Report on Soil Excavation at the Oro Loma Sanitary District Treatment Plant 2600 Grant Avenue San Lorenzo, California

March 29, 1994
2793.94-001

Prepared for
Oro Loma Sanitary District
2600 Grant Avenue
San Lorenzo, California

LEVINE·FRICKE

LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

March 29, 1994 2793.94-001

Ms. Pam Evans
Hazardous Materials Specialist
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, California 94621

Subject: Report on Soil Excavation at the Oro Loma Sanitation District Treatment Plant, 2600 Grant Avenue, San Lorenzo, California

Dear Ms. Evans:

Enclosed is the subject report, describing soil excavation, soil sampling procedures, laboratory analysis results, and backfilling at the subject site.

If you have any questions or comments, please do not hesitate to call either of the undersigned.

Sincerely,

John Sturman, P.E., R.G.
Senior Engineer

Shellie Fletcher
Senior Staff Engineer

Enclosures

cc: Mr. Michael Cortez, Oro Loma Sanitation District

1900 Powell Street, 12th Floor
Emeryville, California 94608
(510) 652-4500
Fax (510) 652-2246

Other offices in Irvine, CA; Sacramento/Roseville, CA; Tallahassee, FL; Honolulu, HI

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REPORT ON SOIL EXCAVATION AT THE ORO LOMA SANITARY DISTRICT TREATMENT PLANT 2600 GRANT AVENUE, SAN LORENZO, CALIFORNIA

INTRODUCTION

This report discusses soil excavation services performed by Levine•Fricke, Inc. (Levine•Fricke), as requested by Mr. Michael Riddiford of the Oro Loma Sanitary District (OLSD), at the OLSD Treatment Plant at 2600 Grant Avenue in San Lorenzo, California ("the Site; Figure 1).

The field work discussed in this report was performed from September 29 through October 21, 1993. Levine•Fricke's scope of work was presented in the "Proposal/Work Order for Soil Excavation Services and Quarterly Ground-Water Monitoring," dated June 17, 1993. The quarterly ground-water monitoring reports discussed in the proposal/work order are prepared and are being submitted to OLSD separately.

BACKGROUND

According to information provided by Mr. Riddiford, two 2,500-gallon-capacity aboveground diesel tanks at the Site were used to fuel the standby engines that drive the plant's sewage influent pumps. These tanks were set on a reinforced concrete slab equipped with saddles. According to drawings we received from Mr. Riddiford, the slab is supported by piles extending approximately 50 feet below the base of the slab.

In September 1992, OLSD reportedly removed the underground fuel piping connecting the tanks to the engines and replaced it with aboveground piping. At the same time, diesel-affected soil around the underground piping was excavated, to a depth of approximately 6 feet below ground surface (bgs). A smaller area of affected soil next to the tanks was also excavated.

Reportedly, soil samples were collected from the base of both of these excavations by Testing and Technology, Inc. ("T&T"). T&T also collected two grab ground-water samples near the former location of the underground piping. The samples were analyzed for total petroleum hydrocarbons (TPH) as diesel (TPHd) and for benzene, toluene, ethylbenzene, and xylenes (BTEX).

In January 1993, Levine·Fricke investigated soil quality near the tank slab, drilling three soil borings and installing a shallow ground-water monitoring well in one of the borings. The scope of work for that investigation is described in Levine·Fricke's "Proposal/Work Order for Soil and Ground-Water Investigation in the Vicinity of Two Aboveground Diesel Fuel Storage Tanks at the Oro Loma Sanitary District Treatment Plant," dated November 13, 1992. The results of the investigation indicated that diesel-affected soils surrounded the tank slab in some areas.

In September 1993, Trumpp Brothers General Engineering Contractors ("Trumpp") of San Jose, California, removed the two aboveground storage tanks and concrete saddles under a direct contract with the OLSD. Levine·Fricke subcontracted with Trumpp, a state-licensed general contractor, to perform soil excavation and backfilling at the Site.

FIELD ACTIVITIES

Site Health and Safety

Trummp and Levine·Fricke employees that worked at the Site fulfilled OSHA 40-hour health and safety training requirements for working with hazardous materials. Work was performed at the Site in accordance with Levine·Fricke's Site Health and Safety Plan (HSP) and HSP Addendum, dated August 2, 1993.

Engineering Oversight

Excavation and subsequent backfilling at the Site was observed by Ms. Shellie Fletcher, Senior Staff Engineer. Ms. Fletcher observed excavated soil for discoloration, used a field photoionization detector (PID) to check for volatile organic compounds (VOCs), sampled soils, and observed and tested the placement and compaction of backfill materials. A soil nuclear density gauge was used to test the relative compaction of placed backfill soils when the backfill soils were accessible (Table 1).

Excavation

Approximately 275 in-place cubic yards (cy) of diesel-affected soil were removed from around and under the concrete tank slab; this created approximately 400 cy of stockpiled soils. The excavation measured approximately 27 feet wide by 32 feet long, and was approximately 8.5 feet in depth (Figure 2). Ground water was encountered in the excavation at a depth of

approximately 6.0 feet bgs and was pumped directly from the excavation directly into the OLSD water treatment plant. Water was pumped for approximately 6 days.

Approximately 5 cy of soil directly under the tank slab were not accessible to construction equipment or personnel. This soil was not excavated, although it was observed to be slightly discolored.

Lithologic Observations

Soil lithology in the excavation was observed to be generally silty sandy gravel overlaying silty clay. The silty sandy gravel was generally observed to increase in depth from approximately 3.5 feet at the southern sidewall to approximately 7 feet at the northern sidewall.

On the floor of the excavation, a sand backfill contained within wooden shoring was encountered. OLSD personnel informed Levine·Fricke that the sand and shoring were backfill materials for an abandoned sewer outfall line. The reported outfall line is a box channel, approximately 5.5 feet wide and running east-west approximately 4 feet to the north of the tank slab. The outfall line was observed to turn approximately 60 degrees to the south approximately 8 feet from the western edge of the tank slab (Figure 2).

