ALLCAL ENVIRONMENTAL

GROUNDWATER MONITORING WELL INSTALLATION WORK PLAN

L&D SCAFFOLD, INC.
1420 162ND AVENUE
SAN LEANDRO, CA 94578

July 22, 2000

Prepared By:

ALLCAL Environmental
27973 High Country Drive
Hayward, CA 94542

John V. Mrakovich, Ph.D., R.G.

REGISTERED GEOLOGIST
JOHN V MRAKOVICH
4665
EXP. 4/02
STATE OF CALIFORNIA

Fax

To: eva chu

Of: ALAMEDA COUNTY HEALTH AGENCY

Fax: 337-9335

Pages: 2, including this cover sheet.

Date: July 25, 2000

RE: Proposed Groundwater Monitoring Well Locations, L&D Scaffold, Inc., 1420 162nd Avenue, San Leandro, CA

Dear Ms. chu:

Per our telephone conversation today, attached is a revised SITE PLAN showing new locations for the three proposed groundwater monitoring wells at the above referenced site.

Only slight revisions have been made to the proposed locations of wells MW-1 and MW-2 and the rationale for their locations remains basically unchanged from that presented in ALLCAL's July 22, 2000, GROUNDWATER MONITORING WELL INSTALLATION WORK PLAN. Well MW-1 has been relocated closer to former boring SB-2 which detected highest dissolved MTBE concentrations to date. Well MW-2 has been relocated to the westerly corner of the property to measure dissolved MTBE concentrations at an estimated down/cross-gradient location (with respect to direction of groundwater flow from the former fuel dispenser area).

The proposed location for well MW-3 has been moved from an estimated up-gradient location (southeasterly property boundary) to an estimated down/cross-gradient location (northerly corner of property). A well at this location will provide a second measure of dissolved MTBE concentrations in a probable down or cross-gradient location (with respect to direction of groundwater flow from the former fuel dispenser area).

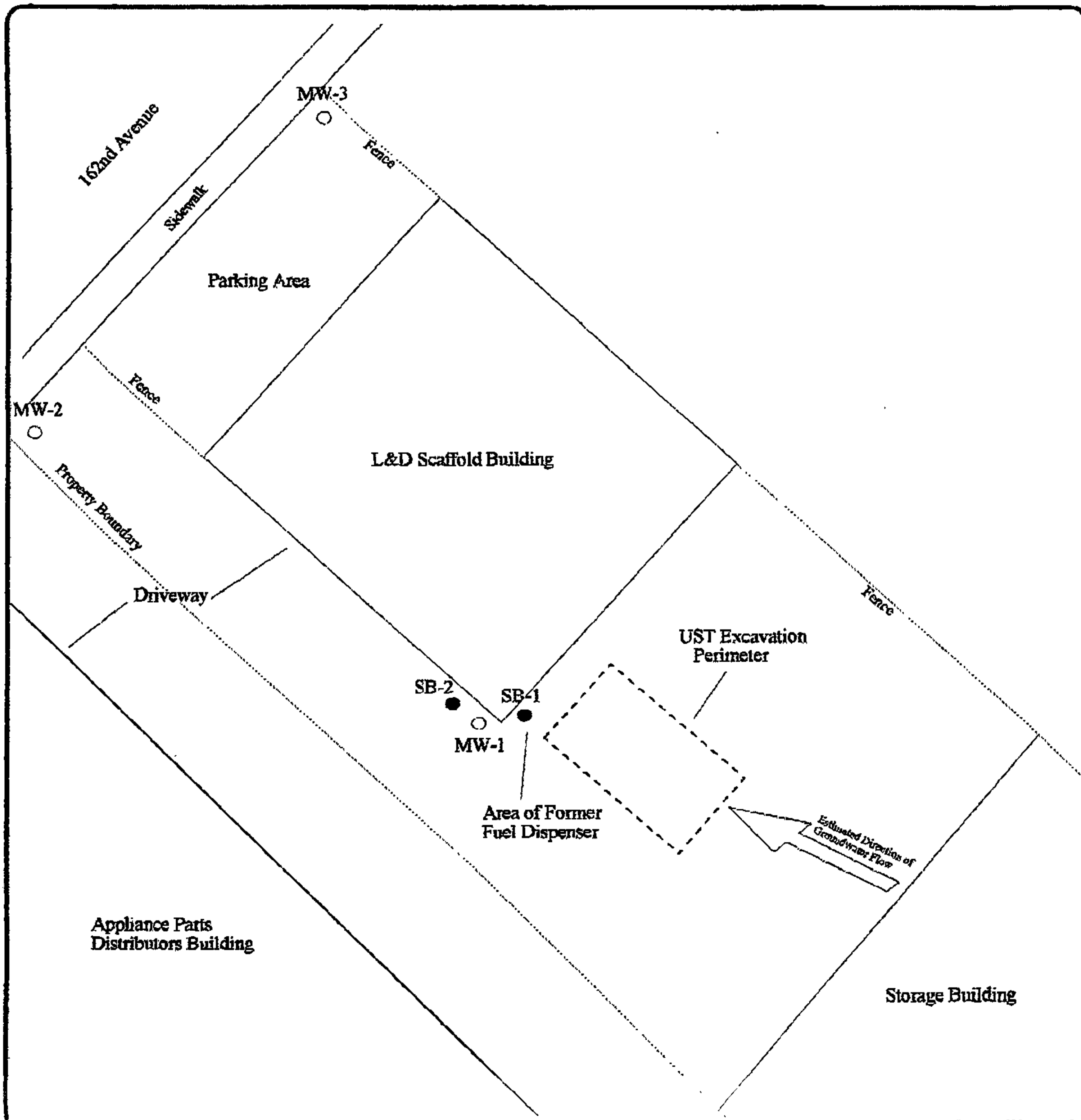
Please call if you have any questions.

John Macdonald

Cc: Betty Puckett (276-9218)

From the desk of ..

