is presented as Appendix D.

The AMP does not address air monitoring protocols used to ensure the health and safety of the contractors and other workers/visitors within the construction area (i.e., within the fence used to control access to the construction area). Monitoring protocols for the protection of the contractors involved in the development of the Site are to be detailed in Site-specific HSPs prepared by the contractors prior to the initiation of construction activities.

## *4.5 RISK MITIGATION EFFORTS TO ADDRESS CONTAMINATION OF SURFACE WATER AND/OR GROUNDWATER*

### *4.5.1 Off-Site Runoff Control*

To prevent the migration of soil from the Site into adjacent areas by surface drainage, runoff control measures shall be implemented around the perimeter of the active construction site and shall include the following:

- Erection of a filter fabric fence, hay bale barrier, or equivalent around the entire active construction site;
- Placement of silt sacks in catch basins in the active construction area and public streets immediately adjacent to the active construction area.

Runoff controls shall be inspected daily during storm events of greater than 48 hours duration, weekly during the rainy season (15 October through 1 April) and quarterly during the remaining months. Any failures of the runoff control devices

shall be immediately rectified. If visible soil runoff is observed leaving the Site, runoff control measures will be amended immediately by the contractor.

All mitigation methods described above to control off-site runoff from impacting adjacent areas should be interpreted so as to be consistent with the State Water Resources Control Board Construction Activities Storm Water General Permit Order No. 99-08-DWQ, and shall be incorporated as BMPs in the required SWPPP that must be prepared for each development project that is constructed at the Site.

### *4.5.2 Methods to Minimize the Creation of Preferential Flow Pathways*

During redevelopment of the Site, trenches will be constructed for the placement of public and private utilities. In general, the depth to groundwater at the Site is between 4 and 8 feet bgs. The following risk management measures apply to trenches constructed below the upper limit of groundwater fluctuation at 4 feet, or below the water table as observed during construction, whichever is shallower. These measures will ensure that trench construction minimizes the migration of impacted groundwater through utility conduits. The measures to mitigate groundwater preferential flow pathways are to be implemented in all trenches that are constructed in an open CERCLA or Petroleum Program site having groundwater contamination, or other areas where apparent groundwater contamination has been encountered (as described in Section 4.3.3.1). For CERCLA or Petroleum Program sites where investigations are complete, these measures are not required more than 100 feet from the groundwater plume.

Mitigation measures include the following:

- Low permeability materials will be placed at 300-foot intervals in the trench to disrupt groundwater flow within the trench backfill.
- Such impediments will also be placed at the intersection of trenches with the Site boundary. Several acceptable alternatives exist:
  - Backfilling a 1-foot trench section with a cement and bentonite mixture;
  - Installing a clay plug by compacting clay around the utility for a 5-foot trench section; or
  - Creating a 1-foot barrier by forming and pouring concrete around the utility.

### *4.5.3 Dewatering Management Protocols*

Dewatering conducted in an open CERCLA or Petroleum Program site having groundwater contamination (Figure 2) or in areas where apparent contamination has been encountered in groundwater, shall be conducted in compliance with all OSHA rules and regulations, in accordance with the following guidelines:

- The dewatering system shall be monitored on a continuous, 24-hour basis during dewatering, or be designed with dual redundancy to prevent an overflow of contaminated water from detention structures. For example, fractionation tanks shall be equipped with both a high-level and an ultrahigh-level sensor, both of which will shut off influent pumps if tripped.
- All applicable discharge permits shall be obtained and observed.
- Dewatering and treatment residuals, such as tank bottoms and spent granular activated carbon, shall be disposed of in an appropriate manner at the direction of the contractor's environmental professional.
- Prior to dewatering in an open CERCLA or Petroleum Program site having groundwater contamination, the Alameda Point BCT will be contacted to ensure coordination between proposed dewatering activities and groundwater investigation and remediation activities.

Table 2 lists sites with groundwater contamination at which dewatering management protocols likely would apply.

### *4.5.4 Long-Term Groundwater Monitoring Impacts*

Due to the presence of the CERCLA and Petroleum Program sites as shown in Figure 2, groundwater monitoring at the Site is ongoing. To prevent redevelopment activities at the Site from negatively impacting these activities, the following actions will be taken:

- Prior to intrusive on-Site activities, monitoring wells will be located and protected by the installation of an appropriate crash barrier around the wellhead. Examples of appropriate crash barriers include a concrete K-rail triangle around the wellhead, or steel I-beams driven into the ground on four sides of the well.
- Any wells destroyed during redevelopment activities will be replaced following approval by and under the supervision of the BCT.
- Any wells rendered ineffective due to permanent changes in groundwater flow patterns caused by redevelopment activities will be replaced following approval by and under the supervision of the BCT.

## *5.0 RISK MANAGEMENT MEASURES TO BE IMPLEMENTED AT THE SITE FOLLOWING DEVELOPMENT*

This section identifies appropriate risk management measures to be implemented at the Site after the development of the LBNL Second Campus is complete in order to ensure that Site occupants are fully protected from residual levels of chemicals that may remain in soil and/or groundwater at the Site.

Implementation of the management measures identified in this section is the responsibility of each owner, lessee, or their delegates with relevant property maintenance experience who have expressly assumed such responsibilities.

### *5.1 LONG-TERM RESTRICTIONS ON GROUNDWATER USE*

Based on high TDS concentrations, shallow groundwater beneath the Site is unlikely to be used as a source of drinking water. As an added precaution, the environmental restrictions that are currently in the LIFOC contain, and will continue to contain, a groundwater use restriction that prohibits the construction of any water well screened for the extraction of water from the shallowest groundwater zone, and prohibits the extraction, utilization, or consumption of water from the shallowest groundwater zone for use other than irrigation or emergency use. Extraction of groundwater for necessary construction dewatering will be permitted following concurrence by the BCT that such extraction does not conflict with environmental remediation activities.

For buildings constructed with vapor intrusion mitigation systems, long-term operation and maintenance will be required to maintain the integrity of the mitigation system. These requirements will be outlined in building-specific operation and maintenance manuals and will include periodic system component inspection and repair procedures, and appropriate agency reporting.

## *6.0 REFERENCES*

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TTEMI. 2002. *Draft Corrective Action Area 9A No Further Action Report, Request for No Further Action, Underground Storage Tanks 584-1 and 584-2, Alameda Point, Alameda, California.* January.

United States Environmental Protection Agency (USEPA). 2011. *Regional Screening Levels (Formerly PRGs)*. Text and current updates available from USEPA via the World Wide Web at: http://www.epa.gov/region9/superfund/prg/.

*Tables*

## Table 1 Soil Preliminary Remediation Criteria
**from PRC Tech Memo (Battelle, 2009)**

| | PRC for Soil (mg/kg) | |
|---|---|---|
| **Chemical** | **Residential[a]** | **Nonresidential[a]** |
| ***Volatile Organic Compounds*** | | |
| Benzene | 1.1 | 5.6 |
| Toluene | 930 | 930 |
| Ethylbenzene | 5.7 | 29 |
| Xylenes | 300 | 300 |
| MTBE | 39 | 190 |
| 1,2-DCA | 0.45 | 2.2 |
| | | |
| ***Metals*** | | |
| Lead | TBD[e] | 800 |
| | | |
| ***Polycyclic Aromatic Hydrocarbons*** | | |
| Acenaphthene | 3,400 | 33,000 |
| Acenaphthylene | 3,400[f] | 33,000[f] |
| Anthracene | 17,000 | 170,000 |
| Benzo(a)anthracene | 0.15[k] | 2.1 |
| Benzo(b)fluoranthene | 0.15[k] | 2.1 |
| Benzo(k)fluoranthene | 0.38[l] | 1.3[l] |
| Benzo(a)pyrene | 0.15[k] | 0.21 |
| Benzo(g,h,i)perylene | 1,700[g] | 17,000[g] |
| Chrysene | 3.8[k], [l] | 13[k], [l] |
| Dibenz(a,h)anthracene | 0.15[k] | 0.21 |
| Fluoranthene | 2,300 | 22,000 |
| Fluorene | 2,300 | 22,000 |
| Indeno(1,2,3-cd)pyrene | 0.15[k] | 2.1 |
| 1-methylnaphthalene | 22 | 99 |
| 2-methylnaphthalene | 310 | 4100 |
| Naphthalene | 3.9 | 20 |
| Pyrene | 1,700 | 17,000 |
| | | |
| ***Total Petroleum Hydrocarbons*** | | |
| Gasoline | 950[i] | 4,333[i] |
| Diesel/Jet Fuel | 429[i] | 1,914[i] |
| Motor Oil | 600 | 2,680 |
| Total TPH | - | - |

**Table 1 Soil Preliminary Remediation Criteria – footnotes**

"-" indicates that there is no value available.
(a) Residential and non-residential PRCs in soil have been updated to be consistent with U.S. EPA RSLs issued in April 2009 (http://www.epa.gov/region09/superfund/prg/index.html), unless otherwise indicated.
(e) A residential soil lead PRC of 319 mg/kg was derived using LeadSpread 7 (Cal/EPA, 2000) in Attachment 2 and includes the homegrown produce exposure pathway and incorporates site-specific characteristics of Alameda Point. However, the regulatory agencies have expressed some concern regarding potential inconsistencies that could be created with residential soil remedial goals for lead that have been applied on CERCLA remedial actions at Alameda Point. At the time of the printing of this tech memo the California DTSC suggests the use of a residential soil lead PRC of 150 mg/kg, but also indicates that they are conducting additional evaluations. The Navy has decided to leave the residential soil lead PRC as "TBD" until additional information is available from DTSC's review, and a consensus can be reached with the regulatory agencies.
(f) Because a RSL is not available for acenaphthylene, the RSL for acenaphthene is used as a surrogate.
(g) Because a RSL is not available for benzo(g,h,i)perylene, the RSL for pyrene is used as a surrogate.
(i) TPH soil PRCs have been updated based on the calculations described in Attachment 3.
(k) These PRCs are less than the comparable ESLs from Water Board, 2008 based on different exposure assumptions and have been incorporated into the ESL screening criteria listed in Table 2. For instance the ESLs in Table 2 consider adult-only consumption for tapwater, whereas the U.S. EPA RSL incorporates exposure to an adult and child (i.e., weighted adjustment of exposure factors).
(l) PRCs set at the values recommended in DTSC HHRA Note No. 3 dated May 6, 2009 instead of U.S. EPA RSLs issued in April 2009.

**Table 2 Contaminant Status of Media at CERCLA and Petroleum Program Sites**

| Site | ROD[1] | Contamination[2] | |
|---|---|---|---|
| | | Soil | Groundwater |
| **CERCLA Program** | | | |
| IR Site 9 | 2012 | no | yes |
| IR Site 13 | 2012 | no | no |
| IR Site 27 | 2008 | no | yes |
| EDC-12 AOC 1 | 2012 | minor | no |
| EDC-12 AOC 2 | 2012 | minor | unlikely |
| EDC-12 AOC 4 | 2012 | no | minor |
| EDC-12 AOC 5 | 2012 | minor | minor |
| EDC-12 AOC 6 | 2012 | no | minor |
| EDC-12 Aircraft Parking/Staining | 2012 | no | no |
| **Petroleum Program** | | | |
| CAA-9A, USTs 584-1 & 2, and NAS GAP 04/SWMU 584 | 2013 | minor | yes |
| CAA-11 | 2013 | minor | minor |
| CAA-11, FL-139 | 2012 | unlikely | unlikely |
| CAA-11, FL-140 | 2012 | unlikely | unlikely |
| CAA-11, USTs 37-9 thru 37-12 | 2012 | unlikely | unlikely |
| CAA-11, USTs 37-13 thru 37-16 | 2013 | unlikely | minor |
| CAA-13 | 2013 | TRW[3] | yes |
| CAA-13, AOC 397 and OWSs 397A thru 397D | 2013 | minor | minor |
| IR9 FP1 and IR9 FP2 | 2013 | minor | yes |
| OWSs 166A & 166B | 2012 | unlikely | unlikely |

[1] Dates are estimated for finalizing future RODs and decision documents in the case of Petroleum Program Sites.