Excavation Boundaries

To the north and west, soil excavation was terminated when visual observations and PID readings did not indicate the presence of petroleum hydrocarbons.

In the northwest corner, the excavation was terminated when it approached a high voltage electric line. The line is generally a few feet to the west of the excavation boundary, but intersected the excavation in the northwest corner.

To the south, the excavation was terminated at the edge of an OLSD roadway; however, a layer of discolored soils was observed along this sidewall. To investigate the lateral limit of this affected soil, an exploratory test pit was excavated approximately 12 feet south of the excavation, to a depth of approximately 4 feet bgs. As shown on Figure 2, the test pit was aligned east-west and was approximately 3 feet wide and 5 feet long, so that the far southern pit wall was approximately 15 feet from the southern sidewall.

Slight soil discoloration was observed at a depth of approximately 3 feet bgs on the test pit's northern sidewall. No indications of discoloration or elevated PID readings were observed in soils taken from the test pit's southern sidewall. These observations suggest that the lateral extent of petroleum-affected soils in this area is 12 to 15 feet south of the southern excavation boundary.

Soil Sampling

Nine soil samples were collected from the excavation (see Figure 2): six from the excavation sidewalls and three from the excavation floor. Sidewall sampling locations were selected where visual observation indicated soils were most affected by petroleum hydrocarbons. Floor sampling locations were selected based on the geometry of the excavation, because there were no apparent visual indications of petroleum hydrocarbons in these soils.

The samples were collected using the excavator bucket, or with a hand-driven sampler where excavator access was not possible. The samples were labeled, preserved in a chilled ice chest, and transported under standard chain-of-custody protocols to American Environmental Network (AEN), a state-certified laboratory, for analysis.

Backfilling

Where accessible to standard compaction equipment, the excavation was backfilled with granular backfill material consisting of crushed gravel, aggregate subbase, and Class II aggregate base. Representative samples of the aggregate subbase and Class II aggregate base were submitted to Testing Engineers Inc. Laboratory in Martinez, California, for laboratory compaction testing in accordance with ASTM Test Method D-1557-78A. The aggregate subbase and Class II aggregate base were tested by Ms. Fletcher with a soil nuclear density gauge where access and site conditions allowed (Table 1). Compaction test results are presented in Appendix A.

Where compaction equipment could not be used, a slurry made of control density fill (CDF), a concrete-fly ash mixture, was poured into the excavation. The specifications for the CDF slurry are found in Appendix B.

Compaction equipment could be used under the slab until the granular backfill reached an elevation of approximately 4.75 feet bgs. Above 4.75 feet bgs, the granular backfill

materials were placed at a slope approximately 45 degrees toward the tank slab, to create containment for the CDF slurry. The granular fill and CDF were then placed in alternating layers to minimize the placed volume of CDF (Figure 3).

The finished grade of the excavation backfill was 0.25 feet bgs, allowing asphalt concrete to be placed to match the surrounding finish grade. The number of passes with a sheepsfoot wheel and/or hand compactor required to achieve sufficient relative compaction was determined for each material type and this compactive effort, or greater, was applied to those lifts and areas where testing with the nuclear gauge was not possible. Areas not tested with a nuclear gauge were either too small for the gauge, were too close to the CDF, or would have been adversely influenced by the sloping of the backfill.

Placement of Aggregate Subbase and Class II Aggregate Base

Crushed gravel was placed from approximately 8.5 feet bgs to 6.0 feet bgs, in two approximately 1.25-foot loose lifts. The first lift of crushed gravel was compacted with a sheepsfoot roller attached to a backhoe. The second lift of crushed gravel was compacted with a hand-compactor.

A non-woven geotextile fabric was placed over the crushed gravel to mitigate the potential for migration of fines from overlaying lifts of subbase into the crushed gravel. The fabric was placed with a minimum of 6 inches of overlap between sections of fabric.

Aggregate subbase was placed from approximately 5.75 to 1.5 feet bgs, in loose lifts that were a maximum of 1 foot thick. Our observations and the field density testing results indicate that the subbase was compacted to no less than 90% relative compaction (see Table 1). Compactive effort was provided with both a sheepsfoot wheel and a hand compactor.

Class II aggregate base was placed from approximately 1.5 to 0.25 feet bgs, in loose lifts that were a maximum of 8 inches thick. Our observations and the field density testing results indicate that the Class II aggregate base was compacted to no less than 95% relative compaction (see Table 1).

CDF Placement

Approximately 40 cy of CDF were installed under and around the tank slab in two lifts. Using extensions from the truck

chute, a slurry of CDF was poured under the slab. The truck and chute were moved often, to prevent void spaces from developing under the slab.

In the first lift, approximately 27 cy of CDF were placed to a thickness of 2.5 feet. This lift was allowed to set for approximately 2.5 days before backfilling continued. Granular backfill was then placed at a slope on top of the CDF, so that the top of the incline reached final grade. This created a second well to contain more CDF slurry.

In the second lift, approximately 13 cy of CDF slurry were poured under the tank slab to a thickness of approximately 2.5 feet, for a total thickness of 4 feet of CDF under the slab.

Disposal of Excavated Soil

Excavated soils, including 24 cy of previously stockpiled soil, were placed on and covered by polyethylene sheeting in two stockpiles located north of the tank slab. The OLSD reportedly transported and disposed of this soil at a Class III Soil Waste Landfill on Vasco Road in Livermore, California, operated by BFI, Inc.

ANALYTICAL RESULTS

Eight of the nine soil samples submitted to AEN were analyzed for TPHd using EPA Method 8015 and for BTEX using modified EPA Method 8020. Soil sample SW-SE-6 was collected but not analyzed, because significant soil discoloration was not observed at this location. Laboratory data sheets are presented in Appendix C.

