Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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TRANSMITTAL

TO: MR. LARRY SETO
ALAMEDA COUNTY DEH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

DATE: 11/22/91
PROJECT NUMBER: 69034.03
SUBJECT: ARCO STATION 601 AT 712 LEWELLING BOULEVARD, SAN LEANDRO, CALIF.

FROM: LOU LEET
TITLE: GEOLOGIC TECHNICIAN

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REMARKS: THIS REPORT HAS BEEN FORWARDED TO YOU AS REQUESTED BY MR. CHUCK CARMEL OF ARCO PRODUCTS COMPANY.

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*Revision Date: 11/21/91
*File Name: TRANSMT.PRJ

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1991
at
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

69034.03 11/22/91

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November 22, 1991
1004ccar
69034.03

Mr. Chuck Carmel
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: Third Quarter 1991 Groundwater Monitoring Report for ARCO Station 601, 712 Lewelling Boulevard, San Leandro, California.

Mr. Carmel:

As requested by ARCO Products Company (ARCO), this letter report summarizes the methods and results of third quarter 1991 groundwater monitoring performed by RESNA at the above-referenced site. The station is on the southwestern corner of Lewelling Boulevard and Washington Avenue in San Leandro, California, as shown on the Site Vicinity Map, Plate 1. ARCO has requested that RESNA perform monthly water level measurements and quarterly groundwater sampling to monitor hydrocarbon concentrations associated with the former waste-oil and gasoline-storage tanks at the site, and to evaluate trends related to fluctuations of these hydrocarbon concentrations.

Prior to the present monitoring, RESNA (formerly Applied GeoSystems [AGS]) and others performed limited subsurface environmental investigations related to the underground gasoline-storage tanks at the site. RESNA performed an environmental site assessment, including the drilling of five borings (B-1 through B-5), in August 1989 prior to tank replacement at the site. GeoStrategies Inc. (GSI) observed the removal of four underground gasoline-storage tanks and one underground waste-oil storage tank in January 1990. In June 1990, RESNA drilled and sampled nine soil borings and installed and sampled three groundwater monitoring wells (MW-1, MW-2, and MW-3). Quarterly groundwater monitoring was initiated in July 1990. In May 1991, RESNA installed and sampled five additional groundwater monitoring wells (MW-4 through MW-8) at the site. The results of these investigations are presented in the reports listed in the references attached to this letter report. The locations of the groundwater monitoring wells and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

RESNA personnel performed monthly monitoring of groundwater elevations and subjective analyses on May 16, June 10, July 18, August 22, and September 18, 1991; in addition, quarterly sampling was performed on June 10, 1991. Field work consisted of measuring depth-to-water (DTW) levels in wells MW-1 through MW-3 on May 16 and MW-1 through MW-8 during the other site visits (wells MW-4 through MW-8 were installed in May 1991); subjectively analyzing water from these wells for the presence of petroleum hydrocarbon sheen and floating product; and removing product from wells containing sheen or product. In addition, on June 10, wells MW-2, MW-5, and MW-8 were purged and sampled for laboratory analysis. Wells MW-1 and MW-3 were not sampled for analysis because of the presence of a sheen or floating product; wells MW-4, MW-6, and MW-7 were not sampled because they were dry. The groundwater sampling protocol is presented in Appendix A.

The DTW levels, wellhead elevations, and groundwater elevations for this and previous monitoring episodes at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. Subjective analyses for site visits during this quarter indicated product sheen to approximately 0.12 feet of floating product in well MW-3 and product sheen to approximately 0.04 feet of floating product in well MW-1. Cumulative results of subjective analyses are presented in Table 1.

Data collected this quarter indicates groundwater gradients ranging from 0.002 to 0.024 between May and September 1991, with an average interpreted groundwater gradient of 0.007 toward the southwest. The groundwater gradient maps for the May 16, June 10, July 18, August 22, and September 18, 1991 are shown on the Groundwater Gradient Maps (Plates 3 through 7, respectively). Data from wells MW-2 and MW-4 were not used to interpret the groundwater gradients due to anomalously high water level readings. These higher elevations may be due to perched water or other causes. Due to floating product in wells MW-1 and MW-3, these interpreted gradients are considered approximate; groundwater elevations in wells containing floating product were calculated as stated in Appendix A.

Monitoring wells MW-2, MW-5, and MW-8 were purged on June 10, 1991 and sampled in accordance with the attached protocol in Appendix A. The purge water was removed from the site by a licensed hazardous waste hauler; the Uniform Hazardous Waste Manifest is also attached in Appendix A.

Laboratory Analysis

Water samples collected from the wells were sent to Sequoia Analytical Laboratory located in Redwood City, California (Hazardous Waste Testing Laboratory Certification No. 1210). The water samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020. Concentrations of TPHg and benzene in the groundwater are shown on Plate 8. Water samples from well MW-8, located downgradient of the former waste-oil tank, were also analyzed for total oil and grease (TOG) by EPA method 413.1. The Chain of Custody Records and Laboratory Analysis Reports are attached. Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Groundwater Laboratory Analyses.

Results of this quarter's groundwater monitoring indicate:

- TPHg ranged from 5,800 parts per billion (ppb) in well MW-8 to 100,000 ppb in well MW-5;
- Benzene exceeded the Maximum Contaminant Level (MCL) of 1 ppb in all wells sampled: MW-2 (3,000 ppb), MW-5 (25,000 ppb), and MW-8 (73 ppb);
- Toluene exceeded State Recommended Action Level (AL) of 100 ppb in wells MW-2 (2,500 ppb) and MW-5 (20,000 ppb);
- Ethylbenzene exceeded the MCL of 680 ppb in wells MW-2 (880 ppb) and MW-5 (2,600 ppb);
- Xylene exceeded the MCL of 1,750 ppb in wells MW-2 (4,200 ppb) and MW-5 (12,000 ppb);
- TOG was nondetectable in well MW-8, which is located downgradient of the former waste-oil tank; and
- Plate 8, which summarizes TPHg and benzene concentrations in groundwater for this quarter, indicates that petroleum hydrocarbons may have migrated offsite.

Monitoring and Removal of Free Product

Floating product was measured and removed during monthly and quarterly monitoring episodes. Quantities of floating product and water removed are presented in Table 3, Approximate Cumulative Product Recovered. The total year-to-date recovered product is approximately 3.1 gallons.

Conclusions and Recommendations

The groundwater at the site has been impacted by gasoline hydrocarbons. Remediation system options are being investigated. RESNA recommends continued groundwater monitoring at the site, including analyses for TPHg and BTEX. It is also recommended that the semi-annual analyses for TOG, cadmium, chromium, lead, and zinc be included in the fourth quarter sample analyses for MW-2. A work plan including additional onsite and offsite groundwater monitoring wells and a groundwater and soil remediation system will be submitted by December 1991.

Schedule

At ARCO's request, RESNA will continue the monthly water level and quarterly groundwater monitoring at this site to evaluate trends in petroleum hydrocarbons and changes in groundwater gradient with time. Routine well maintenance and quality control will be performed as necessary during these site visits. The next quarterly monitoring episode is scheduled for October 1991.

