REPORT OF ADDITIONAL SITE ASSESSMENT
ENGINEER'S HILL
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

ESE PROJECT #6-93-5073

PRESENTED TO:

ALAMEDA COUNTY GENERAL SERVICES AGENCY
4400 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA 94619

PREPARED BY:

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
4090 NELSON AVENUE, SUITE J
CONCORD, CALIFORNIA 94520
(510) 685-4053

JUNE 30, 1994

Environmental
Science &
Engineering, Inc.

A CILCORP Company

TO: Alameda County
Health Care Services Agency
Department of Environmental Health
80 Swan Way, Rm. 350
Oakland, CA 94621

DATE: July 6, 1994

ATTN: Mr. Scott Seery

JOB NUMBER: 6-93-5073

SUBJECT: Engineer's Hill, Santa Rita Correctional Facility, Dublin, California

WE ARE TRANSMITTING THE FOLLOWING:

One copy of a Report of Additional Site Assessment for work performed at the subject location. The Alameda County General Services Agency has indicated an interest in proceeding with the recommended work upon receipt of your written approval.

Sincerely,

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

BY _____
Bart S. Miller
Project Geologist

DIST:
LB
FILE
ORIGINATOR

4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323

This report has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of the Alameda County General Services Agency as it pertains to their site referred to as Engineer's Hill located at the Santa Rita Correctional Facility in Dublin, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this report.

REPORT PREPARED BY:

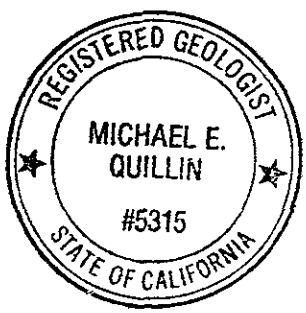
Bart S. Miller
Project Geologist

JULY 6, 1994
DATE

UNDER THE PROFESSIONAL SUPERVISION OF:

Michael E. Quillin
Senior Hydrogeologist
California Registered Geologist No. 5315

JULY 6, 1994
DATE



PROJECT NO. 6-93-5073

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DETAILED SITE ASSESSMENT REPORT
ENGINEER'S HILL, SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of additional site assessment activities conducted by Environmental Science & Engineering, Inc. (ESE) for the Alameda County General Services Agency (GSA) at the Engineer's Hill site on May 3, 1994. The objectives of this additional assessment were to determine the vertical and lateral extent of petroleum hydrocarbons in soil beneath the site. All activities described in this report were conducted in response to written authorization from the GSA. Site assessment procedures were conducted in accordance with Alameda County Health Care Services Agency (HCSA) guidelines, and follow California Regional Water Quality Control Board Tri-Regional Board recommendations (RWQCB, 1990).

1.1 SITE HISTORY

The Engineer's Hill site is located within the Santa Rita Correctional Facility property boundary, approximately two miles northwest of the California Interstate 580 intersection with Tassajara Road at Dublin, California (Figure 1 - Location Map). The site is owned and managed by the GSA. At the site, the County of Alameda (County) formerly operated one 1,000-gallon-capacity underground storage tank (UST) containing diesel fuel (Figure 2 - Site Plan). The UST was constructed of single-walled carbon-steel and fueled a boiler formerly located adjacent to the UST location. The installation date of the UST is unknown.

Under permit from the HCSA and the Dougherty Regional Fire Authority (DRFA), ESE removed and disposed of the UST on May 18, 1992. Personnel from the HCSA and the DRFA witnessed UST removal activities and subsequent soil sampling. No fluids were found in the UST prior to removal.

ESE personnel collected one native soil sample from the base of the UST excavation and submitted it to a California-certified laboratory where it was analyzed for total petroleum hydrocarbons as diesel (TPH-D); benzene, toluene, ethylbenzene, and total xylenes (BTEX); and oil and grease (O&G). The sample was reported to contain TPH-D at a concentration of 190 milligrams per kilogram (mg/Kg). No detectable concentrations of BTEX or O&G were reported in the sample. ESE submitted a closure report for the UST site to the GSA and the HCSA on June 25, 1992 (ESE, 1992).

ESE supervised the overexcavation of impacted soil at the former UST site on November 8, 1992. At a depth of nine feet below grade, ESE personnel observed grey discoloration and a petroleum hydrocarbon odor in a pebbly sand sediment and noted a petroleum hydrocarbon odor. The impacted soil was observed to extend to a depth of approximately 22 feet below grade, the limit of the excavation equipment's reach. One sample, collected by ESE from the impacted soil at a depth of 22 feet below grade, was submitted to a California-certified laboratory for analysis. The sample was reported to contain TPH-D at a concentration of 1,400 mg/Kg and detectable concentrations of BTEX constituents.

To determine the areal extent of impacted soil, three test pits were excavated to maximum depths of 22 feet below grade at locations approximately 10 to 25 feet east, west, and south of the former UST location. No soil discoloration or petroleum hydrocarbon odors were noted at these locations. Ground water was not found in these excavations, and it was not known whether ground water beneath the site had been impacted. Results of the excavation activities were documented in a report submitted to the GSA and the HCSA on January 7, 1993 (ESE, 1993a). Based on these findings, ESE recommended further site assessment be performed to determine the vertical and lateral extent of petroleum hydrocarbons in the unsaturated zone beneath the site and to determine whether ground water at the site had been impacted.

On June 29, 1993, ESE submitted a workplan for a site assessment to the HCSA on behalf of the GSA (ESE, 1993b). The proposed site assessment was comprised of drilling and sampling soil in five borings and collecting one ground water sample in one boring using a Hydropunch® sampler. Results of this assessment indicated that the UST excavation backfill material and formational sediments located beneath the backfill material to an approximate depth of 40 feet below grade are impacted with diesel fuel (ESE, 1994a). In addition, results indicated that the petroleum hydrocarbon plume appears to have migrated toward the west in an apparently dipping pebbly to silty sand layer. The extent of petroleum hydrocarbon migration toward the west was not known. The lack of evidence of ground water saturation in the deepest boring (EH2) to a depth of 80 feet below grade and the presence of a nonimpacted, "tight", clay layer of 15 feet minimum thickness beneath the impacted sediments has also suggested that the petroleum hydrocarbon plume has not migrated to ground water beneath the site (ESE, 1994a). Based on these findings, ESE recommended additional site assessment be performed to more accurately define the petroleum hydrocarbon plume toward the west of the UST backfill in the apparently dipping sand layer.

