

# PAVLAK & Associates

## GEOTECHNICAL / ENVIRONMENTAL CONSULTANTS

Project No. 87-1054-M  
January 25, 1988

I.M.A. Financial Corporation  
260 California Street  
Suite 700  
San Francisco, CA 94111

Attention: Mr. Lawrence Holthaus

Subject: Miller's Outpost Shopping Center  
Railroad Avenue and North P Street  
Livermore, California  
SOIL AND GROUNDWATER QUALITY INVESTIGATION

Gentlemen:

In accordance with your authorization, Pavlak & Associates has investigated the soil and groundwater conditions at selected locations within the subject site during a pre-purchase environmental risk assessment. Three groundwater monitoring wells were installed on the property during the course of the investigation. The subsurface soils and groundwater in the areas of the three wells were analyzed for the presence of selected contaminants.

### Site Description

The approximately 5.0 acre project site is located at the northwest corner of Railroad Avenue and North P Street in the City of Livermore, Alameda County, California. Currently utilized as a shopping center, it is occupied by one single-story, elongated building occupied by several tenants. The major portion of the nearly flat site is covered by asphalt pavement with approximately 335 parking spaces.

### Regional Hydrogeology

The site is underlain by Pleistocene to Holocene alluvial deposits of the Upper Member of the Livermore Formation. These complexly interlayered, unconsolidated clay, silt, sand, and gravel sediments are part of the Mocho II groundwater sub-basin (California Department of Water Resources [CDWR], 1974). The Mocho II subbasin is a source of water for the City of Livermore.

The Upper Member of the Livermore Formation is generally several hundred feet thick and is underlain by the more consolidated sediments of the Lower Member of the Livermore Formation. A boring drilled near Lawrence Livermore Laboratories in 1972 revealed Lower Livermore Formation Sediments to a depth of 2,470 feet, where Franciscan "bedrock" was encountered (Lawrence Livermore National Laboratory [LLNL], 1987). Groundwater west of Lawrence Livermore Laboratories flows generally to the west at a gradient of approximately 0.002 ft/ft (10 ft/mile), according to the previously referenced report (1987) by LLNL.

15:01WY 12 NOV 06  
AUG 21 1990

BSLW Received

AUG 14 1990

Verbal communications with Mr. Craig Mayfield, a water resources engineer of Zone 7 - Alameda County Flood Control and Water Conservation District, revealed that the groundwater flow direction may have shifted to the northwest in the area of the subject site.

#### Field Investigation Procedures

Three groundwater monitoring wells were installed on the site in order to determine whether any contaminants emanating from any off-site or on-site sources have impacted the subject property. Wells M-2 and M-3 were located on the up-gradient side of the site and well M-1 was located down-gradient of a dry cleaners located on the property. The placement of well M-1 was constrained by several underground utilities adjacent to the building.

Three exploratory borings were drilled with a truck-mounted Mobile B-56 drill rig utilizing continuous-flight, hollow-stem augers. Boring logs were maintained by a Certified Engineering Geologist from Pavlak & Associates. Soil samples were obtained by using a California Split-Spoon Sampler at 5-foot intervals, commencing at a depth of 5 feet. The soil samples were collected in brass liners and sealed with aluminum foil, plastic caps, and electrical tape. They were then labeled, placed on ice, and transported to the laboratory for analysis.

During the drilling operation, the soil samples and auger cuttings were examined for odors and visual evidence indicative of contamination. None was detected.

The borings were converted to groundwater monitoring wells by the installation of 2-inch diameter PVC casings with locking well caps. Well construction details are attached to each boring log.

After well development, groundwater samples were collected in glass bailers and transferred to VOA bottles. The bottles were sealed, labeled, and transported to the laboratory on ice for analysis. Proper chain of custody records were maintained for all soil and water samples collected during this investigation.

#### Subsurface Soil Conditions

Soils encountered during the drilling of boring M-1 consisted primarily of sandy and clayey fine to coarse gravel. The clay content of the soils increased dramatically at an approximate depth of 40 feet and in conjunction with the coarse gravel caused the drill augers to bind up at a depth between 50 and 55 feet. Based upon this situation, it was decided to terminate the boring at a depth of 55 feet. The soils at this point were very moist to wet. During the sampling of well M-1, groundwater was measured at a depth of 53.6 feet.