[2] Contaminant status is established for IR Sites 9, 13, and 27, because ROD and/or FS is done. For other sites, status is estimated.

[3] Tarry refinery waste, see Section 2.2.2.

*Figures*

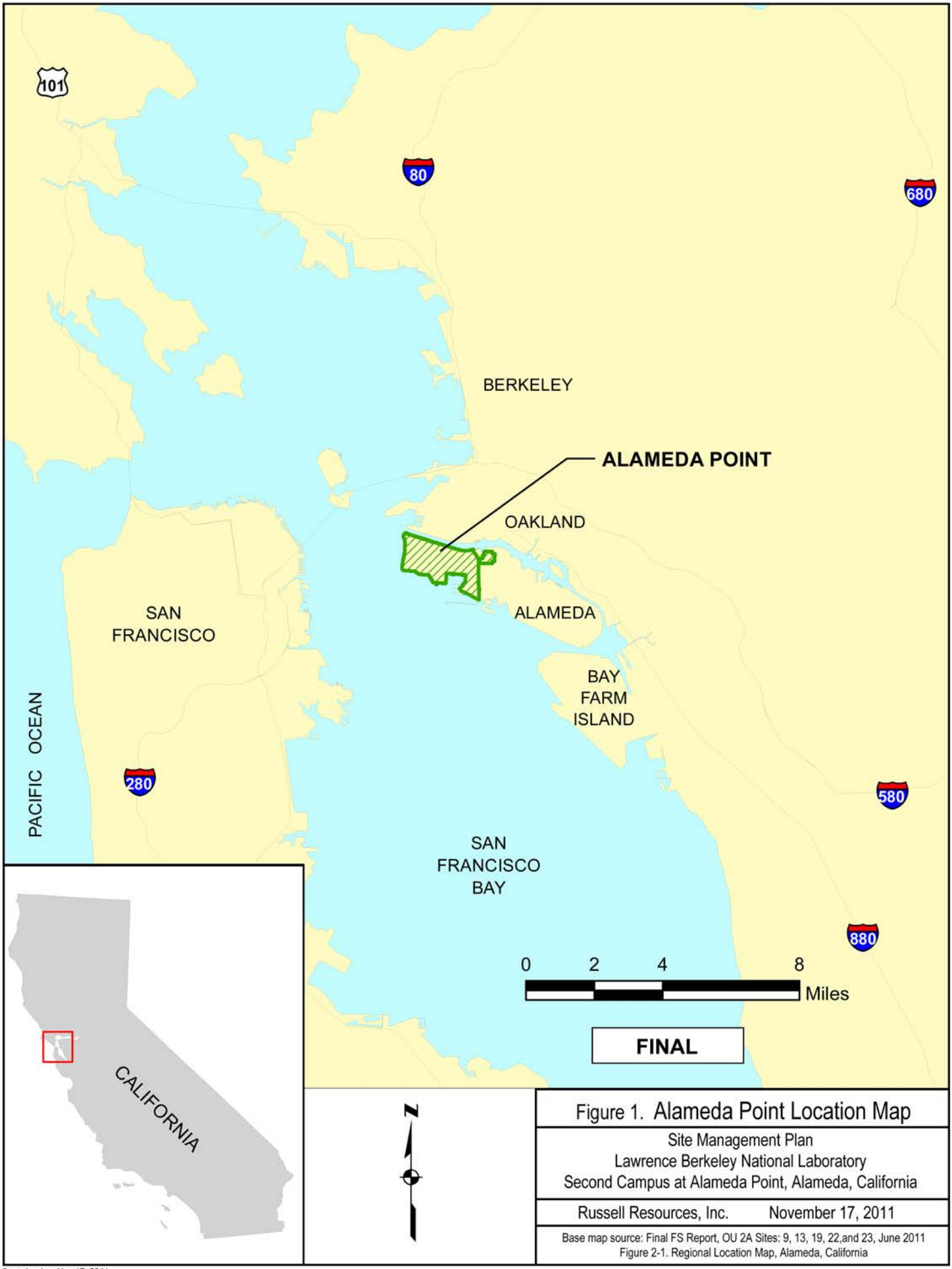



Figure 1. Alameda Point Location Map

Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

Russell Resources, Inc. November 17, 2011

Base map source: Final FS Report, OU 2A Sites: 9, 13, 19, 22,and 23, June 2011
Figure 2-1. Regional Location Map, Alameda, California

figure1_e.jpg Nov 17, 2011

figure2a_f.jpg Nov 17, 2011

# Figure 2A Site Features

Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

Russell Resources, Inc. November 17, 2011

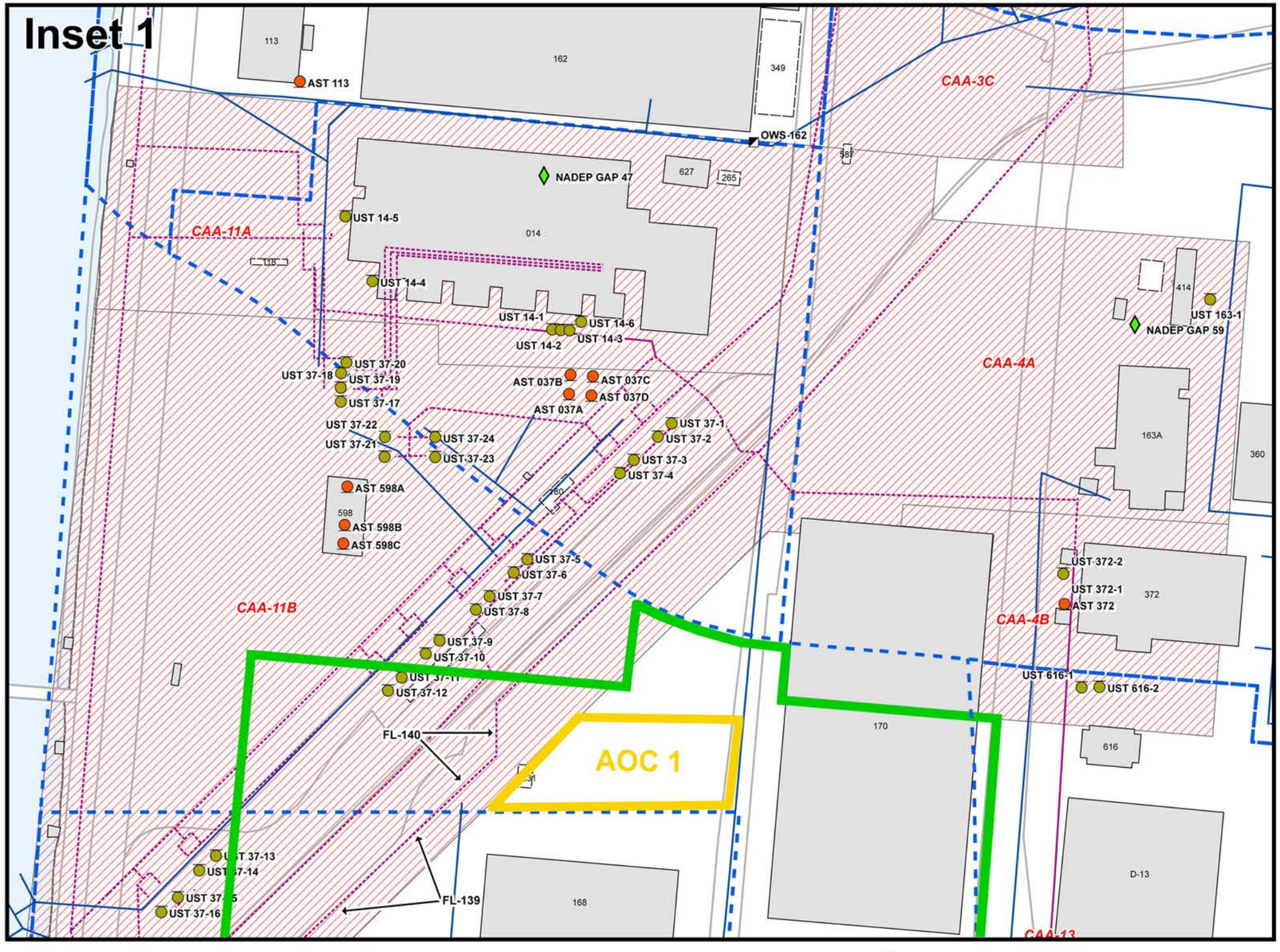
Base map source: Alameda Point Petroleum Management Plan, November 2010
Figure 3-2. Site Location May Be Showing "Open" Petroleum Program Sites

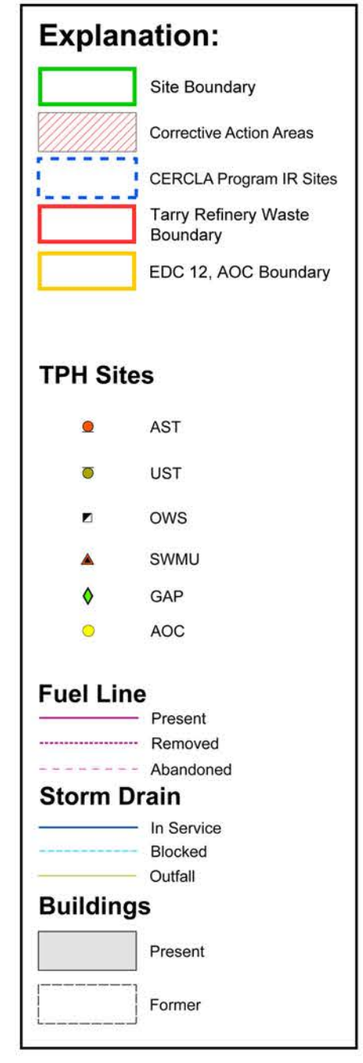
N

0 50 100 200
Feet

**See Inset 1**

AST 113
NADEP GAP 47
UST 14-5
CAA-11A
UST 14-4
UST 37-20
UST 37-19
UST 37-18
UST 37-17
T 037A
AST 037B
C
AST 037D
UST 37-21
UST 37-22
UST 37-24
UST 37-23
UST 37-3
UST 37-2
AST 598B
AST 598A
UST 37-4
UST 37-6
UST 37-5
AST 598C
UST 37-8
UST 37-7
UST 37-10
UST 37-9
CAA-11B
UST 37-11
UST 37-12
FL-140
AOC 1
UST 37-15
UST 37-13
UST 37-14
UST 37-16
FL-139
CAA-4A
NADEP GAP 59
UST 372-2
UST 372-1
AST 372
CAA-4B
UST 616-1
2
OWS 397D
OWS 397C
AOC 397
OWS 397B
OWS 397A
OWS 166B
OWS 166A
IR SITE 09-FP1
IR SITE 09-FP2
OWS
Defueling Are
OWS 529
AST 530A
AST 530C
AST 530B
AOC 2
AOC 4
AOC 5
AOC 6
CAA-9A
TRW
See Inset 2
UNAS GAP 04/ SWMU 584
AST 620
AST 342A
AST 342B
SUPSHIP-1
SUPSHIP
Legend and inserts for this figure are located on Figure 2B
FINAL



