
**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

**ORDER No. R2-2003-0080, REVISED SITE CLEANUP REQUIREMENTS
AND RESCISSION OF ORDER NO. 91-082 AND ORDER NO. 96-070**

**FOR THE PROPERTY LOCATED AT
THE PRESIDIO OF SAN FRANCISCO
CITY AND COUNTY OF SAN FRANCISCO**

TABLE OF CONTENTS

	PAGE
Finding 1 Site Location	1
Finding 2 Site History	1
Finding 3 Named Dischargers	2
Finding 4 Regulatory Status	3
Finding 5 Site Topography	3
Finding 6 Site Geology	3
Finding 7 Site Hydrogeology	3
Finding 8 Historical Groundwater Usage	4
Finding 9 Remedial Investigations	5
Finding 9.a CERCLA Program Sites	5
Finding 9.a.1 Main Installation Operable Unit	5
Finding 9.a.2 Public Health Services Hospital Area	6
Finding 9.a.3 Crissy Field Area	7
Finding 9.a.4 Directorate of Engineering and Housing Area	7
Finding 9.a.5 Building 937	8
Finding 9.a.6 Firing Range Operable Unit	9
Finding 9.b Petroleum Sites	9
Finding 9.b.1 Building 207/231	9
Finding 9.b.2 Commissary/PX	10
Finding 9.b.3 Building 1065 Area	11
Finding 9.b.4 Building 1349	12
Finding 9.b.5 Building 637/638 Area	13
Finding 9.b.6 Mini-Corrective Action Plan Sites	14
Finding 9.b.7 Fuel Distribution System	15
Finding 10 Interim Remedial Measures	16
Finding 11 Adjacent Sites	17
Finding 12 Basis for Cleanup Standards	17
Finding 12.a General	17
Finding 12.b Beneficial Uses	17
Finding 12.c Basis for Groundwater Cleanup Standards	19
Finding 12.d Basis for Soil Cleanup Standards	19
Finding 12.d.1 Soil Cleanup Levels for Protection of Human Health	19
Finding 12.d.2 Soil Cleanup Levels for the Protection of Ecological Receptors	19
Finding 12.d.3 Soil Cleanup Levels for Protection of Water Quality Objectives at Detectable Levels and Soil Cleanup Levels for Protection of Water Quality Objectives at Drinking Water Standards	20
Finding 12.d.4 Point of Compliance Concentrations in Soil and Water for Petroleum Hydrocarbons, BTEX and MTBE for the Saltwater Protection Zone	20
Finding 12.d.5 Point of Compliance Concentrations for Gasoline in	

	Surface Waters and Sediments of the Proposed Freshwater Stream	20
Finding 13	Cleanup Plan	21
Finding 14	Cleanup Goals and Strategy	22
Finding 15	Reuse or Disposal of Extracted Groundwater	22
Finding 16	Basis for 13304 Order	22
Finding 17	Federal Waiver of Sovereign Immunity	23
Finding 18	Cost Recovery	23
Finding 19	CEQA	23
Finding 20	Notification	23
Finding 21	Public Hearing	23
A.	Prohibitions	23
B.	Cleanup Plan and Cleanup Standards	24
C.	Tasks	25
C.1	Comprehensive Petroleum Investigation and Remediation Time Schedule	25
C.2	Work Plan for Development of Freshwater Corridor Surface Water and Sediment Point of Compliance (POCC) Concentrations	25
C.3	Report Documenting the Implementation of the Freshwater Corridor Surface Water and Sediment PCOC Approach	26
C.4	Interim Remedial Action Work Plan for Corrective Action Sites	26
C.5	Completion of Interim Remedial Actions at Corrective Action Sites	27
C.6	Proposed Final Corrective Action Plan and Cleanup Standards at CAP sites	27
C.7	Summary Report and Work Plan for Mini-CAP Sites	28
C.8	Completion of Site Investigation and Remediation Work Plan at Mini-CAP Sites	28
C.9	Completion of Remedial Actions at Mini-CAP Sites	28
C.10	Site Status Reports	29
C.11	Site-wide Groundwater/Surface Water Semi-annual Monitoring Reports	29
C.12	Underground Storage Tank, Aboveground Storage Tank, And Fuel Delivery System Closure Certification	30
C.13	Five-Year Status Reports	30
C.14	Low Temperature Thermal Desorption Soil Tracking	31
C.15	Lead Cleanup Value Proposal	32
C.16	Contingency Petroleum Sites	32
C.17	Delayed Compliance	33
D.	Provisions	33
	Tables 1 through 7	
	Figures 1 through 9	
	Self-Monitoring Program	

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Order No. R2-2003-0080

REVISED SITE CLEANUP REQUIREMENTS AND RESCISSION OF ORDER NO. 91-082
and ORDER NO. 96-070 FOR:

UNITED STATES DEPARTMENT OF DEFENSE, DEPARTMENT OF THE ARMY;
UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE; and
the PRESIDIO TRUST,

for the property located at

THE PRESIDIO OF SAN FRANCISCO
CITY AND COUNTY OF SAN FRANCISCO

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Board), finds that:

- 1. Site Location:** The Presidio of San Francisco (Presidio or Site) is located at the northern tip of the San Francisco Peninsula (Figure 1). The Presidio comprises approximately 1,480 acres of rolling hills, grass covered sand dunes, rugged sea cliffs and low lying fill and beach areas. The site is bounded by San Francisco Bay on the north and the Pacific Ocean on the west. Densely populated residential areas of the City of San Francisco border the Presidio to the south and east.
- 2. Site History:** The cultural history of the Presidio spans thousands of years. The site was once the home of the Ohlone Indians. The Spanish arrived in 1776 to establish the northernmost outpost of their empire in western North America. The Presidio was later under Mexican rule for 24 years before the Department of the Army (Army) took control of it in 1846. Over the next 150 years, the Presidio was an Army installation and served as a mobilization and embarkation point during several overseas conflicts, a medical debarkation center, and the coastal defense for the San Francisco Bay area. Industrial operations formerly performed at the Presidio were associated with the military's maintenance and repair of vehicles, aircraft and base facilities. The

Presidio contains former landfills used by the Army for the disposal of fill soils and construction debris. Municipal waste is only believed to occur in significant quantities in Landfill E.

In December 1988, following the Secretary of Defense's Commission on Base Realignment and Closures recommendation, closure of the Presidio as a military base was initiated. As required by the Base Realignment and Closure Act, the Defense Environmental Restoration Program, and CERCLA, the Army initiated environmental studies and remediation activities in conjunction with the proposed transfer of the property to the National Park Service (NPS).

In October 1994, the transfer to the NPS was completed and the site became part of the Golden Gate National Recreational Area (GGNRA). As a condition of transfer, the NPS accepted administrative responsibility for the Presidio while the Army retained responsibility for environmental investigation and restoration.

In 1996, Congress enacted the Presidio Trust Act (Trust Act) giving jurisdiction over the 1,168-acre inland area of the Presidio, known as Area B, to the Presidio Trust. The Presidio Trust is a federal government corporation established to manage the inland area of the Presidio in accordance with the provisions of the Trust Act, including the purposes of the GGNRA Act (Section 1) and the general objectives of the General Management Plan Amendment (GMPA), while at the same time meeting the financial mandate of the Trust Act. The Trust Act requires that, no later than 2013, the Trust must be financially self-sufficient to support its operations and sustain the Presidio in perpetuity without annual federal appropriations. The NPS, however, retains administrative jurisdiction and management responsibility for the coastal areas of the Presidio, referred to as Area A.

The Presidio Trust is in the process of converting the Presidio from an Army base to a financially self-sufficient national park site.

3. Named Dischargers: The Army is a named discharger to this order because of substantial evidence that pollutants were discharged to soil and groundwater at the site during the course its operations at the Presidio. Environmental investigations conducted by the Army show that discharges to both soil and groundwater at the Presidio consist primarily of petroleum hydrocarbons, which include: gasoline, diesel, fuel oil and motor oil. Further, in accordance with Executive Order 12580 and a 1990 Interagency Agreement with the Department of the Interior, the Army retains all responsibility for environmental restoration arising out of releases for which it is responsible.

The Presidio Trust is named a discharger to this Order because administrative responsibilities for Area B (the 1,168-acre inland area) of the Presidio were transferred to the Trust in 1999, and pursuant to a 1999 MOA between the Army, Trust and NPS, environmental remediation

responsibility for Area B was transferred to the Trust in May 1999. Cleanup of the coastal portion of the Presidio, Area A, has also been delegated to the Trust, per authorization of the NPS.

The NPS is a named discharger to this order because the Presidio property was transferred to the NPS in 1994 becoming part of the Golden Gate National Recreational Area, and because of their active involvement in the planning and execution of environmental cleanups at the Presidio.

The Army, Presidio Trust, and NPS are collectively referred to as Dischargers.

If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the site where it entered or could have entered waters of the state, the Board may consider adding those parties' names to this order.

4. **Regulatory Status:** This site is currently subject to the following Board orders:

- Site Cleanup Requirements Order No. 91-082 adopted on May 15, 1991 for the remediation of soil and groundwater pollution at Buildings 231 and 937; and,
- Site Cleanup Requirements Order No. 96-070 adopted on May 15, 1996 which presented a site-wide soil cleanup and management strategy for petroleum only pollution.

5. **Site Topography:** Topography at the Presidio is highly variable. The northeastern boundary along San Francisco Bay is a low flat area developed on fill material. In contrast, the northern and northwestern boundaries along the Pacific Ocean are very steep with slopes averaging fifty percent. The interior or inland portion of the Presidio, including the eastern and southern boundaries, is characterized by gently rolling hills.

6. **Site Geology:** The three primary lithologies of the Presidio consist of serpentinite, various unconsolidated sediments, and beach/dune sand. The serpentinite is part of the Cretaceous-age Franciscan Formation and constitutes bedrock at the site, whereas the Colma Formation and the beach/dune sands constitute the unconsolidated sediments deposited upon the serpentinite bedrock.

7. **Site Hydrogeology:** Groundwater at the Presidio is found within both the unconsolidated sediments and the serpentinite unit and has been identified as occurring within three groundwater basins (Figure 2). These include the Marina Groundwater Basin, the Lobos Creek Groundwater Basin, and the Coastal Bluff Groundwater Basin.

As is typical of serpentinite, its ability to store or convey water is limited and primarily controlled by fracture zones within the unit. In many upland portions of the Presidio, the serpentinite is

relatively impermeable. Flow occurs along fractures or between the contact with the overlying unconsolidated sediments.

Surface topography and the bedrock configuration are the primary controls on the rates and direction of groundwater movement at the Presidio. Generally, the water table tends to mirror topographic relief, moving from upland areas in the center of the site to Lobos Creek, Mountain Lake, the Pacific Ocean, and San Francisco Bay.

Surface water occurs at various locations throughout the Presidio (Figure 3) and is found in Mountain Lake and Lobos Creek, as spring discharges at El Polin Spring, as seeps near the Public Health Services Hospital and Baker Beach, the eastern edge of Lincoln Boulevard (i.e., immediately west of Fill Site 5), and at other locations throughout the Presidio.

Recent (i.e., 2001 and 2002) water production records show that 80% to 90% of the average daily total water consumed (approximately 780,000 gallons) at the Presidio is derived from Lobos Creek. This water is treated at the water purification plant near Baker Beach. The remainder of the water supply needed comes from the City of San Francisco's municipal water supply system. Of the water consumed at the Presidio, approximately 40% to 50% of the total water consumed at the Presidio is used for landscape irrigation. The Presidio Trust is currently moving forward with the construction of an on-site water recycling system that will provide high-quality recycled water for landscape irrigation and other non-potable uses.

Low concentrations of metals are found in surface water and groundwater at the Presidio. Although additional characterization is needed, the occurrence of these metals in the majority of cases is likely to be naturally occurring. For example, U.S. EPA and Army studies of chromium in bedrock, and dissolved and hexavalent chromium in surface water and groundwater indicate that chromium is widespread at low concentrations in surface water and groundwater throughout the Presidio. The studies further concluded that the serpentine bedrock is a source of hexavalent chromium detected in upland groundwaters.

8. Historical Groundwater Usage: The history of groundwater use at the Presidio is spotty and incomplete. Between the mid-1850s through at least the 1930s, groundwater was used to supplement surface water supplies taken from Mountain Lake and Lobos Creek in an effort to supply a growing population and site infrastructure. The following provides a brief overview of historical groundwater usage at the Presidio.

- a. 1858 - The San Francisco Water Works constructed a well or shaft near Arguello Boulevard Gate in 1858. The well measured several feet in diameter, was uncased, and of unknown depth (possible up to 180 feet deep). The company abandoned the well sometime during the Civil War.

- b. ~1880 – The Army erected a windmill and a pump near the Arguello Gate along with an 800-gallon tank. The water was used for road sprinkling and irrigation. By 1896, the equipment deteriorated and the water supply from the system was deemed insufficient.
- c. March 1888 - Experimental borings for wells were dug at the Presidio. Three borings were completed as artesian wells. All produced clear water, one of which produced 8 – gallons per minute.
- d. 1894 - The Army constructed a new water system for the Presidio. It consisted of a pumping plant and a system of driven and open wells in the southwest portion of the site. Some wells reportedly reached depths of 110 feet.
- e. 1904 - A portion of the water used and consumed at the Presidio came from wells installed near Mountain Lake. Ten wells (one 16-inch, eight 20-inch, and one 45-inch) had a combined production capacity of 13,100 gallons per hour. At around this time, additional water was also supplied via an artesian well (100 gallons per hour) located in the northern end of the Presidio.
- f. 1924 - Six additional water wells were installed near the southern bank of Lobos Creek to supplement the water taken from Lobos Creek.

Currently, no active groundwater supply wells are located within the Presidio.

9. Remedial Investigations: By the mid-1990's, the Army had completed or partially completed several remedial investigations concerning both hazardous substance "CERCLA" sites and petroleum sites.

a. CERCLA Program Sites (Figure 4)

With respect to the CERCLA sites, the Army had completed remedial investigations for the Public Health Service Hospital (PHSH) Area and partially completed a remedial investigation for the Main Installation Operable Unit (which included Crissy Field and Directorate of Engineering and Housing (DEH) Areas and approximately 39 other sites including several landfills and fill sites) before the establishment of the Trust. A brief status recap of the known CERCLA sites follows:

1. Main Installation Operable Unit: In 1997, the Army circulated the "*Final Feasibility Study Report, Presidio Main Installation, Presidio of San Francisco,*" which was prepared by Dames & Moore ("Army FS"). At that time, the stakeholders did not

consider the Army FS complete due to outstanding data gaps and cleanup level issues. In an effort to complete the Main Installation Operable Unit feasibility study, in 2000 and 2001, the Trust conducted additional remedial investigations within select Main Installation sites. The results of these investigations are presented in a draft "*Revised Feasibility Study of Main Installation Sites*," dated March 2003. The revised draft FS covers the 35 of the 39 installation sites that were originally part of the Army's Main Installation Operable Unit. Remaining remedial investigations under the Presidio CERCLA program include the Firing Ranges Operable Unit and the Miscellaneous Sites Operable Unit.