RESNA also recommends that copies of this report be forwarded to:

Mr. Larry Seto
Alameda County Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Lester Feldman
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Guy Telham
San Leandro Fire Department
835 East 14th Street
San Leandro California 94577

If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
RESNA

L. J. Leet

Lou Leet
Geological Technician

Joan E. Tiernan
Registered Civil
Engineer #044600

cc: H.C. Winsor, ARCO Products Company

Enclosures: References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, May 16, 1991
Plate 4, Groundwater Gradient Map, June 10, 1991
Plate 5, Groundwater Gradient Map, July 18, 1991
Plate 6, Groundwater Gradient Map, August 22, 1991
Plate 7, Groundwater Gradient Map, September 18, 1991
Plate 8, TPHg/BTEX Concentrations Map, June 10, 1991

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Groundwater
Table 3, Cumulative Product Recovered

Appendix A: Groundwater Sampling Protocol
Chain of Custody Records
Laboratory Analysis Reports
Uniform Hazardous Waste Manifest

REFERENCES

Applied GeoSystems, July 3, 1991, Letter Report Quarterly Ground-Water Monitoring, Second Quarter 1991, AGS 69021.04.

Applied GeoSystems, March 24, 1991, Letter Report Quarterly Ground-Water Monitoring First Quarter 1991 (Letter Report 0130ccar, AGS 69034-3).

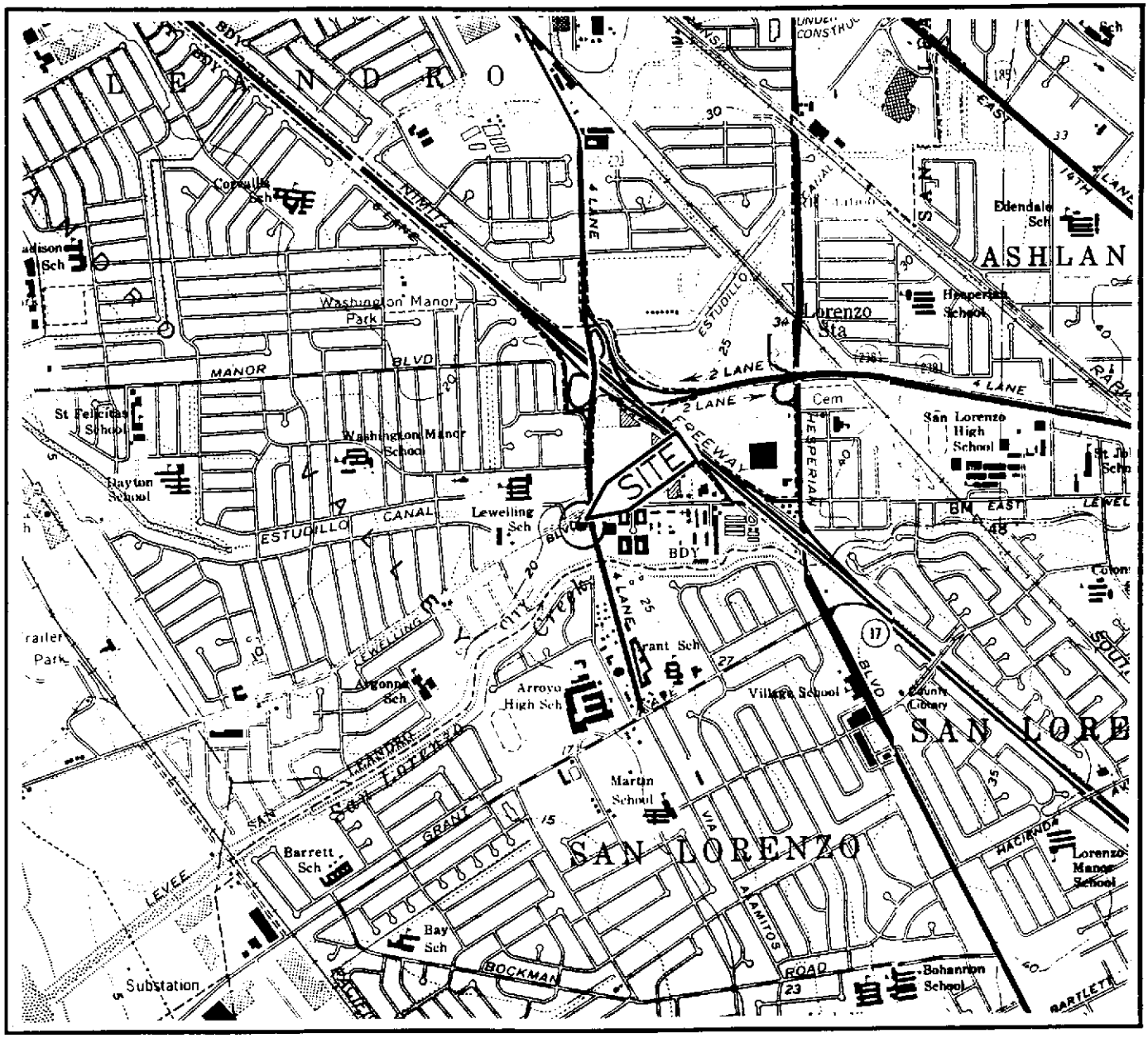
Applied GeoSystems, December 14, 1990, Subsurface Environmental Assessment at ARCO Station 601, San Leandro, California, AGS Report 69034-2.

Applied GeoSystems, November 30, 1990, Letter Report Quarterly Ground-Water Monitoring Fourth Quarter 1990, AGS Report 69034-3.

Applied GeoSystems, November 9, 1989, Limited Environmental Site Assessment at ARCO Service Station No. 601, San Leandro, California, AGS Report 69034-1.

GeoStrategies, Inc., June 29, 1990, Tank Replacement Report, ARCO Service Station #601, San Leandro, California, GSI Report 7918-2.

GeoStrategies, Inc, November 14, 1989, Proposed Scope of Work, ARCO Service Station #601, San Leandro, California, GSI Report 7918-1.



Base: U.S. Geological Survey
7.5-Minute Quadrangles
Hayward/San Leandro,
California.
Photorevised 1984