As shown in Table 2, BTEX was not detected in any sample, and petroleum hydrocarbons were not detected in six of the eight samples. TPHd was detected in two samples: 360 milligrams per kilogram (mg/kg) in SW-W-3.5 and 1,700 mg/kg in SW-S-3.5.

CONCLUSIONS AND RECOMMENDATIONS

Approximately 275 cy of diesel-affected soil have been removed from the vicinity of the aboveground storage tank slab at the Site. Analytical results indicate that diesel-affected soils remain to the west (360 mg/kg) and south (1,700 mg/kg) of the tank slab. Visual observations and PID readings in a test pit

indicated that diesel in soil decreases within 12 to 15 feet of the southern excavation sidewall.

Based on this data and field observations, Levine·Fricke recommends that no additional soil excavation be performed at the aboveground storage tank slab at the Site at this time.

Because some diesel-affected soils are still in place at the aboveground tank slab and to the west of the excavation boundary, Levine·Fricke recommends collecting supplemental soil-quality data west of the excavation. Additionally, we recommend extending the current quarterly ground-water monitoring program at this time for at least one year.

TABLE 1

SOIL DENSITY TEST RESULTS
ORO LOMA SANITARY DISTRICT SITE

Sample Date	Test Depth (inches)	Wet Density	H_2O Density	Dry Density	Moist (%)	Compaction (%)	Location	Elevation	Maximum Density
13-Oct-93	8	136.4	4.0	132.4	3.06	90.3	N3'midslab	-2	146.1
13-Oct-93	8	135.9	9.8	133.1	6.95	91.1	W3'midslab	-2	146.1
13-Oct-93	8	150.0	10.8	139.1	7.79	95.2	N4'W5'	grade	146.6
13-Oct-93	8	150.0	10.8	139.1	7.79	95.2	N4'W5'	grade	146.6
13-Oct-93	8	149.4	10.4	139.0	7.50	95.2	S3'midslab	grade	146.6

NOTES:

Dumbarton Quarry Composite Backfill tested with a soil nuclear density gauge.

Data entered by MEK/24 Nov 93 Data proofed by MEK 11/24/93.

TABLE 2

SOIL ANALYTICAL TEST RESULTS
ORO LOMA SANITARY DISTRICT SITE

(all results in milligrams per kilogram [mg/kg])

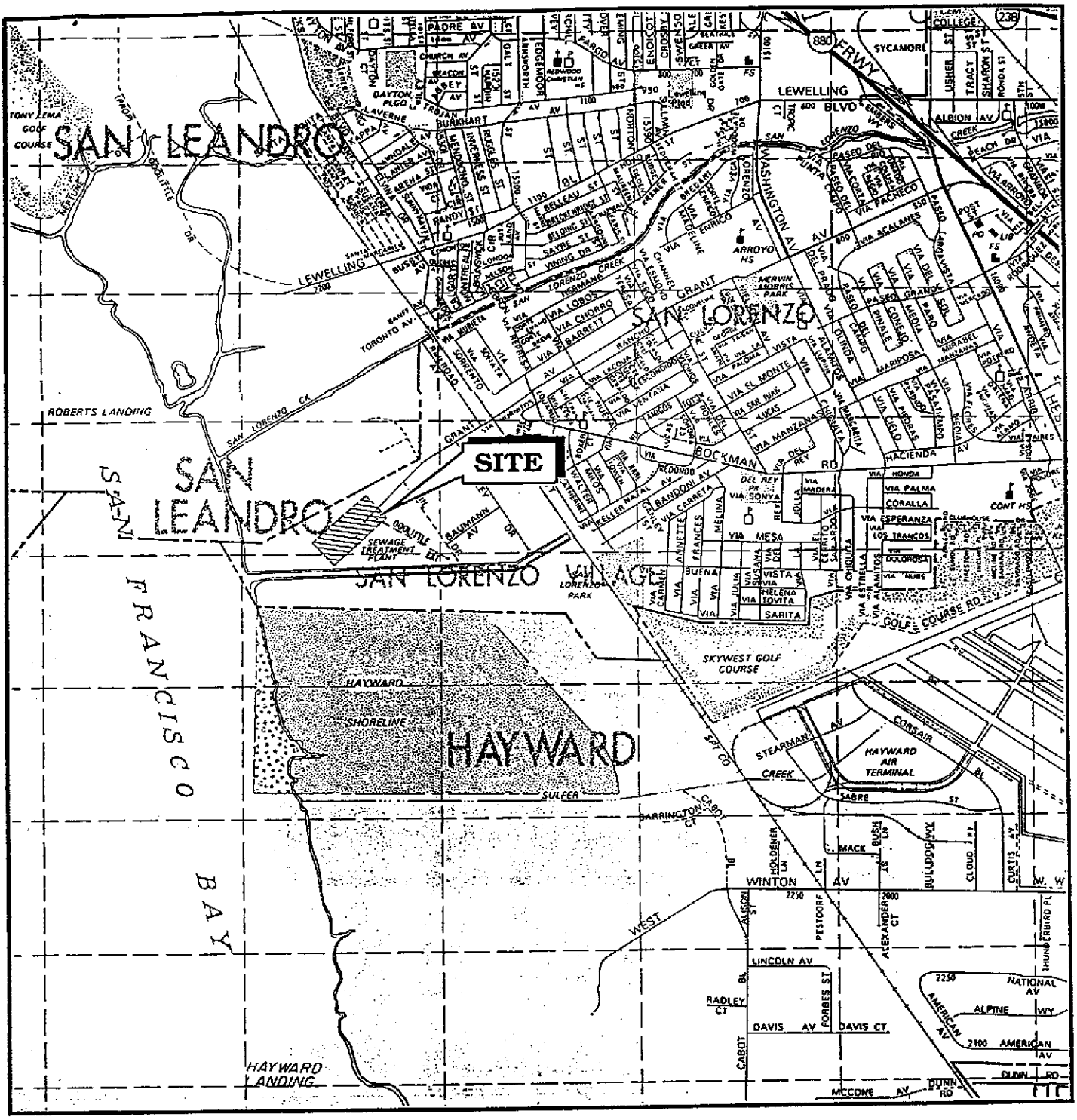
Sample ID	Sample Date	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes
B-N	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005
B-S	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005
B-W	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005
SW-N-4.5	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005
SW-W-3.5	05-Oct-93	360	<0.005	<0.005	<0.005	<0.005
SW-NE-5	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005
SW-S-3.5	05-Oct-93	1,700	<0.005	<0.005	<0.005	<0.005
SW-SW-7	05-Oct-93	<1	<0.005	<0.005	<0.005	<0.005