On April 7, 1994, ESE submitted a workplan for additional site assessment to the HCSA on behalf of the GSA (ESE, 1994b). The proposed additional site assessment was comprised of drilling and sampling soil in three borings located west of the UST backfill material. The HCSA approved the workplan activities in a letter dated May 3, 1994.

1.2 REGIONAL GEOLOGY, HYDROLOGY, PRECIPITATION, AND WATER USAGE

A comprehensive description of the regional geology, regional hydrology, local precipitation, and local water usage was documented in a report prepared by ESE and previously submitted to the HCSA (ESE, 1994a).

2.0 FIELD METHODOLOGY

2.1 SOIL SAMPLING AND ANALYSIS

ESE supervised the drilling and sampling of three soil borings (EH6, EH7, and EH8; Figure 2) during this site assessment. All drilling activities were performed by Exploration Geoservices, Inc. (EGI) of San Jose, California using a Mobile B-61 hollow-stem auger drill rig. To identify the top of the apparently dipping sand layer to the west of boring EH3 (Figure 2), where the top of the sand layer was identified at a depth of approximately 45 feet below grade, ESE continuously sampled the first boring (EH6) during this fieldwork from a depth of 40 feet below grade to a depth of 70 feet below grade. Once identified, soil samples were collected in subsequent borings (EH7 and EH8) at five-foot intervals, at distinct lithologic contacts, and at zones of obvious petroleum hydrocarbon impact from a depth of approximately 40 feet below grade to the bottom of each boring. All soil boring and sampling was conducted in accordance with ESE Standard Operating Procedure No. 1 for Soil Borings and Soil Sampling with Hollow-Stem Augers in Unconsolidated Formations (Appendix A - ESE Standard Operating Procedure No. 1).

Borings EH6 and EH7 were drilled to a total depth of 81 feet below grade and boring EH8 was drilled to a total depth of 70 feet below grade. No ground water was encountered in the soil borings and each was backfilled to grade with cement grout after sampling was completed.

A total of 34 soil samples were collected during this additional site assessment. Based on the screening of volatile organic compounds (VOCs) with a photoionization detector (PID) and visual observations, a total of six soil samples were placed in a cooler with ice and transported under chain of custody documentation to McCampbell Analytical (a California-certified laboratory) of Pacheco, California. All samples were analyzed for TPH-D and BTEX using EPA Method 8015 (modified per CA LUFT) and EPA 8020, respectively.

2.2 WASTE MANAGEMENT

All decontamination rinsates were placed in appropriately labeled 55-gallon capacity Department of Transportation (DOT)-approved drums for temporary storage at the site. Each drum of rinsate was labeled according to source location. As requested by the GSA, all soil drill cuttings were stockpiled at the site on and under plastic sheeting.

3.0 RESULTS

The results of this additional site assessment at the Engineer's Hill former UST site concur with previous findings indicating soil comprised mostly of clay and sandy silts with interbeds of sand, having either a pebbly or silty component, to a depth of 81 feet below grade. Geologic logs for borings EH6, EH7, and EH8 are presented in Appendix B.

Two of the six samples collected at the Engineer's Hill site and submitted for analysis were reported to contain detectable concentrations of TPH-D and BTEX constituents (Table 1 - Analytical Results of Soil Samples Collected From Borings). The two samples containing detectable concentrations of petroleum hydrocarbons (EH8-60' and EH8-63') were collected from boring EH8 at depths of 60 feet and 63 feet below grade. The highest concentration of TPH-D was reported to be 3,900 mg/Kg in sample EH8-63'. No visible discoloration of the samples were observed. Analytical reports with chain of custody documentation are presented in Appendix C.

No ground water was found while drilling the soil borings at the Engineer's Hill site. This finding is consistent with past findings (ESE, 1994a). Schematic cross-sections utilizing boring log data for the site indicate that the plume of petroleum hydrocarbon impacted soil in the unsaturated zone extends from the UST excavation backfill vertically downward through interbeds of sandy silt, sand, and pebbly sand to a silty sand bed located at a depth of approximately 42 feet below grade (Figure 3 - East-West Oriented Schematic Cross-Section; Figure 4 - North-South Schematic Cross-Section). This impacted sand bed has an apparent dip toward the west and is underlain by more than ten feet of nonimpacted silty clay and sandy silt sediments.

The petroleum hydrocarbons appear to have migrated both laterally and vertically along the apparently dipping sand bed toward the west and were detected in soil samples collected from boring EH8 at depths of 60 feet and 63 feet (Figure 3). During the previous site investigation activities, detectable concentrations of petroleum hydrocarbons and visible blue

discoloration were reported to occur in a soil sample collected from the same sand bed in boring EH3 (located approximately 20 feet to the northeast of boring EH8) at a depth of 50 feet (ESE, 1994a). The thickness of the impacted sand layer at EH8 is approximately five feet and the thickness of the same layer at EH3 was measured to be approximately ten feet. appears to be "pinching out" as this bed plunges to west

No petroleum hydrocarbons were detected in soil samples collected from boring EH6 located approximately 25 feet west northwest of EH8 and boring EH7 located approximately 23 feet north northwest of EH8 (Figure 3). Soil samples were collected in the apparently dipping sand layer at a depth of 72 feet below grade at boring EH6 and at a depth of 75 feet below grade at boring EH7.

4.0 DISCUSSION AND CONCLUSIONS

When projecting the apparent dip of the impacted sand layer toward the west from EH3, the anticipated depth of intersection with the top of the sand layer is approximately 67 feet below grade at boring EH6 and approximately 60 feet below grade at boring EH7. These estimates are based on the difference in depth to distance ratio calculated between borings EH3 and EH8. The actual depths of intersection with the top of the impacted sand layer were observed to be 70 feet below grade at borings EH6 and EH7. This result indicates consistency in the apparent westward dip of the sand layer across the site.