2. Public Health Service Hospital (PHSH) Area: Landfill 8 and Landfill 10 are located within the PSHH area (Figure 4). In early 1995, the Army completed the Record of Decision (ROD) for the Former PSHH Area.

Landfill 8 operated between 1946 and 1973 and was used for the disposal of miscellaneous vegetative wastes and building debris. At Landfill 8, The PSHH ROD required five-years of groundwater monitoring to confirm that chemicals are not leaching from the fill material to groundwater. No analytes have been detected above laboratory detection limits at Landfill 8 since groundwater monitoring began in 1994 with the exception of low-level detections of toluene in 1996. The Trust is currently evaluating whether a ROD amendment or an Explanation of Significant Differences (ESD) will be required for future site remediation at Landfill 8.

Demolition debris from a former U.S. Merchant Marine Hospital (demolished and replaced by the existing site structure) may have been placed in Landfill 10. The PSHH ROD proposed both soil and groundwater sampling at Landfill 10 to confirm that the fill material does not pose any threat to human health and the environment. The ROD also required the installation of a groundwater-monitoring network at Landfill 10 followed by quarterly groundwater monitoring for a minimum of one year to confirm that chemicals are not leaching from the fill material to the groundwater. Since 1994, monitoring wells at the Landfill 10 site have been analyzed for BTEX, dissolved metals, TDS and general chemistry parameters. In October 2002, a Five-Year Review and Field Investigation Work Plan for PSHH area was finalized. The objectives of the investigation were to evaluate slope stability, further characterize the subsurface geology, investigate the extent of the landfill debris at the toe of the landfill, investigate the presence of site constituents of concern in downgradient seeps located near Lobos Creek and evaluate groundwater conditions within the landfill itself. The investigation was conducted in October, November and December 2002 and a PSHH Five-Year Review Report will be completed in 2003.

3. Crissy Field Area: In 1998, the Department of Toxic Substances Control (DTSC), the lead State agency for the Site, approved the Crissy Field Remedial Action Plan (RAP). The Crissy Field RAP addressed multiple Crissy Field area contamination sites, including the Building 900s Area. Historic activities in the Building 900s Area included aviation maintenance activities for Crissy Field, which was built in 1919, followed by vehicle maintenance after 1936. Groundwater samples collected from site wells have reportedly contained volatile organic compounds (i.e., vinyl chloride, cis-1,2-DCE, trans-1,2-DCE, and TCE), BTEX compounds, total petroleum hydrocarbons as gasoline, diesel, and fuel oil. For the Building 900s Area, the RAP selected source soil removal and subsequent confirmation groundwater monitoring to ensure that contaminated soil and fill were excavated and removed. The RAP requires that groundwater monitoring be conducted for a minimum of five years following excavation. The Building 900s Area has 31 associated monitoring wells that are distributed over shallow, intermediate and deep aquifers. As per the requirements of the RAP, groundwater monitoring continues. The Trust is currently preparing its request for Completion and Certification for this Operable Unit from the DTSC.

4. Directorate of Engineering and Housing (DEH) Area: The DEH Area is a 4.4-acre site in the northeast portion of the Presidio, adjacent to San Francisco Bay that was initially developed in the early 1900s. The site included 21 buildings that were used for administrative services, storage and maintenance activities. A firing range was also part of the original DEH complex, but the firing range remedy is included in the Crissy Field RAP (see above). DEH area environmental remediation activities have been performed in accordance with the 1997 DEH Remedial Action Plan (RAP) that was approved by the DTSC. The constituents of concern identified in soil in the DEH area include polycyclic aromatic hydrocarbons (PAHs), semi-volatile compounds (SVOCs), organochlorine pesticides, and metals. Analysis of groundwater samples indicated the presence of solvents, petroleum hydrocarbons and metals. The DEH RAP recommended remedial alternative required removal and offsite disposal of contaminated soils from the unsaturated zone and subsequent groundwater monitoring. Reduction of the associated groundwater contamination was expected because of the removal of the source material, subsequent dispersion, and natural degradation processes. In January 2000, the DTSC provided written confirmation with all provisions of the soil removal component of the RAP and indicated that final certification for completion of the remedial activity would be issued when groundwater cleanup standards were achieved. In August 2002, the Presidio reported that groundwater remediation goals at the DEH area had been met and summarized their findings in a draft Closure Report for the DEH Study Area. The Trust is currently preparing a response to regulatory comments on the draft closure report.

5. Building 937: Originally constructed for use as an aircraft hanger and later used for vehicle maintenance (Figure 4). Leaks from underground storage tanks and/or piping associated with the tanks have contributed to soil and groundwater pollution at the site.

Soil and groundwater contamination was first observed at Building 937 in 1981, when the Army identified "bulk oil" which had leaked from a filler pipe leading to the waste tank. The waste tank was used for diesel fuel, waste oils, paint, lacquer thinner, carburetor cleaner, and degreasing solvents. Oil as free product was found floating on the water table. The oil was found to also contain volatile and non-volatile compounds including: benzene, ethylbenzene, chlorobenzene, toluene, and methylene chloride. The semi-volatile organic compounds detected in the oil included p-chloro-m-cresol, naphthalene, and phenanthrene.

Following various site investigation activities between 1982 and 1987, a vacuum-based VOC vapor removal system was installed. The system operated continuously for about one year, then intermittently for several years. The system was removed in 1998. Mass removal calculations for the vapor removal system are not available.

Building 937 site clean-up requirements for petroleum were first established in Order No. 91-082. Subsequent to adoption of Order No. 91-082, the cleanup of the Building 937 site was incorporated into the 1998 Crissy Field Area RAP. Order 91-082 is a TBC/ARAR in the DTSC approved Crissy Field Final RAP. The RAP addressed several Crissy Field area contamination sites. For the Building 900s Area, the RAP selected source removal and subsequent confirmation groundwater monitoring as the remedy. Approximately 39,000 tons of contaminated soil and fill were excavated and removed. The RAP requires that groundwater monitoring be conducted for a minimum of five years following excavation. In 2001, seventeen additional monitoring wells were installed to expand the monitoring well network in the area. Groundwater monitoring at the site continues. Pollutants detected in groundwater are summarized below.

VOCs have been detected in groundwater wells completed within shallow, intermediate, and deep groundwater aquifers in the Building 937 Area. These include:

- Cis-1,2DCE (concentrations ranging from non-detect to 280 µg/L);
- Trans-1,2-DCE (concentrations ranging from non-detect to 70 µg/L);
- Acetone (concentrations ranging from non-detect to 170 µg/L);
- Benzene (concentrations ranging from non-detect to 30 µg/L);
- Carbon Disulfide (concentrations ranging from non-detect to 8.4 µg/L);
- Ethylbenzene (concentrations ranging from non-detect to 0.9 µg/L);
- Toluene (concentrations ranging from non-detect to 6 µg/L);

- TCE (concentrations ranging from non-detect to 42 µg/L);
- Vinyl chloride (concentrations ranging from non-detect to 14 µg/L); and,
- Total xylenes (concentrations ranging from non-detect to 4.2 µg/L).

Total petroleum hydrocarbons (TPH) were detected in only two monitoring wells completed in the Building 937 Area. TPH groundwater concentration ranges include:

- TPH-g between non-detect and 1,200 µg/L;
- TPH-d between non-detect and 720 µg/L; and,
- Total petroleum hydrocarbons as fuel oil (TPH-fo) between non-detect and 1,900 µg/L.

6. Firing Range Operable Unit – The Firing Range Operable Unit as defined by the Presidio Trust consists of five small firing range sites. The types of waste expected to be encountered within the firing ranges include soil contaminated with metals and minor amounts of ammunition fragments. The Presidio Trust has recently submitted a plan entitled the “*Draft Work Plan for the Small Arms Firing Ranges Remedial Investigation/Feasibility Study*,” prepared by Treadwell & Rollo, and dated February 2003. The draft work plan proposes further characterization the nature and extent of potential contamination at the small arms firing ranges.

b. Petroleum Sites

The following provides a detailed description of remedial investigations for Presidio petroleum sites:

1. Building 207/231: Building 231 was built in 1950 and operated as an automobile service station for privately owned vehicles. The building was in operation until mid-1995 (Figure 5).

Gross soil contamination was discovered in 1988 when four, 10,000-gallon underground storage tanks were removed. Approximately 4,000-gallons of hydrocarbon floating product was removed from the water table at that time, followed by excavation of approximately 700 cubic yards of hydrocarbon-impacted soil.

In 1990, the Army installed a combined soil vapor-groundwater extraction system and operated the system for approximately 6 months in 1993. In or about 1996 or 1997, the Army combined the investigation of Building 231 area with the investigation of another former gas station located at Building 207, due north and downgradient of Building 231. At various times between 1992 and 1999, the US Army performed additional site

investigation work and interim soil removals in the area. Although numerous investigations and a large volume of data has been generated in the Building 207/231 area, the Trust reports that the Final Remedial Investigation Report for the Presidio Main Installation (Dames & Moore, 1997) and the Draft Corrective Action Plan for the Building 207/231 Area (Montgomery Watson, 1999), did not consolidate all of the available soil and groundwater data. The Trust has evaluated the available data and has prepared a draft investigation work plan in an effort to fill existing data gaps prior to completing a new corrective action plan for the area.

Following is a list of the maximum detected concentrations in groundwater at the 231/207 site.

- TPH-gasoline (TPH-g) has been detected at concentrations up to 93,000 µg/L;
- TPH-diesel (TPH-d) has been detected at concentrations up to 9,600 µg/L;
- Benzene has been detected at concentrations up to 11,000 µg/L;
- Toluene has been detected at concentrations up to 1,800 µg/L;
- Ethylbenzene has been detected at concentrations up to 4,100 µg/L;
- Total xylenes (sum of m,p-xylenes and o-xylenes) have been detected at concentrations up to 13,600 µg/L; and,
- 1,2-Dichloroethane has been detected at concentrations up to 330 µg/L.

2. Commissary/PX: Located along the southern edge of Crissy Field at the northern end of the Presidio (Figure 5). The Commissary/PX area historically contained a number of structures that constituted the Presidio Consolidated Motor Pool.

In mid-November 1999, the Trust became aware of groundwater seeps, which contained detectable levels of petroleum hydrocarbons as gasoline, in the southwest corner of the new Crissy Field tidal marsh. Throughout 2000, the Trust conducted a series of investigations (i.e., seep sampling, shallow groundwater sampling, advancement of 48 exploratory borings, and excavating 11 test pits) to identify and delineate the source of gasoline in the groundwater seeps at Crissy Field. These investigations documented the following:

- Concentrations of TPH-g in the groundwater seeps at 0.4 to 0.5 mg/L;
- Concentrations of TPH-g in shallow groundwater up to 3.4 mg/L; and,
- Concentrations of TPH-g and TPH-d in shallow soil up to 21,000 mg/kg.

Interim source removal activities were conducted by the Trust in 2001 to address detections of petroleum hydrocarbons in groundwater seeps observed in the Crissy Field tidal marsh. The source removal consisted of removing 3,750 tons of soil that contained petroleum hydrocarbons that exceeded cleanup levels, backfilling the excavation with

clean fill, evaluating the contaminant attenuation characteristics of the 1925 sand, and monitoring groundwater.

Groundwater has been monitored for TPH-g, TPH-d, TPH-fo, BTEX, and MTBE in three groundwater monitoring wells since August 2001 and two seep locations since September 2002. Following is a list of the maximum detected concentrations recorded since the 2001 interim source removal in groundwater and seeps at the Commissary /PX site:

- Concentrations of TPH-g in the groundwater ranging from non-detect to 430 µg/L.
- Concentrations of ethylbenzene and total xylenes in groundwater ranging from non-detect to 4.9 µg/L and 3.33 µg/L, respectively.
- Concentrations of TPH-g in seeps ranging from non-detect to 120 µg/L.

Following the interim source removal, a two-phased site investigation was conducted by the Trust in 2002 and early 2003 to characterize the nature and extent of potential contamination at the former motor pool area, and to collect data required to evaluate potential remedial alternatives. A draft report documenting the findings of this phase of remedial investigation is pending.

3. Building 1065 Area: Includes the former or present locations of Building 1040, 1047, 1062, 1063, 1064 (old and new) 1065, 1066 and the former tank area just west of Building 1027 (Figure 5). Building operations formerly associated with the Building 1065 area include a power house/steam plant, laundry, warehouse, exchange service station, post-exchange auto shop/maintenance/paint shop, and a garage.

Previous investigations, including underground storage tank and above ground storage tank removals, were conducted by the Army to assess the nature and extent of contamination at the Building 1065 Area, close existing underground storage tanks and aboveground storage tanks, and evaluate remedial alternatives. The remedial investigations included borehole drilling, soil and groundwater collection and analysis, passive soil gas surveys, installation of monitoring wells, and groundwater sampling.

In addition to the ongoing groundwater monitoring program, in 2001 and 2002 the Presidio Trust conducted additional remedial investigation work in an effort to fill existing data gaps identified from the review of chemical and hydrologic data collected during the previous investigations. The data gap investigations included a geophysical survey, excavating test pits to investigate identified geophysical anomalies, soil sampling in areas where chemicals exceeded screening levels and at potential source areas that had not been previously sampled, groundwater sampling from shallow, intermediate and deep

groundwater zones, and the installation of shallow, intermediate, and deep groundwater wells and piezometers. The results of the data gaps investigation are presented in a February 2003 report titled "*Interim Data Report, Building 1065 Area, Presidio of San Francisco,*" prepared by MACTEC.

Based on the recent site investigation activities, it appears that contaminant releases at the site were probably from past surface spills, former ASTs, USTs, and former fuel distribution system (FDS) pipelines.