N

LEGEND

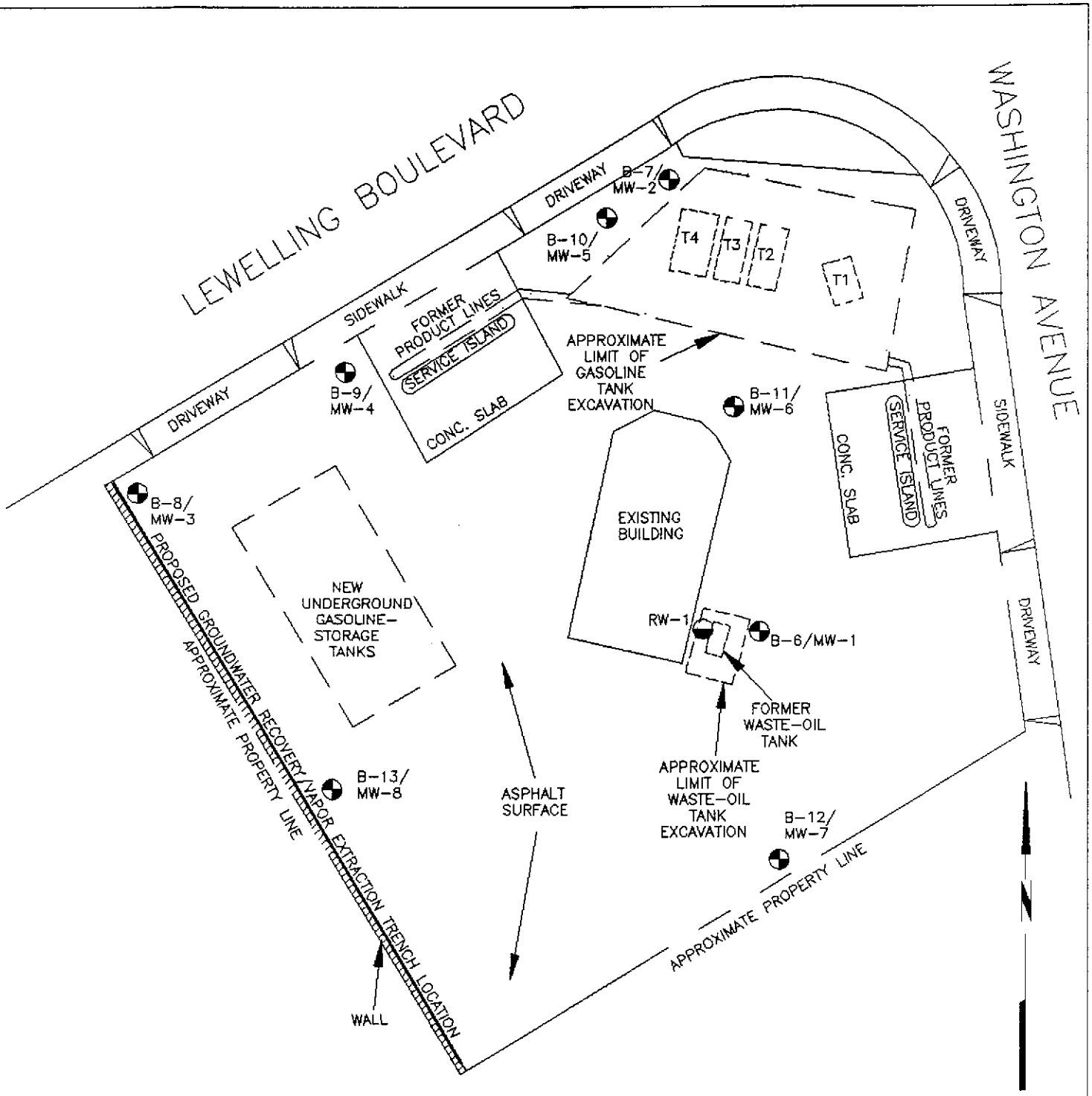
◉ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

RESNA	**SITE VICINITY MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **1**
PROJECT 69034.03		



EXPLANATION

B-13/ MW-8 = Ground-water monitoring well (RESNA, 1990 and 1991)

RW-1 = Product recovery well (GeoStrategies, Jan 1990)

T4 = Former underground gasoline storage tank

Approximate Scale

30 15 0 30 60

feet

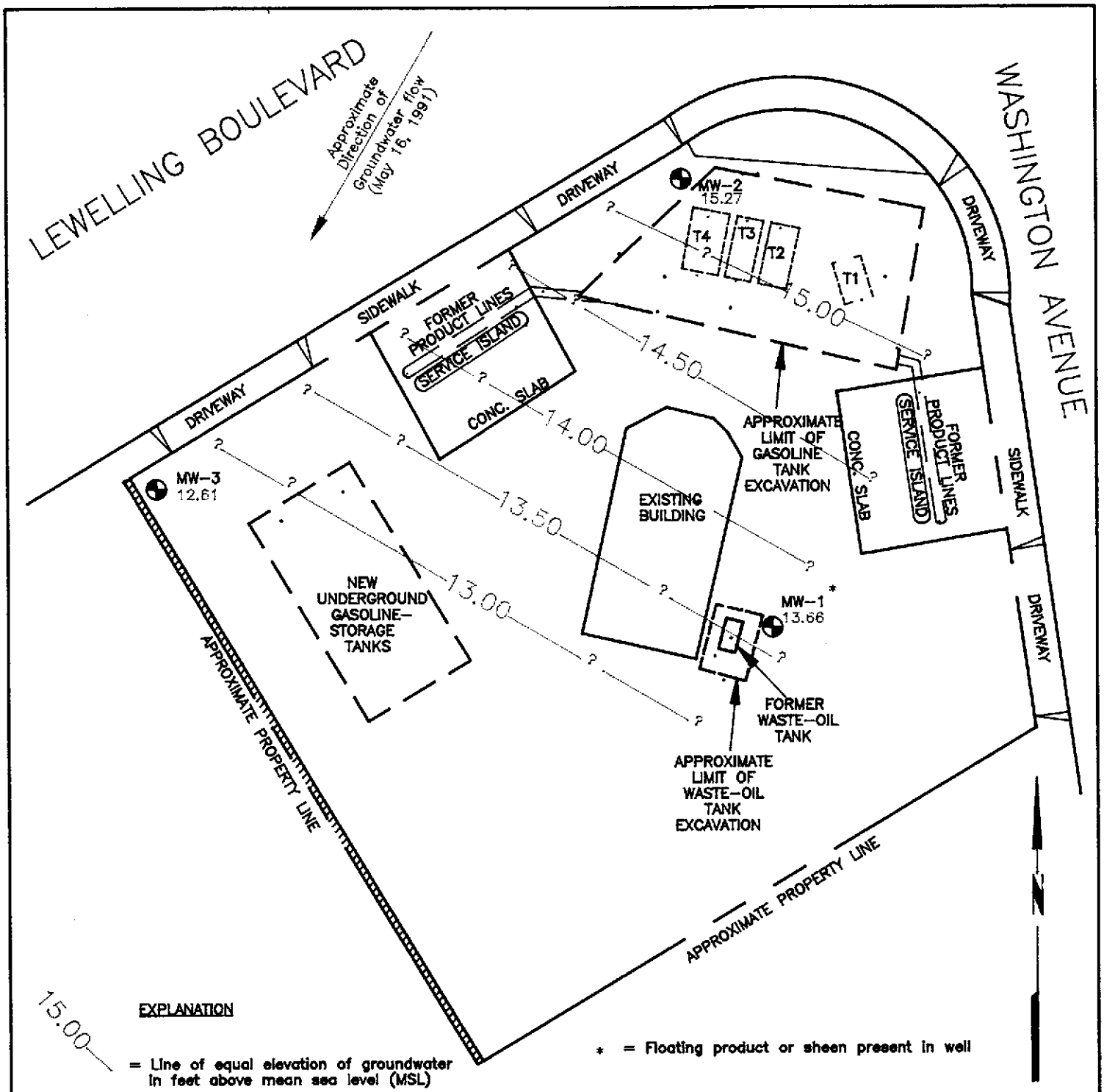
Source: Surveyed by Ron Archer, Civil Engineer Inc.