ALLCAL Environmental
27973 High Country Drive
Hayward, CA 94542
510-581-2320
Fax: 510-581-8490



Legend

SB-1
● Name and Location of Soil Boring

MW-1
○ Proposed Name and Location of Monitoring Well

0 20
Approximate Scale (ft)

N

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FIGURE 2

SITE PLAN

L&D SCAFFOLD, INC.
1420 162nd AVENUE
SAN LEANDRO, CA 94578

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APPENDICES

1.0 INTRODUCTION

ALLCAL Environmental (ALLCAL) is pleased to submit this proposed GROUNDWATER MONITORING WELL INSTALLATION WORK PLAN (WP) for 1420 162nd Avenue in San Leandro, California, (Figure 1) on behalf of Mr. Don Puckett and Ms. Betty Puckett (Client/property owners) of L&D Scaffold, Inc. The Alameda County Health Care Services Agency (ACHCSA) required this WP in a May 23, 2000, letter (Appendix A). This WP was written by John V. Mrakovich, a California registered geologist (No. 4665) for ALLCAL.

The project site is occupied by one two-story building used for office and shop space and a second single story building used for warehousing of scaffolding. The site is bounded to the southwest by by an appliance parts distributor, to the northeast and southeast by apartment complexes and residential property, and to the northwest by 162nd Avenue.

Until recently, the site was used to operate a business that rented and erected scaffolding. The scaffolding business is now closed and the site is for rent.

2.0 HYDROGEOLOGIC SETTING

The following discussion of regional hydrogeology is taken in part from *GEOHYDROLOGY AND GROUNDWATER-QUALITY OVERVIEW, EAST BAY PLAIN AREA, ALAMEDA COUNTY, CALIFORNIA*, 205 (j) Report, Kelvin Hickenbottom and Kenneth Muir, June 1988, and *HYDROGEOLOGY OF CENTRAL SAN LEANDRO*, Woodward-Clyde Consultants, December, 1993.

2.1 Regional Hydrogeology

The site is located in the East Bay Plain of the Coast Ranges physiographic province. The East Bay Plain is an area of flat alluvial lowlands and bay and tidal marshes lying between the bedrock hills of the Diablo Range to the east and San Francisco Bay to the west. Near the site area, the eastern boundary of the plain is located along the Hayward fault which is at the base of the Diablo Range escarpment, about 2,000 feet to the northeast.

The East Bay Plain and San Francisco Bay are the result of a structural downwarp that received sediments for much of Pleistocene time, a period that extends from about 2 million years ago until about 10,000 years ago. The degree of downwarping has varied considerably across the two areas. Consequently, some local areas have a thin sedimentary fill and others have relatively thick sedimentary fill. In San Leandro, significant downwarping has occurred and sedimentary fill may exceed about 1,000 feet in thickness in some areas.

Beneath the sediments are consolidated bedrock whose upper surface is the floor of the structural downwarp. The bedrock is Jurassic, Cretaceous, and Tertiary in age and consists of sandstone, conglomerate, shale, chert, and serpentine with some volcanic rocks. This bedrock also comprises the hills (East Bay Hills)east of the Hayward fault that are part of the Diablo Range.

Sedimentary fill in the San Leandro area was mostly derived from the East Bay Hills. Toward the bay, some fill consists of estuarine and marine deposits. Based on well driller's logs, the sedimentary fill has been divided into "older alluvium" and "younger alluvium." "Younger alluvium in this report will include the Merritt Sand, bay mud, interfluvial basin deposits, and fluvial deposits.

In general, the "older alluvium"is present beneath all of the East Bay Plain and extends under San Francisco Bay. The "older alluvium" is Pleistocene in age and consists of clay, silt, sand, and gravel that was deposited as alluvial fans extending from the East Bay Hills. This sediment is a major groundwater reservoir in the East Bay Plain and may locally reach a thickness of about 1,000 feet. Wells in the "older alluvium" produce sufficient amounts of groundwater for irrigation, industrial, and municipal use.

The "younger alluvium" overlies the "older alluvium" and, with the exception of the Merritt Sand, is still being deposited. These sediments are Pleistocene, Holocene, and Recent in age and have been deposited as beach and near-shore sediments, peat beds, bay and estuarine deposits, and fluvial and flood plain deposits. They may locally reach a thickness of about 150 feet. These sediments are a minor source of groundwater, mostly sufficient for domestic use (lawn and garden irrigation and other non-potable uses) because much of the permeable "younger alluvium" lies above the zone of saturation.

Groundwater flow in aquifers of both the "older and younger alluvium" is generally westerly toward San Francisco Bay; the gradient may vary locally.

2.2 Site Geology and Hydrogeology

The site is located in Township 3 South, Range 2 West, Section 6 of the Hayward, California 7.5-Minute Series, Topographic Quadrangle Map (Figure 1) at an elevation of about 35 feet above mean sea level (MSL). Surface sediments are "younger alluvium" and Holocene in age. Regional topographic gradient is southwesterly; however, at the site the local gradient is northwesterly with a slope of about .0056 feet per foot. San Lorenzo Creek is about 4,500 feet south of the site, San Francisco Bay, the nearest topographically down-gradient surface water, is about 17,000 feet southwest of the site, and Lake Chabot is about 8,000 feet north-northeast of the site. No other significant bodies of nearby surface water are known.

Groundwater, at the site, was encountered during UST removal activities at a depth of about 8 feet below grade and in a soil boring conducted by ALLCAL (see 3.0 BACKGROUND) at a depth of about 12 feet below grade. Direction of groundwater flow has not been determined at the site. Based on topographic gradient and information provided by the ACHCSA on groundwater flow at nearby sites, direction of groundwater flow at the site is estimated to be northwesterly.

3.0 BACKGROUND

The following discussion is summarized from: (1) information provided by the Client, (2) a November 3, 1999, UST REMOVAL REPORT, L&D SCAFFOLD, INC., 1420 162ND AVENUE, SAN LEANDRO, CA, prepared by Environmental Bio-Systems, Inc. (EBS), and (3) an April 20, 2000, REPORT OF PRELIMINARY SITE ASSESSMENT, L&D SCAFFOLD, INC., 1420 162ND AVENUE, SAN LEANDRO, CA, prepared by ALLCAL.

3.1 Site Ownership and UST History

Don and Betty Puckett have owned the subject property since about 1980. Prior to their ownership, Mr. and Ms. Puckett rented the property for about 25 years. During their occupancy, the property has been used as a business that rents and erects scaffolding. The property is used for storing scaffolding.

A 7,500-gallon UST was installed in about 1979 to service company vehicles. The UST was used until Spring 1999.