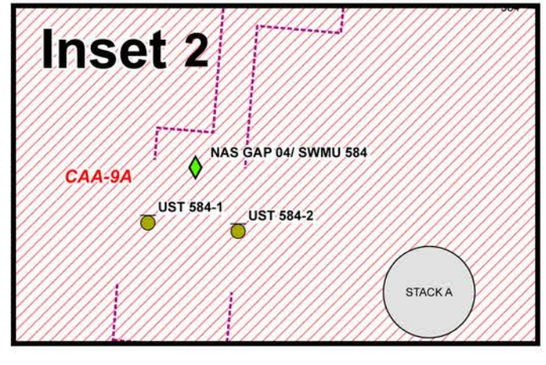




Figure 2B **Site Features**

Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

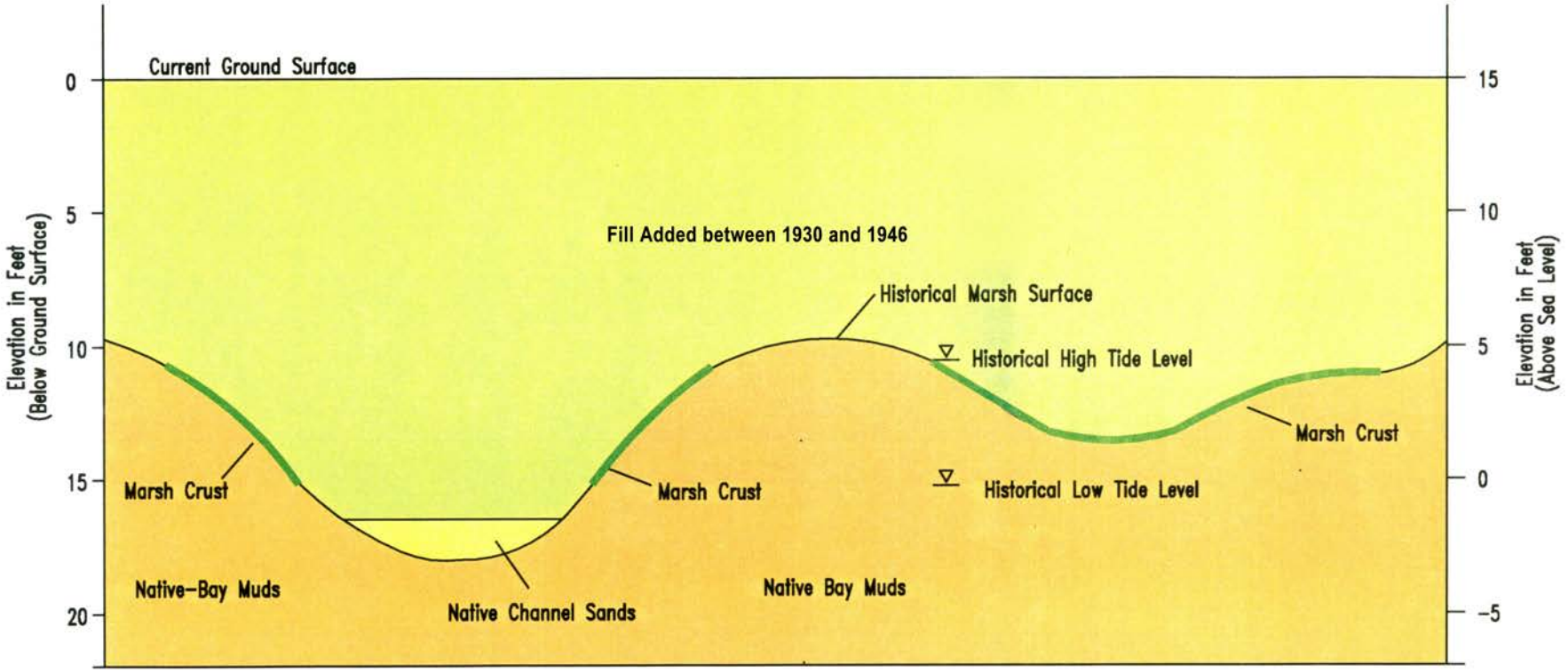
Russell Resources, Inc. November 17, 2011

Base map source: Alameda Point Petroleum Management Plan, November 2010
Figure 3-2. Site Location May Be Showing "Open" Petroleum Program Sites

FINAL

figure2b_f.jpg Nov 17, 2011

figure3_e.jpg Nov 17, 2011

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NOTE: MAP IS BASED ON BORING LOGS AND HISTORICAL RECORDS.

Figure 3. Generalized Geologic Cross Section of Tidal Channels

Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

Russell Resources, Inc. November 17, 2011

Base map source: Final FS for the Marsh Crust and Groundwater at the FISCA and FS for the Marsh Crust and Former Subtidal Area at Alameda Point, March 2000
Figure 1-5. Generalized Geologic Cross-section of Tidal Channels

figure4a_f.jpg Nov 17, 2011

# Figure 4A
# Marsh Crust Threshold Depth Map

## Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

Russell Resources, Inc. November 17, 2011

Base map source: Alameda Point Petroleum Management Plan, November 2010
Figure 3-2. Site Location May Be Showing "Open" Petroleum Program Sites

N

0 50 100 200
Feet

**See Inset 1**

AST 113
NADEP GAP 47
UST 14-5
CAA-11A
UST 14-4
UST 37-20
UST 37-19
UST 37-18
UST 37-17
T 037A
AST 037B C
AST 037D
UST 37-21
UST 37-22
7-24
UST 37-23
UST 37-3
UST 37-2
AST 598B
AST 598A
UST 37-4
UST 37-6
UST 37-5
AST 598C
UST 37-8
UST 37-7
UST 37-10
UST 37-9
CAA-11B
UST 37-11
UST 37-12
FL-140
AOC 1
UST 37-15
UST 37-13
UST 37-14
UST 37-16
FL-139
CAA-4A
NADEP GAP 59
MHHW
4
5
163A
UST-3
UST
AST
Marsh Crust Ordinance is not applicable
CAA-4B
UST 616-1 2
616
170
19
D-13
609
OWS 397D
OWS 397C
AOC 397
OWS 397B
OWS 397A
deeper than mean higher high tide
deeper than five feet
27
10
5
13
TRW
CC1
OWS 166B
OWS 166A
9
410
IR SITE 09-FP1
IR SITE 09-FP2
OWS
Defueling Are
10
AOC 4
AOC 2
AST 530A
AST 530C
AST 530B
OWS 529
AOC 6
584-1
584
See Inset 2
UNAS GAP 04/ SWMU 584
CAA-9A
AST 620
AOC 5
SUPSHIP-1
AST 342A
AST 342B

Legend and inserts for this figure are located on figure 4B.

Note: Map based on "City of Alameda Ordinance No. 2824 Alameda Municipal Code Threshold Depth Map" February 2007.

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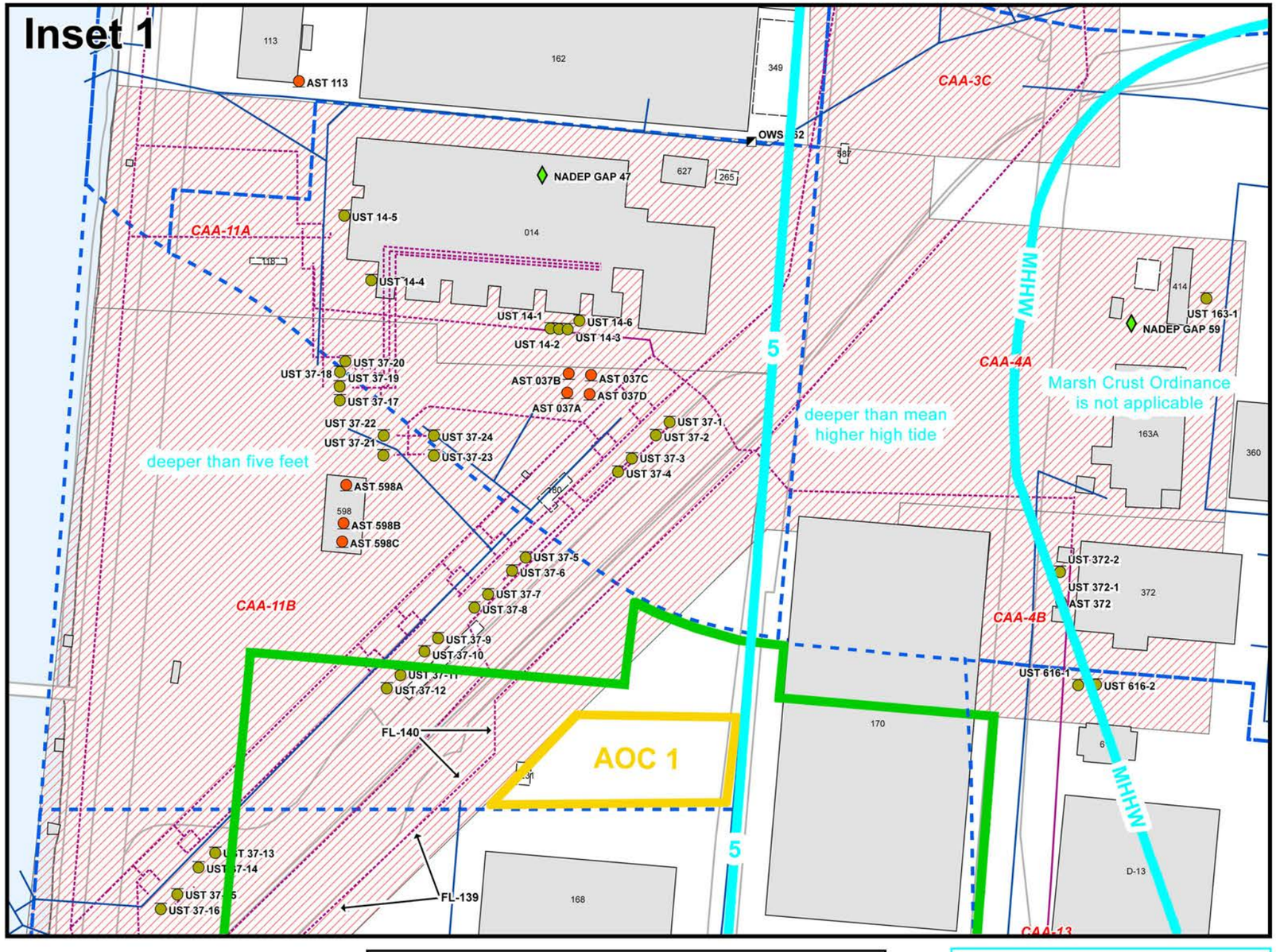



## Explanation:

- Site Boundary
- Corrective Action Areas
- CERCLA Program IR Sites
- Tarry Refinery Waste Boundary
- EDC 12, AOC Boundary
- Marsh Crust Threshold Depth Contour (ft below ground surface)

### TPH Sites

- AST
- UST
- OWS
- SWMU
- GAP
- AOC

### Fuel Line

- Present
- Removed
- Abandoned

### Storm Drain

- In Service
- Blocked
- Outfall

### Buildings

- Present
- Former

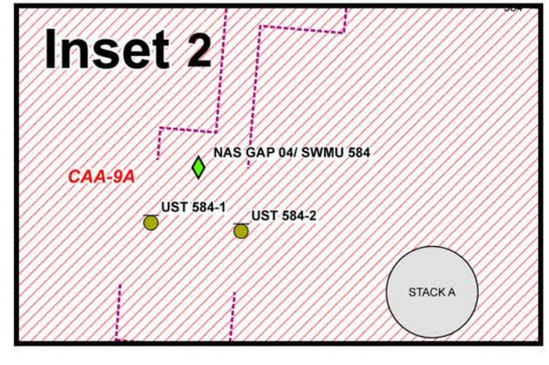



Figure 4B Marsh Crust Threshold Depth

Site Management Plan
Lawrence Berkeley National Laboratory
Second Campus at Alameda Point, Alameda, California

Russell Resources, Inc. November 17, 2011

Base map source: Alameda Point Petroleum Management Plan, November 2010
Figure 3-2. Site Location May Be Showing "Open" Petroleum Program Sites

