

MFA Leasehold EIMP Appendix A - Part 1

3 March 2015

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Erler & Kalinowski, Inc. (“EKI”) has provided a paper copy of the *Environmental Issues Management Plan* (“EIMP”) for the MFA Leasehold on the Former Naval Air Station Moffett Field, California, dated 3 March 2015, prepared by EKI, to our CLIENT, Planetary Ventures, LLC.

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Sincerely,

ERLER & KALINOWSKI, INC.



Michelle K. King, Ph.D.
President

APPENDIX A

NASA EEC Statements

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	AOI 15	
	Abandoned Navy Fuel System	

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SITE NAME:	Site 1: Runway Landfill				
Version:	Final	Date:	02/21/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	37.430918° N		
	Santa Clara County	Longitude	122.052779° W		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
CERCLA	EPA/RWQCB	X		OU1 1997	O&M
SITE SUMMARY					
<p>The Site 1 landfill covers approximately 12 acres at the northern portion of the former Naval Air Station Moffett Field (NASMF) and is northeast of Runway 32R (14L). Figure 1 depicts the location of Site 1 with respect to the former NASMF. Figure 2 is an aerial view of Site 1. The landfill is surrounded on three sides by fencing while the northern portion is bordered by the Storm Water Retention Pond (SWRP). The western portion of the landfill is flat with an elevation of 7 feet above mean sea level while the eastern portion is mounded with the highest elevation at 23 feet above mean sea level. In December of 1991, Site 1 along with the nearby Site 2 landfill was combined into Operable Unit (OU) 1.</p> <p>Site 1 operated from the mid-1960's until the late 1970's. A small arms range was subsequently added to the surface (Figure 3). No detailed disposal records are available for Site 1. Based on interviews, Site 1 received domestic wastes. Additionally the landfill received waste from maintenance and military operations such as scrap metals and equipment, paint and paint thinners, solvents, lacquer, ash, asbestos, jet fuels, waste oil, fuel filters, transformer oil, transformer filters, and polychlorinated biphenyl (PCB)-contaminated sawdust. The estimated volume of refuse at Site 1 was approximately 423,000 cubic yards before consolidation of waste material from Site 2 to Site 1. The material from Site 2 included scrap metal, glass, empty paint containers, and soil. Approximately 1/3 of the waste is located in the groundwater and is saturated.</p> <p>OU1 posed a threat to human health and the environment from possible exposure to the contents in the landfill and production of leachate due to infiltration of water from rainfall. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the Navy produced a Record of Decision (ROD) on August 1, 1997, which provided the Navy's selected remedial action for OU1. Site 1 was designated as a corrective action maintenance unit (CAMU). The CAMU allowed the excavation of the wastes contained at Site 2 to be consolidated into Site 1. Site 1 was then capped with a multilayer soil cap. The ROD also included institutional controls (IC) that were necessary to maintain the protectiveness of the remedy. The ICs included fencing of the site, signage, restrictions on cap disturbances, and operation and maintenance of the Building 191 lift station (Figure 4).</p>					

SITE NAME:**Site 1:Runway Landfill****SITE SUMMARY**

The Navy issued the *Final Site 1 Post-Closure Monitoring Plan* on September 15, 1998. The monitoring program at Sites 1 and 2 began in July, 1999. In 2005, the Navy issued the *Final Site 1 Landfill Post-Closure Long-term Maintenance Plan*. The maintenance plan listed the activities for the inspection and maintenance of the general site conditions, landfill cap, gas vents, landfill gas monitoring wells, collection trench wells, groundwater monitoring wells and piezometers, and storm water runoff and control.

July 1, 1994, NASA became the custodian of much of the former NASMF, including OU1. The Navy and NASA entered into a Memorandum of Agreement to put the institutional controls into effect (Attachment 1). A long-term monitoring and maintenance plan was also developed.

Two five-year reviews were completed for OU1 in 2002 and 2007. The 2002 concluded that the cap at Site 1 is functioning as intended by the ROD. There were no changes to the physical conditions of the site that would affect the protectiveness of the remedy. The Applicable or Relevant and Appropriate Requirements (ARARs) cited in the ROD have been met. The 2002 report noted, however, that the groundwater protectiveness was not conclusive although analysis of groundwater samples taken through 2002 indicated low concentrations (less than the calculated concentration limits) of site contaminants. The Navy planned to update the protectiveness determination in an addendum.

The 2007 five-year review noted some deficiencies: burrowing ground squirrels were active on the landfill slopes and area surrounding the landfill and miscellaneous maintenance needed to be completed. The miscellaneous items included paint, fence signage, vegetation control, and cracked gas-vent slabs. Recommendations included additional monitoring of ground squirrel activity and filling of holes with soil and repair gas-vent slabs. The 2007 five-year review concluded that the remedy at Site 1 was protective of human health and the environment.

In 2010, Site 1 along with Sites 22, 26, and 28 were combined to establish a combined CERCLA Five-Year Review.

During monitoring events between 2004 and 2012, concentrations of metals were discovered exceeding the Calculated Concentration Limits (CCL). CCLs were developed for evaluation of groundwater samples from the points of compliance wells surrounding the landfill. The exceedences were also detected in the collection trench located along the northern edge of Site 1. The metals included barium and intermittent hits of copper exceeding the CCLs (Ba = 40 µg/L; Cu = 5.15 µg/L). Arsenic and cobalt were also intermittently detected but did not exceed CCLs (As = 89.64 µg/L; Co = 230 µg/L). Figures 6 and 7 display sample locations and concentration distributions. The Navy is currently reviewing and analyzing the data in order to determine the source(s) or cause(s) for the exceedences.

There are no buildings associated with Site 1.

SITE NAME:	Site 1:Runway Landfill
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REMEDIAL ACTION

Remedy	Multilayer Soil Cap	Begin Date	07/1997	End Date	11/1998
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<ul style="list-style-type: none"> • Excavation and consolidation of waste materials from Site 2. • Landfill cap including: <ul style="list-style-type: none"> ○ 12-inch minimum vegetation layer using native plants ○ Biotic barrier ○ Low permeability layer (10⁻⁶ cm/sec minimum) ○ Gas vents ○ 24-inch minimum foundation layer • Gas venting trench • Groundwater and gas monitoring • Institutional controls <ul style="list-style-type: none"> ○ Fencing ○ Signs ○ O&M Building 191 lift station ○ Restricted cap disturbances <p>Post Closure Maintenance</p>	<ul style="list-style-type: none"> • Final low permeability layer achieved 10⁻⁸ cm/sec. • The biotic barrier consisted of a geotextile layer. • The bottom foundation layer consisted of soils from the excavation and removal of underground storage tanks at Site 5 and imported clean soil from the construction of the VTA light rail trench south of Moffett. • Raptor perches were installed to attract birds of prey to control burrowing animals. <p>Metal sheets were attached to the lower portion of the fencing to discourage burrowing animals</p>
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Land Use Restrictions	Development Issues
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<p>Institutional Controls:</p> <ul style="list-style-type: none"> • Fencing • Signage • O&M of Bldg. 191 Pump Station • Restrictions of cap disturbances <p>To implement the ICs, the Navy and NASA entered into a Memorandum of Agreement (Attachment 1), 11/15/1999. Under the MOA, NASA agreed to maintain the operation and maintenance of the Building 191 Lift Station. NASA also agreed not to take any activities that would compromise the integrity of the cap.</p> <p>The Navy agreed to conduct any required maintenance needed to maintain the integrity of the landfill cap.</p> <p>While there is no specified inspection schedule provided in the ROD or the MOA, NASA will provide an annual report to the Navy regarding implementation of ICs to be included in the Navy's Annual Monitoring and Maintenance Report.</p> <p>NASA agrees to notify the Navy of any future conveyance of the property and notify subsequent land owners of the restrictions by appropriate notices and restrictions.</p> <p>Figure 4 provides a map of restriction boundaries and location of B. 191.</p> <p>Groundwater extraction wells for use as drinking water, irrigation, or other domestic use are not allowed</p>	<ul style="list-style-type: none"> • Site 1 is located adjacent to wetlands (Site 25) and the US Fish and Wildlife Service tidal marsh restoration. • Excavation at the site is restricted by institutional controls and would expose landfill materials. • EIMP must be followed.
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SITE NAME:		Site 1:Runway Landfill	
RESIDUAL CONTAMINATION			
Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
Barium (W1-22, 10/24/2013)		1100	Barium concentration from Table 3-3, Copper from Table 3-2, 2013 Annual Report Site 1 and Site 22 Landfill.
Copper (W1-23, 4/16/2013)		19	
Barium		296	Values are metal concentrations from synthetic precipitation procedure analysis of soil and sediment samples.
Copper		89.1	
Arsenic		15.4	
Cobalt		32.8	
REFERENCES (Chronological Order)			
<ul style="list-style-type: none"> • <i>Initial Assessment Study of Naval Air Station Moffett Field, Sunnyvale, California.</i> Naval Energy and Environmental Support Activity, Point Hueneme, CA. April, 1984. • <i>Moffett Federal Airfield Final Operable Unit 1 Record of Decision.</i> Department of the Navy. August 1, 1997. • <i>Final Site 1 Post-Closure Monitoring Plan, Moffett Federal Airfield.</i> Tetra Tech EM Inc., San Francisco, CA. September 15, 1998. • <i>Draft Final Interim Remedial Action Report, Site 1 and Site 2 Landfill Closure.</i> Tetra Tech EM Inc., San Francisco, CA. September 25, 2001. • <i>Final Operable Unit 1 2002 Five-Year Review Report, Moffett Federal Airfield, Moffett Field, California.</i> Department of the Navy, Southwest Division, Naval Facilities Engineering Command, San Diego, CA. July 26, 2002. • <i>Final Site 1 Post-Closure Long-Term Maintenance Plan, Former Naval Air Station Moffett Field, Moffett Field, California.</i> Tetra Tech FW, Inc. San Diego, CA. March 18, 2005 • <i>Final Site 1 Post-Closure Long-Term Monitoring Plan, Former Naval Air Station Moffett Field, Moffett Field, California.</i> Tetra Tech FW, Inc. San Diego, CA. March 18, 2005 • <i>Final Operable Unit 1, 2007 Second Five-Year Review Report, Former Naval Air Station Moffett Field, Moffett Field, California.</i> TN & Associates. August, 2008. • <i>Final Five-Year Review Report Installation Restoration Sites 1, 22, 26, and 28, Former Naval Air Station Moffett Field, California.</i> ChaduxTt, San Diego, CA. February 12, 2010. • <i>Draft 2012 Annual Report, Site 1 and Site 22 Landfill, Former NAS Moffett Field, Moffett Field, California.</i> OTIE. Walnut Creek, CA. May, 2013. • <i>Draft 2013 Annual Report, Site 1 and Site 22 Landfill, Former NAS Moffett Field, Moffett Field, California.</i> OTIE. Walnut Creek, CA. April 2014. • <i>Revised Draft Groundwater Monitoring Optimization Report for Installation Restoration Site 1 Landfill, Former Naval Air Station Moffett Field, Santa Clara County, California.</i> Trevet, San Diego, CA. June, 2014. 			

FIGURES

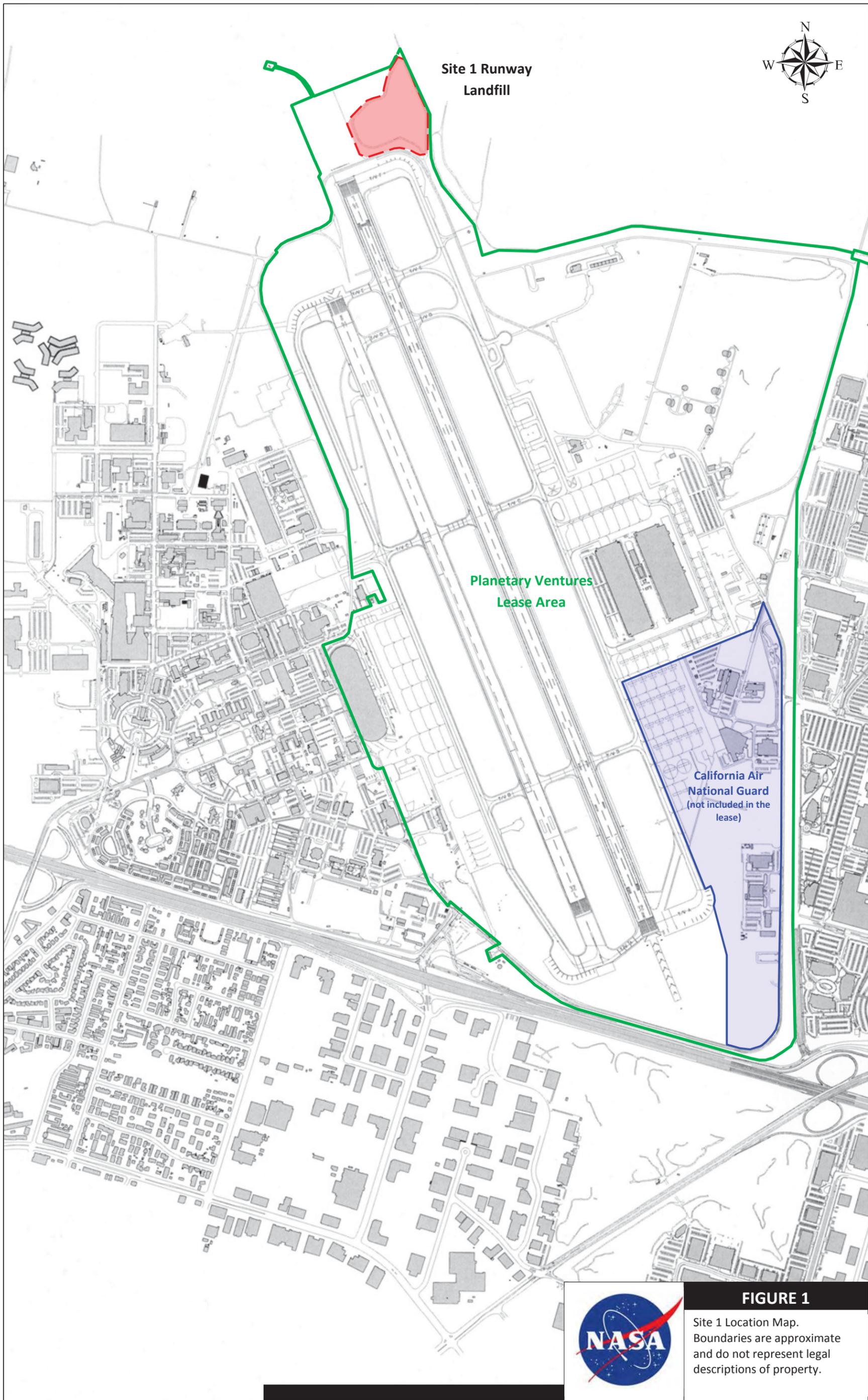


FIGURE 1

Site 1 Location Map. Boundaries are approximate and do not represent legal descriptions of property.



FIGURE 2

Aerial view of Site 1. Fencing, approximate extent of waste, and riprap.



Photograph: Google Earth 9/26/2011



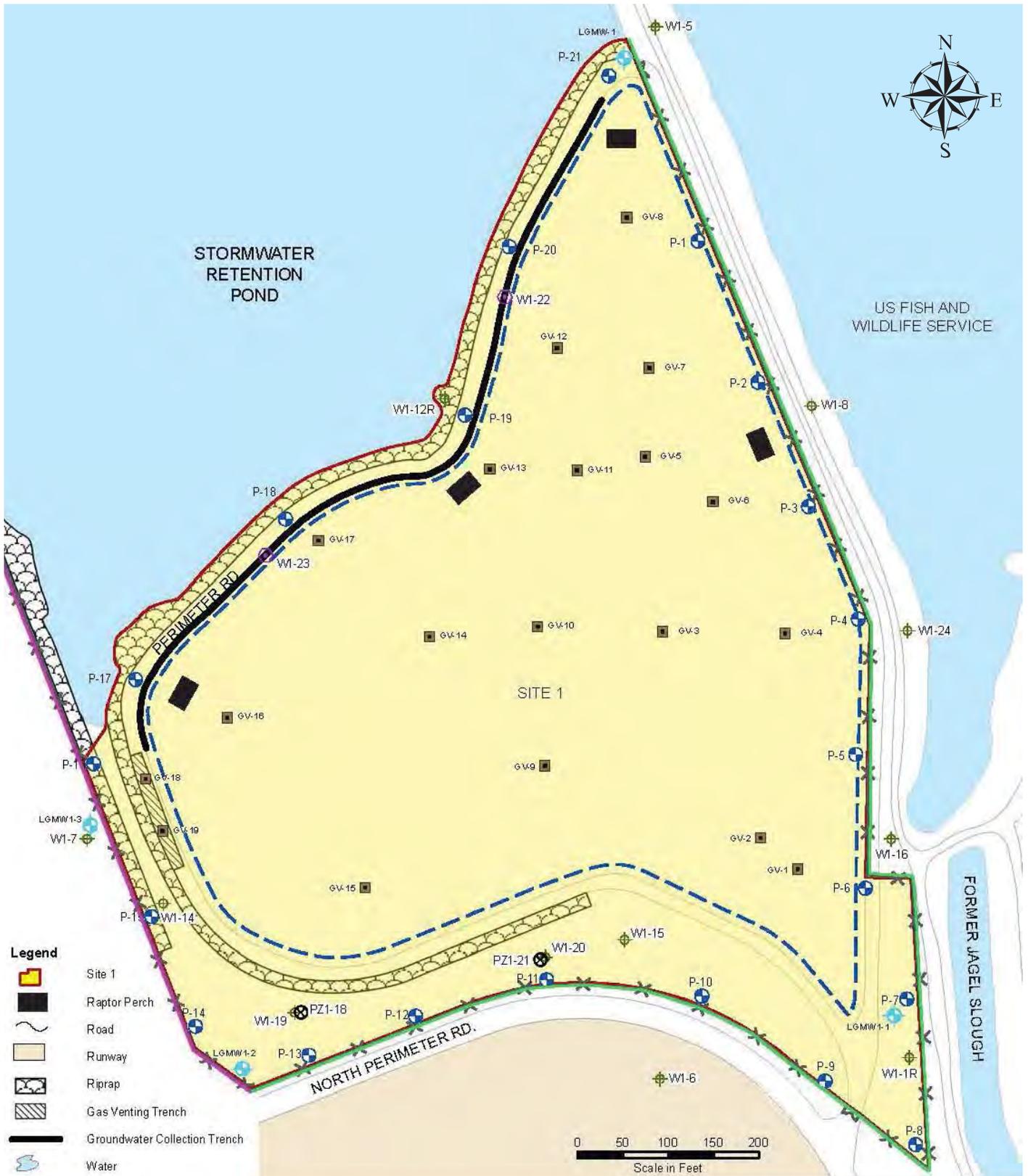
FIGURE 3
1987 aerial view of Site 1 showing the small arms range. Piles of various debris can also be seen on the surface.
Photograph: USN 1987



FIGURE 4

Locations where Institutional controls are in effect for Site 1

Photograph from Google Earth



Legend

- Site 1
- Raptor Perch
- Road
- Runway
- Riprap
- Gas Venting Trench
- Groundwater Collection Trench
- Water
- WI-5 Groundwater Monitoring Well
- WI-22 Collection Trench Well
- PZ1-18 Piezometer
- Approximate Landfill Waste Extent
- P-1 Approximate Perimeter Landfill Gas Monitoring Location
- GV-1 Approximate Gas Vent Location
- LGMW-1 Landfill Gas Monitoring Well
- Site Security Fence
- Gate
- Metallic Flashing
- Non-metallic Flashing

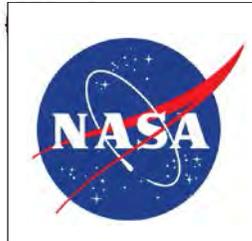
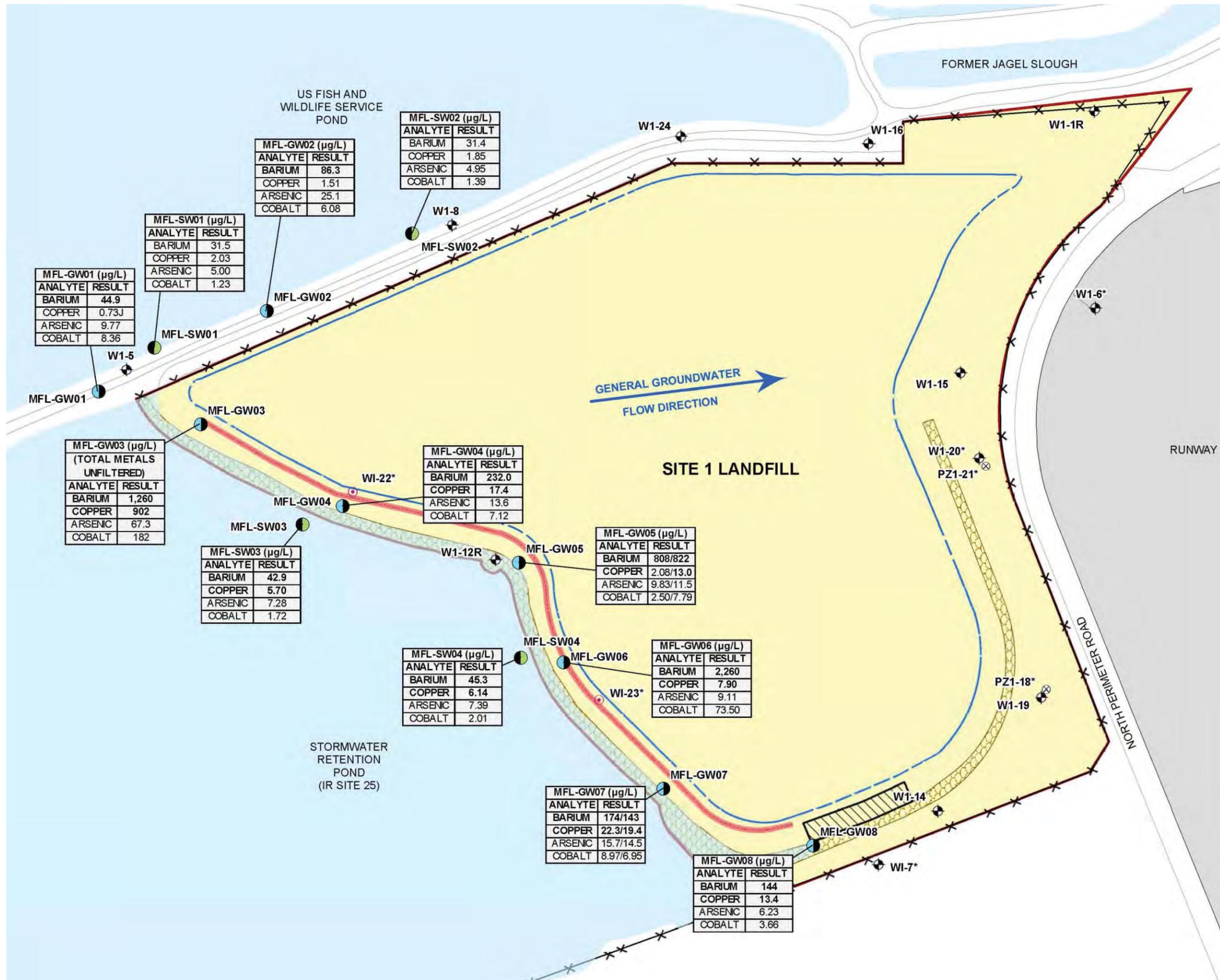


FIGURE 5
 Monitoring points for groundwater and landfill gas sampling locations.
 Map from 2010 5-year review Sites 1, 22, 26, 28



LEGEND

- MFL-GW01 MARCH 2013 TEMPORARY WELL SAMPLING LOCATION (MARCH 2013)
- MFL-SW01 MARCH 2013 SURFACE WATER SAMPLING LOCATION (MARCH 2013)

EXISTING LANDFILL FEATURES

- COLLECTION TRENCH WELL
- ⊕ GROUNDWATER MONITORING WELL
- ⊗ PIEZOMETER
- WETLANDS/PONDS
- LANDFILL COLLECTION TRENCH
- ▨ GAS VENT TRENCH
- RUNWAY AREA
- - - LANDFILL WASTE EXTENT
- ✕ FENCE
- RIP RAP
- IR SITE 1 BOUNDARY
- ROADS
- GENERAL GROUNDWATER FLOW DIRECTION

NOTES:
 * WELL OR PIEZOMETER NOT PART OF THE SITE 1 LANDFILL MONITORING NETWORK

ALL ANALYSES ARE TOTAL DISSOLVED (FILTERED) METALS EXCEPT FOR SAMPLE MFL-GW03 WHICH IS TOTAL (UNFILTERED) METALS

BOLDED RESULTS HAVE CONCENTRATIONS ABOVE THE CALCULATED CONCENTRATION LIMITS (CCLs) FOR THE SITE 1 LANDFILL
 BARIUM - 40.00 µg/L
 COPPER - 5.1 µg/L
 ARSENIC - 89.64 µg/L
 COBALT - 230.00 µg/L

GRAPHIC SCALE
 0 60 120 240
 (IN FEET)
 1 INCH = 120 FEET

FIGURE 7
 Surface and groundwater sampling locations and analytical results from March, 2013.
 Map from Revised Draft Groundwater Monitoring Report IR Site 1 Landfill

ATTACHMENT 1

MEMORANDUM OF AGREEMENT
BETWEEN
U.S. DEPARTMENT OF THE NAVY - ENGINEERING FIELD ACTIVITY WEST
NAVAL FACILITIES ENGINEERING COMMAND
AND
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AMES RESEARCH
CENTER
REGARDING INSTITUTIONAL CONTROLS AT OPERABLE UNITS ONE AND
FIVE
MOFFETT FIELD, CALIFORNIA

The purpose of this Memorandum of Agreement (MOA) is to document the major points of agreement which the National Aeronautics and Space Administration Ames Research Center (NASA ARC) will use in implementing the institutional controls that are required in the *Moffett Federal Airfield Final Operable Units 1 and 5 Record of Decisions* (Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act), dated August 1, 1997 and June 28, 1996, respectively.

I. BACKGROUND

The Operable Unit 1 (OU1) Record of Decision (ROD) selected remedy includes the following:

The OU1 remedy also includes institutional controls. These controls include restrictions on cap disturbances and O&M of the Building 191 pump station and drain/subdrain system. O&M of the pump station was included as a component of the remedy to prevent potential flooding of OU1. The necessity of these restrictions and actions will be noted in the land use planning documents and real property records. The Navy will resolve any issues with NASA regarding the process to develop appropriate restrictive provisions to ensure continued O&M of the Building 191 pump station and to maintain the integrity of the Site 1 cap. The Navy will enter into an agreement with NASA or develop necessary restrictive provisions within 1 year of the date of this ROD. In the event of a future conveyance of the property, the necessity of pump station O&M and use restrictions at Site 1, will be addressed by appropriate notices and land use covenants; however, subsequent landowners may propose remedy modifications to the Navy and, if appropriate, the remedy may be modified in accordance with CERCLA Section 120 and the NCP.

In addition, the Operable Unit 5 (OU5) ROD selected remedy states:

The continued operation of Building 191, the pump station, is necessary for successful implementation of the OU5 cleanup (and for continued runway operation) and is therefore considered part of the selected OU5 pump and

treat remedy. Without its operation, flooding of the northern end of the runways and surrounding area, including portions of the golf course, which overlie the OU5 east side aquifers, will occur during the rainy season. Therefore, the Building 191 pump station is a component of the groundwater remedy and must remain operational. The necessity of continued operation and maintenance of the pump station will be noted in the Master Plan for the government's land uses. (OU5 ROD, page 45)

II. BUILDING 191 PUMP STATION OPERATION AND MAINTENANCE (O&M)

NASA agrees to maintain the Building 191 pump station and drain/subdrain system as long as NASA either owns the property or maintains operational control over the site. This restriction will be recorded in NASA's *Environmental Resources Document*. Furthermore, in the event of a future conveyance of the property, NASA will notify subsequent landowners of this restriction by appropriate notices and land use restrictions.

III. SITE 1 LANDFILL CAP

NASA agrees to not undertake any activities that would compromise the integrity of the landfill cap at Site 1. This restriction will be recorded in NASA's *Environmental Resources Document*. Furthermore, in the event of a future conveyance of the property, NASA will notify subsequent landowners of these restrictions in land use.

Navy agrees to conduct any required ongoing maintenance needed to maintain the integrity of the landfill cap at Site 1.

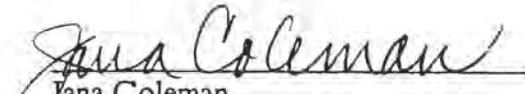
IV. FUNDING

Any requirement for the payment or obligation of funds by the Navy or by NASA pursuant to this MOA shall be subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1341. This MOA shall take effect on the later date appearing under the signature below.

V. MODIFICATION

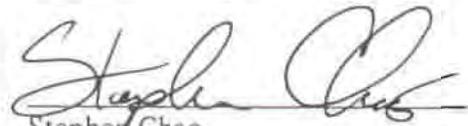
This agreement can be modified at any time by mutual agreement of the parties.

On behalf of NASA:

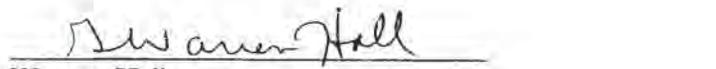

Jana Coleman
Director, Center Operations
NASA Ames Research Center

Date 11-15-99

On behalf of Navy:


Stephen Chao
BRAC Environmental Coordinator
Moffett Federal Airfield

Date 10/13/99


Warren Hall
Director, Safety, Environmental and Mission Assurance
Ames Research Center

Date 10/28/99

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SITE NAME:	Site 2: Golf Course Landfill #1				
Version:	Final	Date:	02/24/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	37.425553° N		
	Santa Clara County	Longitude	122.048338° W		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
CERCLA	EPA/RWQCB		X	OU1 1997	NFA ¹
SITE SUMMARY					
1. NFA – No Further Action					
<p>The Site 2 Landfill, also known as the Golf Course Landfill #1, is located to the west of the golf course and at the intersection of North Patrol Road and Zook Road (Figure 1).</p> <p>Records of landfill operations were not maintained. The landfill operated from the 1940s until approximately 1952. Reportedly the landfill was used to dispose of domestic refuse along with wastes from maintenance and military operations. These wastes included scrap equipment, paint and paint thinners, solvents, lacquer, oil, fuel filters, and sawdust contaminated with PCBs.</p> <p>A 36" high-pressure natural gas line runs through Site 2 (Figure 2). The line belongs to Pacific Gas and Electric (PG&E) and is one of three supply lines for San Francisco and the Peninsula. The Navy excavated several test pits under the supervision of PG&E personnel to define the alignment of the pipeline.</p> <p>The Navy conducted trenching in 1996 to define the edges of the waste and better characterize the contents. Two test pits were excavated in July 1996. The test pits revealed the presence of inert debris only such as construction debris. Eight additional trenches were excavated along the northern portion of Site 2. Municipal-type waste was found to be isolated in a specific waste area and was easily distinguished from inert debris and native clay. Trenching also indicated that some portions of the waste were saturated. The volume of the waste was also found to be less than originally estimated.</p> <p>The initial proposed remedy for Site 2 was to construct a multi-layered cap over the site. After reviewing the results of the exploratory trenching, it was decided to excavate the landfill contents and transport them to Site 1 which was designated as a CAMU. The Navy selected excavation and consolidation as the remedy for Site 2 in the Navy's 1997 OU1 ROD. The ROD did not designate any land use controls for Site 2.</p>					

SITE NAME:

Site 2: Golf Course Landfill #1

SITE SUMMARY

Approximately 23,000 cubic yards of waste was transferred and consolidated within Site 1. The excavation was observed by representatives of the EPA and RWQCB to ensure that drums or containers of hazardous material were not placed at Site 1. Three 20-cubic yard bins of potentially hazardous materials were collected and disposed of as Class II waste off-site. The excavation bottom and sidewalls were sampled to ensure that all waste and contamination were removed. The excavation was backfilled with overburden and clean import fill.

A groundwater monitoring plan was established. Groundwater was to be monitored for a period of at least three years. Monitoring began in 1999 and continued until 2002 providing 3 years of data. Test results consistently showed no contamination present. In 2003, the EPA and the RWQCB approved closure of Site 2. Since the landfill contents had been removed and groundwater contamination was not present, Site 2 was given a "clean closure" and is available for unrestricted use under CERCLA (See Attachment 1).