3.2 UST Closure

On October 25, 1999, a 7,500-gallon, gasoline, single-walled steel UST; appurtenant piping; and dispenser were removed by EBS. The UST and dispenser were located outside the southwestern corner of the site's two-story building (Figure 2). Examination of the UST, after its removal, revealed the tank was in excellent condition with no rust or corrosion visible on the outer surface. The tank had an intact tar wrapping.

During removal of the piping, mild hydrocarbon odor was detected directly beneath a joint located between the dispenser and the UST.

Soil samples were collected for chemical analyses from the northerly sidewall and southwestern corner of the excavation immediately above groundwater; at a depth of about 7 feet below grade. A soil sample was also collected for analysis from beneath the apparent leaky pipe joint discussed above; at a depth of about 1.5 feet below grade. The soil sample collected from the northerly sidewall detected only total petroleum hydrocarbons as gasoline (TPHG), methyl tert-butyl ether (MTBE), and total lead [at concentrations of 2.5 parts per million (ppm), 2.5 ppm, and 10 ppm, respectively]. The soil sample collected from the southwesterly corner detected only MTBE and total lead (at a concentration of 0.037 ppm and 9.1 ppm, respectively). The soil sample collected from beneath the piping detected only TPHG, benzene, MTBE, and total lead (at concentrations of 28 ppm, 2.2 ppm, 28 ppm, and 11 ppm, respectively). The laboratory noted the TPHG concentration in the above samples included the MTBE concentration.

During tank removal activities, water was encountered in the excavation at a depth of about 8 feet below grade. The water was sampled twice for chemical analyses, once prior to UST removal on

October 25, 1999, and once after the tank was removed and the excavation was de-watered for backfilling on October 26, 1999. For the second sampling event, only TPHG, toluene, xylenes, and MTBE were detected [at concentrations of 1,300 parts per billion (ppb), 2.1 ppb, 1.6 ppb, and 1,300 ppb, respectively]. The laboratory noted the TPHG concentration included the MTBE concentration. Because of the concentrations of TPHG and MTBE detected in the above soil and groundwater samples, the ACHCSA requested a Preliminary Site Assessment (PSA) to delineate the extent of soil and groundwater contamination at the site.

3.3 ALLCAL March 28, 2000, PSA

On March 28, 2000, ALLCAL drilled two Geoprobe soil borings (SB-1 and SB-2) to further investigate TPHG and MTBE contamination in the soil and groundwater (Figure 2).

Boring SB-1 was drilled at the location of the former dispenser to further evaluate soil contamination from the apparent leaky pipe joint observed at the time of the UST removal and to evaluate potential leakage of the dispenser.

Boring SB-2 was drilled about 15 feet in the estimated down-gradient direction (northwesterly) of groundwater flow from the former UST excavation to further evaluate the extent of groundwater contamination detected in water in the excavation at the time of UST removal. Also, this boring was used to further evaluate the extent of soil contamination detected beneath the leaky pipe joint near the dispenser at the time of the UST removal.

Results of soil chemical analyses detected TPHG and some BTEX chemicals only in boring SB-1 at the depth of 3 feet. TPHG, benzene, toluene, and xylenes were detected at concentrations of 1.0 ppm, 0.017 ppm, 0.005 ppm, and 0.12 ppm, respectively. MTBE was detected in soil of both borings and ranged up to 17 ppm in boring SB-1 (confirmed by EPA method 8260 at a concentration of 2.8 ppm) and was detected at the concentration of 0.35 ppm in boring SB-2.

Results of groundwater chemical analyses (groundwater collected only from boring SB-2) detected only MTBE and xylenes at concentrations of 16,000 ppb (confirmed by EPA method 8260 at a concentration of 18,000 ppb) and 6.1 ppb, respectively.

Because of the concentrations of MTBE detected in the above groundwater sample, the ACHCSA requested that permanent groundwater monitoring wells be installed on site to assess the MTBE plume. See May 23, 2000, letter in Appendix A.

4.0 PROPOSED GROUNDWATER MONITORING WELL INSTALLATIONS

For installation of groundwater monitoring wells, ALLCAL proposes the following scope of work:

- Obtain a well installation permit from the Alameda County Public Works Agency (ACPWA).

- Mark the location of each well on the ground with white paint and notify Underground Service Alert (USA). Subcontract an underground utility locator to "clear" each location of underground utilities.

- Drill 3 soil borings for installing groundwater monitoring wells.

- Collect soil samples from each boring at approximately 5-foot depth intervals, changes in lithology, and occurrence of apparent soil contamination for construction of boring logs. No soil samples are proposed to be collected for chemical analyses.

- Convert each boring into a 2-inch diameter-casing, polyvinyl chloride (PVC), groundwater monitoring well.

- Survey the elevation of top-of-casing (TOC) of each well relative to MSL.

- Develop, purge, and sample groundwater from each well.

- Analyze the groundwater samples and 1 trip blank sample for TPHG, BTEX, and MTBE.

- Prepare a report.

Details of the proposed scope of work are presented below.

4.1 Pre-drilling Activities

Before commencing drilling activities, ALLCAL will: (1) obtain a well installation permit from the ACPWA, (2) visit the site to mark the proposed groundwater monitoring well locations in white paint, (3) contact USA and subcontract an underground utility locator to "clear" each location, and (4) notify the ACHCSA.

4.2 Rationale for Well Locations

Proposed well locations (Figure 2) are based on estimated direction of groundwater flow and the location of the removed leaky piping which is the apparent source of MTBE contamination to the groundwater. Well MW-1 is proposed to be installed at the approximate location of the removed leaky piping observed during UST removal activities; a well at this location will monitor MTBE groundwater concentrations at the apparent source. Well MW-2 is proposed to be installed at the northwesterly end of the driveway; a well at this location is estimated to be down-gradient of the apparent MTBE source and will evaluate the on-site down-gradient extent of the MTBE groundwater plume. Well MW-3 is proposed to be installed near the southeasterly corner of the site; a well at this location will provide a third datum for groundwater elevation needed to measure direction of groundwater flow and will provide an estimate up-gradient groundwater sample to evaluate the on-site up-gradient extent of the MTBE groundwater plume. A well at this location may also evaluate the potential of up-gradient, off site, MTBE contamination flowing onto the site.