NOTES:

TPHd = total petroleum hydrocarbons as diesel

Analysis performed by American Environmental Network of Pleasant Hill, California.

Data entered by MEK/24 Nov 93. Data proofed by MEK 1/24/93. QA/QC by SRF 2/12/94.



MAP SOURCE:
Thomas Bros. Map
Alameda and Contra Costa Counties, 1991

Figure 1 : SITE VICINITY

Project No. 2793

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REG12NOV92MP

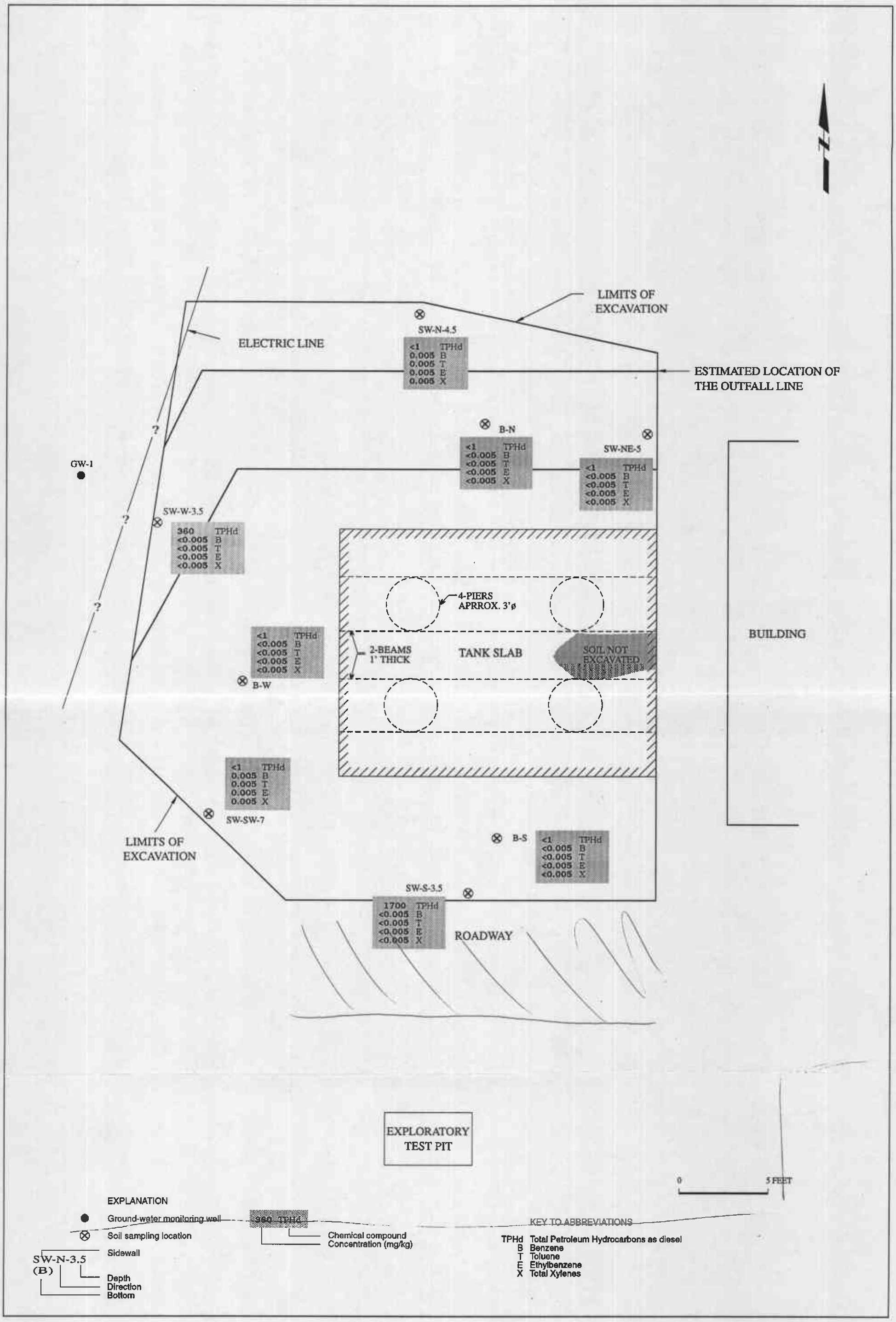