Quarterly groundwater monitoring at the Building 1065 Area is ongoing. The following presents a brief summary of historic analytical results

- TPH-g ranged from non-detect to 110,00 µg/L;
 - TPH-d ranged from non-detect to 3,900 µg/L;
 - Benzene ranged from non-detect to 4,300 µg/L;
 - Toluene ranged from non-detect to 1,400 µg/L;
 - Ethylbenzene ranged from non-detect to 11,000 µg/L; and,
 - Total xylenes ranged from non-detect to 20,000 µg/L.
4. Building 1349: Originally consisted of a 100,000-gallon steel aboveground storage tank (AST) used to store fuel oil for distribution throughout the Presidio by the former FDS pipelines (Figure 5). The FDS was decommissioned in sections beginning in the 1940s and ending in the 1960s. After the FDS piping was decommissioned, the AST (Building 1349) was used to store diesel fuel, which was off-loaded to tanker trucks for transportation to various locations at the Presidio. Closure activities began in October 1995 and included removal of Building 1349 AST and its associated piping and excavating fuel-contaminated soil. Removal of most of the site-wide FDS piping began in 1996.

A Phase 1 Site Investigation was conducted by the Trust in September 2002 to collect additional site data. In March 2003, the Trust reported the results of the Phase 1 investigation in a draft report titled "*Phase 1 Building 1349 Site Investigation Results and Phase 2 Investigation.*" The Phase 1 investigation consisted of:

- Drilling 21 soil borings to depths ranging between 3.0 and 46.5 feet bgs;
- Collecting 38 soil samples;
- Collecting 10 groundwater grab samples;
- Abandoning one monitoring well, installing one new monitoring well and developing an existing monitoring well.

Preliminary soil results collected during the Phase 1 investigation show:

- TPH-d was detected in 10 of 38 samples at concentrations ranging between 1.2 mg/kg and 1,800 mg/kg;
- TPH-unknown was detected in 17 of 38 samples at concentrations ranging between 1.3 mg/kg and 2,600 mg/kg; and,
- TPH-fo was detected in 10 of 38 samples at concentrations ranging between 11 mg/kg and 3,600 mg/kg.

Phase 1 TPH concentrations in grab groundwater samples range from non-detect to 24,000 µg/L for TPH-d, 230 µg/L TPH-g, and 2.6 µg/L for benzene.

Currently the Presidio has outlined a Phase 2 approach that is based on the Phase 1 results, screening level exceedances and the need to fill data gaps prior to preparing a CAP for the site. Additional soil and groundwater sample collection is proposed with the rationale being to laterally and vertically delineate contamination identified during Phase 1. Quarterly groundwater monitoring of existing site monitoring wells is expected to continue into the future.

5. Building 637/638 Area: Remedial activities associated with the 637 Area are documented in the *Excavation Report for the Building 637 Area (22 June 2000)*, prepared by Erler & Kalinowski Inc., on behalf of the Presidio Trust.. This site was previously the location of petroleum, oil and lubricants (POL) area used as a refueling station for the adjacent Consolidated Motor Pool facility (Figure 5). Historic site diagrams show a construction date for three 10,000-gallon ASTs of May 1928. These ASTs were linked to fueling islands at Building 638 via underground pipelines. By the mid-1960s, the POL area contained six ASTs, five fuel pump islands, a vapor recovery tank, and an oil-water separator. The six ASTs included three 20,000-gallon gasoline tanks, and three 5,000-gallon diesel fuel tanks.

The primary potential petroleum-related contaminant sources include subsurface releases from underground piping between ASTs and the fuel-dispensing islands, and surface spills associated with POL operations. In 1989, the facility was deactivated following the Loma Prieta earthquake. The ASTs, vapor recovery tank, underground piping, fuel islands, and pump control house were removed in 1993, and the POL area was closed at that time. Between 1993 and 1996, the Army and the U.S. Army Corps of Engineers performed several removal actions at the site, which include removal of approximately 3,225 cubic yards of hydrocarbon-contaminated soil. The Army also treated groundwater in the Building 637 area. In 1994, the Army installed and operated a groundwater treatment and extraction system that was designed to remove free product, or mobile,

light non-aqueous phase liquid, and high concentrations of petroleum hydrocarbons in groundwater. The system operated about nine months and recovered approximately 25 gallons of floating product. The system was shut down in May 1995.

In August 1999, the Trust completed a CAP for the Building 637/638 Area. As part of the CAP implementation, the Trust excavated and disposed of approximately 1,650 tons of petroleum-impacted soil and asphalt from six locations. At two of the excavation locations, Oxygen Release Compound (ORC®) was incorporated into the backfill material in an effort to enhance in-situ bioremediation. Also, between February and March 2000, approximately 1,320 pounds of ORC® was injected into the soil within the smear zone (capillary fringe zone immediately above groundwater surface) to enhance in-situ bioremediation by increasing the dissolved oxygen content in groundwater. The ORC® injection points were spaced 10 feet on center in the presumed transverse direction to groundwater flow.

Currently, the Building 637 Area has 13 groundwater monitoring wells that are screened in two, tidally influenced distinct water-bearing zones (A1 and A2 zones). The groundwater monitoring wells are monitored for TPH, BTEX and MTBE on quarterly basis (for a one to two year duration to access trends). Summaries of reported results follow:

- Benzene concentrations ranging from non-detect to 1.6 µg/L;
- Toluene concentrations ranging from non-detect to 5.6 µg/L;
- Ethylbenzene concentrations ranging from non-detect to 2.4 µg/L;
- Total xylenes ranging from non-detect to 4.9 µg/L;
- MTBE ranging from non-detect to 13 µg/L; and,
- TPH-g ranging from non-detect to 620 µg/L.

6. Mini-Corrective Action Plan (Mini-CAP) Sites (Figure 6): The Mini-CAP concept/program was developed by the U.S. Army Corps of Engineers, and has been carried forward by the Trust, as a way to address the large number of underground storage tank and pipeline sites at the Presidio.

Mini-CAPs are form-style reports that standardize the way site-specific information is presented and simplify the regulatory review and approval process for closure. Mini-CAPs apply to those petroleum release sites where the following two conditions are met:

- No contaminants other than fuel products are present; and,
- Groundwater quality at the site has not been impacted.

If either of the listed conditions is not met, a site-specific CAP will be prepared for the site. For sites at which multiple tanks and/or pipeline segments are present, only one Mini-CAP will be prepared for the site; however, different corrective action technologies may be selected for each tank or pipeline segment.

Currently, there are 27 documented Mini-CAP sites that include: UST-3, UST-42, UST-100.1, UST-101.1, UST-101.2, UST-102.1, UST-102.2, UST-103.1, UST-104.1, UST-104.2, UST-951, UST-334, UST-338.1, UST-339, UST-342, UST-343, UST-514.1, UST-651, UST-1030, UST-1213, UST-1221.1, UST-1221.2, UST-1221.3, UST-1221.4, UST-1260, UST-1451, and Building 970/971. The final number of Mini-CAP sites is subject to change given that site redevelopment/rehabilitation activities commonly unearth unknown USTs and FDS-related pipeline segments. As new USTs and pipeline segments are discovered, the Trust will evaluate them for releases to the environment and will add them to the CAP or Mini-CAP program, as appropriate.

The Trust is currently evaluating the available data at the above listed Mini-CAP sites, determining if additional cleanup or investigation is necessary to support closure, and performing those required cleanup actions (i.e., work plan preparation, field investigation, etc.) in an effort to close Mini-CAP sites. The Trust expects to complete all mini-cap cleanups by the end of 2005.

7. Fuel Distribution System (FDS): The 45,000-ft main FDS pipeline was a gravity-feed system that was constructed at the turn of the century and used until the early 1960s (Figure 7). The FDS was used to supply heating fuel to approximately 300 USTs located inside or adjacent to administrative buildings and residences at the Presidio through a gravity feed system that originated at the 1349 AST (Figure 7). Petroleum hydrocarbons transported in the FDS consisted primarily of fuel oil. Gasoline and diesel fuel were also conveyed in the FDS sections formerly located in the Crissy Field area. FDS removal activities are described in the "*Fuel Distribution System Closure Report, Presidio of San Francisco,*" (IT Corporation, May 1999), and included:

- Removal of FDS piping where accessible;
- Abandonment in place of FDS piping located in inaccessible and/or sensitive areas;
- Assessment/characterization of soil in FDS removal sections via field immunoassay tests and laboratory analysis of soil samples;
- Excavation of petroleum hydrocarbon affected soil;
- Recycling (i.e., onsite low temperature thermal desorption (LTTD) treatment) and/or disposal of soil that exceeded prescribed remediation goals; and,
- Site restoration.

The length of pipeline removed or abandoned upon completion of this project was approximately 45,000 feet.

To expedite the environmental restoration of fuel sites, the U.S. Army Corps of Engineers developed risk-based soil cleanup levels for petroleum-impacted sites as described in the *Fuel Product Action Level Development Report, Presidio of San Francisco, San Francisco, California* (FPALDR), dated October 1995. Order No. 96-070 formerly adopted the use of the risk-based approach, provided a framework to implement a site-wide soil cleanup and management strategy, and established requirements for operation and monitoring of the LTTD.

Excavations were generally continued until soil sample analytical data confirmed that petroleum hydrocarbons, PAHs and/or BTEX were below cleanup levels. At several locations, excavations were stopped due to the presence of bedrock, utility lines, buildings and/or other structures. Excavations were backfilled with imported clean fill or soil treated by an on-site low temperature thermal desorption unit (LTTD).

Based on the results of the FDS removal and sample analytical results, 26 sites have been identified along the FDS which may require additional investigation and/or remediation. Thirty-four sections were recommended for no further action by the Army and are currently being evaluated by the Trust to assure additional investigation and/or remediation will not be required based on current site use

10. Interim Remedial Measures: In addition to the interim remedial measures summarized in Finding 9.b (Petroleum Sites) above (i.e., Building 937 excavation/SVE/monitoring, Building 207/231 excavation soil-vapor and groundwater extraction and monitoring, Commissary/PX excavation and monitoring, Building 1065 excavation, Building 1349 excavation, Building 637 excavation, ORC injection, and monitoring, and FDS removal) approximately 17,000 tons of petroleum polluted soil was thermally treated/remediated onsite in a low temperature thermal desorption (LTTD) unit. Order No. 96-070 presented operational objectives and requirements, including a self-monitoring program for the LTTD process. The operational history of the LTTD process is described below.

As described in finding 9.b.7, environmental restoration work at the Presidio began with the removal of numerous fuel ASTs, USTs, and the FDS conveyance piping. The primary objective in operating the LTTD was to treat petroleum-impacted soil generated from tank and pipeline removal sites so that the soil would be suitable for reuse as backfill at the excavation sites. A second objective was to demonstrate that the low temperature thermal desorption technology could be successfully applied for treatment of fuel-oil range petroleum-impacted soil.

The LTTD process heated the soil to between 600-700 degrees Fahrenheit (°F) to volatilize organic constituents (i.e., petroleum), followed by destruction of the vaporized hydrocarbons in a 1400 °F thermal oxidizer. Approximately 16,699 tons of impacted soil was treated between July 1996 and May 1997. Eighty-one percent of the treated soil met acceptance criteria following one pass through the treatment system. Soil that exceeded the criteria was reprocessed and re-sampled. All soil accepted for treatment as successfully processed and no hydrocarbon-impacted soil was hauled off-site for disposal.

LTTD soil treatment at the Presidio was terminated in April 1997. The results of the project are well documented in the report titled "*On-Site Soil Treatment Using Low Temperature Thermal Desorption*," dated June 1998. There are no plans to treat/remediate hydrocarbon-impacted soils at the Presidio using LTTD.

11. Adjacent Sites: There are no known nearby pollution sites whose contamination or cleanup activities affect the site, or are affected by pollution from the site.

12. Basis for Cleanup Standards:

a. General: State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. Given the Board's past-experience with groundwater pollution cases of this type, it is unlikely that background levels of water quality can be restored. This initial conclusion will be verified when a cleanup plan is prepared. This Order and its requirements are consistent with Resolution No. 68-16.

State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

b. Beneficial Uses: The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of regulatory provisions is

contained in 23 CCR 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally high contaminant levels. Groundwater underlying and adjacent to the site qualifies as a potential source of drinking water.

The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the site:

- Municipal and domestic water supply;
- Industrial process water supply;
- Industrial service water supply;
- Agricultural water supply; and,
- Freshwater replenishment to surface waters.

Existing beneficial uses also include protection of surface water beneficial uses due to groundwater discharge/seepage to the Bay and freshwater bodies including Mountain Lake, Lobos Creek and the Tennessee Hollow Corridor.

The existing and potential beneficial uses of Central San Francisco Bay and Pacific Ocean, these water bodies as identified within the Basin Plan and Ocean Plan, respectively, include:

- Water Contact Recreation
- Non-contact Water Recreation
- Industrial process water supply (PROC);
- Preservation of Rare and Endangered Species
- Estuarine Habitat
- Fish Spawning
- Saltwater Habitat
- Navigation
- Ocean Commercial and Sport Fishing
- Fish Migration
- Shellfish Harvesting.

As shown on Figure 2, the Dischargers have proposed and the Board staff agrees with a subdivision of the San Francisco Sands Groundwater Basin into the Marina Groundwater Basin,

the Lobos Creek Groundwater Basin, and the Coastal Bluffs Groundwater Basin based on documented geologically controlled groundwater flow regimes.

c. Basis for Groundwater Cleanup Standards: The groundwater cleanup standards for the site are based on applicable water quality objectives and are the more stringent of EPA and California primary maximum contaminant levels (MCLs). Cleanup to this level will protect beneficial uses of groundwater and will result in acceptable residual risk to humans.

d. Basis for Soil Cleanup Standards: The cleanup standards presented on Tables 1 through 7 are concentrations above which corrective action may be required. The flowchart in Figure 8 illustrates how cleanup levels are chosen at a given site. The dischargers will remain responsible for any future source removal, containment, management and monitoring of existing and/or remaining polluted soil and groundwater that may be required as a result of changes in land use, applicable requirements or available information. In addition, a long-term site-wide monitoring program will be required as part of this Order to determine compliance with the levels set forth herein.

Cleanup levels for the protection of human health, the environment, and water quality are presented below.