Note: Map based on "City of Alameda Ordinance No. 2824 Alameda Municipal Code Threshold Depth Map" February 2007.
MHHW = mean higher high water

**FINAL**

figure4b_f.jpg Nov 17, 2011

*Appendix A*
*Marsh Crust Ordinance*

FISC Marsh Crust



CITY OF ALAMEDA ORDINANCE NO. 2824
New Series

AMENDING THE ALAMEDA MUNICIPAL CODE BY AMENDING CHAPTER XIII (BUILDING AND HOUSING) BY ADDING A NEW SECTION 13-56 (EXCAVATION INTO THE MARSH CRUST/SUBTIDAL ZONE AT THE FORMER NAVAL AIR STATION ALAMEDA AND FLEET INDUSTRIAL SUPPLY CENTER, ALAMEDA ANNEX AND FACILITY) TO ARTICLE XVII (PITS, WELLS AND EXCAVATIONS)

WHEREAS, the marshlands and near shore areas once located adjacent to the island of Alameda were filled with dredge material between approximately 1900 and 1940; and

WHEREAS, the marsh crust, and the subtidal zone extending from it, is a horizon that is identifiable in the subsurface (the interface at the bottom of the fill material) which contains remnants of grasses and other intertidal and subtidal features; and



WHEREAS, the marsh crust/subtidal zone also contains, at least locally, elevated levels of petroleum-related substances, such as semi-volatile organic compounds, which substances may pose an unacceptable risk to human health and the environment if excavated in marsh crust/subtidal zone materials, brought to the ground surface and handled in an uncontrolled manner; and

WHEREAS, proper handling, storage and disposal of materials excavated from the marsh crust/subtidal zone, pursuant to state and federal hazardous materials laws, will help eliminate unacceptable exposures and risks to human health and the environment; and

WHEREAS, the Draft Base-wide Focused Feasibility Study for the Former Subtidal Area and Marsh Crust and Ground Water (U.S. Navy, February 20, 1999) recommends implementation by the City of an institutional control, such as an excavation ordinance, as a remedial action related to the cleanup by the United States Navy of Naval Air Station Alameda and the Fleet Industrial Supply Center, Alameda Annex and Facility, which closed military installations are anticipated to be transferred to the City; and

WHEREAS, it can be seen with a certainty that adoption of a permitting program by the City that requires proper handling, storage and disposal, pursuant to existing state and federal hazardous materials laws, of materials excavated from the marsh crust/subtidal zone will not involve or require any physical activities other than optional testing of excavated materials and, therefore, is exempt from the California Environmental Quality Act pursuant to California Code of Regulations, title 14, section 15061(b)(3) because there is no possibility that the enactment of the ordinance may have a significant effect on the environment.

NOW, THEREFORE, BE IT ORDAINED by the Council of the City of Alameda that:

Section 1. The Alameda Municipal Code is hereby amended by adding a new Section 13-56 (Excavation Into the Marsh Crust/Subtidal Zone at the Former Naval Air Station Alameda and Fleet Industrial Supply Center) to Article XVII (Pits, Wells and Excavations) of Chapter XIII (Building and Housing) thereof to read:

## 13-56 EXCAVATION INTO THE MARSH CRUST/SUBTIDAL ZONE AT THE FORMER NAVAL AIR STATION ALAMEDA AND FLEET INDUSTRIAL SUPPLY CENTER, ALAMEDA ANNEX AND FACILITY.

### 13-56.1 DEFINITIONS.

For purposes of this Section 13-56 the following definitions shall apply:

*Bay* shall mean San Francisco Bay, including the Oakland Estuary and the Oakland Inner Harbor.

*DTSC* shall mean the California Environmental Protection Agency, Department of Toxic Substances Control.

*Earth material* shall mean any rock, natural soil or fill or any combination thereof.

*Excavation* shall mean the mechanical removal of earth material.

*Hazardous materials*, as defined in California Health and Safety Code sections 25260(d) and 25501(k), shall mean any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste and any material which a handler or the administering agency has reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

*Marsh crust* shall mean the underground layer that is the remnant of the tidal marsh that existed along the shoreline of Alameda Island before filling to create additional dry land. In many places, this layer contains substances from former industrial discharges that were retained in the historic marsh before filling.

*Subtidal zone* shall mean the underground layer that is the pre-filling Bay floor extension of the historic marsh. Together, the marsh crust and the subtidal zone constitute a single, continuous, underground layer that extends Bayward of the original mean higher high tide line of Alameda Island, before filling, throughout the area that was filled.

*Threshold depth* shall mean the depth below which a permit is required by this Section 13-56. The threshold depth is conservatively identified with the elevation above which there is little likelihood that substances from the historic marsh or Bay floor would have mixed during filling, including a margin of safety above the elevation of the historic marsh surface or subtidal zone. In no event will the threshold depth be above mean higher high water.

**13-56.2 Permit Required.**

a. It shall be unlawful for any person, including utility companies and their employees and contractors, to excavate below a threshold depth above the marsh crust/subtidal zone within the area of the former Naval Air Station Alameda and Fleet and Industrial Supply Center, Alameda Annex and Facility, as depicted in Exhibit A, hereto, without first obtaining a permit in writing from the Chief Building Official.

b. All excavation below the threshold depth in the area subject to this Section 13-56 shall be performed solely in accordance with the permit as approved and issued by the City.

**13-56.3 Depth of Excavation Subject to Permit Requirement.**

The Chief Building Official shall establish a threshold depth, consistent with DTSC's remedial decision documents pertaining to the marsh crust/subtidal zone, below which a permit shall be required for excavation pursuant to this Section 13-56. The threshold depth may vary by location. The Chief Building Official shall publish a map depicting the parcels and threshold depths for which a permit is required under this Section 13-56. The Chief Building Official may update the map, consistent with DTSC's remedial decision documents pertaining to the marsh crust/subtidal zone, as necessary to incorporate any new information concerning the depth of the marsh crust/subtidal zone received by the City since the preparation of the initial map or last update.

**13-56.4 Exception to Permit Requirement.**

a. No permit shall be required under this Section 13-56 for pile driving or other penetration of the marsh crust/subtidal zone that involves neither (i) bringing materials from below the threshold depth to above the threshold depth; nor (ii) exposure of construction workers to soil excavated from below the threshold depth.

b. No permit shall be required under this Section 13-56 for excavation associated with emergency repair of public infrastructure facilities; provided, however, that soil excavated from below the threshold depth in the area of the marsh crust/subtidal zone, as depicted on Exhibit A, must be managed as though it were hazardous in accordance with Subsection 13-56.8b.

**13-56.5 Permit Application.**

Application for a permit shall be made in writing on forms available in or from the Building Services Office and shall be filed in the Building Services Office. Subsection 13-1.2 of Article I of Chapter XXIII regarding Appeals (Section 105.1), Appeal Fee (Section 105.2), Expiration (Section 106.4.4), Permit Fees (Section 107.2) and Plan Review Fees (Section 107.3) shall apply to all permits issued pursuant to this Section 13-56. The information required to be provided on the application shall be determined by the Chief Building Official and shall include at a minimum:

a. A description and map of the property that is to be excavated sufficient to locate the area of proposed excavation on Exhibit A.

b Detailed plans, prepared by a registered civil engineer licensed in the State of California, of the excavation work to be done, including a drawing with dimensions to scale of all proposed excavation activity.

c. A statement of the maximum depth of excavation.

d. All elevations in plans and application materials submitted to the City shall be referenced to City Datum and shall show depth below ground surface.

e. A cost estimate for purposes of determining the amount of the bond required to be obtained pursuant to Subsection 13-56.11.

**13-56.6 Certifications and Acknowledgments.**

a. The following certifications shall be required as part of the permit application:

1. The applicant shall sign a certification prepared by the Chief Building Official acknowledging receipt of notice that the property to be excavated may be in the area of the marsh crust/subtidal zone, and that hazardous materials may be encountered during excavation.

2. The applicant shall sign a certification prepared by the Chief Building Official acknowledging that federal and state hazardous materials laws and regulations will apply to storage, transportation and disposal of any materials excavated from the marsh crust/subtidal zone that are hazardous materials.

3. The applicant shall sign a certification prepared by the Chief Building Official acknowledging liability for disturbing and removing all materials from the marsh crust/subtidal zone in accordance with this Section 13-56 and the permit.

b. All building and excavation permits issued for construction or excavation within the area subject to this SubSection 13-56 shall contain the following written warning:

"Pursuant to Section 13-56 of Article XVII of Chapter XIII of the Alameda Municipal Code, excavation work in the area of the marsh crust/subtidal zone within the area of the former Naval Air Station Alameda and Fleet and Industrial Supply Center, Alameda Annex and Facility, as depicted in Exhibit A to Section 13-56 of Article XVII of Chapter XIII of the Alameda Municipal Code, may be subject to special materials handling requirements. The permittee acknowledges that he or she has been informed of the special materials handling requirements of Section 13-56 of Article XVII of Chapter XIII of the Alameda Municipal Code and that hazardous materials may be encountered during excavation."

**13-56.7 Notification Prior to Start of Excavation.**

a. After receipt of a permit and no less than two (2) business days (forty-eight (48) hours minimum) before commencement of any excavation activity in the area subject to this Section 13-56, the permittee shall notify the Chief Building Official of the planned start of excavation. Said notification shall include a schedule for any excavation work that will last for more than one day.

b. The permittee shall give adequate notice to Underground Service Alert prior to commencing any excavation activity subject to this Section 13-56.

**13-56.8 Materials Handling.**

The permittee shall elect to follow one or more of the courses of action set forth below before beginning any excavation activities in the area subject to this Section 13-56. Unless otherwise demonstrated by the permittee by means of reconnaissance investigation pursuant to Subsection 13-56.8a, or unless the permittee prepares site management plans pursuant to Subsection 13-56.8c, soil below the threshold depth in the area of the marsh crust/subtidal zone, as depicted on Exhibit A, must be managed as though it were hazardous pursuant to Subsection 13-56.8b. The permittee may elect to follow Subsection 13-56.8a, but must comply with Subsection 13-56.8b or 13-56.8c if testing demonstrates that the materials below the threshold depth are hazardous materials. Copies of all reconnaissance testing results and/or existing information used to satisfy the reconnaissance investigation requirements of Subsection 13-56.8a shall be reported to and filed with the City. All observations or encounters with the marsh crust/subtidal zone during excavation shall be reported to the City.

a. **Reconnaissance Investigation to Rule Out the Presence of Hazardous Materials Below the Threshold Depth.**

The permittee may elect to use reconnaissance borings, pursuant to a plan prepared by a qualified registered engineer or registered geologist, licensed in the State of California, to rule out, to the satisfaction of the Chief Building Official, the presence of hazardous materials below the threshold depth in the area to be excavated. As part or all of the reconnaissance plan, the permittee may make use of existing information, where appropriate, if the existing information is directly relevant to the location and depth to be excavated and contains observations or results of analyses that assist in concluding whether hazardous materials are present. The reconnaissance report shall include a description of all observations from below the threshold depth evidencing the presence or absence of the marsh crust/subtidal zone.

1. If hazardous materials are found below the threshold depth within the area to be excavated at any time (during reconnaissance or during excavation), the permittee shall comply with either Subsection 13-56.8b or Subsection 13-56.8c, at his or her election.

2. If hazardous materials are not found below the threshold depth within the area to be excavated, no additional materials controls, except as otherwise may be required under applicable federal, state or local law, are required under this Section 13-56.

**b. Handling Materials Excavated From Below the Threshold Depth as Hazardous Materials.**

If the permittee has not ruled out the presence of hazardous materials pursuant to Subsection 13-56.8a, or elects not to prepare a site management plan and materials testing program pursuant to Subsection 13-56.8c, the permittee shall presume that materials excavated from below the threshold depth must be disposed at an appropriately permitted disposal facility. In addition, no excavated materials from below the threshold depth may be stockpiled prior to disposal or returned to the excavation.

