H2OGEOL
A GROUNDWATER CONSULTANCY

9/7/95

Continue QMR next month in Oct 1995

SOIL SAMPLING
MONITORING WELL INSTALLATIONS
AND
INITIAL GROUNDWATER SAMPLING
AT
1000 NORTH VASCO ROAD
LIVERMORE, CALIFORNIA

AUGUST 16, 1995

H2OGEOL A GROUNDWATER CONSULTANCY
P.O.Box 2165 ▪ Livermore, California 94551 ▪ 510-373-9211

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SOIL SAMPLING MONITORING WELL INSTALLATIONS AND INITIAL GROUNDWATER SAMPLING AT 1000 NORTH VASCO ROAD LIVERMORE, CALIFORNIA

1.0 INTRODUCTION

The property at 1000 North Vasco Road in Livermore, California was identified as an underground tank leak site by the Alameda County Health Care Services Agency, Department of Environmental Health, Environmental Protection Division (ACHCSA). The location of the 1000 North Vasco Road property is shown in Figure 1. The property owner retained H_2OGEOL to conduct this investigation.

Tank removal was reported by Grayland Environmental in their report dated December 28, 1994. ACHCSA reviewed the Grayland report and requested submittal of a Preliminary Site Assessment workplan. A workplan for the installation of three monitoring wells was prepared and was submitted to ACHCSA on April 10, 1995. The ACHCSA approved the workplan in their letter dated April 14, 1995, with the addition of the collection and analysis of soil samples.

1.1 PRESENT INVESTIGATION

The purpose of this investigation is twofold: to determine groundwater flow direction (more precisely direction of groundwater gradient, since the horizontal hydraulic conductivity anisotropy will remain unknown) of the first encountered water bearing formation, and to ascertain the potential presence of underground storage tank derived petrochemicals. The chemicals analyzed and reported are: Total Extractable Petroleum Hydrocarbons as diesel (TPH-D) and Total Petroleum Hydrocarbons as Gasoline (TPH-G), along with the associated aromatic hydrocarbons benzene (B), toluene (T), ethylbenzene (E), and total xylene isomers (X), which are collectively referred to as BTEX in soil and groundwater.

The present investigations consisted of drilling three soil sampling boreholes to depths of about seven feet and collecting soil samples from immediately above the first encountered

groundwater (i.e., in the capillary fringe); drilling and installation of three monitoring wells to depths of about fifteen feet; and collecting and analyzing groundwater samples from the three monitoring wells.

All three of the monitoring wells are located within the fenced or otherwise demarcated property bounds(Figure 2). A ZONE 7 Water Agency (also known as Zone 7 Alameda County Flood Control and Water Conservation District) Drilling Permit Application was filed on May 05, 1995 and issued on May 11, 1995 (Attachment A). Upon completion of the well construction, a California Department of Water Resources (DWR) form 188 was filled out for each well and submitted to Zone 7 as required by the permit (the original DWR form 188 was also submitted to ZONE 7 as stipulated in the permit cover letter). DWR forms 188 are also included in Attachment A.

2.0 FIELD OPERATIONS AND INVESTIGATIVE METHODS

Field investigations consisted of the installation of three boreholes. Two 4-inch diameter, approximately seven foot deep soil sampling boreholes MW-1 and MW-2 were hand augered on July 17, 1995 and one (MW-3) on July 18, 1995 for the indicated purpose. Each of these boreholes were successfully deepened to fifteen feet, reamed to 6.25-inch diameter, and completed into monitoring wells MW-1, MW-2, and MW-3.

2.1 Lithologic Logging

During augering of each borehole, soil characteristics were logged in the field by a geologist. Distinguishing features such as soil composition, color, texture, and unusual odors were noted. The soil characteristics were logged in the field according to the Unified Soil Classification System.

Logging began during the hand augering of the 4-inch soil sampling boreholes. Logging continued when each monitoring well installation borehole was extended to final depth (15.5± feet). Borehole lithologic logs with well completion diagrams are included in Attachment B.

2.2 Soil Sampling

The soil sampling boreholes were drilled with 4-inch AMS soil augers. The hand augered boreholes were advanced until an increase in moisture content indicated that the water table was being approached. In each of the three boreholes this occurred at a depth of about seven feet. After sampling, each auger hole was advanced to the final total depth.

The soil samples were collected from the bottom of the initially augered boreholes using an AMS slide hammer to drive a core sampler. A 6-inch long brass soil sample retaining cylinder was housed within the core sampler. When the sampler was extracted from the borehole and disassembled, the brass cylinder was removed. The ends of the brass cylinder were covered with aluminum foil and a tight fitting "cap plug" was affixed to each end so as to ensure air tightness. The sealed tubes were labeled and then placed onto ice (water frozen in a 2-liter plastic bottle) in an ice chest while awaiting transport to Chromalab, Inc., a state certified laboratory, for analysis following proper chain of custody documentation (presented in Attachment C with the laboratory analytical report).

2.3 Monitoring Well Installation

Well construction commenced after each hand augered borehole was reamed to is final diameter. A ten foot section of 2-inch inside diameter schedule 40 PVC well casing and slotted screens was installed into each monitoring well borehole. Each well was constructed with screen factory slotted to 0.020-inch. Sand (RMC Lonestar, No.3) was poured into the annulus from the ground surface until the sand was about one half foot above the screen. After the required amount of sand was added to the annulus, a one half foot bentonite chip seal was placed above the sand pack. The bentonite chips were hydrated with potable water poured from the surface. A neat cement seal was added to prevent infiltration of the sand pack from surface runoff. Well MW-3 was secured with a locking cap and traffic rated box set onto concrete and sloped to drain away from the lid. Wells MW-1 and MW-2 were secured with stove-pipe type protective covers. The three monitoring wells were constructed as follows:

WELL CONSTRUCTION DETAILS

Well Number	Borehole Diameter (inches)	Casing/ Screen Diameter (inches)	Total Borehole Depth (feet)	Total Well Depth (feet)	Screened Interval (feet)
MW-1	6.25	2	15.8	15.68	5-15
MW-2	6.25	2	15.1	15.26	5-15
MW-3	6.25	2	15.5	15.05	5-15

Each monitoring well was developed on July 24, 1995 by the surge and pump technique. Well development continued until the turbidity was lowered to a point where the amount of sediment in the produced water would not interfere with the laboratory analytical procedures. Development occurred more than 72 hours after the placement of the bentonite and the pouring of the neat cement grout seal, as stipulated in the April 14, 1995 ACHCSA letter.

The wells were surveyed by Ron Archer Civil Engineer, Inc. on July 25, 1995. The well locations are shown on Figure 2 and the surveyor's report in included as Attachment D.

2.4 Monitoring Well Purging and Sampling

The monitoring wells were purged by pumping with an "ES-60" submersible pump marketed for monitoring well purging by Enviro-Tech Services Company of Martinez, California. Field measured water quality parameters were measured using a Cambridge Scientific Industries Hydac™ Conductivity Temperature pH Tester. Well purging activities and the field measured water quality parameters are documented in Attachment E. For each well, purging continued until specific conductance stabilized to +/- 5% on consecutive readings.

The purge pump was slowly removed from each well while running to allow a sweeping of the wellbore, preventing significant surging of the wellbore and drainage of the discharge tubing into the well. Groundwater samples for TPH-D (nonvolatile) analysis were collected in one liter amber bottles directly from the end of the pump discharge tubing. Groundwater samples for TPH-G plus BTEX analysis were collected using a precleaned Teflon™ bailer suspended from a new nylon twine line, and emptied through a precleaned Teflon™ pepcock type bottom emptying device into 40-mL glass vials with Teflon™ septum lids, in duplicate.