4.3 Soil Boring and Sampling Procedures

The exploratory boring for each monitoring well will be drilled by a State of California licensed water well driller (C-57 Water Well Driller contractor's license) using 8-inch diameter, hollow-stem, auger drilling equipment. The augers will be steam-cleaned before drilling each boring to minimize the potential of cross-contamination between borings or introducing offsite contamination to the initial boring. Representative soil samples will be collected at approximately 5-foot depth intervals below the ground surface, at changes in lithology, and the occurrence of apparent hydrocarbon contamination by advancing a Standard Penetration sampler (this type sampler will be used because no collection of soil samples for chemical analyses is proposed in this WP) into the undisturbed soil beyond the tip of the augers. The sampling equipment will be cleaned before each sampling event by washing with a non-phosphate solution and rinsing in tap water.

Drill cuttings will be stored on site, contained in 55-gallon steel drums. The stored cuttings will be labeled to show contents, date stored, suspected contaminant, date of removal, company name, contact person, and telephone number. Disposal of the cuttings is the Client's responsibility. ALLCAL can provide recommendations and, upon the Client's request, assist in disposal of the cuttings in an appropriate manner as an additional work item.

Detailed boring logs will be prepared from auger return material and the Standard Penetration sampler. The soil will be logged according to the Unified Soil Classification System by a California Registered Geologist.

Attached Appendices B and C document ALLCAL's protocols relative to hollow-stem auger drilling and soil sampling procedures, and waste handling and decontamination procedures, respectively.

No soil samples are proposed to be collected for chemical analyses:

4.4 Proposed Well Installation Procedure

Based on an estimated depth to groundwater of 12 feet, the exploratory borings are proposed to be drilled to a depth of about 25 feet. Each boring will be converted into a groundwater monitoring well by installing 2-inch diameter, flush-threaded, schedule 40, PVC casing and 0.010-inch machine-slotted screen. The exact depth of each boring and screen length will be determined by the geologic profile, depth of groundwater, and whether the groundwater is confined or unconfined. If groundwater is unconfined, the screen is proposed to extend about 5 feet above and about 10 feet below the water table surface. The length of screen below the water table surface may be less than 10 feet if an aquiclude/aquitard is encountered. If groundwater is confined, the screen length will extend from the upper contact of the aquifer to a maximum depth of 10 feet. If the aquifer is less than 10 feet thick, the screen length will equal the thickness of the aquifer. A sand pack of number 2/12 filter sand will be placed in the annular space from the bottom of the boring to a maximum of 2 feet above the top of the screened interval. Approximately 1-foot of bentonite will be placed above the sand pack followed by a neat cement slurry seal. A traffic rated, bolt-locked, vault box will be set in concrete to protect the well. A water tight locking well cap with lock will be installed on each well casing.

A California licensed professional engineer or land surveyor will survey the elevation of each well's TOC relative to MSL.

Appendix D documents ALLCAL's protocol relative to groundwater monitoring well construction procedures.

4.5 Proposed Well Development Procedure

The monitoring wells will be developed a minimum of 48 hours after well construction is completed. Before development, depth-to-water will be measured from the TOC to the nearest foot using an electronic water level meter. Each well will be checked for floating product using a dedicated polyethylene bailer. If floating product is present, the thickness of product in the bailer will be measured and recorded to the nearest .05-inch and ALLCAL may recommend that removal of floating product should commence as soon as possible.

Each well will be developed by using a development pump and/or by bailing with a PVC bailer until the well is free of sand, silt, and turbidity or no further improvement is observed.

Development water will be stored on site in 55-gallon steel drums labeled to show contents, date filled, contaminant, company name, contact person, and telephone number. Disposal of the drummed water is the Client's responsibility. After the water is characterized by chemical analysis, ALLCAL can provide recommendations and, upon the Client's request, assist in disposal of the fluids in an appropriate manner as an additional work item.

Appendix E documents ALLCAL's protocol relative to groundwater monitoring well development procedures.

4.6 Proposed Groundwater Sampling Procedure

After a minimum of 48 hours after well development, depth to stabilized water will be measured in each well and recorded as discussed above under **4.5 Proposed Well Development Procedure** and the well will be sampled.

Prior to sampling, each well will be purged a minimum of 3 wetted well volumes with a purge pump or dedicated polyethylene bailer. If a purge pump is used, the pump will be decontaminated in a non-phosphate type solution and rinsed in tap water between purging of wells. If dedicated bailers are used for purging, no decontamination will be necessary. Temperature, pH, and electrical conductivity will be monitored and purging will continue until they are stabilized. After purging is completed, water samples will be collected in dedicated polyethylene bailers and decanted into laboratory provided, sterilized glass vials having Teflon-lined screw caps. The vials will be immediately sealed and labeled to include: date, time, sample location, project number, and sampler name. The samples will be immediately stored in an iced-cooler for transport to a Department of Health Services (DHS) certified laboratory accompanied by chain-of-custody documentation.

Appendix F documents ALLCAL's protocol relative to groundwater monitoring well sampling procedures. Appendices G and H document ALLCAL's protocols relative to sample handling procedures and quality assurance and quality control procedures, respectively.

Purge water will be stored on site in labeled 55-gallon drums. After the drummed water is characterized by chemical analysis, ALLCAL can provide recommendations and, upon request, assist the Client in disposal of the fluids in an appropriate manner as an additional work item.

4.7 Proposed Chemical Analyses for Groundwater

The water samples and a trip blank sample are proposed to be analyzed for TPHG, BTEX, and MTBE by DHS Method 8020. If MTBE is detected, the water sample having the highest concentration is proposed to be confirmed for MTBE by EPA Method 8260.

4.8 Groundwater Gradient Evaluation

The groundwater gradient will be evaluated by triangulation. The stabilized depth-to-water in the wells, when subtracted from their respective TOC's, will provide the groundwater elevations on the date measured. From this information, the groundwater gradient and flow direction will be calculated.

4.9 Report

The information collected, analytical results, and ALLCAL's conclusions and recommendations will be summarized in a report. The report will describe the work performed and include: copies of all required permits, a detailed site plan showing location of the installed monitoring wells, graphic boring logs, graphic monitoring well construction details, well development records, well purging and sampling records, a groundwater gradient map, and copies of certified analytical reports and chains-of-custody.

5.0 SITE SAFETY PLAN

See APPENDIX I for the SITE SAFETY PLAN under which this work plan will be implemented.

6.0 TIME SCHEDULE

The projected time schedule for implementation of the activities described in this work plan is presented below. The schedule reflects a relatively problem-free program. However, delays in the work plan review, permitting, or laboratory analyses could lengthen the project schedule. Access difficulties, adverse weather, and regulator review could also delay the proposed time schedule. ALLCAL will make every effort to adhere to the project schedule.