Petroleum hydrocarbons were not reported to occur in soil samples collected from the apparently dipping sand layer at borings EH6 and EH7. These analytical results support the observations made in the field, including visual observation and VOC measurements with a PID. However, detectable concentrations of petroleum hydrocarbons were reported to occur in soil samples collected from the apparently dipping sand layer at boring EH8. The sand layer was noted to have decreased in thickness from approximately ten feet at boring EH3 to approximately five feet at boring EH8. Unlike soil samples collected at boring BH3, no discoloration of impacted soil was observed at boring EH8. The highest reported concentration of TPH-D in a sample collected at EH8 (3,900 mg/Kg) as compared to the highest reported concentration of TPH-D in a sample collected at EH3 (17,000 mg/Kg) shows an approximate fourfold decrease in TPH-D concentration over a distance of approximately 17 feet toward the west. Given these results, ESE has estimated the westernmost extent of the petroleum hydrocarbon plume in the apparently dipping sand layer to be located approximately 5 to 25 feet west of boring EH8 (Figure 5 - Diesel Plume in Unsaturated Zone).

The lack of evidence of ground water saturation to a minimum depth of 81 feet below grade at the site and the presence of a nonimpacted, "tight', clay layer of 15 feet minimum thickness beneath the impacted sediments suggests that the petroleum hydrocarbon plume has not migrated to ground water beneath the site.

5.0 RECOMMENDATIONS

Based upon the conclusions derived from this additional site assessment at Engineer's Hill, ESE recommends the following:

- The GSA excavate all soil impacted with petroleum hydrocarbons located directly beneath the UST backfill materials to a maximum depth of approximately 40 feet below ground surface;

- An assessment of risk to human health be performed for the residual soil impacted with petroleum hydrocarbons. The assessment would be facilitated using data collected to date and data generated during the recommended corrective action described above.

6.0 REFERENCES

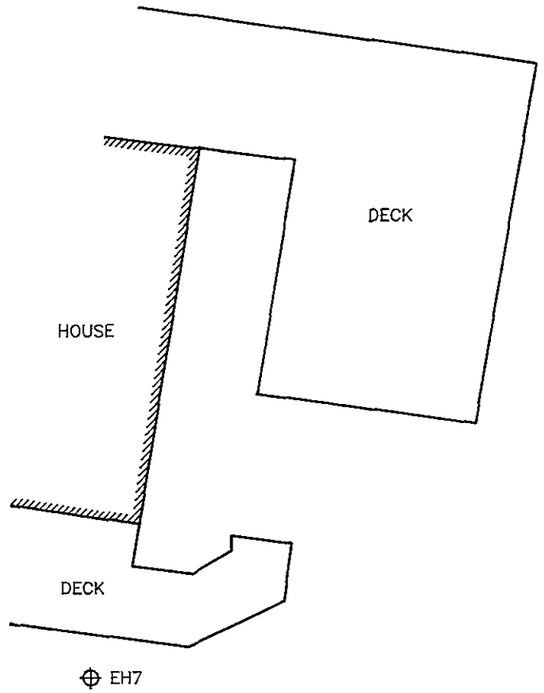
Environmental Science & Engineering Inc. (ESE), 1992. Unpublished UST Closure Report, Engineer's Hill, Santa Rita Correctional Facility, Dublin, California; June 25, 1992.

Environmental Science & Engineering, Inc. (ESE), 1993a. Unpublished Letter Report to the Alameda County General Services Agency Concerning Overexcavation Activities at Engineer's Hill, Santa Rita Correctional Facility, Dublin, California; January 7, 1993.

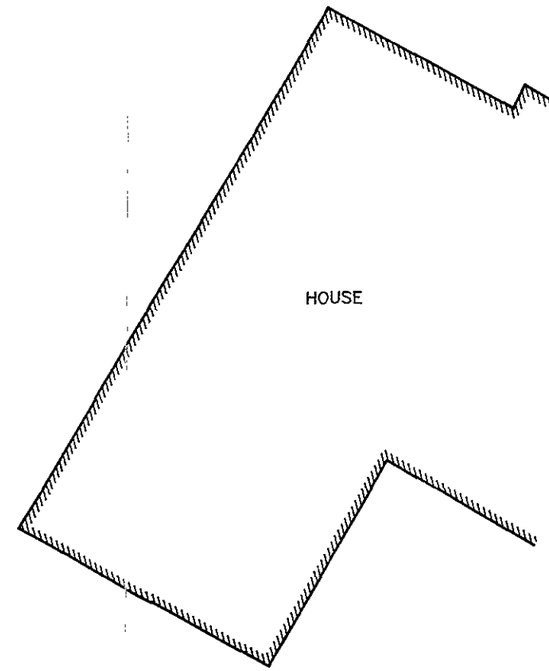
Environmental Science & Engineering, Inc. (ESE), 1993b. Unpublished Workplan for Soil and Ground Water Investigation at Engineer's Hill, Santa Rita Correctional Facility, Dublin, California; June 29, 1993.

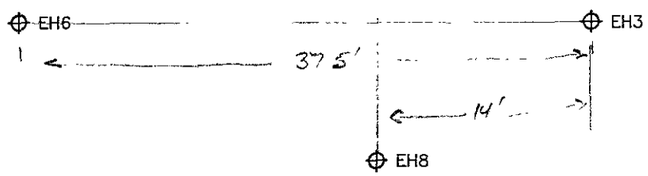
Environmental Science & Engineering, Inc. (ESE), 1994a. Unpublished Site Assessment Report for Engineer's Hill, Santa Rita Correctional Facility, Dublin, California; February 1, 1994.

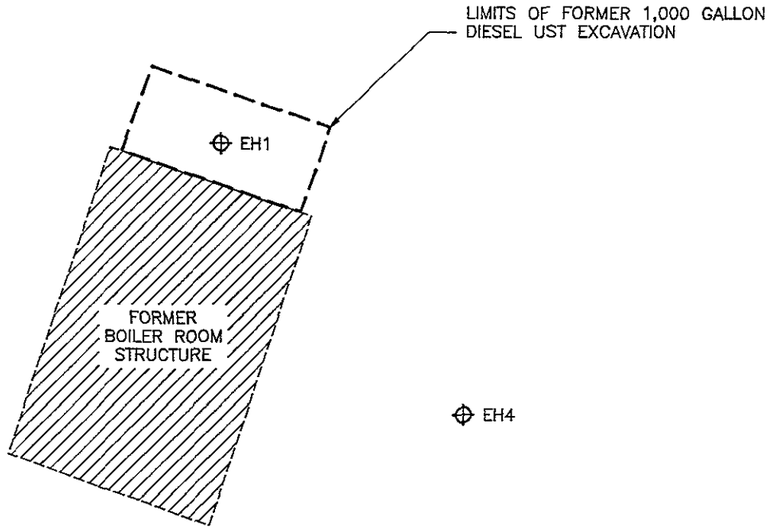
Environmental Science & Engineering, Inc. (ESE), 1994b. Unpublished Workplan for Additional Site Investigation for Engineer's Hill, Santa Rita Correctional Facility, Dublin, California; April 7, 1994.



