RO0324

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Soil and Groundwater Investigation Work Plan
Livermore Gas and Mini-mart
USTCF Claim No. 14203
Fuel Leak Case No. RO0000324,
160 Holmes Street, Livermore, California

Date:
June 30, 2005

Prepared For:
Manwel and Samira Shuwayhat
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Kentfield, CA 94904

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ALLTERRA

June 30, 2005
Project No.: 015-01-003
Manwel and Samira Shuwayhat
54 Wolfe Canyon Road
Kentfield, CA 94904

Subject: Soil and Groundwater Investigation Work Plan, Livermore Gas and Minimart, 160 Holmes Street, Livermore, California

Dear Mr. Shuwayhat:

On your behalf, Allterra Environmental, Inc. (Allterra) has prepared this work plan for advancement of onsite and offsite Geoprobe® (hydro-punch) borings and well installation for the property located at 160 Holmes Street in Livermore, California (site). The purpose of this work is to: 1) establish concentrations of dissolved petroleum hydrocarbons at the source (onsite) and down-gradient from the site, thereby providing information to fill data gaps and correct questionable historical data, and 2) comply with the Workplan Request directive from the Alameda County Health Care Services Agency, Environmental Health Services (ACEH), dated March 29, 2005.

Additionally, the scope of work described in this work plan is intended to comply with the State of California Water Resources Control Board's *Leaking Underground Fuel Tank (LUFT) Manual*, the Regional Water Quality Control Board (RWQCB) *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites*, and Livermore Fire Department (LFD) guidelines. Field methods and procedures are included in Appendix A.

Proposed Scope of Work

- Obtain boring, well construction, and well destruction permits from ACEH if required, prior to drilling;
- Contact Underground Service Alert (USA) to identify the work area for underground municipal utilities;
- Advance 5 Geoprobe® multi-point, soil borings (MB-1, through MB-5) to approximately 50 feet below ground surface (bgs).
- Advance 5 Geoprobe® continuous core, soil borings (DB-1, through DB-5) to approximately 50 feet below ground surface (bgs).
- Advance 4 Geoprobe® continuous core, soil borings (B-1, through B-4) to approximately 20 feet below ground surface (bgs) or first groundwater.
- Advance and convert 6 hollow-stem auger borings into multiple well point groundwater monitoring wells MW-1R through MW–6R to replace the existing wells MW-1 through MW–6;

- Collect soil and groundwater samples from the borings and the newly installed wells for laboratory analysis;
- Analyze selected soil samples (from borings that are not converted into wells) and all groundwater samples for total petroleum hydrocarbons as gasoline (TPHg) and diesel (TPHd) by EPA Method 8015Cm, benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021b, and the fuel oxygenates methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), and tertiary butyl alcohol (TBA) by EPA Method 8260b.
- Establish the top of casing (TOC) elevations of each monitoring well relative to mean sea level (MSL) by a licensed land surveyor;
- Prepare geologic cross sections;
- Submit electronic data to the State's Geotracker database; and
- Evaluate field data and report preparation.

Site Location and Description

The subject property is located at the northeast intersection of Holmes Street and Second Street, in Livermore, California (Figure 1). A Vallero fuel station currently occupies the site and the surrounding area is primarily residential with some retail businesses along 1st and 2nd Streets. The approximate surface elevation of the site is 20 feet above mean sea level (MSL). Pertinent site features, including the locations of the former underground storage tanks (USTs), and existing monitoring wells are presented in Figure 2.

Previous Work

Impacted groundwater was discovered when a soil boring was advanced on February 26, 1999 about 10 feet from the sidewalk along 1st Street near the northern border of the site. A grab groundwater sample from the boring was found to be impacted with concentrations of TPH-g (100,000 µg/kg), benzene (6100 µg/kg), and MTBE (60,000 µg/kg). Historical groundwater elevation data and groundwater analytical results are attached are attached as Tables 1 and 2 respectively.

On April 5, 1999, three gasoline and one diesel USTs and associated structures were removed. Following overexcavation of soil in the tank pit, soil samples were collected from native material. Analytical results from the soil stockpile generated during over-excavation activities indicted TPHd at a concentration of 61 milligrams per kilogram (mg/kg), TPHg at 80 mg/kg, and MTBE up to 110 mg/kg.

On May 20, 1999, soil samples were collected from below the dispenser islands. TPHg was detected beneath the east dispenser at a maximum concentration of 6,500 mg/kg. TPHd was detected beneath the diesel dispenser at a 1,300 mg/kg. No MTBE was detected at or above laboratory detection limits in samples collected from beneath the dispenser.

On July 26, 2000, three soil borings were drilled onsite to about 30 feet bgs. After collecting soil samples, the borings were converted into 2-inch diameter groundwater monitoring wells – MW-1, MW-2, and MW-3. The slotted interval of the PVC well casing was installed from 15 to 30 feet bgs. Analytical results of water samples from these wells indicated significant impact from petroleum hydrocarbons, especially in well MW-1, located directly downgradient from the contaminant source. Sample results from water samples in this well showed TPH-g and MTBE at concentrations of 170,000 µg/L and 320,000 µg/l, respectively.

Subsequent quarterly groundwater monitoring events have revealed significant petroleum hydrocarbon impact. Analytical results and site activities are summarized below:

- On October 19, 2000, analytical results of quarterly groundwater monitoring, as summarized in Geo-Environmental Technology's (GET's) March 31, 2001 report, revealed TPH-g and MTBE concentrations of 170,000 µg/l and 200,000 µg/l, respectively, in downgradient well MW-1.
- The February 22, 2001 sampling event revealed TPH-g and MTBE concentrations of 11,000 µg/l and 190,000 µg/l, respectively, in downgradient well MW-1.
- In the May and August 2001 sampling events, all three wells were found to be dry.
- Three additional monitoring and one extraction well were installed shortly before the November 14, 2001 sampling event. Analytical results of water sampling indicated offsite impact. Well EX1, located directly downgradient of the source, had 2,000 µg/l TPH-g and 2,200 µg/l MTBE.
- In 2002, three monitoring events were conducted. TPH-g in well EX1 ranged from 3,000 µg/l to 7,700, and MTBE ranged from 1,200 to 6,200.Well MW1 had a maximum TPH-g concentration of 130,000 µg/l and MTBE was below the detection limit of 5,000 µg/l.
- In 2003, four monitoring events were conducted. TPH-g in well MW1 ranged from 37,000 to 180,000 µg/l; MTBE ranged from 150,000 to 210,000 µg/l. EX1 concentrations of TPH-g ranged from 120 to 260 µg/l, and MTBE concentrations ranged from 260 to 1200 µg/l. MW-2 had 240 µg/l of TPH-g and 1200 µg/l MTBE in the December event.
- On August 7, 2003, Donna Drogos of the ACEH requested a workplan for additional site investigation using a multiple well point system to monitoring different aquifer levels beneath the site.
- On March 10, 2004, samples from wells MW1 and MW2 contained concentrations of TPHg at 72,000 and 280 µg/l, respect5ively, and concentrations of MTBE at 260,000 and 1400 µg/l, respectively.
- The June 15, 2004 monitoring event showed a northerly groundwater flow direction, consistent with previous monitoring events. MW1 remained highly impacted. In well MW1, TPHg was detected at 42,000 µg/l, MTBE was found at 210,000 µg/l, and BTEX was detected at the respective concentrations of 5,000, 1,800, 3,700, and 6,000 µg/l. MW2 contained 150 µg/l TPHd, 150 µg/l TPHg, and 1,500 MTBE, and trace levels of BTEX. Wells MW3, MW4, MW5, and MW6 had no detectable concentrations of hydrocarbons, except for MTBE in well MW4 at 7.4 µg/l, and 750 µg/l in well MW5.

Site Geology and Hydrogeology

Site geology, as described by previous consultants, consists primarily of clayey sand and silty clay fill material from surface grade to approximately 8 feet bgs. Underlying the fill material, silty clay occurs to approximately 11 feet bgs and is in turn underlain by sandy silt and silty sand to approximately 28 feet bgs. Beneath the silts and sands, silty clay occurs to the total depth investigated (approximately 31.5 feet bgs). Groundwater occurs at depths between approximately 11 and 13 feet bgs and is inferred to flow toward San Francisco Bay to the north as depicted in Figure 3.

Site Investigation – Subsurface Characterization

Proposed Scope of Work

The following is a discussion of activities proposed for investigating the subsurface at the site and in the immediate surrounding area. The proposed activities will provide data that will further define the vertical and horizontal migration of fuel-related compounds, primarily MTBE (see Figures 4 and 5), as well as determine the specific activities and investigative methods that will be employed in future phases of investigation in accordance with the Site Conceptual Model (SCM).

The purpose of the proposed scope of work is to: 1) more fully characterize the hydrogeology, identifying multiple water-bearing zones by advancing a series of onsite and offsite Geoprobe borings; 2) destroy and reinstall groundwater monitoring wells, with appropriate screen intervals, so that analytical results of groundwater samples, and groundwater gradient and flow data more accurately depicts field conditions; and 3) perform a conduit study on and off-site to identify potential pathways for contaminant migration. Refer to Appendix A for Allterra's Preliminary Conduit Study.

The tasks described herein are subject to regulatory agency review and approval.

Permitting and Underground Utility Locating

Prior to advancing borings and installing wells, boring and/or well permits will be obtained from the appropriate agency, if required. In addition to identifying public utilities in the work area prior to commencing drilling activities, Underground Service Alert (USA) was previously notified to identify utilities as potential underground conduits for contamination.

Health and Safety

During field activities, field personnel will wear modified Level D health and safety gear, consisting of hardhats, gloves, safety glasses, and steel-toed boots for protection from overhead drilling equipment. On-site health and safety issues will be the responsibility of the Project Manager and Site Health and Safety Officer and are summarized in Allterra's Site Specific Health and Safety Plan (Appendix B). The Site Health and Safety Officer is responsible to

inform all field personnel of current health and safety issues and will conduct daily health and safety tailgate meetings.

Drilling and Well Installation Activities

Allterra will supervise the installation of 3 variations of Geoprobe® soil boring strategies; standard soil borings, continuous core soil borings, and multi point soil borings (see Figure 6). The standard borings (B-1 through B-4) will be used to evaluate contaminant levels in vadose zone soils near probable sources and will consist of advancing a 2.5" diameter "push-core" drill to a depth of 20' or first encountered groundwater. Soil samples may be collected at 4', 8' and 12' and one groundwater sample will collected at the base of each boring.

The continuous core soil borings (DB-1 through DB-5), will be used to assess soil lithology and identify water bearing zones. Each boring will consist of advancing a 2.5" diameter "push-core" drill to a depth of approximately 50' or drill refusal. The number and depth of soil samples collected will be determined in the field.

The multi-point soil borings (MB-1 through MB-5), will be used to assess; soil lithology, identify water bearing zones, and collect discrete groundwater samples from each zone. Each boring will consist of advancing a 2.5" diameter "push-core" drill to a depth of approximately 50' or drill refusal. Adjacent borings in the immediate vicinity of the initial boring will be advanced for the purpose of collecting discrete groundwater samples from each identified water bearing zone. The number and depth of adjacent soil borings will be determined in the field and based on the number and depth of discrete water-bearing zones.

At the completion of the drilling and sampling activities, all proposed Geoprobe® soil borings will be backfilled to grade by the drilling company with neat cement containing 5% bentonite. Allterra's Field Protocol is attached as Appendix C.

Following the soil boring phase of work, Allterra will select optimal locations for six proposed monitoring wells. The tentative locations of these wells are indicated in Figure 7. After the installation of the proposed monitoring wells, Allterra will supervise the destruction of existing wells MW-1 through MW-6. Existing extraction well EX-1 will not be replaced, and may be utilized in an interim migration control system. The proposed replacement monitoring wells will be completed using a multiple well point system that allows representative sampling of individual aquifers within a single bore-hole.

Soil and groundwater analytical data and boring logs generated from Geoprobe borings will be used to design the replacement and new monitoring wells. Therefore, there will be some lag time between advancement of Geoprobe borings and installation of monitoring wells.

Soil Sample Collection and Soil Classification

During drilling, soil samples will be collected every five feet for hollow stem auger (HSA) borings and as described above for Geoprobe® borings and classified using the Unified Soil

Classification System (USCS). Soil samples collected will be field screened using a photo-ionization detector (PID) for possible chemical analysis.

Well Surveying

Upon completion of well installation activities, latitudes and longitudes of the well's location, mean sea level (MSL) elevation, and lateral relationships between each monitoring well will be established in the field by a licensed land surveyor. Additionally, the wells will be surveyed in accordance with electronic submittal requirements for the State Water Resources Control Board's Geotracker database.