RESNA

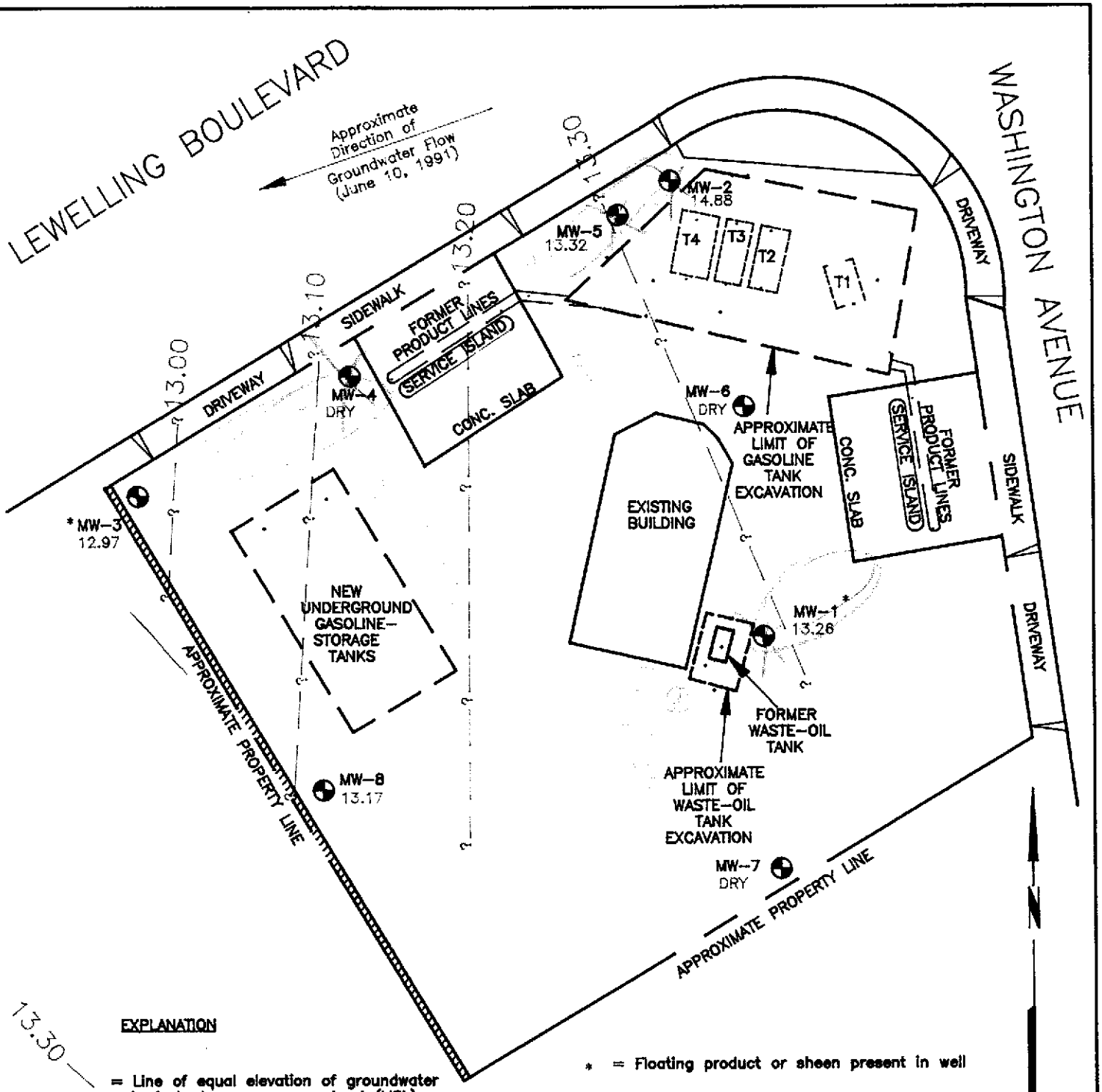
PROJECT 69034.03

GENERALIZED SITE PLAN
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

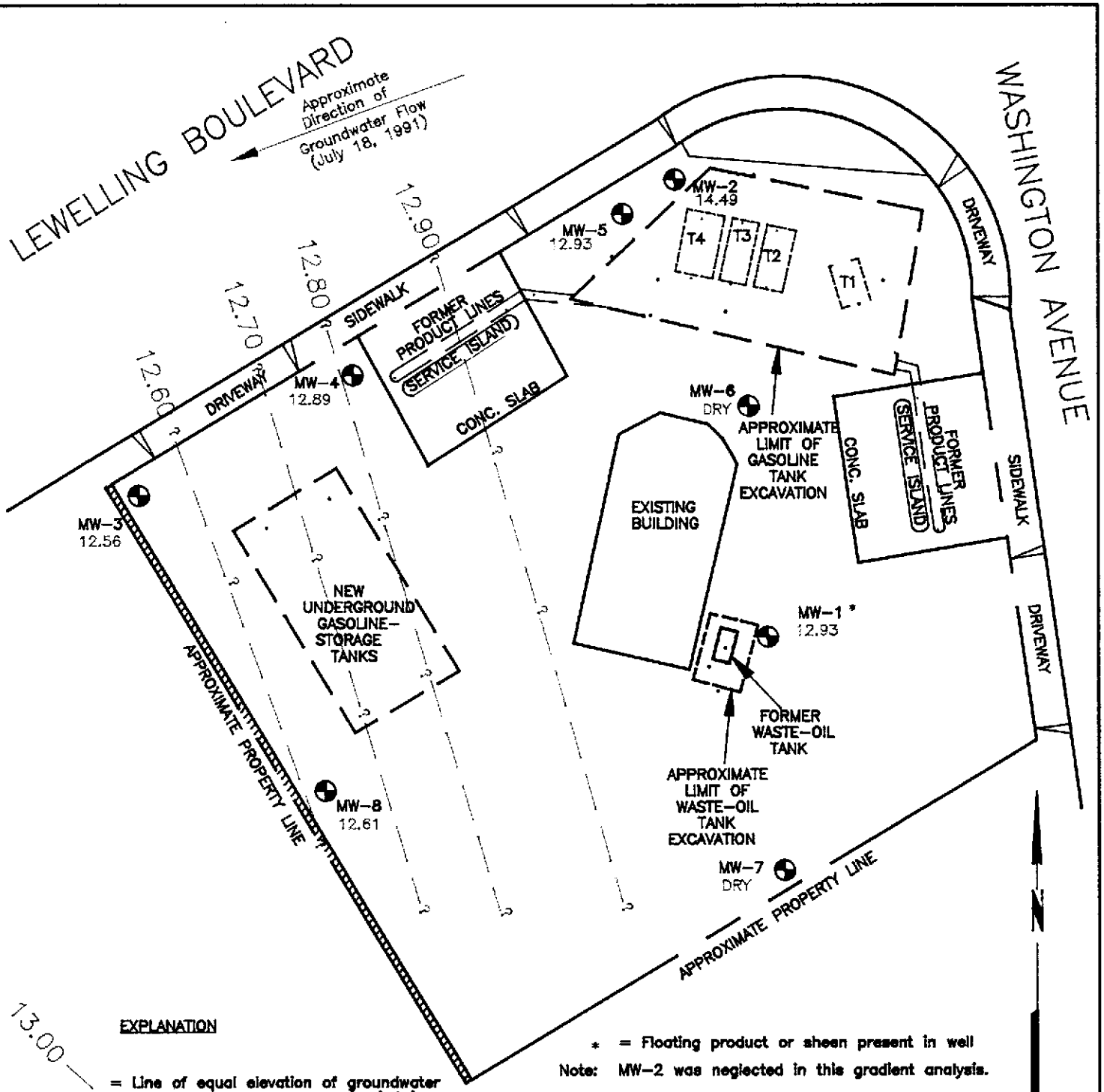
PLATE 2



RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **3**
PROJECT 69034.03		



RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **4**
PROJECT 69034.03		



13.00 EXPLANATION

13.00 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

13.03 = Elevation of groundwater in feet (MSL) July 18, 1991

MW-8 = Groundwater monitoring well (Applied GeoSystems, June 1990 and May 1991)

T4 = Former Underground Gasoline-storage tanks

* = Floating product or sheen present in well

Note: MW-2 was neglected in this gradient analysis.