Figure 2 : SITE MAP, SHOWING EXCAVATION BOUNDARIES, SOIL SAMPLING LOCATIONS, AND ANALYTICAL TEST RESULTS

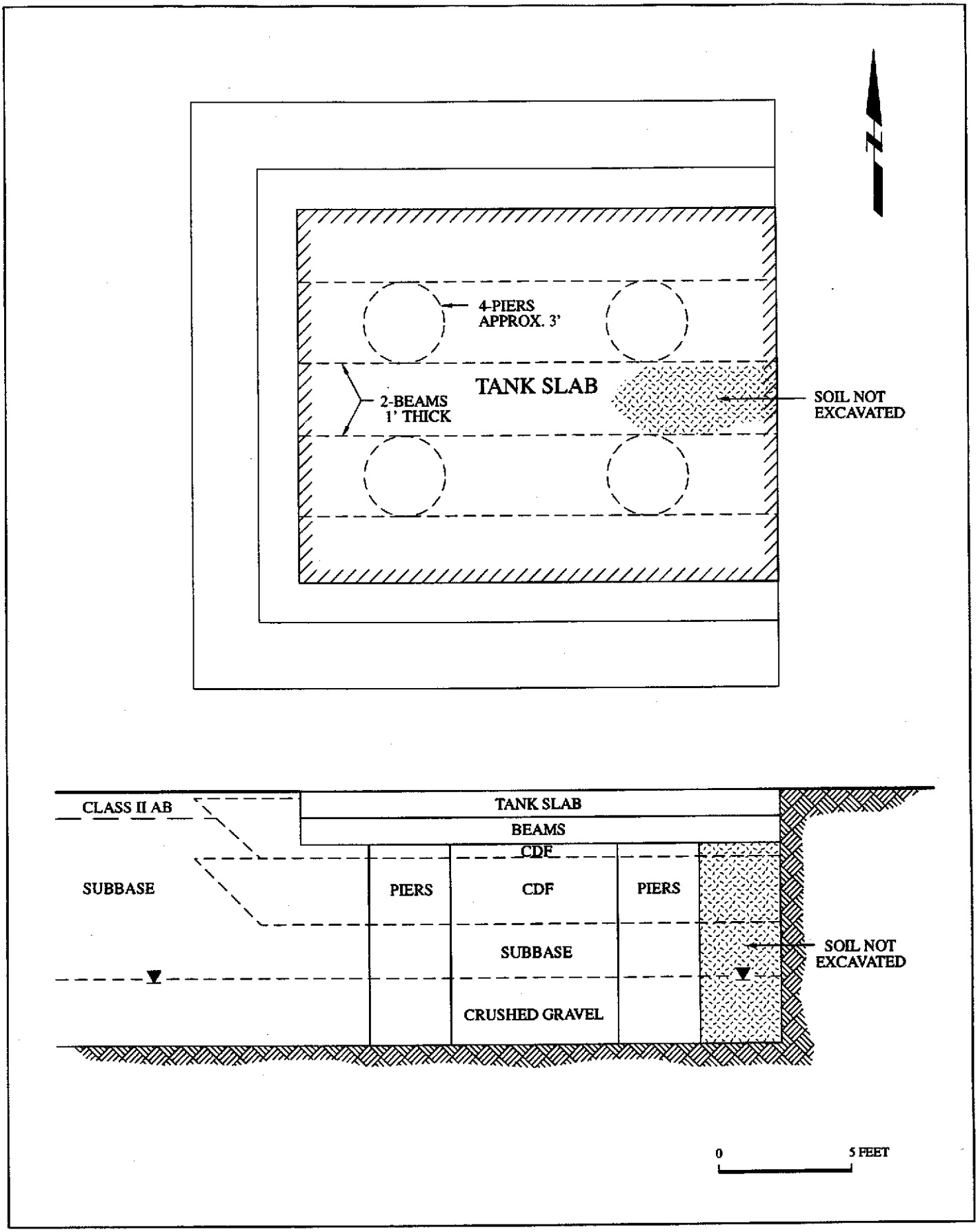


Figure 3 : PLAN AND CROSS-SECTIONAL VIEW OF GRANULAR FILL AND CONTROL DENSITY FILL PLACEMENT

APPENDIX A

COMPACTION TEST RESULTS

Quality Assurance Services
Materials Consulting

Testing Engineers, Inc.

LABORATORY NO. L0317 | **REPORT OF SOIL TESTS** | DATE: 10-12-93

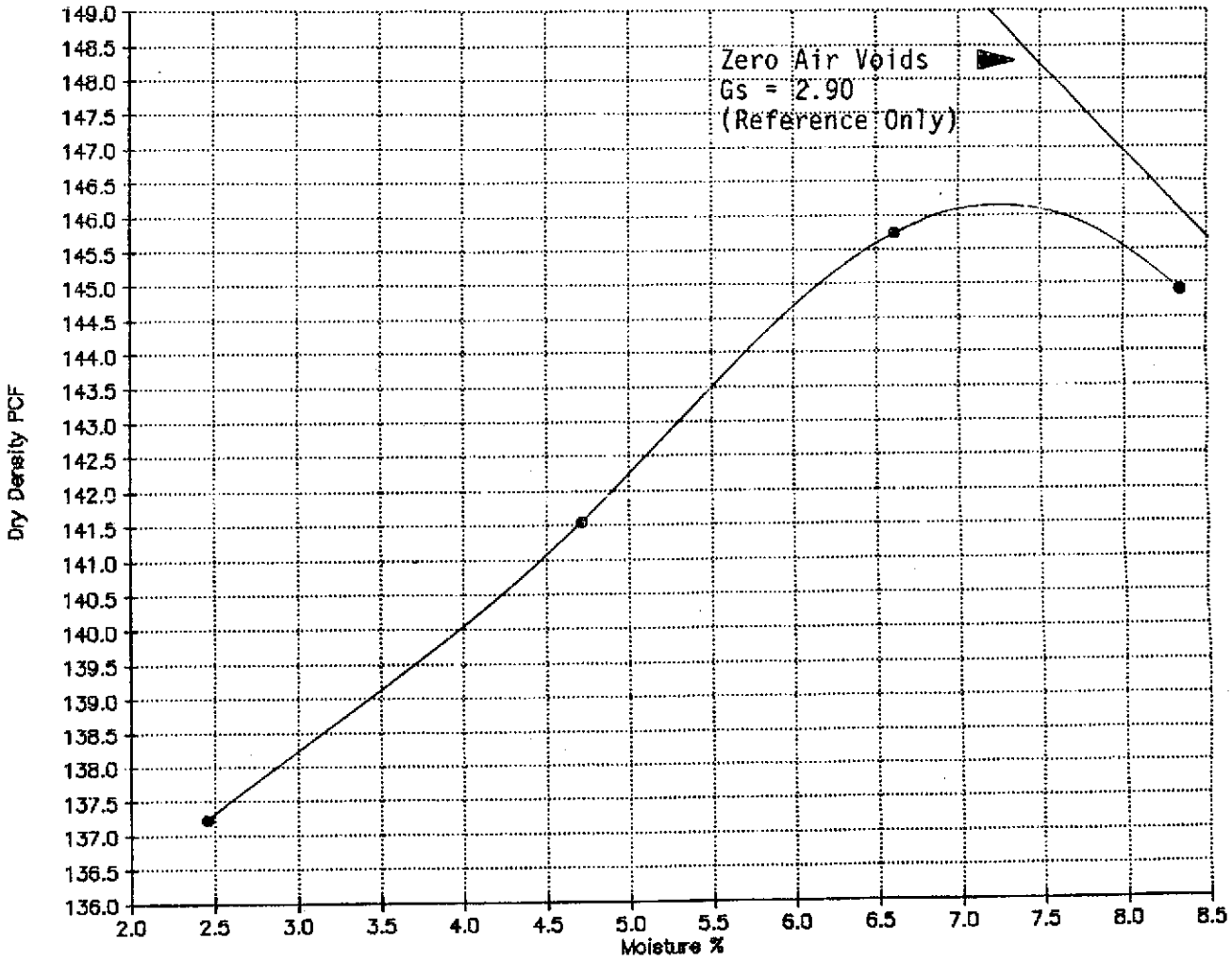
JOB DATA: 19066
Trumpp Bros. Misc.