EH5







EH4

LEGEND

EH SOIL BORING LOCATION

EH2

SCALE 0 10 FEET

ESE A CILCORP Company
Environmental Science & Engineering, Inc.
4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

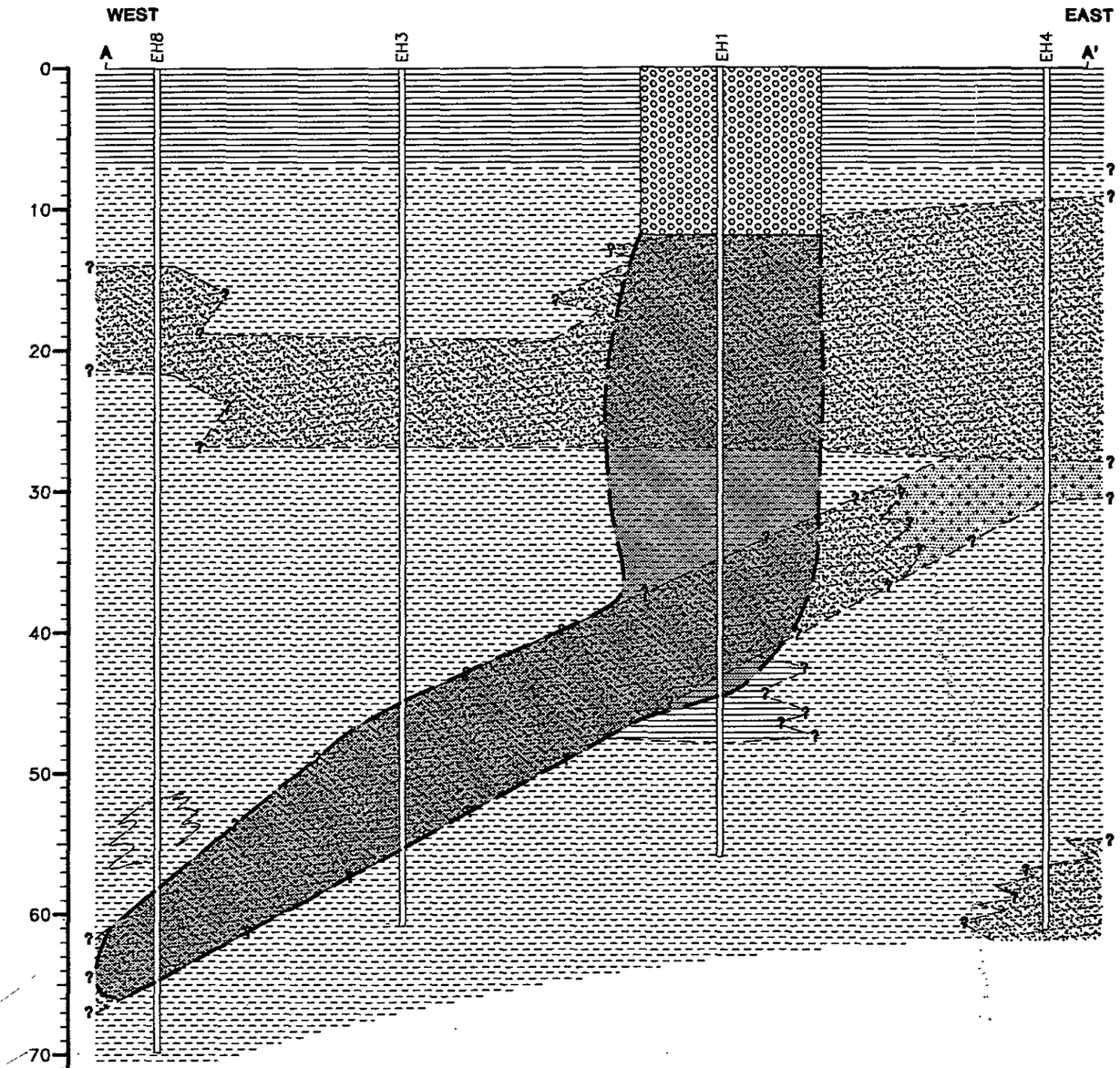
DATE 1/94
REVISED
CAD FILE 50731003

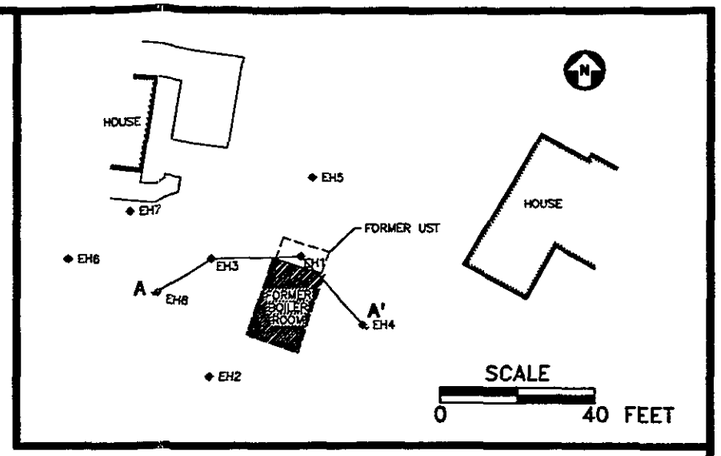
SITE PLAN

ALAMEDA COUNTY GENERAL SERVICES AGENCY
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