Well Development

At least 72 hours after installation, the newly installed wells will be developed using a surging and purging technique. The well will be purged until the groundwater is relatively free of sediment and turbidity, and until groundwater parameters, such as pH, temperature, conductivity, and turbidity, have stabilized. Purge and rinse water will be collected in Department of Transportation (DOT) approved 55-gallon drums and stored on-site pending laboratory analysis, waste profiling, and disposal.

Groundwater Sampling

Groundwater sampling from the newly installed wells will be performed at least 48-hours following well development. Work at the site will include measuring static groundwater level and well depth, subjectively evaluating groundwater in the wells, and purging and sampling the wells for laboratory analysis. Prior to sampling the wells, each well will be purged until measurements of pH, temperature, and conductivity have stabilized. Allterra's Field Protocol is included as Appendix C.

Waste Disposal

Soil generated during drilling activities will be stored in Department of Transportation (DOT) approved 55-gallon drums on-site pending disposal. All disposal documentation will be provided to the appropriate agency upon completion of disposal activities.

Laboratory Analysis

Groundwater samples will be submitted for chemical testing to McCampbell Analytical, Inc., of Pacheco, California, a state of California certified laboratory (ELAP #1644). Samples will be transported to the analytical laboratory under chain-of-custody documentation initiated by Allterra personnel.

Groundwater samples will be analyzed for TPHg and TPHd by EPA Method 8015Cm, and BTEX and fuel oxygenate methyl tertiary butyl ether (MTBE) by EPA Method 8021b. Additionally, for soil disposal purposes, drummed soil cuttings will be analyzed for total lead by EPA Method 6010.

Waste Disposal

Soil cuttings generated during drilling will be temporarily stored on-site in labeled, DOT-approved 55-gallon drums. Soil drums will be sampled, analyzed, and profiled for disposal under waste manifest at an appropriate disposal facility.

Purge water generated during drilling, well development, and groundwater sampling will be temporarily stored on-site in labeled DOT-approved 55-gallon drums pending disposal and/or treatment and permitted discharge to the sanitary sewer system.

Final Report

Upon completion of well installation activities, Allterra will prepare a Preliminary Soil and Groundwater Assessment report, including a discussion of the completed field activities, results of soil and groundwater analyses, a site map depicting the mapped location of Geoprobe borings, completed and destroyed wells, well installation logs, and conclusions and recommendations regarding site conditions.

References

ACEH directive letter - Fuel Leak Case No. RO0000324, Livermore Gas and Mini-Mart, 160 Holmes St., Livermore, California – Work Plan Request dated March 29, 2005

GET – First Quarterly Groundwater Monitoring Report 4/14/05

Limitations

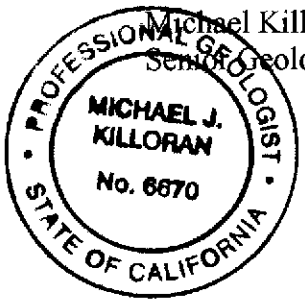
The data, information, and recommendations contained in this work plan are presented solely as preliminary to the existing environmental conditions at 160 Holmes Street. Site conditions can change over time; therefore, data, information, interpretation, and recommendations presented in this work plan are only applicable to the timeframe of this study. Allterra assumes no liability for data, conclusions, and/or recommendations presented by others. The conclusions and professional opinions presented herein were developed by Allterra in accordance with environmental principles and practices generally accepted at this time and location. No warranties are expressed or implied.

If you have any questions, please contact Allterra at (831) 425-2608.

Sincerely,
Allterra Environmental, Inc.

Greg L. Nolen
Project Manager

Michael Killoran R.G. 6670
Senior Geologist



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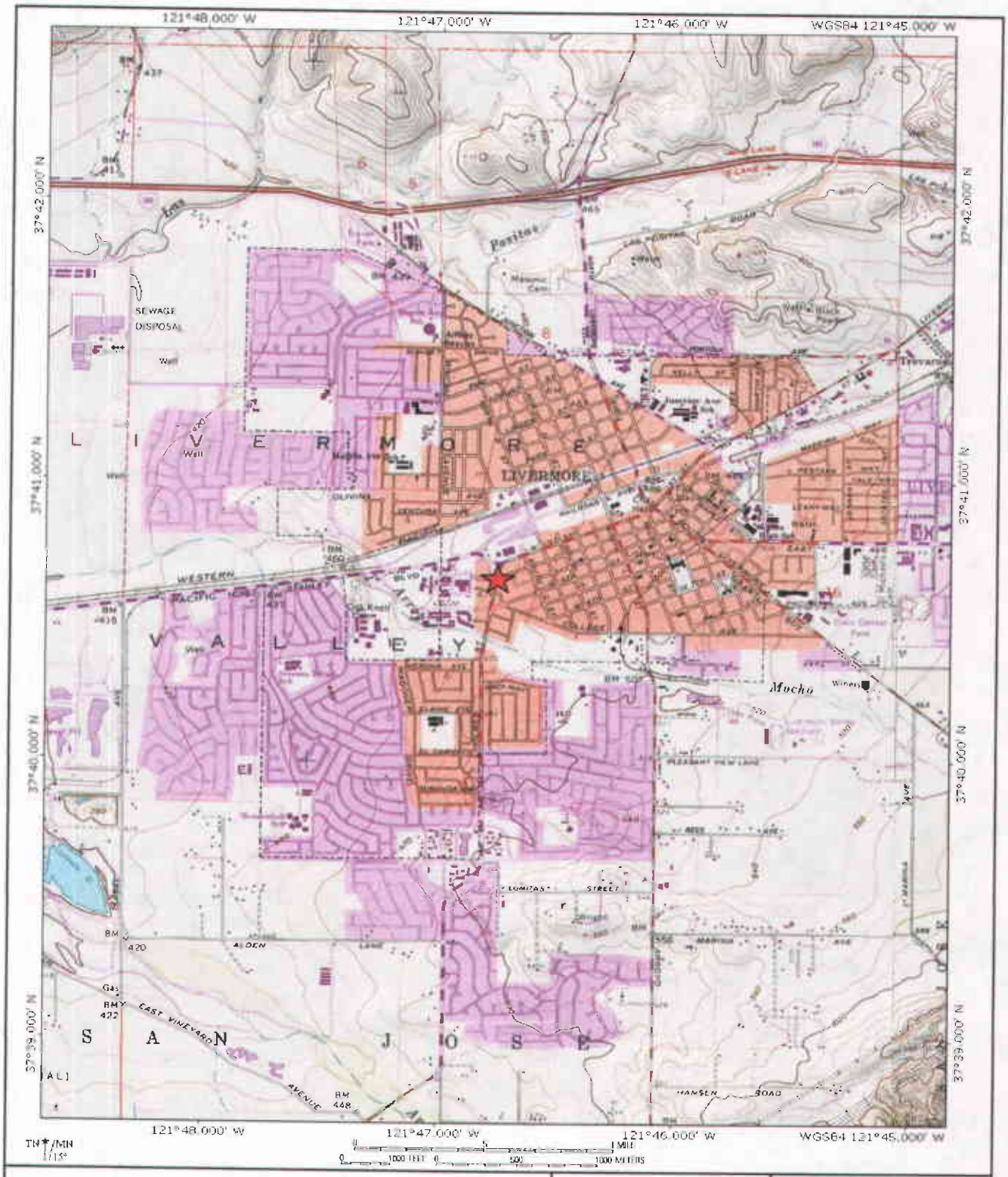
Attachments:

Figure 1, Vicinity Map
Figure 2, Site Map
Figure 3, Groundwater Potentiometric Map for 5/27/05
Figure 4, Concentrations of Fuel-related Compounds in Groundwater
Figure 5, MTBE Iso-Concentration Map for 5/27/05
Figure 6, Proposed Boring Location Map
Figure 7, Proposed Monitoring Well Location Map

Table 1, Historical Groundwater Elevation Data
Table 2, Historical Groundwater Analytical Results

APPENDIX A: Preliminary Conduit Survey
APPENDIX B: Allterra Environmental, Inc.'s Site Specific Health and Safety Plan
APPENDIX C: Allterra Environmental, Inc.'s Site Investigation and Groundwater Monitoring Field Protocol



Vicinity Map

Livermore Gas and Minimart
160 Holmes Street
Livermore, California

Figure 1

6/28/2005

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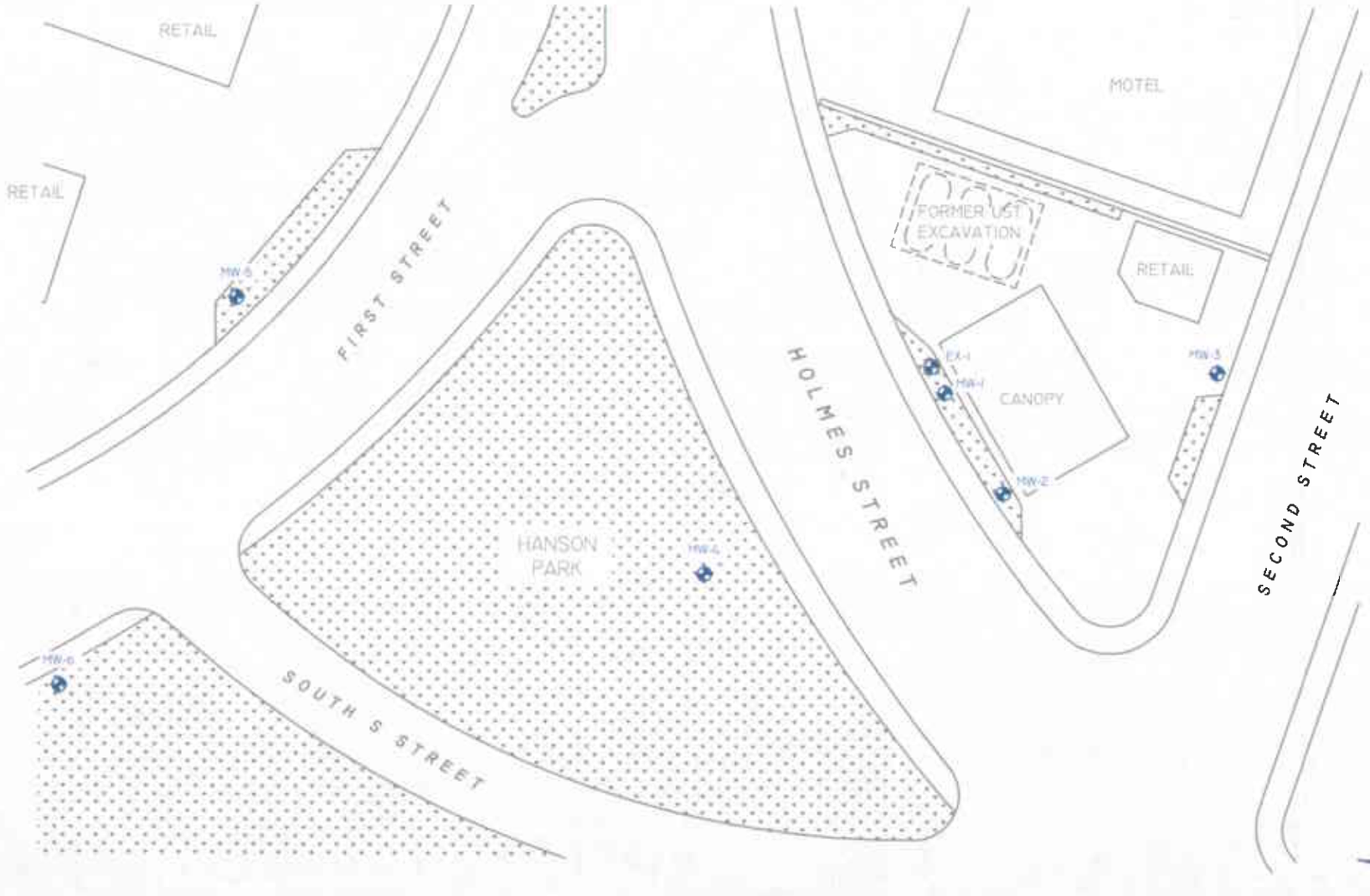

LEGEND:

MW-4 MONITORING WELL LOCATION

EX-1 EXTRACTION WELL LOCATION

0 70 140

SCALE

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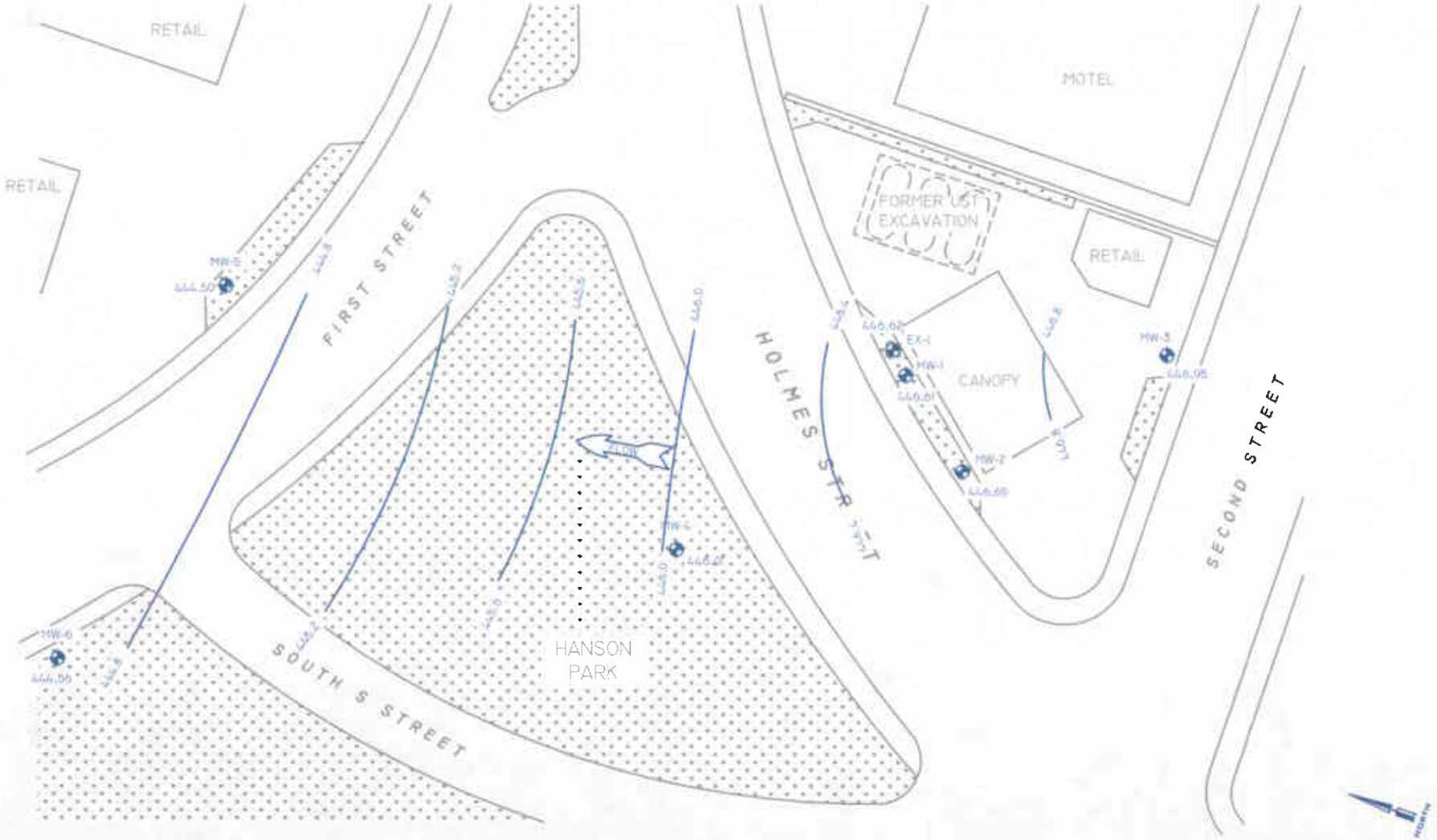
SITE MAP
160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 2
6/16/05



LEGEND:

- MW-4 — MONITORING WELL LOCATION
- EX-1 — EXTRACTION WELL LOCATION
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- 445.6 — INFERRED GROUNDWATER GRADIENT CONTOUR
- 444.56 — GROUNDWATER ELEVATION IN FEET

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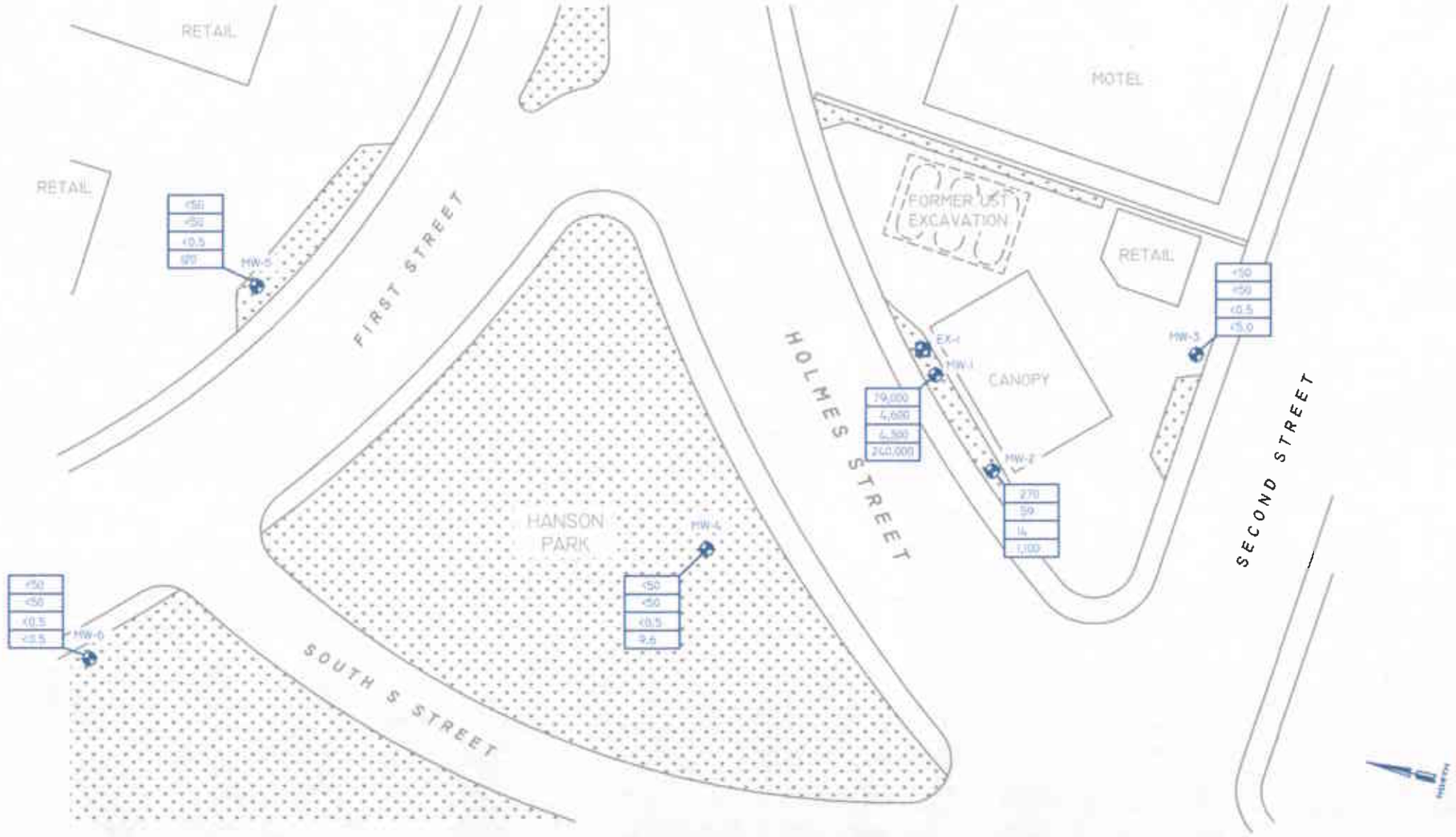
GROUNDWATER POTENTIOMETRIC MAP FOR 5/27/05
160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 3
6/16/05



LEGEND:

MW-4 MONITORING WELL LOCATION

EX-1 EXTRACTION WELL LOCATION

<50	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
<50	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
<0.5	BENZENE
<0.5	METHYL TERTIARY BUTYL ETHER

NOTES:

CONCENTRATIONS OF FUEL-RELATED COMPOUNDS ARE REPORTED IN MICROGRAMS PER LITER (UG/L)

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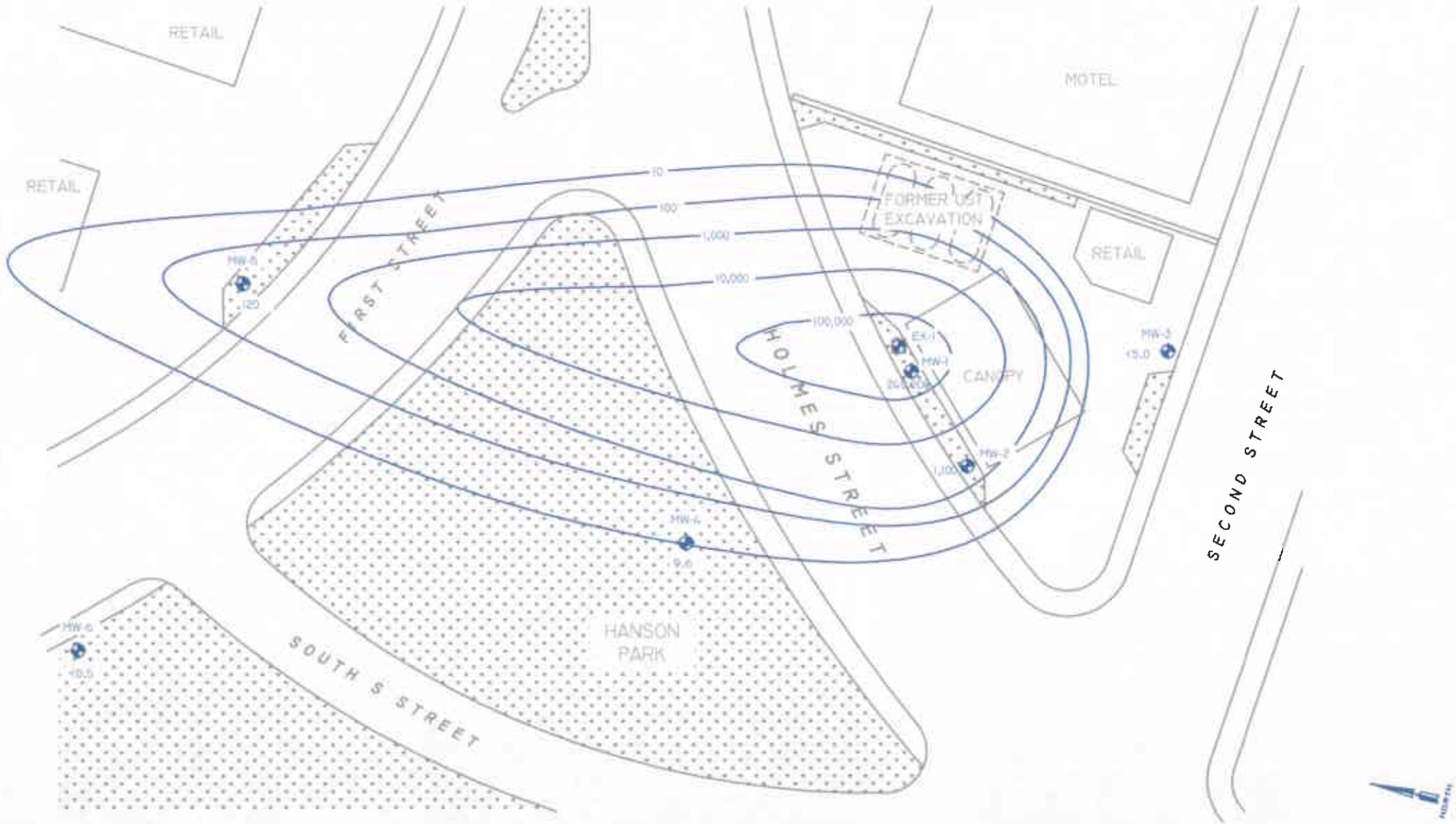
CONCENTRATIONS OF FUEL-RELATED COMPOUNDS IN GROUNDWATER

160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 4
6/16/05



LEGEND:

MW-4	MONITORING WELL LOCATION	1,000	MTBE ISO-CONCENTRATION CONTOUR
EX-1	EXTRACTION WELL LOCATION	1,100	MTBE CONCENTRATION IN GROUNDWATER (ug/L)

