

Project No.
3174.3.050.02

August 8, 2000

Mr. Will Macedo
Livermore Valley Joint Unified School District
685 East Jack London Street
Livermore, CA 94550

MAR 30 2001

Subject: Maintenance Yard
2900 Ladd Avenue
Livermore, California

GROUND-WATER MONITORING WELL INSTALLATION

Dear Mr. Macedo:

ENGEO Incorporated is pleased to present this report documenting the construction of an additional ground-water monitoring well at the subject property located in Livermore, California (Figure 1). Ms. Eva Chu, with the Alameda County Environmental Health Department, requested the additional well to address contaminant concentrations in shallow ground water. The scope of the work included the following:

- Observation of the drilling and construction of one 25-foot-deep, 2-inch-diameter ground-water monitoring well.
- Recovery of soil samples during drilling with organic vapor screening.
- Development of the monitoring well.
- Purging of the monitoring well with sample recovery.
- Laboratory analysis of the soil and ground-water samples.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Field activities were conducted between June 28 and August 1, 2000. Prior to drilling, a Drilling Permit Application was submitted to the Alameda County Zone 7 Water District (Appendix C). The well boring was advanced using a truck-mounted Mobile B-61 drill rig equipped with 8¼-inch-diameter hollow-stem augers. Exploratory drilling and soil sampling protocol details are included in Appendix D.

Monitoring Well MW-5 consisted of 2-inch-diameter PVC casing with flush joints, installed down through the hollow stem auger. The well was constructed with 10 feet of screened casing (0.01-inch slot width) and an approximate 14½-foot length of blank PVC well casing (2-inch-diameter Schedule 40 PVC). The total depth of the monitoring well is approximately 25 feet. A #2/16 sand

filter pack was placed from the base of the well to one foot above the top of the screened interval. A ± 12 -inch-thick bentonite seal was placed at the top of the filter pack. The remaining annular space was backfilled with a cement-bentonite grout seal. The well was completed within a flush-mounted 12-inch-diameter manhole. The top of the well casing was secured with a locking waterproof cap. A copy of the well construction diagram is included in Appendix C. The drill cuttings were placed within sealed 55-gallon drums, pending a review of the field PID screenings and laboratory analysis.

After the cement-bentonite grout had set for at least 72 hours, the well was developed using a surge block and bailer to produce relatively nonturbid ground water. Approximately four well volumes of water were removed from MW-5 during the development process due to the shallow height of the water column. The purged water was stored on site in Department of Transportation approved drums pending the results of the laboratory testing.

SOIL AND GROUND-WATER SAMPLING

Soil samples were recovered from the monitoring well boring at five-foot depth intervals down to the saturated zone. One soil sample from the top of the saturated zone was submitted for laboratory analysis. A Photoelectron Model 580B photoionization detector (PID) equipped with a 10.2 eV bulb was used in the field to screen the soil samples for volatile organic vapors. A copy of the boring log with PID screening data is included in Appendix C. Upon recovery, soil samples were sealed with Teflon, plastic end caps, and tape. The soil samples were preserved in a cooled ice chest for transportation under documented chain-of-custody to Chromalab, Inc., a DTSC certified analytical laboratory, in Pleasanton, California.

After at least 48 hours subsequent to development, the monitoring well was purged and a ground-water sample recovered for laboratory analysis. A copy of the ground-water sampling form is included in Appendix B. The water sample was preserved in a cooled ice chest for transportation under documented chain-of-custody to Chromalab, Inc. Ground-water sampling protocol details are included in Appendix D.

Following completion of the monitoring well, ENGEO prepared a Department of Water Resources (DWR) Well Installation Form for submittal to DWR and the Alameda County Zone Seven Water District. A copy of the DWR Well Installation Form is included in Appendix C.

LABORATORY TESTING

Laboratory analysis was performed by Chromalab, Inc. in Pleasanton, California. The soil and ground-water samples were tested for the following:

- *Total Volatile Petroleum Hydrocarbons (gasoline)*
- *Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX – EPA 8020)*
- *Methyl Tertiary-Butyl Ether (MtBE – EPA 8260)*

A copy of the Chromalab, Inc. analytical report is included in Appendix B.

The concentrations of TVPH as gasoline, BTEX, and MtBE were shown below laboratory reporting limits for the soil sample recovered at a depth of 21½ feet which was submitted for laboratory analysis.

The ground-water sample was collected on August 1, 2000. The depth to the top of the ground water was verified and the well was checked for the presence of free product or petroleum sheen. A thin petroleum film was observed on the water surface. Prior to sampling, approximately four casing volumes of water were removed from the well. The ground-water sample was collected for laboratory testing using a disposable polyethylene bailer. The sample was then decanted into pre-cleaned laboratory glassware and placed in an ice-cooled chest until delivery under a documented chain-of-custody to Chromalab, Inc., in Pleasanton, California. A copy of the ground-water sampling form is provided in Appendix B. The result of the MW-5 ground-water analysis is presented in Table I.

TABLE I
Ground-Water Analysis
(Concentrations reported in parts per billion)

Sample Number	DTW ¹	TVPH Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MtBE
MW-5	20.5	92,000	9,900	15,000	540	17,000	ND ²


1. Approximate depth to ground water, in feet, below the ground surface.
2. ND: Non detect. Analyte concentration below laboratory reporting limit

A copy of this report has been provided to Ms. Eva Chu (ACEHD). We appreciate the opportunity to be of continued service to you on this project. If you have any questions, please contact us.