FIGURE NO. 2
PROJ. NO. 6-93-5073

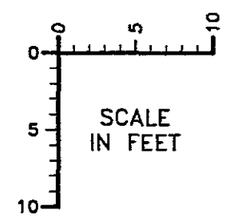
EH6



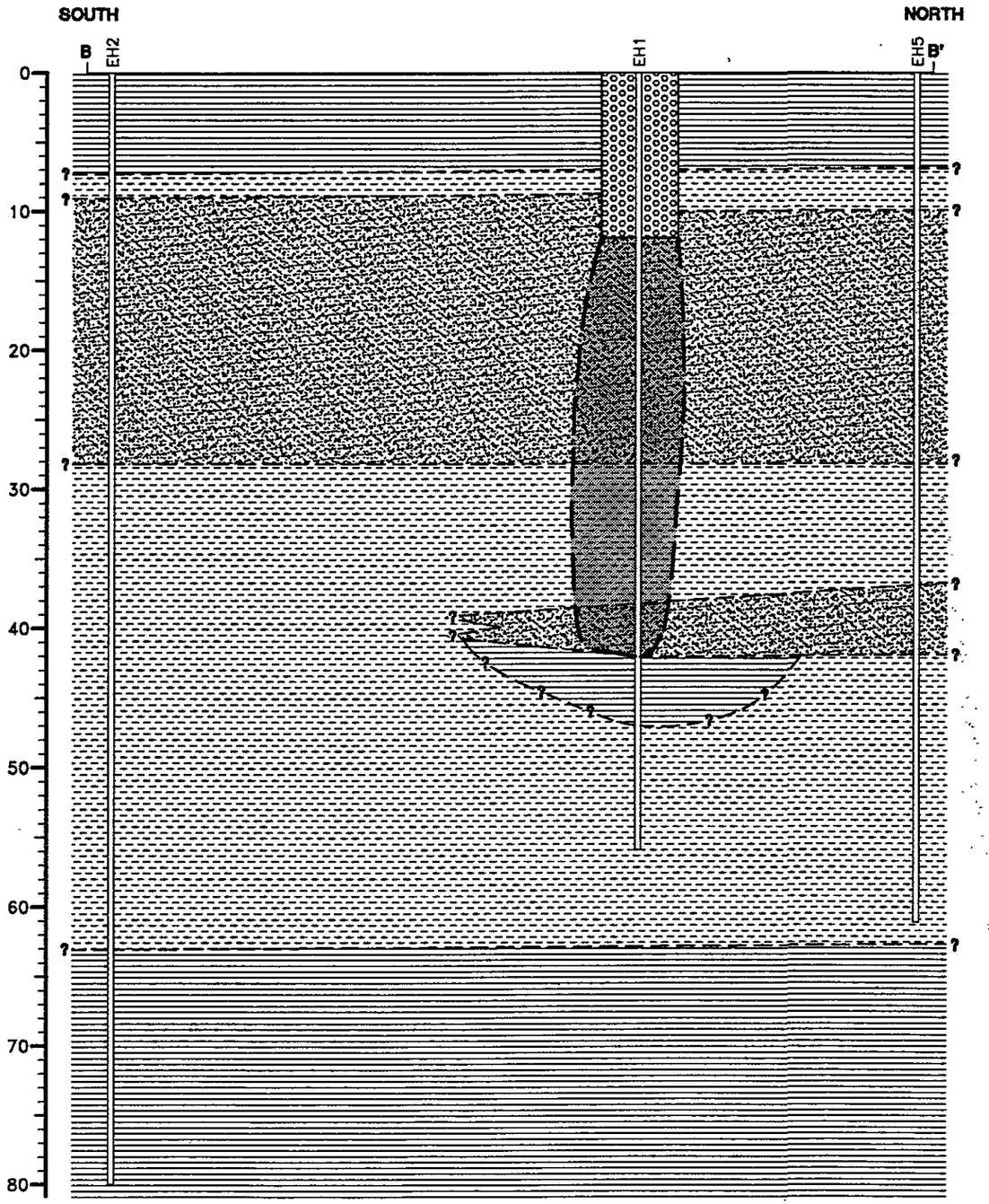


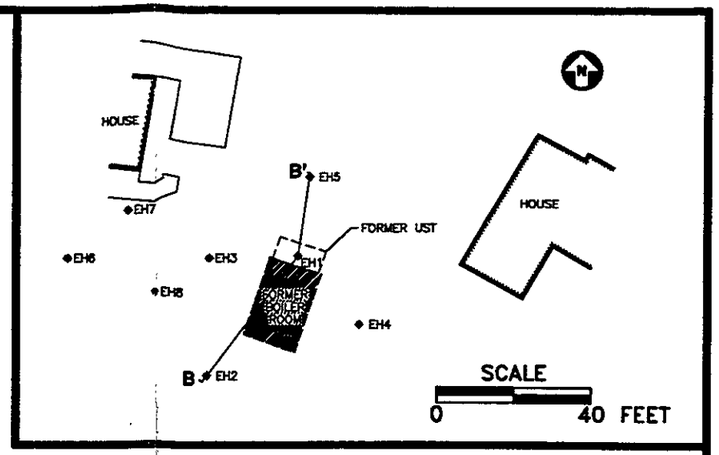
LEGEND

- UST EXCAVATION BACKFILL
- SAND, PEBBLY SAND, SILTY SAND
- SILT, SANDY SILT
- CLAY, SILTY CLAY
- GRAVEL
- ESTIMATED LIMITS OF PLUME OF DIESEL-IMPACTED SOIL IN UNSATURATED ZONE
- EH1 — SOIL BORING LOCATION



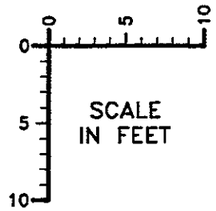
ESE A CH2M HILL Company — Environmental Science & Engineering, Inc. 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DATE 2/94 REVISED 5/94 BSM CAD FILE 50731004	EAST-WEST ORIENTED SCHEMATIC CROSS-SECTION ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA	FIGURE NO. 3 PROJ. NO. 6-93-5073