SITE NAME:		Site 2: Golf Course Landfill #1			
REMEDIAL ACTION					
Remedy	Excavation & Consolidation	Begin Date	07/1997	End Date	11/1998
<ul style="list-style-type: none"> Excavation of municipal-type wastes from Site 2, Transport to & consolidation of Site 2 wastes at Site 1, Backfilling and restoration of excavated area at Site 2 and revegetation using regionally native plants, Groundwater monitoring for a minimum of 3 years, Designation of Site 1 as a CAMU under the OU1 ROD. 		<ul style="list-style-type: none"> Groundwater monitoring ended in 2002 The site was closed by the regulatory agencies in 2003 as a “clean closure” 			
Land Use Restrictions			Development Issues		
<p>Land Use Restrictions (Figure 3):</p> <ul style="list-style-type: none"> Under the <i>NASA Programmatic Environmental Impact Statement</i>, Mitigated Alternative 5, the area of Site 2 has been designated as a burrowing owl preserve. 			<p>No development is allowed in this area.</p>		

FIGURES

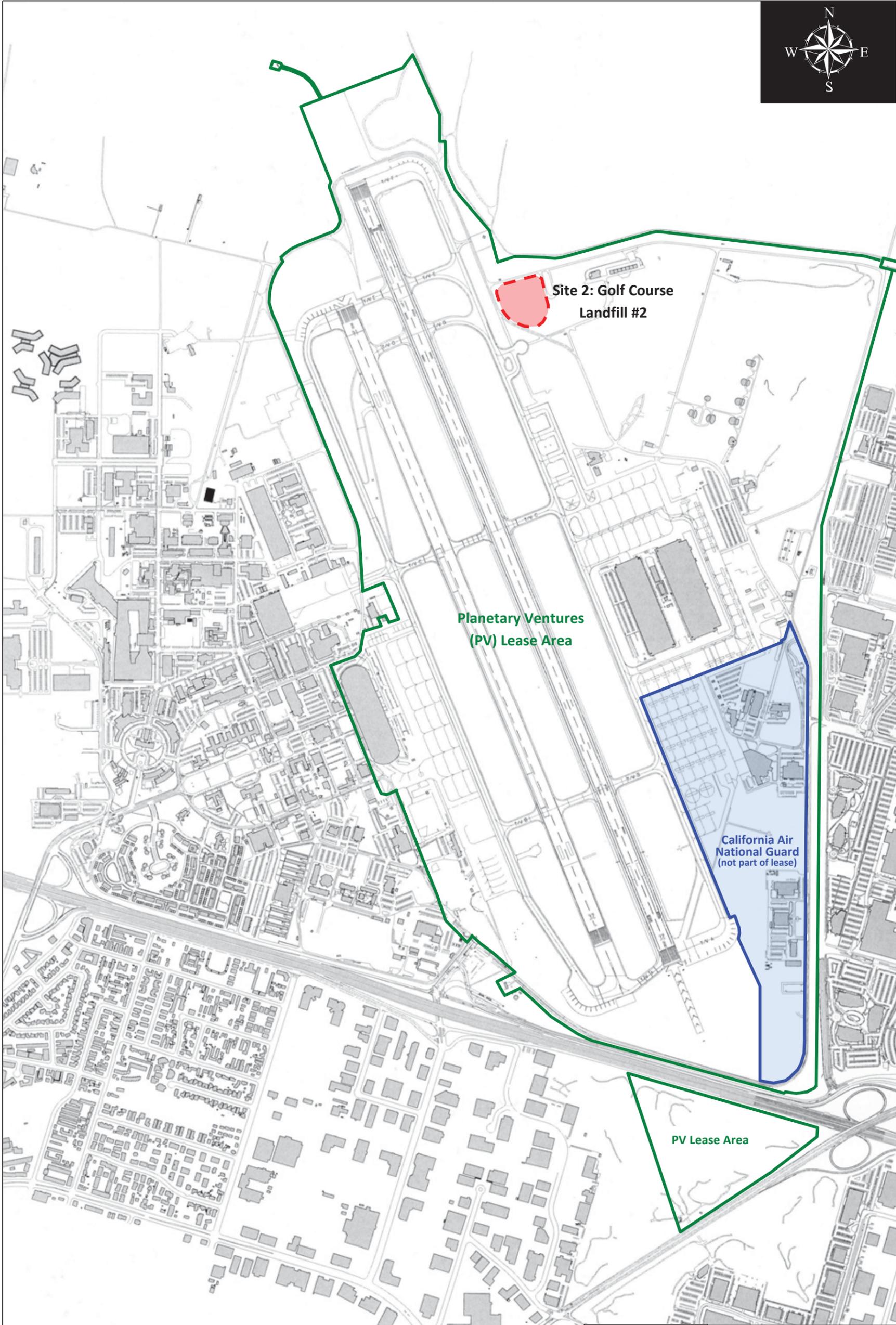
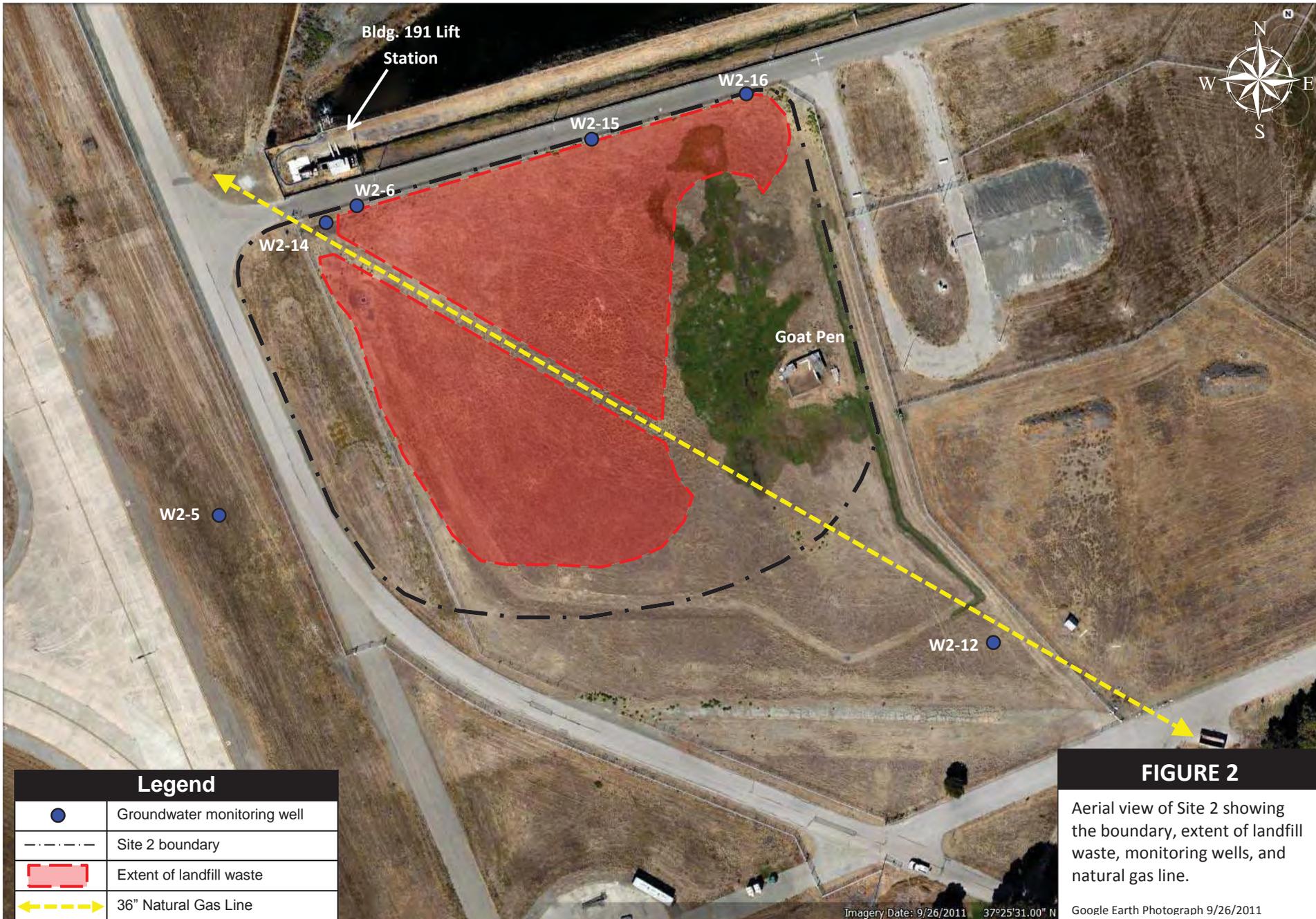


FIGURE 1
Site 2 Location Map.
Boundaries are approximate
and do not represent legal
descriptions of property.



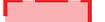
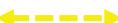
Legend	
	Groundwater monitoring well
	Site 2 boundary
	Extent of landfill waste
	36" Natural Gas Line

FIGURE 2
 Aerial view of Site 2 showing the boundary, extent of landfill waste, monitoring wells, and natural gas line.
 Imagery Date: 9/26/2011 37°25'31.00" N Google Earth Photograph 9/26/2011

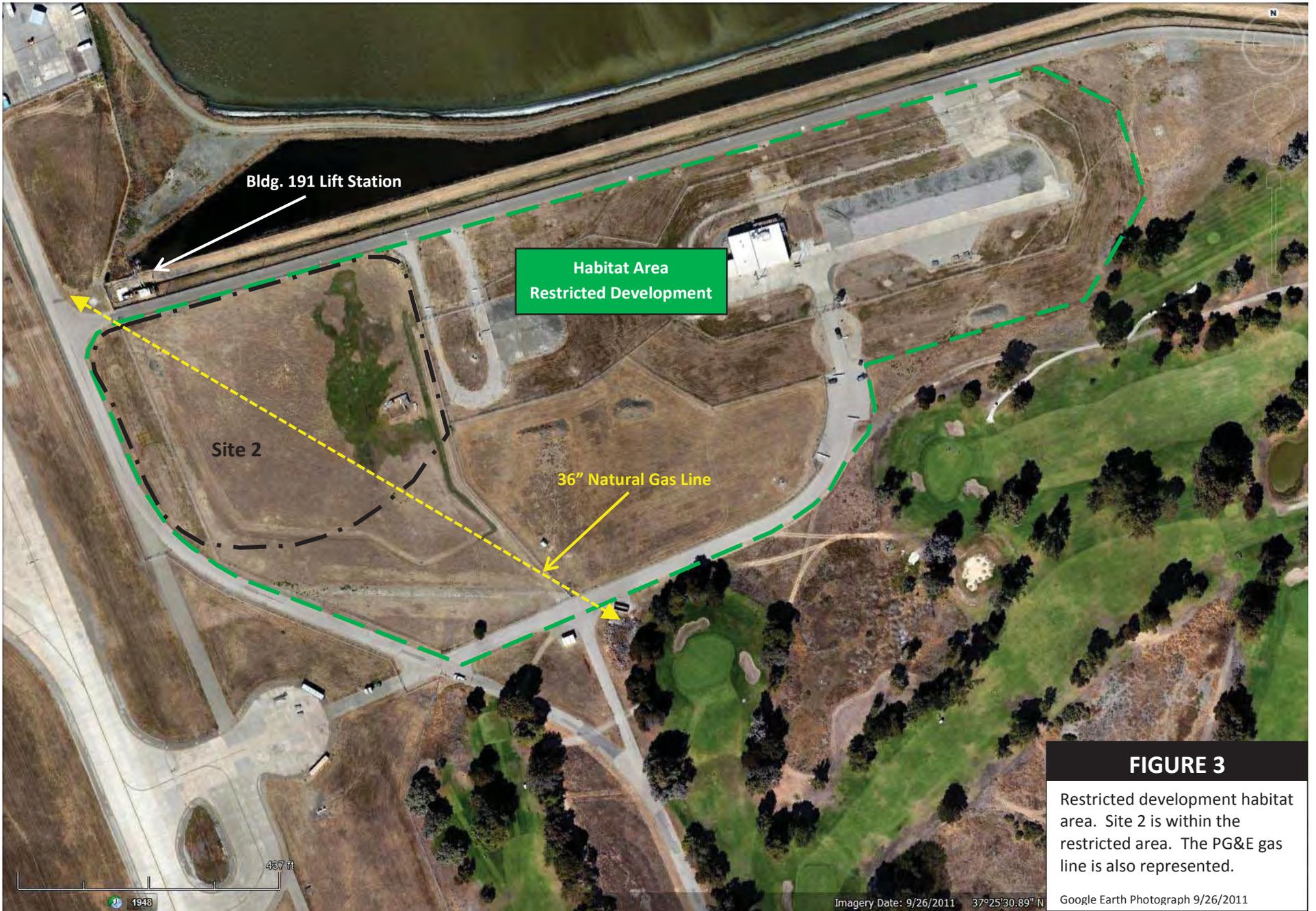


FIGURE 3
Restricted development habitat area. Site 2 is within the restricted area. The PG&E gas line is also represented.

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SITE NAME:	Site 5 Fuel Farm				
Version:	Final	Date:	03/01/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC	Defense Logistics Agency Energy			
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108	8725 John J. Kingman Rd. Fort Belvoir, VA 22060			
Contact	Scott Anderson	Joseph E. Vogel			
	scott.d.anderson@navy.mil	Joseph.Vogel@dla.mil			
	619-532-0938	703-767-8781			
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See site summaries		
	Santa Clara County	Longitude	See site summaries		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum	RWQCB/SCCDEH	X ¹	X ²	N/A	NFA ³
SITE SUMMARY					
<p>Notes: The Northern Fuel Farm has not been closed. The Southern Fuel Farm was closed by the RWQCB on 12/12/2014. NFA = No Further Action, applies to the Southern Fuel Farm only.</p> <p>Site 5 is located on the eastern side of Moffett Field. Site 5 covers the former fuel farm area that supplied fuel to the former Naval Air Station Moffett Field (NASMF). The site has been divided into two parts: Northern Fuel Farm (NFF) and the Southern Fuel Farm (SFF) (Figure 1). The NFF contains four large bulk storage tanks for jet fuel. The tanks are no longer in use but remain at the site. Additionally there are 4 aboveground storage tanks (AST) still present. Three underground storage tanks were also located within the NFF.</p> <p>The SFF contained 6 large USTs used for the storage of fuel oil, diesel, gasoline, and jet fuel. All of the USTs were removed along with the piping, tank car and truck unloading ramps, and the dry wells. Only a small portion of the SFF is located within the lease area. The majority of the SFF is within the California Air National Guard (CANG) area. The Navy has conducted several investigations at the SFF. Based on those investigations, the Navy has requested closure from the California Regional Water Quality Control Board (RWQCB).</p> <p>Site 5 was first described in the Navy's Initial Assessment Study of Naval Air Station Moffett Field, CA. The study listed Site 5 as the Fuel Farm French Drains. Later investigations and documents expanded the site to include fuel farm tanks and related facilities (Figure 2) as shown in the <i>Station-Wide Remedial Investigation Report</i> and the <i>Base-Wide Petroleum Evaluation Methodology Technical Memorandum, Appendix B</i>.</p> <p>Site 5 NFF The following facilities are or were located in the NFF (Figure 3):</p> <ul style="list-style-type: none"> • Bulk Fuel Storage Tanks • Aboveground Storage Tanks • Dry Wells (removed) 					

SITE NAME:**Site 5 Fuel Farm****SITE SUMMARY**

- UST 26 (removed)
- UST 30 & 31 (removed)

Bulk Fuel Storage Tanks (Figure 3)

The bulk storage tanks are field-construction steel underground storage tanks with a capacity of 567,000 gallons each. The tanks were installed in 1953 and were used until 2004. Figures 4 & 5 show the tanks under construction. There are four bulk storage tanks at the NFF:

Tank 10 (Facility 137) (37.417731° N, 122.038604° W)

Tank 11 (Facility 138) (37.418032° N, 122.038525° W)

Tank 12 (Facility 139) (37.417869° N, 122.038034° W)

Tank 13 (Facility 140) (37.418533° N, 122.038350° W)

The tanks are 88 feet in diameter and are 13 feet high. The tanks are made of steel sides with an interior support framework (Figure 5). A large area was excavated for the installation of the tanks. The tanks were built on concrete foundations on the bottom of the excavation. A concrete layer was constructed on the tops of the tanks. The excavation was backfilled.

The tanks were operated by the Navy from 1953 to 1994. On July 1, 1994, NASMF was closed and transferred to NASA Ames Research Center. At that time, operation of the fuel supply system including the tanks was taken over by the Defense Logistics Agency (DLA) Energy as the Defense Fuel Support Point (DFSP) Moffett Field. DLA Energy operated the system for Department of Defense (DoD) customers. DLA Energy stopped operation of the bulk storage tanks in 2003. Fueling operations were transferred to a contractor-owned contractor-operated system using ASTs.

DLA Energy is in the early stages of planning removal of the tanks. The tanks and piping removals are under the oversight of the Santa Clara County Department of Environmental Health (SCCDEH).

ASTs

There are four ASTs located east of the bulk storage tanks (Figure 3):

Tank 72 (Facility 328) – 25,000 gallon steel tank (37.417945° N, 122.037930° W)

Tank 73 (Facility 361) – 20,000 gallon steel tank (37.417906° N, 122.038011° W)

Tank 74 (Facility 360) – 15,000 gallon steel tank (37.417869° N, 122.038034° W)

Tank 75 (Facility 362) – 5800 gallon steel tank (37.417831° N, 122.038065° W)

The tanks were installed in 1954. All four ASTs are located within a concrete containment structure. They are no longer in use. DLA Energy will be removing the tanks under the oversight of SCCDEH.

Dry Wells

Dry Wells 1 to 5 are located within IR Site 5 (Figure 3). Four of the wells were associated with USTs 10 through 13. The fifth dry well was associated with the fuel distribution lines that connected USTs 10 through 13 to a truck fueling rack. The dry wells were excavated pits filled with gravel. Each of the bulk storage tanks included a sump in the center. Water in the fuel would settle down in the sump. Pumps located in the

SITE NAME:**Site 5 Fuel Farm****SITE SUMMARY**

sumps were used to remove the accumulated water. The water with fuel was discharged into the associated dry well. About 500 to 600 gallons of liquid were drawn off at a time.

The five dry wells were investigated between 1988 and 1994. In 2001, the dry wells were excavated and removed (Figure 6). The standpipe shown in Figure 6 remains in place for each dry well site. Groundwater wells were sampled from 2002 to 2003. Additional soils sampling was done in 2009. In 2011, the RWQCB concurred that No Further Action was required for the North Fuel Farm Dry wells.

UST 26 (37.417218° N, 122.038032° W)

Tank 26 was a 10,000-gallon fiberglass UST located within the North Fuel Farm area. Solvents, PCB oils, and other waste oils were stored in the tank. The tank would be pumped out when full and the liquids were disposed as hazardous wastes. Tank 26 was installed in 1977 and removed in June 1991. During tank removal, the tank appeared to be in good condition and no obvious holes were observed. A sheen was observed on groundwater in the excavation and discolored soil was observed on the sidewalls (Figure 7).

As part of the Phase I and Phase II remedial investigation activities, additional soil and groundwater sampling was conducted in the vicinity of the former Tank 26. With the exception of a groundwater sample that contained 300 µg/L of TPH as JP5, no analytes in soil or groundwater were detected above cleanup standards.

In 2009 and 2010, two additional borings were installed in the vicinity of the former Tank 26. TPHd and TPHmo concentrations in some of the soil and groundwater samples exceeded cleanup levels. The RWQCB concluded that because these analytes were not detected in downgradient monitoring wells, the residual contamination was not significantly impacting groundwater and indicated that the residual TPH contamination in soil was expected to degrade. The RWQCB issued a "No Further Action Letter" for UST 26 on December 21, 2011.

USTs 30 & 31 (37.418936° N, 122.037888° W)

Tanks 30 and 31 were located slightly north of the North Fuel Farm Area (Figure 3). The tanks were installed in 1984. The tanks were to be a replacement for UST 26 to store liquid hazardous wastes. These 4,000-gallon steel tanks (Figure 8) were never put into operation and were removed in December 1992. In a letter dated 11/6/2000, RWQCB concurred with the Navy that no further action was required.

Nature and Extent of Contamination**Soil**

The primary contaminants within the NFF area are JP-5 and diesel. In 1988, JP-5 was released when Tank 12 was overfilled. According to base personnel at the time, approximately 5000 gallons of JP-5 were released from Tank 12 and flowed onto the grass field north and west of the tank. Approximately 2400 gallons of fuel were recovered. Releases from the bulk storage tanks due to leaks are unlikely. The tanks were subject to tracer testing and were found to be sound.

There are two areas at the NFF where soil contamination due to JP-5 exist (Figure 9): the area north, west, and south of Tanks 10 – 13, and the area surrounding the former Tank 26 excavation.

SITE NAME:**Site 5 Fuel Farm****SITE SUMMARY**

Numerous soil samples had TPH concentrations exceeding the RWQCB ESL for industrial sites of 500 mg/kg. The exceedences ranged from 520 mg/kg to 2000 mg/kg.

In the area around the Tank 26 excavation, a sample taken from the west sidewall from the excavation had a TPH concentration of 5200 mg/kg. PCBs were also detected at one location at Tank 26. One soil boring, SB05-31, had the following maximum concentrations:

- Aroclor 1016 @ 100 µg/kg
- Aroclor 1221 @ 100 µg/kg
- Aroclor 1232 @ 100 µg/kg
- Aroclor 1242 @ 100 µg/kg
- Aroclor 1248 @ 100 µg/kg
- Aroclor 1254 @ 210 µg/kg
- Aroclor 1260 @ 210 µg/kg

The concentrations are below the 220 µg/kg screening levels for industrial sites as listed in the 2013 Environmental Screening Levels (ESL) from the RWQCB.

Groundwater

Free product was recovered from wells near the bulk storage tanks of the NFF. Several free product wells were installed in 1991 in the NFF. Free phase hydrocarbons were observed in three of the wells during installation: FP05-07 (3 mm), FP05-08 (2 mm), and FP05-09 (1 mm) (Figure 10). Free phase was not seen in later sampling events. Free phase hydrocarbons were observed in W05-27(A1) (4 mm) (installed in 1991) after a 24-hour pump test. FP05-01, had a concentration for TPH as kerosene of 2,000,000 µg/L in the December 1993 sampling event.

The above floating product wells were sampled from 1991 to 1995.

In addition to the area around the bulk storage tanks, jet fuel in groundwater has extended from Site 5 to the golf course to approximately the south weapons storage bunkers (Figure 11). Review of hydrogeological data indicated the presence of a gravel channel at the site. The Navy investigated this channel to determine the extent of the channel and if it may have been a conduit for fuel migration. The investigation is reported in the Final Site 5 Channel Deposit Investigation Report. In the report, the Navy concluded that “Dissolved-phase petroleum has migrated in groundwater through the channel deposit that extends north onto the golf course from the four bulk fuel tanks.” Two types of groundwater samples were taken during the investigation: grab samples and monitoring wells samples.

Grab samples were taken from the groundwater during the installation of the soil borings. As the Navy noted: “Grab groundwater samples from the channel deposit at locations adjacent to and downgradient of [monitor well] W5-34 indicate that petroleum is still present in the matrix of the aquifer.” Concentrations exceeding the RWQCB 2013 ESL of 100µg/L ranged from 130 µg/L to 210,000 µg/L (Figure 11). Groundwater samples from nearby monitoring wells were below the 100 µg/L RWQCB 2013 Environmental Screening Levels.

SITE NAME:**Site 5 Fuel Farm****SITE SUMMARY**

Site 5 SFF (37.414668° N, 122.039228° W)

The Site 5 SFF consisted of the following facilities (Figure 12):

- Four concrete underground storage tanks (see Table 1)
- Two field-constructed underground storage tanks (see Table 1)
- Fuel truck unloading ramp
- Railroad tank car unloading ramp
- Dry wells at all tank locations
- Truck loading rack

Tank	Location (Latitude, Longitude)		Construction	Capacity (gallons)	Contents
4	37.414096° N	122.039848° W	Concrete	50,000	Diesel
5	37.414444° N	122.039748° W	Concrete	50,000	Fuel oil
6	37.413975° N	122.039413° W	Concrete	25,000	Jet Fuel (JP-4/5)
7	37.414401° N	122.039253° W	Concrete	25,000	Gasoline
8	37.414835° N	122.038959° W	Steel	150,000	Jet Fuel (JP-4/5)
9	37.414993° N	122.038916° W	Steel	150,000	Jet Fuel (JP-4/5)

With the exception of the truck loading rack, all of the SFF facilities were removed in 1995. Two parallel pipelines transported fuel from the bulk storage tanks in the NFF to Tanks 8 and 9. These two lines were cut and rerouted to the truck loading rack during the removal of the SFF facilities.

Only a portion of the SFF lies within the Lease Area. This portion includes Tanks 8 and 9 and the truck loading rack. The remainder of Site 5 South is located with the Lease Area for the California Air National Guard.

The Navy conducted several investigations within the SFF. These investigations are summarized in the Navy's *Request for Closure or No Further Action for Former Site 5 South*. Figure 13 presents the locations of wells and borings and some analytical results.

Based on the information presented by the Navy in the *Request for Closure or No Further Action for Former Site 5 South*, the RWQCB issued an "No Further Action" determination for Site 5 South by way of a closure package dated 12/12/2014.

SITE NAME:		Site 5 Fuel Farm			
REMEDIAL ACTION					
Remedy		Begin Date		End Date	
<p>SFF: USTs, piping, dry wells, unloading racks removed, soil excavated; Water Board NFA concurrence pending.</p> <p>NFF:</p> <ul style="list-style-type: none"> • Dry wells removed, Water Board concurrence with NFA • UST 26 removed, Water Board concurrence with NFA • USTS 30 & 31 removed, Water Board concurrence with NFA • USTs, ASTs, and piping remain in place and TPH is present in soil and groundwater • DLA Energy to remove USTs, ASTs, and piping under SCCDEH oversight 					
Land Use Restrictions			Development Issues		
<p>No institutional controls have been promulgated for Site 5. However, ICs established for Site 26 (OU5) prevents use of the aquifer as a drinking water source.</p> <p>The NFF and SFF sites are limited to industrial/commercial use as stated in the NASA <i>Environmental Resources Document</i> (currently under revision)</p> <p>The NFF dry wells and UST 26 NFA concurrence from the RWQCB is based on industrial/commercial use, not available for residential uses and no drinking water use of the groundwater.</p>			<p>The following issues will restrict development or effect development plans:</p> <ul style="list-style-type: none"> • The bulk storage tanks currently interfere with any construction at the NFF • NFA documents require notification to the RWQCB for changes to land or groundwater use • Additional characterization of the nature and extent of the contamination is needed • Contact with chemicals left in place during subsurface work • Comply with the EIMP. 		

SITE NAME:	Site 5 Fuel Farm
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RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
TPH (not specified)	2,000	10,000	These concentrations are from several reports. Only the maximum concentration among those reports is listed here. Additional characterization is needed to better define the nature and extent of contamination.
Jet Fuel (JP-5)	2,000	210,000	
Diesel	1,700		
Motor Oil	5,200		
TPH-extractable other	2,000		
TPH-extractable		47,000	
Benzene	13	610	
Toluene	4.8	150	
Ethylbenzene	1.7	200	
Total Xylenes	11	1,100	
Naphthalene	0.874	89.9	
Diesel Range Organics	350	1600 J	
JP-5/Kerosene	410	5200 J	

REFERENCES (Chronological Order)

- *Initial Assessment Study of Naval Air Station, Moffett Field, CA.* Naval Energy and Environmental Support Activity, Port Hueneme, CA. April 1984.

- *Remedial Investigation Report for Operable Unit 2 Soils at NAS Moffett Field, CA.* IT Corporation, Knoxville, TN. August 1992.

- *Revised Final Installation Restoration Program Petroleum Sites (and Wastewater Tanks and Sumps) Characterization Report, Naval Air Station Moffett Field, CA.* PRC Environmental Management, Inc., Denver, CO. January 28, 1994.

- *Final Additional Petroleum Sites Investigation Technical Memorandum, Moffett Federal Airfield, CA.* PRC Environmental Management, Inc., Denver, CO. January 20, 1995.

- *Final Station-Wide Remedial Investigation Report, Moffett Federal Airfield, CA.* PRC Environmental Management, San Francisco, CA. May 21, 1996.

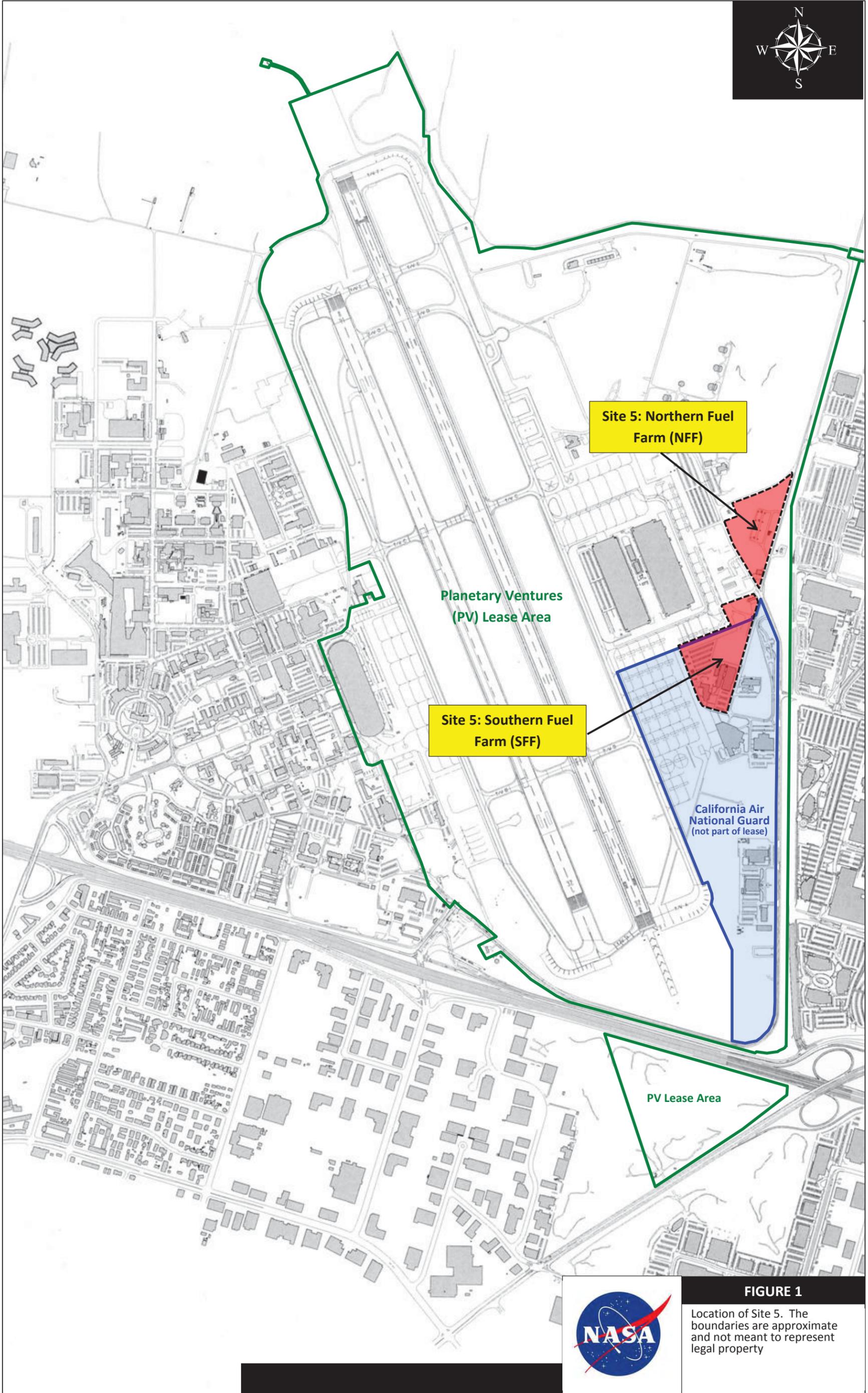
- *Base-Wide Petroleum Site Evaluation Methodology Technical Memorandum, Draft Appendix B, Site 5 Petroleum Evaluation.* Tetra Tech EM, Inc., San Francisco, CA. May 21, 1999.

- *Removal of Non-Existent or Never Use Storage Tanks from Current UST List, Moffett Federal Airfield, CA.* RWQCB Letter to Southwest Division, Oakland, CA. November 16, 2000.

REFERENCES (Chronological Order)

- *Draft Phase III Base-Wide Tank Closure Report Further Assessment Sites, Former Naval Air Station Moffett Field, CA.* Tetra Tech, Inc., San Diego, CA. March 9, 2004.
- *Final Site 5 Channel Deposit Investigation Report, Former Naval Air Station Moffett Field, CA.* SulTech, San Diego, CA. February, 2009.
- *Final Completion Report and Request for Closure or No Further Action for Moffett Petroleum Sites.* Tetra Tech Inc., San Diego, CA. June 2011.
- *No Further Action for Site 5 North Fuel Farm Dry Wells, Former Naval Air Station Moffett Field, Mountain View, Santa Clara County.* RWQCB Letter to Department of the Navy, BRAC PMO West. December 15, 2011.
- *No Further Action for Underground Storage Tank (UST) 26, Former Naval Air Station Moffett Field, Mountain View, Santa Clara County.* RWQCB Letter to Department of the Navy, BRAC PMO West. December 21, 2011.
- *Request for Closure or No Further Action for Former Site 5 South, Former USTs 4 through 9, Dry Wells, and Associated Piping, Former Naval Air Station Moffett Field, Moffett Field, CA.* Tetra Tech EC, Inc., San Diego, CA. August 2012.
- *Draft Closure Plan for the Defense Logistics Agency Energy Aboveground Storage Tanks, Defense Full Support Point Moffett Field, CA.* Tetra Tech, Irvine, CA. December 2012.
- *No Further Action for Site 5 South (USTs 4 – 9), Former Naval Air Station Moffett Field, Santa Clara County, Regional Water Board Case Nos. 43D9067.* San Francisco Bay Regional Water Quality Control Board, Oakland, CA. December 12, 2014.

FIGURES



Site 5: Northern Fuel Farm (NFF)

Planetary Ventures (PV) Lease Area

Site 5: Southern Fuel Farm (SFF)

California Air National Guard (not part of lease)

PV Lease Area



FIGURE 1

Location of Site 5. The boundaries are approximate and not meant to represent legal property



North Fuel Farm

South Fuel Farm



FIGURE 2

IRP Site 5 Fuel Farm

Google Earth Photograph 9/26/2011



FIGURE 3
 Site 5 North Fuel Farm
 Google Earth Photograph 9/26/2011



FIGURE 4
Construction of Bulk
Storage Tanks

US Navy Photograph 9/19/1959

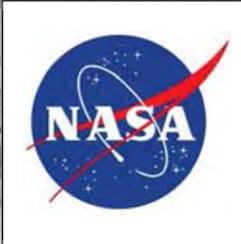
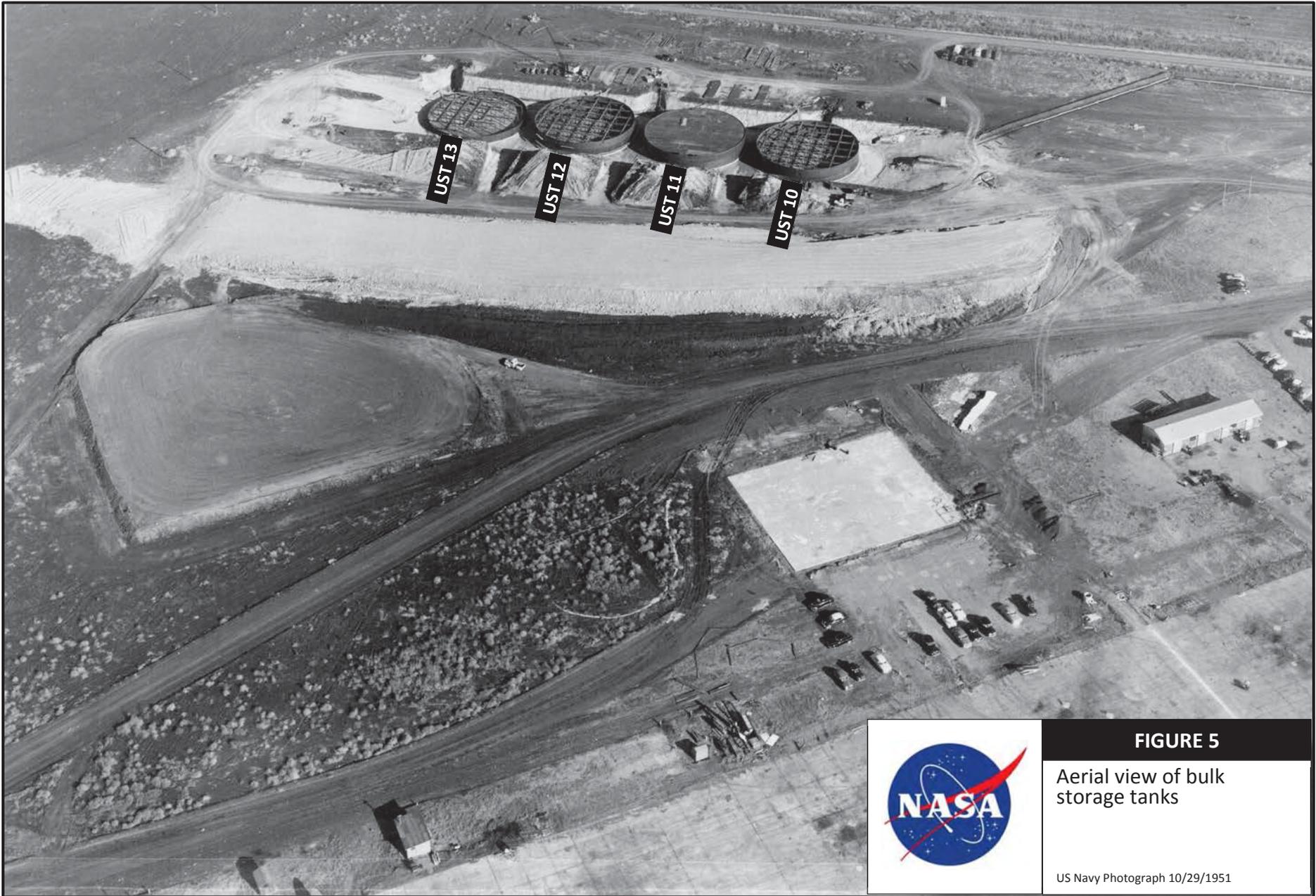


FIGURE 5
Aerial view of bulk storage tanks
US Navy Photograph 10/29/1951



Photograph of soil and gravel removed from one of the dry wells at Site 5.