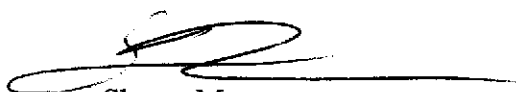
Very truly yours,

ENGEO INCORPORATED

Reviewed by:



Keith Nowell
Staff Geologist
kn/ja:mwinstall



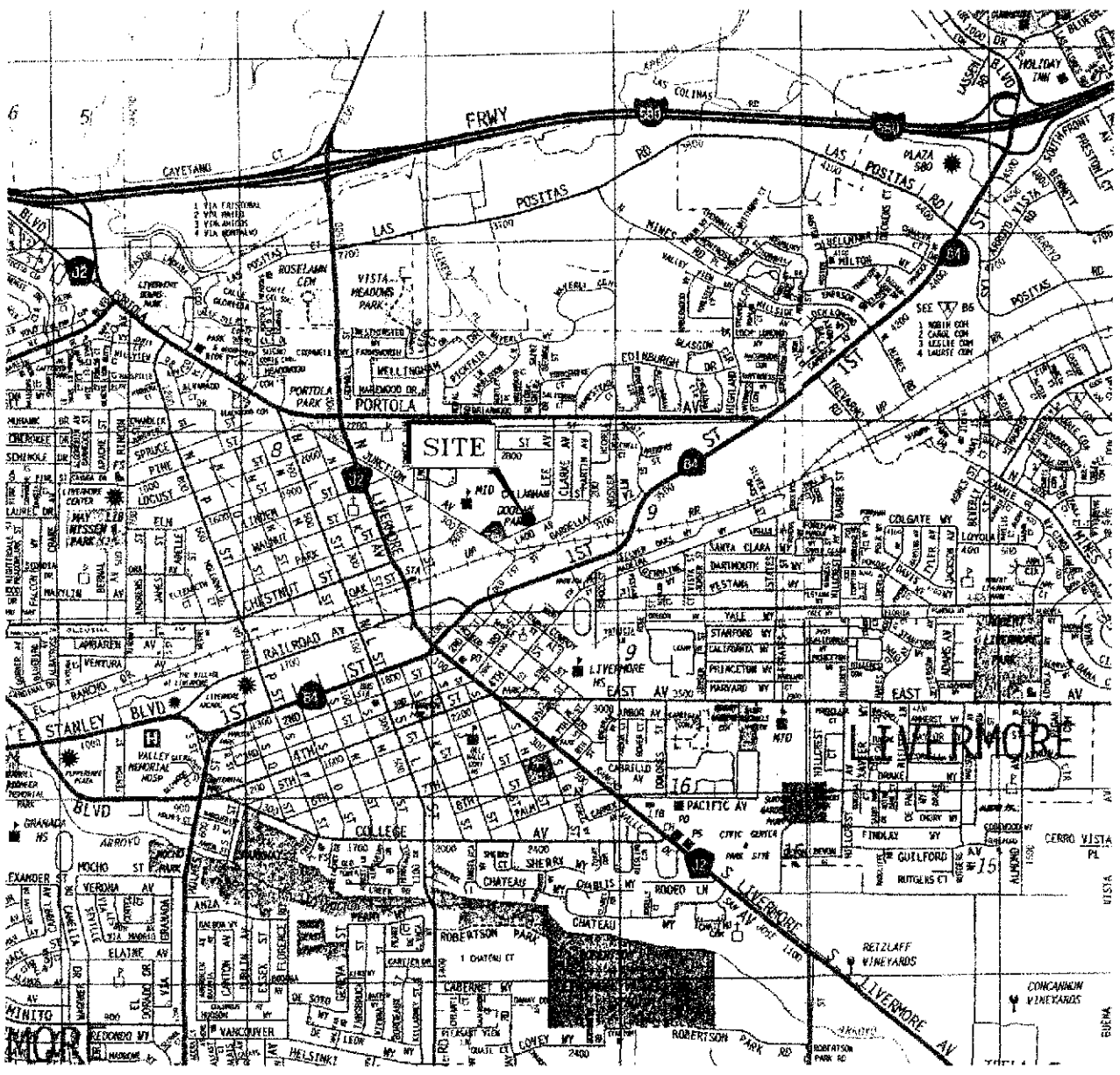
Shawn Munger
CHG 413

APPENDIX A

Figure 1 Site Location

Figure 2 Site Plan

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BASE MAP SOURCE: THOMAS BROTHERS

N.T.S.