Groundwater sample bottles were labeled and placed in an ice chest with 2 Liter plastic bottles containing ice. Chain-of-Custody forms were filled out and were delivered with the ice chest to Chromalab, Inc. of Pleasanton, California, a state certified laboratory. Laboratory reports and Chain-of-Custody documentation are contained in Attachment F.

3.0 RESULTS AND DISCUSSION

3.1 Geology and Borehole Lithology

The 1000 North Vasco Road property lies near the northern end of the Altamont Creek - Arroyo Seco piedmont, near an unnamed intrafan wash, now modified as a flood control channel. The first encountered water bearing unit is a shallow portion of the Altamont Creek alluvial fan aquifer. The ground surface is at an elevation of about 525-530 feet above mean sea level and slopes gently northwestward (Figure 1) toward the flood control channel.

Each of the three monitoring well boreholes encountered clayey sand of the Altamont Creek alluvial fan aquifer at depth of seven feet, beneath a stiff clay. The clay content of the clayey sands generally decreased with depth and at MW-1 and MW-3 was gradational into a well graded sand.

The entire stratigraphic section encountered at MW-2 and MW-3 was yellowish brown to dark yellowish brown. There were no odors detected in the soils from either of these two monitoring well boreholes.

At MW-1 the uppermost portion (7 to 10 foot depth) of the clayey sand had a distinct, though faint, diesel odor and several minute globules of diesel were visibly present in the sands. The MW-1 borehole clayey sands had been partially gleyed as a consequence of the reducing conditions imposed by the presence of petroleum hydrocarbons, resulting in a mottled coloration of greenish gray and yellowish brown. The yellowish brown coloration dominated at increasing depths and the well graded sands were not mottled.

3.2 Soil Analytical Results

Soil samples were submitted to Chromalab, Inc. for analysis of TPH-D by U.S. EPA Method 3550/8015M, for TPH-G by U.S. EPA Method 5030/8015M, and for BTEX by U.S. EPA Method 8020. The laboratory report and Chain-of-Custody documentation is contained in Attachment C.

The soil sample analytical results for the MW-2 and MW-3 samples were all reported by the laboratory as not detected. These results correlate favorably with the remedial excavation perimeter sample analytical results reported by Grayland. The non detectable TPH-G + BTEX in the vicinity of the former gasoline tank and dispenser locations are consistent with the non-detectable to low concentrations in the final remedial excavation confirmation samples.

The diesel tank and dispenser location is represented by the MW-1 sample. The laboratory reported TPH-G and benzene, toluene, and ethylbenzene as not detected. The sample contained:

TPH-D	55	mg/Kg
Total Xylenes	6.4	µg/Kg

Note: 1.0 mg/Kg = 1,000 µg/Kg; also 1 mg/Kg is about 1 part per million (1 ppm) and 1.0 µg/Kg is about 1 part per billion (1 ppb).

Both the MW-1 TPH-D and Total Xylenes concentration are generally lower than the remedial excavation confirmation samples reported by Grayland.

3.2 Groundwater Flow Direction and Gradient

The regional shallow groundwater flow beneath the Altamont Creek - Arroyo Seco piedmont is down the topographic slope toward the main portion of the Livermore Valley groundwater basin. Local to the 1000 North Vasco Road property, shallow groundwater flow is

controlled by the adjacent flood control channel. Future shallow groundwater flow may also be influenced by sewer works in process of construction, and possibly other cultural features.

Depth to water in each monitoring well was measured to +/- 0.01 feet using a Solinst Model 101 water level meter on July 24, 1995. The depth to water was converted to potentiometric surface elevation by subtracting the measured depths to water from the casing top elevation. This information is presented below.

WELL AND GROUNDWATER ELEVATIONS
JULY 24, 1995

Well Number	Top of Casing Elevation (feet, msl)	Time of Depth measurement	Depth to Water (feet)	Groundwater Surface Elevation (feet, msl)
MW-1	526.50	08:45	8.68	517.82
MW-2	526.83	08:43	8.17	518.66
MW-3	526.00	08:40	7.60	518.40

The approximate groundwater flow direction for the triangle with a well at each apex is N 59.8° E at a gradient of 0.00653. Figure 2 is a potentiometric surface map showing well locations and groundwater surface contours as measured on July 24, 1995.

3.3 Groundwater Analytical Results

The groundwater surface at each monitoring well was checked for free product, observation of sheen, and odor. No free product or sheen was found at MW-2 and MW-3. Groundwater from monitoring well MW-1 possessed a slight sheen and a faint diesel odor.

Groundwater samples were submitted to Chromalab, Inc. for analysis of TPH-D by U.S. EPA Method 3510/8015M; for TPH-G by U.S. EPA Method 5030/8015M and for BTEX by method 602/8020. The laboratory report and Chain-of-Custody documentation is contained in Attachment F.

A comparison is made with maximum contaminant levels (MCLs) as listed in: Marshack, Jon B., D. Env., May, 1993, A Compilation of Water Quality Goals, California Regional Water Quality Control Board, Central Valley Region.

Groundwater sample fuel hydrocarbon constituents are summarized in the following table, with all concentrations are expressed in micrograms per liter (μg/L):

Well	TPH-D	TPH-G	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MW-1	910	<0.5	<0.5	<0.5	<0.5	<0.5
MW-2	<50	<0.5	<0.5	<0.5	<0.5	<0.5
MW-3	<50	60	<0.5	<0.5	<0.5	<0.5
California Primary MCL's	na	na	1	na	680	1,750
US E.P.A. Primary MCL's	na	na	5	1,000	700	10,000

There were no fuel hydrocarbon constituents exceeding an identified published regulatory threshold.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The soil sample collected near the groundwater interface from the borehole for MW-1 was found to contain diesel at a concentration below identified levels of concern (i.e., <100 ppm). The other two boreholes did not contain detectable concentrations of petroleum hydrocarbons. MW-1 is downgradient, and immediately adjacent to the diesel tank and dispenser remedial excavation and is consistent with the excavation perimeter confirmation sample analytical results.