Photograph of dry well excavation with backfill material.



Photograph of backfilled dry well excavation. Water and fuel were discharged through the standpipe in the center of the dry well. The standpipe remained in place for each dry well location.



FIGURE 6

Removal of dry wells at Site 5.

US Navy Photograph 2001



Photograph of UST 26 and waste oil transfer hose (date unknown).



UST 26 in excavation before removal (June 1991).



Groundwater in UST excavation with floating product (June 1991).



FIGURE 7

UST 26

US Navy Photographs

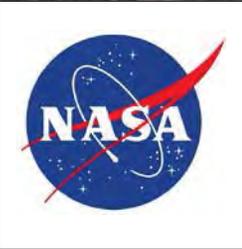


FIGURE 8
USTs 30 and 31
US Navy Photograph June 1991



FIGURE 9
Approximate extent of soil contamination greater than 100 mg/kg.
Google Earth Photograph 9/26/2011



FIGURE 10

Wells where floating product has been detected. Wells with floating product are in red with the thickness in millimeters (mm).
Google Earth Photograph 9/26/2011



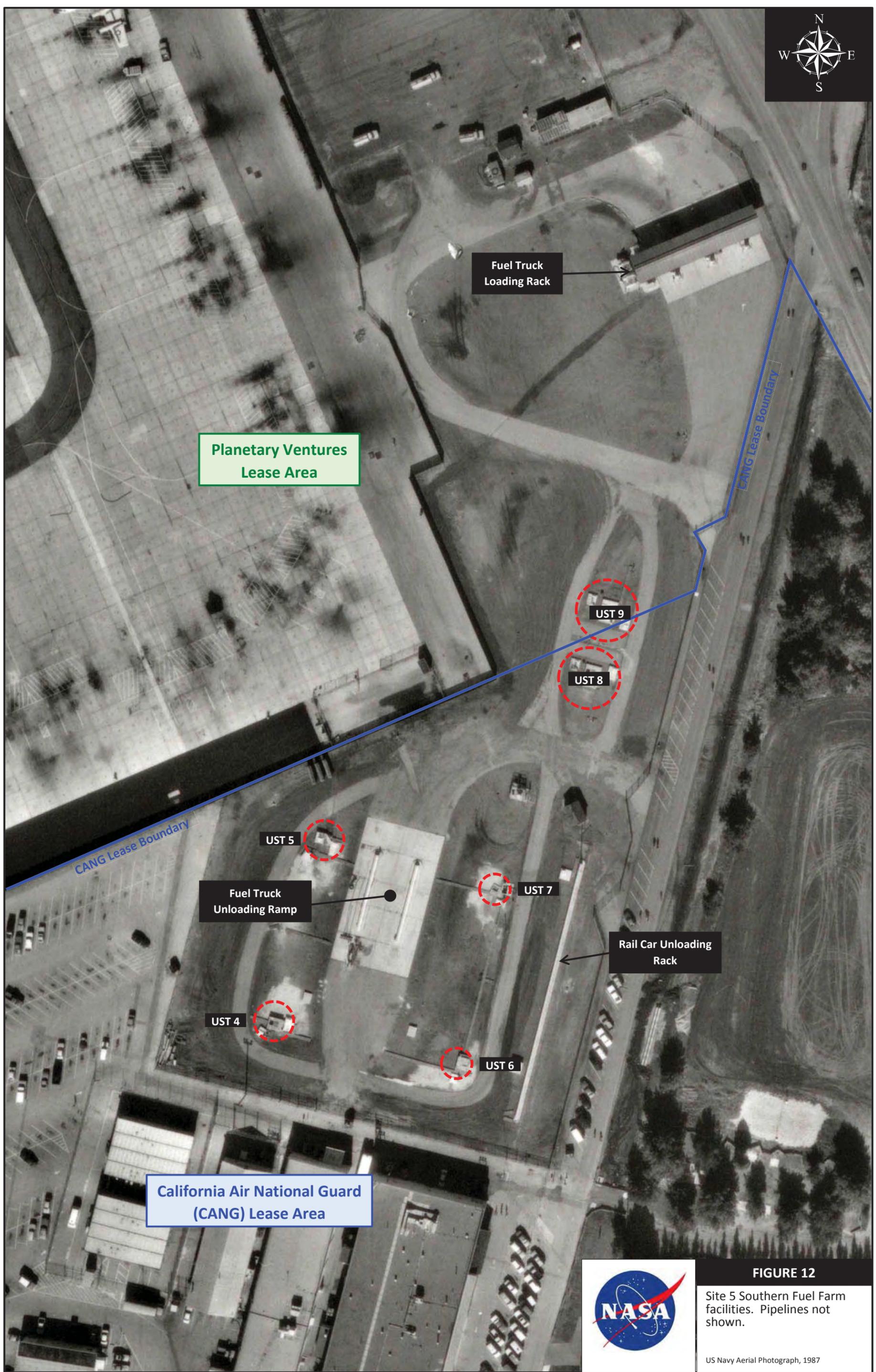
KEY

- HydroPunch Grab Sample
- Monitor Well Sample



FIGURE 11
Approximate extent of groundwater contamination greater than 100 µg/L.

Google Earth Photograph 9/26/2011



Fuel Truck Loading Rack

Planetary Ventures Lease Area

CANG Lease Boundary

UST 9

UST 8

CANG Lease Boundary

UST 5

Fuel Truck Unloading Ramp

UST 7

Rail Car Unloading Rack

UST 4

UST 6

California Air National Guard (CANG) Lease Area



FIGURE 12

Site 5 Southern Fuel Farm facilities. Pipelines not shown.

US Navy Aerial Photograph, 1987

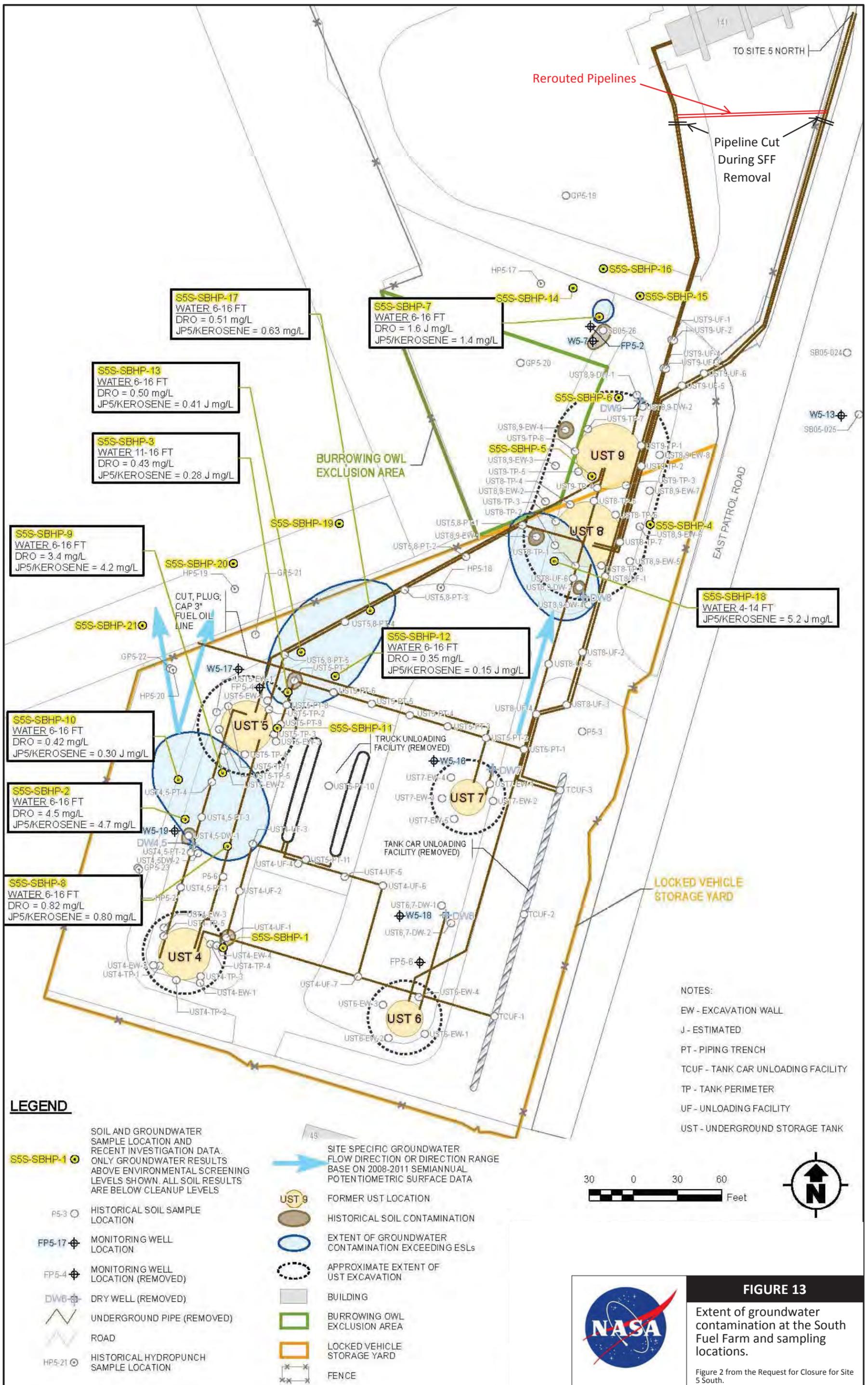


FIGURE 13
 Extent of groundwater contamination at the South Fuel Farm and sampling locations.

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SITE NAME:	Site 12: Former Fire-Fighting Training Area				
Version:	Final	Date:	02/21/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	37.418685° N		
	Santa Clara County	Longitude	122.054273° W		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum	RWQCB		X	N/A	NFA ¹
SITE SUMMARY					
<p>1. NFA: No Further Action</p> <p>The Former Fire-Fighting Training Area is located in the industrial area north of Hangar 1 between Zook Road and the western MFA taxiway (Figure 1). The area consisted of an unlined 65-foot by 65-foot burn pit surrounded by a 1-foot high berm. A mockup of a plane was located inside the burn pit. IR Site 12 also contained a 5,000 gallon aboveground storage tank AST located approximately 90 feet north of the burn pit, which stored waste jet and diesel fuel used in the training exercises (Figure 2). The AST was removed in 1992 and installed near the “day” tank on the eastern side of the runways.</p> <p>It is not known when fire-fighting training started at Site 12. Training ended in 1987. Figure 3, from 1977 shows the site in use. Prior to the 5000 gallon AST, an older fuel trailer with a hose connection was used (Figure 3). Typically, waste fuel such as jet fuel and diesel was transferred by an aboveground hose and spread around the mock-up aircraft. Historically, waste solvents may also have been mixed with the waste fuels. The fuel was ignited and then extinguished with water and firefighting chemicals. The residue was left in the pit to evaporate or percolate into the soil. Sometimes, water and firefighting chemicals fell outside of the pit and flowed to the nearby storm water ditch (Figure 3).</p> <p>Site 12 was evaluated in 1988 and 1989 as part of the Phase I remedial investigation (RI) at the former Naval Air Station Moffett Field (NASMF). Soil gas, soil and groundwater samples were taken. Soil samples were collected from 15 borings at approximately 1, 3 and 5 feet below ground surface (bgs). Three of the borings were converted to monitoring wells. Total petroleum hydrocarbons (TPH) were found in soil up to 1400 mg/kg. There were no detections of TPH above detection limits after six quarters of groundwater sampling from site monitoring wells. In addition, a soil gas survey between the AST and the training area detected high concentrations of chlorinated organics and BTEX compounds.</p> <p>An additional investigation was performed in 1990 to more fully evaluate the extent of contamination and corrective action alternatives. TPH-diesel was detected at a maximum concentration of 3300 mg/kg and TPH-gasoline at 870 mg/kg.</p>					

SITE NAME:**Site 12: Former Fire-Fighting Training Area****SITE SUMMARY**

Ten soil borings were drilled around and in the burn pit. Eight of the boring were installed and sampled in November 1988. Soil borings SB12-1 through SB12- 8 were installed around the location of the burn pit. In June 1990, SB12-13 and SB12-14 were drilled through the burn pit. Soils were sampled for VOCs, SVOCs, and TPH. Contaminants were not detected in any of the borings except for SB12-13 which indicated the presence of gasoline at 20.2 mg/kg at 11 feet.

As a result of this contamination, the Navy instituted a source control measure (SCM) at Site 12. The objective of the SCM was to prevent the petroleum-contaminated soil area near the former AST from becoming a source of groundwater contamination. The SCM consisted of removal of a catch basin, removal of the support structure for the AST, excavation of contaminated soil, transport the excavated material to a treatment pad located on the southeast corner of the former NASMF, treatment using a proprietary catalytic oxidation process, and return treated soil to the excavation.

The amount of soil excavated from Site 12 was 7,755 tons. The soil was treated to reduce TPH concentrations in soil to less than 100 mg/kg, VOC concentrations to less than 1 mg/kg, and SVOC concentrations below the EPA Region 9 Preliminary Remediation Goal of 800 µg/kg (Site 12 SCM Completion Report). A total of 6,000 tons of soil were successfully treated. Of the 1,755 tons of soil that remained, 1,040 tons were reprocessed to <150 mg/kg. With RWQCB approval during discussions on 5/8/1994, treated soils with extractable TPH concentrations less than 150 mg/kg were also used for backfill. The remaining soil with concentrations >150 mg/kg but <400 mg/kg were delivered by the Navy to the California Air National Guard for use as fill material. Free product was not observed at the site during excavation activities.

Sidewall samples were collected from the excavation before backfilling. JP-5 was detected at the eastern excavation wall at 590 mg/kg and kerosene was detected at 1100 mg/kg on the south wall (Figure 5).

Contamination also remained at the bottom of the excavation. At sample point S12-PIT1, JP-5 was detected at 1550 mg/kg and gasoline at 1000 mg/kg. At S12-PIT5, kerosene was present at 1000 mg/kg (Figure 4).

Not all contaminated materials at the site were removed due to the presence of Zook Road and the west parallel taxiway. Additional investigations were conducted at Site 12 in November of 1994 to evaluate the extent of soil contamination remaining and to determine the impact of residual contamination on groundwater quality. Five soil borings (SB12-20 to SB12-24) were drilled (Figure 5). Three of the borings, SB12-20 to SB12-22 were located to evaluate the extent of contamination at the eastern boundary of the excavation. Borings SB12-23 and SB12-24 were positioned to assess contamination in the excavation south sidewall. Boring SB12-20 was converted to a groundwater monitoring well to evaluate groundwater downgradient of Site 12. Soil data from SB12-23 and SB12-24 detected petroleum contamination at low levels (36 to 250 mg/kg). Petroleum was not detected in SB12-20, SB12-21, and SB12-22. Xylenes were detected at 12µg/kg in SB12-23 and 33 µg/kg in SB12-24. Naphthalene was estimated at 400(J) µg/kg in SB12-23 and 800(J) µg/kg in SB12-24.

No petroleum hydrocarbons, VOCs, or SVOCs were detected in groundwater samples collected from monitoring well MW12-20.

SITE NAME:

Site 12: Former Fire-Fighting Training Area

SITE SUMMARY

In the *Final Appendix A Site 12 Petroleum Evaluation* in January 2000, the Navy recommended closure for Site 12. The California Regional Water Quality Control Board (RWQCB) transmitted a closure and summary for the AST at Site 12.

SITE NAME:	Site 12: Former Fire-Fighting Training Area
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REMEDIAL ACTION

Remedy	Source Control Measure	Begin Date	1993	End Date	1993
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<p>The SCM consisted of the following tasks:</p> <ul style="list-style-type: none"> ≠ Removal and disposal of the AST support structures ≠ Excavation of contaminated soil ≠ On-site treatment of soil using a proprietary oxidation process on the east side of Moffett Field at a bioremediation pad. ≠ Confirmation sampling <p>Backfilling with treated soil</p>	
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Land Use Restrictions	Development Issues
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<p>RWQCB concurrence for NFA was predicated on continued use as an industrial/commercial site. Residential use is restricted without additional evaluation of the site.</p> <p>Under the NASA Programmatic Environmental Impact Statement and ROD, Mitigated Alternative 5, the proposed use of the airfield is to remain as an airfield. Site 12 is located within the airfield boundary and is subject to clearance restrictions as provided in 14 CFR Part 77, especially § 77.17 and § 77.19.</p>	<p>Petroleum contamination may be encountered during subsurface work.</p>
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SITE NAME:	Site 12: Former Fire-Fighting Training Area
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RESIDUAL CONTAMINATION		
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Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
JP-5	1550	ND	See Figure 4 for locations of residual contamination.
Kerosene	1100	ND	
Gasoline	1000	ND	
			Backfill was composed of treated soil from the excavation with concentrations of 150 mg/kg or less of TPH- extractable.

REFERENCES (Chronological Order)

- ≠ *Final Station-Wide Remedial Investigation Report, Moffett Federal Airfield, CA.* PRC Environmental Management, San Francisco, CA. May 21, 1996.

- ≠ *Site 12 Source Control Measure Final Completion Report, Moffett Federal Airfield, CA.* PRC Environmental Management, San Francisco, CA, and Montgomery Watson, Walnut Creek, CA. October 26, 1995.

- ≠ *Base-Wide Petroleum Site Evaluation Methodology Technical Memorandum, Final Appendix A, Site 12 Petroleum Evaluation.* Tetra Tech EM Inc., San Francisco, CA. January 10, 2000.

- ≠ *Transmittal of the Closure Letter and Summary for the Department of Defense (DoD) Aboveground Storage Tank at Site 12, Moffett Federal Airfield, Moffett Field, CA.* RWQCB Oakland, CA. letter to BRAC Operations SWNAVFACENCOM, San Diego, CA. August 9, 2002.

FIGURES

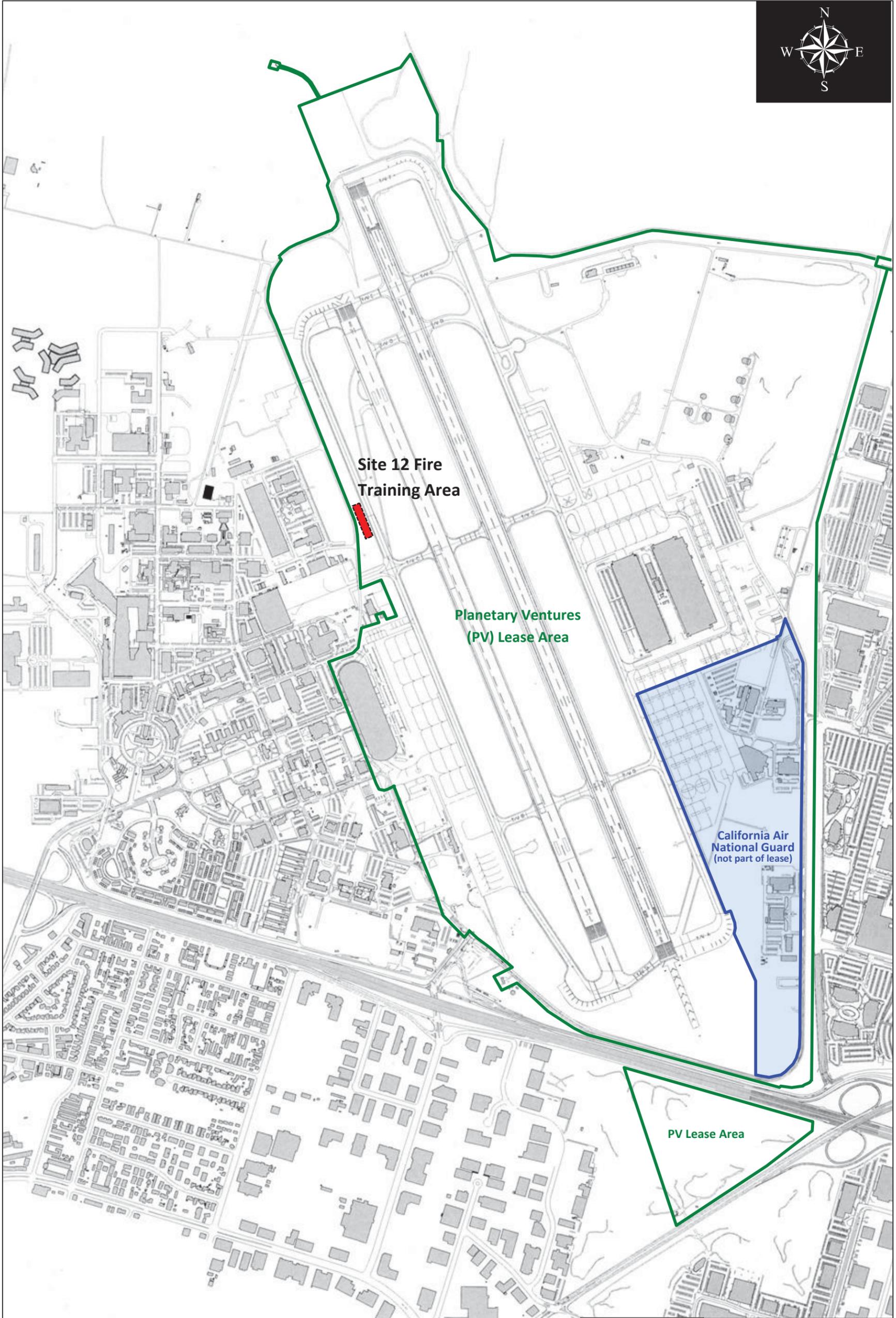


FIGURE 1
Location of Site 12. The boundaries are approximate and not meant to represent legal property descriptions.



Site 22 Landfill Pit



FIGURE 3

Historical photograph showing a portion of Site 22 excavation.

US Navy Photogrph



Approximate boundary of Site 12 excavation

5000 gallon AST

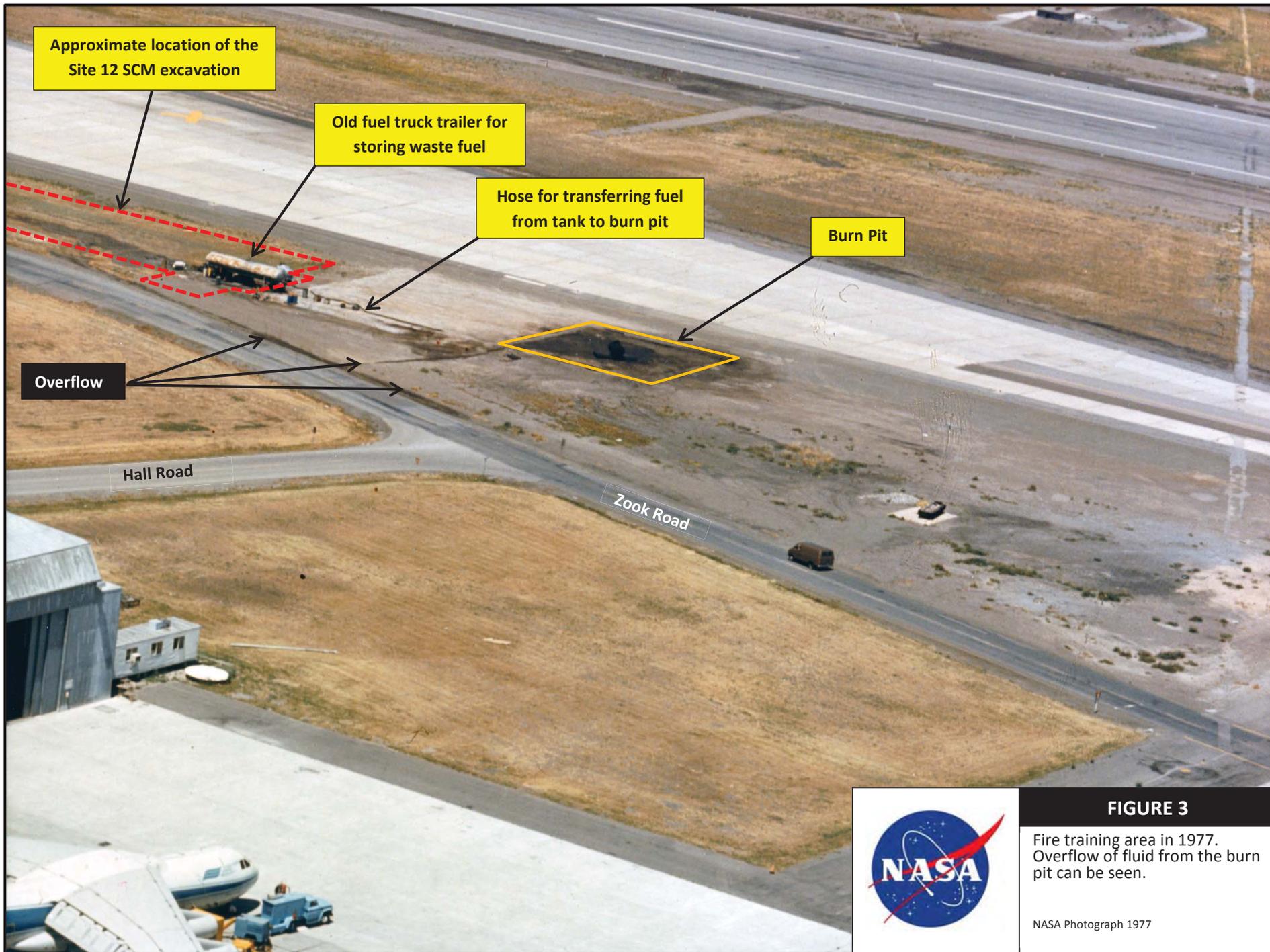
Burn Pit with Target



FIGURE 2

Site 12 Source Control Measure Excavation Area

US Navy Photograph 1987



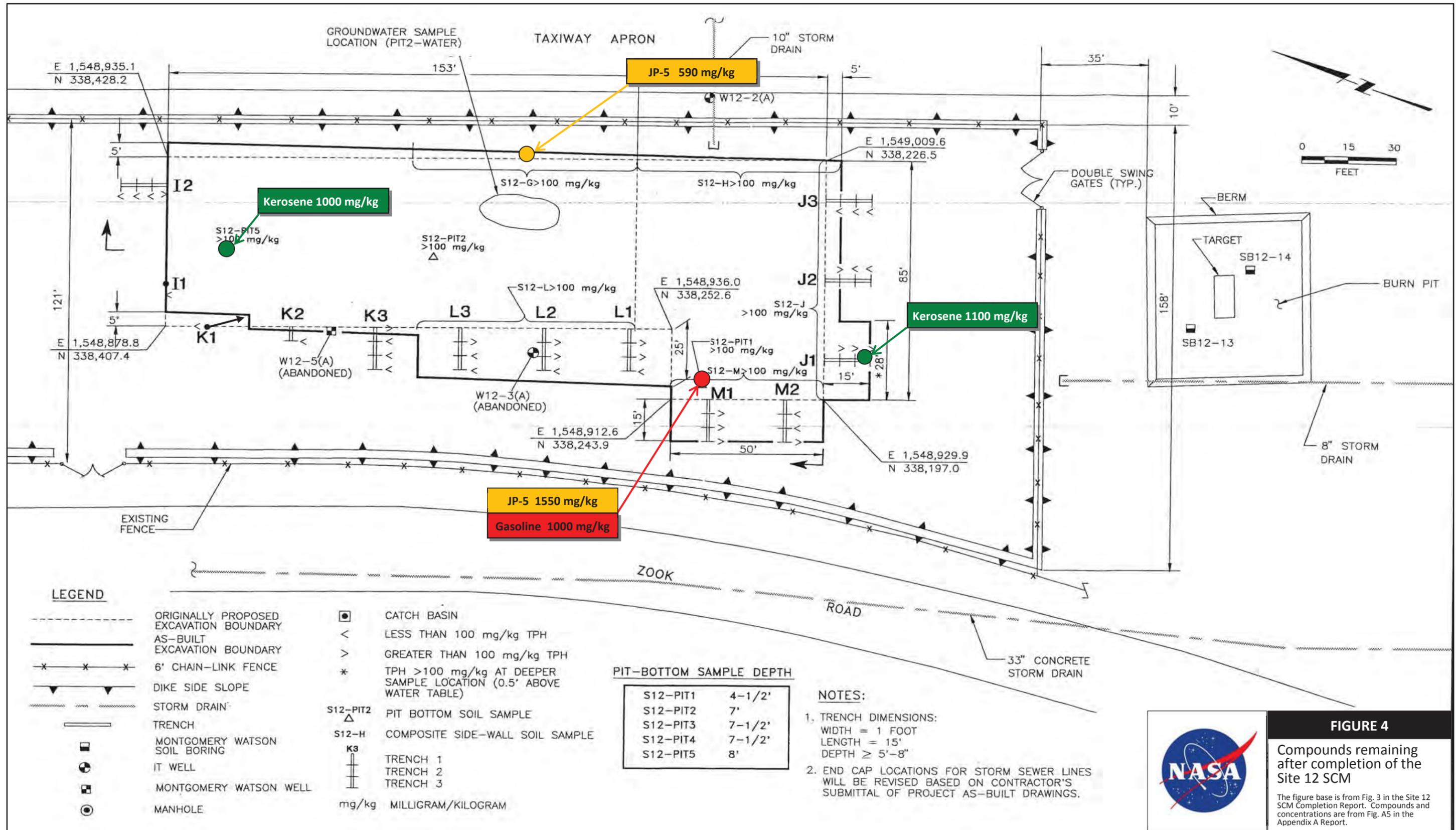
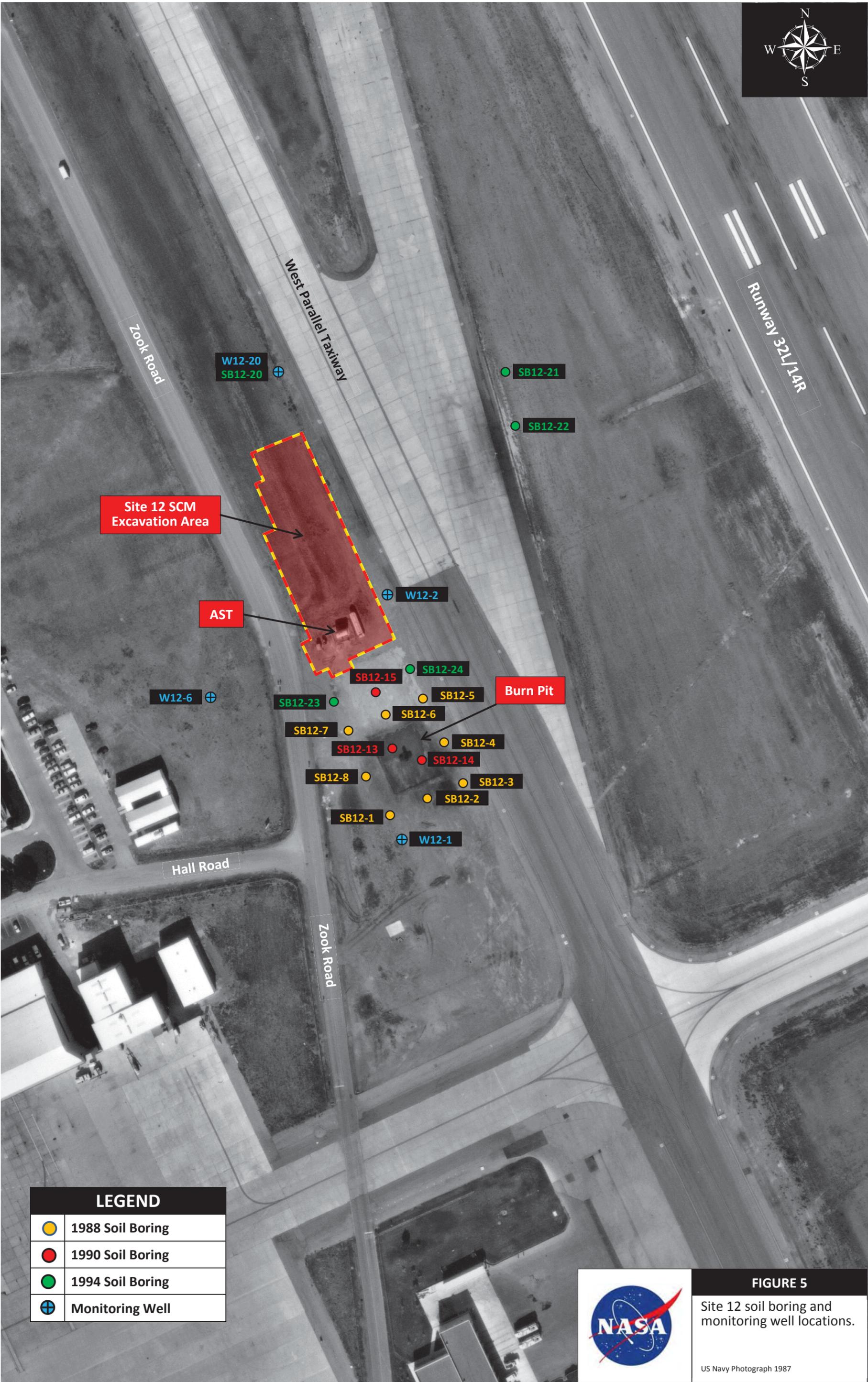


FIGURE 4
Compounds remaining after completion of the Site 12 SCM
 The figure base is from Fig. 3 in the Site 12 SCM Completion Report. Compounds and concentrations are from Fig. A5 in the Appendix A Report.