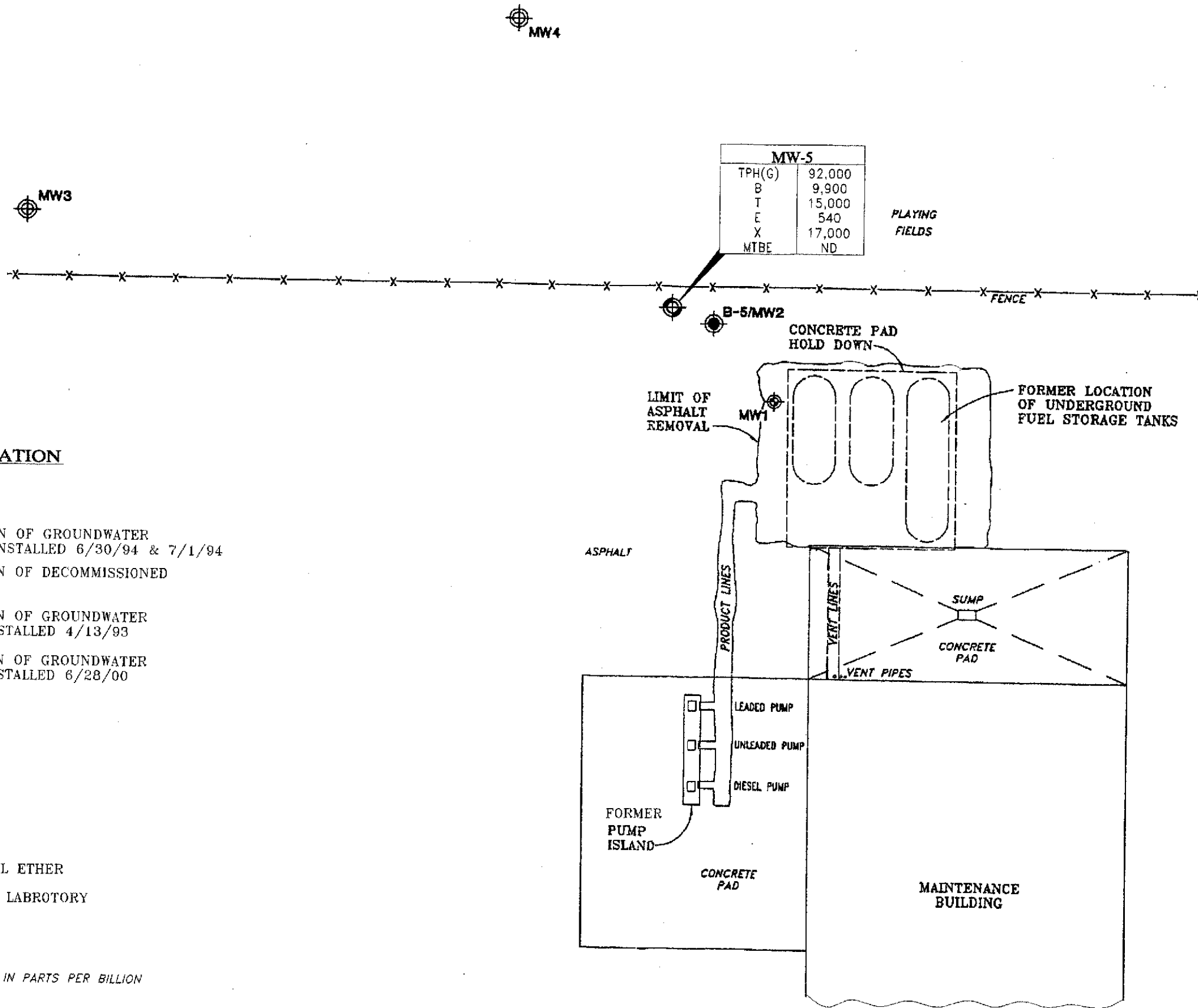


SITE LOCATION
 MAINTENANCE YARD, 2900 LADD AVENUE
 LIVERMORE, CALIFORNIA

PROJECT NO.: 3174.3.050.02
 DATE: AUGUST 2000
 DRAWN BY: *[Signature]* CHECKED BY: *[Signature]*

FIGURE NO.
1

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EXPLANATION

- ⊕ APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELLS INSTALLED 6/30/94 & 7/1/94
- ⊙ APPROXIMATE LOCATION OF DECOMMISSIONED MONITORING WELL
- ⊕ APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL INSTALLED 4/13/93
- ⊕ APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL INSTALLED 6/28/00

TPH(G) GASOLINE

B BENZENE

T TOLUENE

E ETHYL BENZENE

X TOTAL XYLENES

MTBE METHYL-TERIARY-BUTYL ETHER

ND CONCENTRATION BELOW LABROTORY REPORTING LIMITS

CONCENTRATIONS REPORTED IN PARTS PER BILLION



SOURCE: UNKNOWN



MONITORING WELL LOCATIONS
 MAINTENANCE YARD 2900 LADD AVENUE
 LIVERMORE, CALIFORNIA

PROJECT NO.: 3174.3.050.02

DATE: AUGUST, 2000

DRAWN BY: [Signature] CHECKED BY: 871

N.T.S.

FIGURE NO.

2

APPENDIX B

Soil Sampling Form
Ground-Water Sampling Form
Chromalab, Inc. Analytical Reports

3174.3.050.02
August 8, 2000

**ENGEO INCORPORATED
SOIL SAMPLING INFORMATION**

Job Name: 2900 Ladd Avenue
 Location1: Livermore, California
 Location2: _____
 Client: LVJUSD

Job Number: 3174.3.050.02
 Date: 07/20/00
 By: Keith Nowell

DRILLING INFORMATION

Drilling Contractor: Kvilhaug
 Auger Type: Hollow stem
 Hole Diameter: 8.00 inches

License No.: C57-482390
 Sampler Type: Cal-modified 3" O.D.

SAMPLING INFORMATION

Decon Procedure: TSP: X
 Solvent: _____

Distilled Water: X
 Acid: _____

Sample Number	Time	Size	Test	Comments
5- 1	9:12	2" x 6"	Hold	7-7.5-foot sample interval, 1.2 ppm PID
5- 2	9:20	2" x 6"	Hold	12-12.5-foot sample interval, 1124 ppm PID
5- 3	9:30	2" x 6"	Hold	17-17.5-foot sample interval, 394 ppm PID
5- 4	9:40	2" x 6"	TPH(G)/BTEX/MTBE	21.5-22-foot sample interval, 190 ppm PID
5- 5	9:50	2" x 6"	Hold	24.5-25-foot sample interval, 28.5 ppm PID

**ENGENO INCORPORATED
GROUND-WATER SAMPLING INFORMATION**

Job Name: 2900 Ladd Avenue
 Location: Livermore, California
 Client: LVJUSD

Job Number: 3174.3.050.02
 Date: 07/21/00
 By: B. Fagundes

WELL INFORMATION

Well Number: MW-5
 Total Depth (ft.): 25.00 TOC
 Depth to Water (ft.): 20.19 TOC

Casing Diameter (in.): 2.00
 Screen Length (ft.): 25
 Casing Volume (gal.): 0.8

PURGING INFORMATION

Bailer: X Pump: _____ Rate: _____
 Volume Removed (gal.): 3.5

Time (init./fin.): 11:45 / 12:25
 Number of Casing Volumes: 4.2

Time	Volume Removed (Gal.)	Total Casing Volumes	Temperature (degrees farenheight)	Conductivity (micromohs)	pH	Comments
11:45	---	---	---	---	---	Turbid, pet. sheen & odor
12:25	3.5	4.2	71.1	1391	6.9	Turbid, pet. sheen & odor

SAMPLE INFORMATION

Bailer: X Pump: _____
 Decon Procedure: TSP
 Disposable: X

Distilled Water: _____
 Other: _____

Sample	Time	Size / Number	Preservative	Test	Comments
MW-5	12:30	40 ml 3	HCl	TPH/BTEX/MtBE	

Engeo, Inc.

2401 Crow Canyon Rd., Suite 200
San Ramon, CA 94583-1545

Attn.: Mr. Keith Nowell

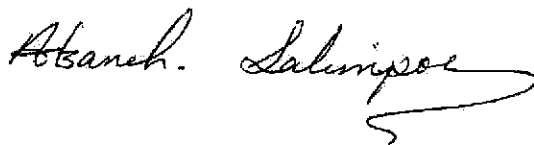
Project: 3174.3.050.02
LVJUSD Maintanance Yard

Dear Mr. Nowell,

Attached is our report for your samples received on Wednesday June 28, 2000
This report has been reviewed and approved for release. Reproduction of this report
is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after July 28, 2000
unless you have requested otherwise. We appreciate the opportunity to be of service to you.
If you have any questions, please call me at (925) 484-1919. You can also contact me via email.
My email address is: asalimpour@chromalab.com

Sincerely,



Afsaneh Salimpour

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0553

Gas/BTEX (Methanol Extraction)

Engeo, Inc.	<input checked="" type="checkbox"/> 2401 Crow Canyon Rd., Suite 200 San Ramon, CA 94583-1545
Attn: Keith Nowell	Phone: (925) 838-1600 Fax: (925) 838-7425
Project #: 3174.3.050.02	Project: LVJUSD Maintenance Yard