0 70 140
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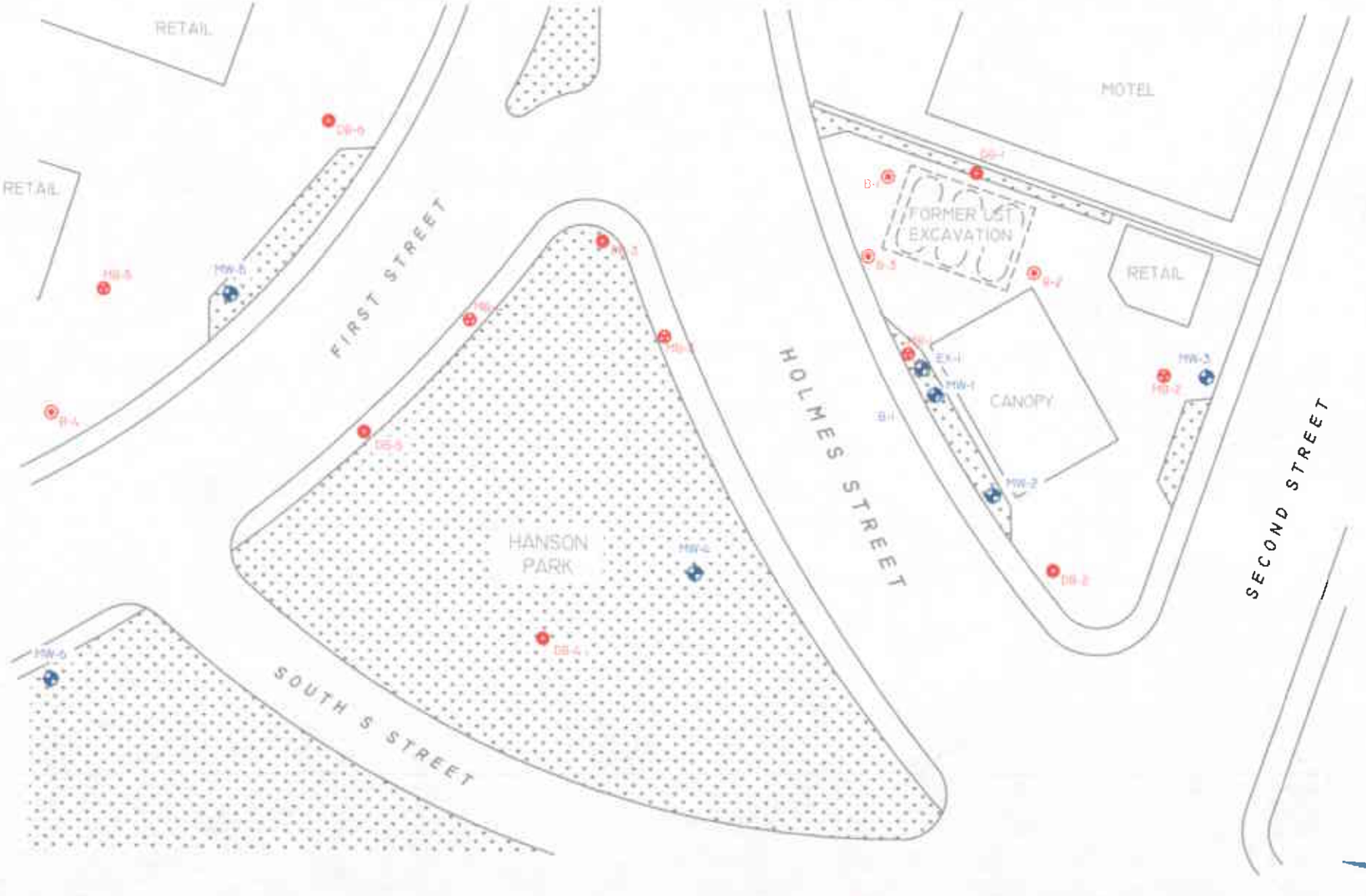
MTBE ISO-CONENTRATION MAP
FOR 5/27/05
150 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 5
6/16/05



LEGEND:

- MW-4 — MONITORING WELL LOCATION
- EX-1 — EXTRACTION WELL LOCATION
- B-1 — PROPOSED SOIL BORING
- DB-1 — PROPOSED DEEP SOIL BORING
- MB-1 — PROPOSED MULTI-POINT SOIL BORING

0 70 140
SCALE

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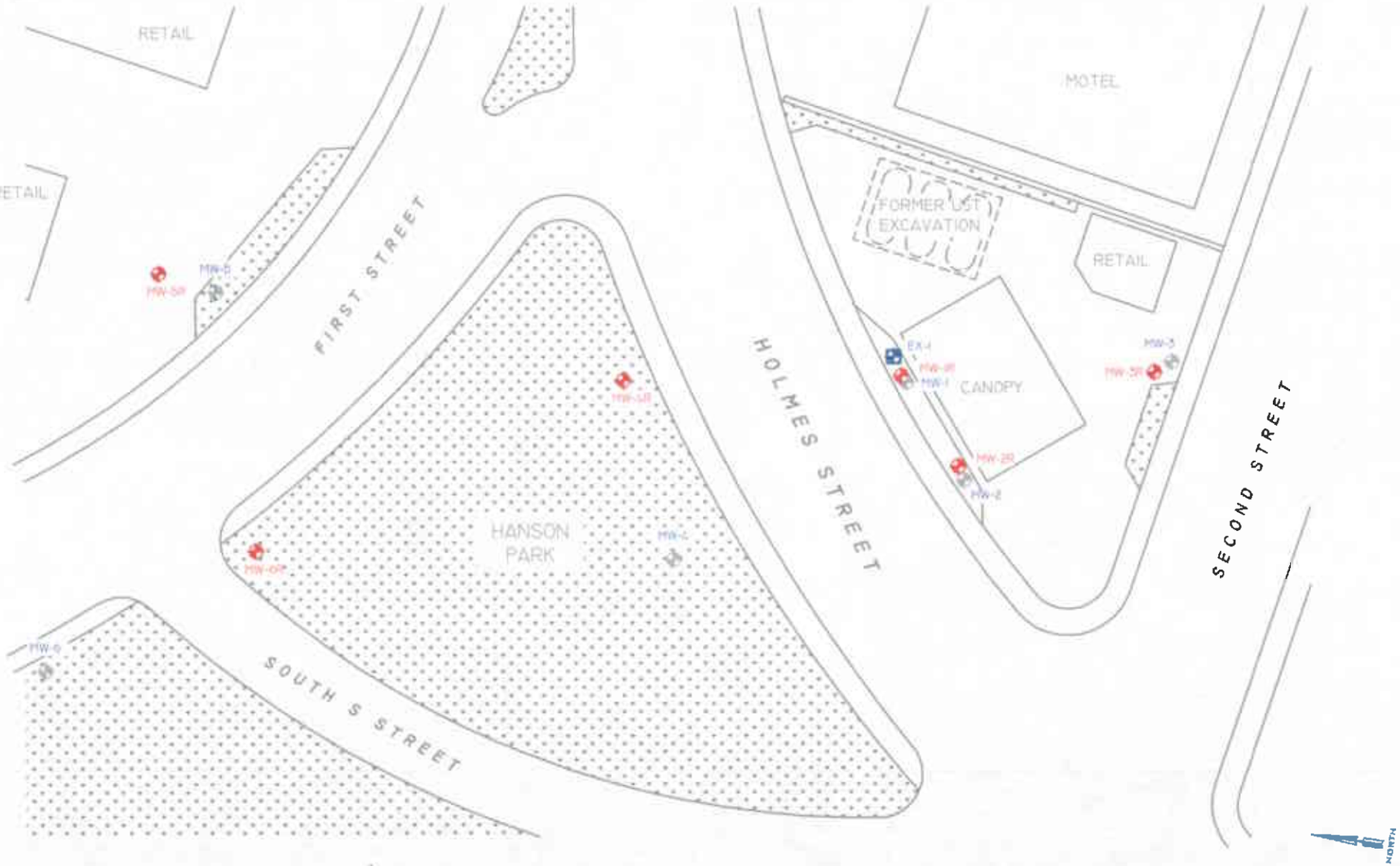
PROPOSED BORING LOCATION MAP
160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 6
6/16/05



LEGEND:

MW-4 EXISTING MONITORING WELL LOCATION TO BE DESTROYED

EX-1 EXISTING EXTRACTION WELL LOCATION

MW-4R PROPOSED MONITORING WELL LOCATION

0 70 140

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PROPOSED MONITORING WELL LOCATIONS
160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 7
6/16/05

Table 1

Groundwater Elevation Data

160 Holmes Street, Livermore

Monitoring Well ID	Date	Top of Casing Elevation* (feet, msl)	Depth to Groundwater (feet)	Groundwater Elevation (feet, msl)
MW-1	8/11/2000	465.03	NM	NC
	10/19/2000	465.03	21.94	443.09
	2/22/2001	465.03	22.91	442.12
	5/30/2001	465.03	Dry	NC
	11/14/2001	465.03	Dry	NC
	5/7/2002	465.03	Dry	NC
	9/11/2002	465.03	26.16	438.87
	12/1/2002	465.03	27.55	437.48
	3/14/2003	465.03	22.63	442.40
	6/25/2003	465.03	22.10	442.93
	9/16/2003	465.03	24.91	440.12
	12/22/2003	465.03	21.75	443.28
	3/10/2004	465.03	17.45	447.58
	6/15/2004	465.03	22.38	442.65
	9/17/2004	465.03	25.61	439.42
	12/10/2004	465.03	22.18	442.85
	3/2/2005	465.03	16.95	448.08
	5/27/2005	**465.03**	**18.42**	**446.61**
MW-2	8/11/2000	464.94	NM	NC
	10/19/2000	464.94	21.80	443.14
	2/22/2001	464.94	22.87	442.07
	5/30/2001	464.94	Dry	NC
	11/14/2001	464.94	Dry	NC
	5/7/2002	464.94	26.70	438.24
	9/11/2002	464.94	25.96	438.98
	12/11/2002	464.94	27.56	437.38
	3/14/2003	464.94	22.41	442.53
	6/25/2003	464.94	21.97	442.97
	9/16/2003	464.94	24.70	440.24
	12/22/2003	464.94	21.58	443.36
	3/10/2004	464.94	17.31	447.63
	6/15/2004	464.94	22.18	442.76
	9/17/2004	464.94	25.44	439.50
	12/10/2004	464.94	22.00	442.94
	3/2/2005	464.94	16.75	448.19
	5/27/2005	**464.94**	**18.29**	**446.65**

Table 1

Groundwater Elevation Data

160 Holmes Street, Livermore

Monitoring Well ID	Date	Top of Casing Elevation* (feet, msl)	Depth to Groundwater (feet)	Groundwater Elevation (feet, msl)
MW-3	8/11/2000	465.84	NM	NC
	10/19/2000	465.84	22.45	443.39
	2/22/2001	465.84	23.51	442.33
	5/30/2001	465.84	Dry	NC
	11/14/2001	465.84	Dry	NC
	5/7/2002	465.84	Dry	NC
	9/11/2002	465.84	26.61	439.23
	12/11/2002	465.84	28.18	437.66
	3/14/2003	465.84	23.04	442.80
	6/25/2003	465.84	22.59	443.25
	9/16/2003	465.84	25.33	440.51
	12/22/2003	465.84	22.37	443.47
	3/10/2004	465.84	17.88	447.96
	6/15/2004	465.84	22.82	443.02
	9/17/2004	465.84	26.09	439.75
	12/10/2004	465.84	22.65	443.19
	3/5/2005	465.84	17.33	448.51
	5/27/2005	**465.84**	**18.89**	**446.95**
MW-4	11/14/2001	465.15	33.84	431.31
	5/7/2002	465.15	26.75	438.40
	9/11/2002	465.15	26.66	438.49
	12/11/2002	465.15	28.39	436.76
	3/14/2003	465.15	23.14	442.01
	6/25/2003	465.15	22.72	442.43
	9/16/2003	465.15	25.39	439.76
	12/22/2003	465.15	22.42	442.73
	3/4/2004	465.15	18.20	446.95
	6/15/2004	465.15	22.95	442.20
	9/17/2004	465.15	26.12	439.03
	12/10/2004	465.15	22.73	442.42
	3/2/2005	465.15	17.60	447.55
	5/27/2005	**465.15**	**19.14**	**446.01**