**c. Preparation of Construction Site Management Plan for Handling Materials Excavated From Below the Threshold Depth.**

1. In lieu of handling materials excavated from below the threshold depth pursuant to the restrictions in Subsection 13-56.8b, the permittee may elect to hire a qualified registered engineer or registered geologist, licensed in the State of California, to develop a site-specific construction site management plan, including a materials testing program, to the satisfaction of the Chief Building Official. The construction site management plan shall include, at a minimum, provisions governing control of precipitation run on and run off from stockpiled soils, soil segregation, securing of stockpiled soils, duration of stockpiling, and contingency plans for handling materials excavated from below the threshold depth that prove to be hazardous materials.

2. The permittee shall hire a qualified registered engineer or registered geologist, licensed in the State of California, to oversee compliance with the approved construction site management plan, and shall transmit to the Chief Building Official upon completion of the project written certification of compliance with the construction site management plan. The certification report shall include a description of all observations from below the threshold depth evidencing the presence or absence of the marsh crust/subtidal zone.

**13-56.9 Health and Safety Plan.**

The applicant shall cause to be prepared by a certified industrial hygienist, and keep on the construction site at all times, a health and safety plan to protect workers at the excavation site and the general public to the satisfaction of the Chief Building Official. The Chief Building Official may prepare and provide to applicants a model health and safety plan which, if used by the applicant, shall be modified by the applicant's certified industrial hygienist to suit the specific requirements of the applicant's project.

**13-56.10 Excavation Site Best Management Practices.**

All excavation and materials handling activities permitted under this Section 13-56 shall be conducted in accordance with applicable Alameda Countywide Clean Water Program Best Management Practices and City of Alameda Storm Water Management and Discharge Control Program Ordinance requirements.

**13-56.11 Bonds.**

Upon a finding by the Chief Building Official that a permit should issue for excavation pursuant to this Section 13-56, a surety or performance bond conditioned upon the faithful performance and completion of the permitted excavation activity shall be filed with the City. Such bond shall be executed in favor of the City and shall be maintained in such form and amounts prescribed by the Risk Manager sufficient to ensure that the work, if not completed in accordance with the approved plans and specifications, will be corrected to eliminate hazardous conditions.

**13-56.12 Nonassumption of Liability.**

In undertaking to require applicants for certain excavation permits to comply with the requirements of this Section 13-56, the City of Alameda is assuming an undertaking only to promote the general welfare. The City is not assuming, nor is it imposing on itself or on its officers and employees, an obligation for breach of which it is liable in money damages to any person who claims that such breach proximately caused injury.

**13-56.13 Construction on City Property.**

a. The Chief Building Official shall prepare standard work procedures that comply with all the requirements of this Section 13-56 for all City

construction or improvement activities involving excavation below the threshold depth in the area subject to this Section 13-56. All departments, boards, commissions, bureaus and agencies of the City of Alameda that conduct construction or improvements on land under their jurisdiction involving excavation below the threshold depth in the area subject to this Section 13-56 shall follow such standard work procedures.

b. The City shall include in all contracts involving excavation below the threshold depth in the area subject to this Section 13-56 a provision requiring City contractors to comply with all the requirements of this Section 13-56. All contracts entered into by departments, boards, commissions, bureaus and agencies of the City of Alameda that authorize construction or improvements on land under their jurisdiction involving excavation below the threshold depth in the area subject to this Section 13-56 also shall contain such standard contract provision.

**13-56.14 Severability.**

If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this Section 13-56 or any part thereof is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this Section 13-56 or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase of this Section 13-56 irrespective of the fact that one or more sections, subsections, subdivisions, paragraphs, sentences, clauses or phrases be declared unconstitutional or invalid or effective.

**13-56.15 Permit Fee.**

No permits for excavation in the marsh crust/subtidal zone shall be issued unless a fee has been paid. The fee shall be set by City Council resolution.

**13-56.16 Penalties.**

a. Any person, including utility companies and their employees and contractors, violating any of the provisions of this Section 13-56 shall be deemed guilty of a misdemeanor, and each person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this Section 13-56 is committed, continued or permitted, and such violation may be prosecuted and punished as an infraction or misdemeanor pursuant to the provisions of Section 1-5.1 of the Alameda Municipal Code .

b. Any person, including utility companies and their employees and contractors, that commences any excavation without first obtaining the necessary permits therefor shall, if subsequently allowed to obtain a permit, pay an amount, in

addition to the ordinary permit fee required, quadruple the permit fee otherwise required.

**13-56.17 Retention and Availability of Permit Files**

The City shall maintain files pertaining to all permits issued under this Section 13-56, and shall make such files available to DTSC for inspection upon request during normal business hours.

**13-56.18 Amendment of Section 13-56**

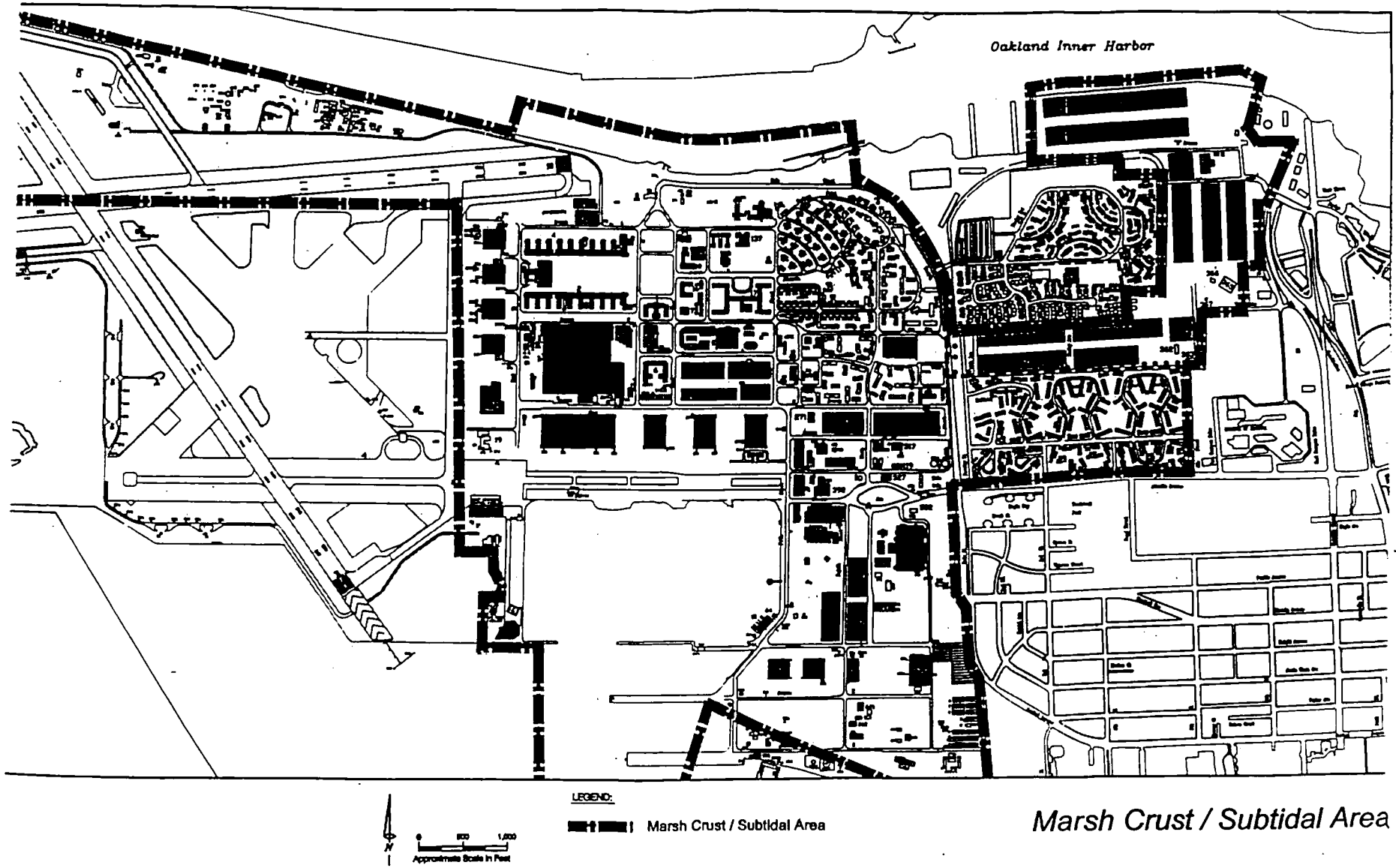
This Section 13-56 shall not be repealed or amended without thirty (30) days prior written notice to the DTSC Deputy Director for Site Mitigation.

Section 2. This Ordinance shall be in full force and effect from and after the expiration of thirty (30) days from the date of its final passage.

Presiding Officer of the City Council

Attest:
City Clerk

* * * * * *



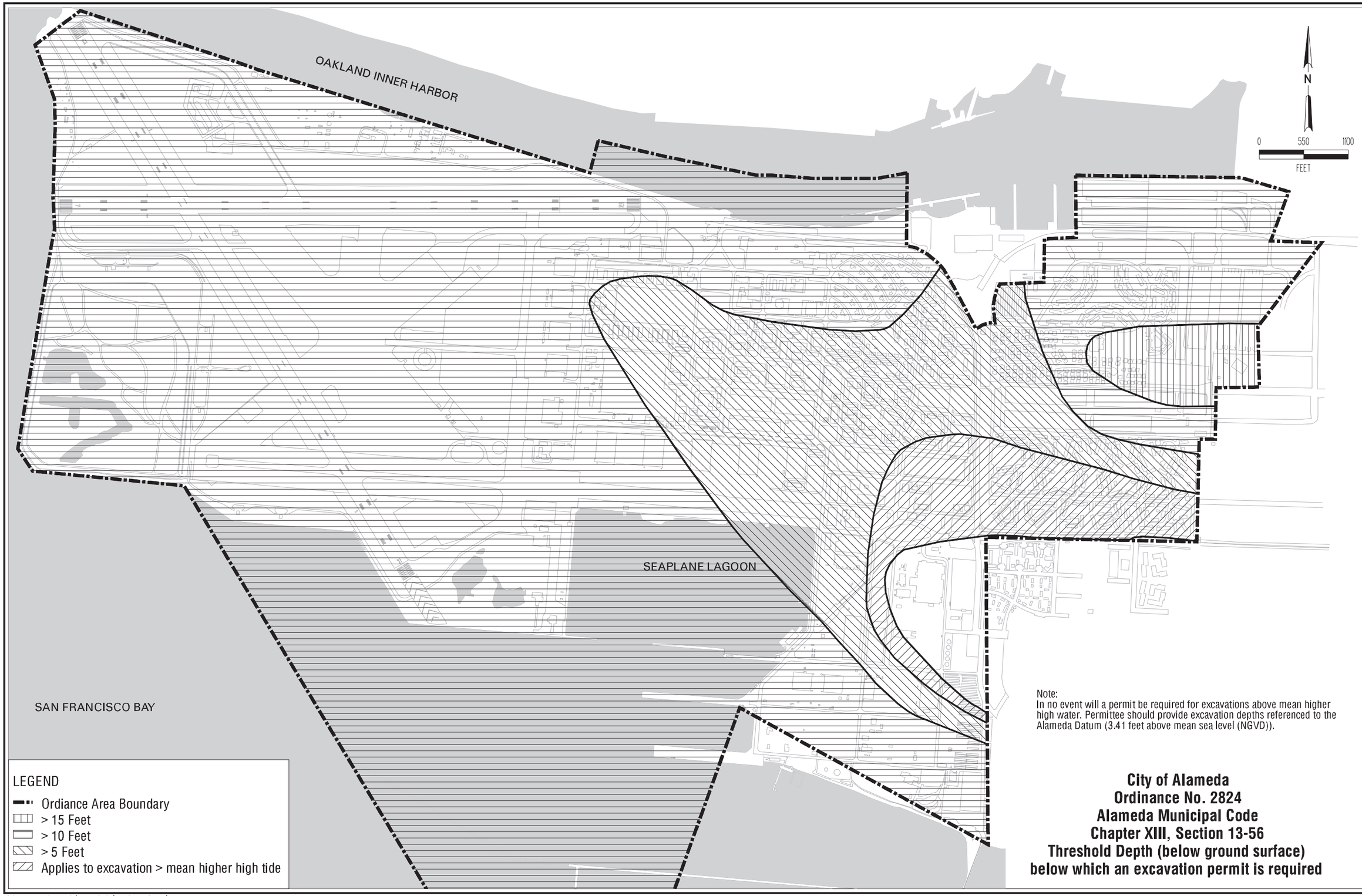

Marsh Crust / Subtidal Area

I, the undersigned, hereby certify that the foregoing Ordinance was duly and regularly adopted and passed by the Council of the City of Alameda in regular meeting assembled on the 15th day of February, 2000, by the following vote to wit:

| | |
|---|---|
| AYES: | Councilmembers Daysog, DeWitt, Johnson, Kerr and Mayor Appezzato - 5. |
| NOES: | None. |
| ABSENT: | None. |
| ABSTENTIONS: | None. |

IN WITNESS, WHEREOF, I have hereunto set my hand and affixed the official seal of said City this 16th day of February, 2000.