During the drilling of boring M-2, the subsurface soils observed consisted primarily of clayey, sandy or silty fine to coarse gravels with interbeds of gravelly clay and clayey, gravelly coarse sand. At a depth of approximately 49 to 50 feet, a very silty clay unit was encountered which extended to the termination depth of the boring of 53 feet. Groundwater was observed at a depth of 45 feet at the time of drilling.

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Project No. 87-1054-M  
January 25, 1988

Boring M-3 encountered subsurface soils consisting primarily of silty, sandy, or clayey fine to coarse gravels with one sandy clay interbed to a depth of approximately 52 feet. This was underlain by interbedded sandy clay and silty clay to the termination depth of the boring (59-1/2 feet). Groundwater was encountered at a depth of approximately 50 feet. Details of the soils encountered during the drilling operation are shown on the Boring Logs (Figures 3, 4, and 5).

#### Laboratory Analysis

All of the soil and groundwater samples were analyzed for the presence of volatile organic priority pollutants utilizing EPA Methods 8240 and 624, respectively.

In addition, the groundwater samples were analyzed for the presence of purgeable aromatics utilizing EPA Method 602.

The laboratory analyses were performed by Anatec Laboratories of Santa Rosa, California. A detailed description of laboratory procedures is presented in Appendix A - Laboratory Test Results.

#### Conclusions

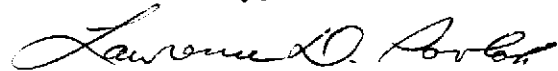
A minor concentration (100 parts per billion) of Tetrachloroethylene was detected in one composite soil sample from boring M-1. This was a composite of samples M-1-6 and M-1-7 from depths of 30 and 35 feet. The increasing clay content of the soils at these depths may have trapped these contaminants, forcing a lateral migration. No contaminants were detected in any of the other soil samples.

The groundwater encountered in all three wells appears to be perched on a clay layer of low permeability. Wells M-1 and M-3 exhibited low volumes of groundwater and very slow recharge rates. The water volume of well M-2, however, was much greater and the well exhibited a fast recharge rate.

No contaminants were detected in the three groundwater samples collected for analysis.

If you have any questions or require additional information, please contact our office at your convenience.