1. Soil Cleanup Levels for the Protection of Human Health (Table 1): A human health risk assessment was used to develop fuel hydrocarbon action levels for persons who may be exposed to soil pollution at the Presidio. The development of these action levels is documented in the October 1995 U.S. Army Corps of Engineers report titled, "*Fuel Product Action Level Development Report (FPALDR), Presidio of San Francisco, San Francisco, California.*" Depending on the location of the site at the Presidio, one or more of the following exposure scenarios will apply:
 - Recreational;
 - Residential (except roadways, parking lots, etc.); and,
 - Park Maintenance worker and groundskeepers for the NPS.
2. Soil Cleanup Levels for the Protection of Ecological Receptors (Table 2): Soil cleanup levels are established herein for the protection of ecological (non-human) receptors. Soil cleanup levels protective of terrestrial receptors are based on a risk based approach, with ingestion of soil and contaminated prey being the primary routes of exposure. The soil cleanup levels for the protection of ecological receptors were developed and documented in the October 1995 U.S. Army Corps of Engineers report titled, "*Fuel Product Action Level Development Report (FPALDR), Presidio of San Francisco, San Francisco, California.*"

3. Soil Cleanup Levels for Protection of Water Quality Objectives at Detectable Levels (Table 3), Soil Cleanup Levels for Protection of Water Quality Objectives at Drinking Water Standards (Table 4), and Soil Cleanup Levels for Crissy Field (Table 5): The development of the soil cleanup levels presented in Tables 3 and 4 are documented in the October 1995 U.S. Army Corps of Engineers report titled, "*Fuel Product Action Level Development Report (FPALDR), Presidio of San Francisco, San Francisco, California.*" These cleanup levels assume that any non-aqueous phase liquid (NAPL) will be removed from the storage facility, fuel line, or subsurface. Therefore, the cleanup levels for the Presidio as shown on Tables 3 and 4, refer to the residual concentration of fuel constituents that can remain in vadose zone soil without impacting the beneficial uses at sites where groundwater impact is not currently known to occur. In general, soil cleanup levels for protection of groundwater quality in this Order were calculated to assure that residual soil pollutants do not cause either background levels of drinking water criteria to be exceeded in groundwater. The one area where this approach is not used is at Crissy Field (Table 5).

Crissy Field is treated differently because there is a low probability of groundwater being used for municipal supply purposes in the near future. Although groundwater in certain areas within Crissy Field meets the criteria of this Board's drinking water policy (Board Resolution 89-39), the probability of use for such purposes is minimal. Pumping groundwater in those portions of Crissy field where artificial fill lie on top of bay mud is likely to cause seawater intrusion and land subsidence, thus limiting the probability of developing these waters for such use.

4. Point of Compliance Concentrations in Soil and Water for Petroleum Hydrocarbons, BTEX, and MTBE for the Saltwater Protection Zone (Table 6): Order No. 96-070 required assessment of the potential effect of petroleum hydrocarbons and fuel constituents on current and future aquatic receptors within the Presidio's Saltwater Ecological Protection Zone (Figure 9). Cleanup levels for saltwater aquatic receptors apply to a saltwater ecological protection zone surrounding the Crissy Field tidal marsh and adjoining San Francisco Bay frontage (Figure 9). Cleanup levels for gasoline and fuel oil in the saltwater protection zone were established by the U.S. Army Corps of Engineers in a 1997 study titled, *Report of Petroleum Hydrocarbon Bioassay and Point of Compliance Concentration Determinations, Saltwater Protection Zone, Presidio of San Francisco, California.*
5. Point of Compliance Concentrations (POCCs) for Gasoline in Surface Waters and Sediments of the Proposed Freshwater Stream (Table 7): As part of the reuse plan for the Presidio, the NPS has proposed that a riparian corridor be reestablished in the

eastern portion of the Presidio (Figure 9). The proposed riparian corridor will include a freshwater stream, which will discharge into tidal wetlands at Crissy Field. Based on communications with the NPS, it was determined that the Building 207/231 site (Finding 9.b.1), may be in or near the alignment of the proposed riparian corridor. As the lead agency for the Corrective Action Plan for the Building 207/231 area, the RWQCB took the lead in performing a bioassay study for freshwater aquatic species likely to inhabit a proposed freshwater stream using groundwater samples from monitoring wells impacted with gasoline from the Building 207/231 site. The purpose of this study was to develop site-specific point-of-compliance concentrations (PCOCs) for gasoline and gasoline constituents in surface water and sediment and evaluate cleanup strategies for soil and groundwater at the Building 207/231 site. Freshwater site-specific POCCs were developed by the U.S. Army Corps of Engineers and are presented in a May 1999 report titled, "*Development of Point of Compliance Concentrations for Gasoline in Surface Waters and Sediments of the proposed Freshwater Stream,*" and the August 1999 "*Draft Final Building 207/231 Corrective Action Plan,*" prepared by Montgomery Watson.

Cleanup levels for diesel and fuel oil for the protection of freshwater aquatic habitat will be developed separately, as described under Tasks 2 and 3 of this Order. Given that the exact placement of the proposed stream is yet to be determined, the application (i.e., lateral distance from stream) of the freshwater stream PCOCs will be determined, as needed, on a site-by-site basis.

13. Cleanup Plan: This Order requires the Dischargers to:

- a. Develop and adhere to a schedule of petroleum cleanup actions for all leaking USTs, ASTs, and associated piping at the Presidio;
- b. Fully investigate, characterize and remediate soil and groundwater petroleum and related constituent pollution at the sites listed on the following table:

Petroleum Category	Petroleum Category Definition	Area/UST Site
CAP Site* (Figure 5)	Large petroleum release sites where groundwater has been affected.	Building 1065, Building 207/231, Building 1349, Commissary/Post Exchange, and Building 637

Mini-CAP Sites* (Figure 6)	Petroleum release sites requiring relatively minor additional corrective actions and/or site investigation and are believed to have resulted in no impact to groundwater.	UST-1451, UST-3, UST-42, UST-100.1, UST-101.1, UST-101.2, UST-102.1, UST-102.2, UST-103.1, UST-104.1, UST-104.2, UST-951, UST-334, UST-338.1, UST-339, UST-342, UST-343, UST-514.1, UST-651, UST-1030, UST-1213, UST-1221.1, UST-1221.2, UST-1221.3, UST-1221.4, UST1260, and Building 970/971.
-------------------------------	---	---

*Additional petroleum sites may be added or moved between categories as additional site data is gathered. From time to time, previously unknown petroleum spills are discovered through normal site maintenance and construction operations. Furthermore, the Trust's experience since 1999 suggests that each year, two or more previously unknown tanks are discovered.

- c. Develop site-specific point of compliance concentrations for surface water and sediment for extractable range (i.e., C12+) hydrocarbons in areas located within the proposed freshwater riparian corridor;
- d. Obtain closure certification for USTs, ASTs, and FDS pipelines (addressed under this Order) following completion of the necessary corrective actions; and,
- e. Conduct site-wide groundwater and surface water monitoring and reporting.

14. Cleanup Goals and Strategy: DTSC is the State's lead agency in overseeing cleanup of the site except for the cleanup of petroleum pollution for which the Board is the lead agency. DTSC is expected to follow the CERCLA cleanup procedures.

The cleanup strategy for petroleum-contaminated sites at the Presidio is based on surface and groundwater quality objectives, the protection of human health and the environment, and risk management. The cleanup strategy also considers long term projected land usage and cost effectiveness of the overall corrective action process.

15. Reuse or Disposal of Extracted Groundwater: Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

16. Basis for 13304 Order: California Water Code Section 13304 authorizes the Board to issue orders requiring a discharger to cleanup and abate waste where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and created or threatens to create a condition of pollution or nuisance.

17. Federal Waiver of Sovereign Immunity: The Federal government has waived its sovereign immunity for the UST sites subject to this Order under Title 42, Chapter 82, Subchapter IX, Section 6991f, of the United States Code.

18. Cost Recovery: Pursuant to California Water Code Section 13304, the dischargers are hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.

19. CEQA: This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

20. Notification: The Board has notified the dischargers and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.

21. Public Hearing: The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner, which will degrade water quality or adversely affect beneficial uses of waters of the State, is prohibited.
2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup, which will cause significant adverse migration of wastes or hazardous substances, are prohibited.
4. Discharges of LTTD soil must maintain a minimum setback distance of fifty (50) feet from any lake, creek, stream or spring.

5. The top 18-inches of each excavation will be backfilled exclusively with soils with no detectable concentrations (i.e., non detect as defined by PQLs for the analytical method specified) of fuel constituents. The source of these soils may be clean fill or excavated soils.
6. Backfill of below the top 18-inches of each excavation, but above the soil cleanup standards established on Tables 1-7, shall not contain fuel constituents in excess of the following standards: 100 mg/kg total petroleum hydrocarbons, 0.005 mg/kg benzene, 0.005 mg/kg toluene, 0.005 mg/kg ethylbenzene, and 0.005 mg/kg xylenes.

B. CLEANUP PLAN AND CLEANUP STANDARDS

1. Implement Cleanup Plan: The Dischargers shall implement the cleanup plan described in Finding 13. The Dischargers shall conduct site investigation, remediation and monitoring activities as needed to define the current hydrogeologic conditions, to define the lateral and vertical extent of pollution on-site, to define the lateral and vertical extent of groundwater pollution on, or emanating from their individual sites, to remediate as may be required any soil pollution on-site, and remediate as may be required any groundwater pollution on or emanating from their site(s). Should monitoring results show evidence of pollutant migration, the source of which is the Site, additional characterization and remediation may be required.

2. Groundwater Cleanup Standards: As shown on Figure 2, the groundwater beneath the Presidio occurs in three groundwater basins and related sub-areas. The following groundwater cleanup standards shall be met in all wells completed in the groundwater basins as shown below.

Groundwater Basin/Area	Standard ($\mu\text{g/L}$)	Basis
Lobos Creek	Drinking water (i.e., MCLs)	EPA/California Primary MCLs
Coastal Bluff	Drinking water (i.e., MCLs)	EPA/California Primary MCLs
Marina	Drinking water (i.e., MCLs)	EPA/California Primary MCLs

3. Soil Cleanup Standards: Cleanup standards for soil and groundwater are established in Tables 1 - 7 of this Order. Consultation with Regional Board staff is required in groundwater areas where groundwater areas or groundwater basins overlap or it is unclear which cleanup level(s) would apply. The Dischargers shall compare the standards for these areas in which they are located for each pollutant and then use the most stringent value as the cleanup objective as outlined on the petroleum cleanup flowchart (Figure 8).

The Dischargers must remediate all contaminated soils to meet all cleanup levels. The cleanup standards presented in Table 1-7 of this Order do not represent or constitute standards for soil reuse.

C. TASKS

The Dischargers shall comply immediately with the Prohibitions and Specifications above or as required in the following tasks:

1. **COMPREHENSIVE PETROLEUM INVESTIGATION AND REMEDIATION TIME SCHEDULE**

COMPLIANCE DATE: November 21, 2003

Submit a technical report, acceptable to the Executive Officer, setting forth a time schedule for the investigation and remediation of underground storage tanks (USTs), aboveground storage tanks (ASTs), and fuel delivery system (FDS) conveyance piping by groundwater basins and areas described in this Order.

For groundwater-impacted petroleum sites (i.e., CAP sites), the schedule shall include interim corrective action work plans, as necessary, and final corrective action plans, as required to remediate groundwater impacts. For the Mini-CAP sites (i.e., soil only contamination, no petroleum impacts to groundwater/surface water), the schedule shall include remediation work plans that demonstrate no impact to groundwater/surface water and define the limits of soil contamination, as necessary, and final Mini-CAP summary reports.

The remediation portion of the schedule must include all known corrective action plan sites and mini-corrective action plan sites that have been identified at the Presidio (i.e., those sites identified in Finding 13).

The remediation schedule must propose actions so that removal or remediation of soils to meet cleanup levels is completed in the most practical timeframe. Upon approval by the Executive Officer, the time schedule and subsequent dates will become part of this Order.

2. **WORKPLAN FOR DEVELOPMENT OF FRESHWATER CORRIDOR SURFACE WATER AND SEDIMENT POINT OF COMPLIANCE CONCENTRATIONS (PCOCs)**

COMPLIANCE DATE: December 19, 2003

Submit a technical report, acceptable to the Executive Officer, for developing site-specific PCOCs for the freshwater corridor surface water and sediments that apply at the point of exposure for extractable range hydrocarbons (i.e., diesel and fuel oil). The freshwater PCOC work plan should consider and as appropriate, build upon, the May 1999 Final Technical Memorandum prepared by Montgomery Watson on behalf of the U.S. Army Corps of Engineers entitled "*Development of Point of Compliance Concentrations (PCOCs) for Gasoline in Surface Waters and Sediments of the Proposed Fresh Water Stream.*"

The work plan needs to consider that the exact location of the proposed freshwater corridor is currently being studied and has not yet been finalized in determining the "zone of application" of the PCOCs. The "zone of application" refers to the lateral distance from stream and into surrounding groundwater the proposed PCOCs apply. Therefore, the work plan for the development of extractable range PCOCs shall evaluate of the variables of site geology, site lithologies, gradient, etc.

3. **REPORT DOCUMENTING THE IMPLEMENTATION OF THE FRESHWATER CORRIDOR SURFACE WATER AND SEDIMENT POINT OF COMPLIANCE CONCENTRATIONS (PCOCs) APPROACH**

COMPLIANCE DATE: December 31, 2004

Submit a technical report, acceptable to the Executive Officer, which details the results of implementing the work plan described under Task 2, above.

4. **INTERIM REMEDIAL ACTION WORK PLAN FOR CORRECTIVE ACTION PLAN SITES**

COMPLIANCE DATE: As adopted from the Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, which evaluates interim remedial action alternatives and recommends one or more alternatives for implementation for those corrective action plan sites that have been identified in the Task 1 schedule as requiring interim remedial actions. (Please note: Not all corrective action plan sites are required to follow an interim remedial action pathway).

Work may be phased to allow any necessary additional source or extent characterization/investigation to proceed efficiently. If groundwater extraction is selected as an interim remedial action, then one task will be the completion of an NPDES permit application for discharge of extracted, treated groundwater to waters of the State. The application must demonstrate that neither reclamation nor discharge to the sanitary sewer is technical or economically feasible.

5. COMPLETION OF INTERIM REMEDIAL ACTIONS AT CORRECTIVE ACTION PLAN SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, documenting completion of necessary tasks identified in the Task 4 work plan(s). For ongoing actions, such as soil vapor extraction, groundwater extraction, etc., the report should document startup as opposed to completion.

6. PROPOSED FINAL CORRECTIVE ACTION PLAN AND CLEANUP STANDARDS AT CAP SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, containing:

- a. Results of the remedial investigation;
- b. Evaluation of the installed interim remedial actions;
- c. Feasibility study evaluating alternative final remedial actions;
- d. Risk assessment for current and post-cleanup exposures;
- e. Recommended final remedial actions and cleanup standards; and,
- f. Implementation tasks and time schedule

Item c should include projections of cost, effectiveness, benefits, and impact on public health, welfare, and the environment of each alternative action.

Items a through c should be consistent with the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), CERCLA guidance documents with respect to remedial investigations and feasibility studies, Health and Safety Code Section 25356.1(c), and State

Board Resolution No. 92-49 as amended ("Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304").

Item e should consider the cleanup levels for soil and groundwater identified in Finding 12 and should address the attainability of background levels of water quality.