Diane Felsch, City Clerk
City of Alameda

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# *Appendix B*
# *ASTM E1903-11: Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process*

*Appendix C*
*ASTM Standard D4700-91: Guide for Soil Sampling from the Vadose Zone*

This copyrighted standard is available at

**http://www.astm.org/Standards/D4700.htm**

*Appendix D*
*Air Monitoring Plan*

## *LIST OF TABLES*



## *LIST OF ATTACHMENT*

***LIST OF ACRONYMS***

| | |
|---|---|
| AHERA | Asbestos Hazard Emergency Response Act |
| AMP | Air Monitoring Plan |
| AOC | Area of Concern |
| AOPC | Activity of potential concern |
| BAAQMD | Bay Area Air Quality Monitoring District |
| CCR | California Code Regulations |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CFR | Code of Federal Regulations |
| COPC | Chemical of potential concern |
| days/yr | days per year |
| FISCA | Fleet and Industrial Supply Center Oakland, Alameda Facility/Alameda Annex |
| HSP | Health and Safety Plan |
| ICP | Inductively coupled plasma |
| kg | kilogram |
| LBP | Lead-based paint |
| MCE | Mixed cellulose ester |
| $(mg/kg\text{-}d)^{-1}$ | per milligram per kilogram-day |
| $mg/m^3$ | milligrams per cubic meter |
| $m^3/day$ | cubic meters per day |
| $\mu g/m^3$ | micrograms per cubic meter |
| MiniRAM | Miniature real-time aerosol monitor |
| mm | Millimeter |
| PAH | Polycyclic aromatic hydrocarbon |
| PPE | Personal protective equipment |
| RAM | Real-time aerosol monitor |
| SMP | Site Management Plan |
| $s/cm^3$ | structures per cubic centimeter |
| TEM | Transmission electron microscope |
| USEPA | United States Environmental Protection Agency |
| VOC | Volatile organic compound |

## *1.0 INTRODUCTION*

On behalf of Alameda Reuse and Redevelopment Authority, Russell Resources, Inc. has developed this Air Monitoring Plan (AMP) to supplement the Site Management Plan (SMP) for the upcoming Lawrence Berkeley National Laboratory Second Campus redevelopment project (the Site). A site location map and site features are presented as Figures 1 and 2, respectively, in the SMP.

The SMP provides guidelines to ensure that activities related to the redevelopment of the Site are conducted in a manner protective of the health and safety of Site workers, future Site occupants, nearby residents, and the environment. Activities addressed by the SMP include earth moving, demolition of existing structures, and dewatering to support redevelopment of the property. Redevelopment is anticipated to occur over an extended period, and will involve the use of heavy equipment, including excavators, scrapers, loaders, concrete crushers, dump trucks, and drilling rigs.

These activities have the potential to expose Site workers and the surrounding community to airborne dust and chemical hazards. The entities selected by the developer to perform construction (hereinafter the "contractors") will each be responsible for providing a site-specific Health and Safety Plan (HSP) to protect workers against exposure to airborne dust and chemical hazards, as well as physical hazards. This AMP does not address personnel breathing-zone air quality monitoring; rather, it has been developed to establish the minimum required data collection efforts at the work zone perimeter, where the personal protective equipment (PPE) specified in the contractors' HSPs would no longer be required, and at the Site perimeter to control exposures of airborne constituents to area residents and the public.

Soil at the Site contains relatively low levels of chemical residues, including metals, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). These residues as airborne dust are the primary chemicals of potential concern (COPCs) with respect to redevelopment. Their occurrence is broadly similar to that of the Alameda Landing Site portion of the Fleet and Industrial Supply Center Oakland, Alameda Facility/Alameda Annex (FISCA). This AMP is modeled after the AMP contained in the Alameda Landing SMP, which was approved by the Department of Toxic Substances Control. In addition, several chemical residues are present in Site groundwater at relatively low concentrations including halogenated volatile organic compounds (VOCs) and petroleum hydrocarbons. Groundwater VOCs at the Site generally are at lower concentrations than at Alameda Landing and consist of halogenated VOCs rather than benzene.

## *1.1 OBJECTIVE*

The purpose of this AMP is to provide added assurance that airborne emissions from redevelopment activities are not impacting unprotected Site workers or migrating offsite at concentrations of concern. This AMP establishes procedures to measure and document concentrations of airborne contaminants during work activities. In addition, this AMP establishes action levels that will increase the intensity of dust and/or emission control measures. Information gathered during the air monitoring and sampling activities described in this AMP will be used to document and, if necessary, reduce the risk of exposure to neighboring communities and the general public.

## *1.2 SCOPE AND APPLICABILITY*

This AMP is intended to supplement the contractors' site-specific HSPs, and portions of the SMP related to exposures of airborne constituents that could potentially be mobilized during redevelopment at the site. This AMP is designed to be in effect through all phases of redevelopment. Note, however, this AMP doesn't apply to media in areas of the Site that have been remediated to achieve BCT-approved cleanup levels (e.g., the Record of Decision for IR Site 27 states that soil at IR Site 27 does not pose an unacceptable risk to human health or the environment).

As stated previously, a separate, site-specific HSP will be developed by each contractor for the project to address personnel monitoring and chemical exposure to prevent injury and health risks to their workers. Air monitoring for the purpose of monitoring worker exposure, determining appropriate PPE, and establishing work and exclusion zones will be included as one component of these HSPs. Therefore, such worker protection measures are not addressed in this AMP. Specifically, the site-specific HSP is assumed to cover all personnel within the fenced perimeter of the work zone. Accordingly, this AMP is concerned only with populations outside the fenced perimeter.

## *2.0 IDENTIFICATION OF POTENTIAL AIR EMISSIONS*

The potential for air emissions will depend on the type of work being performed, contaminants present in a specific work area, and the effectiveness of emission controls at the work site. Potential airborne hazards at the Site can be categorized as volatile emissions of halogenated VOCs and particulate matter that may contain metals, petroleum hydrocarbons, and metals; collectively identified as COPCs. The following activities have the potential to result in hazardous air emissions, each of which is hereby defined as an activity of potential concern:

- Demolition;
- Truck loading and unloading;
- Grading and compacting;
- Excavation;
- Drilling, boring, and pile driving;
- Concrete crushing;
- Asbestos and lead-based paint (LBP) abatement;
- Excavation below the water table in in an open Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Petroleum Program site having groundwater contamination; and
- Dewatering in in an open CERCLA or Petroleum Program site having groundwater contamination.

## *2.1 VOLATILE EMISSIONS*

The principal VOCs in groundwater are 1,2,3-trichloropropane at IR Site 9; 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene, and trichloroethene at IR Site 27; and vinyl chloride at both IR sites (SMP Figure 2). However, VOCs in IR Site 9 groundwater are present only in low concentrations and are primarily in deeper groundwater, not the uppermost water-bearing zone. Active remediation at IR Site 27 is complete and the site is transitioning to monitored natural attenuation. Accordingly, only low concentrations of VOCs remain in IR Site 27 groundwater. It is possible that activities of potential concern could result in the volatilization of VOCs in groundwater and/or soil gas to ambient air, thereby potentially exposing Site workers and downwind residents. The risks associated with inhalation of volatilized benzene, naphthalene, and 1,3-butadiene by excavation personnel will be addressed in the contractors' HSPs.

VOCs are unlikely to be present in Site soils at concentrations associated with risks to human health or the environment. Volatilization of VOCs from soil and/or off-site migration of VOC-containing dust are not considered potential air quality hazards.

## *2.2 PARTICULATE MATTER*

During activities of potential concern, fine soil particles (i.e., dust) can become airborne and therefore carried with prevailing wind. If this dust contains metals, petroleum hydrocarbons, or PAHs, all of which tend to adsorb to soil particles, it may pose a threat to neighboring communities. However, concentrations of these substances are not present in soil at high levels. The risk from trace levels of contaminants in soil at IR Sites 9, 13, and 27 is so low that remediation is not needed. Soil contamination at the EDC-11 Areas of Concern (AOCs) and the Petroleum Program sites, where present, is only at relatively low concentrations (SMP Figure 2).

As described in Section 4.4 of the SMP, dust suppression measures will be implemented to minimize any potential risks from activities of potential concern.

## *2.3 ASBESTOS-CONTAINING MATERIALS*

Asbestos, which has been identified in construction materials at the site, can also become airborne as particulate matter during demolition or removal activities if dust suppression is inadequate or improperly implemented. A prequalified asbestos abatement contractor will conduct all abatement work in areas where asbestos has been identified. Abatement will be conducted pursuant to all applicable rules and regulations, including the following:

- 29 Code of Federal Regulations (CFR) Sections 1910.12, 1910.20, 1910.134, 1910.145, and 1910.1001;
- 29 CFR Section 1926.1101;
- 34 CFR Section 231;
- 40 CFR Section 61, Subparts A and M;
- California Code of Regulations (CCR) Title 8, Sections 1529 and 5208;
- CCR Title 8, Article 2.5;
- CCR Title 22, Division 4; and
- San Francisco Bay Area Air Quality Management District (BAAQMD) Regulation 11, Hazardous Pollutants Rule 2.

In addition to the above referenced regulations, asbestos work will be performed pursuant to any BAAQMD permit-specific restrictions. In addition to the regulatory requirements for dust suppression, all demolition work involving the removal of asbestos will include dust suppression per Section 4.4.1 of the SMP.

Monitoring of personnel breathing zones for health and safety purposes is required by the above-referenced regulations. Air monitoring will additionally be conducted at the perimeter fence line, upwind and downwind of work areas involving asbestos, by a certified asbestos consultant, or site surveillance technician, to assess the adequacy of dust control measures and monitor asbestos emissions.

## *2.4 LEAD-BASED PAINT*

As all of the buildings at the facility were constructed prior to 1978, the buildings were painted with LBP. Unless abatement is performed prior to demolition, the potential exists for lead-bearing dusts to be generated. Lead abatement including the removal of loose and flaking LBP will be conducted at the facility pursuant to CCR Title 8, Section 1532.1 and CCR Title 17, Sections 35000-36100 prior to demolition of site structures.