Yours truly,



Lawrence D. Pavlak, C.E.G.  
Principal Geologist  
PAVLAK & Associates

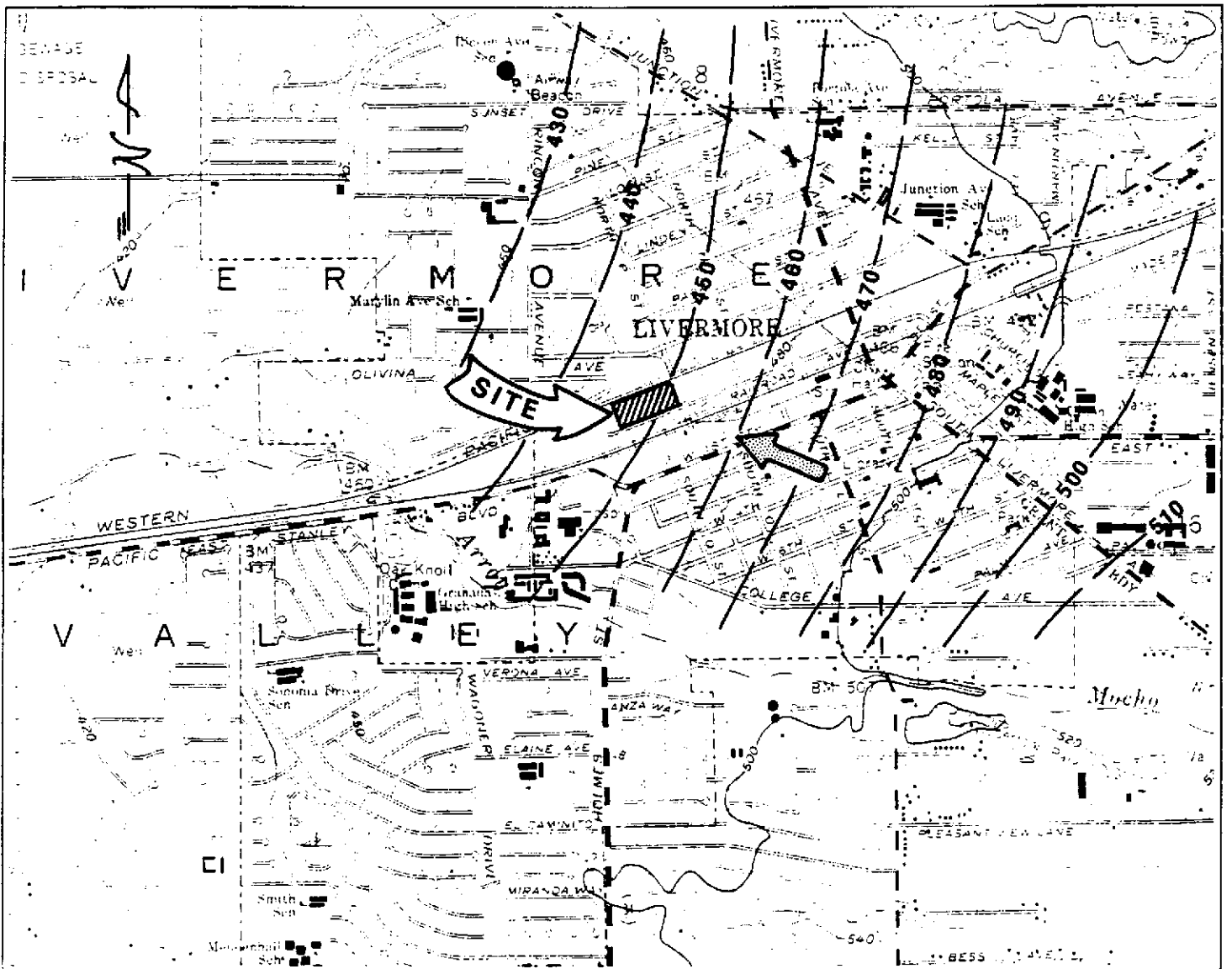
LDP/np

Project No. 87-1054-M  
January 25, 1988

References:

California Department of Water Resources, Evaluation of Ground Water Resources: Livermore and Sunol Valleys, Department of Water Resources Bulletin 118-2, 1974.

Lawrence Livermore National Laboratory, Remedial Alternative for VOCs in Ground Water West of LLNL, University of California, Livermore, California, September, 1987.



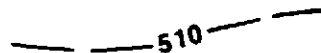
Scale: 1"=2000'

Base: U.S.G.S. 7.5 Quad Sheet  
Livermore, Ca., 1973

LEGEND



Approximate Groundwater  
Flow Direction



Potentiometric Surface Contour  
in Holocene Alluvium (ACFCWCD, 1983)