7. SUMMARY REPORT AND WORK PLAN FOR MINI-CAP SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, that summarizes the interim remedial actions taken at the remaining mini-cap sites and evaluates whether additional site investigation/characterization is warranted, identifies data gaps, and proposes additional soil and groundwater investigation as warranted. The work plan should present a plan and time schedule for collecting any needed additional site characterization data. Work may be phased to allow any necessary additional source or extent characterization/investigation to proceed efficiently.

8. COMPLETION OF SITE INVESTIGATION AND REMEDIATION WORK PLAN AT MINI-CAP SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, documenting the completion of the necessary tasks identified in the Task 7 summary report and work plan. The report should provide sufficient data to support the mini-cap status for the site (i.e., no groundwater impact from petroleum releases to soil). For sites impacted by soil pollution that exceeds established cleanup goals, the work plan should present a plan and time schedule for remediating any remaining soil pollution that exceeds the established site cleanup goals.

9. COMPLETION OF FINAL REMEDIAL ACTIONS AT MINI-CAP SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report, acceptable to the Executive Officer, documenting completion of soils remediation tasks identified in the Task 8 remediation work plan.

10. SITE STATUS REPORTS

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

On a semi-annual basis, the Dischargers shall submit a status report, acceptable to the Executive Officer, documenting compliance with this Order, commencing on January 15, 2004. Thereafter, reports shall be due semi-annually on the 15th of each ensuing July and January. The semi-annual status reports may be prepared in a business letter format and include at least the following information:

- a. Summary of the work completed since submittal of the previous semi-annual report, and work projected to be completed before submittal of the next report; and,
- b. Identification of any obstacles which may threaten compliance with this Order, and what actions area being taken to overcome these obstacles.

11. SITE-WIDE GROUNDWATER/SURFACE WATER SEMI-ANNUAL MONITORING REPORTS

COMPLIANCE DATE: October 15, 2003

Submit a technical report, acceptable to the Executive Officer, documenting quarterly groundwater and surface water monitoring, commencing on October 15, 2003, and covering the previous calendar semi-annual period. Thereafter, reports shall be due semi-annually on the 15th of each ensuing April and October. Each semi-annual monitoring report shall include, but not be limited to, the following information:

- a. Cumulative tabulated results of total petroleum hydrocarbons and water quality sampling analyses for all sampling points including but not limited to surface seeps, hydropunch, piezometer wells, and monitoring wells both on and related offsite. This data shall be accompanied by pollutant isoconcentration plume maps for each chemical constituent of concern for each monitored water-bearing zone based upon the results of each sampling event.

- b. A cumulative tabulation of all new or previously unpublished information on well construction details including screen intervals, screen lengths, well installation dates, quarterly water level measurements, and cumulative chemical concentrations for each well.
- c. Updated water table and potentiometric surface maps, based upon the quarterly field measurements for all affected water bearing zones and for all onsite and related offsite wells.
- d. Reference diagrams and maps including the hydrogeologic conditions of the site, and appropriately scaled and detailed base maps showing the location of all monitoring wells, or points and identifying facilities and structures.

12. UNDERGROUND STORAGE TANK, ABOVEGROUND STORAGE TANK, AND FUEL DELIVERLY SYSTEM CLOSURE CERTIFICATION

COMPLIANCE DATE: Within 180-days of the completion of the required corrective action

Submit a technical report, acceptable to the Executive Officer, that requests closure certification for USTs, ASTs, and FDS pipelines following completion of any necessary corrective actions. This request shall be accompanied with case closure summary in a format acceptable to the Executive Officer. For soil-impacted sites, the case closure summary shall include confirmation sampling results to demonstrate compliance with the soil cleanup levels prescribed in this Order. For groundwater-impacted sites, the case closure summary shall demonstrate satisfactory completion of the preferred corrective action alternative.

13. FIVE-YEAR STATUS REPORT

COMPLIANCE DATE: Five Years following Executive Officer approval of each, final corrective action plan submitted under Task 6

Submit a technical report, acceptable to the Executive Officer, which evaluates the effectiveness of the approved corrective action plan(s) for groundwater-impacted sites. The report should include:

- a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment;
- b. Comparison of contaminant concentration trends with cleanup standards;

- c. Comparison of anticipated versus actual costs of cleanup activities;
- d. Performance data (e.g. groundwater volume extracted, chemical mass removed, mass removed per million gallon extracted);
- e. Cost effectiveness data (e.g. cost per pound of contaminant removed);
- f. Summary of additional investigations (including results) and significant modifications to remediation systems;
- g. Additional remedial actions proposed to meet cleanup standards (if applicable) include time schedule; and,
- h. The probability or improbability of potential groundwater development based on current site ownership.

If cleanup standards have not been met and are not projected to be met within a reasonable time, the report should assess the technical practicability of meeting cleanup standards and may propose an alternative cleanup strategy.

14. LOW TEMPERATURE THERMAL DESORPTION (LTTD) SOIL TRACKING AND MANAGEMENT

COMPLIANCE DATE: As specified in Task 1 Comprehensive Petroleum Program Time Schedule

Submit a technical report acceptable to the Executive Officer documenting the management tools or procedures to be used by the dischargers to prevent or minimize the disturbance of LTTD soils that have been treated to standards appropriate for reuse as backfill material for closure activities at petroleum impacted sites, road-base material, or tiered, segregated, landfill capping.

The management of LTTD soil shall insure that:

- Discharges of treated soil must maintain a minimum setback distance of fifty (50) feet from any lake, creek, stream or spring.
- Soils containing PAHs may be discharged to levels prescribed within Tables 1-5. Within the saltwater and freshwater aquatic protection zones, there shall be no discharge of petroleum constituents at levels higher than those protective levels established for the saltwater and freshwater protection zone, respectively.
- The top 18-inches of each LTTD soil backfill excavation will be maintained so that the top 18-inches contains soils with no detectable concentrations (i.e., non detect as defined by PQLs for the analytical method specified) of fuel constituents.

15. LEAD CLEANUP VALUE PROPOSAL

COMPLIANCE DATE: 120 days after requested
by Executive Officer

Submit a technical report acceptable to the Executive Officer for lead cleanup values higher than 50 mg/kg for approval by the Executive Officer. The proposals may be for individual sites or groups of sites with similar soil types, soil characteristics, or terrestrial receptors and exposure pathways. Proposals for higher cleanup values must be based on specific technical information. The following types of information could be used to support the Discharger's proposals: a) soil background concentrations, b) soil characteristics such as pH or organic content that affect lead bio-availability to terrestrial plants, c) bioassay data or other evidence that the terrestrial plants at the site or site grouping will not be adversely affected by higher lead concentrations, d) documentation that re-use plans for the site do not necessitate protection of terrestrial plants, e) evidence that the excavation to 50 mg/kg would disrupt sensitive habitat for receptors with higher ecological value than those protected by the lead cleanup value.

16. CONTINGENCY PETROLEUM SITES

COMPLIANCE DATE: As specified in Task 1 Comprehensive
Petroleum Program Time Schedule

Submit a technical report acceptable to the Executive Officer that outlines the actions that will be taken in the event unknown petroleum contamination is discovered at the Presidio. The report shall include procedures for:

- Notifying the regulatory agencies (i.e., RWQCB, DTSC, City of San Francisco, as appropriate) of the discovery;
- Validation soil sampling and tank pit water sampling and analyses;
- Reporting of any interim remedial measures taken (i.e., soil over-excavation, etc.), the analytical results from the validation soil and tank pit sampling;
- Conducting any additional remedial actions (i.e., groundwater impacts leading to corrective action path or soil impacts only resulting in a mini-CAP designation); and,
- Developing a schedule for implementing any necessary/additional remedial actions to achieve the soil cleanup levels described on Tables 1-7 and to gain site closure.

The validation sampling and analysis procedures shall include a protocol for sampling beneath the UST/AST (frequency and location of samples based on size of tank and location of fill ends, and the observed water in the tank pit), and pipelines (frequency and location of samples based on number of linear feet of pipe, location of joints or turns, etc.). The sampling protocol shall include a description of soil classification and field observation of impacted soils.

17. DELAYED COMPLIANCE

If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer and the Board may consider revision to this Order.

D. PROVISIONS

1. **No Nuisance:** The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).
2. **Good Operation and Maintenance (O&M):** The dischargers shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.
3. **Cost Recovery:** The dischargers shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the dischargers over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.
4. **Access to Site and Records:** In accordance with California Water Code Section 13267(c), the dischargers shall permit the Board or its authorized representative:

- a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in response to this Order.
 - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the dischargers.
5. **Self-Monitoring Program:** The dischargers shall comply with the Self-Monitoring Program as attached to this Order and as may be amended by the Executive Officer.
6. **Contractor / Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.
7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).
8. **Document Distribution:** Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:
- a. Cal-EPA Department of Toxic Substances Control
 - b. National Parks Service
 - c. Presidio Restoration Advisory Board
 - d. U.S. Army Corps of Engineers – Contact: Bruce Handel

The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator:** The dischargers shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.

10. **Reporting of Hazardous Substance Release:** If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the dischargers shall report such discharge to the Regional Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00).

A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

11. **Rescission of Existing Order:** This Order supercedes and rescinds Order No. 91-082 and Order No. 96-070.
12. **Periodic SCR Review:** The Board will review this Order periodically and may revise it when necessary. The dischargers may request revisions and upon review, the Executive Officer may recommend that the Board revise these requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 20, 2003.



Loretta K. Barsamian
Executive Officer

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

Attachments:

FIGURES:

1. Site/Location Map, Presidio of San Francisco, San Francisco County
2. Groundwater Basin/Area Map, Presidio of San Francisco, San Francisco County
3. Groundwater Seep Locations and Surface Water Body Locations, Presidio of San Francisco, San Francisco County
4. Locations of CERCLA Program Sites, Presidio of San Francisco, San Francisco County
5. Locations of Petroleum Remedial Investigation Sites, Presidio of San Francisco, San Francisco County

6. Locations of known Mini-CAP Sites, Presidio of San Francisco, San Francisco County
7. Generalized Locations of the Fuel Distribution System (FDS), Presidio of San Francisco, San Francisco County
8. Petroleum Cleanup Flowchart, Presidio of San Francisco, San Francisco County
9. Saltwater and Freshwater Ecological Protection Zones, Presidio of San Francisco, San Francisco County

TABLES:

1. Soil Cleanup Levels for the Protection of Human Health
2. Soil Cleanup Levels for the Protection of Ecological Receptors
3. Soil Cleanup Levels for the Protection of Water Quality at Detectable Levels
4. Soil Cleanup Levels for the Protection of Water Quality at Drinking Water Standards
5. Soil Cleanup Levels for Crissy Field
6. Point-of-Compliance Concentrations in Soil and Water for Petroleum Hydrocarbons, BTEX, and MTBE for the Saltwater Protection Zone
7. Point-of-Compliance Concentrations in Soil and Water for Gasoline and BTEX in Surface Water and Sediments of the Proposed Freshwater Stream

SELF-MONITORING PROGRAM

Order No. R2-2003-0080
Site Cleanup Requirements
Presidio of San Francisco

TABLES

TABLE 1: SOIL CLEANUP LEVELS FOR THE PROTECTION OF HUMAN HEALTH

Chemical	Residential* (mg/kg)	Park** maintenance (mg/kg)	Recreational*** (mg/kg)
Gasoline ^a	1,030 ^b	5,900 ^c	2,400 ^b
Diesel ^a	1,380 ^c	6,700 ^c	3,200 ^c
Fuel Oil ^a	1,900 ^c	9,400 ^c	4,500 ^c
Benzene	0.6	5.0	1.5
Toluene	530	12,800	1,200
Ethylbenzene	840	6,600	1,900
Xylenes	1,080	109,000	2,500
Total <i>Carcinogenic PAH</i> ^d	5.6	19.7	13.0
Noncarcinogenic PAHs			
Anthracene	5,900	17,800	13,800
Benzo(g,h,i) perylene	620	1,700	1,400
Flouranthene	820	2,300	1,900
Fluorene	770	2,300	1,800
Napthalene	480	2,300	1,100
Phenanthrene	600	1,700	1,400
Pyrene	620	1,700	1,400
<i>Other</i>			
Dioxins	4.1 x 10 ⁻⁶	1.6x10 ⁻⁵	1.0x10 ⁻⁵
Lead ^e	400	400	500

^a TPH quantified using USEPA modified method 8015

^b Based on n-hexane as a surrogate compound

^c Based on Napthalene as a surrogate compound

^d Carcinogenic PAHs calculated as a compilation of the following:

Benzo(a)pyrene	0.04	0.15	0.1
Benzo(b)flouranthene	0.43	1.5	1.0
Benzo(k)flouranthene	0.43	1.5	1.0
Benzo(a)anthracene	0.43	1.5	1.0
Chrysene	4.3	15	10

^e Lead levels taken from Table 7-5 of the report titled "Development of Presidio-wide Cleanup Levels for Soil, Sediment, Groundwater and Surface Water," dated October 2002.

* Fuel constituents present at < 10 feet below ground surface

** Action level based on Park Maintenance worker/ groundskeeper

*** Fuel constituents present at < 2 feet below ground surface

Order No. R2-2003-0080
Site Cleanup Requirements
Presidio of San Francisco

TABLE 2: SOIL CLEANUP LEVELS FOR THE PROTECTION OF ECOLOGICAL RECEPTORS

Chemical	Terrestrial Receptors (mg/kg)	Saltwater Aquatic Receptors (mg/kg)
Gasoline	610	11.6
Diesel	700	144
Fuel Oil	980	144
Benzene	40	50
Toluene	270	260
Ethyl- Benzene	125	5
Xylenes	55	22
MTBE	---	190
Benzo(a)pyrene	0.3	---
Total PAHs	---	---
Lead*	50	---

* This value only applies to cleanup of leaded gasoline releases and not releases from any other sources. The Discharger may propose an alternate cleanup value pursuant to Task 15 of this Order.

TABLE 3: SOIL CLEANUP LEVELS FOR THE PROTECTION OF WATER QUALITY AT DETECTABLE LEVELS^a

Chemical	Soil Cleanup level ^a (> 5 feet above the highest groundwater) (mg/kg)	Soil Cleanup level ^b (< 5 feet above the highest groundwater) (mg/kg)
Gasoline	5,000	7
Diesel	15,000	7
Fuel Oil	15,000	10
Benzene	140	0.005
Toluene	420	0.005
Ethylbenzene	60	0.009
Xylenes	180	0.009
<i>Carcinogenic PAHs</i>		
Benzo(a)pyrene	NA	0.8
Benzo(b)flouranthene	NA	0.6
Benzo(k)flouranthene	NA	0.6
Benzo(a)anthracene	NA	0.2
Chrysene	NA	0.3
Total PAHs	---	2.5
<i>Noncarcinogenic PAHs</i>		
Anthracene	NA	0.05
Benzo(g,h,i)perylene	NA	2
Flouranthene	NA	0.05
Fluorene	NA	0.05
Napthalene	NA	0.05
Phenanthrene	NA	0.05
Pyrene	NA	0.09
Other		
Dioxins as Tetrachlorodibenzo-p-dioxin equivalents	NA	8.4x1 0 ⁻⁵

^a Soil cleanup levels are based on residual saturation

^b Soil Cleanup levels are based on Lobos Creek Groundwater Basin detectable levels (PQLs), with $C_{soil} = K_d C_{water}$ where $K_d = 130$ for TPH.