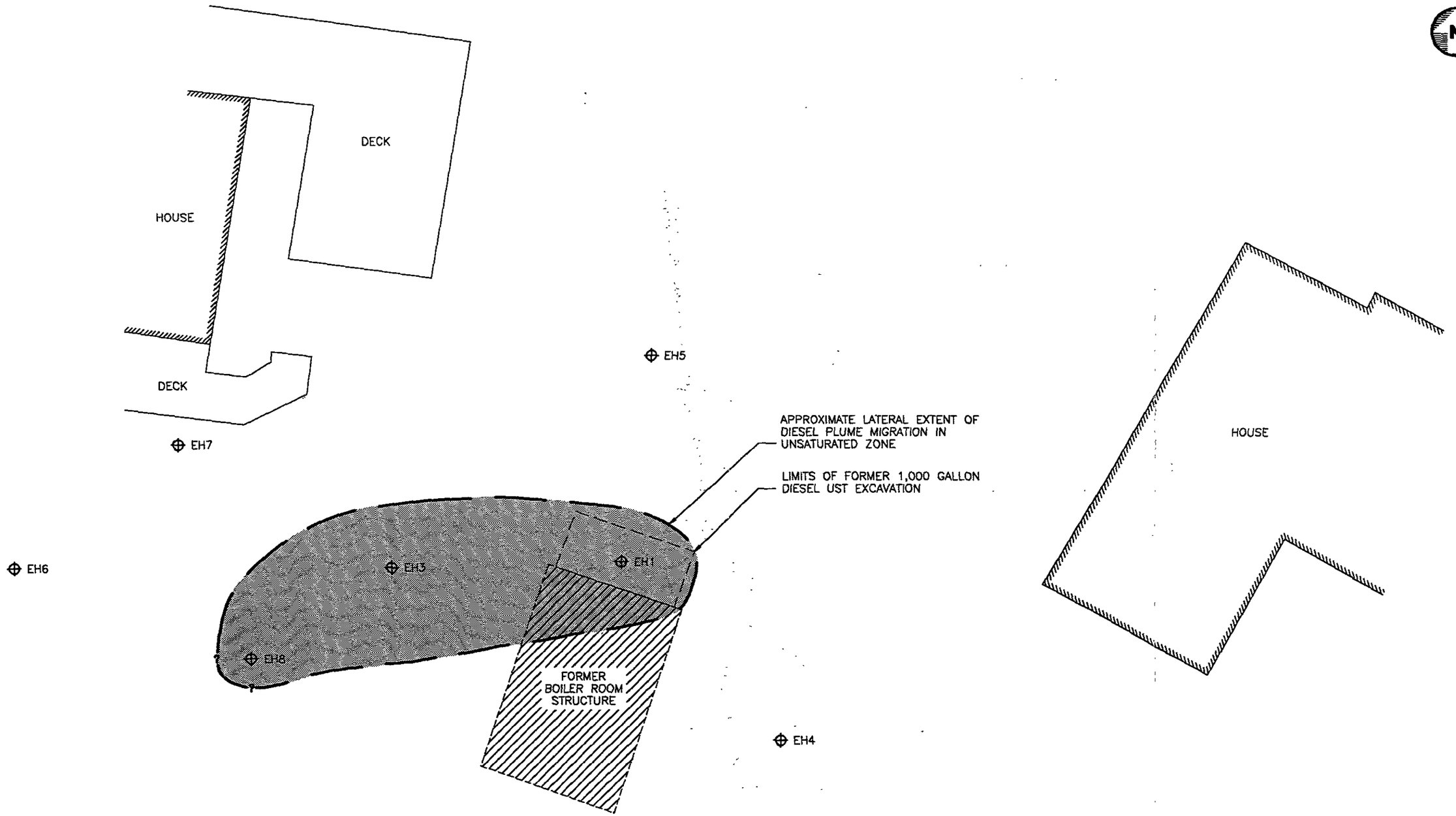


LEGEND

- UST EXCAVATION BACKFILL
- SAND, PEBBLY SAND, SILTY SAND
- SILT, SANDY SILT
- CLAY, SILTY CLAY
- GRAVEL
- ESTIMATED LIMITS OF PLUME OF DIESEL-IMPACTED SOIL IN UNSATURATED ZONE
- EH1 SOIL BORING LOCATION



ESE A CILCORP Company — Environmental Science & Engineering, Inc. 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DATE 2/94 REVISED 5/94 BSM CAD FILE 50731006	NORTH-SOUTH ORIENTED SCHEMATIC CROSS-SECTION ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA	FIGURE NO. 4 PROJ. NO. 6-93-5073



ESE A CILCORP Company — Environmental Science & Engineering, Inc. 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DATE 2/94 REVISED 5/94 BSM CAD FILE 50731008	DIESEL PLUME IN UNSATURATED ZONE ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA	FIGURE NO. 5 PROJ. NO. 6-93-5073

APPENDIX A

ESE STANDARD OPERATING PROCEDURE NO. 1

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 1
FOR SOIL BORINGS AND SOIL SAMPLING WITH HOLLOW-STEM AUGERS IN UNCONSOLIDATED FORMATIONS

Environmental Science & Engineering, Inc. (ESE) typically drills soil borings using a truck-mounted, continuous-flight, hollow-stem auger drill rig. The drill rig is owned and operated by a drilling company possessing a valid State of California C-57 license. The soil borings are conducted under the direct supervision and guidance of an experienced ESE geologist. Prior to drilling, the ESE geologist will clear the borehole location with a hand auger to a depth of five feet. The ESE geologist logs each borehole during drilling in accordance with the Unified Soil Classification System (USCS). Additionally, the ESE geologist observes and notes the soil color, relative density or stiffness, moisture content, odor (if obvious) and organic content (if present). The ESE geologist will record all observations on geologic boring logs.

Soil samples are collected during drilling at a minimum of five-foot intervals by driving an 18-inch long Modified California Split-spoon sampler (sampler), lined with new, thin-wall brass sleeves, through the center of and ahead of the hollow stem augers, thus collecting a relatively undisturbed soil sample core. The brass sleeves are typically 2-inches in diameter and 6-inches in length. The sampler is driven by dropping a 140-pound hammer 30-inches onto rods attached to the top of the sampler. Soil sample depth intervals and the number of hammer blows required to advance the sampler each six-inch interval are recorded by the ESE geologist on geologic boring logs. The ends of one brass sleeve are covered with Teflon sheeting, then covered with plastic end caps. The end caps are sealed to the brass sleeve using duct tape. Each sample is then labeled and placed on ice in a cooler for transport under chain of custody documentation to the designated analytical laboratory. A portion of the remaining soil in the sampler is placed in either a new Ziploc® bag or a clean Mason Jar® and set in direct sunlight to enhance the volatilization of any Volatile Organic Compounds (VOCs) present in the soil. After approximately 15-minutes that sample is screened for VOCs using a photoionization detector (PID). The PID measurements will be noted on the geologic boring logs. The PID provides qualitative data for use in selecting samples for laboratory analysis. Soil samples from the saturated zone (beneath the ground-water table) are collected as described above, are not screened with the PID, and are not submitted to the analytical laboratory. The samples from the saturated zone are used for descriptive purposes. Soil samples from the saturated zone may be retained as described above for physical analyses (grain size, permeability and porosity testing).