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
5-4	Soil	06/28/2000 09:40	1

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0553

To: **Engeo, Inc.**

Test Method: 8020
8015M

Attn.: Keith Nowell

Prep Method: 5030

Gas/BTEX (Methanol Extraction)

Sample ID: 5-4	Lab Sample ID: 2000-06-0553-001
Project: 3174.3.050.02 LVJUSD Maintenance Yard	Received: 06/28/2000 12:20
Sampled: 06/28/2000 09:40	Extracted: 07/07/2000 13:43
Matrix: Soil	QC-Batch: 2000/07/07-05.02
Sample/Analysis Flag o (See Legend & Note section)	

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	10	mg/Kg	1.00	07/07/2000 13:43	
Benzene	ND	0.62	mg/Kg	1.00	07/07/2000 13:43	
Toluene	ND	0.62	mg/Kg	1.00	07/07/2000 13:43	
Ethyl benzene	ND	0.62	mg/Kg	1.00	07/07/2000 13:43	
Xylene(s)	ND	0.62	mg/Kg	1.00	07/07/2000 13:43	
MTBE	ND	0.62	mg/Kg	1.00	07/07/2000 13:43	
Surrogate(s)						
Trifluorotoluene	77.3	53-125	%	1.00	07/07/2000 13:43	
Trifluorotoluene-FID	91.8	53-125	%	1.00	07/07/2000 13:43	

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

Printed on: 07/07/2000 18:34

Page 2 of 5

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0553

To: Engeo, Inc.

Test Method: 8020
8015M

Attn.: Keith Nowell

Prep Method: 5030

Batch QC Report Gas/BTEX (Methanol Extraction)

Method Blank	Soil	QC Batch # 2000/07/07-05.02
MB: 2000/07/07-05.02-001		Date Extracted: 07/07/2000 08:23

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Gasoline	ND	10	mg/Kg	07/07/2000 08:23	
Benzene	ND	0.62	mg/Kg	07/07/2000 08:23	
Toluene	ND	0.62	mg/Kg	07/07/2000 08:23	
Ethyl benzene	ND	0.62	mg/Kg	07/07/2000 08:23	
Xylene(s)	ND	0.62	mg/Kg	07/07/2000 08:23	
MTBE	ND	0.62	mg/Kg	07/07/2000 08:23	
Surrogate(s)					
Trifluorotoluene	80.8	53-125	%	07/07/2000 08:23	
4-Bromofluorobenzene-FID	90.2	58-124	%	07/07/2000 08:23	

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0553

To: Engeo, Inc.

Test Method: 8020
8015M

Attn: Keith Nowell

Prep Method: 5030

Batch QC Report

Gas/BTEX (Methanol Extraction)

Laboratory Control Spike (LCS/LCSD)		Soil		QC Batch # 2000/07/07-05.02	
LCS:	2000/07/07-05.02-002	Extracted:	07/07/2000 08:54	Analyzed	07/07/2000 08:54
LCSD:	2000/07/07-05.02-003	Extracted:	07/07/2000 09:25	Analyzed	07/07/2000 09:25

Compound	Conc. [mg/Kg]		Exp. Conc. [mg/Kg]		Recovery [%]		RPD [%]	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD		Recovery	RPD	LCS	LCSD
Gasoline	0.708	0.720	0.625	0.625	113.3	115.2	1.7	75-125	35		
Benzene	0.113	0.117	0.125	0.125	90.4	93.6	3.5	77-123	35		
Toluene	0.109	0.113	0.125	0.125	87.2	90.4	3.6	78-122	35		
Ethyl benzene	0.110	0.115	0.125	0.125	88.0	92.0	4.4	70-130	35		
Xylene(s)	0.333	0.348	0.375	0.375	88.8	92.8	4.4	75-125	35		
Surrogate(s)											
Trifluorotoluene	408	443	500	500	81.6	88.6		53-125			
4-Bromofluorobenzene-FI	469	467	500	500	93.8	93.4		58-124			

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

To: Engeo, Inc.

Test Method: 8020
8015M

Attn: Keith Nowell

Prep Method: 5030

Legend & Notes

Gas/BTEX (Methanol Extraction)

Analysis Flags

0

Reporting limits were raised due to high level of analyte present in the sample.

Engeo, Inc.

2401 Crow Canyon Road, Suite 200
San Ramon, CA 94583-1545

Attn.: Bill Fagundes

Project: 3174.3.050.02
Maintenance Yard

Attached is our report for your samples received on Friday July 21, 2000
This report has been reviewed and approved for release. Reproduction of this report
is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after August 20, 2000
unless you have requested otherwise. We appreciate the opportunity to be of service to you.
If you have any questions, please call me at (925) 484-1919. You can also contact me via email.
My email address is: asalimpour@chromalab.com

Sincerely,



Afsaneh Salimpour

Gas/BTEX and MTBE

Engeo, Inc.	☒ 2401 Crow Canyon Road, Suite 200 San Ramon, CA 94583-1545
Attn: Bill Fagundes	Phone: (925) 838-1600 Fax: (925) 838-7425
Project #: 3174.3.050.02	Project: Maintenance Yard

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
MW-2	Water	07/21/2000 14:20	1
MW-5	Water	07/21/2000 12:30	2

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-07-0345

To: Engeo, Inc.

Test Method: 8020
8015M

Attn.: Bill Fagundes

Prep Method: 5030

Gas/BTEX and MTBE

Sample ID: MW-5	Lab Sample ID: 2000-07-0345-002
Project: 3174.3.050.02 Maintenance Yard	Received: 07/21/2000 15:41
Sampled: 07/21/2000 12:30	Extracted: 07/26/2000 15:30
Matrix: Water	QC-Batch: 2000/07/26-01.03

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	92000	13000	ug/L	250.00	07/26/2000 15:30	
Benzene	9900	130	ug/L	250.00	07/26/2000 15:30	
Toluene	15000	130	ug/L	250.00	07/26/2000 15:30	
Ethyl benzene	540	130	ug/L	250.00	07/26/2000 15:30	
Xylene(s)	17000	130	ug/L	250.00	07/26/2000 15:30	
MTBE	ND	1300	ug/L	250.00	07/26/2000 15:30	
Surrogate(s)						
Trifluorotoluene	104.5	58-124	%	1.00	07/26/2000 15:30	
4-Bromofluorobenzene-FID	108.1	50-150	%	1.00	07/26/2000 15:30	

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

Printed on: 07/27/2000 17:19

Page 3 of 7

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-07-0345

To: Engeo, Inc.