This Table applies to soils located within the Lobos Creek Groundwater Basin.

TABLE 4: SOIL CLEANUP LEVELS FOR THE, PROTECTION OF WATER QUALITY AT DRINKING WATER STANDARDS

Chemical	Soil Cleanup level ^a (> 5 feet above the highest groundwater) (mg/kg)	Soil Cleanup level ^b (< 5 feet above the highest groundwater) (mg/kg)
Gasoline	5,000	100
Diesel	15,000	115
Fuel Oil	15,000	160
Benzene	140	0.005
Toluene	420	1
Ethylbenzene	60	13
Xylenes	180	33
<i>Carcinogenic PAHs'</i>	NA	111
<i>Noncarcinogenic PAHs</i>		
Anthracene	NA	308
Benzo(g,h,i)perylene	NA	5,040
Flouranthene	NA	316
Fluorene	NA	60
Napthalene	NA	9
Phenanthrene	NA	86
Pyrene	NA	241
Other		
Dioxins	NA	0.0006
(as Tetrachlorodibenzo-p-dioxin equivalents)		
^a Soil cleanup levels are based on residual saturation		
^b Soil Cleanup levels are based on water quality goals for Coastal Bluff Groundwater Basin, Northeastern Groundwater Area, and West Valley Area; water quality goals are MCLs or risk based drinking water standards. $C_{soil} = K_d C_{water}$, where $K_d = 130$ for TPH.		
^c <i>Carcinogenic PAHs</i>		
Benzo(a@)pyrene	NA	3
Benzo(b)flourenthene	NA	23
Benzo(k)flouranthene	NA	23
Benzo(a)anthracene	NA	8
Chrysene	NA	54
Total PAHs	NA	111

This Table applies to soils located within the Coastal Bluff Groundwater Basin and the Marina Groundwater Basin.

TABLE 5: SOIL CLEANUP LEVELS FOR CRISSY FIELD

Chemical	Soil Cleanup level ^a (> 5 feet above the highest groundwater) (mg/kg)	Soil Cleanup level ^b (< 5 feet above the highest groundwater) (mg/kg)
Gasoline	5,000	1,690
Diesel	15,000	1,950
Fuel Oil	15,000	2,730
Benzene	140	1
Toluene	420	14
Ethylbenzene	60	19
Xylenes	180	4,340
<i>Carcinogenic PAHs^c</i>	NA	253
<i>Noncarcinogenic PAHs</i>		
Anthrocene	NA	1,120
Benzo(g,h,i)perylene	NA	19,500
Flouranthene	NA	1,160
Fluorene	NA	220
Napthalene	NA	140
Phenanthrene	NA	410
Pyrene	NA	910
<i>Other</i>		
Dioxins as Tetrachlorodibenzo-p-dioxin equivalents	NA	0.0008
^a Soil cleanup levels are based on residual saturation		
^b <i>Soil Cleanup levels are risk-based for protection of park maintenance worker.</i>		
$C_{\text{soil}} = K_d C_{\text{water}}$, where $K_d = 130$ for TPH		
^c <i>Carcinogenic PAHs</i>		
Benzo(a)pyrene	NA	9
Benzo(b)flouranthene	NA	64
Benzo(k)flouranthene	NA	64
Benzo(a)anthracene	NA	23
Chrysene	NA	151
Total PAHs	NA	253

**TABLE 6: POINT-OF-COMPLIANCE CONCENTRATIONS IN SOIL AND WATER FOR
PETROLEUM HYDROCARBONS, BTEX AND MTBE FOR THE SALTWATER
PROTECTION ZONE**

Chemical	Water (mg/L)	Soil (mg/kg)
TPH, gasoline	1.2 ^a	11.6 ^b
TPH, diesel	2.2	144
TPH, fuel Oil	2.2 ^a	144 ^b
Benzene	0.51 ^c	50 ^d
Toluene	1.0 ^c	260 ^d
Ethylbenzene	0.043 ^c	5 ^d
Xylenes	0.13 ^c	22 ^d
MTBE	4.4 ^c	190 ^d

See section 6.8 of the report entitled "Report of Petroleum Hydrocarbon Biosassay and Point-of-Compliance Concentration Determinations Saltwater Ecological Protection Zone, Presidio of San Francisco, San Francisco, California," dated December 1997 for discussion of PCOCs.

^a From Table 12

^b From Table 13 and Figures 4 and 5

^c From Table 14

^d From Table 15

Order No. R2-2003-0080
Site Cleanup Requirements
Presidio of San Francisco

TABLE 7: POINT-OF-COMPLIANCE CONCENTRATIONS IN SOIL AND WATER FOR GASOLINE AND BTEX IN SURFACE WATER AND SEDIMENTS OF THE PROPOSED FRESHWATER STREAM

Chemical	Water ($\mu\text{g/L}$)	Soil (mg/kg)
TPH, gasoline	443 ^a	140 ^c
TPH, fuel Oil	TBD	TBD
Benzene	463 ^b	0.79 ^c
Toluene	490 ^b	3.0 ^c
Ethylbenzene	845 ^b	15 ^c
Xylenes	318 ^b	5.7 ^c

See the final technical memorandum entitled "Development of Point-of-compliance Concentrations (PCOCs) for Gasoline in Surface Waters and Sediments of the Proposed Freshwater Stream," Presidio of San Francisco, San Francisco, California," dated May 4, 1999 for a discussion on the recommended PCOCs.

^a From Tables 2 and 3

^b From Table 5

^c From Table 6

Order No. R2-2003-0080
Site Cleanup Requirements
Presidio of San Francisco

FIGURES

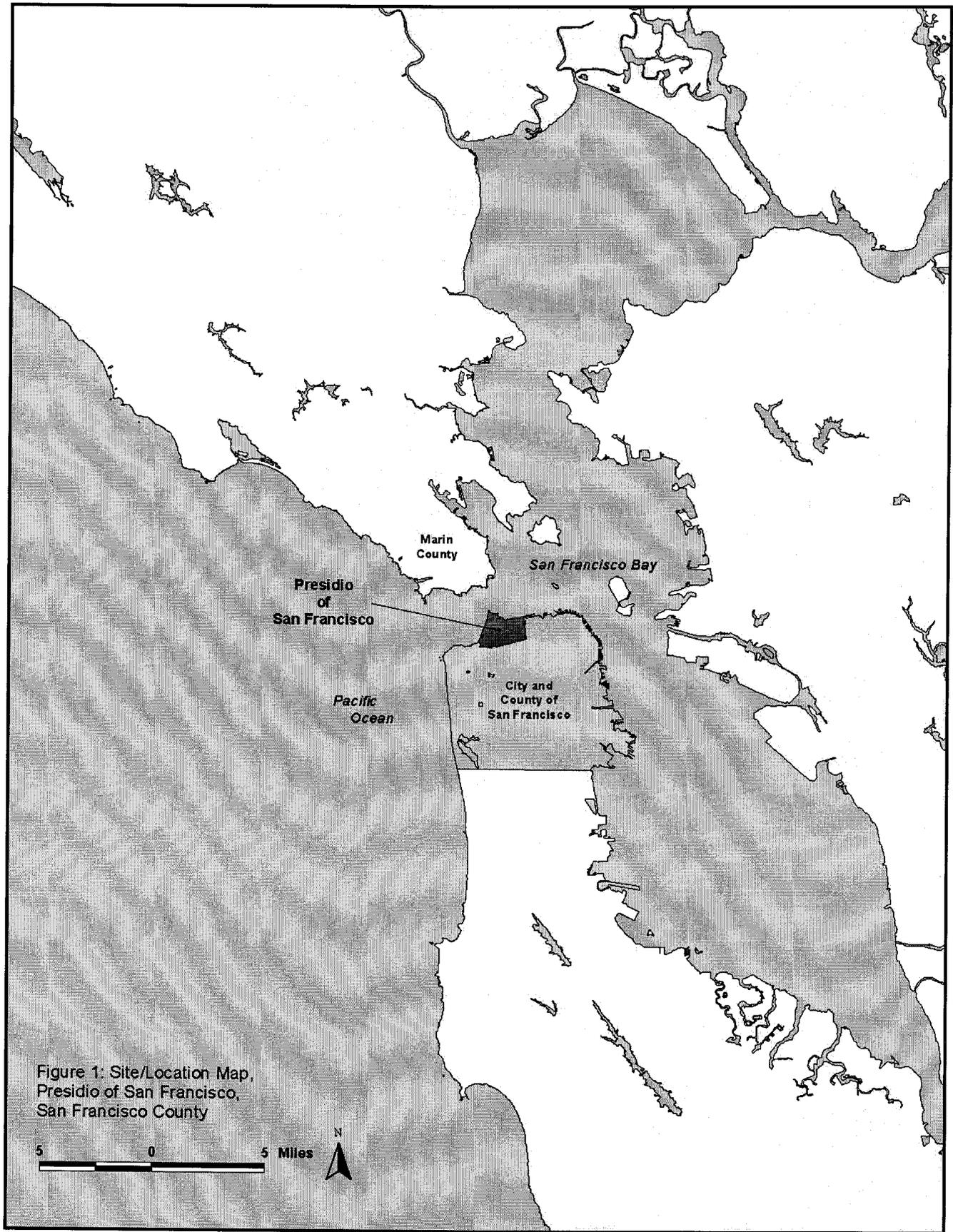


Figure 1: Site/Location Map,
Presidio of San Francisco,
San Francisco County



Figure 2: Groundwater Basin/Area Map,
Presidio of San Francisco,
San Francisco County

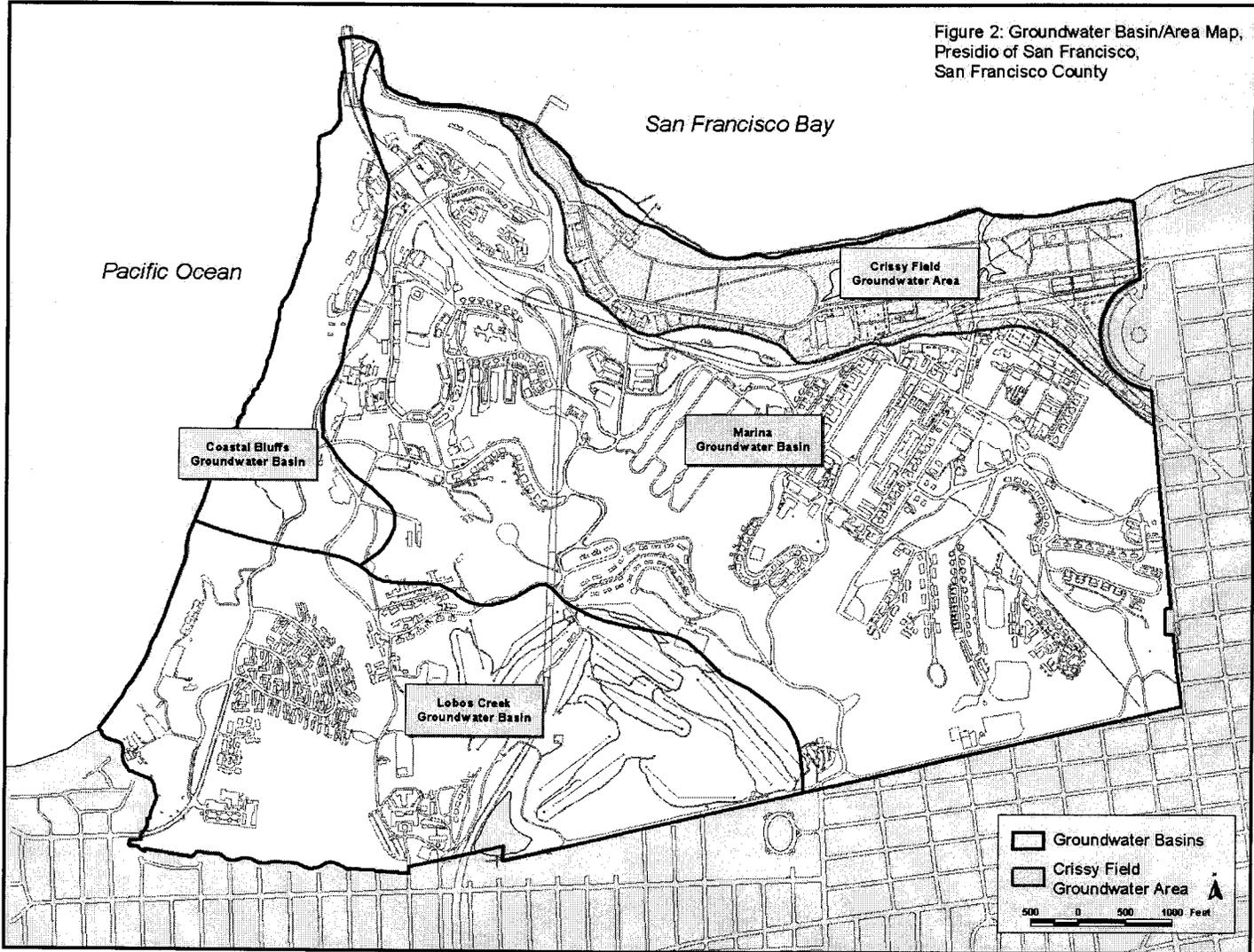


Figure 3: Groundwater Seeps and Surface Water Locations, Presidio of San Francisco, San Francisco County