Table 1

Groundwater Elevation Data

160 Holmes Street, Livermore

Monitoring Well ID	Date	Top of Casing Elevation* (feet, msl)	Depth to Groundwater (feet)	Groundwater Elevation (feet, msl)
MW-5	11/14/2001	464.65	34.94	429.71
	5/7/2002	464.65	27.90	436.75
	9/11/2002	464.65	27.99	436.66
	12/11/2002	464.65	29.50	435.15
	3/14/2003	464.65	24.26	440.39
	6/25/2003	464.65	24.01	440.64
	9/16/2003	464.65	26.83	437.82
	12/22/2003	464.65	23.68	440.97
	3/10/2004	464.65	19.22	445.43
	6/15/2004	464.65	24.20	440.45
	9/17/2004	464.65	27.68	436.97
	12/10/2004	464.65	23.93	440.72
	3/2/2005	464.65	18.56	446.09
	5/27/2005	**464.65**	**20.15**	**444.50**
MW-6	11/14/2001	464.13	33.88	430.25
	5/7/2002	464.13	27.01	437.12
	9/11/2002	464.13	27.03	437.10
	12/11/2002	464.13	28.77	435.36
	3/14/2003	464.13	23.46	440.67
	6/25/2003	464.13	23.08	441.05
	9/16/2003	464.13	25.77	438.36
	12/22/2003	464.13	22.59	441.54
	3/10/2004	464.13	18.65	445.48
	6/15/2004	464.13	23.31	440.82
	9/17/2004	464.13	26.56	437.57
	12/10/2004	464.13	23.09	441.04
	3/2/2005	464.13	18.04	446.09
	5/27/2005	**464.13**	**19.57**	**444.56**

Table 1

Groundwater Elevation Data

160 Holmes Street, Livermore

Monitoring Well ID	Date	Top of Casing Elevation* (feet, msl)	Depth to Groundwater (feet)	Groundwater Elevation (feet, msl)
EX-1	11/14/2001	465.30	33.41	431.89
	5/7/2002	465.30	27.58	437.72
	9/11/2002	465.30	NM	NC
	12/11/2002	465.30	27.98	437.32
	3/14/2003	465.30	23.02	442.28
	6/25/2003	465.30	22.41	442.89
	9/16/2003	465.30	24.65	440.65
	3/10/2004	465.30	17.99	447.31
	6/15/2004	465.30	22.48	442.82
	9/17/2004	465.30	25.91	439.39
	12/10/2004	465.30	NM	NC
	3/2/2005	465.30	NM	NC
	5/27/2005	**465.30**	**18.68**	**446.62**

MSL: Mean sea level

bgs: Below ground surface

NA: well not accessible

NC: elevation not calculated

NM: well not measured

Table 2
Groundwater Analytical Results
160 Holmes Street, Livermore

Monitoring Well ID	Date Collected	Total Petroleum Hydrocarbons as (µg/L)		Aromatic Volatile Organic Compounds (µg/L)				Fuel Oxygenates (µg/L)
		Gasoline	Diesel	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-1	8/11/2000	170,000	57,000	6,400	7,600	4,200	9,700	320,000
	10/19/2000	170,000	17,000	8,400	3,200	2,700	10,000	200,000
	2/22/2001	82,000	11,000	5,100	1,000	13,000	8,700	190,000
	5/30/2001	not sampled - well dry						
	11/14/2001	not sampled - well dry						
	5/7/2002	not sampled - well dry						
	9/11/2002	130,000	NA	7,700	1,100	4,500	1,500	<5000
	12/1/2002	NS	NS	NS	NS	NS	NS	NS
	3/14/2003	180,000	3,800	7,100	3,200	4,300	6,000	220,000
	6/25/2003	71,000	3,100	7,500	4,700	4,800	8,900	210,000
	9/16/2003	37,000	3,600	4,600	220	3,600	930	150,000
	12/22/2003	44,000	4,000	6,800	1,500	4,000	3,800	180,000
	3/10/2004	72,000	3,100	6,000	11,000	3,900	10,000	260,000
	6/15/2004	42,000	4,300	5,000	1,800	3,700	6,000	210,000
	9/17/2004	24,000	2,900	2,800	<33	2,900	500	83,000
	12/10/2004	31,000	2,700	4,600	190	4,400	2,800	200,000
	3/2/2005	58,000	2,800	4,000	2,500	4,500	7,800	230,000
	5/27/2005	**79,000**	**4,600**	**4,300**	**6,200**	**5,100**	**13,000**	**240,000**
MW-2	8/11/2000	4,500	1,900	220	52	160	170	3,000
	10/19/2000	3,400	1,300	150	21	100	70	1,900
	2/22/2001	7,600	880	25	<10	69	25	2,200
	5/30/2001	not sampled - well dry						
	11/14/2001	not sampled - well dry						
	5/7/2002	400	86	5.4	<0.5	1.9	2.3	230
	9/11/2002	260	NA	1.3	<0.5	0.57	0.77	200
	12/11/2002	250	120	7.9	1.6	13	9.9	180
	3/14/2003	830	110	56	<0.5	<0.5	<1.0	1,200
	6/25/2003	260	180	0.92	2.9	3.1	8.1	2,000
	9/16/2003	420	260	3.6	3.4	5.2	2.4	1,300
	12/22/2003	240	120	0.82	3.1	7.8	3.9	1,400
	3/10/2004	280	210	9.4	4.2	14	11	1,400
	6/15/2004	150	150	2.1	2.4	2.2	1.3	1,500
	9/17/2004	61	70	<0.5	1.0	<0.5	<0.5	730
	12/10/2004	84	110	<0.5	1.2	<0.5	1.5	1,300
	3/2/2005	63	91	0.55	<0.5	0.63	0.51	1,000
	5/27/2005	**270**	**59**	**14**	**3.9**	**19**	**6.8**	**1,100**

Table 2
Groundwater Analytical Results
160 Holmes Street, Livermore

Monitoring Well ID	Date Collected	Total Petroleum Hydrocarbons as (µg/L)		Aromatic Volatile Organic Compounds (µg/L)				Fuel Oxygenates (µg/L)
		Gasoline	Diesel	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-3	8/11/2000	59	260	<0.5	<0.5	<0.5	<0.5	<5.0
	10/19/2000	<50	<65	<0.5	<0.5	<0.5	<0.5	<5.0
	2/22/2001	<50	100	<0.5	<0.5	<0.5	<0.5	<5.0
	5/30/2001	not sampled - well dry						
	11/14/2001	not sampled - well dry						
	5/7/2002	not sampled - well dry						
	9/11/2002	<50	NA	<0.5	<0.5	<0.5	<0.5	<5.0
	12/11/2002		NS					
	3/14/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	6/25/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/16/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/22/2003	<50	69	<0.5	<0.5	<0.5	<0.5	<5.0
	3/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	6/15/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/17/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	7.6
	3/5/2005	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	5/27/2005	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5.0**
MW-4	11/14/2001	510	90	4.0	<0.5	<0.5	<0.5	14
	5/7/2002	150	<50	3.5	0.5	<0.5	<0.5	48
	9/11/2002	<50	NA	<0.5	<0.5	<0.5	<0.5	15
	12/11/2002	<50	<50	<0.5	<0.5	<0.5	<0.5	24
	3/14/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<1.0
	6/25/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<1.0
	9/16/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/22/2003	<50	69	<0.5	<0.5	<0.5	<0.5	<5.0
	3/4/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	37
	6/15/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	7.4
	9/17/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/2/2005	<50	<50	<0.5	<0.5	<0.5	<0.5	14
	5/27/2005	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**9.6**
MW-5	11/14/2001	<50	<66	<0.5	<0.5	<0.5	<0.5	8.2
	5/7/2002	140	<50	<0.5	<0.5	<0.5	<0.5	110
	9/11/2002	<50	NA	<0.5	<0.5	<0.5	<0.5	6.3
	12/11/2002	73	<50	<0.5	<0.5	<0.5	<0.5	160
	3/14/2003	110	<50	<0.5	<0.5	<0.5	<0.5	170
	6/25/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	89
	9/16/2003	630	<50	<0.5	3.5	<0.5	2.6	1500
	12/22/2003	<0.5	<50	<0.5	<0.5	<0.5	<0.5	630
	3/10/2004	57	<50	<0.5	<0.5	<0.5	<0.5	1100
	6/15/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	750
	9/17/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	780
	12/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	120
	3/2/2005	<50	<50	<0.5	<0.5	<0.5	<0.5	320
	5/27/2005	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**120**

Table 2
Groundwater Analytical Results
160 Holmes Street, Livermore

Monitoring Well ID	Date Collected	Total Petroleum Hydrocarbons as (µg/L)		Aromatic Volatile Organic Compounds (µg/L)				Fuel Oxygenates (µg/L)
		Gasoline	Diesel	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-6	11/14/2001	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	5/7/2002	<50	<67	<0.5	<0.5	<0.5	<0.5	<5.0
	9/11/2002	<50	NA	<0.5	<0.5	<0.5	<0.5	<5.0
	12/11/2002	<50	<50	<0.5	<0.5	<0.5	<0.5	<1.0
	3/14/2003	<50	<50	<0.5	<0.5	<0.5	<1.0	<1.0
	6/25/2003	<50	<50	<0.5	<0.5	<0.5	<1.0	<1.0
	9/16/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/22/2003	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	6/15/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/17/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/10/2004	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/2/2005	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	5/27/2005	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5.0**
EX-1	11/14/2001	13,000	2,000	180	1,000	330	3,200	2,200
	5/7/2002	7,700	560	320	<25	66	150	6,200
	9/11/2002	2,800	NA	32	<13	14	<13	2,500
	12/11/2002	3,000	100	81	<0.5	44	<1.0	4,800
	3/14/2003	750	50	<0.5	<0.5	7.7	13	1,200
	6/25/2003	120	<50	3.2	3.7	4.2	7.6	260
	9/16/2003	170	<50	0.5	1.5	<0.5	0.9	1,600
	3/10/2004		NS					
	6/15/2004		NS					
	9/17/2004		NS					
	12/10/2004		NS					
	3/2/2005		NS					
	5/27/2005		**NS**					

Notes:

-- = not applicable
µg/L = micrograms per liter
NS = Not Sampled
NA = Not Analyzed
MTBE = methyl tertiary butyl ether

APPENDIX A

Preliminary Conduit Study

ALLTERRA

June 30, 2005
Project No.: 015-01-003
Manwel and Samira Shuwayhat
54 Wolfe Canyon Road
Kentfield, CA 94904

Subject: Preliminary Conduit Study, Livermore Gas and Mini-mart, 160 Holmes Street, Livermore, California

Dear Mr. Shuwayhat:

On your behalf, Allterra Environmental, Inc. (Allterra) has prepared this Preliminary Conduit Study to evaluate potential horizontal and vertical pathways for migration of fuel-related compounds beneath the referenced site and adjacent properties. This preliminary study will be revised as accurate subsurface lithology and aquifer data becomes available. In addition, the finalized study will comply with the Work plan Request directive from the Alameda County Health Care Services Agency, Environmental Health Services (ACEH), dated March 29, 2005.

Site Location and Description

The subject property site is located at the northeast intersection of Holmes Street and Second Street, in Livermore, California (Figure 1). A Valero fuel station currently occupies the site and the surrounding area is primarily residential with some retail businesses along 1st and 2nd Streets. The approximate surface elevation of the site is 20 feet above mean sea level (MSL). Pertinent site features, including the locations of the former underground fuel storage tanks (USTs), and monitoring wells are presented in Figure 2.

Site Geology and Hydrogeology

Site geology, as described by previous consultants, consists primarily of clayey sand and silty clay fill material from surface grade to approximately 8 feet below surface grade (bgs). Underlying the fill material, silty clay occurs to approximately 11 feet bgs and is in turn underlain by sandy silt and silty sand to approximately 28 feet bgs. Beneath the silts and sands, silty clay occurs to the total depth investigated (approximately 31.5 feet bgs). Groundwater occurs at depths between approximately 11 and 13 feet bgs and is inferred to flow toward San Francisco Bay to the north.

Site Investigation - Research Activities

Regional Well Survey

In order to comply with *ACEH's* request for a survey of wells located within a 2,000-foot radius of the subject site, a well survey was performed to locate production wells for municipal, domestic, agriculture, industry and other uses within 2,000 feet of the site.

On June 14, 2005, Water District Zone 7 responded to Allterra's request for well information. However; a well list is still forthcoming from Zone 7.

Allterra has mailed requests for well information (see Appendix A, Well Survey Questionnaire) to 520 property addresses within a 2,000-foot radius of the site. To date, Allterra has not received any responses.