Test Method: 8020
8015M

Attn.: Bill Fagundes

Prep Method: 5030

Batch QC Report Gas/BTEX and MTBE

Method Blank	Water	QC Batch # 2000/07/25-01.01
MB: 2000/07/25-01.01-001		Date Extracted: 07/25/2000 10:40

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Gasoline	ND	50	ug/L	07/25/2000 10:40	
Benzene	ND	0.5	ug/L	07/25/2000 10:40	
Toluene	ND	0.5	ug/L	07/25/2000 10:40	
Ethyl benzene	ND	0.5	ug/L	07/25/2000 10:40	
Xylene(s)	ND	0.5	ug/L	07/25/2000 10:40	
MTBE	ND	5.0	ug/L	07/25/2000 10:40	
Surrogate(s)					
Trifluorotoluene	94.6	58-124	%	07/25/2000 10:40	
4-Bromofluorobenzene-FID	85.0	50-150	%	07/25/2000 10:40	

1220 Quarry Lane * Pleasanton, CA 94566-4756
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CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-07-0345

To: Engeo, Inc.

Test Method: 8020
8015M

Attn.: Bill Fagundes

Prep Method: 5030

Batch QC Report Gas/BTEX and MTBE

Method Blank	Water	QC Batch # 2000/07/26-01.03
MB: 2000/07/26-01.03-001		Date Extracted: 07/26/2000 07:52

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Gasoline	ND	50	ug/L	07/26/2000 07:52	
Benzene	ND	0.5	ug/L	07/26/2000 07:52	
Toluene	ND	0.5	ug/L	07/26/2000 07:52	
Ethyl benzene	ND	0.5	ug/L	07/26/2000 07:52	
Xylene(s)	ND	0.5	ug/L	07/26/2000 07:52	
MTBE	ND	5.0	ug/L	07/26/2000 07:52	
Surrogate(s)					
Trifluorotoluene	113.2	58-124	%	07/26/2000 07:52	
4-Bromofluorobenzene-FID	117.0	50-150	%	07/26/2000 07:52	

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

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CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-07-0345

To: Engeo, Inc.

Test Method: 8020
8015M

Attn: Bill Fagundes

Prep Method: 5030

Batch QC Report

Gas/BTEX and MTBE

Laboratory Control Spike (LCS/LCSD)		Water	QC Batch # 2000/07/25-01.01	
LCS:	2000/07/25-01.01-002	Extracted: 07/25/2000 07:46	Analyzed	07/25/2000 07:46
LCSD:	2000/07/25-01.01-003	Extracted: 07/25/2000 08:21	Analyzed	07/25/2000 08:21

Compound	Conc. [ug/L]		Exp. Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD		Recovery	RPD	LCS	LCSD
Gasoline	510	472	500	500	102.0	94.4	7.7	75-125	20		
Benzene	92.0	93.0	100.0	100.0	92.0	93.0	1.1	77-123	20		
Toluene	86.4	87.1	100.0	100.0	86.4	87.1	0.8	78-122	20		
Ethyl benzene	83.0	84.2	100.0	100.0	83.0	84.2	1.4	70-130	20		
Xylene(s)	242	246	300	300	80.7	82.0	1.6	75-125	20		
Surrogate(s)											
Trifluorotoluene	418	428	500	500	83.6	85.6		58-124			
4-Bromofluorobenzene-FI	371	356	500	500	74.2	71.2		50-150			

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

Printed on: 07/27/2000 17:19

Page 6 of 7

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-07-0345

To: Engeo, Inc.

Test Method: 8020
8015M

Attn: Bill Fagundes

Prep Method: 5030

Batch QC Report

Gas/BTEX and MTBE

Laboratory Control Spike (LCS/LCSD)		Water	QC Batch # 2000/07/26-01.03	
LCS:	2000/07/26-01.03-002	Extracted: 07/26/2000 08:22	Analyzed	07/26/2000 08:22
LCSD:	2000/07/26-01.03-003	Extracted: 07/26/2000 08:53	Analyzed	07/26/2000 08:53

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD		Recovery	RPD	LCS	LCSD
Gasoline	615	609	500	500	123.0	121.8	1.0	75-125	20		
Benzene	49.9	48.9	50	50	99.8	97.8	2.0	77-123	20		
Toluene	48.3	47.7	50	50	96.6	95.4	1.3	78-122	20		
Ethyl benzene	49.6	49.4	50	50	99.2	98.8	0.4	70-130	20		
Xylene(s)	150	150	150	150	100.0	100.0	0.0	75-125	20		
Surrogate(s)											
Trifluorotoluene	271	262	250	250	108.4	104.8		58-124			
4-Bromofluorobenzene-Fi	581	576	500	500	116.2	115.2		50-150			

1220 Quarry Lane * Pleasanton, CA 94566-4756
Telephone: (925) 484-1919 * Facsimile: (925) 484-1096

Printed on: 07/27/2000 17:19

Page 7 of 7

CHROMALAB, INC.

1220 Quarry Lane • Pleasanton, California 94566-4756

(925) 484-1919 • Fax (925) 484-1096

Reference #: 53465

Chain of Custody

Environmental Services (SDB) (DOHS 1094)

DATE _____ PAGE _____ OF _____

PROJ. MGR. <u>BILL FAGUNDES</u> COMPANY <u>ENGE INC</u> ADDRESS <u>2901 Crow Canyon Rd STE 200</u> <u>San Ramon, CA 94583</u>	ANALYSIS REPORT																						
SAMPLERS (SIGNATURE) <u>Bill Fagundes</u> (PHONE NO.) <u>925-838-1600</u> (FAX NO.) <u>925-838-7425</u>	TPH (EPA 8015, 8020) <input checked="" type="checkbox"/> Gas w/ MTBE <u>MTBE</u>	PURGEABLE AROMATICS BTX (EPA 8020)	TPH-Diesel (EPA 8015M)	TEPH (EPA 8015M) <input type="checkbox"/> Diesel <input type="checkbox"/> M.O. <input type="checkbox"/> Other	PURGEABLE HALOCARBONS (HVOCs) (EPA 8010)	VOLATILE ORGANICS (VOCs) (EPA 8260)	SEMIVOLATILES (EPA 8270)	Oil & Grease <input type="checkbox"/> Petrol <input type="checkbox"/> Total <input type="checkbox"/> 1664	<input type="checkbox"/> PESTICIDES (EPA 8080) <input type="checkbox"/> PCB'S (EPA 8080)	PNA's by <input type="checkbox"/> 8270 <input type="checkbox"/> 8310	<input type="checkbox"/> Spec. Cond. <input type="checkbox"/> TSS <input type="checkbox"/> TDS	LUFT METALS: Cd, Cr, Pb, Ni, Zn	CAM 17 METALS (EPA 6010/7470/7471)	TOTAL LEAD	<input type="checkbox"/> W.L.T. (STLC) <input type="checkbox"/> TCLP	<input type="checkbox"/> Hexavalent Chromium <input type="checkbox"/> pH (24 hr hold time for H2O)							NUMBER OF CONTAINERS
SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.																			