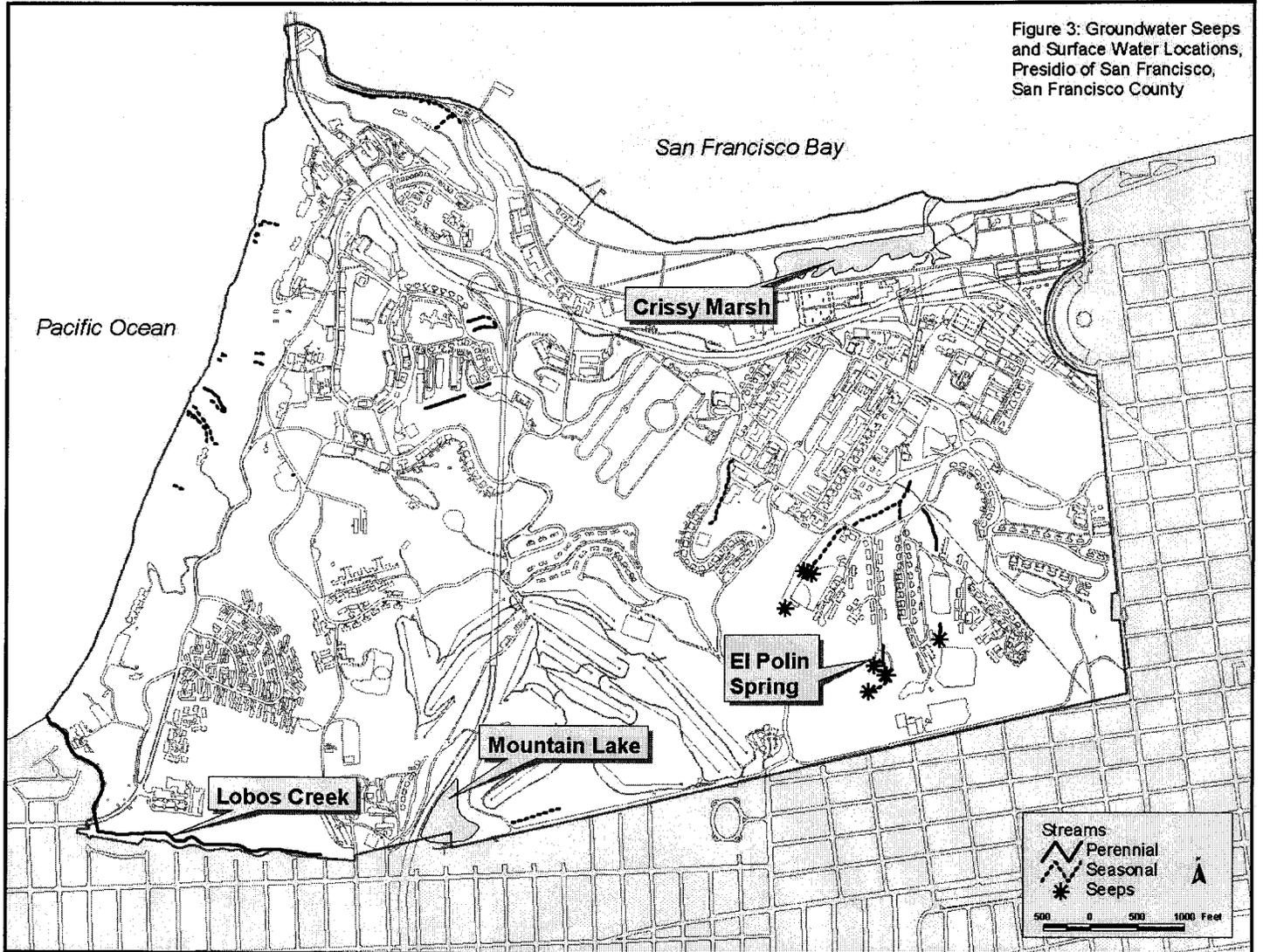


Figure 4: CERCLA Sites, Presidio of San Francisco, San Francisco County

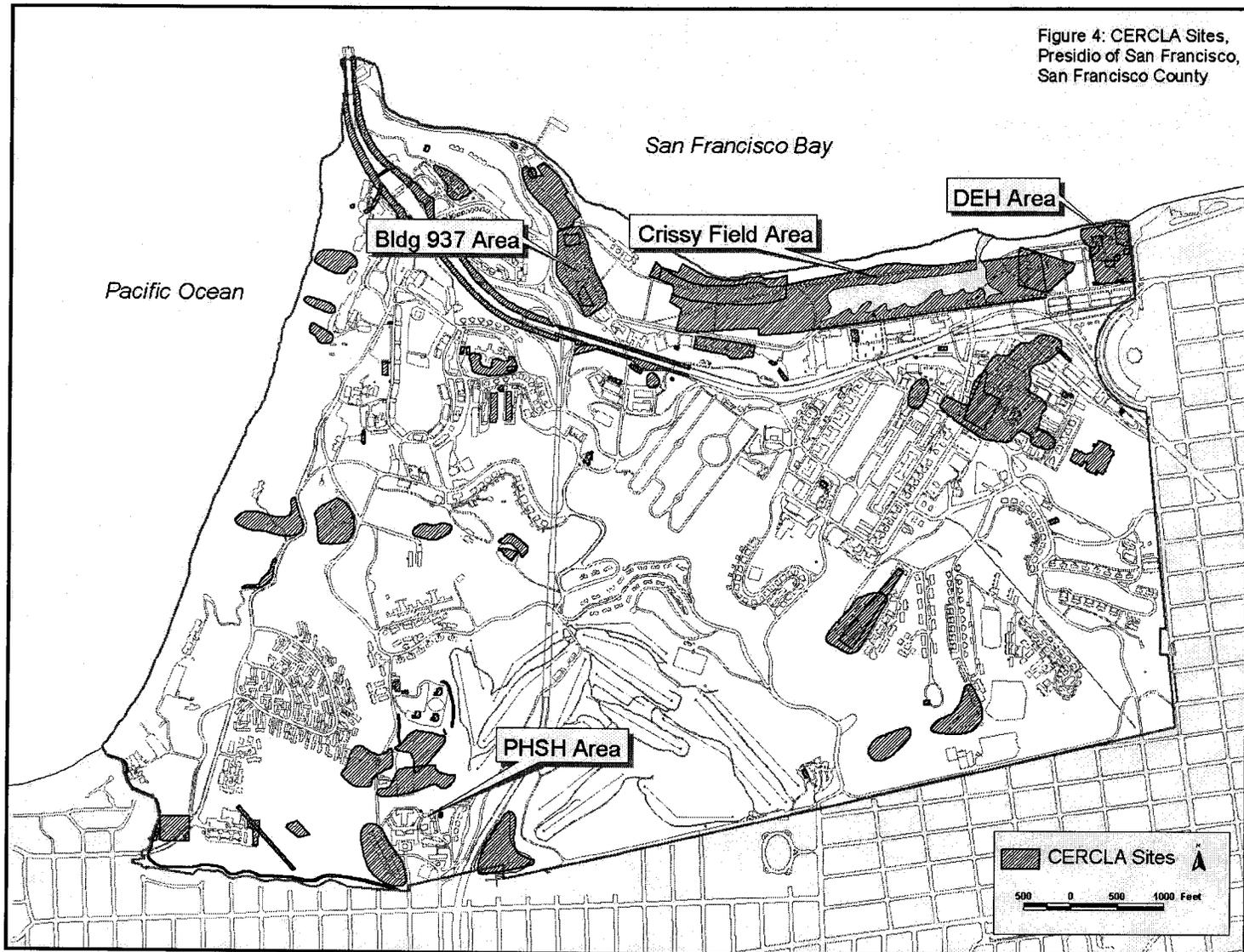


Figure 5: Locations of Petroleum Remedial Investigation Sites, Presidio of San Francisco, San Francisco County

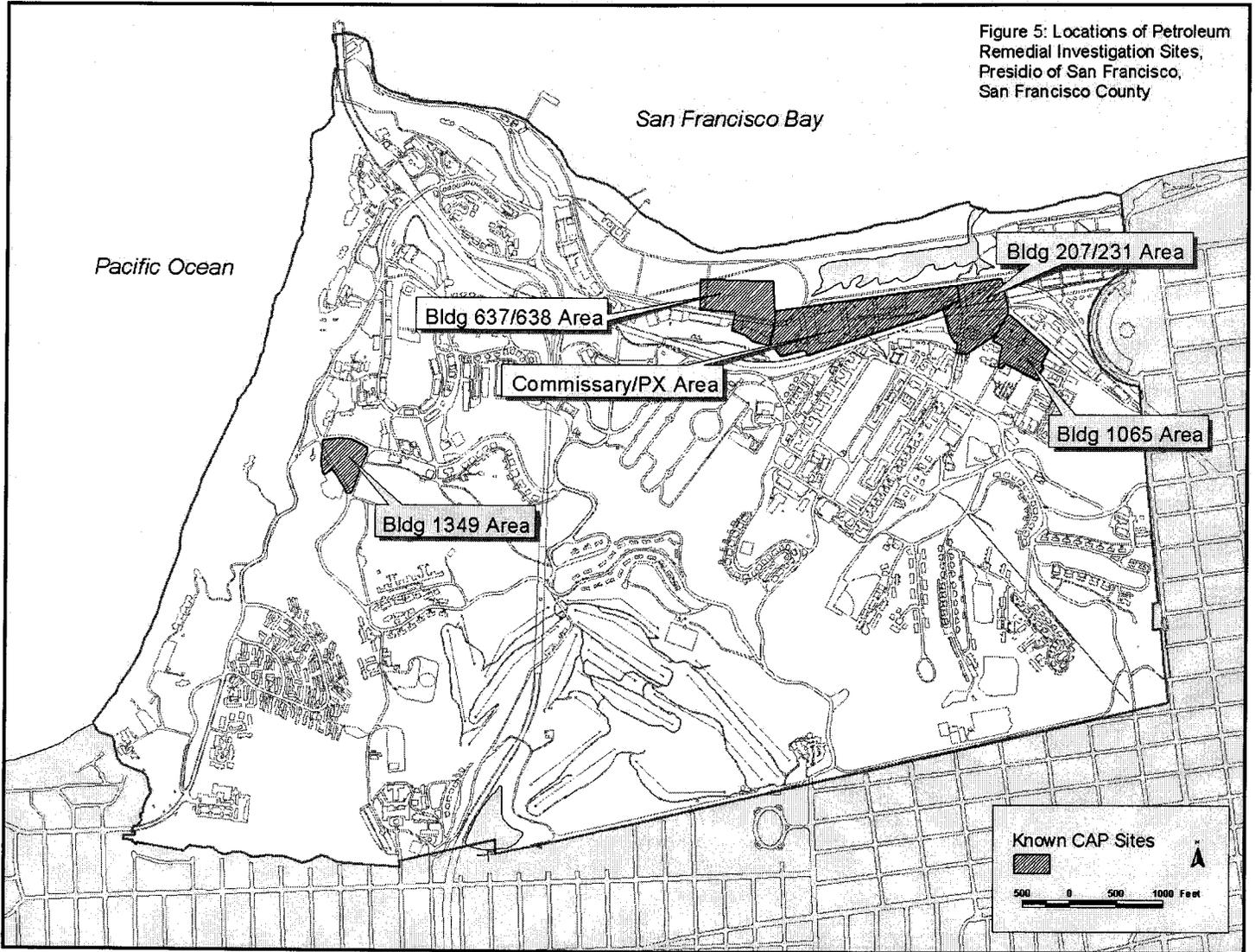


Figure 6: Locations of known Mini-Cap Sites, Presidio of San Francisco, San Francisco County