Allterra conducted a file search at the Department of Water Resources on June 14, 2005. The location of each well in the records was established to determine if the well was within 2,000 feet of the site. Wells within 2,000 feet are listed below:

DWR No.	Distance (ft.)	Location Relative to Site	Address (if Known)
3S/2E-17A			
3S/2E-17B-2	550	SSE	W. 4th St. (btwn S & Q Sts.)
3S/2E-17C-1	1100	WSW	985 E. Stanley Blvd.
3S/2E-17D	(LIVERMORE POTTERY, LAT/LONG AVAIL.)		
3S/2E-17E1	>2000	SW	S side Mocho St.
3S/2E-17F1	~1600	SW	0.2 mi. W of Holmes/College
3S/2E-17F3			761 S. N St.
3S/2E-17L2	>2000	W	
3S/2E-17P	>2000		
3S/2E-17P4	>2000		
3S/2E-17R1	(CREEK BANK RANCH)		
3S/2E-17F2			Vallecitos Rd.
3S/2E-17B4	850	NE	S. P & 1st Sts.
3S/2E-17C4	600	N	E OF S. S & RR
3S/2E-17C5	400	N	E OF S. S & RR
3S/2E-17C6			
3S/2E-17C7			
3S/2E-18R1			Vallecitos Rd.
3S/2E-18A3	>2000		785 E. Stanley Blvd.
3S/2E-18A4	>2000		785 E. Stanley Blvd.
3S/2E-18A5	>2000		785 E. Stanley Blvd.
3S/2E-18A6	>2000		785 E. Stanley Blvd.
3S/2E-18A13	>2000		785 E. Stanley Blvd.
3S/2E-18A12M	>2000		785 E. Stanley Blvd.
3S/2E-18A10M	>2000		785 E. Stanley Blvd.
3S/2E-18A9M	>2000		785 E. Stanley Blvd.
3S/2E-18A8M	>2000		785 E. Stanley Blvd.
3S/2E-18A7	>2000		785 E. Stanley Blvd.
3S/2E-18A11M	>2000		785 E. Stanley Blvd.
3S/2E-18A14M	>2000		785 E. Stanley Blvd.
3S/2E-18A	>2000		

DWR No.	Distance (ft.)	Location Relative to Site	Address (if Known)
3S/2E-18A1	>2000		
3S/2E-18C	>2000		871 S. H Street
3S/2E-18D	>2000		
3S/2E-18M	>2000		¼ mi. S. of 871 S. H Street
3S/2E-18F2	>2000		200' S of E. Stanley and 528' E of Murdell Lane
3S/2E-18E1			
3S/2E-18CO1			
3S/2E-18DO1			

Utility Search

In order to evaluate the presence of potential contaminant horizontal and vertical migration pathways, underground utilities within approximately 100 feet of the former UST complex were located. Utilities were also identified so that the forthcoming subsurface investigation could proceed safely. Refer to Figure 2 for the location of identified utilities at and in the vicinity of the site.

Aerial Photographs Review

On June 3, 2005, Allterra personnel reviewed aerial photographs of the site and surrounding area. The primary purpose of the review was to identify wells located within a 2000 foot radius of the site. Secondarily, the review helped establish the historical land use of the site and surrounding area. The results of our review are summarized below:

1959

In 1959, the site appears vacant. Hanson Park, located just north of the site, is mostly vacant. Structures on the property located immediately to the north, across 1st Street, may be canopies for a fuel/service station. Properties west of South S Street appear to be residential, and one includes a small grove. Properties along the north side of 1st Street, east of the aforementioned suspect service station appear to be in the construction phase. The remaining area surrounding the site is residential.

1971 and 1982

The 1971 and 1982 aerial photographs show similar land use. The site is occupied by a service station and canopies are evident. The areas north of Railroad Avenue and south of 2nd Street are residential, as seen in the other photographs. The canopy seen in older photos north of 1st Street is present, but small shed-sized structures were observed in the 1971 photograph but not in the 1982 photograph.

1992

Canopies over service station structures are not evident in the 1992 photograph, but the station was known to exist at that time through other historical sources.

2002
The site is a service station, as was noted in earlier photos. The Valley Memorial Hospital and associated buildings are evident along the west side of South S Street, but were not observed in older photographs.

Historical Telephone Directories

1963
The Mullin-Kille & Herald News "Con-Survey" listed the site as Goines & Russell Sunland. The nearby Townhouse Motel and Safeway were present. Listings indicated that the surrounding area was mostly residential. Service stations were located in the general area at 1336, 1679, 1737, and 1771 1st Street. According to assessors parcel maps, 1336 1st Street is directly across 1st Street from the site, to the north.

1970
The 1970 directory shows that the site and neighboring property listings were similar to the 1972 listings.

1972
In 1972, the site was a service station (Sunland Peck Service) as in previous directories. The nearby Townhouse Motel and Safeway were present, as in previous directories. The surrounding area listings were mostly residential in all directories reviewed.

Final Report
As stated earlier, upon completion of the soil and groundwater investigation, Allterra will prepare a Final Conduit Study. This final report will include maps and cross-sections developed from data collected during the proposed sub-surface investigation. Data collected will provide the basis for an evaluation of the probability that fuel-related compounds are impacting production wells.

References
Guidelines for Identification, Location, and Evaluation of Deep Well Conduits, May 2003, San Francisco Regional Water Quality Control Board, 1986 Staff Memo by Tom Berkins.

ACEH directive letter - Fuel Leak Case No. RO0000324, Livermore Gas and Mini-Mart, 160 Holmes St., Livermore, California – Work Plan Request dated March 29, 2005

Limitations
Allterra prepared this report for the use of Manwel and Samira Shuwayhat, Alameda County Health Care Services Agency, in evaluating groundwater quality at selected on-site locations at the time of this study. Statements, conclusions, and recommendations in this report are based solely on the field observations and analytical results related to work performed by Allterra and

there is no warranty, expressed or implied. Site conditions and data can change over time; therefore, data presented in this report is only applicable to the timeframe of this study. Allterra's services have been performed in accordance with environmental principles generally accepted at this time and location.

If you have any questions, please contact Allterra at (831) 425-2608.

Sincerely,
Allterra Environmental

Greg L. Nolen
Project Manager

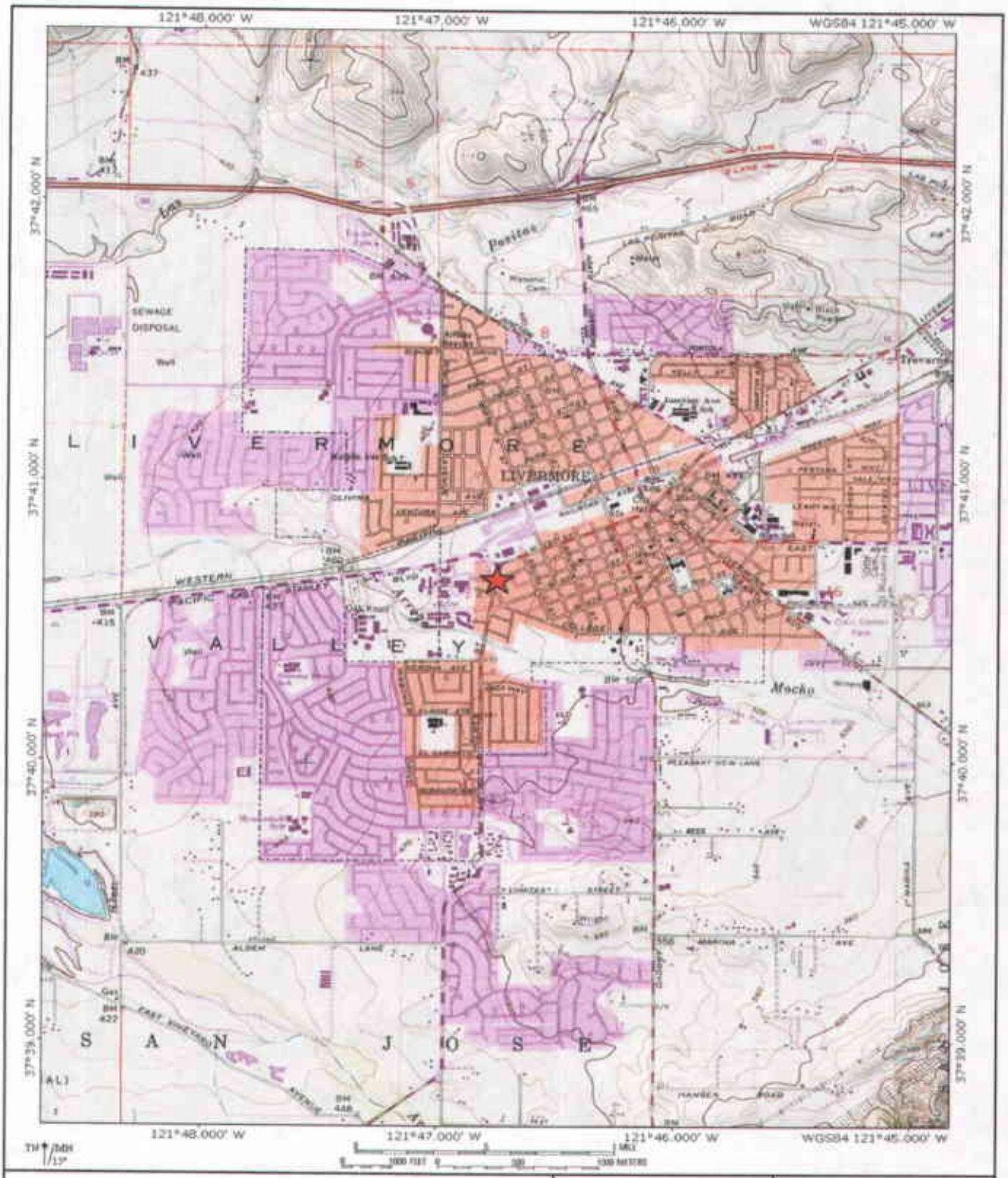
Michael Killoran R.G. 6670
Senior Geologist

PROFESSIONAL GEOLOGIST
MICHAEL J. KILLORAN
No. 6670
STATE OF CALIFORNIA

Attachments:

Figure 1, Vicinity Map
Figure 2, Locations of Production Wells Within 2,000 Feet
Figure 3, Site Map with Utilities

APPENDIX A, Well Survey Questionnaire



Vicinity Map

Livermore Gas and Minimart
160 Holmes Street
Livermore, California

Figure 1

6/28/2005

ALLTERRA
849 Almar Avenue, Suite C, No. 281
Santa Cruz, California
http://www.allterraenv.com

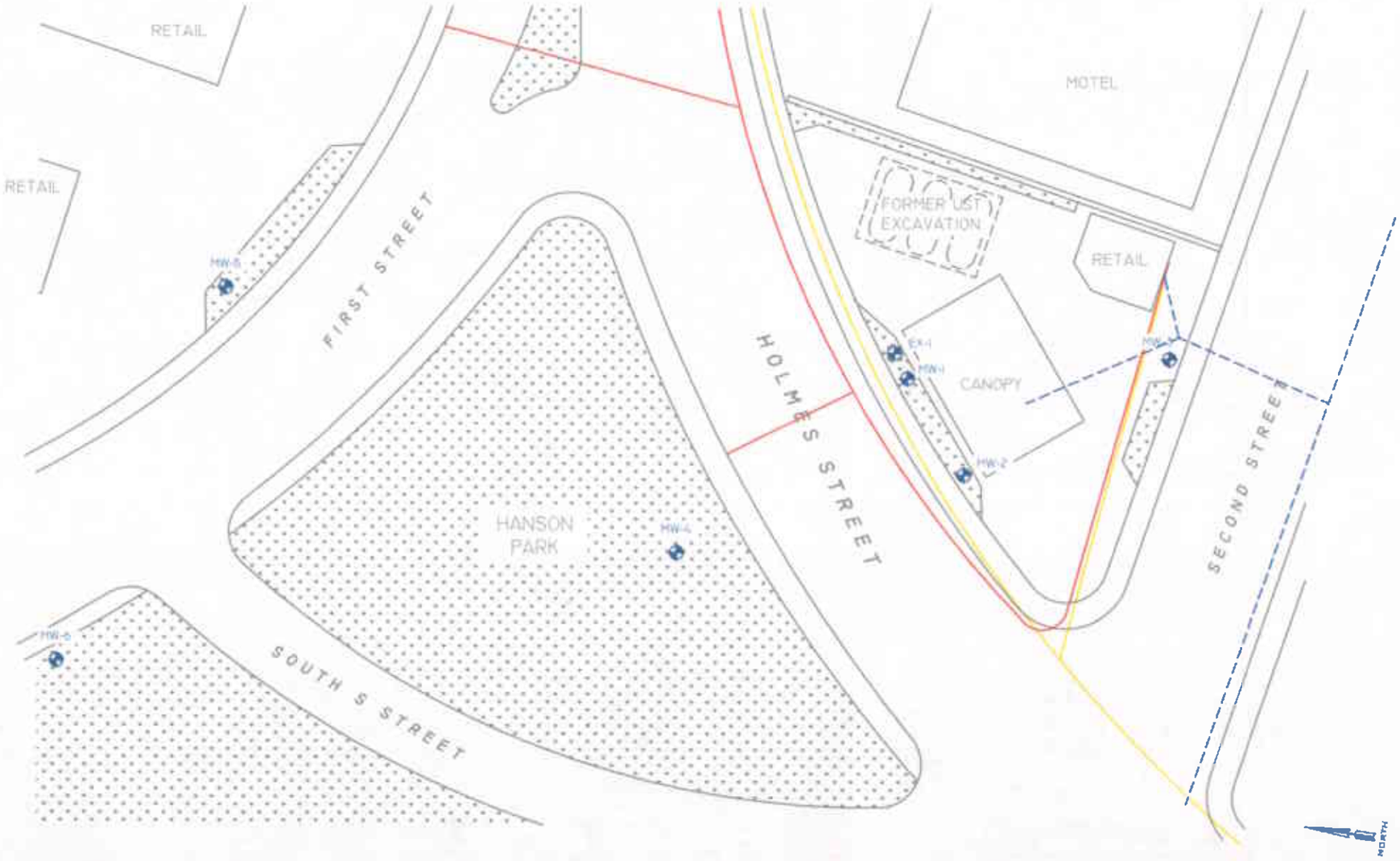
LEGEND

△ PRODUCTION WELL -
● UNKNOWN WELL
◆ MONITORING WELL
✤ ABANDONED WELL

WELL LOCATION MAP
160 HOLMES STREET
LIVERMORE, CALIFORNIA

ALLTERRA
849 ALMARE AVENUE, SUITE C -281
SANTA CRUZ, CALIFORNIA 95060
www.allterraenv.com