SAMPLE DATA:
Dumbarton Quarry Composite Backfill

VISUAL CLASSIFICATION:
Reddish Brown Silty Sandy Gravel

MAXIMUM DENSITY DETERMINATION:

Method	ASTM D1557
Optimum Moisture, %	7.2
Maximum Dry Density (lbs. cu. ft.)	2.34 g/cc 146.1



Reviewed by Warren Benson
Warren Benson, Lab Supervisor

827 Arnold Drive, Bay 4, Martinez, California 94553 • (415) 370-1022

2cc: Trumpp Bros.

Quality Assurance Services
Materials Consulting

Testing Engineers, Inc.

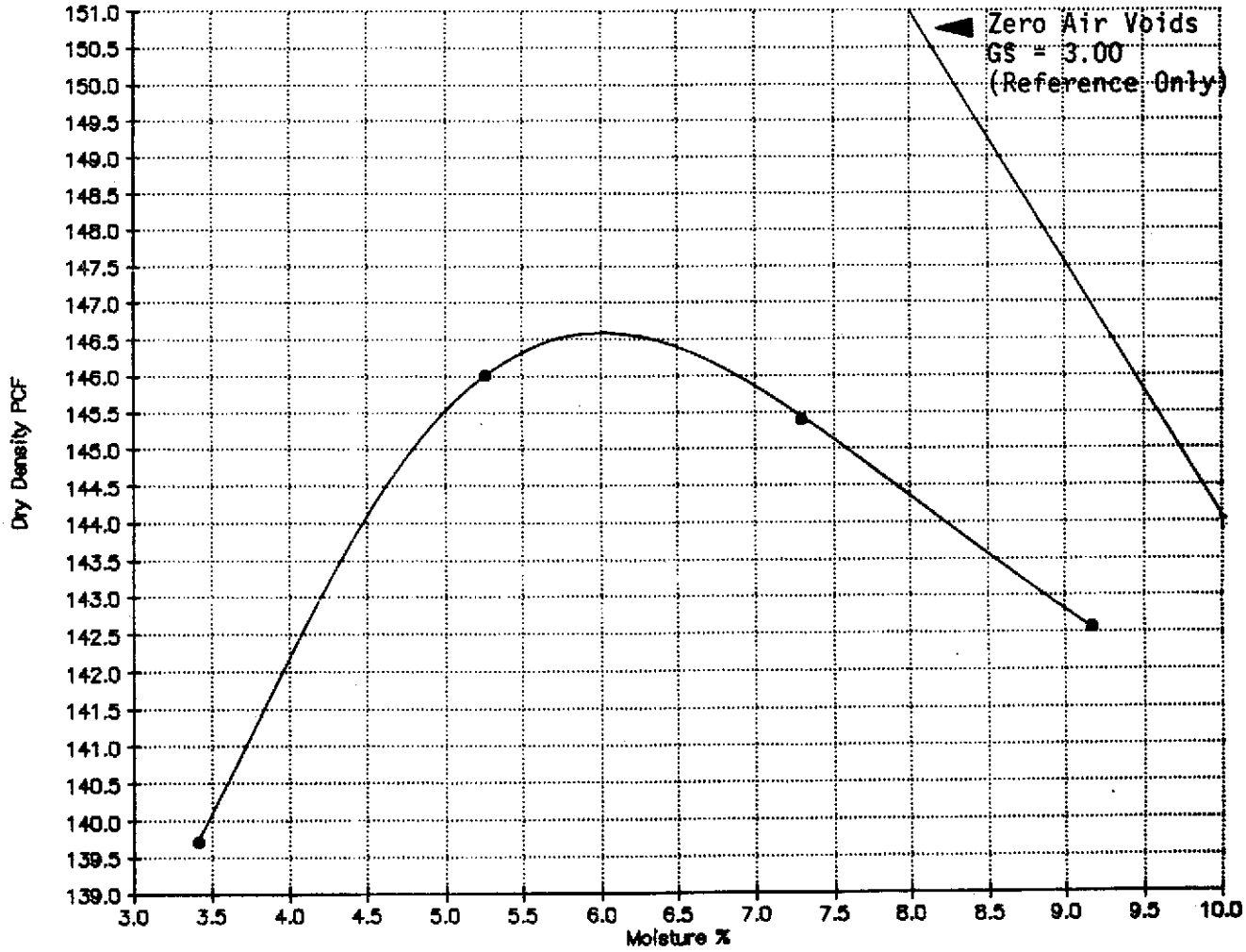
LABORATORY NO. L0307 **REPORT OF SOIL TESTS** DATE: 10-7-93