LEGEND	
	1988 Soil Boring
	1990 Soil Boring
	1994 Soil Boring
	Monitoring Well



FIGURE 5
Site 12 soil boring and monitoring well locations.
US Navy Photograph 1987

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SITE NAME:	OU2 East Soils				
Version:	Final	Date:	03/01/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See Site Summaries		
	Santa Clara County	Longitude	See Site Summaries		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
CERCLA	EPA/RWQCB		X	OU2 East 1994	NFA
SITE SUMMARY					
NFA = No Further Action					
Operable Unit (OU) 2 East comprises several sites on the eastern portion of Moffett Federal Airfield. OU2 east addresses soils associated with the following sites (Figure 1):					
Site 3 – Marriage Road Ditch (37.424043° N, 122.042066° W)					
Site 4 – Former Wastewater Holding Pond (37.419827° N, 122.042743° W)					
Site 6 – Runway Apron (37.418837° N, 122.041286° W)					
Site 7 – Hangars 2 & 3 (37.416524° N, 122.043001° W)					
Site 10 – Runways (37.414732o N, 122.048534o W)					
Site 11 – Engine Test Stand Area (37.427172° N, 122.049978° W)					
Site 13 – Equipment Parking Area & Building 142 (37.417548° N, 122.040103° W)					
Groundwater issues that may be associated with OU2 East sites are covered under OU5 East Side Aquifers.					
Site 3 – Marriage Road Ditch (Figure 2)					
Site 3 runs along the eastern side of Marriage Road (Figure 1). Site 3 carries storm water from surface drainage at the intersection of Marriage Road and Macon Road. The ditch also carries storm water from drains around the area of Hangars 2 and 3. A series of French drains under portions of the runways also drain into Marriage Road Ditch. Site 3 discharges at the northern end into the North Patrol Ditch (NPD). Water from the NPD is pumped by the Bldg. 191 lift station into the Northern Channel (Site 27).					
Reportedly an estimated 150,000 to 750,000 gallons of mixed hazardous wastes were disposed of in storm drains from the 1940s to the 1970s. These wastes included waste oils, solvents, fuels, detergents, paints, paint strippers, and hydraulic fluids.					

SITE NAME:

OU2 East Soils

SITE SUMMARY

The Navy conducted a Phase I and Phase II Remedial Investigation. Soils were sampled for Volatile Organic Compounds (VOCs), pH, metals, Polychlorinated biphenyl (PCBs), Base, Neutral, and Acid Extractable Compounds (BNAs), and Total Petroleum Hydrocarbons (TPHC).

Risk evaluations were determined for compounds detected at Site 3. Based on the risk assessments, there were no risks to the environment posed by Site 3. The RI report recommended that no remediation activities were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 4 – Former Wastewater Holding Pond (Figures 3 and 4)

The pond was located north of Hangars 2 & 3 (Figure 1). The pond was unlined and received about 15 million gallons of wastewater from aircraft washing, equipment maintenance, and operations in Hangars 2 & 3 from 1968 to 1978 (Figure 4). The wastewater was held in the ponds, treated, and released to the sanitary sewer. Operations at the pond ceased and the pond was filled in. The date the pond was filled in is unknown.

Reportedly about 35,000 gallons of wastewater was discharged to the pond. Hazardous materials included toluene, methyl ethyl ketone (MEK), dry cleaning solvent, paint sludge, paint stripper, Freon-113, TCE, TCA, carbon remover, ethylene glycol, fuel, and oil.

The Navy conducted a Phase I and Phase II Remedial Investigation. Soils were sampled for Volatile Organic Compounds (VOCs), pH, metals, Polychlorinated biphenyl (PCBs), Base, Neutral, and Acid Extractable Compounds (BNAs), and Total Petroleum Hydrocarbons (TPHC).

Risk evaluations were determined for compounds detected at Site 4. Based on the risk assessments, there were no risks to the environment posed by Site 4. The RI report recommended that no remediation activities were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 6 – Runway Apron (Figures 3 & 4)

Site 6 was designated the Runway Apron disposal site in the Initial Assessment Study (Figure 1). Site 6 was unpaved areas adjacent to the aircraft parking area northeast of Hangar 3 (Figure 4). In 1979, the area was paved over as part of an enlargement project for aircraft parking.

Reportedly, an estimated 120,000 to 600,000 gallons of hazardous waste from aircraft maintenance was disposed of at Site 6. These wastes included solvents, oils, fuels, paints, and paint thinners. Wastes were disposed of at Site 6 from the 1940s to the 1970s.

The Navy conducted a Phase I and Phase II Remedial Investigation. Soils were sampled for Volatile Organic Compounds (VOCs), pH, metals, Polychlorinated biphenyl (PCBs), Base, Neutral, and Acid Extractable Compounds (BNAs), and Total Petroleum Hydrocarbons (TPHC).

Risk evaluations were determined for compounds detected at Site 6. Based on the risk assessments, there were no risks to the environment posed by Site 6. The RI report recommended that no remediation activities

SITE SUMMARY

were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 7 – Hangars 2 and 3 (Figure 5)

Hangars 2 and 3 were constructed in 1942 for lighter than air operations during WWII (Figure 1). Blimps were originally moored inside. After the LTA program ceased at Moffett Field, other aircraft were stored and maintained in them. Site 7 includes both hangars and the paved and unpaved areas surrounding them.

Reportedly, an estimated 120,000 to 160,000 gallons of paint, paint strippers, oils, solvents, fuels, hydraulic oil, and other hazardous wastes were dumped in the unpaved areas at the corners of the hangars. A power plant shop in the northeast corner of Hangar 3 disposed of chlorinated solvent, including TCE, into deck drains and the unpaved areas around the hangars. The deck drains flowed to Marriage Road Ditch, Site 3.

The Navy conducted a Phase I and Phase II Remedial Investigation. Soils were sampled for Volatile Organic Compounds (VOCs), pH, metals, Polychlorinated biphenyl (PCBs), Base, Neutral, and Acid Extractable Compounds (BNAs), and Total Petroleum Hydrocarbons (TPHC).

Risk evaluations were determined for compounds detected at Site 7. Based on the risk assessments, there were no risks to the environment posed by Site 7. The RI report recommended that no remediation activities were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 10 – Chase Park and Runways (Figure 6)

Only the runways in Site 10 fall within the lease area (Figure 1). The OU2 East RI stated: “No sources are known to exist in the runway area, although it is presumed fuels, oils, and hydraulic fluids may have been spilled there.” Two monitoring wells were installed for Site 10: W10-5(A1) and W10-6(C). Soil samples were collected at 1-, 3-, 5-, 6-, 7- and 9-foot depths from both well borings. Samples were analyzed for VOCs, pH, metals, BNAs, and TPHC.

Constituent	Max Concentration
Acetone	57 µg/kg
Methylene chloride	26 µg/kg
Bis(2-ethylhexyl)phthalate	730 µg/kg
JP-5	170 mg/kg
Antimony	7 mg/kg
Arsenic	2.6 mg/kg
Barium	754 mg/kg
Beryllium	1.6 mg/kg
Chromium	72.5 mg/kg
Copper	67 mg/kg
Mercury	0.8 mg/kg
Nickel	64.3 mg/kg
Silver	1.6 mg/kg
Zinc	78.1 mg/kg

The wells are no longer active and have been removed.

SITE NAME:**OU2 East Soils****SITE SUMMARY**

Based on the risk assessment performed in the OU2 East RI, it was concluded that there was no risk to human health. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

There were some underground and aboveground storage tanks that were associated with the Runways. These tanks are covered in the UST/AST Existing Environmental Condition report for the Planetary Ventures Lease.

Site 11 – Engine Test Stand Area (Figures 7 & 8)

The engine test stand area is located approximately 500 feet north of the intersection of Zook Road and the North Patrol Road (Figure 1). The site is fenced. A 200 foot by 200 foot concrete and asphalt pad supported the facility. A small drainage depression drains the pad to the south edge of the pad. During operations, waste oils, hydraulic fluids, and jet fuel may have run into the depression and into the adjacent soil. The site was used to test engines from P-3 aircraft as part of maintenance. The engines were removed from aircraft and mounted on test stands. Fuel from aboveground storage tanks were supplied to the engines. The engines were operated from a control facility. Figure 8 shows Site 11 in 1987. At that time, there were two ASTs associated with the facility. These tanks were removed when the Naval Air Station ceased operations at the test stand. The tanks and control rooms were removed. After closure of NASMF, the Naval Air Reserve (NAR) installed an engine test facility which included a single AST as illustrated in Figure 7. NAR later ceased operations at Moffett Field including removal of the test facility and tank.

The tanks that were used at Site 11 were not numbered and not listed in the Navy's tank inventory. There are no closure records for these tanks.

The Navy conducted a Phase I and Phase II Remedial Investigation. Soils were sampled for Volatile Organic Compounds (VOCs), pH, metals, Polychlorinated biphenyl (PCBs), Base, Neutral, and Acid Extractable Compounds (BNAs), and Total Petroleum Hydrocarbons (TPHC).

Risk evaluations were determined for compounds detected at Site 11. Based on the risk assessments, there were no risks to the environment posed by Site 11. The RI report recommended that no remediation activities were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 13 – Equipment Parking Area (Building 142) (Figures 4 & 9)

The equipment parking area is located northeast of Building 142, approximately 600 feet east of Hangar 3 (Figure 1). The area was used to store and wash aircraft ground support equipment. Bldg. 142 was used for the maintenance and repair of the equipment. Wash water and storm water containing spills drained into an unlined ditch. Runoff also discharged into a storm drain located by Bldg. 142. Bldg. 142 and other structures nearby were demolished by NASA. The area currently has no structures and is not used.

The Navy conducted Phase I and Phase II Remedial Investigations at Site 13. Soils were sampled at four locations in an unnamed storm water ditch adjacent to the site (Figure 9). Two samples were taken at each locations at depths of 1 – 3 feet and 5 – 10 feet. Samples were analyzed for VOCs, BNAs, TPHC, oil & grease,

SITE SUMMARY

and metals during Phase I. PCB analysis was not performed. No sampling was conducted in Phase II.

Oil and grease were detected in all eight samples ranging from 6 mg/kg to 1150 mg/kg. The highest concentration was found in SB13-4 @ 5 – 10 feet. JP-5 was detected @ 110 mg/kg in SB13-4 @ 5 – 10 feet. Arsenic was found in all eight samples ranging from 2.3 mg/kg to 10.2 mg/kg. The highest concentration was found in SB13-3 @ 5 – 10 feet. Lead was found in SB13-3 @ 462 mg/kg @ 1 – 3 feet.

Risk evaluations were determined for compounds detected at Site 11. Based on the risk assessments, there were no risks to the environment posed by Site 13. The RI report recommended that no remediation activities were needed. The OU2 East ROD selected no action for this site as protective of human health. The ROD was signed by the Navy, EPA, RWQCB, and DTSC.

Site 7 Update

Site 7 is located within the Planetary Ventures (PV) Lease Area. Conditions below the floor slabs for Hangars 2 and 3 have not been previously characterized. In the interest of due diligence, PV decided to investigate the conditions under both hangars. PV requested that their consultant Eler and Kalinowski (EKI) conduct sub-slab vapor analysis.

Between August 25 and 29, 2014, EKI installed a total of 50 temporary sub-slab vapor probes (SSVPs). Samples were collected from the probes between August 27 and September 3. Vapor samples were analyzed for VOCs using EPA Method TO-15 and for 1,1,1,2-tetrafluoroethane (TeFA) using EPA Method TO-3.

Eleven sub-slab vapors samples (10 samples and 1 duplicate) from the 10 sampling locations in Hangar 2. Sample locations and analytical results are shown in Figure 10. VOCs were detected at 8 of the 10 locations. VOCs detected include:

- TCE
- PCE
- Carbon tetrachloride (CT)
- Chloroform
- Trichlorofluoromethane (Freon 11)
- 1,1,2-trichloro-1,2,2-flouroethane (Freon 113)
- 1,1,1-trichloroethane (1,1,1-TCA)
- Methylene chloride

VOC concentrations exceeded screening levels at 5 of the 10 SSVP locations.

Forty-four samples were collected at Hangar 3 (40 samples and 4 duplicates). The locations of the SSVP locations and analytical results are illustrated on Figure 11. VOCs were detected in 37 of the 40 sampling locations. The VOCS detected include:

SITE NAME:

OU2 East Soils

SITE SUMMARY

- TCE
- PCE
- CT
- Chloroform
- Freon 11
- Freon 113
- 1,1,1-TCA
- Methylene chloride
- BTEX (benzene, toluene, ethylbenzene, and xylenes)
- 1,2,4-trimethylbenzene (TMB)
- 1,3,5-TMB
- Styrene.

VOCs exceeded screening levels at 31 of the 40 samples. Additionally, some of the VOCs had analytical reporting limits that were higher than the screening level.

NASA conducted vapor intrusion sampling within Hangars 2 and 3 as a follow up to the EKI study. Several samples were collected in the two hangars in September, 2014. Additional sampling was conducted in Room 242 in Hangar 2 in October 2014. Sampling locations are shown on Figure 12.

Analytical results indicated the presence of CT, TCE, and PCE exceeding the screening level in Hangar 2. Hangar 3 results indicated the presence of VOCs, but none of the concentrations exceeded the screening levels.

Further investigation will be required to fully characterize the subsurface conditions below Hangars 2 and 3.

SITE NAME:		OU2 East Soils			
REMEDIAL ACTION					
Remedy	No Further Action	Begin Date	NA	End Date	NA
Land Use Restrictions			Development Issues		
<p>As stated in the OU2 East ROD, all sites under this ROD are below risk levels for residential use.</p> <p>Sites 3, 4, 6, and 7 are also subject to the ICs associated with Site 26:</p> <ul style="list-style-type: none"> • Operation and maintenance of the Bldg. 191 and storm drainage system, • Fencing of the treatment system area, • Installation of groundwater extraction wells for domestic uses are prohibited at Site 26. <p>A MOA between NASA and Navy was signed to maintain O&M of the Bldg. 191 and storm drain system.</p> <p>Future or new development must conform to the NASA Programmatic Environmental Impact Statement, Mitigated Alternative 5, and the NEPA process. Development restrictions are part of the NASA Ames Development Plan. Development is limited near Sites 10 and 11 due to FAA height restrictions as specified under 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>			<p>Site 3 is a jurisdictional wetland and is not open to development.</p> <p>Sites 3, 4, 6, and 7 overlie the Site 26 VOC plume. These sites may be subject to vapor intrusion. Development must not interfere with the Site 26 remedy.</p> <p>Development will need to address the possibility of vapor intrusion.</p> <p>The EIMP must be followed.</p>		

SITE NAME:	OU2 East Soils
-------------------	-----------------------

RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
			No residual contamination.

REFERENCES (Chronological Order)

- *Initial Assessment Study of Naval Air Station Moffett Field, Sunnyvale, California.* Naval Energy and Environmental Support Activity, Point Hueneme, CA. April, 1984.
- *Remedial Investigation Report Operable Unit 2: Sites 3-11, 13, 14, 16-19 Soils, NAS Moffett Field, California.* IT Corporation, Knoxville, TN. August, 1992
- *Moffett Federal Airfield Final Operable Unit 2-East Record of Decision.* Department of the Navy. October 28, 1994.
- *Hangar 2 and Hangar 3 Sub-Slab Vapor Investigation, Former Naval Air Station Moffett Field, CA.* Erler and Kalinowski, Inc. (EKI), Burlingame, CA. September 23, 2014.
- *Hangars 2 & 3 Indoor Air Sampling, Fall 2014 Sampling Results Summary Report, NASA Ames Research Center, Moffett Field, CA.* Earth Resources Technology Inc., Moffett Field, CA. December 2014.

FIGURES

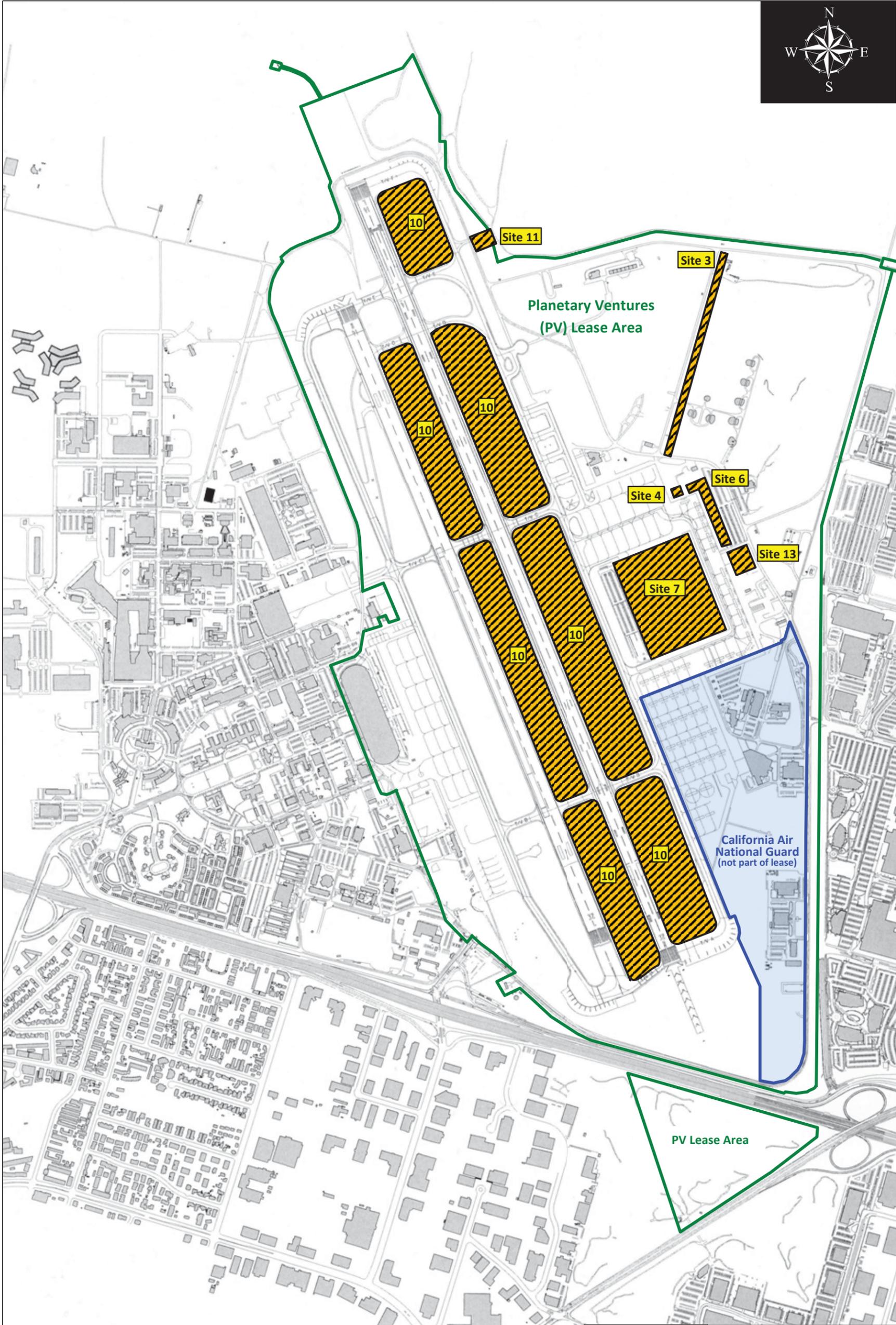


FIGURE 1
OU2 East Soils site locations.

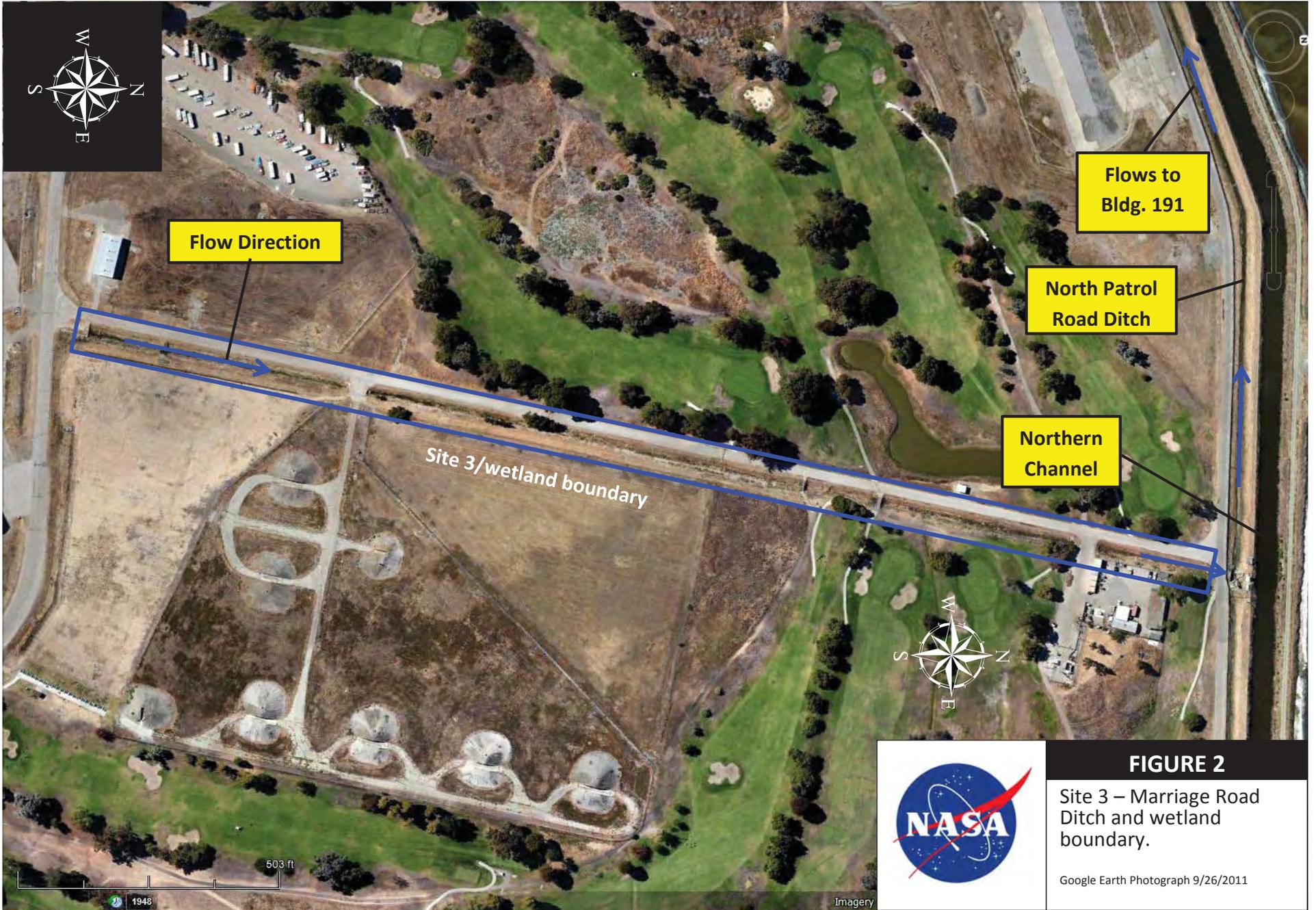


FIGURE 2
 Site 3 – Marriage Road Ditch and wetland boundary.
 Google Earth Photograph 9/26/2011



FIGURE 3

Current view of Sites 4 – Former Waste Water Pond and Site 6 – Aircraft Parking Ramp.

Google Earth photograph, 9/26/2011

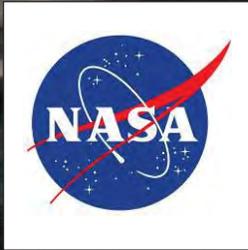
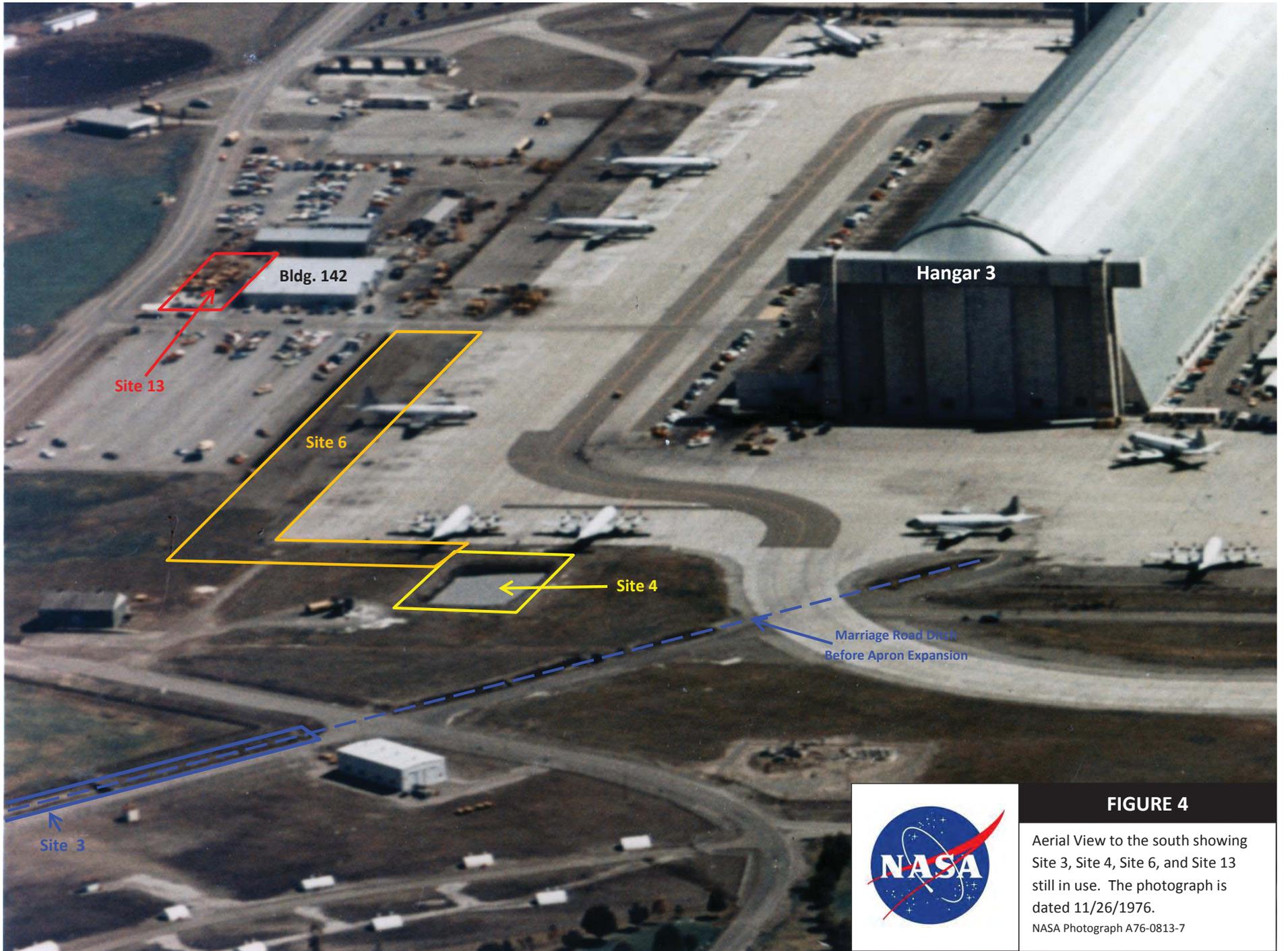


FIGURE 4

Aerial View to the south showing Site 3, Site 4, Site 6, and Site 13 still in use. The photograph is dated 11/26/1976.

NASA Photograph A76-0813-7



FIGURE 5

Aerial view of Site 7 – Hangars 2 & 3.

Google Earth photograph 9/26/2011



W10-5(A1)

W10-6(C)

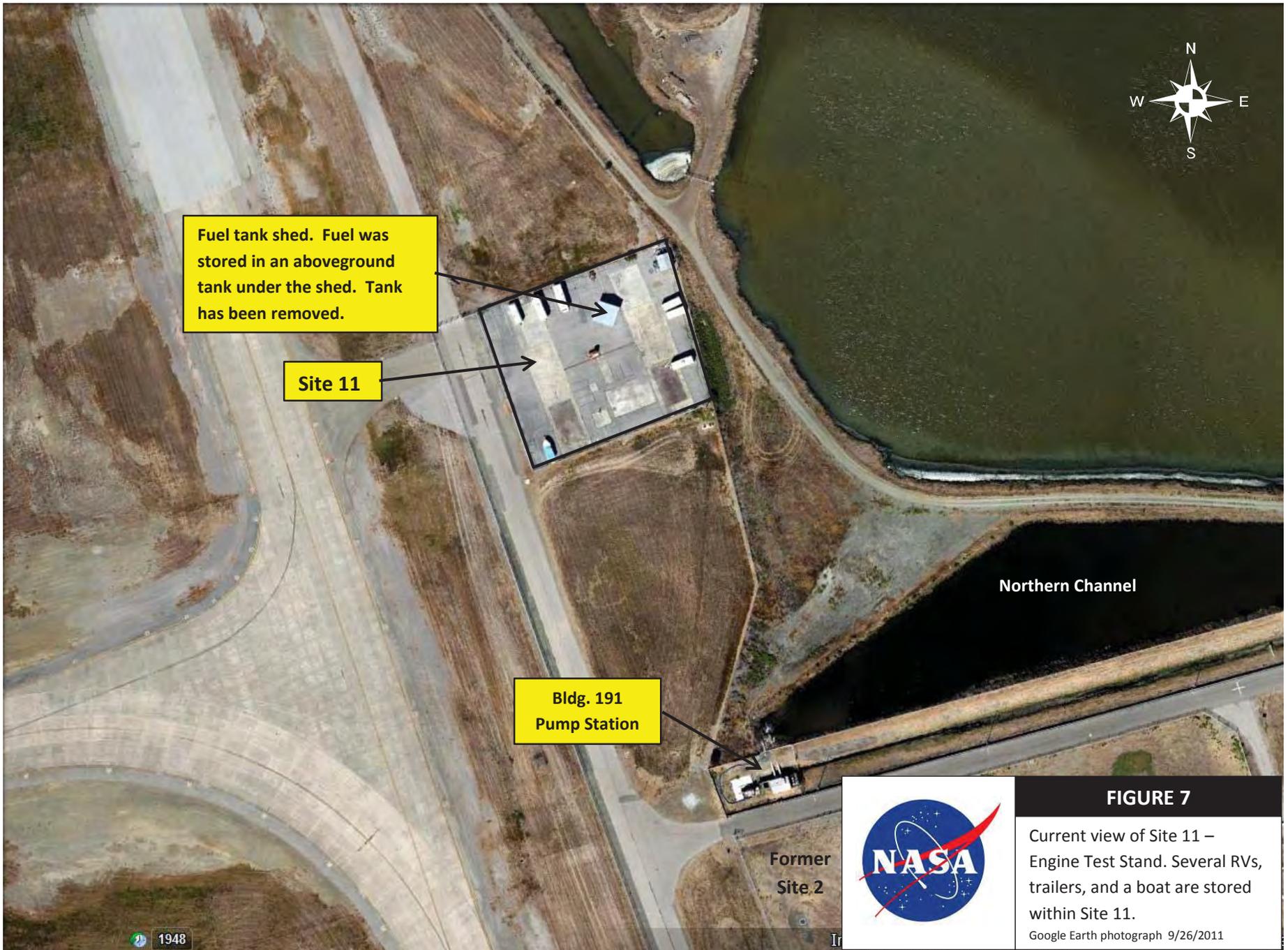
© 2014 Google



FIGURE 6

Aerial view of Site 10 Runways and associated monitoring wells.

Google Earth photograph 9/26/2011



Fuel tank shed. Fuel was stored in an aboveground tank under the shed. Tank has been removed.

Site 11

Bldg. 191
Pump Station

Northern Channel

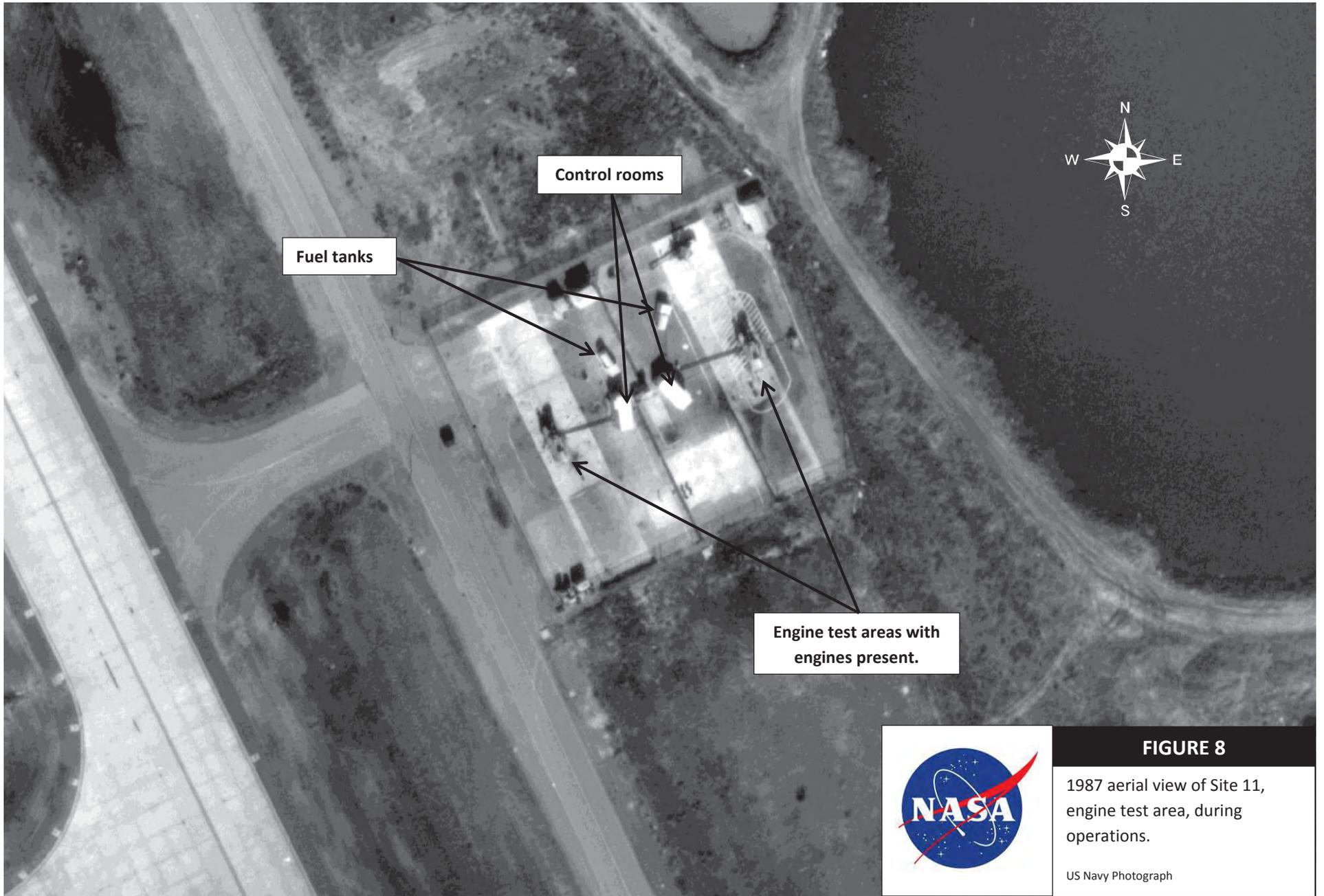
Former
Site 2



FIGURE 7

Current view of Site 11 – Engine Test Stand. Several RVs, trailers, and a boat are stored within Site 11.