Figure 2
6/16/05



LEGEND:

MW-4 MONITORING WELL LOCATION

EX-1 EXTRACTION WELL LOCATION

UNDERGROUND GAS SERVICE

UNDERGROUND ELECTRICAL CONDUIT

UNDERGROUND WATER LINE

0 70 140

SCALE

ALLTEREA

849 ALMAR AVE., SUITE C, NO. 29
SANTA CRUZ, CALIFORNIA
WWW.ALLTEREA.COM

SITE MAP WITH UTILITIES

160 HOLMES STREET
LIVERMORE, CALIFORNIA

FIGURE 3
6/16/05

APPENDIX A

Well Survey Questionnaire

ALLTERRA

June 29, 2005

To Whom It May Concern:

Subject: Well Survey Questionnaire

The following is an independent public health questionnaire regarding the possible existence of irrigation or drinking water wells near East Stanley Blvd., Railroad Ave., S Street, Glenwood Street, 2nd Street, and Holmes Street. The reason for this survey is to establish a list of potential receptors that may be affected by a gasoline leak into the groundwater from the corner of Holmes Street and 2nd Street in Livermore. The results of this questionnaire will be used to determine whether water in the well on your property (should one exist) needs to be tested for the presence of gasoline-related compounds. Testing would be free of charge. Please fill out the following information to the best of your knowledge. If you do not know, just mark "UNKNOWN." Even if you don't have a well, please fill out tenant and property owner information. Should you have any questions, please contact Mr. Robert Shultz of Alameda County at (510) 567-6719 or Mr. James Allen of Allterra Environmental, Inc. at (831) 425-2608. Thank you for your cooperation.

Tenant name: _____ Phone No.: _____

Address: _____

Owner Name (if other than tenant): _____

Phone No.: _____ Address: _____

_____

Is there a well on the property?: YES NO UNKNOWN

If yes, please fill out the following 1nformation to the best of your ability:

Number of wells: _____ Well diameter(s): _____

Well depth(s): _____ Well material: PVC Steel Clay Other_____

Date of installation: _____ Well usage: _____

Well Status: Active / Inactive / Destroyed

If you have any other information regarding wells in the area, please comment below (use other side if necessary):

Comments: _____

_____

_____

_____

Thank you for your assistance. Please return this questionnaire in the enclosed envelope.

Allterra Environmental, Inc., 849 Almar Avenue, Suite C, No. 281, Santa Cruz, California 95060
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APPENDIX B

Site Specific Health and Safety Plan

Site Specific Health and Safety Plan
160 Holmes Street, Livermore, California

Prepared For:
Livermore Gas and Mini Mart
160 Holmes Street
Livermore, California 94551

Allterra Environmental, Inc.
849 Almar Avenue, Suite C, No. 281
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Introduction
The purpose of this Health and Safety Plan (HASP) is to ensure that all individuals engaged in site activities do so in a safe manner and in compliance with EPA, state and local regulations. The primary regulatory documents with which site personnel need to comply are OSHA 29 CFR, Part 1910, and the California Administrative Code, Title 8. In addition, all site work will comply with Allterra Environmental, Inc. (Allterra) Health and Safety Program and all supporting Standard Operating Procedures. This HASP may be modified during actual field activities, if necessary, as more information and site-specific data are obtained.

Prior to beginning any work on-site, an approved copy of this HASP shall be provided to all employees and subcontractors by the Project Manager. Each subcontractor will be responsible for providing his own HASP. Allterra retains the right to review and approve each subcontractor's Health and Safety Plan prior to the beginning of fieldwork.

Purpose and Objectives
The purpose of this site-specific Health and Safety Plan is to provide guidelines and procedures to ensure the health and physical safety of those persons working at the site. While it may be impossible to eliminate all risks associated with site work, the goal is to provide state-of-the-art precautionary and responsive measures for the protection of on-site personnel, the general public and the environment. The HASP objectives are as follows:

a. Ensure the safety of all site personnel;
b. Protect the public and the environment; and
c. Adhere to Allterra health and safety policies and procedures.

Implementation
This site-specific Health and Safety Plan, and any additional HASP, will be reviewed by all site personnel prior to their scheduled field work. Whenever the site-specific HASP is revised or amended, personnel will be instructed of changes and new procedures.

The site-specific Health and Safety Plan will be implemented in the field by Allterra's Health and Safety Coordinator and/or designated Site Safety Officer (SSO).

Background and Site Description
The subject property is located on northeast corner of Holmes Street and 2nd Avenue at 160 Holmes Street in a primarily residential area with some retail businesses nearby. The property operates as a Vallero fuel station and mini mart.

Proposed Work
Allterra has proposed to destroy six monitoring wells, install six monitoring wells and install 14 Geoprobe locations as part of a soil and groundwater investigation.

Job Hazard Assessment
Chemical Health Hazards

Chemical	PEL/Ceiling/ IDLH	Highest Documented Concentrations in Soil, Water, Air, Etc	Signs/Symptoms
Benzene	1 ppm	Soil = NA Water = 8,400 µg/L	Irritation of eyes, nose, and respiratory systems. Headache, giddiness, fatigue, anorexia, staggered gait, and dermatitis
Toluene	100 ppm	Soil = NA Water = 11,000 µg/L	Irritation of eyes and mucous membrane, headache, dermatitis, narcosis, and coma.
Xylenes	100 ppm	Soil = NA Water = 10,000 µg/L	Irritation of eyes, nose, and throat, excitement, drowsiness, headache, dizziness, nausea ,vomiting, anorexia, staggered gait, and dermatitis.
Ethyl Benzene	300 ppm	Soil = NA Water = 13,000 µg/L	Irritation of eyes and mucous membrane, headache, dermatitis, narcosis, and coma.
Gasoline	300 ppm	Soil = NA Water = 180,000 µg/L	Skin irritant, disturbance of eyes. Deep burning in the throat and respiratory track and bronchopneumonia. Repeated chronic dermal contact may result in drying of skin, lesions and other dermatological conditions.
Diesel	100 mg/m^3	Soil = NA Water = 57,000 µg/L	Irritation to skin. Prolonged breathing at high vapor concentrations can cause central nervous system effects
Lead	100 mg/m^3	Soil = NA Water = NA	Prolonged exposure may result in anorexia, low weight, malnutrition, constipation, abdominal pain, colic, or anemia
Tetraethyl-lead	40 mg/m^3	NA	Irritating to the eyes. Prolonged exposure may result in insomnia, anxiety, tremors, hypotension, nausea, low-weight, convulsions, and coma.
Tetramethyl-lead	40 mg/m^3	NA	Prolonged exposure may result in insomnia, anxiety, tremors, hypotension, nausea, low-weight, convulsions, and coma.
Tetra-chloro-ethylene	500 ppm	NA	Inhalation exposure is associated with eye, nose and throat irritation. Ingestion is associated with nausea, flush face and neck.

Physical Hazards

Hazard	Mitigation Measure
Drilling Equipment Hazard	Heavy equipment will be in good working order and operated in accordance with recognized industry standards. Strive to keep a safe distance from heavy machinery so that you would not be in the path of a moving part if it were to swing suddenly. Always be aware of the movement of machinery around you. Approach vehicles from the driver's side. Make sure you are seen by the vehicle operator. Make eye contact.
Trip/Fall Hazard	Good housekeeping and shoes with traction will be worn.

Fire and Explosion Hazards

List Flammable or combustible materials kept on-site. Keep ignition sources away from the following materials.

Flammable (Flash Point < 100 °F)	Combustible (Flash Point < 200 °F)
Gasoline (43 °F)	Diesel (130 °F)

Flammability will be monitored by LEL meter.

List all oxidizers kept on-site: Unknown

Type and location of Fire Extinguisher: ABC fire extinguisher will be located in the support zone in the truck or outside.

Other Hazards

_X_ *Noise*:

Activities likely to generate noise exceeding 85 Db: drilling – PPE: use hearing protection

_____ *Heat Stress*

Symptoms: Heat Cramps: Muscular pains and spasms.
Heat Exhaustion: Cool, pale, moist skin; dilated pupils, headache, sweating, nausea, dizziness, vomiting, near normal body temperature.
Heat Stroke: Hot, red skin; small pupils; high body temperature; reduced sweating

Mitigation: Cool place for breaks (in the shade or in trucks)
Whenever ambient temperatures exceed 80 °F, or whenever semipermeable or impermeable protective clothing is worn and ambient temperatures exceed 70 °F, monitoring the worker may include:

Calculate the workers heart rate at the beginning of the rest period. If the heart rate exceeds 110 beats/min shorten the next work cycle. If the heart

rate still exceeds 110 beats/min during the next rest period, shorten the work cycle by 1/2 and continue monitoring.

Take frequent breaks in shaded areas. Remove PPE during breaks and provide plenty of drinking water. Record the time and duration of all breaks. Heat stroke victims must receive emergency medical care.

_____*Hypothermia/ Frostbite*

Symptoms: Hypothermia: Shivering, apathy, loss of consciousness, decreasing pulse and breathing rate.
Frostbite: White, then greyish yellow processing to greyish blue skin. Cold numb body parts.

Mitigation: Wear multi-layer cold weather clothing. Take frequent breaks in a warm sheltered area. Provide warm drinks. For frostbite victims, warm the injured part gradually, do not rub the affected area. Warm hypothermia victims and transport to emergency medical care.

Exposure Monitoring
All samples will be recorded in the exposure log. Copies of the exposure log are filed in the job file. All sampling instruments will be calibrated per the manufacturer's instructions on a daily basis.

Monitoring Equipment	Hazard Monitored	Sample Location	Sample Frequency	Action Level	Action
PID	Volatile organic vapors	To be determined	hourly	1000 ppm	Use of a respirator while working

Personal Protective Equipment
As a minimum, Level D protection is required on all Allterra worksites. Level D includes: steel-toe boots, safety glasses, and a hard hat. For each task on this project, identify additional protective garments as requires, include the conditions (exposure levels, etc.) under which the level of PPE would be modified for each task.

Task(s)	Condition	Garment(s)
All	At all times	steel-toe boots, safety glasses, and hard hat

Site Control and Communication
The site will be secured as follows: Traffic safety equipment and caution tape.

Work Zones will be marked as follows: Marked with florescent or caution tape and traffic safety equipment. Exclusion Zone is within 15 feet of machinery. Only essential personnel will be allowed into an Exclusion Zone. When practical, 25 to 75 feet of space surrounding Exclusion Zones will be designated as Contamination Reduction Zones. Support Zone is all other area.

On-site communication:	Radio	____
	Verbal	X
	Hand Signals	X
	Other	____
Off-site communication:	Radio	____
	Telephone	X
	Other	____

The specific signal for an emergency is: Waving both arms overhead
The specific signal for an evacuation is: Wave personnel toward assembly point
Evacuation assembly point is: To be designated prior to work so a head count can be taken in the event of an evacuation.

Sanitation and Decontamination
As required, all equipment (trucks, field equipment, heavy machinery, etc.) shall be decontaminated prior to exiting the work zone. Personnel decontamination shall be conducted as needed in accordance with the health and safety section of this plan. All waste soils removed during drilling activities will be placed into drums and will remain on site pending disposal.