Monitoring of personnel breathing zones for health and safety purposes is required by the above referenced regulations. Air monitoring will additionally be conducted at the perimeter fence line of work zones in which buildings impacted with LBP are being abated or demolished to assess the adequacy of dust control measures and monitor lead emissions.

## *3.0 DATA COLLECTION PROCEDURES*

This section covers procedures for collecting air quality data at the site. Equipment needs, calibration requirements, monitoring and sampling methodology, and sample handling and control procedures are addressed.

As discussed in this AMP and the SMP, air monitoring and sampling will be performed at the site for multiple purposes. Air monitoring using hand-held, direct-read instruments is most applicable to the planned development and offers the best opportunity for real-time characterization of changing site conditions. Direct-read instruments will be used to establish background concentrations, and during work periods to monitor air around work zones and at the site perimeter to allow real-time feedback to Site operations to help ensure that the concentrations of COPCs are not above established action levels at the fence line. Perimeter or fence line air sampling will be conducted periodically at the Site border to quantify constituent concentrations leaving the Site (if any) and to ensure that exposure from airborne hazards to the neighboring community and general public is minimized.

To provide an air quality data collection program that will ensure the highest degree of safety assurance to off-site populations, defined as those populations located beyond the Site perimeter, this AMP incorporates multiple data collection strategies, including the following:

- Obtaining historical data from an existing weather station at the Port of Oakland to determine predominant wind direction(s) and wind velocity(ies).
- Collecting background air quality data prior to the commencement of dust-generating activities.
- Obtaining daily site-specific information on wind direction and velocity using a weather station installed at the site.
- Conducting air monitoring upwind and downwind of activities of potential concern, and at perimeter air monitoring stations using direct-read instruments [including a real-time aerosol monitor (RAM) or a miniature RAM (MiniRAM) to measure dust levels].
- Collecting one or more of the following types of 8-hour samples at the perimeter air monitoring stations, per Table D-1:
  - Mixed-cellulose ester (MCE) filter samples for asbestos- and metal-containing dust analysis using air sampling pumps.
- Conducting air monitoring for VOCs at perimeter monitoring stations per Table D-1.

- Following proper sample handling and documentation procedures from point of generation to point of analysis to ensure the integrity of air quality samples.

A more detailed discussion of monitoring and sampling equipment and associated procedures is provided in the following subsections.

## *3.1 ESTABLISHING WIND DIRECTION*

A weather station and data logger capable of recording temperature, wind velocity, and wind direction at 10-minute intervals will be installed at the site. Prevailing wind direction(s) and velocity(ies) will be established by downloading and evaluating data from the weather station data logger prior to commencing dust generating activities, and periodically thereafter. The ideal area selected for this purpose will be undisturbed throughout development; however, it may be necessary to relocate the station to accommodate development activities.

The anemometer and windsock will be used to determine site-specific wind direction and velocity when upwind and downwind dust readings are to be taken around a work area. Perimeter air monitoring stations will also be established using these data.

## *3.2 ESTABLISHING AIR MONITORING STATIONS*

Perimeter air monitoring and sampling stations will be established prior to each sampling event based on locations of proposed activities of potential concern, wind direction, and velocity. Locations of perimeter air monitoring stations will change during the course of the project to best characterize air quality leaving the Site. Perimeter stations will be placed onsite, inside the perimeter fencing. If necessary, fencing (including a locking gate) will be installed around air monitoring stations to protect sampling equipment from potential theft and vandalism. Locations of perimeter air monitoring stations will be documented in field notes.

Upwind and downwind fence line work zone air monitoring stations(s) will be determined based on the prevailing wind direction and size of the potential emission-generating area. The number of monitoring points will be based on the current size and intensity of the activity of potential concern and the consistency in wind direction.

## *3.3 INSTRUMENTATION, CALIBRATION, AND SAMPLE COLLECTION AND HANDLING PROCEDURES*

Air monitoring and sampling strategies are briefly summarized below and discussed in greater detail in the following subsections.

- **Upwind/Downwind Work Area Monitoring:** Air monitoring using direct-read instruments (i.e., RAM or MiniRAM) will be performed immediately upwind and downwind of activities of potential concern per Table D-1. The purpose of this monitoring is provide immediate feedback to Site operations to help ensure that fence line concentrations of COPCs are not above action levels.

  Such monitoring will be performed daily during the first 2 weeks of the activity of potential concern to assess emissions from active dust-generating activities and trigger enhanced dust-emission suppression efforts. Monitoring will be conducted weekly thereafter as specified in Table D-1.

- **Perimeter Monitoring and Sampling:** Air monitoring and sampling stations will be established at the site boundary at downwind perimeter locations. Perimeter stations will be moved during the course of the project based on the prevailing wind direction at the time of monitoring or sampling and on the location of the activity of potential concern.

  Both direct-read monitoring data and 8-hour continuous samples will be collected at the perimeter monitoring stations. Continuous air samples will be submitted for laboratory analysis per Table D-1. Laboratory results will be used to identify individual constituent concentrations present in air flowing onsite and offsite. If warranted by action level exceedances, the laboratory results will assist in determining the need for additional emission control measures.

- **Perimeter Monitoring for VOCs:** If Site construction workers are required to don PPE pursuant to the contractor's site-specific HSP, then air monitoring for VOCs will be conducted at the site boundary at downwind perimeter locations to document that unacceptable VOC exposures to off-site receptors do not occur.

### *3.3.1 Sampling Equipment*

#### *3.3.1.1 Direct-Read Instruments*

Direct-read instruments will be used for collecting air monitoring data. For the purpose of this AMP, air monitoring data are defined as direct-read instrument results collected in less than 15 minutes. Dust levels will be measured using a dust

monitor such as a RAM, MiniRAM, or $PM_{10}$ meter. VOC levels will be measured using a VOC monitor specified in the CIH-approved SMP. The make and model of direct-read instruments used will depend on instrument sensitivity and ability to achieve detection limits below action levels. All direct-read instruments will be calibrated according to manufacturer's instructions prior to use each day. Calibration notes and direct-read instrument measurements will be recorded in the field notes using standard forms developed for this purpose as appropriate.

*3.3.1.2 Metal Samples*

During LBP material abatement or demolition activities, samples for lead will be collected using a sampling pump set at a flow rate of 2 liters per minute, equipped with a 37-millimeter (mm) MCE sample filter. The sample train, in the direction of airflow, will be filter, tubing, regulator, and pump. The pump will be elevated approximately 5 to 7 feet above ground surface using a tripod stand and ¼-inch flexible tubing.

A separate calibration cartridge will be used to set the flow rate prior to initiating sampling. The pump flow rates should be set at 2 liters per minute, and will be operated for the entire 8-hour shift. The air pump will be calibrated before and after the sampling period with a Bios DryCal DC-1 Flow Calibrator or other acceptable primary or secondary standard. The flow calibrator is considered a primary flow standard, as it utilizes the principle of measuring the flow rate of gases over a fixed volume per unit of time.

Flow measurements and calibration notes will be in the field notes. Prior to shipping sample cartridges to the lab, the end caps will be replaced and the cartridges labeled and placed in separate plastic bags. The sample cartridges will be shipped to a California-certified analytical laboratory for metals analysis by National Institute for Occupational Safety and Health Method 7300, using inductively coupled argon plasma (ICP). Lead will be included in the analytical suite. Field blanks should be included for analysis, and will represent at least 10 percent of the total number of samples collected.

*3.3.1.3 Asbestos Samples*

During asbestos materials abatement or demolition activities, the perimeter air sampling methodology will consist of placing sampling pumps at strategic locations (upwind and downwind of the excavation area at the site fence line perimeter) representative of all work shifts, and collecting samples from each over a duration of approximately 8 hours. Air sampling pumps will be set at flow rates of between 2-3 liters per minute, with flow rates calibrated before and after each sampling round. Flow measurements and calibration notes will be recorded.

Asbestos will be sampled using 25 mm MCE filters. Samples will be shipped to a California-certified analytical laboratory for asbestos analysis using transmission electron microscopy (TEM) as described in the method specified by the United States Environmental Protection Agency's (USEPA's) Asbestos Hazard Emergency Response Act (AHERA) criteria for asbestos in Appendix A of 40 CFR, Part 763 Subpart E. Field blanks will be sent to the laboratory with each sample batch.

### *3.3.2 Monitoring and Sampling Frequency*

The following paragraphs outline data collection frequency requirements for both air monitoring and sampling.

#### *3.3.2.1 Air Monitoring*

Air monitoring with direct-read instruments will be conducted upwind and downwind of each active activity of potential concern and at the Site perimeter, as specified in Table D-1. In the case of VOCs, an active activity of potential concern is any activity for which the contractor's HSP requires construction workers to don PPE for protection against VOCs. Initially, such sampling will be conducted daily for the first 2 weeks of the activity of potential concern. Monitoring will be conducted 3 to 4 times per day; however, the frequency per day may be decreased if at least 3 consecutive days' monitoring indicates no action level exceedances. Monitoring frequency during this initial 2 week period will increase whenever there is visible windblown dust or high dust readings. The Health and Safety Officer or a designee will conduct the upwind and downwind monitoring.

Following this initial 2-week monitoring period, monitoring will be conducted weekly in activity of potential concern areas per Table D-1. Should perimeter monitoring indicate that a fence line action level was exceeded, the monitoring schedule will revert to daily for a 1 week period following the exceedance.

Air monitoring for the purpose of monitoring personnel breathing zones during site activities will be covered in the contractors' site-specific HSPs.

#### *3.3.2.2 Air Sampling*

Because of the increased expense and the delays in obtaining data, air samples are intended primarily to provide documentation of the success of emission suppression measures employed at the Site. Real-time monitoring allows the immediate identification and mitigation of any air quality problems that might arise.

Air samples will be collected in the activity of potential concern area prior to commencing the activity of potential concern, in order to determine background concentrations. Sampling for each constituent will also be conducted at the perimeter sampling station per Table D-1. Should a fence line action level be exceeded, dust mitigation efforts will be increased, and air sampling will be performed to confirm the success of increased dust-suppression efforts.

*3.3.2.3 Control Measures Governing Monitoring and Sampling Frequency*

If, at any time during the above-described monitoring or sampling, detections above dust action levels are observed, the contractor will immediately be instructed to increase dust-suppression measures. As described above, air samples will be collected as soon as possible to document that such measures are effectively reducing off-site emissions, and monitoring for the exceeding constituent will be conducted daily for a period of 1 week following the exceedance.

The following circumstances will trigger enhanced emission suppression at active dust generation areas. Fence line monitoring will be performed daily for one week after any of the following circumstances:

- Exceedance of a fence line action level;
- Observance of a sustained wind velocity of 15 miles per hour generating significant dust emission;
- Dust or odor complaints from neighboring residents.

The schedule of 8-hour samples to be collected (i.e., asbestos or metals) will be based on Table D-1, and may be modified as appropriate to respond to changed field conditions, i.e., the discovery of new contaminants.

If, at any time during the above-described Site boundary monitoring, detections above VOC action levels are observed, the contractor will immediately be instructed to suspend any Site work activities that cause the VOC exceedance until site-boundary VOC levels are lowered by, for example, modifying construction methods or relocating the fence line.

If odors resulting from site activities are detected at the fence line, appropriate air samples will be collected to document concentrations of airborne COPCs.