Google Earth photograph 9/26/2011



Control rooms

Fuel tanks

Engine test areas with engines present.

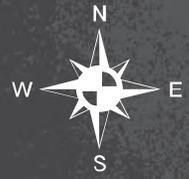


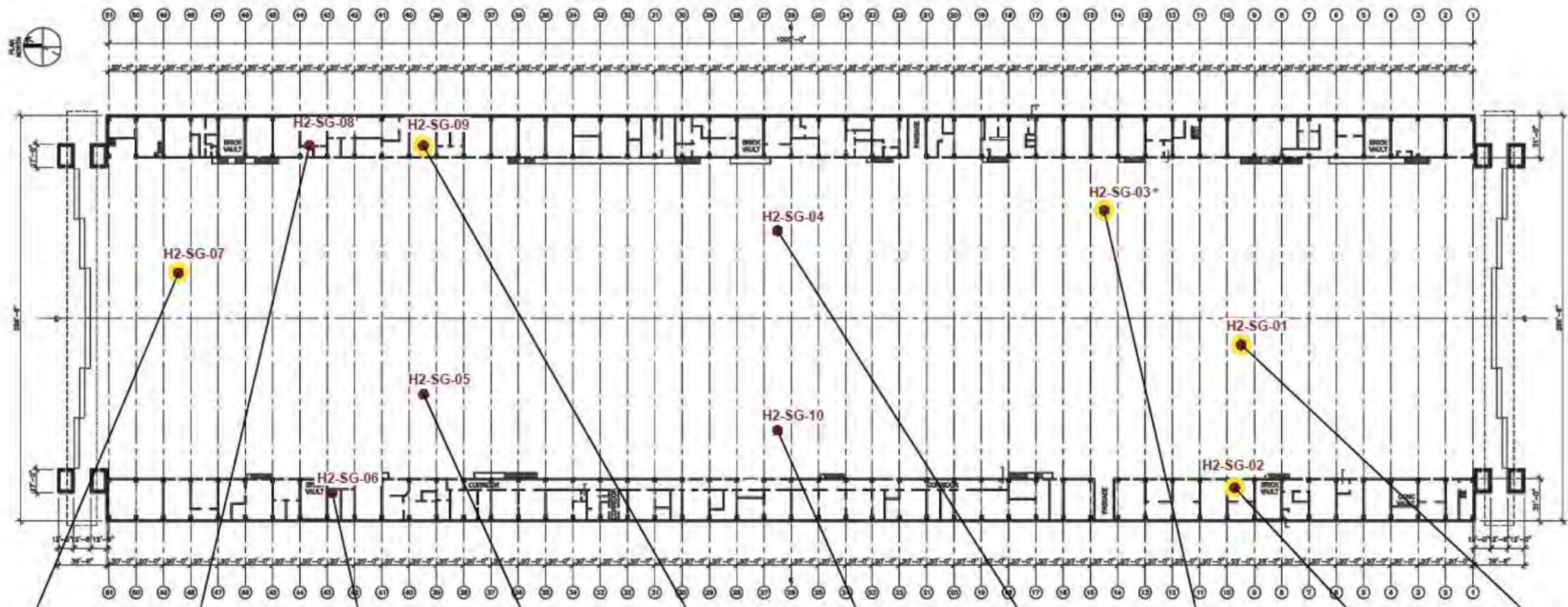
FIGURE 8
1987 aerial view of Site 11, engine test area, during operations.
US Navy Photograph



FIGURE 9

Aerial view of Site 13 –
Equipment Parking Area and
soil sampling locations.

Google Earth photograph 9/26/2011

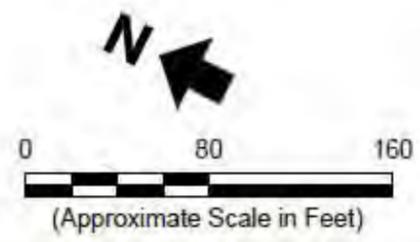


Location ID	H2-SG-07	Location ID	H2-SG-08	Location ID	H2-SG-08	Location ID	H2-SG-05	Location ID	H2-SG-09	Location ID	H2-SG-10	Location ID	H2-SG-04	Location ID	H2-SG-03*	Location ID	H2-SG-02	Location ID	H2-SG-01
Date	8/28/14	Date	9/3/14	Date	9/3/14	Date	8/28/14	Date	8/28/14	Date	9/3/14	Date	8/27/14	Date	8/27/14	Date	9/3/14	Date	8/27/14
TCE	<430	TCE	<5.37	TCE	<5.37	TCE	<26.9	TCE	11.3	TCE	<5.37	TCE	<5.37	TCE	<5.370	TCE	90	TCE	21.4 (20.9)
PCE	<543	PCE	25.4	PCE	<6.78	PCE	<33.9	PCE	<6.78	PCE	<6.78	PCE	<6.78	PCE	<6.780	PCE	187	PCE	103 (104)
CT	1.950	CT	<6.29	CT	<6.29	CT	<31.5	CT	12.8	CT	<6.29	CT	<6.29	CT	<6.290	CT	319	CT	<6.29 (<6.29)
Chloroform	10.400	Chloroform	<4.88	Chloroform	<4.88	Chloroform	<24.4	Chloroform	<4.88	Chloroform	<4.88	Chloroform	<4.88	Chloroform	6.760	Chloroform	59.3	Chloroform	<4.88 (<4.88)

Legend:
 ● H2-SG-01 Sub-Slab Vapor Probe Location
 ● Exceeds Screening Level

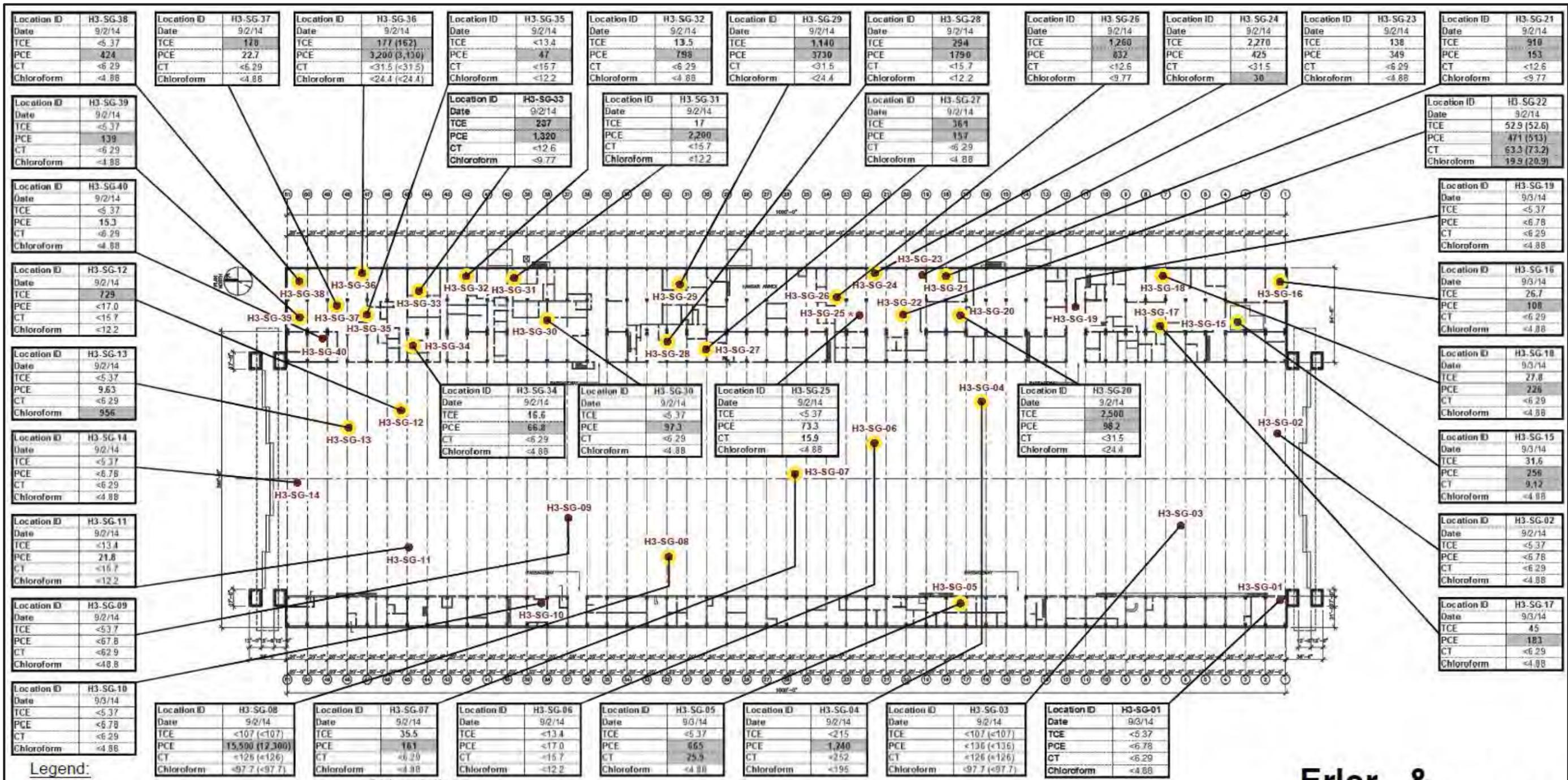
Abbreviations:
 CT = carbon tetrachloride
 PCE = tetrachloroethene
 TCE = trichloroethene
 TeFA = 1,1,1,2-tetrafluoroethane

- Notes:**
- All locations are approximate based on field map and truss locations.
 - Base figure from: Rehabilitation of Hangars 2 and 3 Basis of Design Document, Project Team Draft 3.5, 29 August 2014.
 - "Bold" values are detections; shaded values exceed sub-slab vapor screening levels (sub-slab screening levels are presented in Table 2 of the Hangar 2 and Hangar 3 Sub-Slab Vapor and Indoor Air Investigation Report); results presented in parenthesis are duplicate sample results.
 - All concentration results are in micrograms per cubic meter ("ug/m³").
 - No other chemicals were detected above screening levels in the Hangar 2 sub-slab vapor samples.
 - * H2-SG-03 analytical results may be biased low. Leak check compound TeFA was detected in the sample at approximately 6%.



Erler & Kalinowski, Inc.
 Sub-Slab Vapor TCE, PCE, Carbon Tetrachloride and Chloroform⁵ Concentrations in Hangar 2

 **FIGURE 10**
 From EKI Figure 5



Legend:

- H3-SG-01 Sub-Slab Vapor Probe Location
- Exceeds Screening Level

Abbreviations:

- CT = carbon tetrachloride
- TCE = trichloroethene
- PCE = tetrachloroethene
- TeFA = 1,1,1,2-tetrafluoroethane

Notes:

- All locations are approximate based on field map and truss locations.
- Base figure from: Rehabilitation of Hangars 2 and 3 Basis of Design Document, Project Team Draft 3.5, 29 August 2014.
- "Bold" values are detections; shaded values exceed sub-slab vapor screening levels (sub-slab screening levels are presented in Table 2 of the Hangar 2 and Hangar 3 Sub-Slab Vapor and Indoor Air Investigation Report); results presented in parenthesis are duplicate sample results.
- All concentration results are in micrograms per cubic meter ("ug/m³").
- Benzene was detected above its screening level at H3-SG-27. No other chemicals were detected above their respective screening levels in the Hangar 3 sub-slab vapor samples.
- "x" H3-SG-25 analytical results may be biased low. Leak check compound TeFA was detected in the sample at approximately 8%.

Erlor & Kalinowski, Inc.

Sub-Slab Vapor TCE, PCE, Carbon Tetrachloride, and Chloroform⁵ Concentrations in Hangar 3

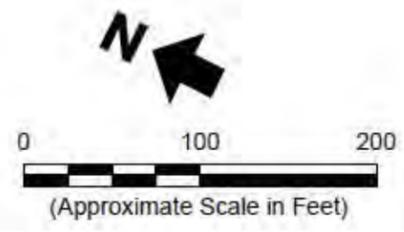
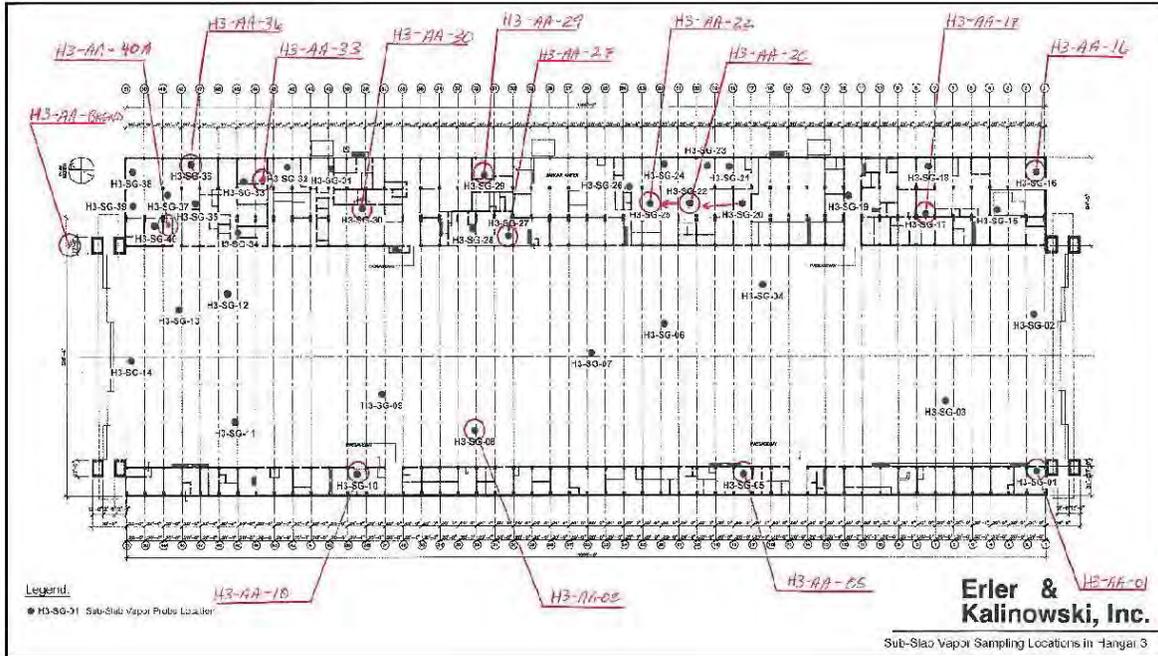


FIGURE 11

Figure 6 from EKI report.

Hangar 3



Hangar 2

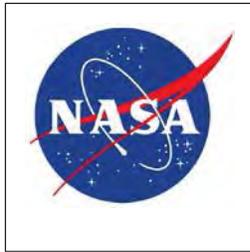
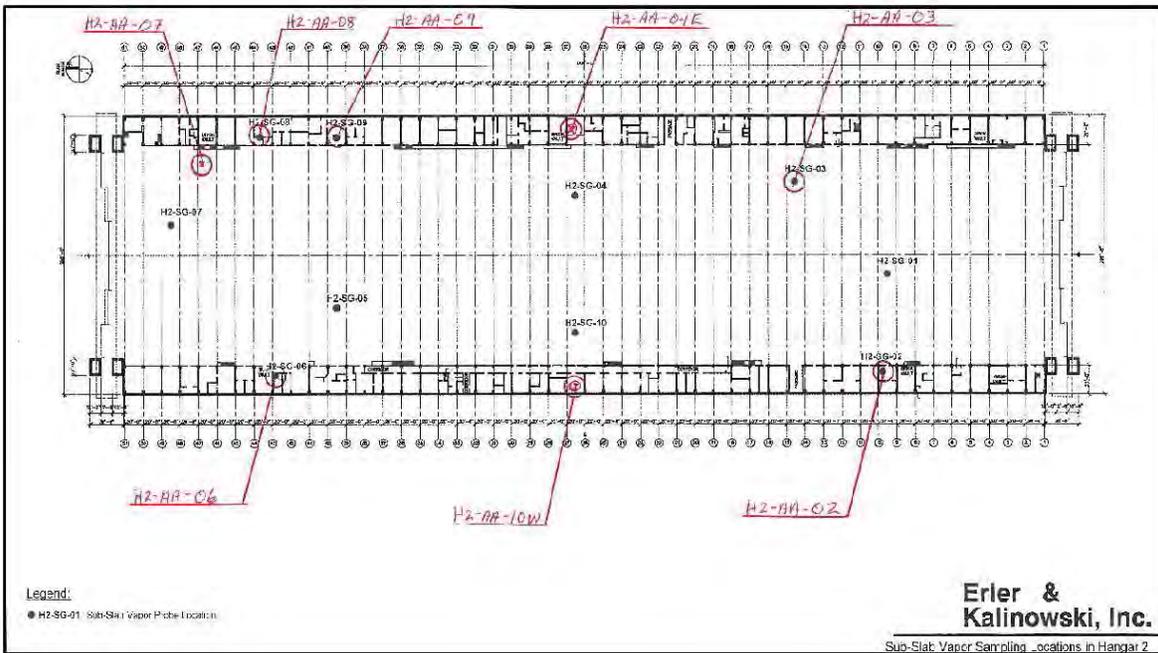


FIGURE 12
 Vapor intrusion sampling locations.
 Figure 1 from the NASA vapor intrusion Report of Findings

SITE NAME:	Site 15: Sumps 59, 63, and 54				
Version:	Final	Date:	02/25/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See Site Summary		
	Santa Clara County	Longitude	See Site Summary		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum	RWQCB		X	N/A	See Site Summary
SITE SUMMARY					
<p>Site 15 consists of three sumps, three oil/water separators (OWS), one catch basin, one storm water diversion box, and one underground storage tank (UST). Of the eight sumps and tank, only three are within the lease area (Figure 1):</p> <p>Sump 59: oil/water separator [Status: active] Sump 63: catch basin for ground support equipment (GSE) wash rack [Status: No Further Action] UST 54: wastewater collection tank [Status: No Further Action]</p> <p>UST 54 (37.416075° N, 122.041063° W) UST 54 was a 1500 gallon steel single-wall tank that stored wastewater from aircraft maintenance operations in Hangar 3 (Figure 2). It is unknown as to when the tank was installed. The tank was removed 12/18/1992. Groundwater was not encountered during the removal. Three soil samples were collected during the removal (Figure 3). No TPH contamination was detected. Methylene chloride was detected in both sidewall samples at 280µg/kg. Trichloroethene was detected on the south side wall at 24µg/kg.</p> <p>The Navy recommended closure for UST 54. The Regional Water Quality Control Board (RWQCB) concurred in a letter dated August 19, 2003.</p> <p>Sump 59 (37.420443° N, 122.045597° W) Sump 59 was a 1,400-gallon OWS at Building 684 (Figure 2) that was used to treat oily wastewater from the California Air National Guard (CANG) ground support equipment cleaning area; the OWS water is discharged to the sanitary sewer. The sump is still in use by the CANG.</p>					

SITE NAME:**Site 15: Sumps 59, 63, and 54****SITE SUMMARY**

In 1994, four samples were collected from two soil borings (GP59-1 and GP59-2) adjacent to the sump. Two samples were collected from each boring at 5 – 7 feet and 9 – 11 feet. The samples were analyzed for TPH-purgeable, TPH-extractable, TPH-oil and grease, VOCs, SVOCs, and metals. Extractable TPH was detected in GP59-2 at (5 – 7 feet) at a concentration of 2.3 mg/kg (Figure 4). No additional action was taken for Sump 59.

Sump 63 (37.417575° N, 122.040347° W)

Sump 63 was 200-gallon concrete sump adjacent to Building 142 (Figure 2). It was previously used to collect wastewater from the ground support equipment (GSE) steam cleaning operations. The wastewater was discharged through an industrial wastewater sewer line to the former flux ponds. The sump was cleaned out and sealed in 1996.

In 1994 soil samples were collected from two borings (GP63-1 and GP63-2) drilled adjacent to the sump (Figure 5). Two samples were collected from each boring at 3 – 5 feet and 5 – 7 feet. The samples were analyzed for TPH-e, TPH-p, TPH-oil & grease, VOCs, SVOCs, and metals. Sample results are provided in Table 1.

One groundwater sample was collected using HydroPunch equipment. The sample was analyzed for TPH-p, TPH-e, VOCs, and SVOCs. TCE was detected at 0.9 µg/L. Other analytes were either non-detect or reported as an estimated value.

In 2009, 18 soil borings were advanced at approximately 50-foot intervals using vacuum excavation equipment to expose the top of the pipe along the piping between Sump 63 to the flux ponds. The purpose of the investigation was to evaluate environmental conditions beneath the pipe. Using a hand auger, soil samples were collected from each of these locations approximately 1 foot below the pipe. The samples were analyzed for extractable TPH, TPH-g, VOCs, cadmium, chromium, lead, nickel, and zinc. Sample results for TPH and metals are provided in Table 1. No groundwater samples were collected.

An additional investigation was performed between 2010 and 2011. 15 additional borings were drilled to evaluate the lateral and vertical extent of contamination around the pipeline (Figure 6). Three soil borings were drilled at 5 locations from the 2009 investigation where sampling revealed TPH concentration greater than the cleanup levels or above RWQCB 2008 ESLs but below cleanup levels. At each location, one soil boring was in the pipeline trench and two soil borings were located on either side of the trench. Two samples were collected from the pipeline trench borings: one two feet below the 2009 sample depth and one at the water table. Two samples were taken from the side borings except for S63-SBHP-1 through S63-SBHP-4 where only one soil sample was collected. The samples were analyzed for extractable TPH, TPH-g, VOCs cadmium, chromium, lead, nickel, and zinc. Analytical results are provided in Table 1.

Groundwater samples were collected at each location using HydroPunch equipment during the 2010/2011 investigation. Groundwater samples were analyzed for TPH-e, TPH-g, and VOCs. Gasoline range organics were detected at 190µg/L. Results for JP-5, Kerosene, and motor oils were reported as non-detect <500µg/L. The RWQCB 2008 ESL for these compounds was 100µg/L. Total xylenes were detected in S63-SBHP-5 at 4.6µg/L. In samples S63-SBHP-4 through S63-SBHP-16, cis-1,2-Dichloropropene was reported as ND but

SITE NAME:**Site 15: Sumps 59, 63, and 54****SITE SUMMARY**

the detection limit 5.0µg/l exceeded the ESL of 0.5µg/L. In the same borings, methylene chloride (ESL 5µg/L) was reported as ND <50µg/L. Trans-1,3-Dichloropopene (ESL 0.5µg/L) was reported for the same borings as ND <5.0µg/L.

Based on the results for the investigations for Sump 63, the Navy proposed closure for the site. The RWQCB concurred with a NFA letter dated February 19, 2013.

SITE NAME:	Site 15: Sumps 59, 63, and 54
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REMEDIAL ACTION			
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Remedy	N/A	Begin Date	N/A	End Date	N/A
None					

Land Use Restrictions	Development Issues
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<p>The RWQCB concurrence of NFA was based on industrial/commercial land use:</p> <ul style="list-style-type: none"> ≠ No residential land use ≠ No grading, excavation, or subsurface activities without a soil management plan ≠ Notify the RWQCB on proposed changes in land or groundwater uses. ≠ Decommissioning monitor wells. ≠ Groundwater may not be extracted for domestic use. <p>Land use is also restricted to uses described in the NASA Programmatic Environmental Impact Statement Mitigated Alternative 5, Jul 2002.</p>	<p>Development must take into account the following issues:</p> <ul style="list-style-type: none"> ≠ Contact with chemicals left in place during any excavation ≠ Piping has been left in place ≠ EIMP must be followed
--	--

TABLES

Table 1: SUMP 63 SOIL SAMPLING RESULTS¹
Units = mg/kg²

Sample ID	Date	Depth (feet)		Gasoline Range Organics	Diesel Range Organics	JP-5	Kerosene	Motor Oils	Cadmium	Chromium	Lead	Nickel	Zinc
		Top	Bottom										
S63-SB-1	10/19/2009	4	4.5	1.2U ⁴	13 ^c	12.0U	12.0U	35	0.6U	37.5J ³	3.4J	36.8J	34.8
S63-SB-2	10/19/2009	4	4.5	0.50J ^c	2900 ^d	2200	2200	1200.0U	0.6U	31.1J	3.6J	29.9J	27.4
S63-SB-3	10/19/2009	3.5	4	12.0U	2000 ^d	4800.0U	4800.0U	4800.0U	0.6U	33.3J	4.6J	33.1J	32.2
S63-SB-4	10/19/2009	3.5	4	1.2U	190 ^b	88	88	220	0.6U	31.7J	3.3J	33.0J	28.9
S63-SB-5	10/19/2009	4.5	5	46 ^c	6600 ^d	4500	4500	2300J	0.11J	29.6J	8.2J	25.2J	27.7
S63-SB-6	10/19/2009	4.5	5	1.8J ^c	1900 ^b	2500.0U	2500.0U	2300J	0.12J	43.3J	5.0J	42.1J	39.0
S63-SB-7	10/19/2009	4	4.5	1.2U	150 ^c	61.0U	61.0U	480	0.70J	32.8J	21.4J	29.0J	42.0
S63-SB-8	10/19/2009	4	4.5	1.2U	1.2U	12.0U	12.0U	52	0.6U	36.2J	5.0J	35.7J	36.9
S63-SB-9	10/19/2009	4	4.5	1.2U	1.2U	12.0U	12.0U	51	0.26J	39.1J	7.5J	38.4J	38.4
S63-SB-10	10/19/2009	3.5	4	1.2U	1.2U	12.0U	12.0U	150	0.91J	42.6J	33.3J	36.6J	42.9
S63-SB-11	10/19/2009	3.5	4	1.2U	6.1U	61.0U	61.0U	150	0.082J	41.1J	4.2J	35.9J	34.8
S63-SB-12	10/19/2009	3	4	1.2U	6.0U	60.0U	60.0U	620	0.43 J	55.6 J	5.3 J	41.2 J	42.4
S63-SB-13	10/20/2009	3	3.3	1.2U	18 ^c	12.0U	12.0U	67	0.6 UJ ⁵	61.9 J	8.0 J	59.4 J	48.0 J
S63-SB-14	10/20/2009	4	4.5	1.2U	27 ^c	12.0U	12.0U	70	0.6 UJ	58.5 J	13.0 J	55.8 J	47.7 J
S63-SB-15	10/20/2009	4.5	5	1.3U	1.3U	13.0U	13.0U	130	0.6 UJ	67.6 J	6.6 J	63.1 J	50.6 J
S63-SB-16	10/20/2009	4.5	5	1.2U	1.2U	12.0U	12.0U	130	0.6 UJ	49.9 J	9.1 J	48.7 J	42.1 J
S63-SB-17	10/20/2009	4	4.5	0.89J ^c	120 ^c	12.0U	12.0U	340	0.6 UJ	61.9 J	6.2 J	57.0 J	45.8 J
S63-SB-18	10/20/2009	4	4.5	1.2U	1.2U	12.0U	12.0U	12.0U	0.6 UJ	71.1 J	6.5 J	71.1 J	55.1 J
S63-SBHP-1	3/11/2010	6	7	0.41U	0.72U	4.00U	4.00U	4.20U	NA ⁶	NA	NA	NA	NA
S63-SBHP-2	3/10/2010	6	7	0.40U	120 ^b	95	95	83	NA	NA	NA	NA	NA
S63-SBHP-3	3/11/2010	6	7	0.41 U	0.72 U	3.90 U	3.90 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-4	12/20/2010	5	6	1.3 U	1.3 U	13.0 U	13.0 U	13.0 U	NA	NA	NA	NA	NA
S63-SBHP-5	12/20/2010	6	8	240 ^c	120.0 U	3400 J	3400 J	1200.0 U	NA	NA	NA	NA	NA
S63-SBHP-5	12/20/2010	8	10	1.2 U	1.2 U	12.0 U	12.0 U	12.0 U	NA	NA	NA	NA	NA
S63-SBHP-6	12/20/2010	4.5	5	1.2 U	1.2 U	12.0 U	12.0 U	12.0 U	NA	NA	NA	NA	NA
S63-SBHP-7	10/4/2011	4.5	5	0.91 J ^c	3100 ^d	2700	2700	210.00 U	NA	NA	NA	NA	NA
S63-SBHP-7	10/4/2011	8	10	0.41 U	0.72 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-8	10/4/2011	4.5	5	0.41 U	0.72 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-8	10/4/2011	8	10	0.40 U	0.71 U	3.90 U	3.90 U	4.10 U	NA	NA	NA	NA	NA
S63-SBHP-9	10/4/2011	4.5	5	0.40 U	0.71 U	3.90 U	3.90 U	4.10 U	NA	NA	NA	NA	NA
S63-SBHP-9	10/4/2011	8	10	0.41 U	0.72 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-10	10/4/2011	6	8	0.99 J ^c	1800 ^d	1600	1600	200.00 U	NA	NA	NA	NA	NA
S63-SBHP-10	10/4/2011	8	10	0.40 U	0.71 U	3.90 U	3.90 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-11	10/4/2011	5	6	0.38 U	0.68 U	3.70 U	3.70 U	4.00 U	NA	NA	NA	NA	NA
S63-SBHP-11	10/4/2011	8	10	0.40 U	0.71 U	3.90 U	3.90 U	4.10 U	NA	NA	NA	NA	NA
S63-SBHP-12	10/4/2011	5	6	0.41 U	0.73 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-12	10/4/2011	8	10	0.40 U	0.70 U	3.90 U	3.90 U	4.10 U	NA	NA	NA	NA	NA

Sample ID	Date	Depth (feet)		Gasoline Range Organics	Diesel Range Organics	JP-5	Kerosene	Motor Oils	Cadmium	Chromium	Lead	Nickel	Zinc
		Top	Bottom										
S63-SBHP-13	10/5/2011	5.5	6.5	330 J ^c	240	2400	2400	210.00 U	NA	NA	NA	NA	NA
S63-SBHP-13	10/5/2011	8	9	0.41 U	420 ^d	380	380	42.00 U	NA	NA	NA	NA	NA
S63-SBHP-14	10/5/2011	7	8	38 J ^c	41 J	37 J	37 J	16 J	NA	NA	NA	NA	NA
S63-SBHP-14	10/5/2011	8	9	0.41 U	0.72 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
S63-SBHP-15	10/5/2011	6	7	5.4 ^c	420 ^d	400	400	43.00 U	NA	NA	NA	NA	NA
S63-SBHP-15	10/5/2011	8	9	0.41 U	0.72 U	4.00 U	4.00 U	4.20 U	NA	NA	NA	NA	NA
RWQCB 2008 Environmental Screening Levels				83	83	83	83	2500	7.40	NE⁷	750	150	600
Cleanup Levels				500	500	500	500	2500	800	1400	800	69000	310000

NOTES:

1. Data from Table 3-1 in the *Final Completion Report and Request for Closure or No Further Action for Moffett Petroleum Sites*.
 2. mg/kg – milligrams per kilogram
 3. J – estimated value
 4. U – analyte not detected above the project reporting limit
 5. UJ – analyte not detected above the estimated reporting limit
 6. NA – not analyzed
 7. NE – not established
- b – The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match the gasoline/diesel standard.
- c – The analyst has noted that the chromatogram of this sample is mainly higher boiling point hydrocarbons.
- d – The analyst has noted that the chromatogram of this sample is mainly lower boiling point hydrocarbons.

FIGURES

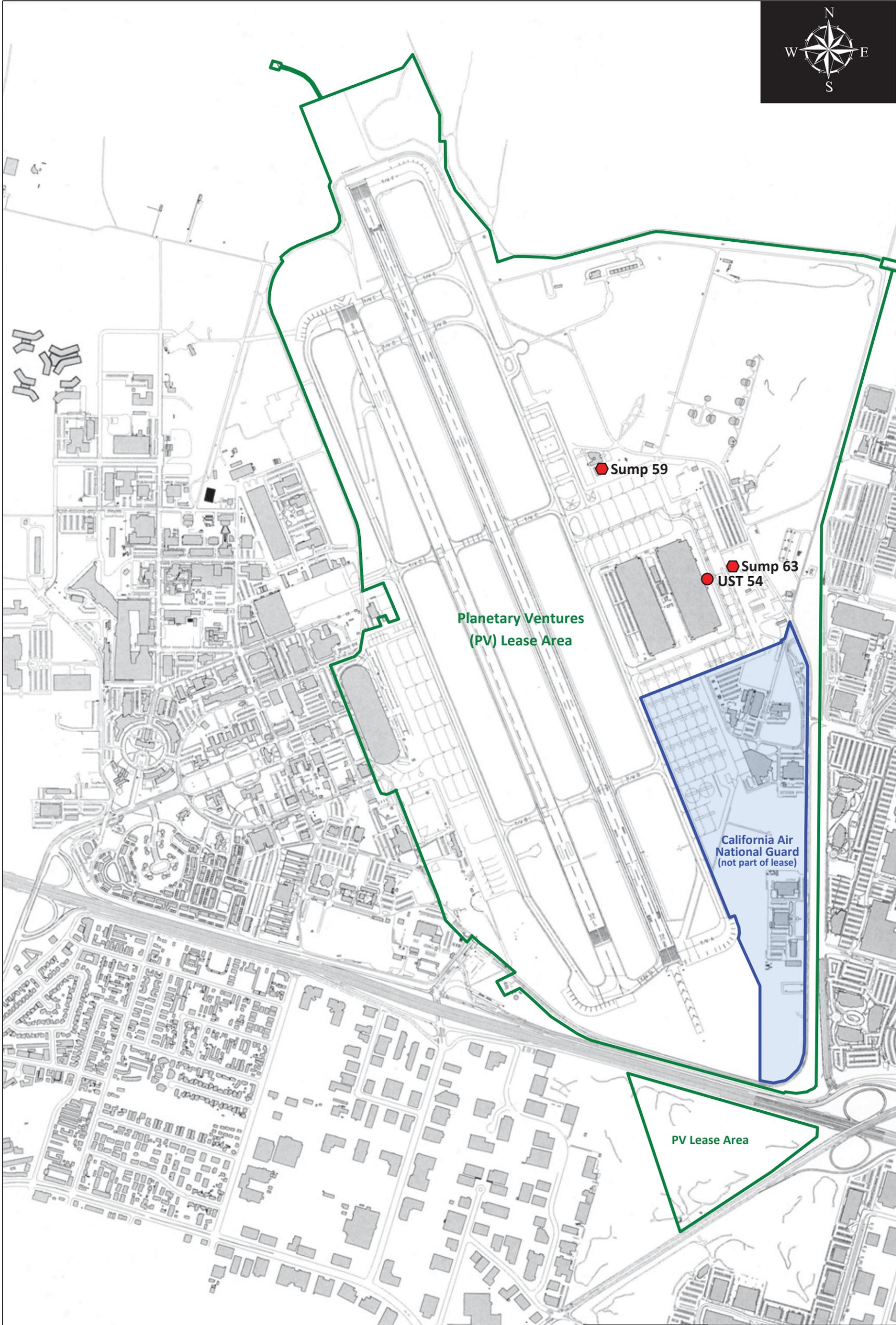


FIGURE 1
Location of Site 12. The boundaries are approximate and not meant to represent legal property descriptions.