JOB DATA: 19066
Trumpp Bros. Misc.
Oro Loma

SAMPLE DATA:
Dumbarton ASB

VISUAL CLASSIFICATION:
Reddish Brown Silty Sandy Gravel

MAXIMUM DENSITY DETERMINATION:
Method ASTM D1557
Optimum Moisture, % 6.0
Maximum Dry Density 2.35 g/cc
(lbs. cu. ft.) 146.6



Reviewed by Warren Benson
Warren Benson, Lab Supervisor

2cc: Trumpp Bros.

827 Arnold Drive, Bay 4, Martinez, California 94553 • (415) 370-7002

SANTA CLARA • DIABLO VALLEY • SACRAMENTO • MONTEREY

APPENDIX B

CDF SPECIFICATIONS

Walker's Concrete

457 QUEENS LANE, SAN JOSE, CA 95112-4310 (408) 436-8100 FAX 436-0392

CONCRETE MIX PROPORTIONS

CONTRACTOR: Public Works
PROJECT: As Needed

USE: Controlled Density Fill

MIX NO.: 3501802-2

	ABS. VOL.	SSD WEIGHT	MOISTURE	BATCH WEIGHT
CEMENT: 1.00 sks	0.48	94	0	94
FLYASH: 2.50 sks	1.69	236	0	236
WATER:	3.74	233	-114	119
ENTRAINED AIR:	1.62	- - -	- - -	1.2 ozs per cwt
3/8" PEAGRAVEL:	9.72	1620	1%	1636
CONCRETE SAND:	9.77	1633	6%	1731
	27.00	3815		3815

Compressive Strength: 100 - 200 psi @ 28 days
Water/cement ratio: 0.71
Total Water Demand: 28.0 gallons
Total Cementitious: 330 #'s
Air entrainment: 6 % +/- 1 1/2 %
Slump: 7" - 10"

Admix Dosage

MICROAIR: 4.00 ozs per yard

Material Sources

ASTM C-33	Gravel: Kaiser Sand & Gravel - Radum
ASTM C-33	Concrete Sand: Kaiser Sand & Gravel - Mountain View
ASTM C-150	Type II Cement: Kaiser Cement Corporation - Permanente
ASTM C-618	Class F Flyash: Pozzolanic International
ASTM C-494	Microair: Air entraining agent - Master Builders

Prepared by: R.D Beatty R. D. Beatty Date: July 12, 1993

This mix has been prepared in accordance with the City of San Jose Standard Specifications dated July, 1992 Section 1301-2.3 for CONTROLLED DENSITY FILL. It will perform to those standards when produced, sampled and tested in accordance with those Specifications.

APPENDIX C

ANALYTICAL LABORATORY REPORTS

SRF

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 94523-001

LEVINE-FRICKE
1900 POWELL ST., 12TH FLOOR
EMERYVILLE, CA 94608

ATTN: SHELLIE FLETCHER

CLIENT PROJ. ID: 2793.01
C.O.C. SERIAL NO: 11206
PROJ. NAME: ORO LOMA

REPORT DATE: 10/28/93

DATE SAMPLED: 10/05/93

DATE RECEIVED: 10/06/93

AEN JOB NO: 9310055

PROJECT SUMMARY:

On October 6, 1993, this laboratory received nine (9) soil samples.

Client requested eight (8) samples be analyzed for organic parameters. One (1) sample was placed on hold. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

All laboratory quality control parameters were found to be within established limits. Batch QC data is included at the end of this report.

If you have any questions, please contact Client Services at (510) 930-9090.

Andrew Bradden for

OCT 31 1993

Larry Klein
General Manager

Results FAXed 10/19/93

COPY

LEVINE-FRICKE

SAMPLE ID: B-N
AEN LAB NO: 9310055-01
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	5	ug/Kg	10/14/93
Toluene	108-88-3	ND	5	ug/Kg	10/14/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/14/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/14/93
#Extraction for Diesel/Oil	EPA 3550			Extrn Date	10/13/93
TPH as Diesel	3550/GC-FID	ND	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: B-S
AEN LAB NO: 9310055-02
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/13/93
Toluene	108-88-3	ND	5	ug/Kg	10/13/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/13/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/13/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/13/93
TPH as Diesel	**3550/GC-FID**	ND	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: SW-N-4 1/2
AEN LAB NO: 9310055-04
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/13/93
Toluene	108-88-3	ND	5	ug/Kg	10/13/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/13/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/13/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/13/93
TPH as Diesel	**3550/GC-FID**	ND	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: SW-W-3 1/2
AEN LAB NO: 9310055-05
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/13/93
Toluene	108-88-3	ND	5	ug/Kg	10/13/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/13/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/13/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/13/93
TPH as Diesel	**3550/GC-FID**	360 *	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: SW-NE-5
AEN LAB NO: 9310055-06
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/13/93
Toluene	108-88-3	ND	5	ug/Kg	10/13/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/13/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/13/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/13/93
TPH as Diesel	**3550/GC-FID**	ND	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: SW-S-3 1/2
AEN LAB NO: 9310055-07
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/14/93
Toluene	108-88-3	ND	5	ug/Kg	10/14/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/14/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/14/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/14/93
TPH as Diesel	**3550/GC-FID**	1,700 *	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