MW-2	7/21/00	1420	Aqua.	HCl	X																		3	
MW-5	7/21/00	1230	Aqua.	HCl	X																			3

PROJECT INFORMATION					SAMPLE RECEIPT					RELINQUISHED BY 1			RELINQUISHED BY 2			RELINQUISHED BY 3		
PROJECT NAME: <u>Maintenance Yard</u>					TOTAL NO. OF CONTAINERS: <u>6</u>					SIGNATURE: <u>Bill Fagundes 7/21/00</u> (TIME)			SIGNATURE: _____ (TIME)			SIGNATURE: _____ (TIME)		
PROJECT NUMBER: <u>31743.050.02</u>					HEAD SPACE: _____					PRINTED NAME: <u>BILL FAGUNDES</u> (DATE)			PRINTED NAME: _____ (DATE)			PRINTED NAME: _____ (DATE)		
P.O. # _____					TEMPERATURE: <u>24 hrs.</u>					COMPANY: <u>ENGE INC.</u>			COMPANY: _____			COMPANY: _____		
TAT: <u>STANDARD 5-DAY</u>					CONFORMS TO RECORD: _____					RECEIVED BY 1: _____ (SIGNATURE) (TIME)			RECEIVED BY 2: _____ (SIGNATURE) (TIME)			RECEIVED BY (LABORATORY) 3: <u>DeWise Harrington</u> (SIGNATURE) (TIME)		
SPECIAL INSTRUCTIONS/COMMENTS: Report: <input type="checkbox"/> Routine <input type="checkbox"/> Level 2 <input type="checkbox"/> Level 3 <input type="checkbox"/> Level 4 <input type="checkbox"/> Electronic Report										PRINTED NAME: _____ (DATE)			PRINTED NAME: _____ (DATE)			PRINTED NAME: <u>D. Harrington 7/21/00</u> (DATE)		
<u>Confirm MTBE by EPA 8260</u>										COMPANY: _____			COMPANY: _____			LAB: <u>Chromalab</u>		

APPENDIX C

MW-5 Bore Log
Monitoring Well Detail
DWR Well Completion Form
Zone 7 Permit

3174.3.050.02
August 8, 2000

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: June 28, 2000	BLOWS/FT	OVM	IN PLACE	
				SURFACE ELEVATION: Approx. 490 feet (149 meters)		READING P.I.D. (10.0eV)	DRY UNIT WEIGHT	MOIST. CONTENT
DESCRIPTION						(Parts Per million)	(PCF)	% DRY WEIGHT
0				2 inches Asphalt over 4 inches of Aggregate Baserock.				
				CLAYEY GRAVEL (GC), dark brown, moist, gravels to 2/3 inches maximum diameter, subangular.		1.5		
5		5-1		CLAYEY GRAVEL (GC), gravels to 1 1/4 inch maximum diameter, subangular to subrounded, very moist, very dense.	75	1.2		
10		5-2		CLAYEY GRAVEL (GC), dark gray, moderate petroleum odor.	75	1124		
15		5-3		SANDY lean CLAY (CL), mottled dark yellowish brown/gray, moist, fine-grained sand, moderate petroleum odor, stiff.	19	394		
20		5-4		SILTY, CLAYEY fine SAND (SC-SM), dark gray with dark yellow brown mottling, wet, very dense.	85	190.4		
				CLAYEY GRAVEL (GC), dark gray with dark yellowish brown mottling, very moist, with sand, dense.				
25		5-5		▽ Water level at 24.4 feet, at 11:30.	55	28.5		
				Bottom of boring at approximately 25 feet. Ground water encountered at 24.4 feet during drilling.				
30								

OVMMEI 3174C.GPJ 8/21/00

ENGEIO
INCORPORATED

LVIJSD MAINTENANCE YARD
LIVERMORE, CALIFORNIA

BORING NO.: MW-5

DATE: August 2000

PROJ. NO.: 3174.3.050.02

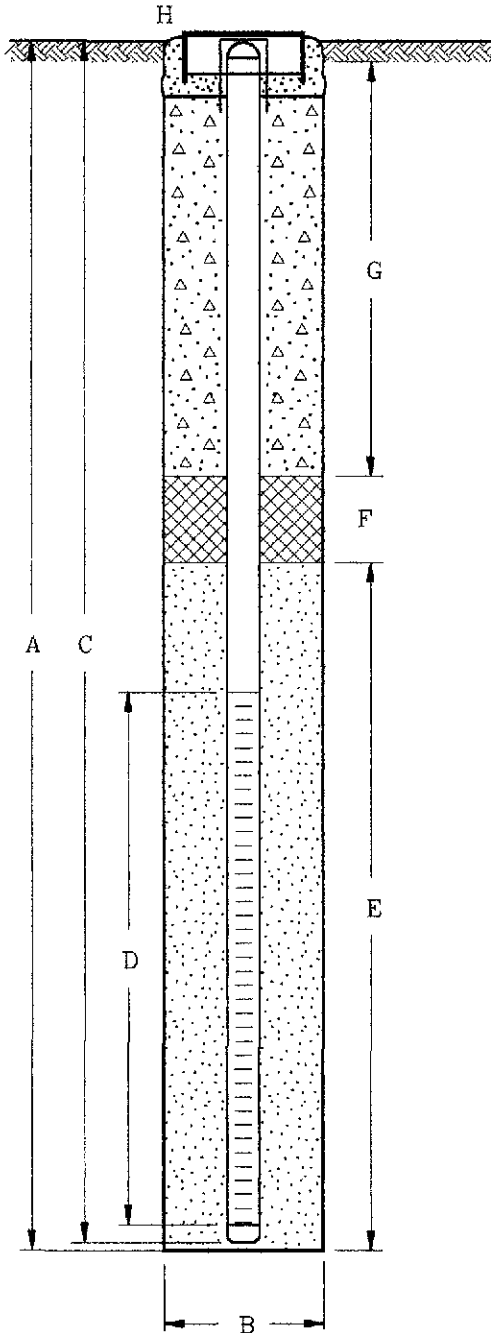
CHECKED BY

FIGURE NO.