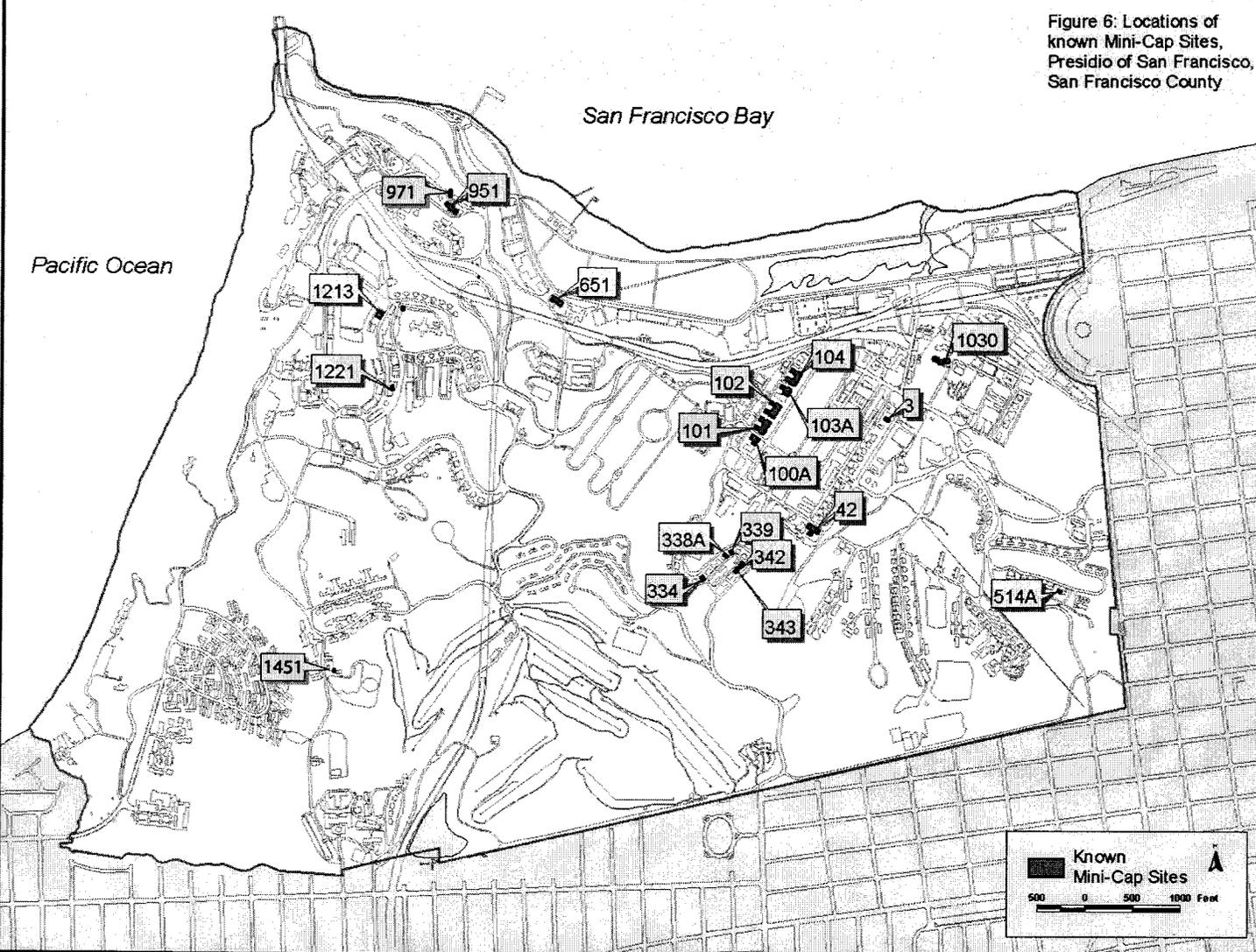
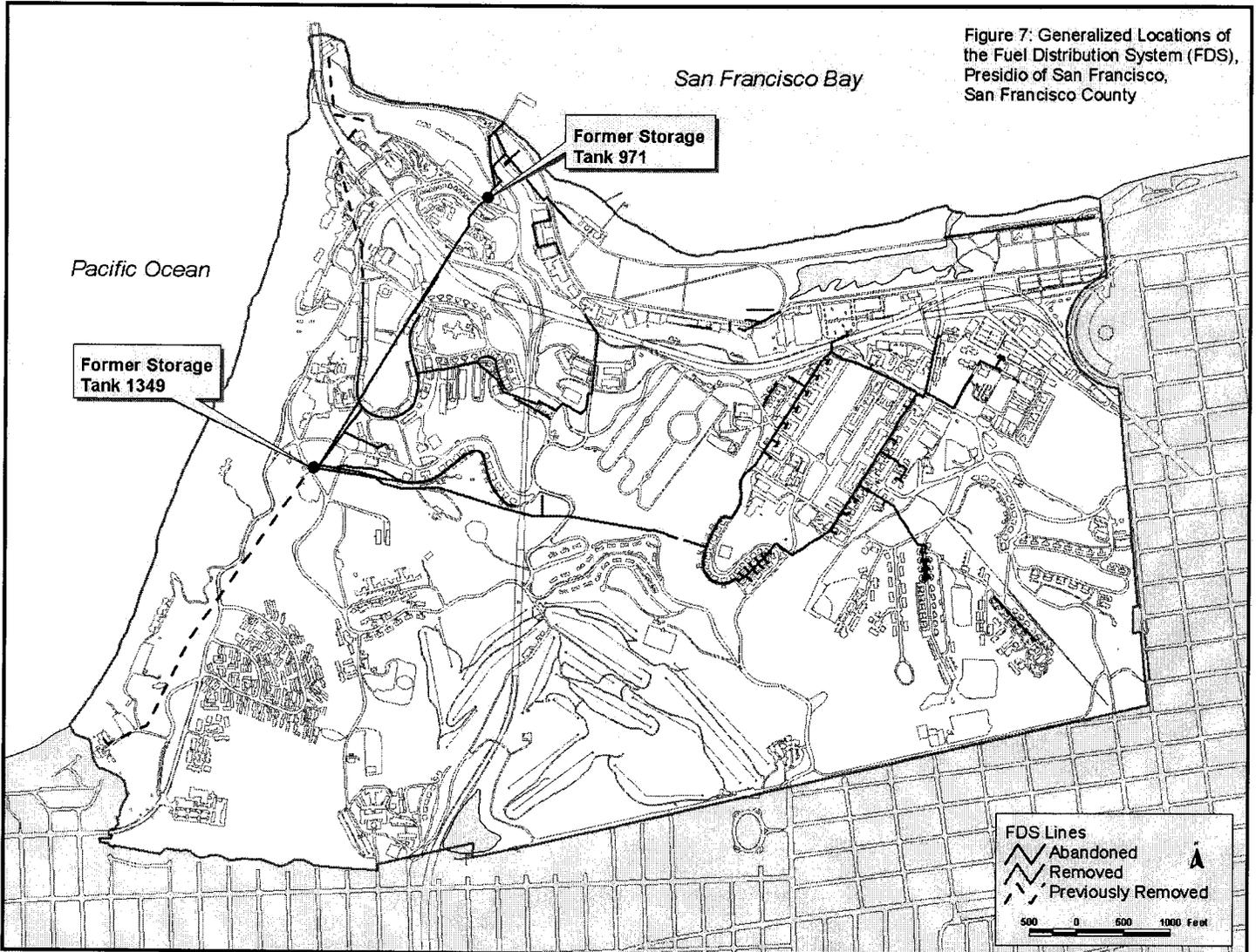
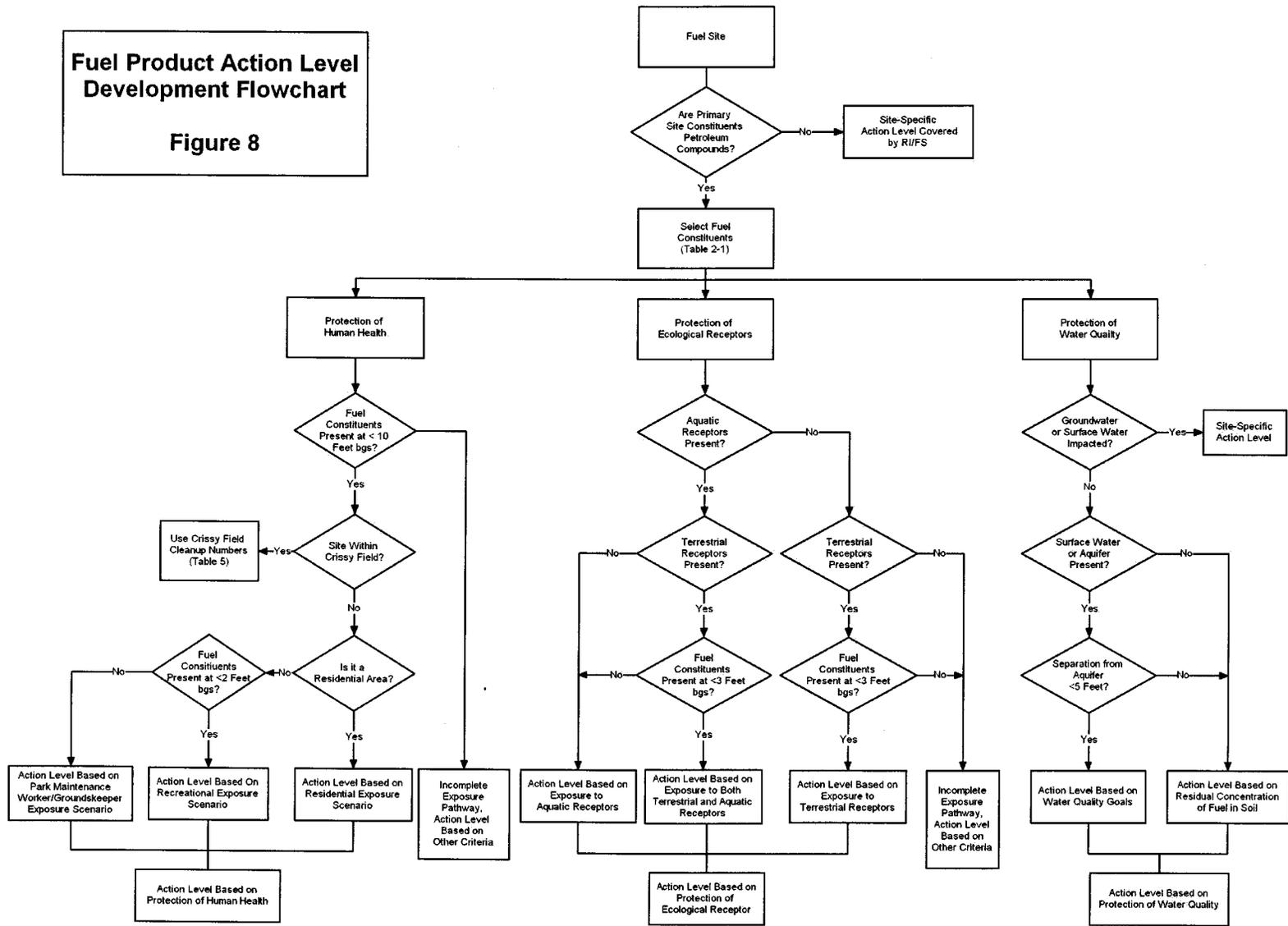


Figure 7: Generalized Locations of the Fuel Distribution System (FDS), Presidio of San Francisco, San Francisco County



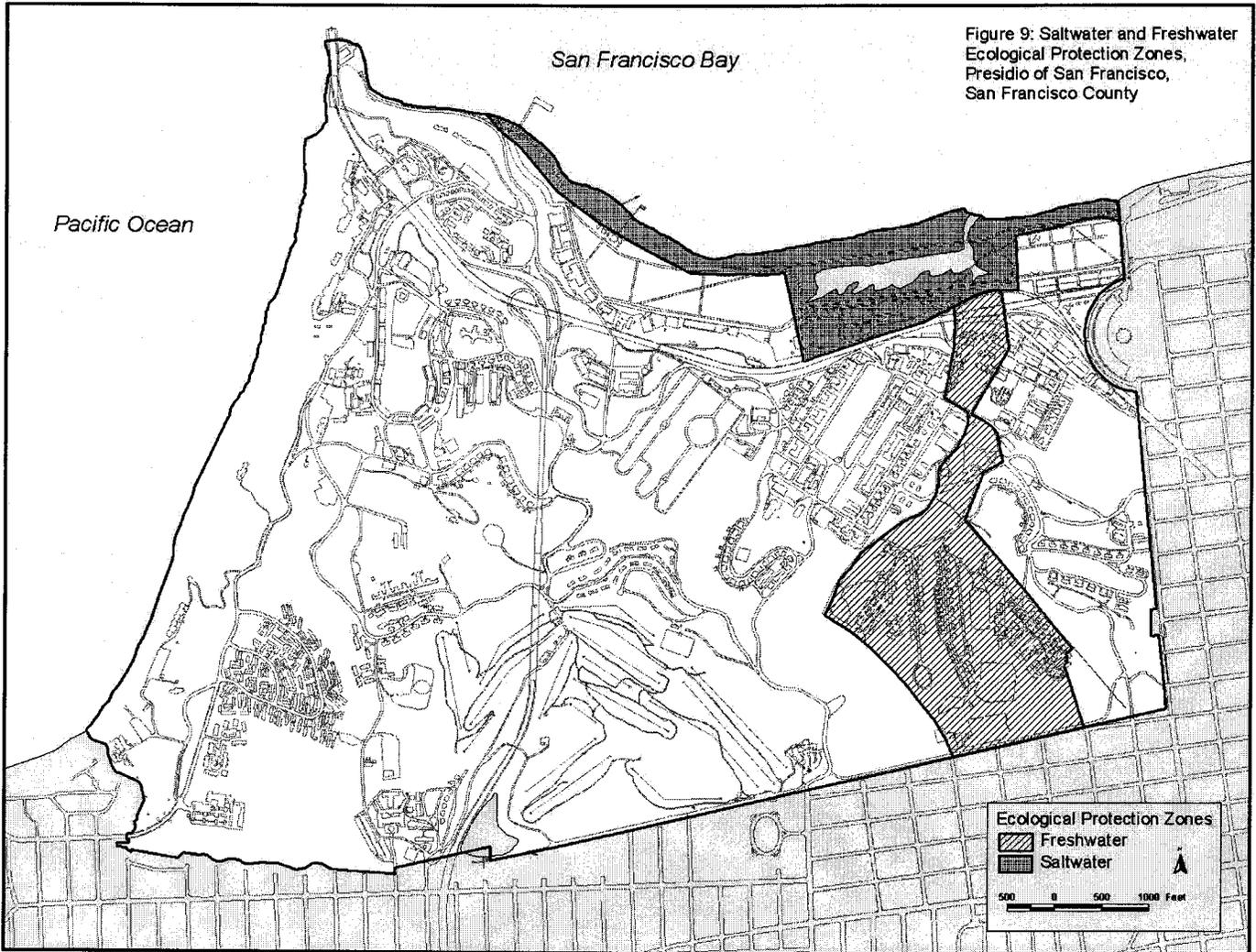
Fuel Product Action Level Development Flowchart

Figure 8



bgs: below ground surface
 RI/FS: Remedial Investigation/ Feasibility Study

Figure 9: Saltwater and Freshwater Ecological Protection Zones, Presidio of San Francisco, San Francisco County



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

UNITED STATES DEPARTMENT OF DEFENSE, DEPARTMENT OF THE ARMY
UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE
PRESIDIO TRUST

for the property located at

PRESIDIO OF SAN FRANCISCO
SAN FRANCISCO
SAN FRANCISCO COUNTY

1. **Authority and Purpose:** The Board requests the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Board Order No. R2-2003-0080 (site cleanup requirements).
2. **Monitoring:** The dischargers shall propose a monitoring schedule (e.g. similar to Table 1 of the current Presidio-wide Groundwater Monitoring Program), acceptable to the Executive Officer, that includes the well ID or number, sampling frequency, analyses, and groundwater elevations in all site monitoring wells.

The dischargers may propose changes in the above -referenced table; any proposed changes are subject to Executive Officer approval.

3. **Semi-annual Monitoring Reports:** The dischargers shall submit semi-annual monitoring reports to the Board no later than 110 days following the end of the semi-annual period (e.g. report for first half of the calendar year, i.e., January through June, due October 15). The first semi-annual monitoring report shall be due on October 15th and the second monitoring report which covers the second half of the calendar year (i.e., July through December) shall be due on April 15th. The reports shall include:

- a. **Transmittal Letter:** The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.
- b. **Groundwater Elevations:** Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included in each semi-annual report each year.
- c. **Groundwater Analyses:** Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in each semi-annual report. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).
- d. **Groundwater Extraction:** If applicable, the report shall include groundwater extraction results in tabular form, for each extraction well and for the site as a whole, expressed in gallons per minute and total groundwater volume for the quarter. The report shall also include contaminant removal results, from groundwater extraction wells and from other remediation systems (e.g. soil vapor extraction), expressed in units of chemical mass per day and mass for the quarter. Historical mass removal results shall be included in each semi-annual status report.
- e. **Status Report:** The second semi-annual report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following semi-annual period.
- f. **Electronic Reporting:** The dischargers are responsible for the electronic submission of compliance data as required by AB2886. As of September 1, 2001

soil and water chemistry analytical data included in compliance reports must be electronically submitted. As of January 1, 2002, data for groundwater monitoring wells including sub-meter latitude and longitude data, elevation data, depth to water measurements must be electronically reported. The dischargers are legally responsible for the authenticity and accuracy of any electronic data submitted by individuals that they have authorized to the GeoTracker system.

4. **Violation Reports:** If the dischargers violate requirements in the Site Cleanup Requirements, then the dischargers shall notify the Board office by telephone as soon as practicable once the dischargers have knowledge of the violation. Board staff may, depending on violation severity, requires the s to submit a separate technical report on the violation within five working days of telephone notification.
5. **Other Reports:** The dischargers shall notify the Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.
6. **Record Keeping:** The dischargers or his/her agents shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Board upon request.
7. **SMP Revisions:** Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the dischargers. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

I, Loretta K. Barsamian, Executive Officer, hereby certify that this Self-Monitoring Program was adopted by the Board on August 20, 2003.



Loretta K. Barsamian
Executive Officer