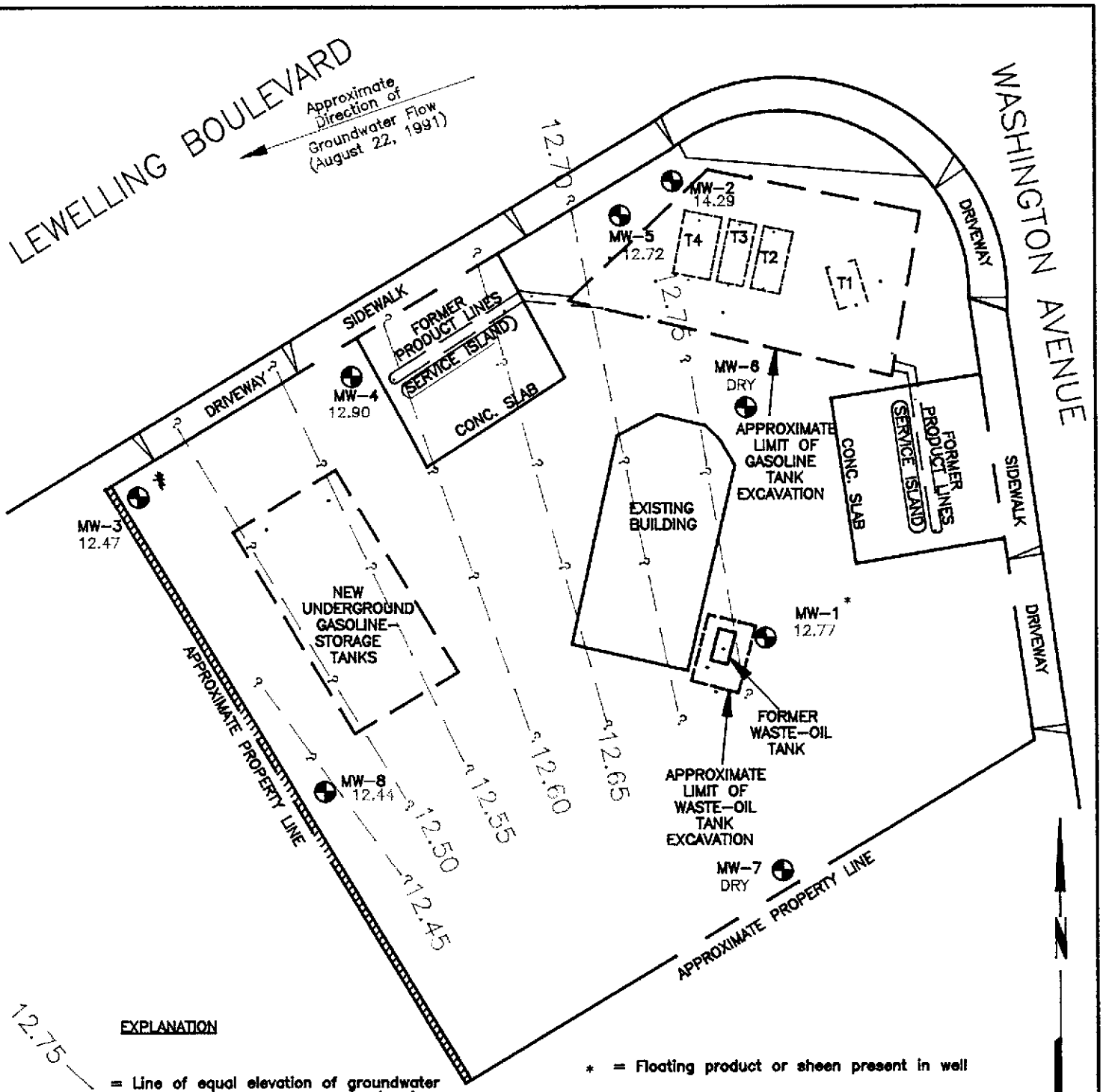
Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer, Civil Engineer Inc.

RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **5**
PROJECT 69034.03		



EXPLANATION

12.75 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

12.77 = Elevation of groundwater in feet (MSL) August 22, 1991

MW-8 = Groundwater monitoring well (Applied GeoSystems, June 1990 and May 1991)

T4 = Former Underground Gasoline-storage tanks

* = Floating product or sheen present in well

Note: MW-2 and MW-4 were neglected in this gradient analysis

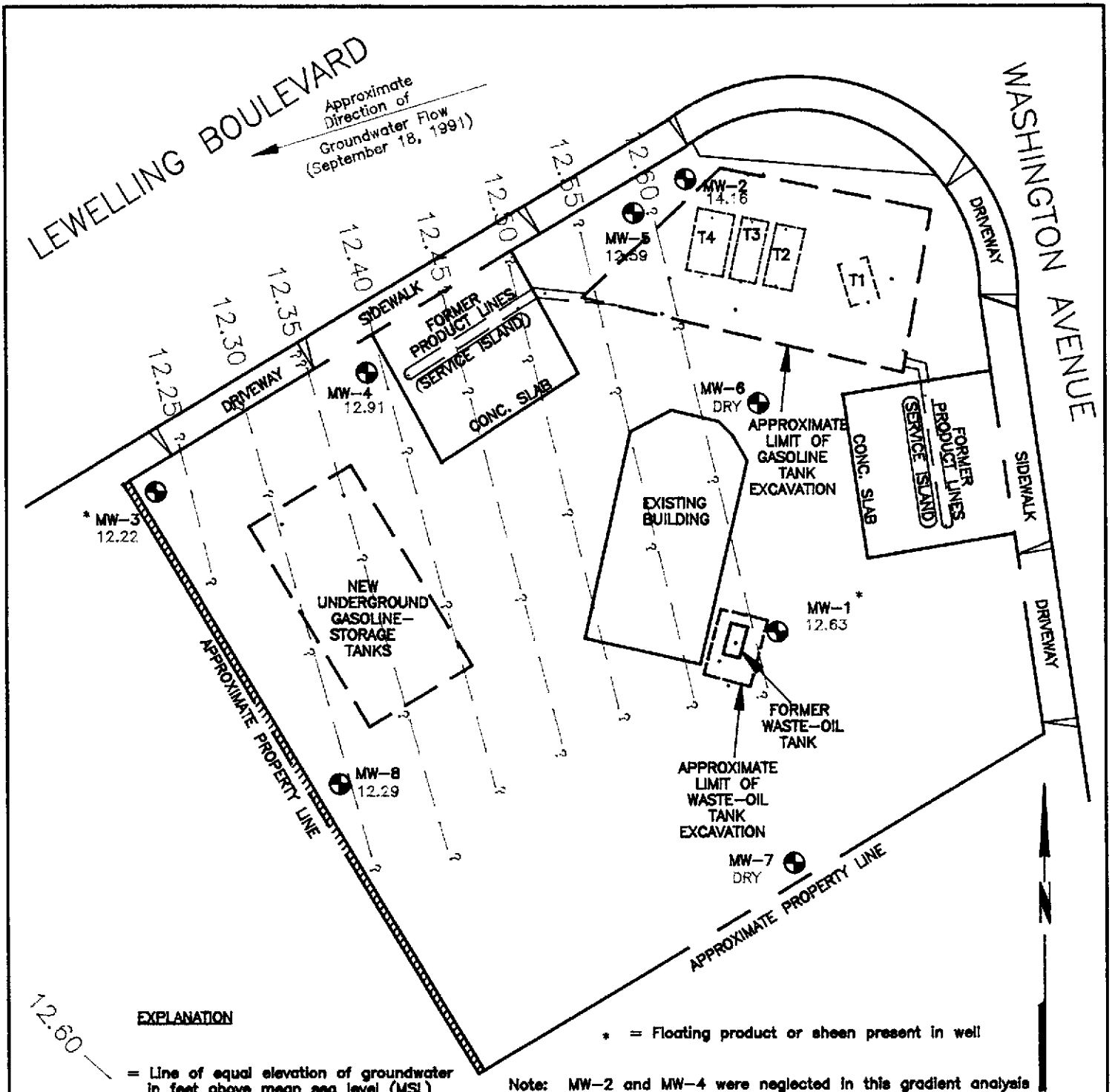
Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer, Civil Engineer Inc.

RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **6**
PROJECT 69034.03		



EXPLANATION

12.60 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

12.63 = Elevation of groundwater in feet (MSL) September 18, 1991

MW-8 = Groundwater monitoring well (Applied GeoSystems, June 1990 and May 1991)

T4 = Former Underground Gasoline-storage tanks

* = Floating product or sheen present in well

Note: MW-2 and MW-4 were neglected in this gradient analysis

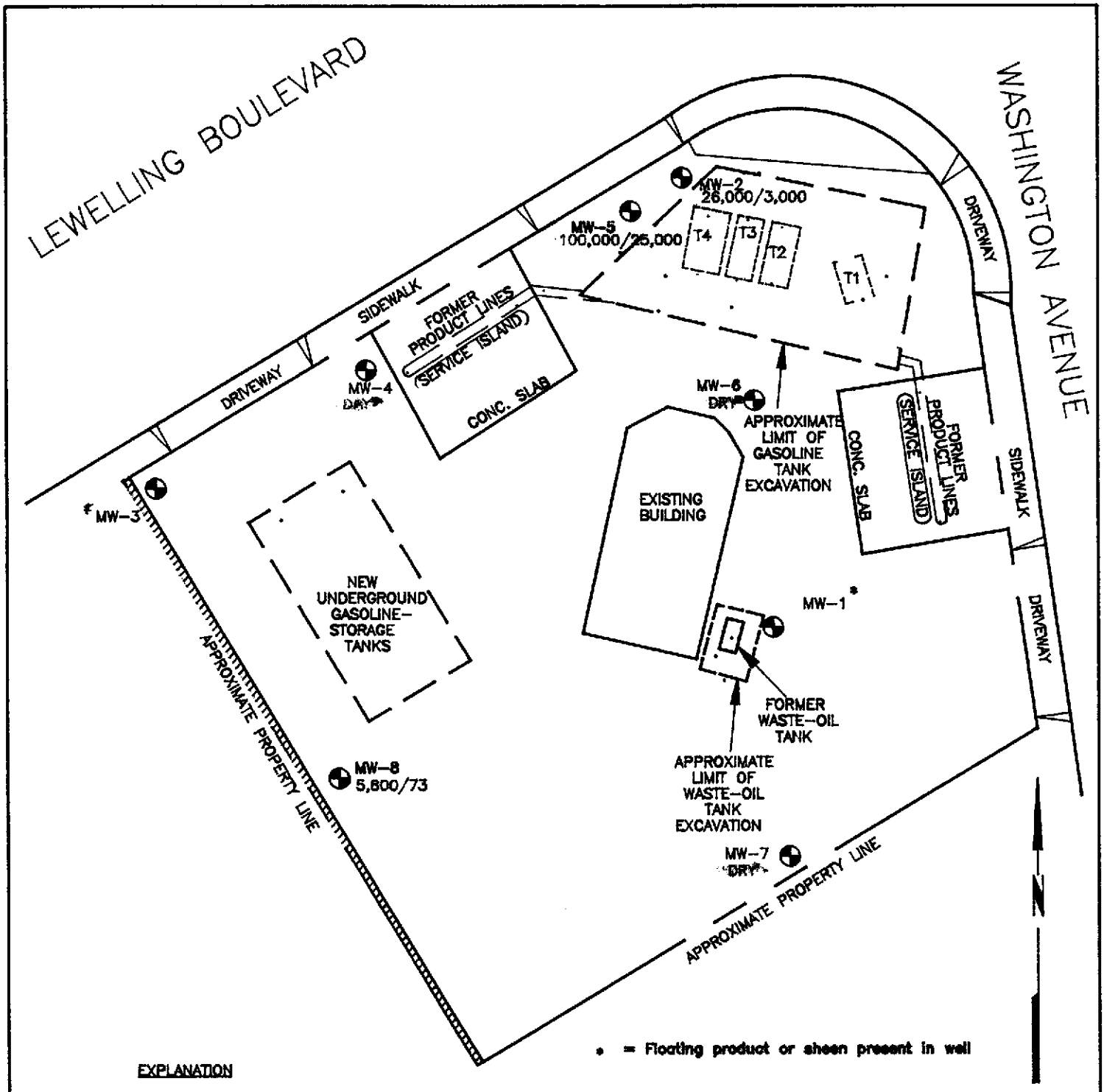
Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer, Civil Engineer Inc.

RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Station 601** **712 Lewelling Boulevard** **San Leandro, California**	**PLATE** **7**
PROJECT 69034.03		



RESNA	**TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER ARCO Station 601 712 Lewelling Boulevard San Leandro, California**	**PLATE 8**
PROJECT 69034.03		

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 601
San Leandro, California
(Page 1 of 2)

Date Well Measured	Depth of Well	Well Elevation	Depth-to-Water	Water Elevation	Product Evidence
MW-1					
07/17/90	11.20	22.98	9.03	13.95	Emulsion
08/07/90			9.19	13.79	None
10/15/90			9.85*	13.13	0.25
11/20/90			9.79*	13.19	0.46
12/21/90			9.18	13.80	Sheen
01/09/91			9.47*	13.51*	0.02
02/27/91			9.31*	13.67*	0.03
03/20/91**			7.81	15.17	Sheen
04/16/91			6.12	16.86	Sheen
05/16/91		22.26	8.60*	13.66*	0.01
06/10/91			9.00	13.26	Sheen
07/18/91			9.33*	12.93*	0.01
08/22/91			9.49*	12.77*	0.04
09/18/91			9.63*	12.63*	0.04
MW-2					
07/17/90	12.33	22.06	7.86	14.20	None
08/07/90			8.03	14.03	None
10/15/90			8.61	13.45	None
11/20/90			8.76	13.30	None
12/21/90			8.28	13.78	None
01/09/91			8.43	13.63	None
02/27/91			8.28	13.78	None
03/20/91**			7.26	14.80	None
04/16/91			6.97	15.09	None
05/16/91		22.79	7.52	15.27	None
06/10/91			7.91	14.88	None
07/18/91			8.30	14.49	None
08/22/91			8.50	14.29	None
09/18/91			8.63	14.16	None
MW-3					
07/17/90	11.99	20.84	7.03	13.81	Sheen
08/07/90			7.21	13.63	None
10/15/90			8.19*	12.65	0.75
11/20/90			7.98*	12.85	1.08
12/21/90			7.22*	13.62*	0.01
01/09/91			7.46*	13.38*	0.30
02/27/91			7.37*	13.47*	0.02
03/20/91**			5.79	15.05	Sheen
04/16/91			7.95	12.89	Sheen
05/16/91		20.11	7.50	12.61	None
06/10/91			7.14	12.97	Sheen

See notes on page 2 of 2.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 601
San Leandro, California
(Page 2 of 2)

Date Well Measured	Depth of Well	Well Elevation	Depth-to-Water	Water Elevation	Product Evidence
MW-3 Continued					
07/18/91			7.55	12.56	None
08/22/91			7.64	12.47	Sheen
09/18/91			7.89*	12.22*	0.12
MW-4					
06/10/91	8.30	20.75	Dry	____	____
07/18/91			7.86	12.89	None
08/22/91			7.85	12.90	None
09/18/91			7.84	12.91	None
MW-5					
06/10/91	9.88	20.90	7.58	13.32	None
07/18/91			7.97	12.93	None
08/22/91			8.18	12.72	None
09/18/91			8.31	12.59	None
MW-6					
06/10/91	8.40	22.08	Dry	____	____
07/18/91			Dry	____	____
08/22/91			Dry	____	____
09/18/91			Dry	____	____
MW-7					
06/10/91	9.36	22.89	Dry	____	____
07/18/91			Dry	____	____
08/22/91			Dry	____	____
09/18/91			Dry	____	____
MW-8					
06/10/91		20.97	7.80	13.17	None
07/18/91			8.36	12.61	None
08/22/91			8.53	12.44	None
09/18/91			8.68	12.29	None