BORING/WELL NO. MW-5

MONITORING WELL DETAIL

PROJECT NUMBER 3174.3.050.02 DATE OF INSTALLATION 5/28/2000
PROJECT NAME LVJUSD MAINTENANCE YARD TOP OF CASING ELEV. _____
COUNTY ALAMEDA GROUND SURFACE ELEV. 482 FT. (APPROX)
WELL PERMIT NO. 20102 DATUM _____



EXPLORATORY BORING

A. TOTAL DEPTH _____ 25 FT.
B. DIAMETER _____ 8 IN.

DRILLING METHOD

CONTINUOUS FLIGHT HOLLOW STEM AUGER

WELL CONSTRUCTION

C. CASING LENGTH _____ 24.5 FT.
MATERIAL SCH 40 PVC
DIAMETER _____ 2 IN.
D. SLOTTED INTERVAL LENGTH _____ 10 FT.
SLOTTED INTERVAL FROM 15 TO 25 FT.
SLOT SIZE _____ 0.010 IN.
E. FILTER PACK INTERVAL _____ 14 TO _____ 25 FT.
FILTER MATERIAL MONTEREY #2/16 SAND
F. FILTER PACK SEAL _____ 13 TO _____ 14 FT.
SEAL MATERIAL BENTONITE CHIPS
G. GROUT INTERVAL _____ 0.5 TO _____ 13 FT.
GROUT MATERIAL NEET CEMENT
H. 12" DIAMETER FLUSH MOUNT MONUMENT

ENGEO
INCORPORATED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE

PLEASANTON, CALIFORNIA 94586-5127

PHONE (925) 484-2600 FAX (925) 462-3914

June 22, 2000

Mr. Keith Nowell
Engeo, Inc.
2401 Crow Canyon Road, Suite 200
San Ramon, CA 94583

Dear Mr. Nowell:

Enclosed is drilling permit 20102 for a monitoring well construction project at 2900 Ladd Avenue in Livermore for Livermore Valley Joint Unified School District. Also enclosed are current drilling permits for your files. Please discard non-current drilling permits.

Please note that permit condition A-2 requires that a well construction report be submitted after completion of the work. The report should include drilling and completion logs, location sketch, and permit number. Please submit the original of your completion report. We will forward your submittal to the California Department of Water Resources.

If you have any questions, please contact me at extension 235 or Matt Katen at extension 234.

Sincerely,

Wyman Hong
Water Resources Technician II

Enc.

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588-5127 VOICE (925) 484-2600 X235
FAX (925) 462-3914



DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE

LOCATION OF PROJECT 2900 Ladd Avenue
Livermore, CA

PERMIT NUMBER 20102
WELL NUMBER 3S/2E 9L14
APN _____

California Coordinates Source _____ ft. Accuracy _____ ft.
CCN 437 210 ft. CCE 1630 200 ft.
APN _____

PERMIT CONDITIONS

CLIENT Livermore Valley Joint Unified School District
Name Attn: Mr. Will Macedo
Address 685 East Jack London St Phone 925/606-3319
City Livermore Zip 94550

Circled Permit Requirements Apply

APPLICANT
Name ENGE0 (Keith Nowell)
Address 2401 Crow Canyon Rd #200 Phone 925/838-1600
City San Ramon Zip 94583

- (A) GENERAL
 1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
 2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
 3. Permit is void if project not begun within 90 days of approval date.

TYPE OF PROJECT		Geotechnical Investigation	
Well Construction	<input type="checkbox"/>	General	<input type="checkbox"/>
Cathodic Protection	<input type="checkbox"/>	Contamination	<input type="checkbox"/>
Water Supply	<input type="checkbox"/>	Well Destruction	<input type="checkbox"/>
Monitoring	<input checked="" type="checkbox"/>		

- B. WATER SUPPLY WELLS
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
 3. An access port at least 0.5 inches in diameter is required on the wellhead for water level measurements.
 4. A sample port is required on the discharge pipe near the wellhead.

PROPOSED WATER SUPPLY WELL USE			
New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other	<input type="checkbox"/>

- (C) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

DRILLING METHOD:
Mud Rotary Air Rotary Auger
Cable Other

DRILLER'S LICENSE NO. 485185

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 25 ft.
Surface Seal Depth 13 ft. Number one

- D. GEOTECHNICAL: Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
- E. CATHODIC: Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION: See attached.
- G. SPECIAL CONDITIONS

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE 6/28/00
ESTIMATED COMPLETION DATE 6/28/00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 6/21/00
Wyman Hong

APPLICANT'S SIGNATURE Keith Nowell Date 6/12/00
Keith Nowell

APPENDIX D

Ground-Water Sampling Protocol
Soil Sampling Protocol
Laboratory Procedures

3174.3.050.02
August 8, 2000

GROUND-WATER SAMPLING PROTOCOL

Equipment Cleaning

Ground-water samples are recovered in pre-cleaned disposable polyethylene or Teflon bailers. The samples are then placed in pre-cleaned laboratory supplied glassware. Sample bottles and caps remain sealed until actual usage at the site. Before and during use at the site, equipment which comes in contact with the well or ground water is thoroughly cleaned with trisodium phosphate or Alquinox and rinsed with deionized or distilled water. This procedure occurs between each sampling event. Monitoring wells are sampled in approximate order of increasing contamination.

Prior to field activities ground-water and field monitoring equipment are *calibrated* using the appropriate calibration standards.

Water Level Measurements

Prior to checking for floating product, purging of the well and sampling, the depth to water is measured in each well using a sealed sounding tape of a scaled electric sounder. Water levels are recorded in the field to the nearest 0.01 foot from a common reference point on the well casing.

Floating Product Thickness

A field check for floating product is made with a clean and clear acrylic or Teflon bailer. Thickness of floating product as well as odor and color of the water is recorded. A clean nylon or cotton cord is used in each well. The cords are replaced with new cords prior to the sampling event.