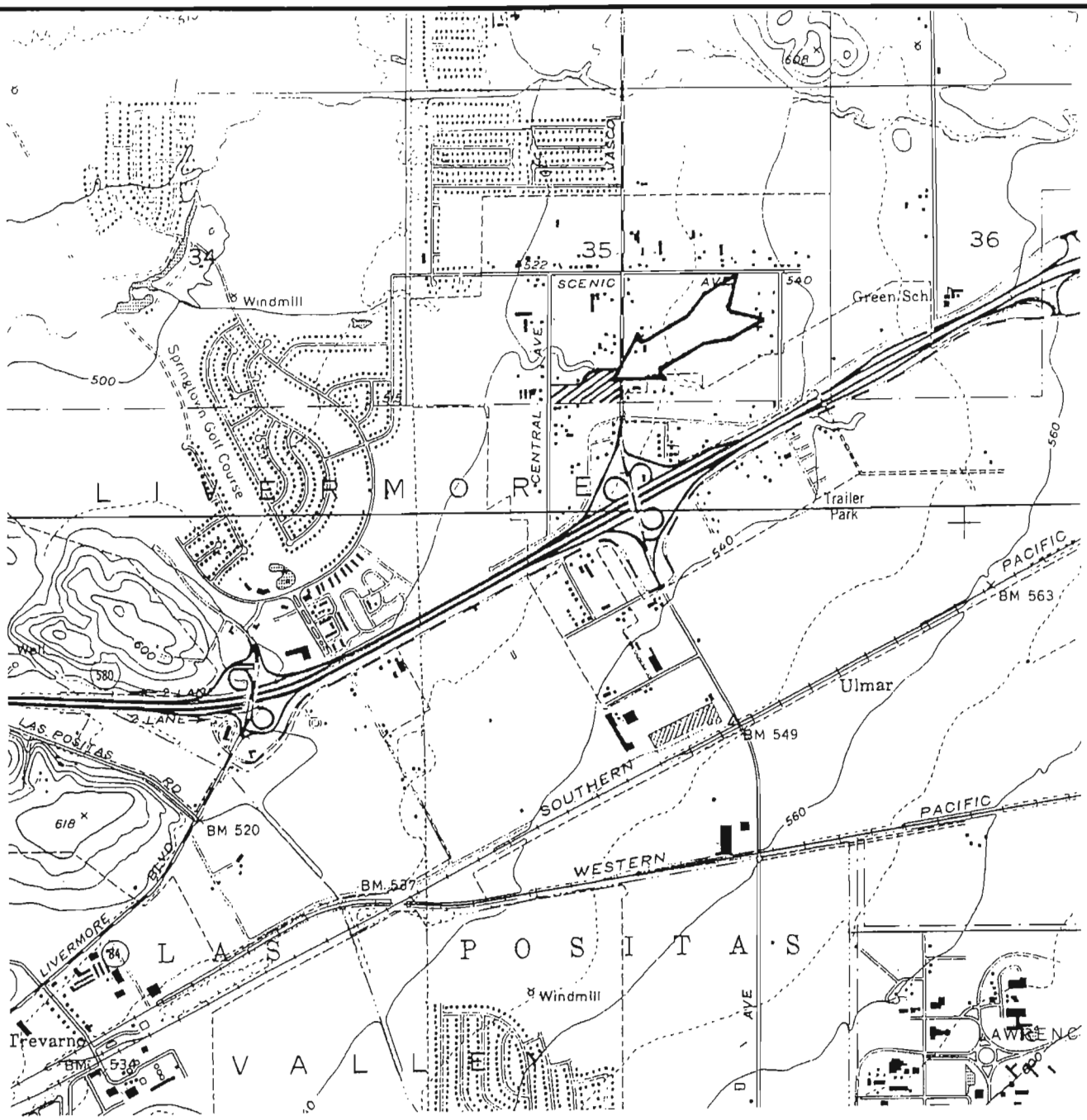
Groundwater samples from the monitoring wells were found not to contain detectable concentrations of the aromatic hydrocarbons benzene (B), toluene (T), ethylbenzene (E), and total xylene isomers (X). The groundwater sample from MW-1 was found to contain diesel at a concentration of 910 µg/L and MW-3 was found to contain TPH-G at a concentration of 60 µg/L. However, there are no published MCL's for these constituents. The three monitoring wells should be monitored quarterly for fuel hydrocarbons (TPH-D and TPH-G + BTEX), as required by ACHCSA guidelines.

5.0 PROFESSIONAL CERTIFICATION

This report on additional boreholes and monitoring wells at the property at 1000 North Vasco Road in Livermore, California has been prepared by H_2OGEOL A GroundWater Consultancy, by and under the professional supervision of the sole proprietor. The findings, recommendations, specifications, or professional opinions are presented after being investigated and prepared in accordance with generally accepted professional environmental hydrogeologic and groundwater monitoring practice. Incorporation of information developed and or reported by others does not necessarily mean that the undersigned accepts that information as valid. There is no other warranty, either expressed or implied.

This report was prepared by:

Gary D. Lowe, R.G.,C.E.G.,C.H.
Principal, Hydrogeologist
H_2OGEOL A GroundWater Consultancy