## *4.0 DETECTION LIMITS AND FENCE LINE ACTION LEVELS*

Air monitoring and sampling (as discussed in Section 3.0) will be performed to ensure that airborne emissions from activities of potential concern do not result in unacceptable concentrations of COPCs in ambient air at the Site fence line perimeter. Limits have been established to monitor potential impacts to downwind residents and the general public during redevelopment. Worker protection limits will be a component of the contractors' site-specific HSPs. Fence line action levels are as follows:

- Dust as measured with real-time aerosol monitoring shall be no greater than 0.5 milligram per cubic meter ($mg/m^3$) sustained or 5 $mg/m^3$ maximum, as measured using a direct reading monitor (RAM, MiniRAM, $PM_{10}$ meter).
- Asbestos as measured by AHERA TEM Method shall be no greater than 0.048 structures per cubic centimeter.
- Ringelmann No. 1 Limitation: No emission from any source for a period or periods aggregating more than three minutes in any hour a visible emission that is as dark or darker than No. 1 on the Ringelmann Chart or of such opacity as to obscure an observer's view to an equivalent or greater degree. (BAAQMD Rule 6-1-301)
- Opacity Limitation: No emission from any source for a period or periods aggregating more than three minutes in any hour an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such device is required by BAAQMD regulations. (BAAQMD Rule 6-1-302)
- Visible Particles: A person shall not emit particles from any operation in sufficient number to cause annoyance to any other person, which particles are large enough to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles. This Section 6-1-305 shall only apply if such particles fall on real property other than that of the person responsible for the emission.
- VOCs: The fence line action levels are the same as the contractor's CIH-approved HSP's action levels for protection of construction workers.

Air quality data collected upwind will also be compared to those collected downwind during a specific sampling event to quantify the project's effect on air quality.

In the event that upwind air quality data indicate an exceedance of the fence line action limits, indicating an ambient air quality problem not related to the development, additional dust and/or emission control measures would be required

only if the site perimeter air quality results exceed the measured upwind concentrations by an increment equal to or greater than the fence line action level.

## *4.1 DEVELOPMENT OF CONSTITUENT-SPECIFIC ACTION LEVELS*

Fence line action levels are meant to serve as a threshold level for ensuring the effectiveness of dust and asbestos suppression measures at the Site. Fence line action levels were developed for asbestos, the primary chemical of concern during asbestos abatement activities. A constituent-specific action level developed for asbestos is summarized in Table D-2.

In order to maintain air concentrations that are protective of human health during construction activities, an action level was developed for asbestos. An action level is are maximum allowable air concentration of a COPC off-Site residential receptors may be exposed to without exceeding the relevant risk level, incorporating the expected exposure duration during Site activity of potential concern. In accordance with the CalEPA and USEPA risk assessment guidance (CalEPA 1994, USEPA 1989), the relevant risk levels are $1 \times 10^{-6}$ risk for carcinogenic compounds. A noncancer reference dose for asbestos is not applicable or not available.

To ensure that the action levels are protective of off-Site resident populations, the FISCA AMP, from which this AMP is adapted, developed the asbestos action level using standard residential exposure assumptions, with modifications to account for the expected duration of excavation activities. To calculate the action levels for each COPCs, the FISCA AMP uses the standard formula for the calculation of human health risk (CalEPA 1994, USEPA 1989). Based on the approximate area of the Site that will undergo building demolition activities, the expected duration of activity of potential concern for asbestos is assumed to be a maximum of 90 days.

The resulting action level is reported in structures per cubic meters. The specific equations and assumptions used in calculating the action levels are presented in Attachment A.

## *4.2 DEVELOPMENT OF TOTAL DUST AND FENCE LINE ACTION LEVELS*

Limits for dust emissions in Alameda Point remedial action work plans that have been published subsequent to the FISCA AMP are the basis for this AMP's dust action levels. The final remedial action work plan for IR Site 17 (Seaplane Lagoon) contains an AMP, Section 5.1 of which specifies numerical action levels for dust of 0.5 $mg/m^3$ sustained or 5 $mg/m^3$ maximum (Battelle and Tetra Tech,

2011). Section 4.2.4 of that remedial action work plan states "the 0.5 $mg/m^3$ level is a conservative level that would effectively prevent fugitive dust release from the site, and the 5 $mg/m^3$ level is consistent with regulatory thresholds for permissible exposure to total particulate material." Section 3.14 of the final remedial design/remedial action work plan for IR Site 35 (AOCs 3, 10, and 12 in Transfer Parcel EDC-5) specifies no numerical action levels for emissions but states that fugitive dust will be controlled during the remedial action implementation to comply with the BAAQMD Rules 6-1-301, 6-1-302, and 6-1-305 (OTIE, 2011a). Similarly, Section 9.4.1.2 of the final project work plan for the IR Sites 5 and 10 storm drain and sewer line time-critical removal action references BAAQMD requirements, rather than providing numerical action levels (Tetra Tech, 2009b). Neither the remedial action work plan for OU-1 (IR Sites 6, 7, 8, and 16) nor the final work plan for removing oil/water separator 163 at OU-2B mentions action levels for off-site emissions (URS, 2010, and Tetra Tech, 2009a, respectively). This SMP incorporates the emissions action levels of both the IR Site 17 and IR Site 35 remedial action work plans.

## *Table D-1 Air Monitoring and Sampling Matrix*

| | **Upwind Work Area Station** | **Downwind Work Area Station** | **Downwind Perimeter** | |
|---|---|---|---|---|
| | Monitoring/Sampling | Monitoring | Monitoring | Sampling |
| Total Dust | Once prior to, then daily for the first 2 weeks of AOPCs in each active AOPC area. Daily for one week after the following:<br>• exceedance of fence line action level;<br>• observance of sustained wind speeds in excess of 15 mph.<br>Thereafter, no less than weekly in any AOPC area. | Once prior to, then daily for the first 2 weeks of AOPCs in each active AOPC area. Daily for one week after the following:<br>• exceedance of fence line action level;<br>• observance of sustained wind speeds in excess of 15 mph.<br>Thereafter, no less than weekly in any AOPC area. | Once prior to, then daily for the first 2 weeks of AOPC in each active dust generating area(s), and daily for one week after exceedance of fence line action level. Thereafter, no less than weekly in any AOPC area. | None |
| Asbestos | None | None | None | Sampling conducted once prior to, and then daily for first week of asbestos abatement activities, weekly thereafter. |
| Lead | None | None | None | Sampling conducted once prior to, and then daily for first week of LBP abatement activities, weekly thereafter. |
| VOCs | None | None | Daily whenever the contractor's HSP requires construction workers to don PPE for protection from VOCs. | None |

Notes:

AOPC = activity of potential concern
LBP = lead-based paint
VOC = volatile organic compound

## *Table D-2 Analytical Methods, Detection Limits, and Fence Line Action Levels*

| Constituent | Analytical Method | Detection Limit | Fence Line Action Level |
|---|---|---|---|
| Total Dust | Direct-read (RAM, MiniRAM, $PM_{10}$ meter) | 1.0 µg/$m^3$ of air | 0.5 mg/$m^3$ sustained or 5 mg/$m^3$ maximum |
| Lead | USEPA Method 6010 (ICP) | 0.05 µg/$m^3$ of air[1] | 1.5 µg/$m^3$ of air |
| Asbestos | AHERA TEM Method | 0.001 s/$cm^3$ | 0.048 s/$cm^3$ |
| VOCs | same as contractor's HSP | | |

Notes:
The action levels proposed in this table may require modification based on actual field data or other findings.
AHERA TEM Method = Transmission electron microscopy (TEM) method specified by USEPA's Asbestos Hazard Emergency Response Act (AHERA) criteria for asbestos in 40 CFR, Part 763 Subpart E, Appendix A.
Detection limits for direct-read instruments will depend on model used.
mg/$m^3$ = milligrams per cubic meter
µg/$m^3$ = micrograms per cubic meter
s/$cm^3$ = structures per cubic centimeter

1 = Detection limit based on sample volume of 4.8 $m^3$ (10 liters per minute over 8 hours) passes over a polyurethane foam filter with media detection limit of 1 µg.

# ATTACHMENT A
# ACTION LEVEL CALCULATIONS

## Table 1: Calculation of Action Levels

**Lawrence Berkeley National Laboratory Second Campus**

**Alameda Point, Alameda California**

**Cancer Endpoint**

$$AL_{ca} = \frac{\text{Target Risk Level}^{a}}{\text{Intake Factor}^{b} \times \text{CSF}^{c}} \times 10^{3}\ \mu g/mg$$

**Notes:**

AL: Action Level ($\mu g/m^3$)

[a] Target risk level is $1 \times 10^{-6}$ for residential and commercial exposure, respectively.

[b] The intake factor is calculated using the standard formula below:

$$\text{Intake Factor} = \frac{\text{Inhalation Rate} \times \text{Exposure Frequency} \times \text{Exposure Duration}}{\text{Body Weight} \times \text{Averaging Time}}$$

Values for these terms are presented in Table 2. Source of formula: United States Environmental Protection Agency (USEPA). 1989. *Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A).* Office of Emergency and Remedial Response. EPA/540/1-89/002.

[c] Toxicity values (i.e. cancer slope factor [CSF]) is presented in Table 3.

## Table 2. Exposure Assumptions

**Lawrence Berkeley National Laboratory Second Campus**

**Alameda Point, Alameda California**

| Parameter | Offsite Resident | | Offsite Commercial Worker | Source |
|---|---|---|---|---|
| | Adult | Child | | |
| Inhalation Rate ($m^3$/day) [a] | 6.7 | 3.3 | 20 | scenario specific assumption |
| Exposure Frequency (days/yr) | 90 | 90 | 90 | scenario specific assumption |
| Exposure Duration (years) | 1 | 1 | 1 | scenario specific assumption |
| Body Weight (kg) | 70 | 15 | 70 | Cal/EPA 1992 |
| Averaging Time—Carcinogens | 25550 | 25550 | 25550 | USEPA 1989 |

**Notes:**

[a] Breathing rate of 20 $m^3$/day and 10 $m^3$/day for adult and child resident (Cal/EPA 1992), respectively, for the inhalation exposure has been adjusted for 8 hours per day exposure from Site (e.g., 20 $m^3$/day x [8 hours/day / 24 hours/day]).

**Sources:**

California Environmental Protection Agency (Cal/EPA). 1992. *Supplemental Guidance for Human health Multimedia Risk Assessments of hazardous Waste Sites and Permitted Facilities*. July.

United States Environmental Protection Agency (USEPA). 1989. *Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A)*. Office of Emergency and Remedial Response. EPA/540/1-89/002.

## Table 3: Toxicity Values

**Lawrence Berkeley National Laboratory Second Campus**

**Alameda Point, Alameda California**

| Chemical | Cancer Slope Factor (CSF) $(mg/kg\text{-}d)^{-1}$ | |
|---|---|---|
| | Inhalation | Source |
| lead | NA [a] | NA |
| asbestos | 2.2E+02 | Cal/EPA 2007 |

**Notes:**

NA = Not applicable

[a] Action level based on National Ambient Air Quality Standard for lead for the protection of the surrounding community.

**Source:**

California Environmental Protection Agency (Cal/EPA). 2007. Toxicity Criteria Database. Maintained online at www.oehha.org by Office of Environmental Health Hazard Assessment (OEHHA).

## Table 4: Action Levels

**Lawrence Berkeley National Laboratory Second Campus**

**Alameda Point, Alameda California**

| Chemical | Cancer Endpoint Action Level | | | Final Action Level | Units |
|---|---|---|---|---|---|
| | Offsite Resident | | Offsite Commercial Worker | | |
| | Adult | Child | | | |
| lead [a] | NA | NA | NA | 1.5 | µg/m$^3$ |
| asbestos [b] | 0.14 | 0.062 | 0.048 | 0.048 | structures/cm$^3$ |

**Notes:**

NA = Not applicable.

[a] Action level based on the National Ambient Air Quality Standard for lead for the protection of the surrounding community.

[b] Action level converted from units of µg/m$^3$ to structures/cm$^3$ using the following formula:

$$\text{Action Level (structures/cm}^3) = \frac{\text{Action Level (ug/m}^3) \times 320 \text{ TEM structures/PCM fiber}}{0.00003 \text{ µg/PCM fiber}} \times 10^{-6} \text{ m}^3/\text{cm}^3$$