If the soil boring is not going to be completed as a well, then the boring is typically terminated upon penetrating the saturated soil horizon or until a predetermined interval of soil containing no evidence of contamination is penetrated. This predetermined interval is typically based upon site specific regulatory or client guidelines. The boring is then backfilled using either neat cement, neat cement and bentonite powder mixture (not exceeding 5% bentonite), bentonite pellets, or a sand and cement mixture (not exceeding a 2:1 ratio of sand to cement). However, if the boring is to be completed as a monitoring well, then the boring is continued until either a competent, low estimated-permeability, lower confining soil layer is found or 10 to 15-feet of the saturated soil horizon is penetrated, whichever occurs first. If a low estimated-permeability soil layer is found, the soil boring will be advanced approximately five-feet into that layer to evaluate its competence as a lower confining layer, prior to the termination of that boring.

All soil sampling equipment is cleaned between each sample collection event using an Alconox® detergent and tap water solution followed by a tap water rinse. Additionally, all drilling equipment and soil sampling equipment is cleaned between borings, using a high pressure steam cleaner, to prevent cross-contamination. All wash and rinse water is collected and contained onsite in Department of Transportation approved containers (typically 55-gallon drums) pending laboratory analysis and proper disposal/recycling.

APPENDIX B

BORING LOGS

Environmental Science & Engineering, Inc.
A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH6

Page 1 of 3

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073

Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
0	FORMATIONAL SEDIMENTS CLAY, dark brown, dry, moderate plasticity, no odor	OL					Start 8:18
5	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
10	PEBBLY SAND, brown, medium grained, dry, no odor.	SP					
15							
20							
25							
30	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
35							

REGISTERED GEOLOGIST
MICHAEL E. QUILLIN
#5315
STATE OF CALIFORNIA

Environmental Science & Engineering, Inc.
A GILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH6

Page 2 of 3

WELL COMPLETION

Completion Depth:

Size/Type	From	To

Casing:
Screen:
Filter:
Seal:

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073
Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
35	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
40			19 20 35			0	SAMPLE COLLECTED 8:54
			12 17 20			0	SAMPLE COLLECTED 9:03
			9 13 18			0	SAMPLE COLLECTED 9:07
45			10 13 18			0	SAMPLE COLLECTED 9:11
			6 19 26			0	SAMPLE COLLECTED 9:15
			9 17 21			0	SAMPLE COLLECTED 9:20
50			10 17 19			0	SAMPLE COLLECTED 9:23
			8 16 20			0	SAMPLE COLLECTED 9:29
			9 13 19			0	SAMPLE COLLECTED 9:33
			13 19 23			0	SAMPLE COLLECTED 9:38
55			15 19 28			0	SAMPLE COLLECTED 9:52
	SAND, brown, medium grained, dry, no odor.	SP	25 29 31			0	SAMPLE COLLECTED 9:58
	SANDY SILT, light brown, low plasticity, dry, no odor.	ML	13 18 26			0	SAMPLE COLLECTED 10:04
60			13 17 24			0	SAMPLE COLLECTED 10:13
			17 23 25			0	SAMPLE COLLECTED 10:20
65			13 17 19			0	SAMPLE COLLECTED 10:25
			11 19 27			0	SAMPLE COLLECTED 10:42
70			13			0	SAMPLE COLLECTED 10:50

Environmental Science & Engineering, Inc.

A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH6

Page 3 of 3

WELL COMPLETION

Completion Depth:

Size/Type	From	To

Casing:
Screen:
Filter:
Seal:

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073
Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
70	SILTY SAND, brown, no pebbles, fine-grained, dry, no odor.	SP	27 48				
			19 27 45			0	SAMPLE COLLECTED* 10:59
75	SILT, brown, low plasticity, dry, no odor.	ML					
80			21 50			0	SAMPLE COLLECTED* 11:19
							* Sample submitted to laboratory for analysis.
							Boring backfilled to grade with cement grout.
85							
90							
95							
100							
105							

Environmental Science & Engineering, Inc.

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BORING LOG AND WELL COMPLETION SUMMARY

EH7

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073

Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
0	FORMATIONAL SEDIMENTS CLAY, dark brown, moderate plasticity, dry, no odor.	OL					Start 12:27
5	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
10	PEBBLY SAND, brown, medium grained, dry, no odor.	SP					
15							
20							
25							
30	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
35							

REGISTERED GEOLOGIST
MICHAEL E. QUILLIN
#5315
STATE OF CALIFORNIA

Environmental Science & Engineering, Inc.
A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH7

Page 2 of 3

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073
Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type	
35	SANDY SILT, light brown, low plasticity, dry, no odor.	ML						
40								
45			9 13 19			0	SAMPLE COLLECTED	13:00
50			19 34 41			0	SAMPLE COLLECTED	13:10
55			5 9 13			0	SAMPLE COLLECTED	13:17
	SAND, brown, medium grained, dry, no odor.	SP						
	SANDY SILT, light brown, low plasticity, dry, no odor.	ML						
60	SAND, brown, medium grained, dry, no odor.	SP	9 17 30			0	SAMPLE COLLECTED	13:24
	SANDY SILT, light brown, low plasticity, dry, no odor.	ML						
65			13 21 30			0	SAMPLE COLLECTED	13:35
70			12			0	SAMPLE COLLECTED	13:48

Environmental Science & Engineering, Inc.

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BORING LOG AND WELL COMPLETION SUMMARY

EH7

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073

Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 81 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
70	SILTY SAND, brown, no pebbles, fine-grained, dry, no odor	SP	22 40				
75	SILT, brown, low plasticity, dry, no odor	ML	13 21 42				SAMPLE COLLECTED* 14:19
80							* Sample submitted to laboratory for analysis
							Boring backfilled to grade with cement grout.
85							
90							
95							
100							
105							

Environmental Science & Engineering, Inc.
A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH8

Page 1 of 2

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073
Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 70 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
0	FORMATIONAL SEDIMENTS CLAY, dark brown, moderate plasticity, dry, no odor.	OL					Start 12:27
5	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
10							
15	PEBBLY SAND, brown, medium grained, dry, no odor.	SP					
20							
25	SANDY SILT, light brown, low plasticity, dry, no odor.	ML					
30							
35							

REGISTERED GEOLOGIST
MICHAEL E. QUILLIN
#5315
STATE OF CALIFORNIA

Environmental Science & Engineering, Inc.