Base from U.S. Geological Survey Altamont 7.5 Minute Series Topographic Map

NORTH

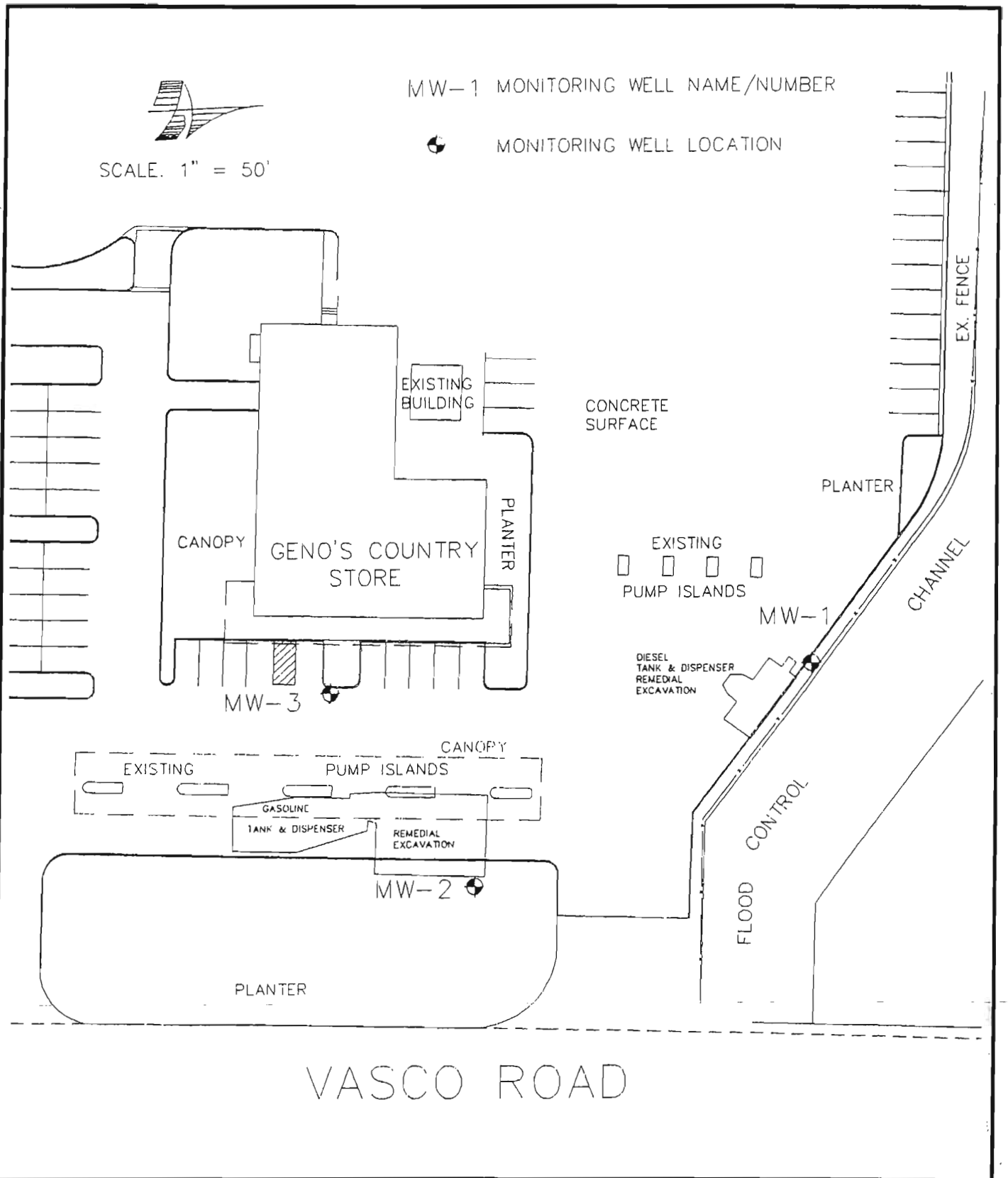
1000 0 1000 2000 3000 4000 5000 FEET

CALIF

H2OGEOLOGIC
GROUNDWATER CONSULTANTS

SITE LOCATION MAP
GENO'S COUNTRY STORE
1000 NORTH VASCO ROAD
LIVERMORE, CALIFORNIA

FIGURE
1



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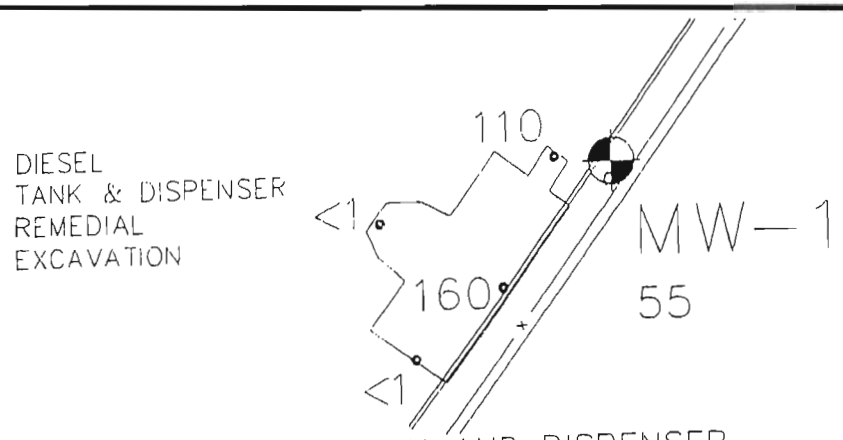
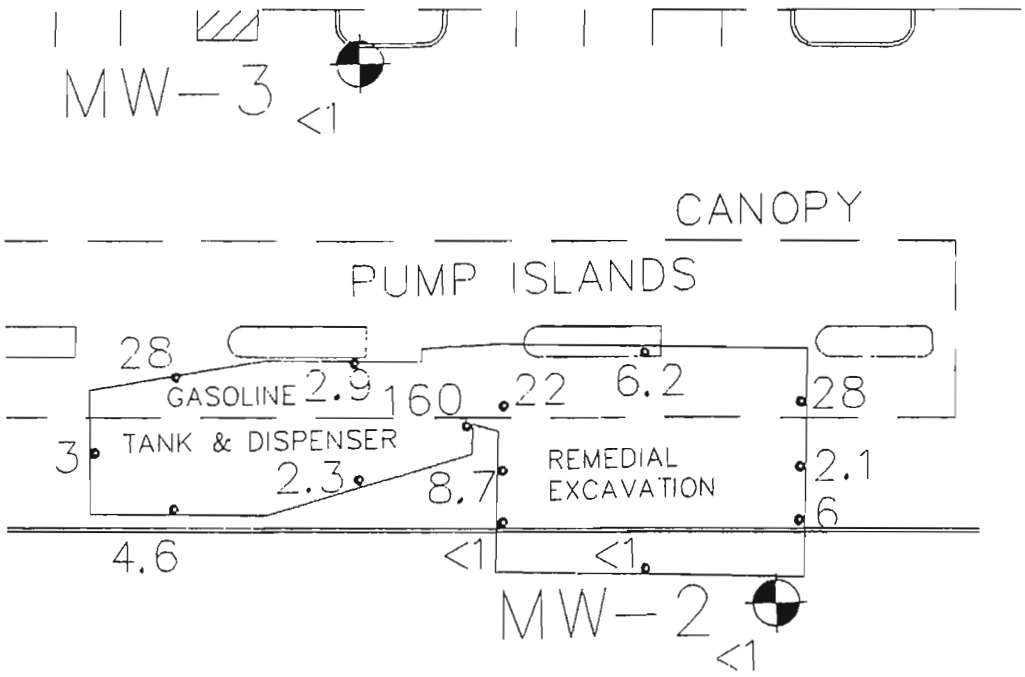
MONITORING WELL LOCATIONS

GENO'S COUNTRY STORE
1000 NORTH VASCO ROAD
LIVERMORE, CALIFORNIA

FIGURE
2



DIESEL TANK AND DISPENSER
REMEDIAL EXCAVATION
SOIL CONFIRMATION SAMPLE
TPH-D ANALYTICAL RESULTS
(FROM GRAYLAND, DECEMBER 28, 1994)



GASOLINE TANK AND DISPENSER
REMEDIAL EXCAVATION
SOIL CONFIRMATION SAMPLE
TPH-G ANALYTICAL RESULTS
(FROM GRAYLAND, DECEMBER 28, 1994)

ALL CONCENTRATIONS IN mg/kG (ppm)

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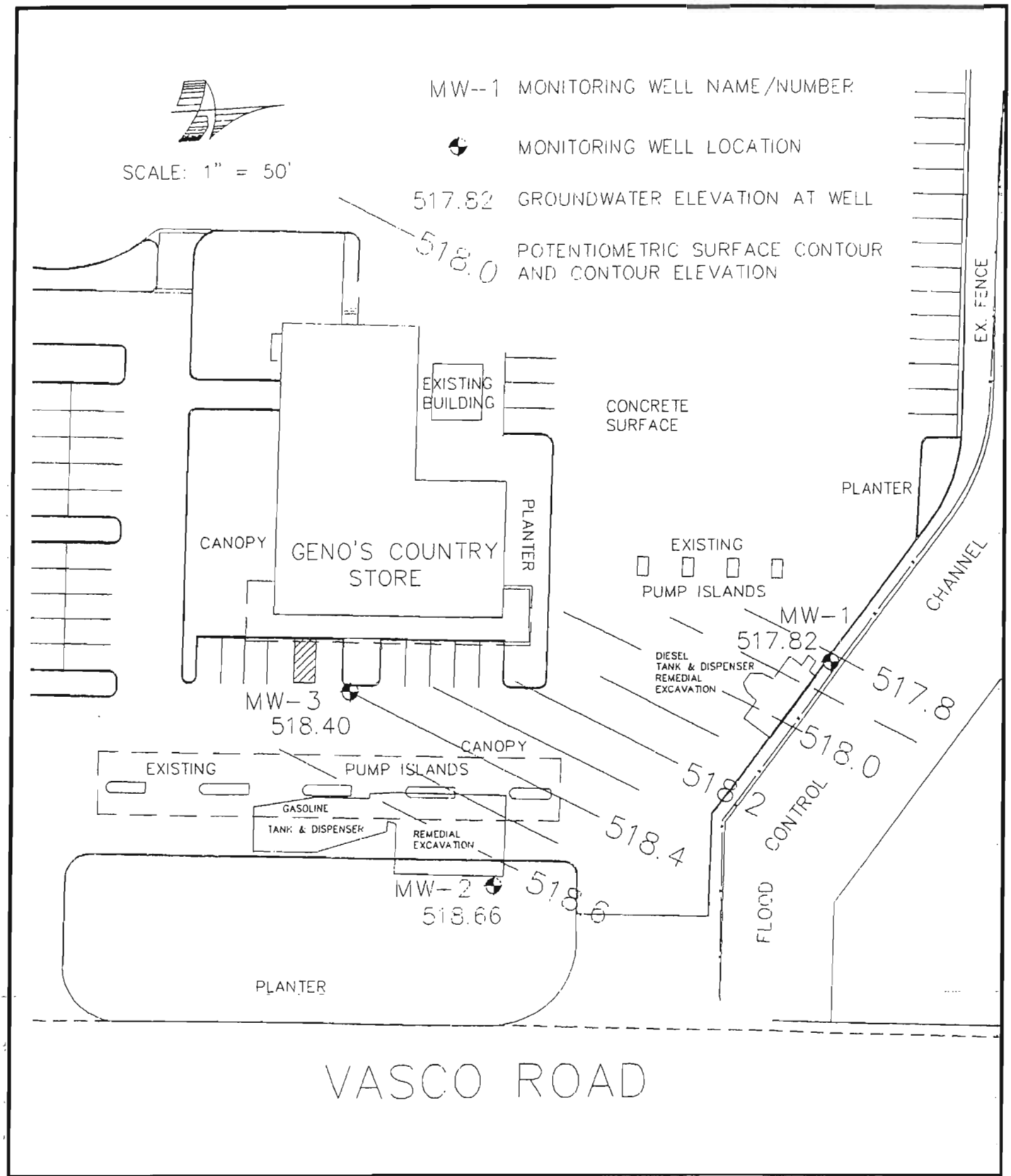
DIESEL AND GASOLINE TANK AREAS
SOIL SAMPLE ANALYTICAL RESULTS
(SEE FIGURE 2 FOR LOCATIONS)
GENO'S COUNTRY STORE
1000 NORTH VASCO ROAD
LIVERMORE, CALIFORNIA

FIGURE
3



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POTENTIOMETRIC SURFACE MAP FOR JULY 24, 1995

GENO'S COUNTRY STORE
1000 NORTH VASCO ROAD
LIVERMORE, CALIFORNIA

FIGURE
4

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ATTACHMENT A

PERMITS/FORMS

ZONE 7 WATER AGENCY
DRILLING PERMIT APPLICATION/
PERMIT No. 95296

AND

CALIFORNIA DEPARTMENT OF WATER RESOURCES
FORM 188
No. 193173 FOR MW-1
No. 193174 FOR MW-2
No. 193175 FOR MW-3

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588-5127 • PHONE (510) 484-2600 FAX (510) 462-3914

May 12, 1995

H2O Geological
P.O. Box 2165
Livermore, CA 94551-2165

Gentlemen:

Enclosed is drilling permit 95296 for a monitoring well construction project at 1000 North Vasco Road in Livermore for Geno Macedo.