Measurements in feet.
Datum mean sea level.
Depth-to-Water measured in feet below top of casing.
ND = Not detected.
* Depth to water and water elevation were calculated using the attached protocol (Appendix A).
** Anomalous due to extensive rainfall and non-functioning storm drain.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF GROUNDWATER
ARCO Service Station 601
San Leandro, California
(Page 1 of 2)

Sample	TPHg	TPHd	B	T	E	X	TOG	BNAs	VOCs	Cd	Cr	Pb	Zn
MW-1													
07/18/90						NOT SAMPLED--FLOATING PRODUCT							
10/15/90						NOT SAMPLED--FLOATING PRODUCT							
01/09/91						NOT SAMPLED--FLOATING PRODUCT							
04/16/91						NOT SAMPLED--SHEEN							
06/10/91						NOT SAMPLED--SHEEN							
MW-2													
07/18/90	35,000	850*	3,800 (3,200)	2,900 (2,400)	690 (270)	3,600 (2,900)	<5,000	340[a] 170[b]	39[c]	<20	50	50	120
10/15/90	6,400	NR	650	290	110	560	NR	NA	18[c]	NA	NA	NA	NA
01/09/91	13,000	NR	1500 (1700)	970 (1200)	390 (370)	1500 (2400)	NR	NA	6.5[d]	NA	NA	NA	NA
04/16/91	54,000	NR	5,200	9,000	1,500	7,700	NR	NA	NA	NA	NA	NA	NA
06/10/91	26,000	NR	3,000	2,500	880	4,200	NR	NA	NA	NA	NA	NA	NA
MW-3													
07/18/90	NA	NA	NA	NA	NA	NA	<5,000	NA	NA	NA	NA	NA	NA
10/15/90						NOT SAMPLED--FLOATING PRODUCT							
01/09/91						NOT SAMPLED--FLOATING PRODUCT							
04/16/91						NOT SAMPLED--SHEEN							
06/10/91						NOT SAMPLED--SHEEN							
MW-4													
06/10/91						NOT SAMPLED--DRY							
MW-5													
06/10/91	100,000	NR	25,000	20,000	2,600	12,000	NA	NR	NA	NA	NA	NA	NA
MW-6													
06/10/91						NOT SAMPLED--DRY							
MW-7													
06/10/91						NOT SAMPLED--DRY							
MW-8													
06/10/91	5,800	NR	73	7.2	150	21	<5,000	NA	NA	NA	NA	NA	NA
DWAL:	---	---	---	---	---	---	---	---	40c	10	50	50	5,000
MCLs:	---	---	1	NA	680	1,750	---	---	---	---	---	---	---
ALs:	---	---	100	---	---	---	---	---	---	---	---	---	

See notes on page 2 of 2.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF GROUNDWATER
ARCO Service Station 601
San Leandro, California
(Page 2 of 2)

Results in micrograms per liter (ug/L) = parts per billion (ppb).

NA: Not analyzed.
NR: Not requested.
<: Results reported as less than the detection limit.
*: Applied analytical laboratories reports that the chromatograph resembled gasoline not diesel.
( ): BTEX results analyzed as VOCs.
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 8015.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3550/3510.
B: Benzene, T: Toluene, E: Ethylbenzene, X: Total Xylene isomers.
BTEX: Measured by EPA method 8020/602.
TOG: Total oil and grease measured by Standard Method 503A/E.
BNAs: Base neutral and acid extractables including polynuclear aromatics concentrations are below laboratory reporting limits for respective compounds except as indicated. (^{a} = naphthalene, ^{b} = 2-methylnaphthalene)
VOCs: Volatile organics except for BTEX concentrations are below laboratory reporting limits for respective compounds except as indicated. (^{c} = methylene chloride) (^{d} = 1,2-DCA)
Cd: Cadmium, Cr: Chromium, Pb: Lead, Zn: Zinc
DWAL: California Department of Health Services recommended drinking water action levels (July 1990).
MCLs: Maximum Contaminant Level in ppb.
ALs: Action Levels in ppb.

TABLE 3
CUMULATIVE PRODUCT RECOVERED
ARCO Station 601
San Leandro, California

Date	Floating Product Removed (gallons)	Water Removed (gallons)
MW-1		
08/07/90	1.00	1
10/15/90	0.15	1
11/20/90	0.28	1
01/09/91	0.12	12
02/27/91	0.02	7
05/16/91	0.01	1
08/22/91	0.02	1
09/18/91	0.02	1.5
MW-3		
10/15/90	0.45	1
11/20/90	0.65	1
12/21/90	0.01	1
01/09/91	0.18	30.5
02/27/91	0.12	8
09/18/91	0.07	1.5
TOTAL:	3.1	68.5

GROUNDWATER SAMPLING PROTOCOL

The static water level in each well that contained water was measured with a Solinst® water-level indicator; this instrument is accurate to the nearest 0.01 foot. These groundwater depths were subtracted from wellhead elevations measured by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in groundwater elevations.

The static water level in each well that was suspected to contain floating product was measured with an ORS® interface probe; this instrument is accurate to the nearest 0.01 foot. The probe contains two different sensor units, one for detecting the liquid/air interface, and one for distinguishing between water and hydrocarbon. The thickness of the floating product and the groundwater depths were recorded. The recorded thickness of the floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value is then subtracted from the measured depth to water to obtain a calculated depth to water. These calculated groundwater depths were subtracted from wellhead elevations measured by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in groundwater elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a new, disposable bailer past the air-water interface (if possible) and collecting a sample from near the surface of the water in the well. The samples were checked for measurable floating hydrocarbon product and sheen.

Before water samples were collected from the groundwater monitoring wells, the wells were purged until stabilization of the temperature, pH, and conductivity was obtained. Approximately 3 well casing volumes of water were purged before these characteristics stabilized. The quantity of water purged from the wells was calculated as follows:

1 well casing volume = $\pi r^2 h(7.48)$
where:
r = radius of the well casing in feet.
h = column of water in the well in feet
(well depth - depth to water).
7.48 = conversion constant from cubic feet to gallons

gallons of water purged/gallons in 1 well casing volume = well casing volumes removed.