Water Sampling Procedures

Prior to sampling of the ground water, a minimum of four to ten well-casing volumes of water are removed from the well. The volume of water to be removed is calculated from the measurements of the water level, casing diameter, and the well depth. Water is removed by either bailer, hand pump, or submersible electric pump. During purging, temperature, pH, dissolved solids, and oxidation-reduction potential are monitored for stabilization ($\pm 10\%$). Turbidity of the water is also noted either qualitatively or by means of a NTU instrument. A water sample is collected using a clean disposable polyethylene bailer when the appropriate volume has been purged or when the parameters have stabilized and a minimum of four well-casings have been purged. If the well is dewatered during purging, the well is allowed to recover to 80 percent of the static water level prior to sampling. If recovery exceeds a two-hour duration, the sample will be collected when a sufficient volume is available for the specific laboratory analyses.

Collection of Samples

Ground-water samples are collected in the appropriately sized pre-cleaned laboratory containers. Samples for volatile organic analyses are recovered in 40 milliliter vials lined with a Teflon septum. The volatile organic samples are recovered with zero headspace to prevent the loss of volatile constituents.

Ground-water samples for metal analyses are filtered in the field using a pressurized bailer system. Following filtering the metal samples are acidified to $\text{pH} < 2$ with HNO_3 or HCL and preserved in a cooled ice chest.

The water sample containers are labeled with the appropriate sample number, location, project name and number, time of collection and the date. Chain-of-custody forms are logged with the same information, signed and accompany the samples. Samples are placed in an iced cooler and transported to a state-certified analytical laboratory. Travel and equipment blanks are submitted on a project specific basis to provide for laboratory and field QA/QC.

SOIL SAMPLING PROTOCOL

Soil Sampling by Drill Rig

Review and confirmation of the proposed boring locations and special instructions are discussed with the client prior to sampling. Underground Service Alert (USA) and/or private utility locators are contacted to mark utilities in the area before beginning the drilling activities.

Equipment used in drilling is steam cleaned prior to its arrival at the site. Equipment includes, but is not limited to, augers, bits, drilling rod, samplers and sample liners. The sampler is thoroughly cleaned with trisodium phosphate or Alquinox and rinsed with distilled water between sampling intervals.

Each exploratory boring is drilled with a truck-mounted drilling rig using either solid flight or hollow stem augers. The boring is advanced to the desired sampling depth and the sampler is then lowered to the bottom of the hole. The sampler is driven a maximum of 18 inches by a 140-pound, rig-operated hammer falling 30 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the boring log.

The samplers commonly used are either a California-type sampler (3-inch or 2.5-inch) or a standard penetrometer (2-inch). If samples are collected for laboratory analysis, a California sampler equipped with brass or stainless steel liners is used.

Upon retrieval, the sampler is disassembled into its component parts. One or more of the liners are selected for chemical analysis. The selected liners(s) are sealed with Teflon sheets, plastic caps, and tape. The samples are then labeled, logged on the chain-of-custody and preserved in a cooled ice chest.

Each soil sample is classified in the field with the aid of the Unified Soil Classification System and a Munsell soil color chart. Soil descriptions are detailed on the boring log.

Soil samples may also be field-screened for volatile organic vapor with a photoionization detector (PID) calibrated to a 100 ppm isobutylene standard. Soil samples or auger cuttings are placed into polyethylene bags or glass mason jars and allowed to accumulate (PID) headspace vapors for a period of five to ten minutes (temperature dependent). The instrument probe is inserted into the bags or mason jars and the maximum reading is recorded.

Samples are held in the possession of ENGEO personnel until transfer to the analytical laboratory. The transfer is accomplished in one of three ways; on-site pickup by the laboratory, pick-up by the laboratory at ENGEO offices; or delivery to the laboratory by ENGEO. Each transfer of responsibility is documented on a chain-of-custody log that accompanies the sample(s).

LABORATORY PROCEDURES

Laboratory Contractor Selection

The laboratories selected to perform the analytical work are certified by the California State Department of Health Services as qualified to perform the selected analyses. The selected laboratories are reviewed by ENGEO to provide that an adequate quality control program is in place and certified by the State of California.

Chain-of-Custody Control

The following procedures are used during sampling and analytical activities to provide chain-of-custody control during transfer of samples from collection through delivery to the laboratory.

Contact with the laboratory prior to the sampling date to attain the appropriate containers for the desired analysis and the alert the laboratory to the date of sampling and sample pick up.

Documentation of the field sampling activities are logged.

Each sample is clearly and completely labeled for identification.

Chain-of-custody record documenting the transfer and possession of samples is maintained.

A laboratory analysis request sheet for documenting analyses to be performed is completed.

Samples Containers

Sample containers vary with each type of analytical parameter. Selected container types and materials are non-reactive with the sample and the particular analytical parameter being tested. Sample containers are cleaned and sterilized by the certified laboratory according to the EPA protocol for the individual analyses.

Sample Preservation and Shipment

Various preservatives are used by the certified laboratory to retard chemical changes in the samples. The samples are stored on ice after collection. Sample shipment from ENGEO to laboratories performing the selected analyses routinely occurs within 24 hours of sample collection. Sample holding times designated by DHS and the EPA for the specific analyses are observed.

Analytical Procedures

The analysis of ground-water and soil samples is conducted in accordance with accepted quantitative analytical procedures. The following publications are considered the primary references for ground-water sample analysis, and the contracts with the laboratories analyzing the samples stipulate that the methods set out in these publications be used. These procedures used are periodically updated by federal and state agencies.

Standard Methods for the Examination of Water and Wastewater, 16th Edition, American Public Health Association, et al., 1985.

Methods for Chemical Analysis of Water and Wastes, United States Environmental Protection Agency, 600/4-79-020, March 1979.

Test Methods for Evaluation of Solid Waste: Physical/Chemical Methods, United States Environmental Protection Agency, SW-846, 1982.

Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, United States Environmental Protection Agency, 600/4-82-057, 1982.

Practical Guide for Ground-Water Sampling, United States Environmental Protection Agency, 600/2-85/104.

RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, United States Environmental Protection Agency, September 1986.

Leaking Underground Tank Field Manual, State of California Leaking Underground Fuel Tank Task Force; October 1989.

Tri-Regional Board Staff Recommendations For Preliminary Evaluation and Investigation of Underground Tank Sites, State of California Regional Water Quality Control Board (Regions 1, 2, and 5), August 10, 1990.