Week 1: Work plan submitted for Regulator Approval.

Week 2: Regulator approval received. ALLCAL applies for drilling permit, subcontracts driller, marks boring locations on the ground and notifies USA, and subcontracts an underground utility locator to "clear" each boring location.

Week 3: ALLCAL installs 3 groundwater monitoring wells and has TOC's surveyed.

Week 4: ALLCAL develops and samples 3 groundwater monitoring wells and submits groundwater samples for chemical analyses.

Week 5: ALLCAL receives water chemical analyses, constructs gradient map, and writes report.

Week 6: ALLCAL submits report to Client.

Legend

U S G S 7.5 Minute Series Topographic Map, Hayward, California, 1959, Photorevised 1980

N

0 2000
Approximate Scale (ft)

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FIGURE 1

SITE LOCATION MAP

L&D SCAFFOLD, INC
1420 162nd AVENUE
SAN LEANDRO, CA 94578

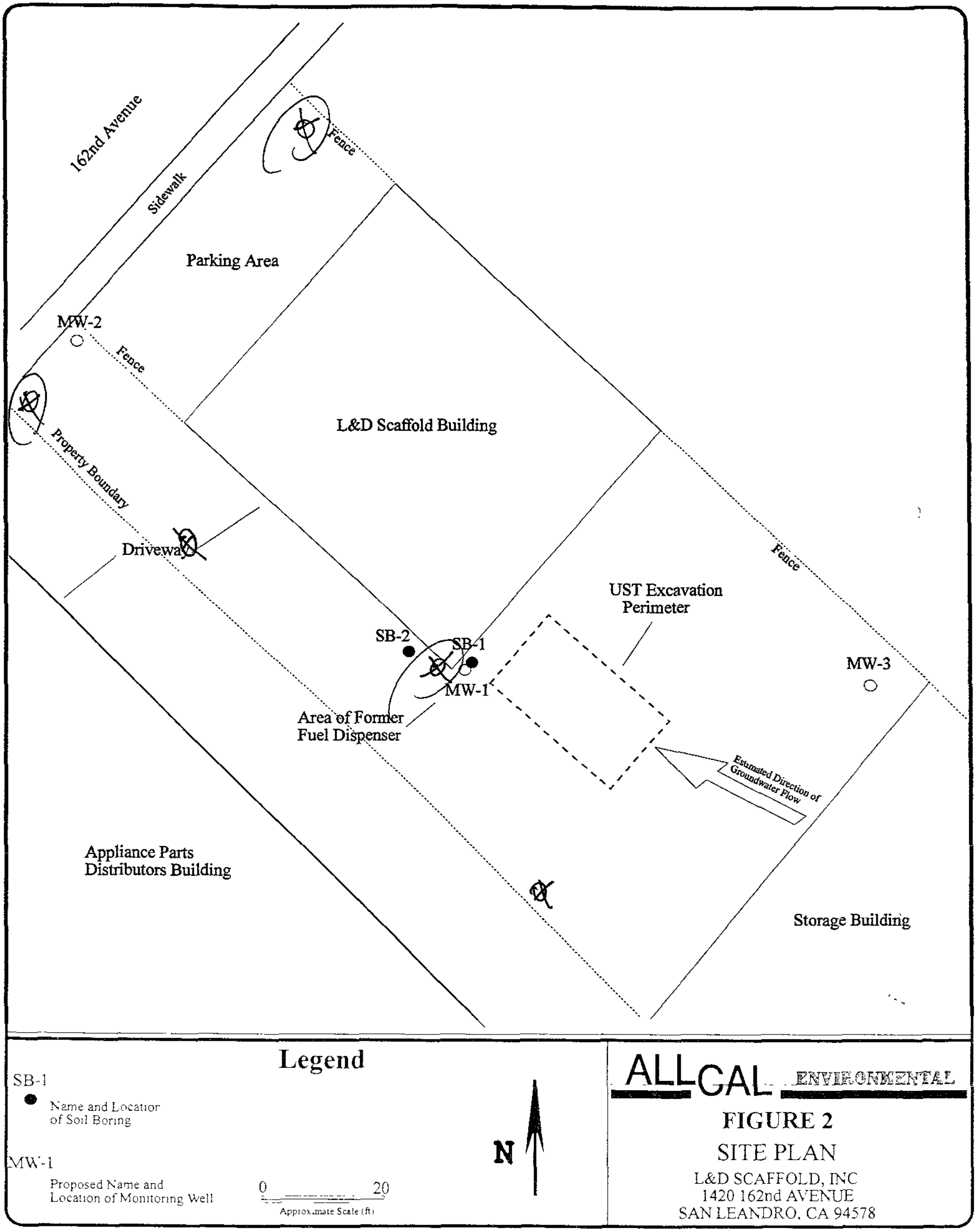

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FIGURE 2

SITE PLAN

L&D SCAFFOLD, INC
1420 162nd AVENUE
SAN LEANDRO, CA 94578

APPENDIX A

ALAMEDA COUNTY HEALTH CARE SERVICES LETTER

StID 6645

May 23, 2000

Mr. Don Puckett
P.O.Box 7237
Clear Lake, CA 95422

Ms. Betty Puckett
L&D Scaffold
1420 162nd Avenue
San Leandro, CA 94578

RE: Groundwater Monitoring Wells for 1420 162nd Avenue, San Leandro, CA

Dear Mr. and Ms. Puckett:

I have completed review of AllCal Environmental's April 2000 *Report of Preliminary Site Assessment* prepared for the above referenced site. That report summarized findings where two soil borings were advanced in the vicinity of the former underground storage tank. Shallow soil samples contained up to 17 parts per million MTBE at 3 feet below ground surface. A grab groundwater sample contained up to 18,000 part per billion MTBE.

At this time, permanent groundwater monitoring wells are required at the site to assess the MTBE plume. A workplan for this next phase of investigation is due within 90 days of the date of this letter, or **by August 14, 2000.**

If you have any questions, I can be reached at (510) 567-6762.

eva chu
Hazardous Materials Specialist

email: John Mrakovich (mrakovich@worldnet.att.net)

l&dscaffold-3

APPENDIX B

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

Undisturbed soil samples will be recovered from soil without introducing liquids into the borings. Soil samples as core or cutting will be taken continuously from ground surface to termination depth, or through the aquifer zone of interest for lithologic logging.