After purging, each well was allowed to recharge to within 80% of the initial water level. Water samples were then collected with a new, disposable bailer. The water samples were carefully poured into 40-milliliter glass vials, which were filled so as to produce a positive meniscus. Each sample container was preserved with hydrochloric acid, sealed with a cap containing a Teflon® septum, and subsequently examined for air bubbles to avoid headspace which would allow volatilization to occur. The samples were promptly transported in iced storage in a thermally-insulated ice chest, accompanied by a Chain of Custody Record, to a California-certified laboratory. Purge water was removed by H & H Ship Service Company, a licensed hazardous waste hauler; the Uniform Hazardous Waste Manifest is attached.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 601-90-2

Chain of Custody

ARCO Facility no. ARCO 601	City (Facility) SAN LEANDRO	Project manager (Consultant) JOEL COFFMAN	Laboratory name SEQUOIA
ARCO engineer CHUCK CARMEL	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) 408-264-2435
Consultant name RESNA/APPLIED GEOSYSTEMS	Address (Consultant) 3315 ALMADEN EXPRESSWAY, SAN JOSE		Contract number 07-073

Method of shipment: SEQUOIA FIELD TECH

Sample I.D	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/827C	TCLP Metals ☐ Sem. VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
W-7.9-MW2	1			X		X	X	6-10-91	5:05		X											
W-7.9-MW2	1			X		X	X	6-10-91	5:05		X											
W-7.9-MW2	1			X		X	X	6-10-91	5:05		X			10615	61							
W-7.9-MW2	1			X		X	X	6-10-91	5:05		X											
W-7.5-MW5	1			X		X	X	6-10-91	5:30		X											
W-7.5-MW5	1			X		X	X	6-10-91	5:30		X											
W-7.5-MW5	1			X		X	X	6-10-91	5:30		X			10615	62							
W-7.5-MW5	1			X		X	X	6-10-91	5:30		X											
W-8-MW8	1			X		X	X	6-10-91	5:00		X											
W-8-MW8	1			X		X	X	6-10-91	5:00		X											
W-8-MW8	1			X		X	X	6-10-91	5:00		X											
W-8-MW8	1			X		X	X	6-10-91	5:00		X											
W-8-MW8	1			X		X		6-10-91	5:00				X			10615	63					
W-8-MW8	1			X		X		6-10-91	5:00				X									
W-8-MW8	1			X		X		6-10-91	5:00				X									

Special detection Limit/reporting

Special QA/QC

Remarks: JOB NO 69034.03

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: Good

Temperature received: cool

Relinquished by sampler	Date	Time	Received by
L. J. Lee	6-11-91	1:56	Dan Sullivan
Relinquished by: Dan Sullivan	Date 6/11/91	Time 4:53 PM	Received by
Relinquished by	Date	Time	Received by laboratory: [illegible] Date 6/11 Time 1655

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

ARCO 3292 (2-91)

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Joel Coffman

Project: #69034.03, Arco #601, San Leandro

Enclosed are the results from 4 water samples received at Sequoia Analytical on June 11,1991. The requested analyses are listed below:

1061561 A-D	Water Composite, W-7.9-MW2	6/10/91	EPA 5030/8015/8020
1061562 A-D	Water Composite, W-7.5-MW5	6/10/91	EPA 5030/8015/8020
1061563 A-D	Water Composite, W-8-MW8	6/10/91	EPA 5030/8015/8020
1061563 E-G	Water Composite, W-8-MW8	6/10/91	EPA 413.1 (Gravimetric)

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems	Client Project ID:	#69034.03, Arco #601, San Leandro	Sampled:	Jun 10, 1991
3315 Almaden Expressway, Ste 34	Matrix Descript:	Water Composite	Received:	Jun 11, 1991
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Analyzed:	6/12-13/91
Attention: Joel Coffman	First Sample #:	106-1561 A - D	Reported:	Jun 17, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
1061561 A-D	W-7.9-MW2	26,000	3,000	2,500	880	4,200
1061562 A-D	W-7.5-MW5	100,000	25,000	20,000	2,600	12,000
1061563 A-D	W-8-MW8	5,800	73	7.2	150	21
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems	Client Project ID:	#69034.03, Arco #601, San Leandro	Sampled:	Jun 10, 1991
3315 Almaden Expressway, Ste 34	Matrix Descript:	Water Composite	Received:	Jun 11, 1991
San Jose, CA 95118	Analysis Method:	EPA 413.1 (Gravimetric)	Extracted:	Jun 14, 1991
Attention: Joel Coffman	First Sample #:	106-1563 E - G	Analyzed:	Jun 14, 1991
			Reported:	Jun 17, 1991

TOTAL RECOVERABLE OIL & GREASE

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
1061563 E-G	W-8-MW8	N.D.

Detection Limits:	5.0

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: #69034.03, Arco #601, San Leandro
QC Sample Group: 1061561 - 63
Reported: Jun 17, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	S.Chieffo	S.Chieffo	S.Chieffo	S.Chieffo
Reporting Units:	ng	ng	ng	ng
Date Analyzed:	Jun 12, 1991	Jun 12, 1991	Jun 12, 1991	Jun 12, 1991
QC Sample #:	GBLK061291	GBLK061291	GBLK061291	GBLK061291
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	300
Conc. Matrix Spike:	96	97	99	300
Matrix Spike % Recovery:	96	97	99	100
Conc. Matrix Spike Dup.:	100	100	100	310
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	4.1	3.0	1.0	3.3

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: #69034.03, Arco #601, San Leandro

QC Sample Group: 1061561 - 63

Reported: Jun 17, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes	Ttl. Oil & Grease
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 413.1
Analyst:	J.Dinsay	J.Dinsay	J.Dinsay	J.Dinsay	V.Nunzir
Reporting Units:	ng	ng	ng	ng	mg/L
Date Analyzed:	Jun 13, 1991	Jun 13, 1991	Jun 13, 1991	Jun 13, 1991	Jun 14, 1991
QC Sample #:	GBLK061391	GBLK061391	GBLK061391	GBLK061391	BLK61491
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	300	100
Conc. Matrix Spike:	99	99	100	300	83
Matrix Spike % Recovery:	99	99	100	100	83
Conc. Matrix Spike Dup.:	94	95	94	290	85
Matrix Spike Duplicate % Recovery:	94	95	94	97	85
Relative % Difference:	5.2	4.1	6.2	3.4	2.3

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$

Form Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. *Form designed for use on elite (12-pitch typewriter).*

and Front of Page 7

Toxic Substances Control Division
Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. C A L 0 0 0 0 1 1 5 6 1 | Manifest Document No. 0 0 0 0 1

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ARCO
P. O. Box 5811, San Mateo, CA 94402
4. Generator's Phone (415) 571-2434/571-2428

A. State Manifest Document Number 90546737

B. State Generator's ID H Y B 0 3 6 - 0 1 5 6 0

5. Transporter 1 Company Name: H & H Ship Service Company
6. US EPA ID Number: C A D 0 0 4 7 7 1 1 6 8

C. State Transporter's ID 200556

D. Transporter's Phone (415) 543-4835

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
H & H Ship Service Company
220 China Basin Street
San Francisco, CA 94107
10. US EPA ID Number: C A D 0 0 4 7 7 1 1 6 8

G. State Facility's ID C A D 0 0 4 7 7 1 1 6 8

H. Facility's Phone (415) 543-4835

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. OIL AND WATER NON-RCRA HAZARDOUS WASTE LIQUID	0 0 1	T T	00055	G	State 134/135 EPA/Other
b.					State EPA/Other
c.					State EPA/Other
d.					State EPA/Other

J. Additional Descriptions for Materials Listed Above
FUEL, OIL AND WATER

PROFILE #A1173

K. Handling Codes for Wastes Listed Above
a. 01 b.
c. d.

15. Special Handling Instructions and Additional Information
JOB #8159
24 Hr. Emergency Contact: H & H #(415) 543-4835
APPROPRIATE PROTECTIVE CLOTHING AND RESPIRATOR.

JOB SITE: ARCO STATION, #1319
365 Jackson
Hayward, California

16.
GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

GENERATOR

Printed/Typed Name | Signature | Month Day Year: 0 8 2 2 9 1

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LANCE D. SMITH | Signature | Month Day Year: 0 8 2 2 9 1

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

DHS 8022 A
EPA 8700—22
(Rev. 6-89) *Previous editions are obsolete.*

Do Not Write Below This Line

YELLOW: GENERATOR RETAINS