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.

If you have any questions, please contact **Wyman Hong** at extension 235 or me at extension 233.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer III

WH:djf
encls.

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1000 North Nasco Road
Livermore, CA

PERMIT NUMBER 95296
LOCATION NUMBER

CLIENT
Name Mr. Geno Macedo / Geno's Deli
Address 1000 North Nasco Rd Voice 449-3841
City Livermore CA Zip 94550

APPLICANT
Name Gary D. Lowe, R.G. C.E.G.
dba Hydrologic Fax 3739222
Address P.O. Box 2165 Voice 3739211
City Livermore, CA Zip 94551-2165

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring (3)	✓	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ✓ either hand or hollow stem auger
Cable ___ Other ___

DRILLER'S LICENSE NO. If hand Ace Drilling C-57 629340
If hollow stem auger V&W Drilling C57 658786

WELL PROJECTS

Drill Hole Diameter	6	in.	Maximum		
Casing Diameter	2	in.	Depth	16-20 ft. / probably 15 ft.	
Surface Seal Depth	5	ft.	Number	3	

GEOTECHNICAL PROJECTS

Number of Borings	___		Maximum		
Hole Diameter	___	in.	Depth	___	ft.

ESTIMATED STARTING DATE 06/14/95
ESTIMATED COMPLETION DATE 06/20/95

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

APPLICANT'S SIGNATURE Gary D. Lowe Date 05/05/95

PERMIT CONDITIONS

Circled Permit Requirements Apply

(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.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
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. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. 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.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 11 May 95
Wyman Hong

91992

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

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ATTACHMENT B

BOREHOLE LITHOLOGIC LOGS

MW-1
MW-2
MW-3

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BOREHOLE LITHOLOGIC LOG

BOREHOLE No. MW-1 Sheet 1 of 1

Project No.:	Date: 07/17-18/95	Drilling Co. ASE Drilling	Drill Model Iwan Auger
Client: Geno's Country Store		Drilling Method - Hand Operation	Borehole Diameter 6.25-in
Location: 1000 North Vasco Road		Ground Surface Elevation 526.3	Datum: ground surface
Livermore, California		Borehole MW-1 was completed as a monitoring well MW-1	
Logged by: GDL	Driller: RCV/GDL		

Water Level	8.68			
Time	8:45			
Date	7/24/95			

Sampling Blowcounts	PID/FID HNu/OVA reading	Depth feet	Sample	Soil Sample Number	Graphic Soil Symbol	USCS Soil Symbol	Field Soil Description
		1				CL	Landscape fill. dark brown 7.5YR 3/4 very sandy silty clay.
		2				CL/ CH	Olive 5Y 4/3 gravelly sandy silty clay, pebbles to 2 cm
		3					Neat Cement Grout
		4				CH	Dark yellowish brown 10YR 3/4 silty stiff clay. Faint diesel odor.
		5					Bentonite Seal
		6					Trace gravels
		7	■	7-7.5 Ft.			
		8				SC	Greenish gray 5G 5/1 mottled yellowish brown 10YR 5/6 gravelly very clayey very fine to medium sand. Faint diesel odor.
		9					First Encountered Water at 8.8 Feet. ▽
		10					Decreasing clay with depth
		11					No odor from 10 foot to total depth.
		12					LONESTAR No. 3 Sand
		13				SW	Yellowish brown 10YR 5/6 clayey very fine to medium sand.
		14				CH	Yellowish brown 10YR 5/6 stiff clay.
		15				SC	Yellowish brown 10YR 5/6 very clayey very fine to medium sand.
		16					Total Well Depth = 15.68 Feet. (below reference mark)
							Total Depth 15.8 (below grade)
		17					Well completed with 6-inch stove pipe type cover.
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

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BOREHOLE LITHOLOGIC LOG

BOREHOLE No. MW-2 Sheet 1 of 1

Project No.:	Date: 07/17-18/96	Drilling Co. ASE Drilling	Drill Model Iwan Auger
Client: Geno's Country Store		Drilling Method - Hand Operation	Borehole Diameter 6.25-in
Location: 1000 North Vasco Road		Ground Surface Elevation 526.6	Datum: ground surface
Livermore, California		Borehole MW-2 was completed as a monitoring well MW-2	
Logged by: GDL	Driller: RCV/GDL		

Water Level	8.17			
Time	8:43			
Date	7/24/95			

Sampling Blowcounts	PID/FID HNu/OVA reading	Depth feet	Sample	Soil Sample Number	Graphic Soil Symbol	USCS Soil Symbol	Field Soil Description
						CL	Landscape fill. dark brown 7.5YR 3/4 very sandy silty clay.
		1					Dark yellowish brown 10YR 3/4 silty stiff clay.
		2					
		3					
		4				CH	
		5					Trace gravels
		6					
		7	■	7-7.5 Ft.			
		8					Dark yellowish brown 10YR 3/4, gravelly very clayey very fine to medium sand.
		9					First Encountered Water at 8.35 Feet. ▽
		10				SC	
		11					
		12					
		13					Dark yellowish brown 10YR 4/4 sandy clay.
		14				CL	
		15					
		16					Total Depth 15.1 (below grade)
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

Neat Cement Grout

Bentonite Seal

LONESTAR No. 3 Sand

2-inch PVC casing and screen.

screen openings = 0.020 inch

Total Well Depth = 15.26 Feet (below reference mark)

Well completed with 6-inch stove pipe type cover.

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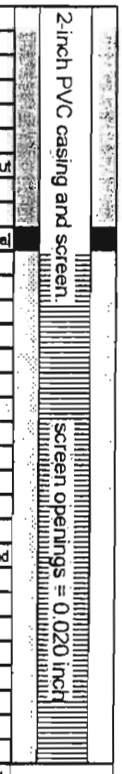
BOREHOLE LITHOLOGIC LOG

BOREHOLE No. MW-3 Sheet 1 of 1

Project No.:	Date: 07/18-19/95	Drilling Co. ASE Drilling	Drill Model Iwan Auger
Client: Geno's Country Store		Drilling Method - Hand Operation	Borehole Diameter 6.25-in
Location: 1000 North Vasco Road		Ground Surface Elevation 526.3	Datum: ground surface
Livermore, California		Borehole MW-3 was completed as a monitoring well MW-3	
Logged by: GDL	Driller: RCV/GDL		

Water Level	7.60			
Time	8:40			
Date	7/24/95			

Depth	Sampling Blowcounts	PID/FID HNu/OVA reading	Sample test	Soil Sample Number	Graphic Soil Symbol	USCS Soil Symbol	Field Soil Description
							Concrete 0.5 feet, baserock 0.3 feet
1						CH	Dark yellowish brown 10YR 3/4 stiff clay.
2							
3						CH	Yellowish brown 10YR 5/6 sandy stiff clay.
4							Increasing sand content with depth.
5						SC	Yellowish brown 10YR 5/6 clayey sand.
6							Yellowish brown 10YR 5/4 clayey sand.
7			■	7-7.5 Ft.			Decreasing clay with depth.
8						SC/SW	First Encountered Water at 7.85 Feet. ▽
9							Yellowish brown 10YR 5/4 very clayey pebbly fine to coarse sand.
10						SW	Pebbles to 1 cm.
11							Yellowish brown 10YR 5/4 pebbly fine to coarse sand.
12							Pebbles to 2X7 cm.
13						CH	Yellowish brown 10YR 5/4 stiff sandy clay.
14							
15							
16							Total Depth 15.6 (below grade)
17							
18							
19							
20							
21							
22							
23							
24							
25							



Total Well Depth = 15.05 Feet. (below reference mark)
Well completed with 8-inch flush box.