Borings will be drilled with a hollow-stem auger and sampled with a California or modified California-type split-spoon sampler. Soil samples will be of sufficient volume to perform the analyses which may be required, including replicate analyses.

Soil from all borings will be described in detail using the Unified Soil Classification System and will be logged by a geologist, civil engineer, or engineering geologist who is registered or certified by the State of California and is experienced in the use of the Unified Soil Classification System. All wet zones above the free water zone will be noted and logged.

Soil samples will be collected in decontaminated brass or stainless steel sampling tubes in the split-spoon. Sediment traps will be used when unconsolidated sand and gravel fall from the sampler during retrieval. The brass tubes will be cut apart using a clean knife. The ends of the tubes will be covered with a thin sheet of Teflon tape or aluminum foil beneath plastic end caps. The samples will be stored on ice at a temperature of 4 degrees Celsius. In the Alameda County Water District, the samples will be stored on dry ice.

Drill cuttings will be stored on site in 55-gallon drums or covered with plastic sheeting. Analytical results will be submitted immediately to the site owner for determination of appropriate disposal procedures. The soil borings not completed as wells will be backfilled with a cement grout.

APPENDIX C

WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling, or field equipment that comes into contact with soil or groundwater will be decontaminated prior to its use at the site and after each incident of contact with the soil or groundwater being investigated. Decontamination is essential to obtain samples that are representative of environmental conditions and to accurately characterize the extent of soil and groundwater contamination. Hollow-stem auger flights, the drill bit, and all other soil boring devices will be steam-cleaned between the drilling of each boring.

All sample equipment, including the split-spoon sampler and brass or stainless-steel tubes, will be cleaned by washing with trisodium phosphate or Alconox detergent, followed by rinsing with tap water. Where required by specific regulatory guidelines, a nonphosphate detergent will be used.

Waste Handling: Waste materials generated during site characterization activities will be handled and stored as hazardous waste and will be stored on site in appropriately labeled containers. Waste materials anticipated include: excavated soil, drill cuttings, development and purge water, water generated during aquifer testing, water generated during decontamination, and used personnel protection equipment such as gloves and Tyvek. The site owner will be responsible for providing the storage containers and will be responsible for the disposal of the waste materials. Drill cuttings from individual borings will be stored separately in drums or covered by plastic sheeting, and the appropriate disposal procedure will be determined by the site owner following receipt of the soil sample analytical results. Storage containers will be labeled to show material stored, known or suspected contaminant, date stored, expected removal date, company name, contact, and telephone number.

APPENDIX D

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

Casing Diameter: The minimum diameter of well casings will be 2 inches (nominal).

Borehole Diameter: The diameter of the borehole will be a minimum of 4 inches and a maximum of 12 inches greater than the diameter of the well casing.

Shallow (Unconfined Zone) Wells: When groundwater is encountered or known to be within 45 feet of the ground surface, the borehole will be advanced through the aquifer to an underlying competent aquitard. The competency of the aquitard may be tested by sampling 5 feet into the underlying aquitard and backfilling the excess hole with either bentonite pellets or neat cement placed by tremie pipe method. An aquitard found to be less than 5 feet thick, may be assumed to represent a local lens. The screened interval will begin a minimum of 5 feet above the saturated zone and extend the full thickness of the aquifer or no more than 20 feet into the saturated zone, whichever is reached first. The well screen will not extend into the aquitard, nor will the screened interval exceed 25 feet in length.

Deep (Confined Zone) Wells: Any monitoring well to be screened below an upper aquifer will be installed as a double-cased well. A steel conductor casing will be placed through the upper water-bearing zone to prevent aquifer cross-contamination.

The conductor casing will be installed in the following manner: A large diameter borehole (typically 18 inches) will be drilled until it is determined that the first competent aquitard has been reached. A low carbon steel conductor casing will be placed in the borehole to the depth drilled. Centralizers will be used to center the casing in the borehole. The annular space between the conductor casing and the formation will be cement-grouted from bottom to top by tremie pipe method. The grout will be allowed to set for a minimum of 72 hours.

Drilling may continue inside the conductor casing, with a drill bit of smaller diameter than the conductor casing. If additional known aquifers are to be fully penetrated, the procedure can be repeated with successively smaller diameter conductor casings.

The bottom of the well screen in a confined aquifer will be determined by presence or lack of a competent (5 foot) aquitard as described above. The screened interval in a confined zone will extend across the entire saturated zone of the aquifer or up to a length of 20 feet, which ever is less. The screened zone and filter pack will not cross-connect to another aquifer.

Casing Materials: Well casing will be constructed of materials that have the least potential for affecting the quality of the water sample. The most suitable material for a particular installation will depend upon the parameters to be monitored. Acceptable materials include PVC, stainless steel, or low carbon steel.

Casing Joints: Joints will be connected by flush threaded couplers. Organic bonding compounds and solvents will not be used on joints.

Well Screen Slots: Well screen will be factory slotted. The size of the slots will be selected to allow sufficient groundwater flow to the well for sampling, minimize the passage of formation materials into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

Casing Bottom Plug: The bottom of the well casing will be permanently plugged, either by flush threaded screw-on or friction cap. Friction caps will be secured with stainless steel set screws. No organic solvents or cements will be applied.

Filter Pack Material: Filter envelope materials will be durable, water worn, and washed clean of silt, dirt, and foreign matter. Sand-size particles will be screened silica sand. Particles will be well rounded and graded to an appropriate size for retention of aquifer materials.

Bentonite Seal Material: Bentonite will be pure and free of additives that may effect groundwater quality. Bentonite will be hydrated with clean water.

Grout Seal Material: Cement grout will consist of a proper mixture if Type 1/11 Portland cement, hydrated with clean water. Up to 3% bentonite may be added to the mixture to control shrinkage.

Decontamination: All downhole tools, well casings, casing fittings, screens, and all other components that are installed in the well will be thoroughly cleaned immediately before starting each well installation. When available, each component will be cleaned with a high temperature, high pressure washer for a minimum of five minutes. When a washer is not available, components will be cleaned with water and detergent or tri-sodium phosphate, rinsed in clean water, than rinsed in distilled water.

Soil and water sampling equipment and material used to construct the wells will not donate to, capture, mask, nor alter the chemical composition of the soil and groundwater.