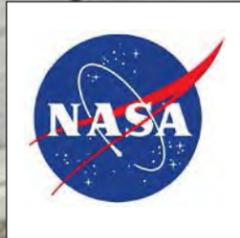


FIGURE 2
Site 15: Locations of UST 54, Sump 59, & Sump 63
Google Earth Photograph 9/26/2011



Sump 63

Approximate Groundwater Flow Direction

UST 54 Excavation Site

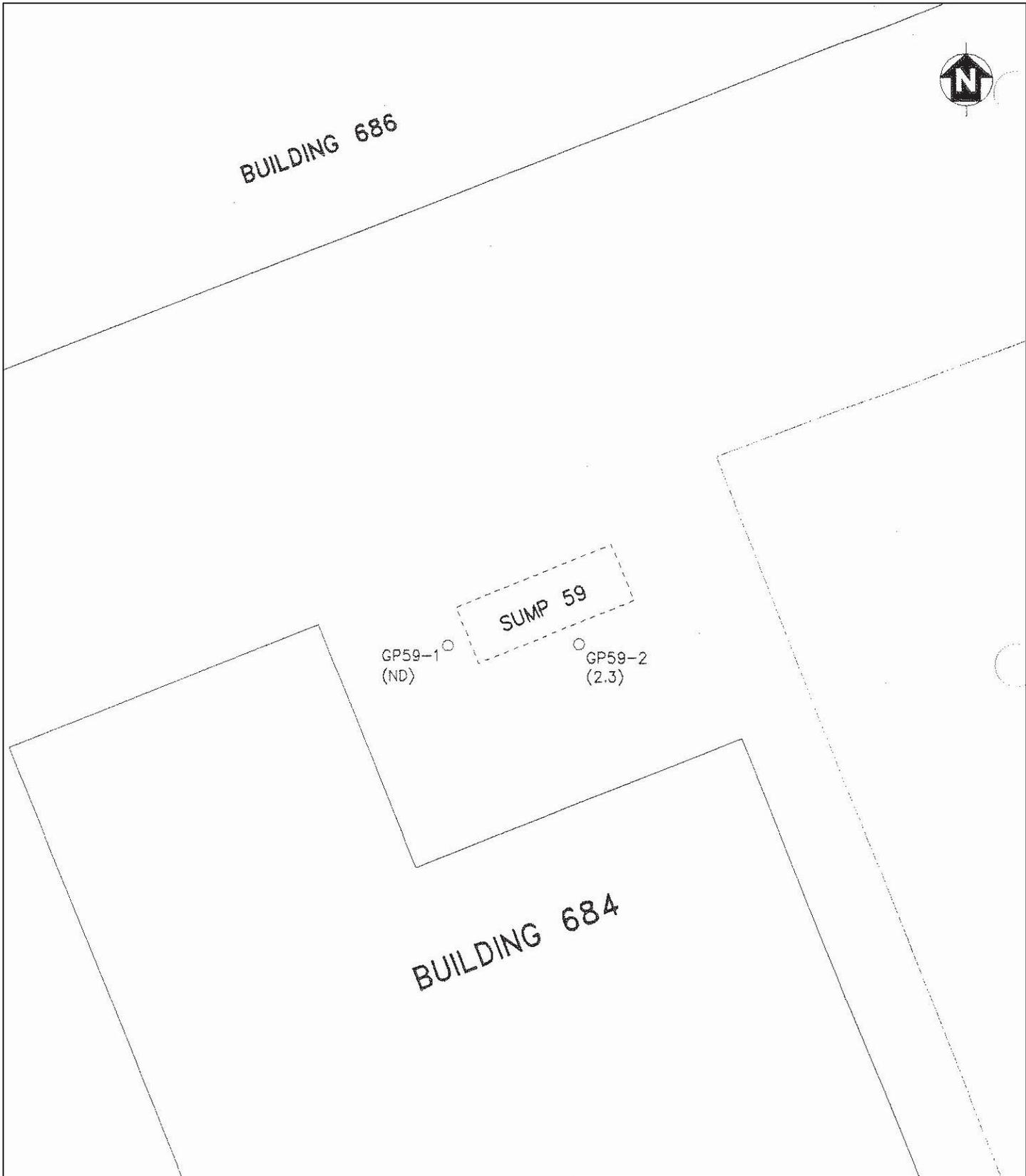
54
54N
54S



FIGURE 3

UST 54 excavation location and soil sample locations.

Google Earth Photograph 9/26/2011



LEGEND

- Geoprobe Sampling Location
- (9) TPH Extractable Concentration (mg/kg)

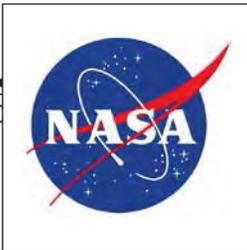
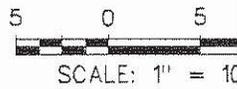


FIGURE 4

Sump 59 location and sampling points.

Figure 4-32 from Station-Wide Remedial Investigation.

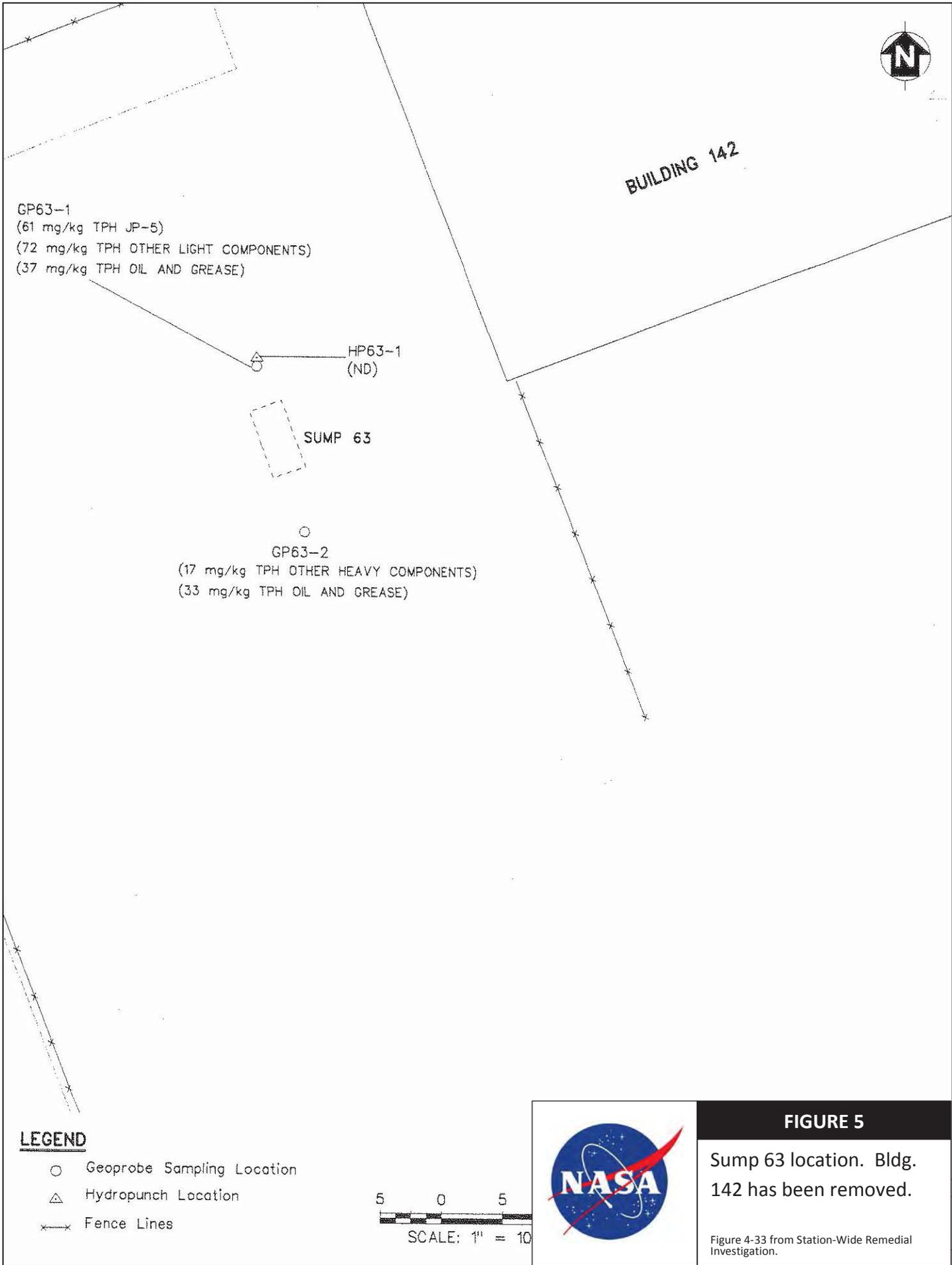
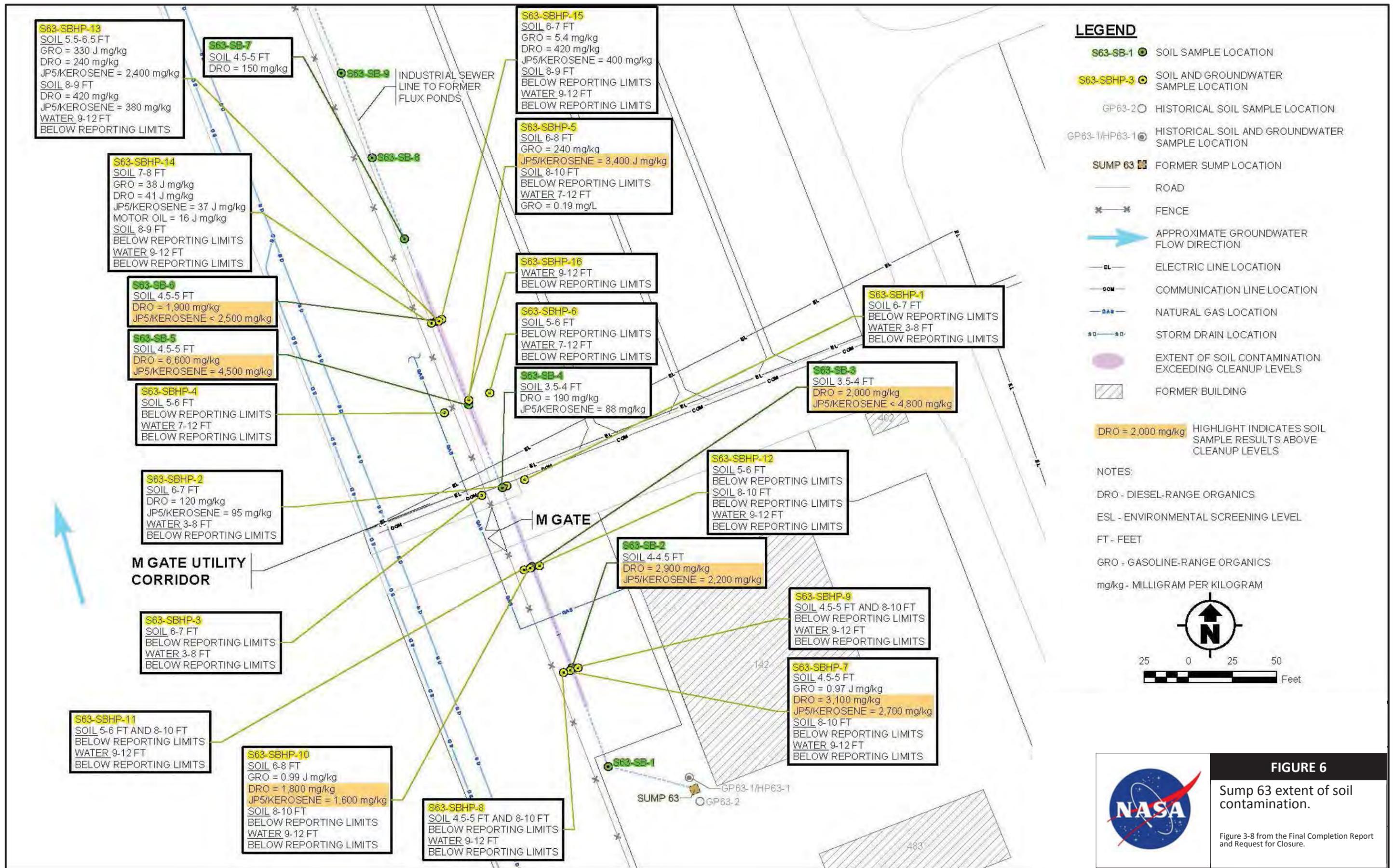


FIGURE 5
 Sump 63 location. Bldg. 142 has been removed.
 Figure 4-33 from Station-Wide Remedial Investigation.



SITE NAME:	Site 19: USTs 2, 14, 43, 53				
Version:	Final	Date:	2/25/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See Site Summary		
	Santa Clara County	Longitude	See Site Summary		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum/CERCLA	EPA/RWQCB			N/A	See Site Summary
SITE SUMMARY					
<p>Site 19 consists of four underground storage tank (UST) sites and current status: UST 2 – No Further Action (NFA) UST 14 – NFA UST 43 – Open UST 53 – NFA</p> <p>Site 19 tank locations are provided in Figure 1. All four tanks have been removed.</p> <p>UST 2 (37.416923° N, 122.041341° W) UST 2 was a steel 2,000-gallon UST located next to Hangar 3 (Figure 2). The tank was installed in 1979 and removed on 5/11/1990. The tank was used to store waste products from the power plant shop in Hangar 3. Wastes likely included spent mixtures of oils, hydraulic fluids, methyl ethyl ketone, jet fuel, PD-680 solvent, toluene, and stoddard solvent. The tank contents were periodically pumped out and disposed of as hazardous waste. This UST and its associated piping were removed during the Phase I and Phase II tank removal interim remedial actions.</p> <p>Four soil samples were collected during removal of the UST and its associated piping and analyzed for VOCs, SVOCs, and TPH compounds. TPHd was detected at 1,700 mg/kg in a soil sample from the northern excavation sidewall. Other petroleum detections include 110 mg/kg of TPH as JP-5/kerosene at location W7-20 (located between 10 and 20 feet north of the Tank 2 excavation), 150 mg/kg of TPH-g at the eastern excavation sidewall, and 120 mg/kg TPHmo approximately 10 feet south of the excavation in a piping trench (TP2-1). The 1996 Station-Wide Remedial Investigation (RI) also indicated that toluene and 4-methylphenol were detected at concentrations of 86 µg/kg and 1,420 µg/kg, respectively, in the pipe trench sample TP2-1 and TCE was observed in soil boring SB19-1 at concentrations up to 110 µg/kg in a sample collected between 3 to 5 ft bgs (Figures 3 & 4).</p>					

SITE NAME:**Site 19: USTs 2, 14, 43, 53****SITE SUMMARY**

Groundwater data from two monitoring wells immediately downgradient of Tank 2 and grab groundwater results indicate that groundwater contamination in the Tank 2 area is limited. TPHmo was detected at 840 µg/L (greater than the cleanup goal of 700 µg/L) at location HPT2-2, ethylbenzene was detected at 0.9 µg/L at location HPT2-1, and 14 µg/L of TPH-p as other light components was detected in a sample from well WT2-1. Sample locations and results are shown on Figures 5 & 6.

The Regional Water Quality Control Board issued a "No Further Action" letter for UST 2 in May, 2003.

UST 14

UST 14 was a steel 1,100-gallon UST used to store diesel for a backup generator in Building 158, the Airfield Flight Operations building (Figure 7). The tank was installed during the construction of Bldg. 158 and removed on 5/11/1990. During the removal of Tank 14, approximately 2,580 cubic feet of soil were excavated due to visible staining; these materials were disposed of offsite.

Soil samples were collected during the removal of Tank 14 and analyzed for total petroleum hydrocarbons (extractable (TPH-e) and purgeable (TPH-p)), benzene, toluene, ethylbenzene, and xylene. A sample along the northern wall of the excavation (sample TN14-NY) contained TPH-e as diesel at 1,700 mg/kg and small concentrations of TPH-e as motor oil were detected at TN14-BY and TP14-1. In a soil sample from nearby monitoring well WT14-1, TPH-e as diesel was detected at 130 mg/kg and toluene was observed at 5.7 µg/kg (Figure 8).

In May 1992, two samples were collected from each of three boreholes in the vicinity of the northern excavation boundary and analyzed for TPHd. As none of the samples contained detectable concentrations of TPHd, the prior detection of TPH at 1,700 mg/kg was attributed to localized contamination with no significant extent.

A grab groundwater sample was collected during the removal of Tank 14 and analyzed for petroleum hydrocarbons, BTEX compounds, MTBE, and metal. TPH-d was detected at 5,600 µg/L. Between 1990 and 1995, well WT14-1 was sampled six times:

- ≠ July 1991
- ≠ November 1991
- ≠ February 1992
- ≠ May 1992
- ≠ August 1992
- ≠ March 1995

All samples were analyzed for BTEX, TPH-e as diesel, and TPH-p as gasoline. Four of the samples were analyzed for TPH-e as JP-5. Sample results and locations shown on Figure 9.

UST 14 was closed by the RWQCB in a letter dated 10/8/2002.

UST 43

UST 43 was a steel 2,000-gallon UST located at the northeast end of Hangar 3 (Figure 10). The tank was installed in 1979 and removed in 1990. UST 43 was used to store rinse water from the engine cleaning rack,

SITE NAME:**Site 19: USTs 2, 14, 43, 53****SITE SUMMARY**

drains, and sinks in Hangar 3. The former Tank 43 may have contained waste oils, solvents, waste fuel, methyl ethyl ketone, paint wastes and battery acid. The tank and its associated piping were removed during the Phase I and Phase II tank removal interim remedial actions conducted between May and October 1990.

PCE, TCE, and their degradation products are present in the southern portion of the IR Site 26 groundwater plume in the A1-aquifer zone that emanates from the northeastern corner of Hanger 3 near the former location of Tank 43. TPHd and TPH as JP-5/kerosene have been also observed downgradient of the former Tank 43 at concentrations up to 1,900 µg/L and 99,000 µg/L, respectively. Figures 11 – 15 illustrate compounds detected in groundwater.

Groundwater contamination is being addressed under the remediation activities at Site 26. A letter from the RWQCB dated 5/8/2008 stated that the closure of UST 43 will be dependent on the closure of Site 26.

UST 53

Tank 53 was a 500-gallon UST that was used to store gasoline fuel that was located in the Golf Course Maintenance Area (Figure 16); Tank 53 was removed in 1990. During tank removal a leak was discovered. After the tank was removed, the excavation was enlarged to remove visibly contaminated soils. Approximately 56 cubic yards of impacted materials were excavated and disposed of off-site. Four sidewall soil samples were collected from the expanded excavation.

From the four soil samples that were collected during the tank removal, one sample contained 1,600 mg/kg TPH-g (gasoline), 6.8 mg/kg toluene, and 14.95 mg/kg ethylbenzene. In 1992, 24 additional soil samples were collected from a depth of 4.5 to 5.5 feet bgs using direct push equipment and analyzed for TPH-g and BTEX compounds. The samples were screened in the field for TPH-g and BTEX. Samples T53-2, T53-3, T53-8, T53-13 through T53-18, T53-20, and T53-22 through T53-24 were sent off-site to a lab and analyzed for TPH-g and BTEX. One sample collected at 2.5 feet bgs detected 1,600 mg/kg TPH-g, 5.2 mg/kg toluene, 20 mg/kg ethylbenzene, and 79 mg/kg xylenes were detected.

Additional sampling was also carried out in January and February 1994. Four soil samples were collected between 4 and 5 feet bgs using direct push. The sampling locations were designated GP53-24 through GP53-27. The soil samples were analyzed for TPH-g and BTEX.

Selected soil sampling results are summarized in Figure 17.

Groundwater impacts from petroleum releases have been monitored with groundwater samples taken from direct push soil borings and from monitoring wells W53-1 and W53-2. Four consecutive quarters of monitoring were conducted from November 1991 through September 1992 at W53-1; the samples were analyzed for BTEX, TPH-e as diesel, and TPH-g as gasoline. Three consecutive quarters of groundwater monitoring were conducted from February through September 1992 at W53-2; samples were analyzed for BTEX and TPH-g. Concentrations of petroleum constituents in groundwater have been at non-detect or near-non-detect levels since 1992. Two groundwater samples were collected in 1994 using a HydroPunch probe. The groundwater samples were analyzed for TPH-g and BTEX.

SITE NAME:

Site 19: USTs 2, 14, 43, 53

SITE SUMMARY

Selected groundwater sampling results are provided on Figure 18.

The Navy proposed UST 53 for closure. The RWQCB granted no further action for UST in a letter dated on February 23, 2004.

SITE NAME:		Site 19: USTs 2, 14, 43, 53			
REMEDIAL ACTION					
Remedy	Soil Removal and Off-Site Disposal	Begin Date		End Date	
<p>Volumes of soils removed:</p> <p>UST 2: 182 cubic yards (cy) UST 14: 96 cy UST 43: 250 cy UST 53: 282 cy</p> <p>Volume of UST 2 was estimated using dimensions of the excavation shown in Figure 3 and estimated depth of 8' plus measured area of trench by two feet.</p> <p>Volume for UST 14 was given as 2580 cubic feet and was converted to cy.</p> <p>Volume for UST 43 was calculated by totaling the backfill reported in the Phase II Tank report.</p> <p>Volume of tank 53 was calculated using the dimensions shown on Figure 17 and an estimated depth of 8'.</p>					
Land Use Restrictions			Development Issues		
<p>USTs 2, 14, and 53 are restricted to commercial/industrial use only as provided in closure letter from the Water Board. No residential use.</p> <p>Land use must conform to the November 2002 Record of Decision for NASA's Development plan as outlined by Mitigated Alternative 5 of the Final Programmatic Environmental Impact Statement.</p>			<ul style="list-style-type: none"> ≠ Vapor intrusion issues will need to be evaluated in the UST 43 area due to the presence of VOCs in the groundwater ≠ UST 53 site is located near jurisdictional wetlands limiting development to compatible uses 		

SITE NAME:	Site 19: USTs 2, 14, 43, 53
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RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
			See attached figures for residual contamination

REFERENCES (Chronological Order)

≠ *Final Station-Wide Remedial Investigation Report, Moffett Federal Airfield, CA.* PRC Environmental Management, San Francisco, CA. May 21, 1996.

≠ *Base-Wide Petroleum Site Evaluation Methodology Technical Memorandum Draft Final Appendix E, Site 19 Petroleum Evaluation, Moffett Federal Airfield, CA.* Tetra Tech EM Inc., San Francisco, CA. December 11, 2000. [UST 14 and 53]

≠ *Closure Letter for Department of Defense (DoD) Underground Storage Tank 14 Tank at Site 19, Moffett Federal Airfield, Moffett Field, CA.* CA Regional Water Quality Control Board, San Francisco Bay Region, Oakland, CA. October 8, 2000.

≠ *Base-Wide Petroleum Sites Evaluation Methodology Technical Memorandum Draft Appendix D.* Tetra Tech EM Inc., San Francisco, CA. January 20, 2001. [UST 2]

≠ *Closure Letter for Underground Storage Tank 2, Site 19, Moffett Federal Airfield, Moffett Field, CA (RWQCB Case No. 43D9039).* CA Regional Water Quality Control Board, San Francisco Bay Region, Oakland, CA. May 2003.

≠ *Draft Final Phase II Base-Wide Tank Closure Report, Moffett Federal Airfield, CA.* Tetra Tech EM Inc., San Francisco, CA. June 10, 2003. [UST 43]

≠ *Closure Letter for Underground Storage Tank 53, Site 19, Moffett Federal Airfield, Moffett Field, CA (RWQCB Case No. 43D9036).* CA Regional Water Quality Control Board, San Francisco Bay Region, Oakland, CA. February 23, 2004.

≠ *Comments on Draft Final Phase II Basewide Tank Closure Report, NAS Moffett Field, CA.* Letter to Department of the Navy from the CA Regional Water Quality Control Board, San Francisco Bay Region, Oakland, CA. Mat 8, 2008.

FIGURES

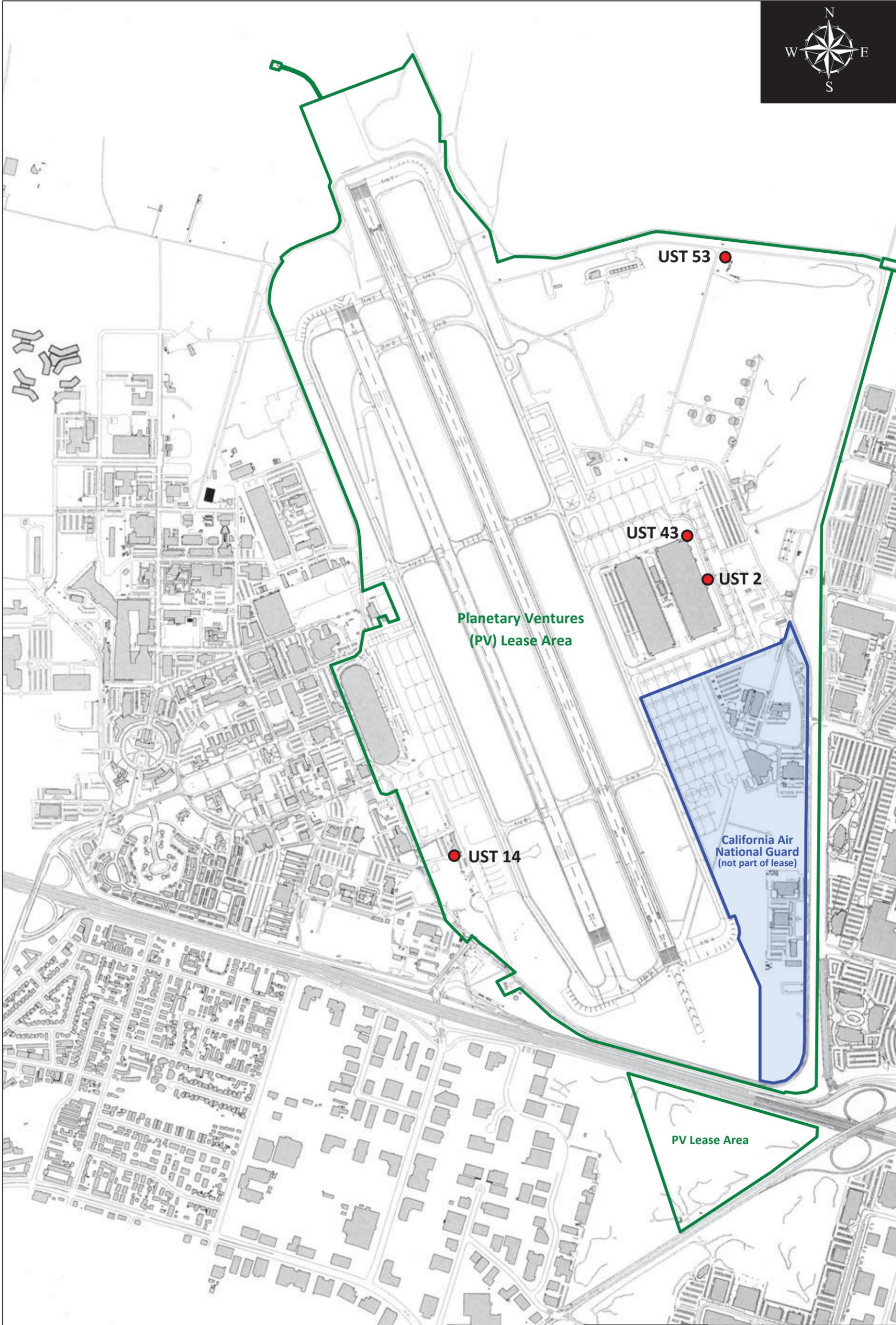
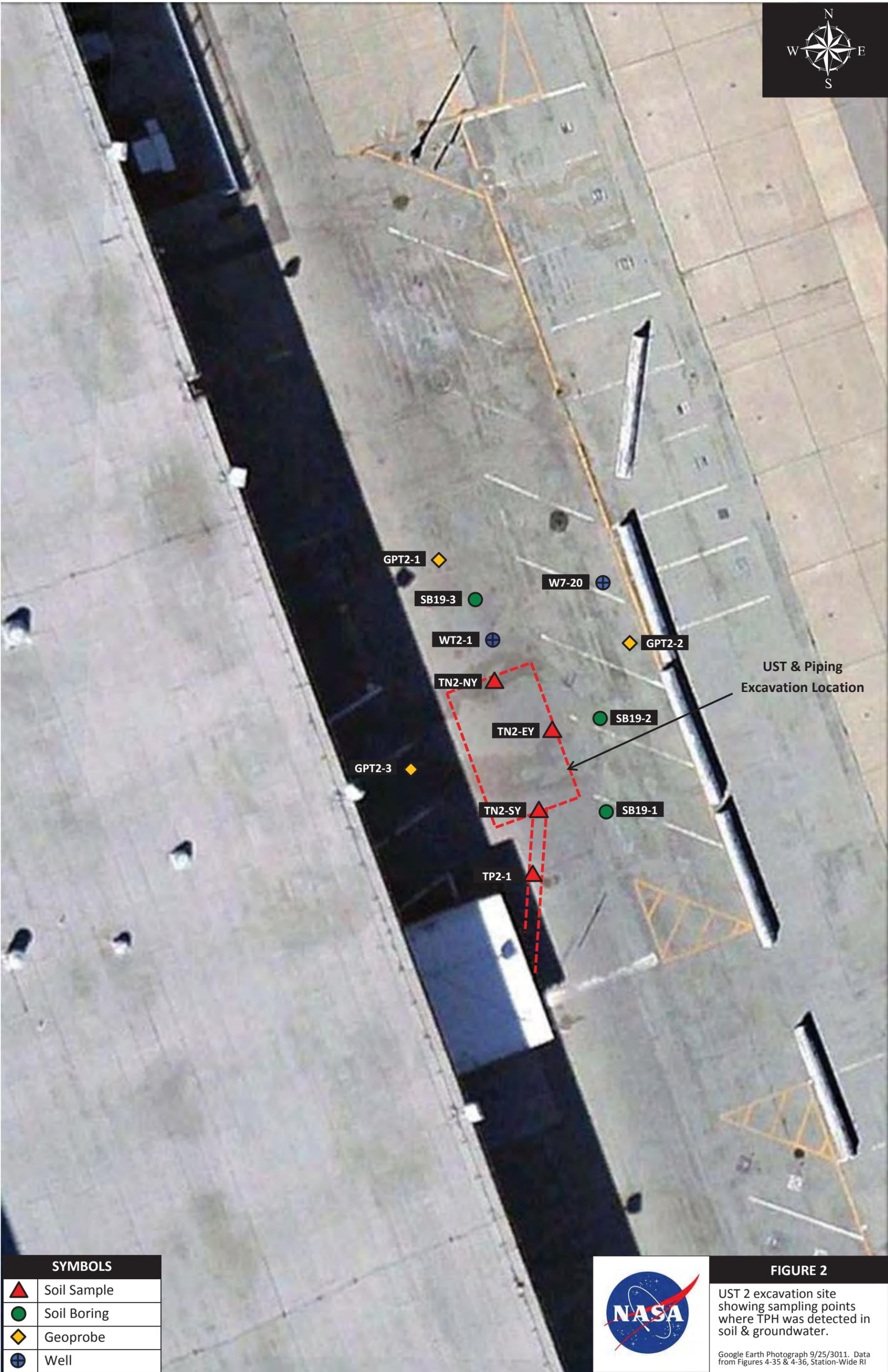


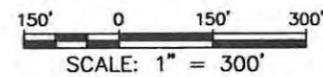
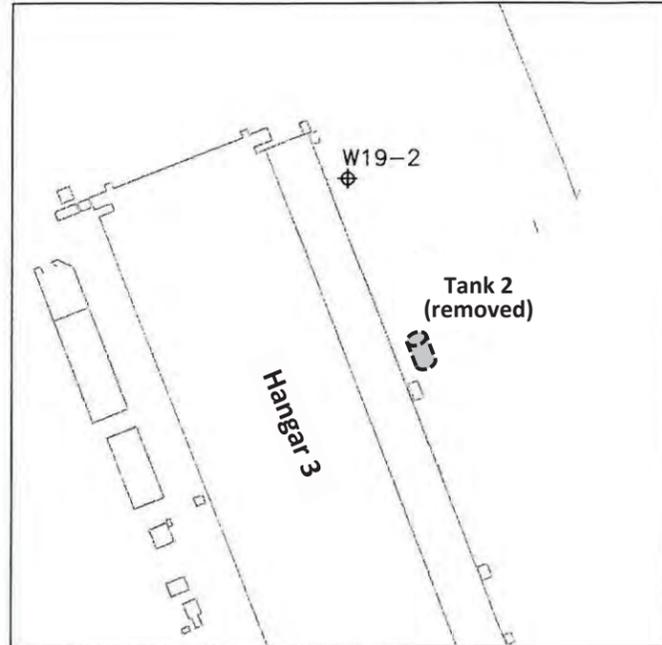
FIGURE 1
Site 19 tank locations. The boundaries are approximate and not meant to represent legal property descriptions.