H2OGEOL
A GROUNDWATER CONSULTANCY

P.O.Box 2165 ▪ Livermore, California 94551 ▪ 510-373-9211

ATTACHMENT C

SOIL SAMPLE ANALYTICAL RESULTS
CHROMALAB, INC.
SUBMISSION # 9507201

CHROMALAB, INC.

Environmental Services (SDB)

July 25, 1995 *Submission #:* 9507201

H20 GEOL

Atten: Gary Lowe

Project: GENO'S COUNTRY STORE
Received: July 19, 1995

re: 3 samples for Gasoline and BTEX analysis.
Method: EPA 5030/8015M/8020

Sampled: July 17, 1995 *Matrix:* SOIL
Run: 7705-4 *Analyzed:* July 20, 1995

Spl #	Sample ID	Gasoline (mg/Kg)	Benzene (ug/Kg)	Toluene (ug/Kg)	Ethyl Benzene (ug/Kg)	Total Xylenes (ug/Kg)
96287	MW-1@ 7-7.5'	N.D.	N.D.	N.D.	N.D.	6.4
96288	MW-2@ 7-7.5'	N.D.	N.D.	N.D.	N.D.	N.D.
96289	MW-3@ 7-7.5'	N.D.	N.D.	N.D.	N.D.	N.D.
	oorting Limits	1.0	5.0	5.0	5.0	5.0
	Blank Result	N.D.	N.D.	N.D.	N.D.	N.D.
	Blank Spike Result (%)	92	97	96	99	100

Billy Thach
Chemist

Ali Kharrazi
Organic Manager

1220 Quarry Lane • Pleasanton, California 94566-4756
(510) 484-1919 • Facsimile (510) 484-1096

CHROMALAB, INC.

Environmental Services (SDB)

July 31, 1995 *Submission #:* 9507201

H20 GEOL

Atten: Gary Lowe

Project: GENO'S COUNTRY STORE
Received: July 19, 1995

re: 3 samples for Diesel analysis.
Method: EPA 3550/8015M

Sampled: July 17, 1995 *Matrix:* SOIL *Extracted:* July 20, 1995
Run: 7749-D *Analyzed:* July 22, 1995

Spl #	Sample ID	DIESEL (mg/Kg)	REPORTING LIMIT (mg/Kg)	BLANK RESULT (mg/Kg)	BLANK SPIKE RESULT (%)
96289	MW-3@ 7-7.5'	N.D.	1.0	N.D.	92

Sampled: July 17, 1995 *Matrix:* SOIL *Extracted:* July 20, 1995
Run: 7749-D *Analyzed:* July 24, 1995

Spl #	Sample ID	DIESEL (mg/Kg)	REPORTING LIMIT (mg/Kg)	BLANK RESULT (mg/Kg)	BLANK SPIKE RESULT (%)
96287	MW-1@ 7-7.5'	55	10	N.D.	92
	For above sample:	*REPORTING LIMIT RAISED 10X DUE TO DILUTION.*			
96288	MW-2@ 7-7.5'	N.D.	1.0	N.D.	92

Dennis Mayugba
Chemist

Ali Kharrazi
Organic Manager

1220 Quarry Lane • Pleasanton, California 94566-4756
(510) 484-1919 • Facsimile (510) 484-1096

201/96287-96289

22977

CHAIN OF CUSTODY

DATE: 07/19/95 PAGE 1 of 1

H_2OGEOL A GROUNDWATER CONSULTANCY

P.O. BOX 2165
LIVERMORE, CALIFORNIA 94551-2165

Sample Source:
Geno's Country Store
1000 North Vasco Road
Livermore, California

SAMPLER(S): Gary D. Lowe & Richard Vorst

SAMPLER'S SIGNATURE: Gary D Lowe

SAMPLE RECIEPT:
TOTAL No. of CONTAINERS _____
CHAIN OF CUSTODY SEALS _____
REC'D GOOD CONDITION/COLD _____
CONFORMS TO RECORD _____
LAB NO.

SUBM #: 9507201 REP: GC
CLIENT: H2OGEOL
DUE: 08/02/95
REF #: ~~22977~~

FAX RESULTS TO (510) 373-9222

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	ANALYTE: Total Petroleum Hydrocarbons as Diesel (EPA 3550/8015)	ANALYTE: Total petroleum Hydrocarbons as Gasoline + BTEX (EPA 5030/8015M + 8020/602)					NUMBER OF CONTAINERS
MW-1 @ 7-7.5 Ft.	7/17/95	08:15	SOIL		X	X					1
MW-2 @ 7-7.5 Ft.	7/17/95	11:15	SOIL		X	X					1
MW-3 @ 7-7.5 Ft.	7/18/95	14:26	SOIL		X	X					1

Please note special pricing
per Gary Cook.
10-Day TAT

RELINQUISHED BY:			RELINQUISHED BY:		
SIGNATURE	Gary D Lowe	TIME	SIGNATURE	Myrna R. Lowe 6:15	TIME
PRINTED NAME	Gary D. Lowe	06:15	PRINTED NAME	Myrna R. Lowe	
COMPANY	H_2OGEOL	DATE 07/19/95	COMPANY	H_2OGEOL	DATE 07/19/95

RECEIVED BY:			RECEIVED BY LABORATORY:		
SIGNATURE	Myrna R. Lowe	TIME	SIGNATURE	Chris Rowley 1105	TIME
PRINTED NAME	Myrna R. Lowe	11:05	PRINTED NAME	Chris Rowley 7/19/95	
COMPANY	H_2OGEOL	DATE 07/19/95	COMPANY	Chromalab, Inc.	DATE 07/19/95

H2OGEOL
A GROUNDWATER CONSULTANCY

P.O.Box 2165 ▪ Livermore, California 94551 ▪ 510-373-9211

ATTACHMENT D

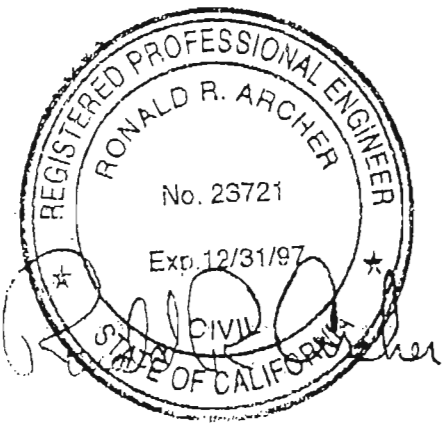
WELL SURVEYOR'S REPORT
RON ARCHER, CIVIL ENGINEER, INC.

RON ARCHER

CIVIL ENGINEER INC.

CONSULTING • PLANNING • DESIGN • SURVEYING

4133 Mohr Ave., Suite E • Pleasanton, CA 94566
(510) 462-9372



JULY 25, 1995 JOB NO 2308

ELEVATIONS OF EXISTING MONITORING WELLS AT THE GENO'S COUNTRY STORE FACILITY, LOCATED AT 1000 NORTH VASCO ROAD, CITY OF LIVERMORE, ALAMEDA COUNTY, CALIFORNIA.