A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

EH8

Page 2 of 2

WELL COMPLETION

Completion Depth:

Size/Type	From	To
Casing:		
Screen:		
Filter:		
Seal:		

Well Cap or Box:

Project Name: Alameda County GSA Project No: 6-93-5073

Location: Engineer's Hill
Santa Rita Correctional Facility
Dublin, California

Driller: Exploration Geoservices, Inc.
Method: Mobile B-61 Hollow Stem Auger
Hole Diameter: 8 Inches Total Depth: 70 Feet
Ref. Elevations:
Logged By: Bart Miller

Dates:
Start: 5/3/94
Finish: 5/3/94

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type	
35	SANDY SILT, light brown, low plasticity, dry, no odor.	ML						
40			7 13 14			0	SAMPLE COLLECTED	15:10
45			6 13 12			0	SAMPLE COLLECTED	15:15
50			8 11 14			0	SAMPLE COLLECTED	15:22
55			17 23 38			0	SAMPLE COLLECTED	15:28
60	SAND, brown, medium grained, dry, petroleum hydrocarbon odor.	SP	8 14 19			106	SAMPLE COLLECTED*	15:35
			13 16 21			227	SAMPLE COLLECTED*	15:40
65	SANDY SILT, light brown, low plasticity, dry, no odor.	ML	13 21 30			1.0	SAMPLE COLLECTED*	15:47
70							* Sample submitted to laboratory for analysis.	
							Boring backfilled to grade with cement grout.	

APPENDIX C

LABORATORY RESULTS WITH CHAIN OF CUSTODY DOCUMENTATION

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

05/11/94

Dear Bart:

Enclosed are:

1). the results of 6 samples from your # **6-93-5073 Alameda Co. GSA, Engineers Hill** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Environmental Science & Eng. 4090 Nelson Avenue, Suite J Concord, CA 94520	Client Project ID: # 6-93-5073 Alameda Co. GSA, Engineers Hill	Date Sampled: 05/03/94
		Date Received: 05/04/94
	Client Contact: Bart Miller	Date Extracted: 05/04/94
	Client P.O:	Date Analyzed: 05/04-05/05/94

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
35480	EH6-80'	S	---	ND	ND	ND	ND	103
35481	EH7-75'	S	---	ND	ND	ND	ND	110
35482	EH8-60'	S	---	ND	0.008	0.020	0.37	103
35483	EH8-63'	S	---	ND> 0.01	0.030	0.085	0.44	101
35484	EH8-65'	S	---	ND	ND	ND	ND	109
35485	EH6-72'	S	---	ND	ND	ND	ND	111
Detection Limit unless otherwise stated; ND means Not Detected		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

*water samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak co-elutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds are significant; no recognizable pattern; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible phase is present.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Environmental Science & Eng. 4090 Nelson Avenue, Suite J Concord, CA 94520	Client Project ID: # 6-93-5073 Alameda Co. GSA, Engineers Hill	Date Sampled: 05/03/94
		Date Received: 05/04/94
	Client Contact: Bart Miller	Date Extracted: 05/05/94
	Client P.O:	Date Analyzed: 05/05/94

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
35480	EH6-80'	S	ND	93
35481	EH7-75'	S	ND	93
35482	EH8-60'	S	590,a	96
35483	EH8-63'	S	3900,a,d	111#
35484	EH8-65'	S	ND	94
35485	EH6-72'	S	ND	94
Detection Limit unless otherwise stated; ND means Not Detected		W	50 ug/L	
		S	10 mg/kg	

*water samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; surrogate and sample peaks co-elute or surrogate peak is on elevated baseline

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) modified diesel?; light(c_L) or heavy(c_H) diesel compounds are significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel(?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible phase is present.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 05/05/94 Matrix: Soil

Analyte	Concentration (mg/kg)			Amount Spiked	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
TPH (gas)	0.000	1.747	1.765	2.03	86	87	1.1
Benzene	0.000	0.160	0.168	0.2	80	84	4.9
Toluene	0.000	0.164	0.178	0.2	82	89	8.2
Ethylbenzene	0.000	0.168	0.182	0.2	84	91	8.0
Xylenes	0.000	0.556	0.580	0.6	93	97	4.2
TPH (diesel)	0	341	343	300	114	114	0.7
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

2359 AESE59

CHAIN OF CUSTODY RECORD

DATE 5/04/94 PAGE 1 OF 1

PROJECT NAME ALAMEDA Co. GSA

ADDRESS ENGINEER'S HILL
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

PROJECT NO. 6-93-5073

SAMPLED BY BART MILLER

LAB NAME McCAMPBELL ANALYTICAL

Environmental Science & Engineering, Inc

SAMPLE #	DATE	TIME	LOCATION	TPH-D (8015m)	BTEX (8020)									MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
EH6-80'	5/03/94	11:19		✓	✓			35480						SOIL	1	2-inch diam. brass sleeves; no odor
EH7-75'	"	13:58		✓	✓			35481						"	1	" ; no odor
EH8-60'	"	15:35		✓	✓			35482						"	1	" ; slight pet. odor
EH8-63'	"	15:40		✓	✓			35483						"	1	" ; pet. hyd. odor
EH8-65'	"	15:47		✓	✓			35484						"	1	" ; no odor
EH6-72'	"	10:59		✓	✓			35485						"	1	" ; no odor

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1. [signature]	[signature]	5/4	9:45
2.			
3.			
4.			
5.			

ICE/T° ✓ GOOD CONDITION ✓ HEAD SPACE ABSENT ✓ | PRESERVATIVE | VOAS | O&G | METALS | OTHER | APPROPRIATE CONTAINERS ✓

6 TOTAL NUMBER OF CONTAINERS

REPORT RESULTS TO: BART MILLER ESE

SPECIAL SHIPMENT REQUIREMENTS: COLD TRANSPORT

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):
NORMAL T.A.T. INVOICE TO ALAMEDA COUNTY GSA

SAMPLE RECEIPT	
CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	✓
CONFORMS TO RECORD	✓