SYMBOLS	
	Soil Sample
	Soil Boring
	Geoprobe
	Well



FIGURE 2
 UST 2 excavation site showing sampling points where TPH was detected in soil & groundwater.
 Google Earth Photograph 9/25/3011. Data from Figures 4-35 & 4-36, Station-Wide RI

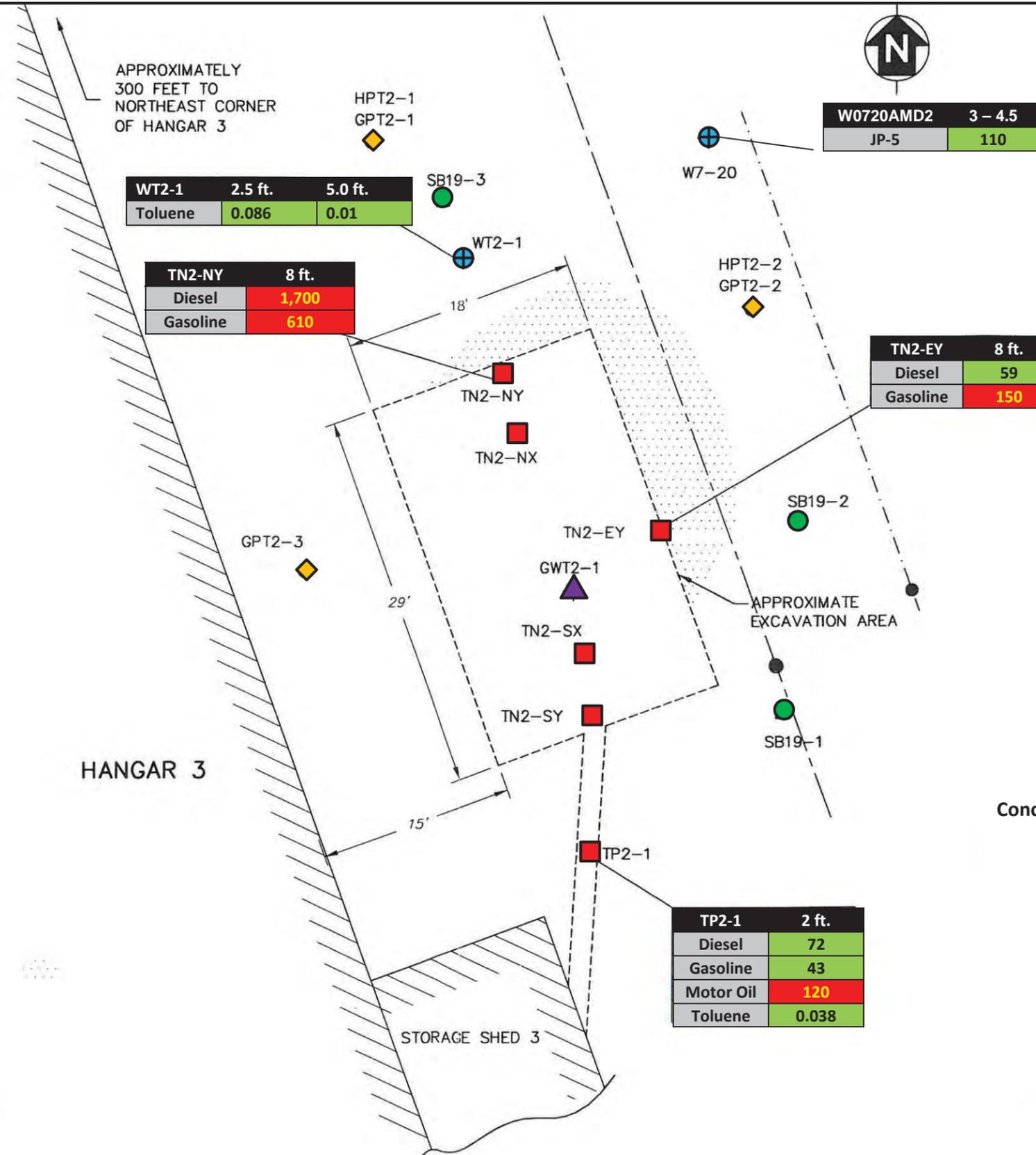


XXX	Contaminant detected, concentration > ESL
ND (X)	Contaminant not detected, detection limit > ESL
XXX	Contaminant detected, concentration ≤ ESL

LEGEND

- TANK 2 EXCAVATION AREA
- GEOPROBE SOIL SAMPLE AND HYDROPUNCH GROUNDWATER SAMPLE LOCATION (1994)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER, (ZONE)
- IT SOIL BORING (1989)
- SOIL SAMPLE FROM EXCAVATION (1990)
- GROUNDWATER SAMPLE FROM EXCAVATION (1990)
- MANHOLE
- SANITARY SEWER
- STORM DRAIN

mg/kg MILLIGRAMS PER KILOGRAM



WT2-1	2.5 ft.	5.0 ft.
Toluene	0.086	0.01

TN2-NY	8 ft.
Diesel	1,700
Gasoline	610

W0720AMD2	3 - 4.5
JP-5	110

TN2-EY	8 ft.
Diesel	59
Gasoline	150

TP2-1	2 ft.
Diesel	72
Gasoline	43
Motor Oil	120
Toluene	0.038

Environmental Screening Levels ¹ (ESL) (mg/kg)	
Benzene	0.044
Diesel	110
Ethylbenzene	3.3
Gasoline	500
JP-5 (jet fuel)	110 ²
Motor Oil	500
Toluene	2.9
Xylenes	2.3

1. San Francisco Bay Regional Water Control December 2013 ESLs, Summary Table A, Commercial/Industrial Land Use.
 2. ESL for diesel used as ESL for JP-5.

Concentrations are in mg/kg

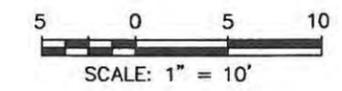
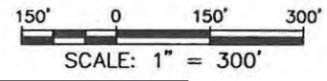
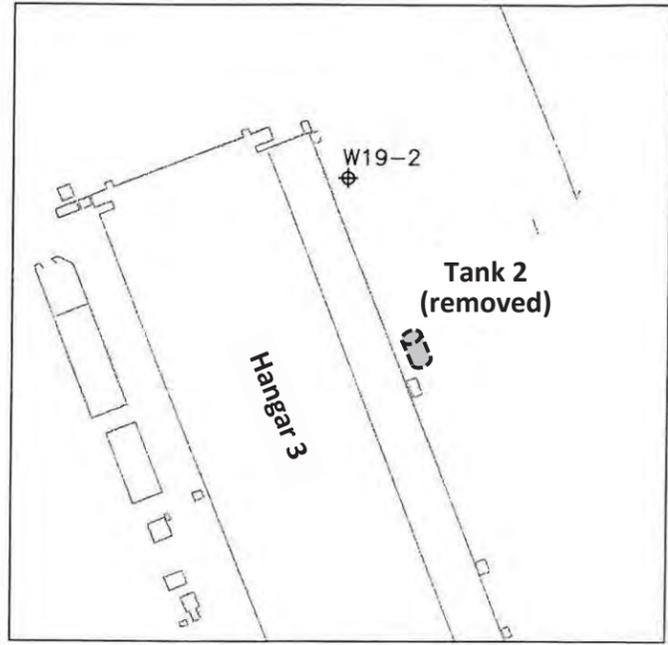



FIGURE 3
 Petroleum compounds detected in soil at UST 2.
 Figure based on Figure D8 from Basewide Petroleum Sites Tech Memo Appendix D.

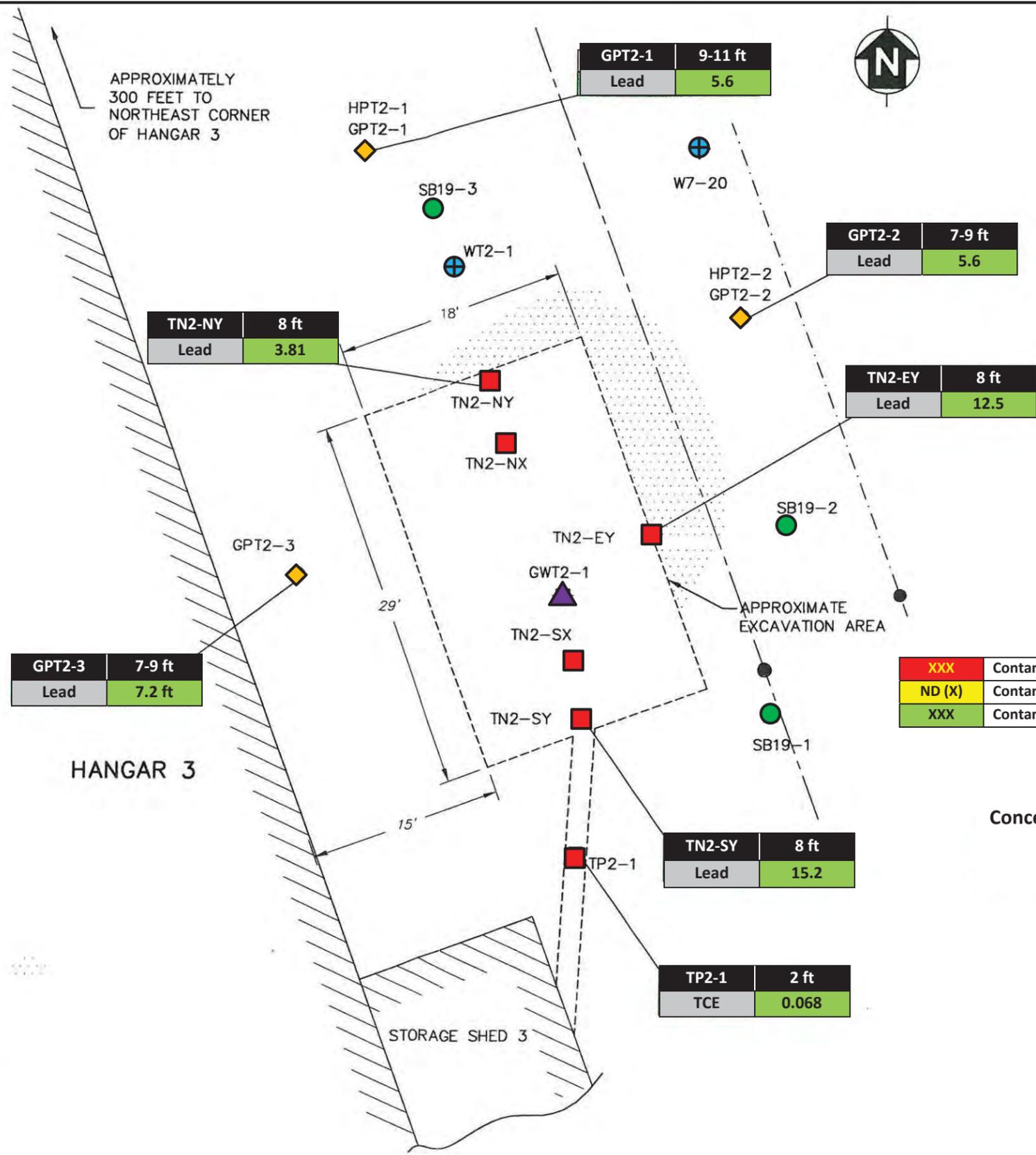


ESL ¹ (mg/kg)	
Lead	320
TCE	0.46

1. ESL: San Francisco Bay Regional Water Quality Control Board Environmental Screening Level, December 2013, Summary Table A, Commercial/Industrial Land Use

LEGEND

- TANK 2 EXCAVATION AREA
- GEOPROBE SOIL SAMPLE AND HYDROPUNCH GROUNDWATER SAMPLE LOCATION (1994)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER, (ZONE)
- IT SOIL BORING (1989)
- SOIL SAMPLE FROM EXCAVATION (1990)
- GROUNDWATER SAMPLE FROM EXCAVATION (1990)
- MANHOLE
- SANITARY SEWER
- STORM DRAIN
- mg/kg MILLIGRAMS PER KILOGRAM
- TCE TRICHTHORETHENE



XXX	Contaminant detected, concentration > ESL
ND (X)	Contaminant not detected, detection limit > ESL
XXX	Contaminant detected, concentration ≤ ESL

Concentrations are mg/kg

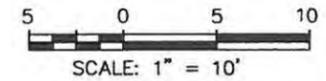
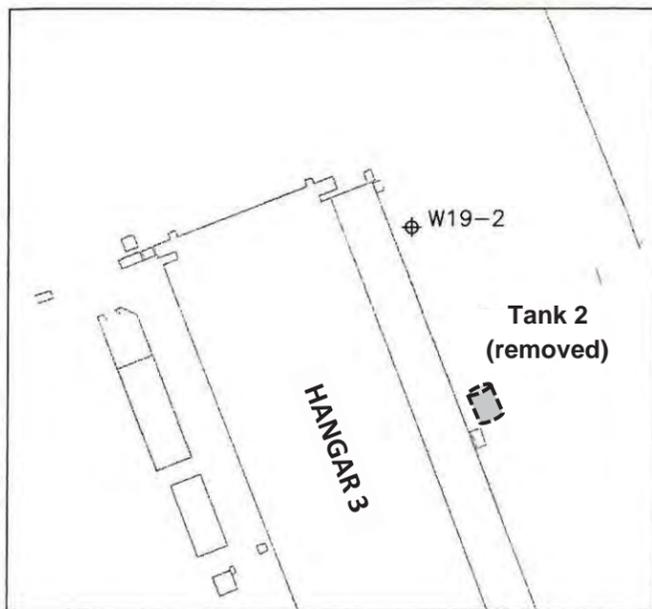


FIGURE 4

CERCLA contaminants detected in soil at UST 2.

Figure based on Figure D9 from Basewide Petroleum Sites Tech Memo Appendix D.



XXX	Contaminant detected, concentration is > ESL
ND (X)	Contaminant not detected but the detection limit is > ESL
XXX	Contaminant detected, concentration is ≤ ESL

HPT2-1 (µg/L)			
Date	Benzene	Ethylbenzene	Xylenes
Jan - 94	0.2 J	1 J	0.6 J

WT2-1 (µg/L)			
Date	Benzene	OLC	Toluene
Dec - 92	ND (2)	14	ND (2)
Nov - 94	0.2 J	NS	0.2 J

W7-20 (µg/L)		
Date	Benzene	Toluene
Jun - 93	0.5 J	0.5 J

HPT2-2 (µg/L)			
Date	Benzene	Motor Oil	Xylenes
Jan - 94	0.1 J	840	0.6 J

ESL ¹ (µg/L)	
Benzene	1.0
Ethylbenzene	3.0
Motor Oil	100
OLC ²	100
Toluene	40
Xylenes	2.0

1. ESL: San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, December 2013, Summary Table A.
 2. ESL concentration used for OLC is for gasoline.

LEGEND

- TANK 2 EXCAVATION AREA
- GEOPROBE SOIL SAMPLE AND HYDROPUNCH GROUNDWATER SAMPLE LOCATION (1994)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER (ZONE)
- IT SOIL BORING (1989)
- SOIL SAMPLE FROM EXCAVATION (1990)
- GROUNDWATER SAMPLE FROM EXCAVATION (1990)
- MANHOLE
- SANITARY SEWER
- STORM DRAIN
- µg/L MICROGRAMS PER LITER
- ND NOT DETECTED
- NS NOT SAMPLED
- J APPROXIMATE CONCENTRATION
- (10) DETECTION LIMIT
- OLC OTHER LIGHT COMPOUNDS

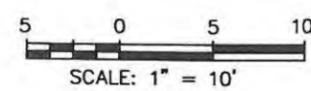
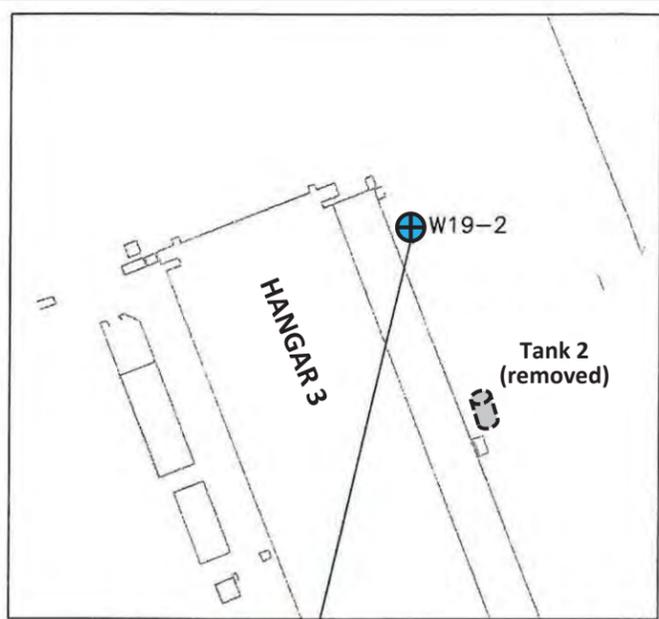



FIGURE 5
 Selected petroleum contaminants detected in groundwater at UST 2.
 Figure and data from Figure D10 in the Basewide Petroleum Sites Appendix D.



W19-2 (µg/L)	
Date	PCE
Sep - 94	0.5 J

HPT2-1 (µg/L)			
Date	1,2-DCE	PCE	TCE
Jan - 94	2 J	4	4

WT2-1 (µg/L)							
Date	1,1,1-TCA	1,2-DCE	Chloroform	PCE	TCE	VC	Lead
Nov - 91	ND (1)	2	ND (1)	8	9	ND (0.5)	ND (7.5)
Feb - 92	ND (1)	ND (1)	ND (1)	3.4	4.6	ND (0.5)	ND (0.8)
Jan - 92	ND (5)	3 J	ND (5)	3 J	2 J	ND (10)	ND (1.6)
Sep - 92	0.9 JG	3	2	5	10	0.2 JG	ND (1)
Dec - 92	ND (2)	3	0.06 J	5	9	ND (2)	ND (1.2)
Dec - 93	ND (2)	2	ND (2)	6	7	ND (2)	NS
May - 94	ND (2)	1 J	ND (2)	3	5	ND (2)	ND (1)
Aug - 94	NS	NS	NS	NS	NS	NS	1.4 B
Sep - 94	ND (2)	ND (3)	ND (2)	6	8	ND (2)	ND (0.8)
Nov - 94	ND (3)	2 J	ND (3)	5	8	ND (3)	ND (3.9)
Jun - 95	ND (2)	0.4 J	0.4 J	2	5	ND (2)	NS

W7-20 (µg/L)				
Date	1,1-DCA	1,1-DCE	1,2-DCE	TCE
Jun - 93	ND (2)	ND (2)	0.7 J	3
Nov - 93	ND (2)	ND (2)	1 J	5
Jun - 95	0.2 J	0.08 J	0.4 J	ND (2)

HPT2-2 (µg/L)				
Date	1,1-DCA	1,1-DCE	1,2-DCE	TCE
Jan - 94	0.2 J	0.2 J	0.5 J	0.9 J

ESLs ¹ (µg/L)	
Chloroform	80
1,1-DCA	5
1,2-DCE ²	6
Lead	2.5
PCE	5
1,1,1-TCA	62
TCE	5
Vinyl Chloride	0.5

XXX	Contaminant detected, concentration is > ESL
ND(X)	Contaminant not detected but the detection limit is > ESL
XXX	Contaminant detected, concentration is ≤ ESL

1. ESL: San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, December 2013, Summary Table A.
 2. ESL concentration used for 1,2-DCE is for cis-1,2-DCE.

LEGEND

- TANK 2 EXCAVATION AREA
- GEOPROBE SOIL SAMPLE AND HYDROPUNCH GROUNDWATER SAMPLE LOCATION (1994)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER (ZONE)
- IT SOIL BORING (1989)
- SOIL SAMPLE FROM EXCAVATION (1990)
- GROUNDWATER SAMPLE FROM EXCAVATION (1990)
- MANHOLE
- SANITARY SEWER
- STORM DRAIN
- µg/L MICROGRAMS PER LITER
- ND NOT DETECTED
- NS NOT SAMPLED
- DCA DICHLOROETHANE
- DCE DICHLOROETHENE
- PCE TETRACHLOROETHENE
- TCA TRICHLOROETHANE
- TCE TRICHLOROETHENE
- VC VINYL CHLORIDE
- J APPROXIMATE CONCENTRATION
- B INORGANIC VALUE IS GREATER THAN INSTRUMENT DETECTION LIMIT BUT LESS THAN CONTRACT REQUIRED DETECTION LIMIT.
- G ESTIMATED VALUE. VALUE IS BELOW THE CONTRACT REQUIRED QUANTITATION LIMIT BUT ABOVE 5 OR 10 TIMES RULE FOR BLANK CONTAMINATION
- (10) DETECTION LIMIT

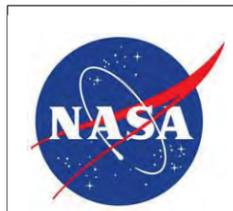
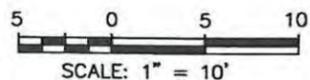


FIGURE 6
 CERCLA contamination detected in groundwater at UST2.
 Figure based on Figure D11 from Basewide Petroleum Sites Tech Memo Appendix D.



UST 14
Excavation Site

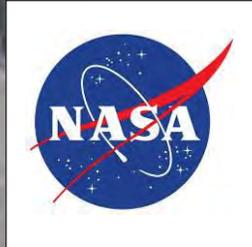


FIGURE 7

UST 14 excavation location and sample location of TPH-d soil contamination left.

Google Earth Photograph 9/26/2011. Data from Figure E-2 from Petroleum Appendix E.

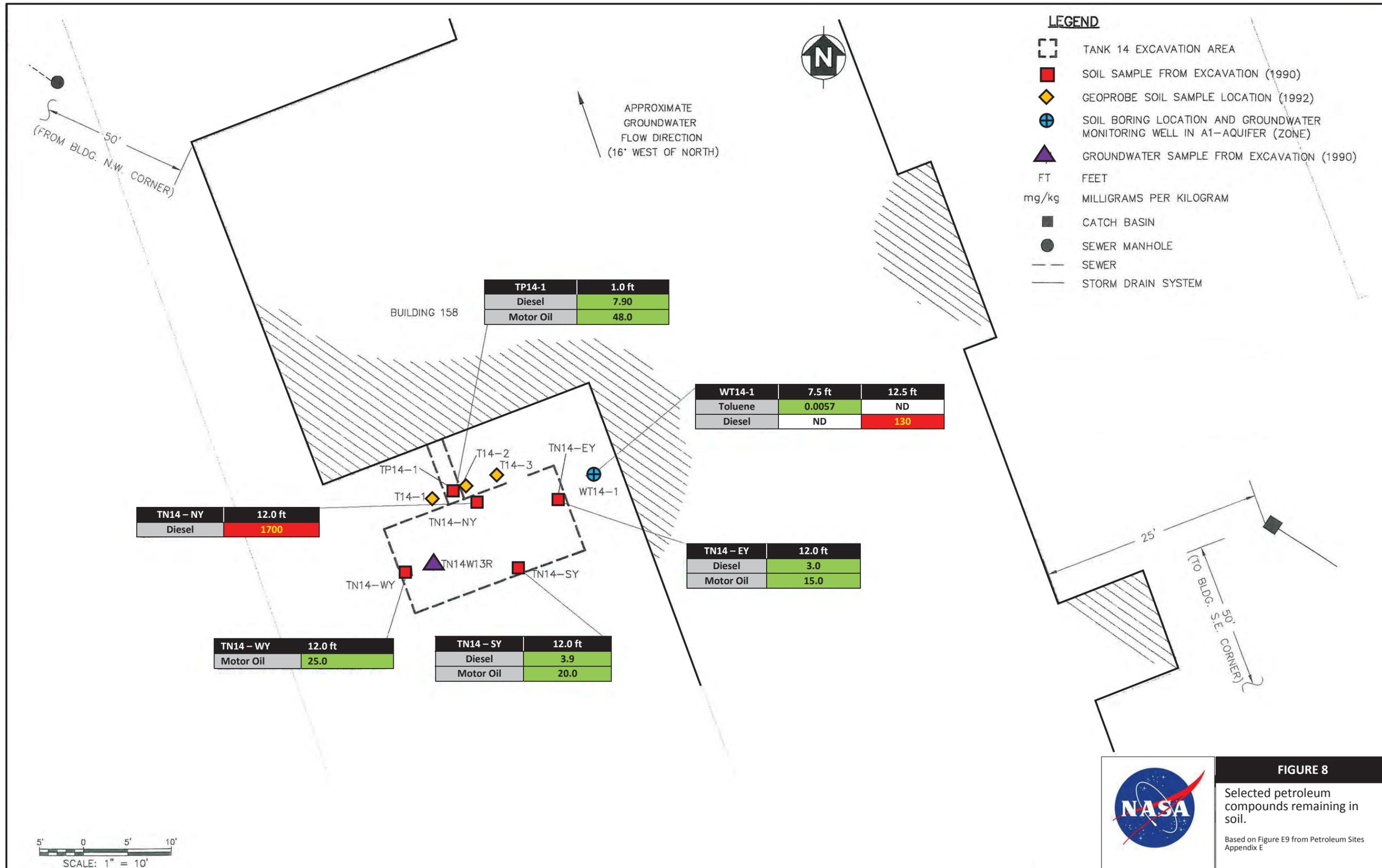


FIGURE 8

Selected petroleum compounds remaining in soil.

Based on Figure E9 from Petroleum Sites Appendix E

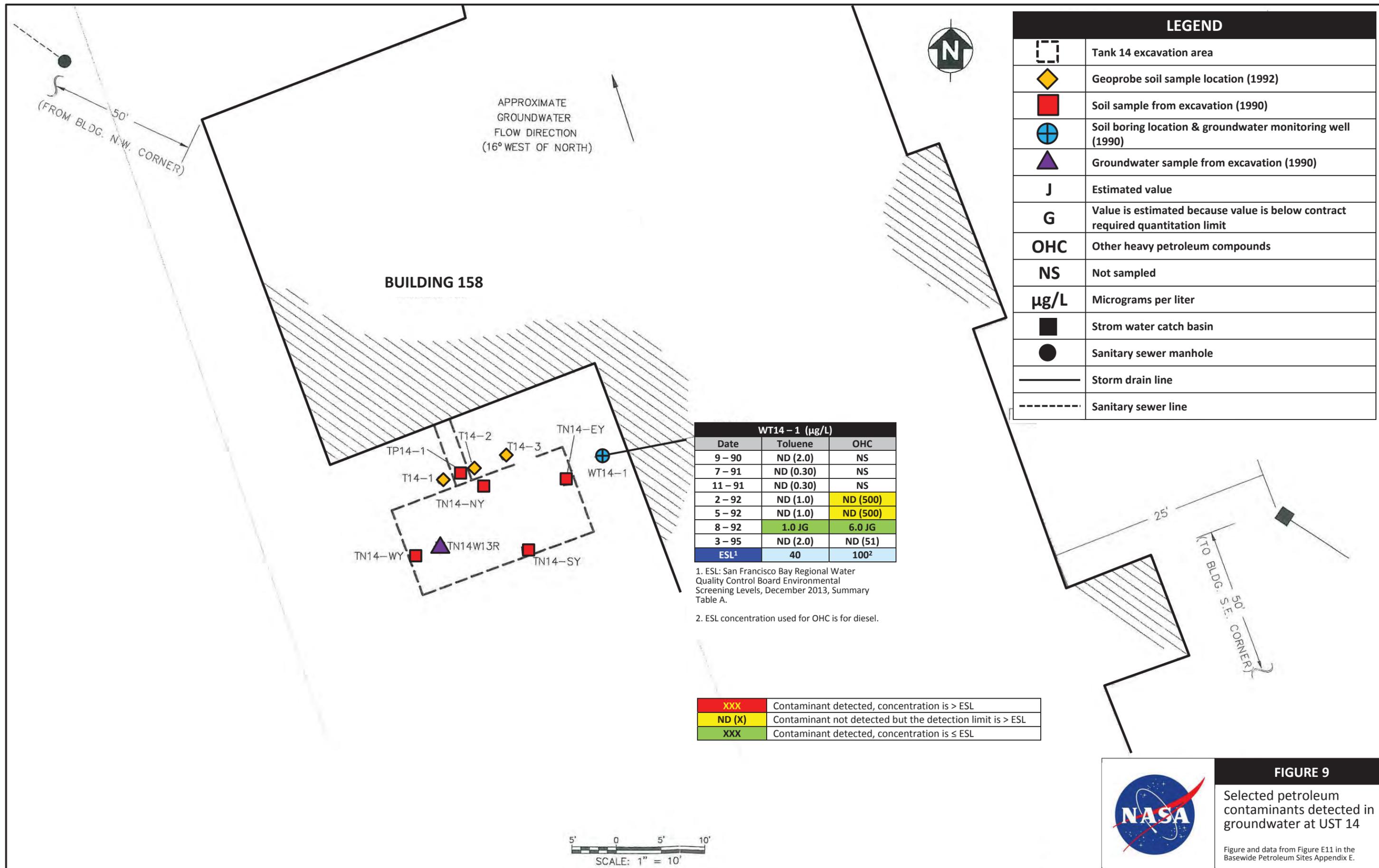


FIGURE 9
 Selected petroleum contaminants detected in groundwater at UST 14

Figure and data from Figure E11 in the Basewide Petroleum Sites Appendix E.

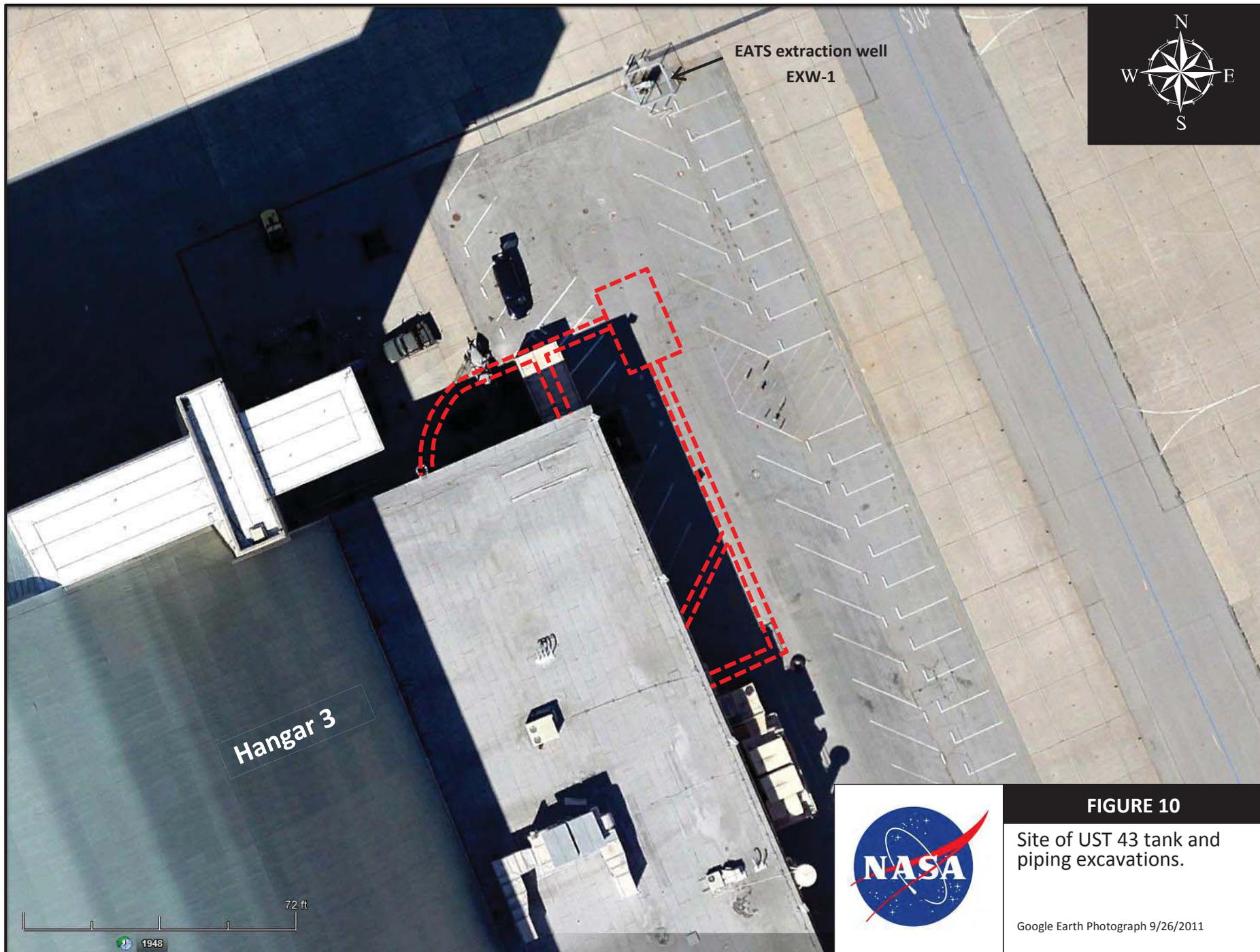


FIGURE 10

Site of UST 43 tank and piping excavations.