PAVLAK & Associates

REGIONAL MAP

Miller's Outpost Shopping Center  
Livermore, California

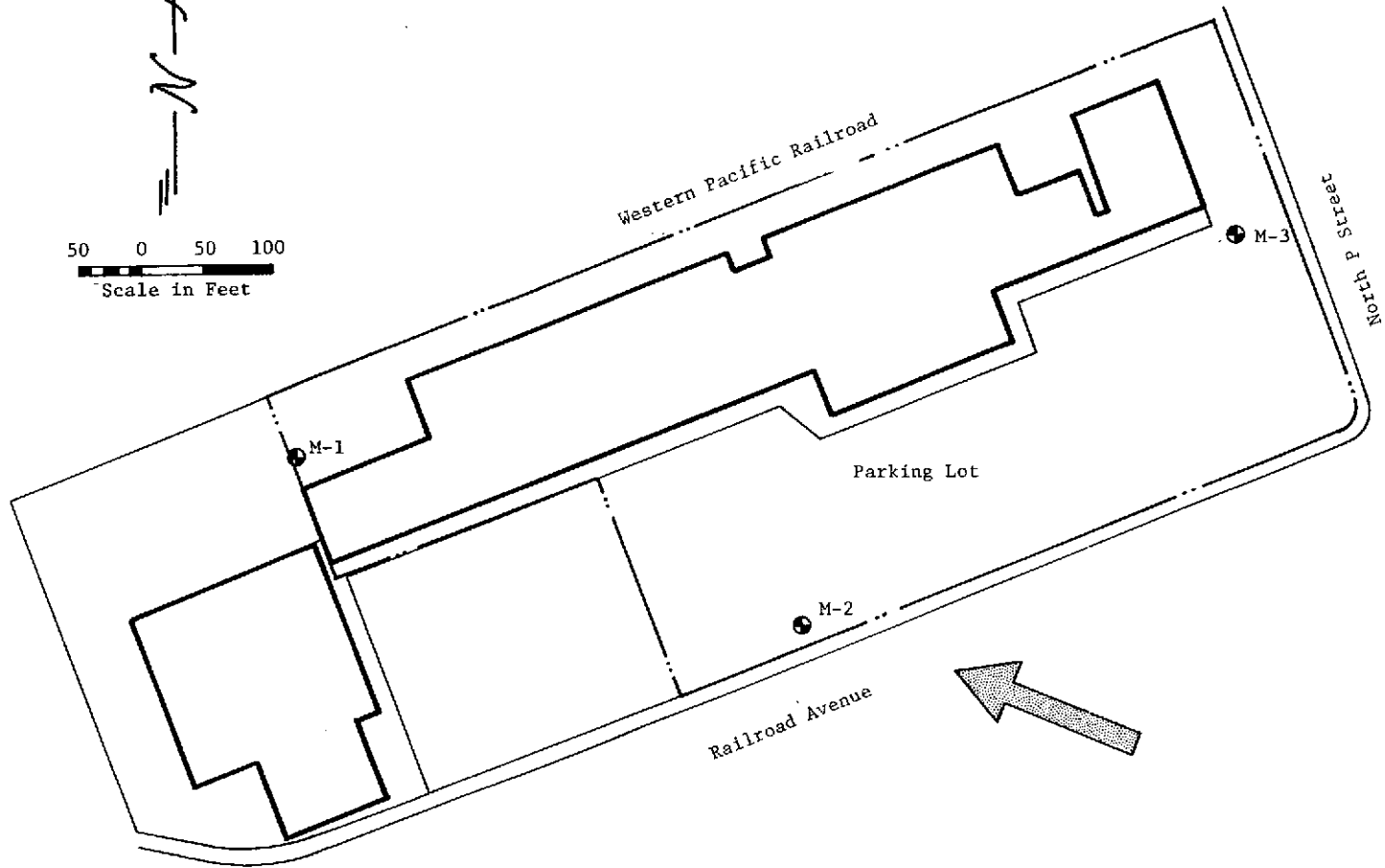
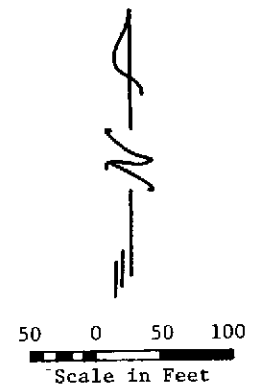
PROJECT NO.

DATE





Figure 1

87-1054-M

Jan. 25, 1988



LEGEND

-  Area of Investigation
-  Existing Building
-  Groundwater Monitoring Well
-  Approximate Groundwater Flow Direction



SITE PLAN -- Figure No. 2

LOGGED BY <u>LP</u> DATE DRILLED <u>1-4-88</u> BORING DIAMETER <u>8"</u> BORING NO. <u>M-1</u>									
Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
2			Asphalt Pavement & Baserock						
4			Brown gravelly CLAY, moist	CL					
6	1		Brown sandy clayey fine to coarse GRAVEL, very moist, rounded to well rounded clasts up to 4" across, moist	GC					
10	2								
16	3								
22	4		(Increasing clay content, very moist)						
26	5								
30	6		(Clayey gravel, very moist)						
34	7		(Brown sandy, gravelly clay interbed, very moist)						
38			(Coarse gravel)						
40	8		(Light brown very clayey, sandy fine to coarse gravel, very moist)						
46	9								