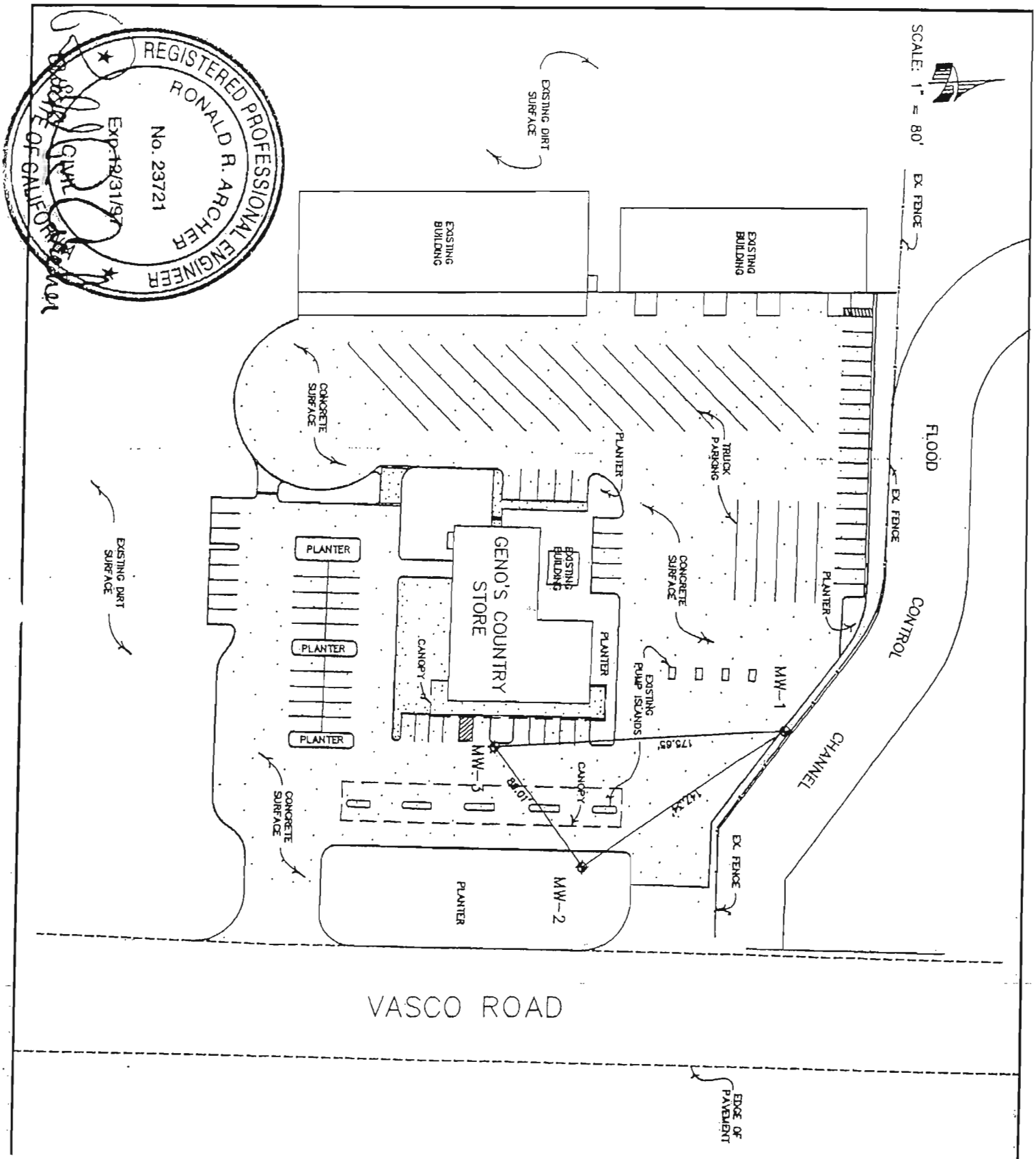
FOR: *H_2O GEOL*

BENCHMARK: VAS-NOR

A FOUND U.S.G.S. BRASS DISK STAMPED "VAS-NOR", LOCATED IN THE TOP OF CURB ABOVE A CATCH BASIN AT THE SOUTHWEST CORNER OF THE INTERSECTION OF VASCO ROAD AND NORTHFRONT ROAD. ELEVATION TAKEN AS 527.04 M.S.L.

MONITORING WELL DATA TABLE

WELL DESIGNATION	TOP OF CASING ELEVATION	TOP OF BOX ELEVATION
MW-1	526.50	526.26 (GROUND)
MW-2	526.83	526.61 (GROUND)
MW-3	526.00	526.32 (BOX)



GENO'S COUNTRY STORE
1000 NORTH VASCO ROAD,
CITY OF LIVERMORE,
ALAMEDA COUNTY, CALIFORNIA
FOR: H_2O GEOL

RON ARCHER CIVIL ENGINEER INC. • 4133 MOHR AVE. SUITE E • PLEASANTON CA. 94566	DATE: JULY 25, 1995	JOB NO. 2308

H2OGEOL
A GROUNDWATER CONSULTANCY

P.O.Box 2165 ▪ Livermore, California 94551 ▪ 510-373-9211

ATTACHMENT E

LOG OF WELL SAMPLING ACTIVITIES

LOG OF WELL SAMPLING ACTIVITIES

Well Identification: MW-1 Project Name: 1000 N. Ustick Rd. Date: 7/24/55

Sampled by: RCV/GDL Weather Conditions: Clear, 68°F, breezy

Well Location: Landscaping Well Casing Diameter: 2" Depth of Well Casing: _____

Measuring Point: Top of PVC Casing Initial Depth to Water: _____ Final Depth to Water: _____

Casing Volume (1 vol./ 3 vol): _____ Well Borehole Volume: _____

Purging Method: Centrifugal Pump/Peristaltic Pump; Grundfos Submersible Pump; Centrifugal Pump/ES-60 Submersible; ES-60 12v Submersible Pump ✓

Sampling Method: Peristaltic Pump; Grundfos Submersible Pump; Teflon Bailer

Purging Rate: See below Total Discharge: _____ Casing Volumes Purged: _____

Comments: Slight Sheen

Waste Water Disposal: _____

Starting Time: 10:02

Time Pump on: 10:04

Date	Time	Gal. Purged	pH	T deg. F	Diluted S.C.		Dil. Factor		S.C. (µS/cm)	Color
7/24/55	10:09	3.0/emptied	8.37	64.9		x		=	1900	Yelv Brown
"	10:18	4.0/Emptied	7.77	65.1		x		=	1860	" "
"	10:15	5.0/emptied	7.70	64.6		x		=	1860	" "
"	10:18	8.0/emptied	7.68	64.5		x		=	1850	" "
"	10:22	10.0/emptied	7.68	64.4		x		=	1870	" "
"	10:29	10.5	7.76	64.6		x		=	1840	" "
"	10:31	11.0	7.74	64.9		x		=	1850	" "
"	10:34	12.0	7.77	65.0		x		=		
						x		=		
						x		=		
						x		=		

Sample Identification: MW-1 Sample Time: 10:38

TURBIDITY ANALYSIS

Finishing Time: 10:52 Time Analyzed: _____ NTU Value: _____

LOG OF WELL SAMPLING ACTIVITIES

Well Identification: MW-2 Project Name: 1000 N. Vasco Rd. Date: 7/24/15

Sampled by: RCL/GDL Weather Conditions: Partly cloudy, 67°F, breezy

Well Location: Landscaping Well Casing Diameter: 2" Depth of Well Casing: _____

Measuring Point: Top of PVC Casing Initial Depth to Water: _____ Final Depth to Water: _____