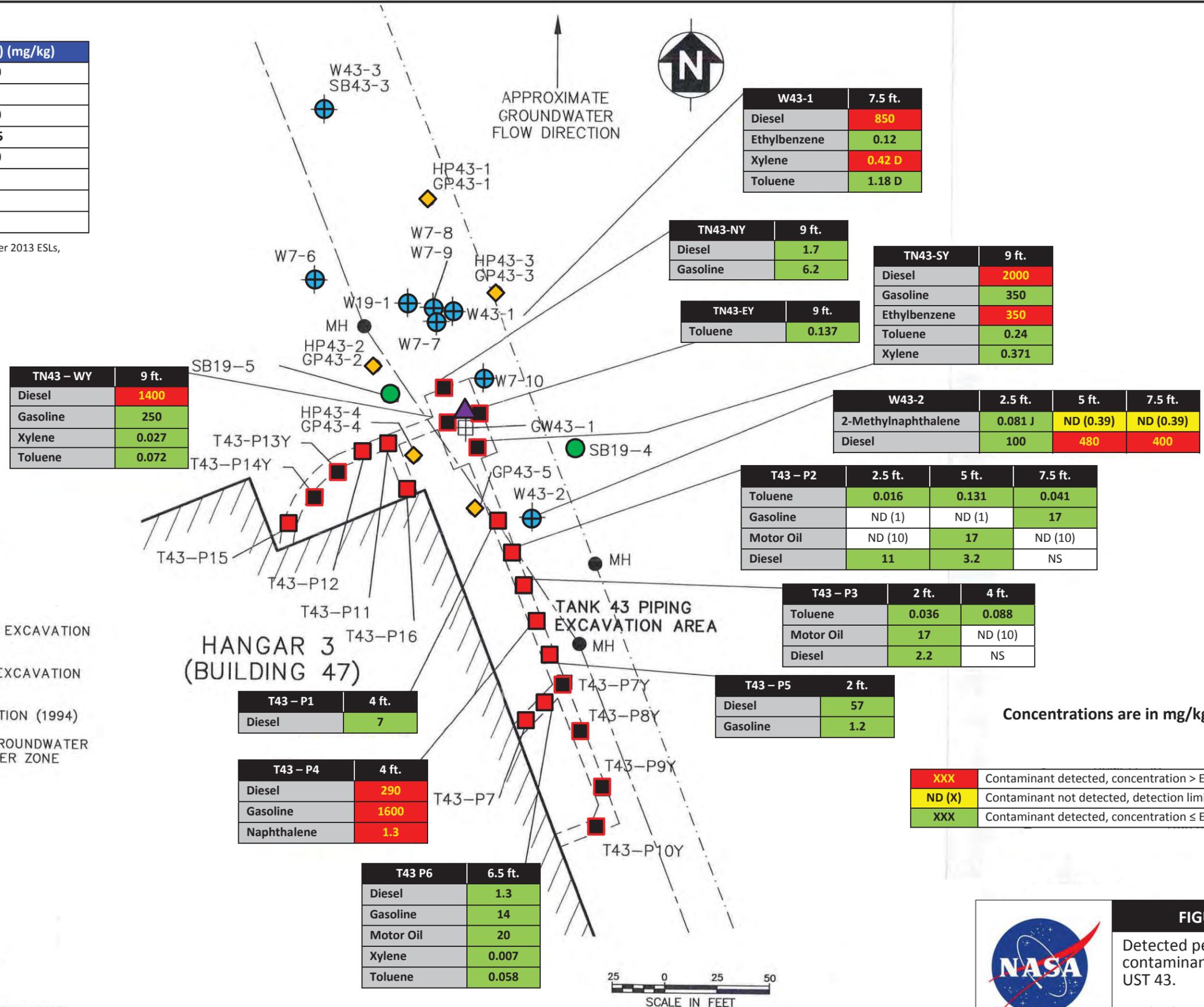
Google Earth Photograph 9/26/2011

Environmental Screening Level ¹ (ESL) (mg/kg)	
Diesel	110
Ethylbenzene	3.3
Gasoline	500
2-Methylnaphthalene	0.25
Motor Oil	500
Naphthalene	1.2
Toluene	2.9
Xylene	2.3

1. San Francisco Bay Regional Water Control December 2013 ESLs, Summary Table A, Commercial/Industrial Land Use.

LEGEND

- IT SOIL BORING (1989)
- GROUNDWATER SAMPLE FROM EXCAVATION (1990)
- TANK 43 EXCAVATION AREA
- SOIL SAMPLE FROM ENLARGED EXCAVATION (1990)
- SOIL SAMPLE FROM ORIGINAL EXCAVATION (1990)
- GEOPROBE SOIL SAMPLE LOCATION (1994)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER ZONE
- MANHOLE
- SANITARY SEWER
- STORM DRAIN
- NS NOT SAMPLED
- ND NOT DETECTED
- (1) DETECTION LIMIT
- J APPROXIMATE CONCENTRATION
- mg/kg MILLIGRAMS PER KILOGRAM
- D COMPOUNDS IDENTIFIED IN AN ANALYSIS AT A SECONDARY DILUTION FACTOR



XXX	Contaminant detected, concentration > ESL
ND (X)	Contaminant not detected, detection limit > ESL
XXX	Contaminant detected, concentration ≤ ESL



FIGURE 11
Detected petroleum contaminants in soil at UST 43.
Figure based on Figure 8 from the Phase II Basewide Tank Closure Report

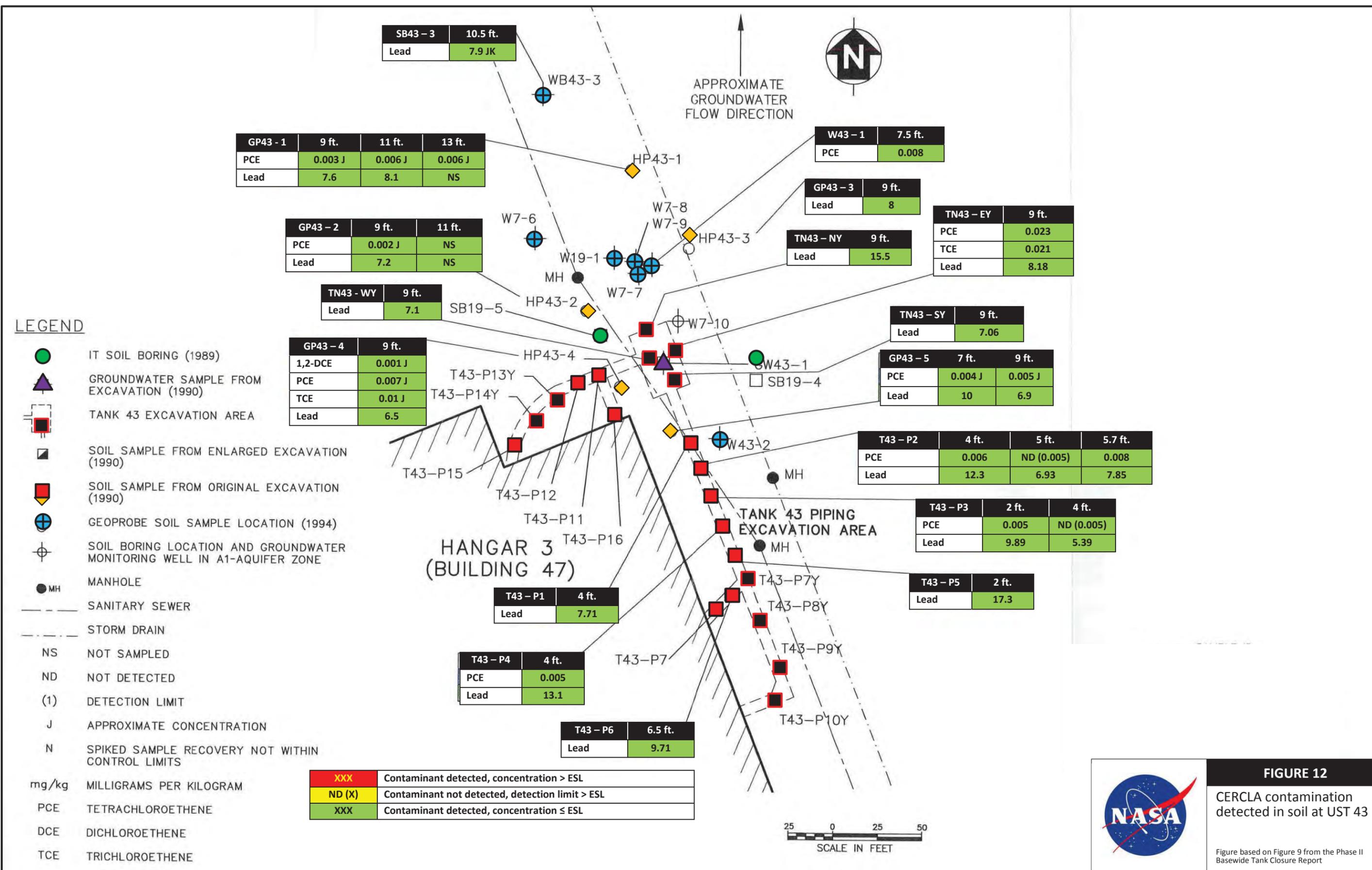


FIGURE 12

CERCLA contamination detected in soil at UST 43

Figure based on Figure 9 from the Phase II Basewide Tank Closure Report

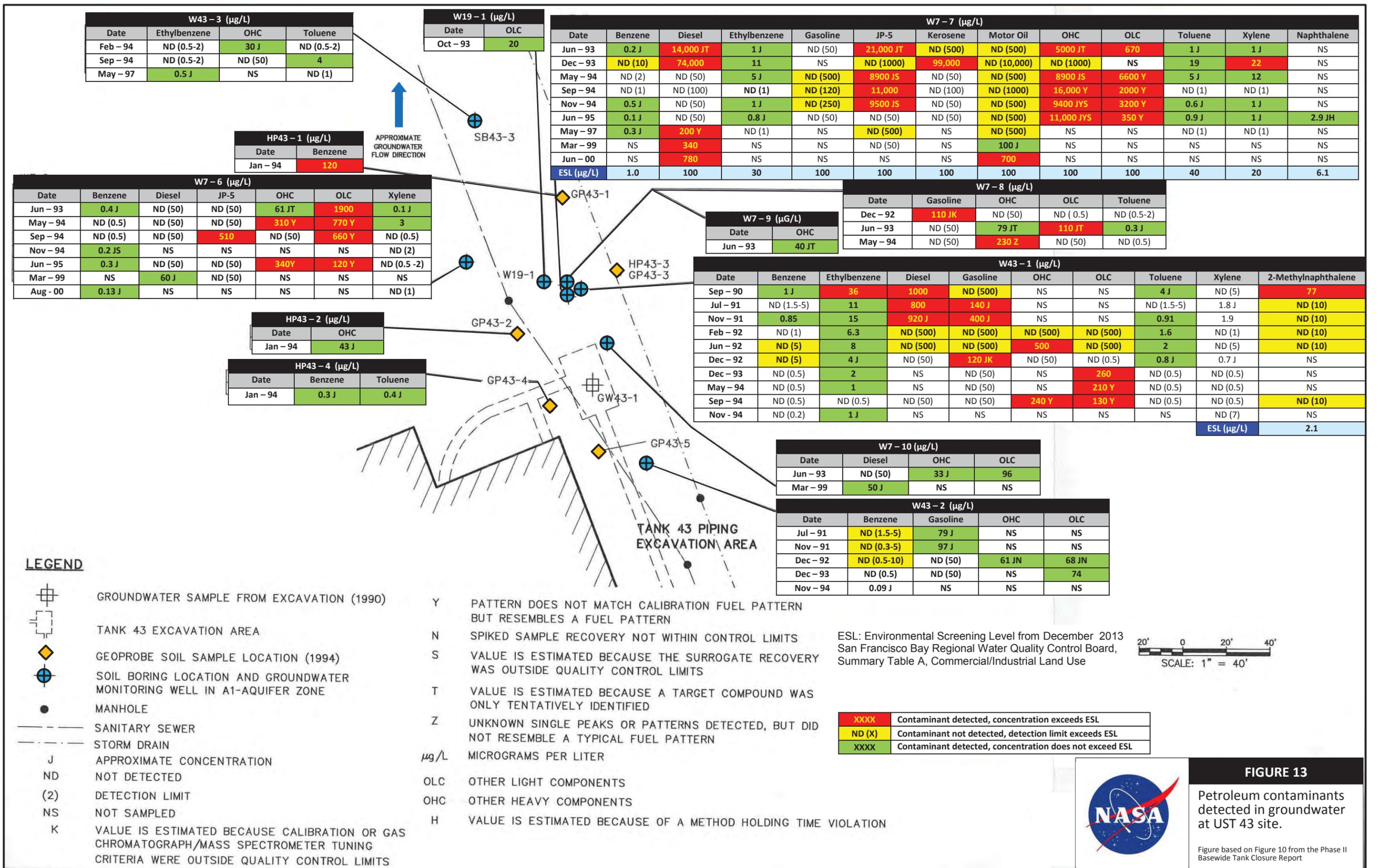


FIGURE 13
 Petroleum contaminants detected in groundwater at UST 43 site.
 Figure based on Figure 10 from the Phase II Basewide Tank Closure Report



W43-3 (µg/L)								
Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE	VC	Lead
Feb-94	0.3 J	2 J	0.5 J	3	0.7 J	1 J	ND (2)	ND (1)
May-94	0.4 J	2 J	0.7 J	3	0.7 J	1 J	ND (2)	NS
Sep-94	ND (2)	2 J	0.6 J	4	1 J	2 J	0.7 J	1.2 JZ
Nov-94	0.4 J	2 J	0.9 J	5	2 J	2 J	1 J	ND (2.9-4.6)
Jun-95	ND (5)	1 J	0.9 J	ND (2)	0.9 J	5	0.4 J	NS
May-97	2	3	1	8	7	15	0.5 J	NS
Mar-99	ND (0.5)	ND (0.5)	ND (0.5)	NS	6.6	4.5	ND (1)	NS
Jun-99	ND (1)	0.9 J	ND (1)	NS	4.1	3	ND (1)	NS
Jan-00	ND (1)	0.8 J	ND (1)	NS	2.1	2	ND (0.5)	NS
Aug-00	ND (1)	0.63	0.34 J	NS	2	2	0.31 J	NS

HP43-1 (µg/L)						
Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE
Jan-94	1 J	0.3 J	1 J	17	87	30

W7-6 (µg/L)						
Date	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE	VC
Jun-93	3	1 J	83 D	3	7	50 D
Dec-93	3 J	ND (10)	48	4 J	7 J	46
May-94	3 J	ND (10)	51	2 J	4 J	39
Sep-94	NS	NS	NS	NS	NS	NS
Nov-94	3	0.8 J	58	5	7	56
Jun-95	1 J	0.4 J	37	2 J	3	43
May-97	3	0.4 J	22	0.3 J	12	27
Mar-99	ND (0.5)	27				
Jun-99	2	0.5 J	NS	2	3.5	18.2
Jan-00	2	ND (1)	NS	2	2.3	24.2
Aug-00	0.85 J	0.31 J	NS	0.19 J	1.5	15

HP 43-2 (µg/L)					
Date	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE
Jan-94	2 J	1 J	14	67	22

HP43-4 (µg/L)						
Date	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE	VC
Jan-94	1 J	0.5 J	3	0.6 J	1 J	0.5 J

W7-10 (µg/L)									
Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE	VC	Lead
Jun-93	1 J	1 J	0.6 J	17	ND (2)	95 D	31	ND (2)	ND (1)
Aug-94	NS	NS	NS	NS	NS	NS	NS	NS	3.7
Nov-94	ND (10)	ND (10)	1 J	21	ND (10)	130	39	ND (10)	ND (1.3)
May-97	1 J	ND (3)	ND (3)	15	ND (3)	66	33	ND (3)	NS
Mar-99	ND (5)	ND (5)	ND (5)	NS	ND (0.5)	33.4	16.9	ND (1)	NS
Jun-99	0.9 J	1	0.7 J	NS	ND (1)	75	26	ND (0.5)	NS
Jan-00	0.9 J	1	0.4 J	NS	ND (1)	63	22	ND (0.5)	NS
Aug-00	0.37 J	0.6 J	0.25 J	NS	0.11 J	26	16	0.28 J	NS

W43-2 (µg/L)										
Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE	VC	Lead	
Sep-90	ND (5)	2 J	ND (5)	ND (5)	ND (5)	130	53	ND (10)	NS	
Jul-91	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	260	53	ND (10)	NS	
Nov-91	2	2 J	ND (5)	13	ND (8-10)	210	67	ND (10)	NS	
Feb-92	ND (2.5)	ND (2.5)	ND (2.5)	9.5	ND (8-10)	98	37	ND (1.2)	ND (0.8)	
Jun-92	2 J	2 J	ND (5)	13	ND (5)	130	40	ND (10)	ND (1.6)	
Dec-92	ND (10)	3 J	ND (10)	18	ND (8-10)	12	46	ND (10)	ND (1)	
Dec-93	NS	NS	NS	NS	NS	NS	NS	NS	NS	
Aug-94	NS	NS	NS	NS	NS	NS	NS	NS	1.5 B	
Nov-94	2	2	1 J	17	0.2 J	140 D	51 D	2 J	ND (2.3)	

Environmental Screening Level ¹ (ESL) (µg/L)	
Chloroform	80
1,1-DCA	5.0
1,1-DCE	6.0
1,2-DCE	6.0
Lead	2.5
PCE	5.0
1,1,1-TCA	62
TCE	5.0
Vinyl Chloride (VC)	0.5

1. ESL: San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, December 2013, Summary Table A.

LEGEND

- ◆ Hydropunch groundwater sample
- ⊕ Groundwater monitor well sample
- J Approximate concentration
- ND Not detected
- (2) Detection limit
- NS Not sampled
- s Value is estimated because the surrogate was outside quality control limits
- µg/L Micrograms per liter
- DCA Dichloroethane
- DCE Dichloroethene
- PCE Tetrachloroethene
- TCA Trichloroethane
- TCE Trichloroethene
- VC Vinyl chloride
- D Compounds identified in an analysis at a secondary dilution analysis
- B Inorganic value is greater than instrument detection limit but less than contract required detection limit
- Z Value is estimated due to negative blank problems
- XXX Compound detected, concentration > ESL
- ND (X) Compound not detected, detection limit > ESL
- XXX Compound detected, concentration ≤ ESL

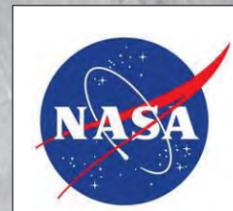


FIGURE 14

CERCLA compounds detected @ UST 43 in wells W43-2, W43-3, W7-6, W7-10 and Hydropunch locations HP43-1, HP43-2, & HP43-4. Based on Figure 11 from the Phase II Basewide Tank Closure Report



W19-1 (µg/L)

Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE	VC
Oct - 93	0.7 J	1 J	ND (2)	8	0.6 J	30	10 J*	ND (2)
Sep - 94	2 J	3	2	22	1 J	69 D	22	0.3 J
Dec - 94	1 J	3	2 J	16	2 J	57 D	20	ND (2)

W7-8 (µg/L)

Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE	VC	Lead
Dec - 92	3	4	3	23	1 J	150 D	42 D	0.3 J	ND (1)
Jun - 93	1 J	2	1 J	20	0.7 J	110 D	30	ND (2)	ND (1)
May - 94	NS	NS	NS	NS	NS	NS	NS	NS	NS
May - 97	ND (3)	2 J	ND (3)	16	ND (3)	72	25	ND (3)	NS
Mar - 99	ND (5)	ND (5)	ND (5)	ND(5)	ND (5)	7.3	3.3	ND (1)	ND(0.95)
Jun - 99	ND (1)	0.4 J	ND (1)	NS	ND (1)	7.9	3	ND (0.5)	NS
Jan - 00	ND (1)	ND (1)	ND (1)	NS	ND (1)	5	2	ND (0.5)	8.5
Aug - 00	0.59 J	1.5	0.98 J	NS	0.18 J	64	22	0.21 J	NS

W7-9 (µg/L)

Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE
Jun - 93	ND (2)	3	0.7 J	2	ND (2)	ND (2)	ND (2)
Sep - 94	0.6 J	3	0.8 J	1 J	0.2 J	0.5 J	0.4 J
Nov - 94	ND (92)	4 JS	0.9 JS	2 JS	ND (2)	0.4 JS	ND (2)

W43-1 (µg/L)

Date	1,1-DCA	1,1-DCE	1,2-DCE	Chloroform	PCE	TCE	VC	Lead
Sep - 90	5	3 J	110	ND (5)	ND (5)	22	66	NS
Jul - 91	5	3	98	ND (5)	ND (5)	52	48	NS
Nov - 91	6	3 J	ND (5)	ND (5)	ND (5)	46	80	NS
Feb - 92	3.7	1.5	58 D	39	ND (1)	21	52 D	ND (0.8)
Jun - 92	6	2 J	79	ND (5)	2 J	34	89	ND (1.6)
Dec - 92	6	2J	90	ND (5)	7	11	56	ND (1)
Dec - 93	NS	NS	NS	NS	NS	NS	NS	NS
May - 94	NS	NS	NS	NS	NS	NS	NS	ND (1)
Aug - 94	NS	NS	NS	NS	NS	NS	NS	1.5 B
Sep - 94	NS	NS	NS	NS	NS	NS	NS	ND (0.99)
Nov - 94	3 J	0.8 J	46	ND (7)	ND (7)	4 J	110	ND (2.8)

HP43-3 (µg/L)

Date	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE
Jan - 94	1 J	1 J	1 J	12	80	45

W7-7 (Mg/L)

Date	1,1-DCA	1,1-DCE	1,2-DCE	PCE	TCE	VC
Jun - 93	3	1 J	83 D	3	7	50 D
Dec - 93	3 J	ND (10)	48	4 J	7 J	46
May - 94	3 J	ND (10)	51	2 J	4 J	39
Sep - 94	NS	NS	NS	NS	NS	NS
Nov - 94	3	0.8 J	58	5	7	56
Jun - 95	1 J	0.4 J	37	2 J	3 J	43
May - 97	3	0.4 J	22	0.3 J	12	27
Mar - 99	ND (0.5)	27				
Jun - 99	2	0.5 J	NS	2	3.5	18.2
Jan - 00	2	ND (1)	NS	2	2.3	24.2
Aug - 00	0.85 J	0.31 J	NS	0.19 J	1.5	15

Environmental Screening Level¹ (ESL) (µg/L)

Chloroform	80
1,1-DCA	5.0
1,1-DCE	6.0
1,2-DCE	6.0
Lead	2.5
PCE	5.0
1,1,1-TCA	62
TCE	5.0
Vinyl Chloride (VC)	0.5

1. ESL: San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, December 2013, Summary Table A.

LEGEND

	Hydropunch groundwater sample	D	Compounds identified in an analysis at a secondary dilution analysis
	Groundwater monitor well sample	B	Inorganic value is greater than instrument detection limit but less than contract required detection limit
J	Approximate concentration	Z	Value is estimated due to negative blank problems
ND	Not detected	XXX	Compound detected, concentration > ESL
(2)	Detection limit	ND (X)	Compound not detected, detection limit > ESL
NS	Not sampled	XXX	Compound detected, concentration ≤ ESL
S	Value is estimated because the surrogate was outside quality control limits	*	Value estimated because precision laboratory matrix spike/matrix spike duplicate sample was outside quality control limits
µg/L	Micrograms per liter		
DCA	Dichloroethane		
DCE	Dichloroethene		
PCE	Tetrachloroethene		
TCA	Trichloroethane		
TCE	Trichloroethene		
VC	Vinyl chloride		

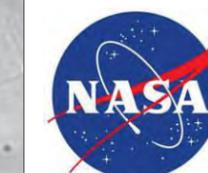


FIGURE 15

CERCLA compounds detected @ UST 43 in wells W19-1, W43-1, W7-7, W7-8, W7-9 and Hydropunch location HP43-3.

Based on Figure 11 from the Phase II Basewide Tank Closure Report

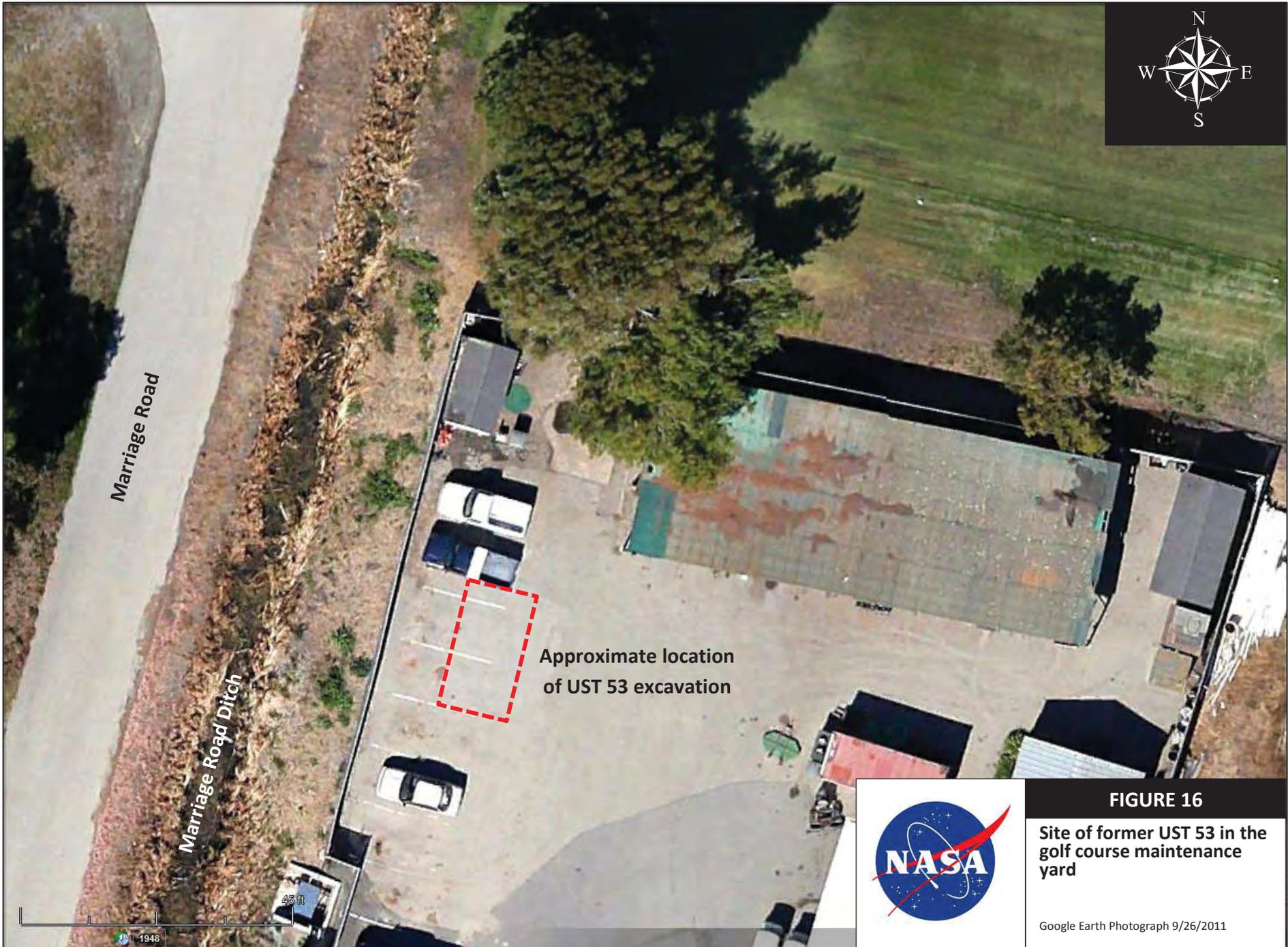


FIGURE 16

**Site of former UST 53 in the
golf course maintenance
yard**

Google Earth Photograph 9/26/2011

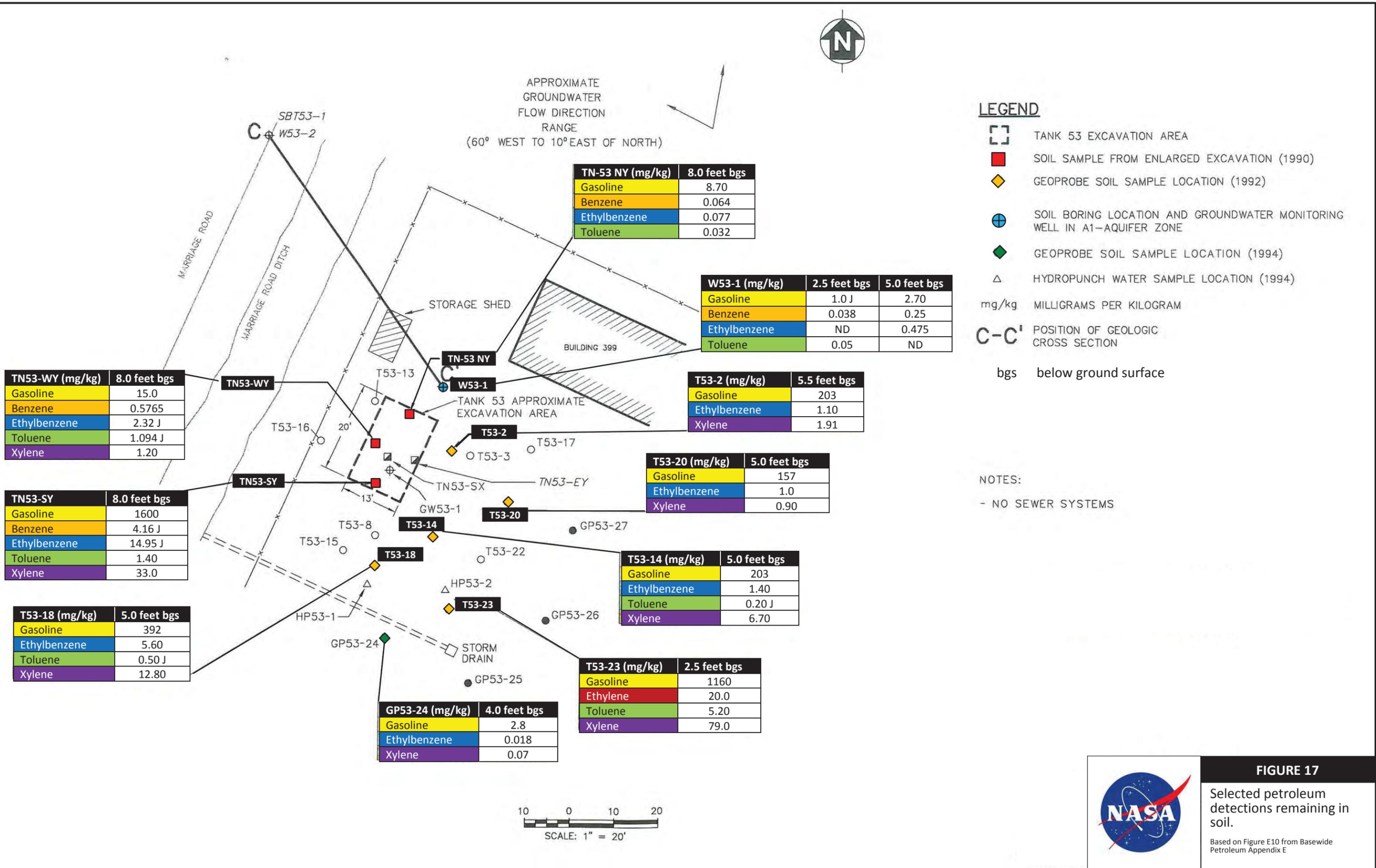
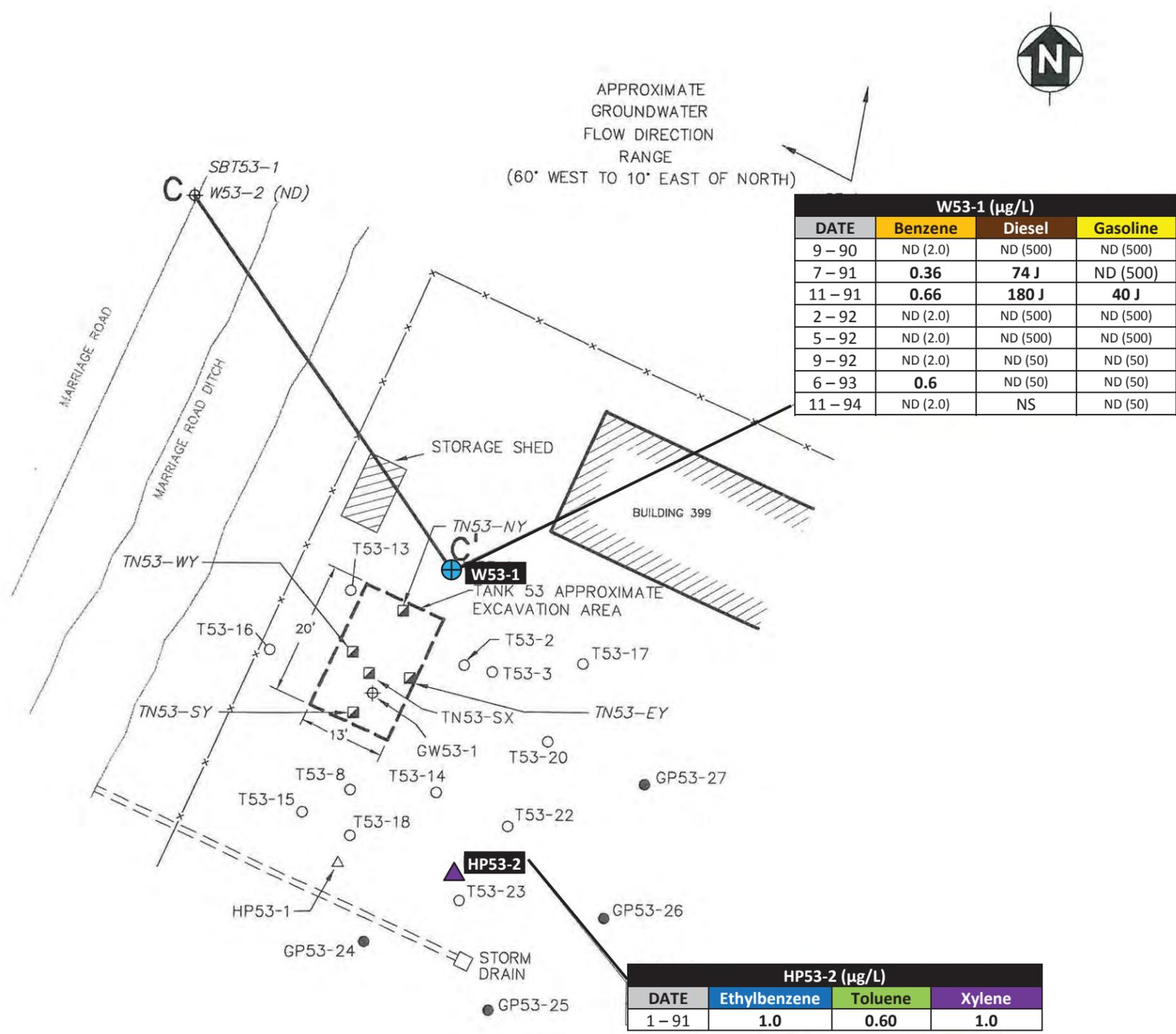


FIGURE 17

Selected petroleum detections remaining in soil.

Based on Figure E10 from Basewide Petroleum Appendix E



LEGEND

- TANK 53 EXCAVATION AREA
- SOIL SAMPLE FROM ENLARGED EXCAVATION (1990)
- GEOPROBE SOIL SAMPLE LOCATION (1992)
- SOIL BORING LOCATION AND GROUNDWATER MONITORING WELL IN A1-AQUIFER ZONE
- GEOPROBE SOIL SAMPLE LOCATION (1994)
- HYDROPUNCH WATER SAMPLE LOCATION (1994)
- C-C'** POSITION OF GEOLOGIC CROSS SECTION
- NS NOT SAMPLED
- J ESTIMATED VALUE
- µg/L MICROGRAMS PER LITER

NOTES:

- NO SEWER SYSTEMS

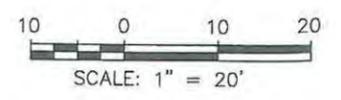



FIGURE 18
 Detected petroleum compounds at UST 53 in groundwater.
 Based on Figure E12 from Basewide Petroleum Appendix E