Personal decontamination procedure: *Hands and face must be clean prior to eating, drinking, or smoking.*
Location of Wash Water: *Support Zone, or to designated prior to work start.*
Location of toilet: *Support Zone, or to designated prior to work start.*
Location of drinking water: *Support Zone, or to designated prior to work start.*
Equipment Decontamination Procedures: *Steam cleaned or washed with Alconox.*
Materials to be disposed of as Hazardous Waste: *Personal Protective Equipment.*

This hazard assessment is based on available information concerning chemical hazards suspected to be present at the site. The work to be performed will be conducted in accordance with EPA and CAL-OSHA regulations and Alameda County requirements.

Emergency Services
If an emergency should occur on-site, the Emergency System (911) should be activated. Two-way communication between the site and the emergency trauma center will be maintained via a portable cellular telephone. Emergency telephone numbers shall be posted on-site and a portable telephone unit made immediately available at all times. These numbers shall include the following:

Emergency

Ambulance	911
Police	911
Poison Control	(800) 662-9886
Valley Memorial Hospital	(925) 373-4018

Non Emergency

Alameda County Fire Station	(925) 551-6868
Livermore Police Dept.	(925) 371-4797
National Response Center	(800) 424-8802

Emergency/Contingency Plans and Procedures

In case of a medical emergency, transport the injured person to the emergency room at Valley Memorial Hospital. Directions are as follows: start on Holmes St. toward 2nd St. for 0.1 miles followed by a right onto Murrieta Blvd. After 0.2 miles turn right on E. Stanley Blvd. and follow for 0.1 miles to 1133 E. Stanley Blvd. If required, summon emergency medical personnel by dialing 911. The project manager will remain in view of all field activities, and he will inform site personnel of a change in activities.

Key Safety Personnel and Responsibilities

Project Manager

The Allterra Project Manager is the SSO. The SSO will ensure that site personnel have proper protective equipment available, that specific site hazards are noted, and that personnel have knowledge of the nearest hospital location. The site safety officer can stop work at the subject site upon determination that an eminent health or safety hazard exists. If a stop-work order is issued, Allterra will take appropriate steps to remedy the situation and resume site activities. Allterra's Project Manager is responsible for directing all project operations. The Project Manager is also responsible for ensuring that the safety personnel are given free access to all relevant site information that could impact health and safety. The project manager will remain in view of all field activities, and he will inform site personnel of a change in activities.

Employees

All Allterra employees working at the site are responsible for reading and understanding the HASP. Other subcontractors at the site are responsible for providing their own HASPs, which must incorporate, at a minimum, Allterra's HASP. As described above, Allterra's SSO has the authority to ensure that subcontractor employees are following the Allterra Health and Safety Plan provisions.

Site Safety Briefing Procedures (Tailgate Meeting):

All field personnel from Allterra and the subcontractors must attend a safety orientation meeting prior to commencing field activities. The meeting will be scheduled and conducted by the SSO and is to include an overview of the site history, the potentially hazardous compounds, their potential mode of ingress into the body, protective equipment requirements, and emergency response equipment. All individuals who do not have respirators and who may be required to

wear them, will not be allowed on the site until they are provided with and fit tested for respirators by their respective employers.

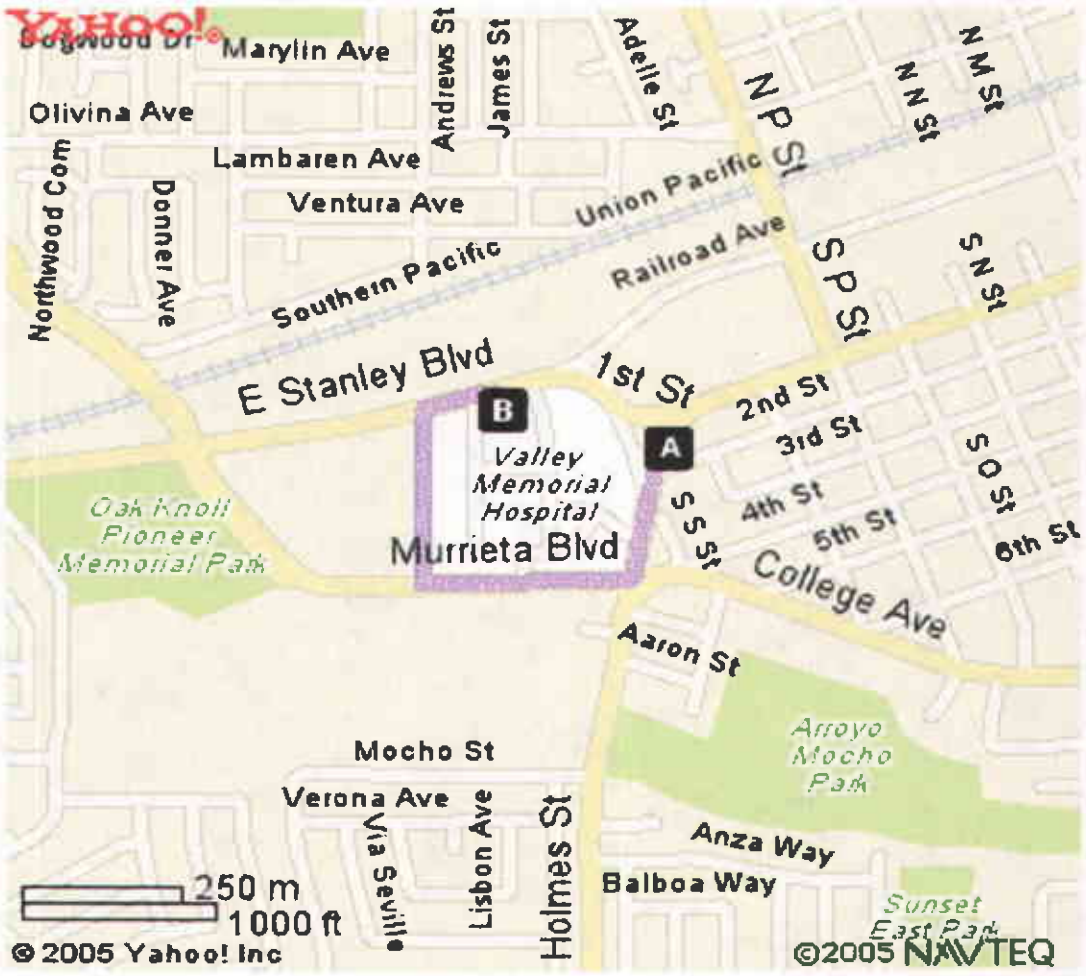
A tailgate meeting will be held every morning before the start of work and is to be attended by all personnel on-site. The purpose of the meeting is to discuss the days work, potential hazards, and specific health and safety procedures to be utilized during the day.

Sign-Off

I have read the HASP and fully understand the hazards associated with the following job:
160 Holmes St., Livermore , CA 94551

I will comply with the minimum safety requirements set forth in the HASP. I agree to notify the responsible employee of Allterra should any unsafe acts be witnessed by me while I am on-site.

Print Name	Signature	Date



Hospital Location Map
160 Holmes Street, Livermore, California

APPENDIX C

Site Investigation and Groundwater Monitoring Field Protocol

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Geoprobe Boring Installations and Sampling: A truck-mounted Geoprobe rig hydraulically pushes a 4-foot steel core barrel (usually 2.5-inch diameter) equipped with an acetate liner into undisturbed soil. Four-foot core soil samples are collected in the acetate liner. The core barrel is extracted from the boring and the liner is removed. Soil samples from the necessary depth is cut from the acetate liner and capped with Teflon® sheets and plastic caps. The sample is labeled and stored on ice in an ice chest. The remainder of the acetate liner is then cut open and examined for lithology according to the Unified Soil Classification System. Job location, boring location, boring name, date, soil types, observations and activities are recorded on the boring logs. A portion of each sample is field screened using portable photo-ionization detector (PID). The core barrel is decontaminated between each boring. If groundwater samples are not necessary, the hole is filled with a cement grout and bentonite mixture from the bottom of the boring to surface grade.

Once the borings are advanced to the necessary depth, water samples are collected using a clean stainless steel bailer. If the boring does not stay open, a temporary well casing and screen is lowered into the boring to aid in water sample collection. Recovered water is transferred into labeled sample containers placed on ice. After the water samples are collected, the temporary well casing and screen are removed from the boring and is filled with a cement grout and bentonite mixture from the bottom of the boring to surface grade.

Monitoring Well Installation/Construction and Soil Sampling: A truck-mounted, hollow-stem auger drill rig is used to drill boreholes for monitoring wells. The borehole diameter is a minimum of 4-inches larger than the outside diameter of the casing when installing well screen. The hollow-stem auger provides minimal interruption of drilling while permitting soil sampling at desired intervals. An Allterra geologist or engineer will continuously log each borehole during drilling and will constantly check drill cuttings for indications of both the first recognizable occurrence of groundwater and volatile organic compounds using a portable photoionization detector (PID).

During drilling, soil samples are collected in 2-inch by 6-inch brass sleeves. Three brass tubes are placed in an 18-inch long split-barrel (spoon) sampler of the appropriate inside-diameter. The split-barrel sampler is driven its entire length using a 140-pound hammer, or until refusal. The sampler is extracted from the borehole and the bottom brass sleeve is capped with Teflon® sheets and plastic caps, labeled, and stored on ice. The two other brass sleeves are used for soil lithology classification (according to the Unified Soil Classification System) and field screening using a PID.

All soil borings not converted into monitoring wells are backfilled with a mixture of neat cement with 5% bentonite powder to surface grade.

Monitoring wells are constructed with blank and factory-perforated Schedule 40 polyvinyl chloride (PVC). The perforated interval consists of slotted casing, generally with 0.02-inch wide by 1.5-inch long slots, with 42 slots per foot. A threaded PVC cap is secured to the bottom of the casing. After setting the casing inside the hollow-stem auger, sand or gravel filter material is poured into the annular space to fill from boring bottom to generally 1 to 2 feet above the screened interval. A 1- to 2-foot thick bentonite seal is set above this sand/gravel pack. Neat cement containing approximately 5% bentonite is then tremmied into the annular space from the top of the bentonite plug to approximately 0.5 feet below ground surface. A traffic-rated well box is installed around each wellhead.

Monitoring Well Development: After installation, the wells are thoroughly developed to remove residual drilling materials from the wellbore and fine material from the filter pack. Typically, 10 well volumes are removed from the well and field parameters, such as pH, temperature, and conductivity, are recorded between each well volume. Well development techniques used may include surging, swabbing, bailing, and/or pumping All development water is collected either in drums or tanks for temporary storage, and properly disposed of pending laboratory analytical results. Following development, the well is typically allowed to stand undisturbed for a minimum of 48 hours before its first sampling.

Well Monitoring and Sample Collection: A Teflon bailer or submersible pump was used to purge a minimum of three well volumes of groundwater from each well. After each well volume is purged, field parameters such as pH, temperature, and conductivity are recorded. Wells are purged until field parameters have stabilized or a maximum of 10 well volumes of groundwater have been removed. If the well yield is low and the well was dewatered, the well is allowed to recharge to 80% of its original volume prior to sample collection. Field parameter measurements and pertinent qualitative observations, such as groundwater color and odor, are recorded in Groundwater Sampling Field Logs. Groundwater samples are collected in appropriate bottles and stored on ice for delivery, under chain-of-custody documentation, to a state-certified laboratory for analysis.

Sample Identification and Chain-Of-Custody Procedures: Each sample container submitted for analysis is labeled to identify the job number, date, time of sample collection, a sample number unique to the sample, any in-field measurements made, sampling methodology, name(s) of on-site personnel, and any other pertinent field observations also recorded on the field excavation or boring log. During shipment, the person with custody or the samples will relinquish them to the next person by signing the chain-of-custody form(s) and noting the date and time.

Equipment Decontamination: All drilling, sampling, well construction, and well development equipment is cleaned in a solution of laboratory grade detergent and distilled water or steam cleaned before use at each sampling point.

Field Personnel: During groundwater sampling activities, sampling personnel will wear pertinent attire to minimize risks to health and safety. Field personnel will also use a pair of clean, powderless, surgical gloves for each successive sampling point. Used surgical gloves will be placed into waste drums for future disposal.

Waste Disposal: Soil generated during drilling will be stored in DOT-approved 55-gallon waste drums pending proper disposal. Water generated during well development, purging, and sampling activities will be placed into DOT-approved 55-gallon waste drums pending proper disposal and/or permitted discharge to the sanitary sewer.