Casing Volume (1 vol./ 3 vol): _____ Well Borehole Volume: _____

Purging Method: Centrifugal Pump/Peristaltic Pump; Grundfos Submersible Pump; Centrifugal Pump/ES-60 Submersible; ES-60 12v Submersible Pump ✓

Sampling Method: Peristaltic Pump; Grundfos Submersible Pump; Teflon Bailer

Purging Rate: See below Total Discharge: _____ Casing Volumes Purged: _____

Comments: no sheen

Waste Water Disposal: _____

Starting Time: 9:23

Time Pump on: 9:25

Date	Time	Gal. Purged	pH	T deg. F	Diluted S.C.		Dil. Factor		S.C. (µS/cm)	Color
7/24/15	9:26	2.0	7.60	67.8		x		=	2610	yel. Brown
"	9:28	6.0	7.31	67.9		x		=	2560	wh. 7.86 hue
"	9:36	10.0	7.31	67.8		x		=	2580	" "
"	9:44	13.5	7.39	68.0		x		=	2550	" "
"	9:46	15.0	7.36	68.1		x		=	2570	" "
"	9:47	16.0	7.36	67.9		x		=	2580	" "
"	9:48	17.0	7.37	68.0		x		=	2560	" "
"	9:49	18.0	7.38	68.1		x		=	2580	" "
						x		=		
						x		=		
						x		=		

Sample Identification: MW-2 Sample Time: 9:50

TURBIDITY ANALYSIS

Finishing Time: 10:02 Time Analyzed: _____ NTU Value: _____

LOG OF WELL SAMPLING ACTIVITIES

Well Identification: MW-3 Project Name: 1005 N. Vasco Rd Date: 7/24/95

Sampled by: RCW/GDL Weather Conditions: Foggy, cool, my 64°F

Well Location: Park lot Well Casing Diameter: 2" Depth of Well Casing: _____

Measuring Point: Top of PVC Casing Initial Depth to Water: _____ Final Depth to Water: _____

Casing Volume (1 vol./ 3 vol): _____ Well Borehole Volume: _____

Purging Method:
- Centrifugal Pump/Peristaltic Pump
- Grundfos Submersible Pump
- Centrifugal Pump/ES-60 Submersible
- ES-60 12v Submersible Pump ✓

Sampling Method:
- Peristaltic Pump
- Grundfos Submersible Pump
- Teflon Bailer

Purging Rate: See below Total Discharge: 22.5 Casing Volumes Purged: _____

Comments: No Sheen, pump

Waste Water Disposal: _____

Starting Time: 8:36

Time Pump on: 8:48

Date	Time	Gal. Purged	pH	T deg. F	Diluted S.C.		Dil. Factor		S.C. (µS/cm)	Color
7/24	8:49	2	7.42	69.4		x		=	2,540	yel. Brown
"	8:55	10	7.44	69.0		x		=	2430	" "
"	8:59	17	7.34	69.0		x		=	2420	whitish tan
"	9:01	19	7.39	68.7		x		=	2440	" "
"	9:02	20	7.36	68.9		x		=	2430	" "
"	9:03	21	7.39	68.7		x		=	2440	" "
"	9:03	21.5	7.38	68.8		x		=	2440	" "
"	9:04	22.0	7.36	68.7		x		=	2430	" "
"	9:05	22.5	7.37	68.9		x		=	2440	" "
						x		=		
						x		=		

Sample Identification: MW-3 Sample Time: 9:06

TURBIDITY ANALYSIS

Finishing Time: 9:23 Time Analyzed: _____ NTU Value: _____

H2OGEOL
A GROUNDWATER CONSULTANCY

P.O.Box 2165 ▪ Livermore, California 94551 ▪ 510-373-9211

ATTACHMENT F

GROUNDWATER SAMPLE ANALYTICAL RESULTS
CHROMALAB, INC.
SUBMISSION # 9507272

CHROMALAB, INC.

Environmental Services (SDB)

August 7, 1995 *Submission #:* 9507272

H20 GEOL

Atten: Gary Lowe

Project: GENO'S COUNTRY STORE
Received: July 24, 1995

re: 3 samples for Diesel analysis.
Method: EPA 3510/8015M

Sampled: July 24, 1995 *Matrix:* WATER *Extracted:* July 25, 1995
Run: 7774-D *Analyzed:* July 26, 1995

Spl #	Sample ID	DIESEL (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE RESULT (%)
96748	MW-1	910	250	N.D.	68
	For above sample:	*REPORTING LIMIT RAISED 5X DUE TO DILUTION.*			
96749	MW-2	N.D.	50	N.D.	68
96750	MW-3	N.D.	50	N.D.	68

Dennis Mayugba
Chemist

Ali Khavrazi
Organic Manager

1220 Quarry Lane • Pleasanton, California 94566-4756
(510) 484-1919 • Facsimile (510) 484-1096
Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

August 7, 1995 *Submission #:* 9507272

H20 GEOL

Atten: Gary Lowe

Project: GENO'S COUNTRY STORE
Received: July 24, 1995

re: 3 samples for Gasoline and BTEX analysis.
Method: EPA 5030/8015M/602/8020

Sampled: July 24, 1995 *Matrix:* WATER
Run: 7765-3 *Analyzed:* July 26, 1995

Spl #	Sample ID	Gasoline (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
96748	MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
96749	MW-2	N.D.	N.D.	N.D.	N.D.	N.D.
96750	MW-3	0.06	N.D.	N.D.	N.D.	N.D.
Reporting Limits		0.05	0.5	0.5	0.5	0.5
Blank Result		N.D.	N.D.	N.D.	N.D.	N.D.
Blank Spike Result (%)		90	99	98	98	97

Billy Thach
Chemist

Ali Kharrazi
Organic Manager

1220 Quarry Lane • Pleasanton, California 94566-4756
(510) 484-1919 • Facsimile (510) 484-1096

2 1 4 | 96 | 148 - 150

23044

CHAIN OF CUSTODY

H_2OGEOL A GROUNDWATER CONSULTANCY

P.O. BOX 2165
LIVERMORE, CALIFORNIA 94551-2165

DATE: 07/24/95 PAGE 1 of 1

Sample Source:
Geno's Country Store
1000 North Vasco Road
Livermore, California

SAMPLER(S): Gary D. Lowe & Richard Vorst

SAMPLER'S SIGNATURE: [signature]

SAMPLE RECIEPT:
TOTAL No. of CONTAINERS
CHAIN OF CUSTODY SEALS
REC'D GOOD CONDITION/COLD
CONFORMS TO RECORD
LAB NO.

SUBM #: 9507272 REP: GC
CLIENT: H2OGEOL
DUE: 08/07/95
REF #:23049

FAX RESULTS TO (510) 373-8222

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	ANALYTE: Total Petroleum Hydrocarbons as Diesel (EPA 3550/8015)	ANALYTE: Total petroleum Hydrocarbons as Gasoline + BTEX (EPA 5030/8015M + 8020/602)					NUMBER OF CONTAINERS
MW-1	7/24/95	10:38	WATER		X	X					3
MW-2	7/24/95	09:50	WATER		X	X					3
MW-3	7/24/95	09:06	WATER		X	X					3

Please note special pricing
per Gary Cook.
10-Day TAT

RELINQUISHED BY:
SIGNATURE [signature]
PRINTED NAME Gary D. Lowe
COMPANY H_2OGEOL
TIME 12:42
DATE 07/24/95

RELINQUISHED BY:
SIGNATURE
PRINTED NAME
COMPANY H_2OGEOL
TIME
DATE

RECEIVED BY:
SIGNATURE
PRINTED NAME Myrna R. Lowe
COMPANY H_2OGEOL
TIME
DATE

RECEIVED BY LABORATORY:
SIGNATURE Kevin Molander
PRINTED NAME Kevin Molander
COMPANY Chromalab, Inc.
TIME 12:40
DATE 7-24-95
DATE 07/24/95