Drilling Methods: Acceptable drilling methods include solid and hollow-stem auger, percussion, direct circulation mud and air rotary, and reverse rotary. The best alternative is that which minimizes the introduction of foreign materials or fluids. If drilling fluid is employed, drilling fluid additives will be limited to inorganic and non-hazardous compounds. Compressed air introduced to the borehole will be adequately filtered to remove oil and particulates.

Casing Installation: The casing will be set under tension to ensure straightness. Centralizers will be used where necessary to prevent curvature or stress to the casing

Sand Pack Installation: The sand pack will be installed so as to avoid bridging and the creation of void spaces. The tremie pipe method will be used where installation conditions or local regulations require. Drilling mud, when used, will be thinned prior to pack placement. The sand pack will cover the entire screened interval and rise a minimum of two feet above the highest perforation.

Bentonite Seal Placement: The bentonite seal will be placed by a method that prevents bridging. Bentonite pellets can be placed by free fall if proper sinking through annular water can be assured. Bentonite slurry will be placed by the tremie pipe method from the bottom upward. The bentonite seal should not be less than 1 foot in thickness above the sand pack.

Grout Seal Placement: The cement grout mixture will be hydrated with clean water and thoroughly mixed prior to placement. If substantial groundwater exists in the bore hole, the grout will be placed by tremie pipe method from the bottom upward. In a dry borehole, the grout may be surface poured. Grout will be placed in one continuous lift and will extend to the surface or to the well vault if the wellhead is completed below grade. A minimum of 5 feet of grout seal will be installed, unless impractical due to the willow nature of the well.

Surface Completion: The wellhead will be protected from fluid entry, accidental damage, unauthorized access, and vandalism. A watertight cap will be installed on the well casing. Access to the casing will be controlled by a keyed lock.

Wellheads completed below grade will be completed in a concrete and/or steel vault, installed to drain surface runoff away from the vault.

Well Identification: Each well will be identified by well number, owner, and type of installation. Construction data, including depth, hole and casing diameter, and screened interval will be noted.

APPENDIX E

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

INTRODUCTION

Newly installed groundwater monitoring wells will be developed to restore natural hydraulic conductivity of the formation, remove sediments from well casing and filter pack, stabilize the filter pack and aquifer material, and promote turbidity-free groundwater samples.

Wells may be developed by bailing, mechanical pumping, air lift pumping, surging, swabbing, or an effective combination of methods. Wells will be developed until the water is free of sand, silt, and turbidity or no further improvement is achieved.

In some cases where low permeability materials are involved or the drilling mud used fails to respond to cleanup, initial development pumping may immediately dewater the well casing and thereby inhibit development. When this occurs, clean, potable grade water may be introduced into the well, followed by surging of the introduced waters with a surge block. This operation will be followed by pumping. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals will set and cure not less then 24 hours prior to well development.

Decontamination: All well development tools and equipment will be thoroughly cleaned immediately before starting each well installation. When available, each component will be cleaned with a high temperature, high pressure washer for a minimum of five minutes. When a washer is not available, components will be cleaned with clean water, then rinsed with distilled water.

Development equipment will not donate to, capture, mask, nor alter the chemical composition of the soils and groundwater.

Introduction of Water: Initial development of wells in low permeability materials may dewater the casing and filter pack. When this occurs, clean, potable water will be introduced into the well to enhance development.

Bailing: Development will begin by bailing to remove heavy sediments from the well casing. Care will be taken to not damage the well bottom cap during lowering of the bailer.

Surging: Care will be exercised when using a surge block to avoid damaging the well screen and casing. When surging wells screened in coarse (sand/gravelly) aquifers, the rate of surge block lifting will be slow and constant. When surging wells screened in fine (silty) aquifers, more vigorous lifting may be required. Between surging episodes, wells will be bailed to remove accumulated sediments.

Pumping: Development pumping rates will be less than the recharge rate of the well in order to avoid de-watering.

Discharged Water Containment and Disposal: All water and sediment generated by well development will be stored in 55-gallon steel drums. Development water will be temporarily contained on site, pending sampling and laboratory analysis. All hazardous development water will be transported off site by a licensed transporter to a hazardous waste disposal or treatment facility. No hazardous development water will be released to the environment.

APPENDIX F

GROUNDWATER SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 48 hours after well development. Groundwater samples will be obtained using either a bladder pump, a clear Teflon bailer, or a dedicated polyethylene bailer. Prior to sampling, sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after three to five wetted casing volumes of groundwater have been evacuated and after the ALLCAL sampling team leader determines that water representative of the formation is being obtained. The well will be purged until conductivity has been stabilized (three consecutive conductivity reading within 15% of one another). If the well is emptied before four to ten well volumes are removed, the sample will be taken when the water level in the well recovers to 80% of its initial water level or better.

ALLCAL will also measure the thickness of any floating product in the monitoring wells using a probe or clear bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, ALLCAL will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples will be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No.233, Page 69544, Table 1l) for the type of analysis to be performed.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	Units
Electrical Conductivity	Umhos
Temperature	Degrees F or C
Depth to Water	Feet/Tenths
Volume of Water Discharged	Gallons

Documentation: All parameter measurements will be documented in writing on ALLCAL development logs.

APPENDIX G

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination and will be delivered to the laboratory in an iced-cooler. Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers.

Samples will be stored in iced-coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory. Ice, blue ice, or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to cool samples during transport to the laboratory. Water samples will be cooled with crushed ice. In the Alameda County Water District, water samples will be buried in the crushed ice with a thermometer, and the laboratory will be requested to record thermometer temperature at the time of receipt.

Each sample will be identified by affixing a label on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection, and the collector's initials.

Soil samples collected in brass or stainless-steel tubes will be preserved by covering the ends with Teflon tape and capping with plastic end-caps. The tubes will be labeled, sealed in quart-size bags, and placed in an iced-cooler for transport to the laboratory.

All groundwater sample containers will be pre-cleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory. All sample transfers will be documented in the chain-of-custody. All field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician or professional who has been designated as being responsible for sample shipment to the appropriate laboratory. The custody record will include the following information: site identification, name of person collecting the sample(s), date and time sample(s) were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used, and signature of the person relinquishing samples to another person with the date and time of transfer noted.

APPENDIX H

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling, and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples, and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits, and proper sample preservation and holding times also provide assurance of accurate analytical data.