LOGGED BY LP		DATE DRILLED 1-4-88		BORING DIAMETER 8"		BORING NO. M-1			
Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
48	10		(Increasing clay content, very moist to wet)						
50									
52									
54									
56			BOTTOM OF HOLE - 55 feet						
<p>Well Construction Details:</p> <p>Installed 55' of 2" dia. Sch. 40 PVC casing, lower 30' perforated (.020" slots) Aquarium sand pack from 55' to 23', 12" of bentonite, cement slurry seal to surface. Set concrete vault box and locking well cap.</p>									



LOGGED BY <u>LP</u> DATE DRILLED <u>1-4-88</u> BORING DIAMETER <u>8"</u> BORING NO. <u>M-2</u>		Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
		2			Asphalt Pavement & Baserock						
		4			Brown sandy fine to coarse GRAVEL with minor clay, moist, rounded to well rounded clasts up to 3" across	GC					
		6	1								
		8									
		10			(Increasing clast size, decreasing sand and clay)						
		12	2								
		14			(Increasing clay content)						
		16	3								
		18			Brown very gravelly CLAY, very moist	CL					
		20									
		22	4		(Very sandy)						
		24									
		26	5		Brown very clayey, sandy, fine to coarse GRAVEL, very moist	GC					
		28									
		30	6		Light brown clayey, very gravelly coarse SAND, very moist	SP					
		32									
		34									
		36	7		Light brown silty, sandy, fine to coarse GRAVEL, very moist to wet, rounded to well rounded clasts up to 2" across	GM					
		38									
		40									
		42									
		44									
		46	9								
		48									

LOGGED BY LP		DATE DRILLED 1-4-88		BORING DIAMETER 8"		BORING NO. M-2			
Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
48									
50	10		Light brown very silty CLAY, moist	CL					
52	11		(Minor fine gravel)						
54			Bottom of Hole 53 feet - Groundwater at 45 feet						
			Well Construction Details:						
			Installed 50' of 2" dia. Sch. 40 PVC casing, lower 28' perforated (.020" slots) Aquarium sand pack from 50' to 20'. 12" of bentonite and cement slurry to surface. Set concrete vault box and locking well cap.						

LOGGED BY LP		DATE DRILLED 1-5-88		BORING DIAMETER 8"		BORING NO. M-3			
Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
2			Asphalt Pavement & Baserock						
4			Brown silty, sandy, fine to coarse GRAVEL, moist, sub-angular to well rounded clasts up to 4" across	GW					
6	1								
8									
10	2								
12									
14									
16	3		(Grading slight clayey, very moist, moderate orange oxide staining)	GC					
18									
20	4		Light brown sandy CLAY, moist	CL					
22									
24									
26	5		Light brown, very clayey, fine to coarse GRAVEL, very moist, sub-angular to well rounded clasts up to 3" across	GC					
28									
30	6		Light brown silty, sandy, fine to coarse GRAVEL, very moist to wet	GM					
32									
34									
36	7								
38									
40	8		(Minor orange oxide staining)						
42									
44									
46	9								
48									

LOGGED BY <u>LP</u> DATE DRILLED <u>1-5-88</u> BORING DIAMETER <u>8"</u> BORING NO. <u>M-3</u>									
Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
48			Light brown, sandy, gravelly CLAY, very moist to wet	CL					
50	10								
52			Light brown interbedded slightly sandy CLAY & silty CLAY, moist	CH/CL					
54									
56	11								
58	12								
60	13								
			Bottom of Hole - 59-1/2 feet  Well Construction Details:  Backfilled boring with bentonite from 60' to 54'. Installed 54' of 2" dia. Sch. 40 PVC casing, lower 30' perforated. Aquarium sand backfill from 54' to 22', 12" of bentonite, cement slurry to surface. Set concrete vault box and locking well cap.						