LEVINE-FRICKE

SAMPLE ID: SW-SW-7
AEN LAB NO: 9310055-08
AEN WORK ORDER: 9310055
CLIENT PROJ. ID: 2793.01

DATE SAMPLED: 10/05/93
DATE RECEIVED: 10/06/93
REPORT DATE: 10/28/93

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	5	ug/Kg	10/14/93
Toluene	108-88-3	ND	5	ug/Kg	10/14/93
Ethylbenzene	100-41-4	ND	5	ug/Kg	10/14/93
Xylenes, Total	1330-20-7	ND	5	ug/Kg	10/14/93
#Extraction for Diesel/Oil	**EPA 3550**			Extrn Date	10/14/93
TPH as Diesel	**3550/GC-FID**	ND	1	mg/kg	10/16/93

ND = Not detected
* = Indicates value above reporting limit

QUALITY CONTROL DATA

DATE EXTRACTED: 10/12/93
DATE ANALYZED: 10/14/93
CLIENT PROJ. ID: 2793.01

AEN JOB NO: 9310055
SAMPLE SPIKED: 9309389-35
INSTRUMENT: C

MATRIX SPIKE RECOVERY SUMMARY
TPH EXTRACTABLE SOILS
METHOD: EPA 3550 GCFID

ANALYTE	Spike Conc. (mg/kg)	Sample Result (mg/kg)	MS Result (mg/kg)	MSD Result (mg/kg)	Average Percent Recovery	RPD
Diesel	40.2	ND	29.7	30.0	74.3	1.0

CURRENT QC LIMITS (Revised 06/22/92)

Analyte	Percent Recovery	RPD
Diesel	(44.1-105.8)	24.3

METHOD BLANK RESULT

Lab Id.	Extractable Hydrocarbons as Diesel (mg/kg)
101393-METHOD BLANK	ND
101493-METHOD BLANK	ND

Reporting Limit: 1
Method: 3550 GCFID
Instrument: C
Date Extracted: 10/13,14/93
Date Analyzed: 10/16/93

MS = Matrix Spike
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference
ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: H

CLIENT PROJ. ID: 2793.01

AEN JOB NO: 9310055
AEN LAB NO: 1013-BLANK
DATE ANALYZED: 10/13/93

BTEX AND HYDROCARBONS (SOIL MATRIX)
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	0.5
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/kg	0.05 mg/kg

ND = Not Detected

QUALITY CONTROL DATA

INSTRUMENT: H

CLIENT PROJ. ID: 2793.01

AEN JOB NO: 9310055
AEN LAB NO: 1014-BLANK
DATE ANALYZED: 10/14/93

BTEX AND HYDROCARBONS (SOIL MATRIX)
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	0.5
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/kg	0.05 mg/kg

ND = Not Detected

QUALITY CONTROL DATA

CLIENT PROJ. ID: 2793.01

AEN JOB NO: 9310055

INSTRUMENT: H

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020
(SOIL MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION Client Id.	Lab Id.	SURROGATE RECOVERY (PERCENT) Fluorobenzene
10/14/93	B-N	01	95.2
10/13/93	B-S	02	96.3
10/14/93	B-W	03	101.4
10/13/93	SW-N-4 1/2	04	95.2
10/13/93	SW-W-3 1/2	05	95.7
10/13/93	SW-NE-5	06	93.7
10/14/93	SW-S-3 1/2	07	106.4
10/14/93	SW-SW-7	08	98.9
10/13/93		1013-BLANK	94.6
10/14/93		1014-BLANK	94.5

CURRENT QC LIMITS

ANALYTE	PERCENT RECOVERY
Fluorobenzene	(70-115)

QUALITY CONTROL DATA

DATE ANALYZED: 10/14/93
SAMPLE SPIKED: 9310055-04
CLIENT PROJ. ID: 2793.01

AEN JOB NO: 9310055
INSTRUMENT: H

MATRIX SPIKE RECOVERY SUMMARY
METHOD: EPA 8020, 5020 GCFID
(SOIL MATRIX)

ANALYTE	Spike Conc. (ug/kg)	Sample Result (ug/kg)	MS Result (ug/kg)	MSD Result (ug/kg)	Average Percent Recovery	RPD
Benzene	19.0	ND	19.3	18.2	98.7	5.9
Toluene	72.8	ND	73.4	70.0	98.5	4.7
Hydrocarbons as Gasoline	1000	ND	892	888	89.0	0.4

CURRENT QC LIMITS (Revised 05/14/92)

Analyte	Percent Recovery	RPD
Benzene	(81.4-115.3)	10.2
Toluene	(85.3-112.4)	9.4
Gasoline	(72.0-119.4)	12.3

MS = Matrix Spike
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference
ND = Not Detected

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

R-4, S-H

9310055

Project No.: 2793.01	Field Logbook No.:	Date: 10.5.93	Serial No.: 11206
Project Name: ORO Loma	Project Location: SAN Lorenzo		
Sampler (Signature): Shelli Hatch			Samplers: SRF

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	TPHd	BTEX			HOLD	RUSH	REMARKS
B-N	10.5.93		01A	1	Soil			X	X					
B-S			02A											NORMAL TAT
B-W			03A											
SW-N-4½			04A											Results to SRF
SW-W-3½			05A											
SW-NE-5			06A											
SW-S-3½			07A											
SW-SW-7			08A					↓	↓					
SW-SE-6	X		09A	↓	↓							X		

RELINQUISHED BY: (Signature) Shelli Hatch	DATE 10.5.93	TIME 4.55	RECEIVED BY: (Signature)	DATE 10-6-93	TIME 11:50
RELINQUISHED BY: (Signature)	DATE 10.6.93	TIME 12:45	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature) Denise Harrington	DATE 10/6/93	TIME 1245
METHOD OF SHIPMENT:	DATE	TIME	LAB COMMENTS:		

Sample Collector:

LEVINE-FRICKE
1900 Powell Street, 12th Floor
Emeryville, Ca 94608
(415) 652-4500

Analytical Laboratory: AEN

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