A quality assurance and quality control (QA/QC) program may be conducted in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples may be taken in the field to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip blanks, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and laboratory analysis. They are water samples that remain with the collected samples during transportation and are analyzed along with the field samples to check for residual contamination. Analytically confirmed organic-free water will be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blanks will be numbered, packaged, and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water sample is poured into appropriate containers to simulate actual sampling conditions. Contamination due to air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of trip and field blanks, and false identifying numbers will be put on the labels.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by performing QC tests designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and the United States Environmental Protection Agency-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and the observance of good laboratory practices.

APPENDIX I

SITE HEALTH AND SAFETY PLAN

Site: **L&D Scaffold, Inc.**
1420 162nd Avenue
San Leandro, CA 94578

Plan Prepared by: **John Mrakovich** Date: **7/22/00**

1.0 KEY PERSONNEL AND RESPONSIBILITIES

Project Manager:	**John Mrakovich**	**(510) 582-2320**
Site Safety Manager:	**John Mrakovich**	
Alternate Site Safety Manager:	**N/A**	
Field Team Members:	**N/A**	

Agency Reps: **Alameda County Health Care Services Agency** **(510) 567-6783**

2.0 JOB HAZARD ANALYSIS

2.1 OVERALL HAZARD EVALUATION

Hazard Level: High ( ) Moderate ( ) Low (X) Unknown ( )
Hazard Type: Liquid (X) Solid (X) Sludge ( ) Vapor/Gas (X)

Known or suspected hazardous materials present on site:

Gasoline Chemicals.

Characteristics of hazardous materials included above (complete for each chemical presents):

Corrosive ( ) Ignitable ( ) Toxic (X) Reactive ( )
Volatile (X) Radioactive ( ) Biological Agent ( )

Exposure Routes: Inhalation (X) Ingestion (X) Contact (X)

2.2 JOB-SPECIFIC HAZARDS

For each labor category specify the possible hazards based on information available (eg., Task-driller, Hazards-trauma from drill rig accidents, etc.). For each hazard, indicate steps to be taken to minimize the hazard.

Driller/Helper/Geologist-Trauma from drilling rig accidents- wear hard hat, gloves, steel-toed boots.

The following additional hazards are expected on site (i.e., snake infested area, extreme heat, etc.):

Temporary open boreholes.

Measures to minimize the effects of the additional hazards are:

Protect with barricades, caution tape, or traffic cones when unattended.

3.0 MONITORING PLAN

3.1 (a) Air Monitoring Plan

Action levels for implementation of air monitoring. Action levels should be based on published data available on contaminants of concern. Action levels should be set by persons experienced in industrial hygiene.

Level (i.e., .5 ppm)	Action Taken (i.e., commence perimeter monitoring)
5 ppm	**Stop work and monitor until air level drops below 5 ppm.**

(b) Air Monitoring Equipment

Outline the specific equipment to be used, calibration method, frequency of monitoring, locations to be monitored, and analysis of samples (if applicable).

If air monitoring is not to be implemented for this site, explain why:

Air monitoring will not be conducted because previous work has not detected any hazardous vapors.

3.2 Personnel Monitoring (Include hierarchy of responsibilities decision making on the site)

N/A

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equipment used by employees for the site tasks and operations being conducted. Be Specific (eg., hard hat, impact resistance goggles, other protective gloves, etc.).

Hard hat, protective gloves (when necessary), steel-toed boots.

5.0 SITE CONTROL AND SECURITY MEASURES

The following general work zone security guidelines should be implemented:

- Work zone shall be delineated with traffic cones.
- Boreholes shall be delineated with traffic cones when drilling and sampling activities are not actually taking place.
- Visitors will not be allowed to enter the work zone unless they have attended a project safety briefing.

6.0 DECONTAMINATION PROCEDURE

List the procedures and specific steps to be taken to decontaminate equipment and PPE.

Wash equipment with a trisodium phosphate or Alconox solution and rinse with clean potable water.

7.0 TRAINING REQUIREMENTS

Prior to mobilization at the job site, employees will attend a safety briefing. The briefing will include the nature of the wastes and the site, donning personal protection equipment, decontamination procedures and emergency procedures.

8.0 MEDICAL SURVEILLANCE REQUIREMENTS

If any task requires a very high personnel protection level (OSHA Level A or B), personnel shall provide assurances that they have received a physical examination and they are fit to do the task. Also personnel will be instructed to look for any symptom of heat stress, heat stroke, heat exhaustion or any other unusual symptom. If there is any report of that kind it will be immediately followed through, and appropriate action will be taken.

9.0 STANDARD OPERATION PROCEDURES

ALLCAL Environmental (ALLCAL) is responsible for the safety of its employees on site. Each contractor shall provide all the equipment necessary to meet safe operation practices and procedures for their personnel on site and be responsible for their safety.

A "Three Warning" system is utilized to enforce compliance with Health and Safety procedures practices which will be implemented at the site for worker safety:

- Eating, drinking, chewing gum or tobacco, and smoking will be allowed only in designated areas.
- Wash facilities will be utilized by workers in the work areas before eating, drinking, or use of the toilet facilities.
- Containers will be labeled identifying them as waste, debris, or contaminated clothing.
- All drilling work will comply with regulatory agency requirements.
- All site personnel will be required to wear hard hats and advised to take adequate measures for self protection.
- Any other action which is determined to be unsafe by the site safety officer will be taken.

10.0 CONFINED SPACE ENTRY PROCEDURES

No one is allowed to enter any confined space operation without proper safety measures. Specifically in case of an excavated tank pit no one should enter at any time.

11.0 EMERGENCY RESPONSE PLAN

Relevant phone numbers:

Person	Title/Phone No.
Betty Puckett	Owner (510) 276-9211
John Mrakovich	Project Manager (510) 581-2320
Fire	911
Police	911
Ambulance	911

HEALTH AND SAFETY COMPLIANCE STATEMENT

I have received and read a copy of the project Health and Safety Plan.

I understand that I am required to have read the aforementioned document and have received proper training under the Occupational Safety and Health Act (29 CFR, Part 1910.120) prior to conducting site activities at the site.

____________________ ________________

Signature Date

____________________ ________________

Signature Date

Nearby Hospital:

San Leandro Hospital
13855 East 14th Street
San Leandro, CA 94578
Emergency (510) 667-4545