



Atlantic Richfield Company  
(a BP affiliated company)

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4:13 pm, Sep 02, 2008

Alameda County  
Environmental Health



2 September 2008

Re: Work Plan for Ground-Water Investigation  
Atlantic Richfield Company Service Station #2107  
3310 Park Boulevard  
Oakland, California  
ACEH Case #RO0002526

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct."

Submitted by:

Paul Supple  
Environmental Business Manager

**Work Plan for Ground-Water Investigation**  
Atlantic Richfield Company Station No. 2107  
3310 Park Boulevard, Oakland, California  
ACEH Fuel Leak Case No. RO0002526

Prepared for

Mr. Paul Supple  
Environmental Business Manager  
Atlantic Richfield Company  
P.O. Box 1257  
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Prepared by



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2 September 2008

Project No. 06-08-614

2 September 2008

Project No. 06-08-614

Atlantic Richfield Company  
P.O. Box 1257  
San Ramon, CA 94583  
Submitted via ENFOS

Attn.: Mr. Paul Supple

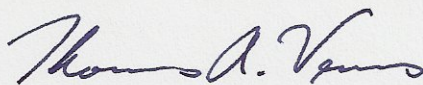
Re: Work Plan for Ground-Water Investigation, Atlantic Richfield Company Station  
No.2107, 3310 Park Boulevard, Oakland, California; ACEH Case No.RO0002526

Dear Mr. Supple:

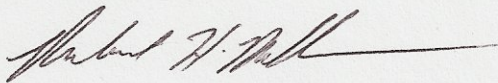
Broadbent & Associates, Inc. (BAI) is pleased to submit this *Work Plan for Ground-Water Investigation* for Atlantic Richfield Company Station No.2107 (herein referred to as Station No.2107) located at 3310 Park Boulevard, Oakland, California (Site). This work plan was prepared in response to a letter request from Alameda County Environmental Health (ACEH) dated 7 July 2008. Specifically, technical comments within the ACEH letter requested a proposal to further evaluate hydrogeologic conditions, including an evaluation to determine whether vertical gradients exist at the Site, as well as delineating the vertical extent of ground-water contamination by Methyl-Tertiary Butyl Ether (MTBE) through ground-water contaminant plume monitoring.

Should you have questions or require additional information, please do not hesitate to contact us at (530) 566-1400.

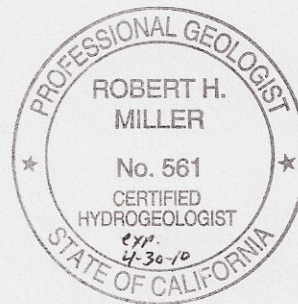
Sincerely,  
BROADBENT & ASSOCIATES, INC.



Thomas A. Venus, P.E.  
Senior Engineer



Robert H. Miller, P.G., C.HG.  
Principal Hydrogeologist



Attachment

cc: Mr. Paresh Khatri, Alameda County Environmental Health (Submitted via ACEH ftp site)  
Electronic copy uploaded to GeoTracker

**WORK PLAN FOR GROUND-WATER INVESTIGATION**  
**Atlantic Richfield Company Station No. 2107**  
**3310 Park Boulevard, Oakland, California**  
**Fuel Leak Case No.RO02526**

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- Drawing 1     Site Vicinity Map
- Drawing 2     Site Map with Proposed Monitoring Well Locations

**APPENDICES**

- Appendix A    Recent Regulatory Correspondence
- Appendix B    Historical Soil and Ground-Water Data (Includes boring logs, geologic cross-sections, boring location maps, and summarized soil and ground-water laboratory analytical results)

**WORK PLAN FOR GROUND-WATER INVESTIGATION**  
**Atlantic Richfield Company Station No. 2107**  
**3310 Park Boulevard, Oakland, California**  
**Fuel Leak Case No.RO02526**

## **1.0 INTRODUCTION**

On behalf of the Atlantic Richfield Company, RM – a BP affiliated company, Broadbent & Associates, Inc. (BAI) has prepared this Work Plan for Ground-Water Investigation for the Atlantic Richfield Company Station No. 2107, located at 3310 Park Boulevard, Oakland, California (Site). This work plan was prepared in response to a letter request from the Alameda County Environmental Health Services (ACEH) dated 7 July 2008. A copy of this letter is provided in Appendix A. Specifically, ACEH technical comments within the 7 July 2008 letter requested a proposal to further evaluate hydrogeologic conditions, including an evaluation to determine whether vertical gradients exist at the Site, as well as delineating the vertical extent of ground-water contamination by Methyl-Tertiary Butyl Ether (MTBE). This work plan includes discussions on the site background and previous investigations, regional and Site geology and hydrogeology, and the proposed scope of work.

## **2.0 SITE BACKGROUND**

The Site is an active ARCO brand gasoline retail outlet located on the southwest corner of Park Boulevard and East 34<sup>th</sup> Street in Oakland, California (Drawing 1 and Drawing 2). The land use in the immediate vicinity of the Site is mixed commercial, residential, and educational. The Site presently consists of a service station building, free-standing canopy over two dispenser islands with four, double-sided pumps and three double-walled fiberglass 12,000-gallon gasoline underground storage tanks (USTs) with associated piping. The majority of the Site is surfaced with asphalt or concrete. The Site was historically leveled by cutting into the hillside on the southern portion of the Site.

On 12 January 1987, contamination by petroleum hydrocarbons was discovered during excavation and removal of a waste-oil UST and three gasoline USTs from the Site. With this discovery, ACEH opened release/leak case number RO651. In a letter dated 11 July 1997, ACEH confirmed that no further action was required at the Site. However, it should be noted that MTBE was not requested or required to be analyzed for prior to the time of closure. Remediation and monitoring infrastructure (nine monitoring wells and one remediation well) were removed from the Site, with the exception of remediation piping which was left under the main driveway. No additional environmental work was completed at the Site until product line removal and upgrade construction activities in October and November of 2002. Historical data prior to closure of ACEH Case No.RO651, including geologic cross-sections, boring location maps, summarized soil and ground-water laboratory analytical results, and remediation system data, are mostly available within the ACEH files. However, due to the dates of completion and incomplete records, soil boring logs could not be located for the various subsurface investigations conducted prior to 1997.

In November 2002, URS oversaw a product line upgrade at the Site. Numerous soil samples were collected during the product line upgrading activities from depths ranging between 3.5 and 7.5 feet bgs. TPH-g was detected above laboratory reporting limits in six of the 20 collected soil samples, including over-excavation samples, at concentrations up to 4,000 mg/kg in sample S-D7. Benzene was detected above laboratory reporting limits in one of the 20 soil samples

collected at a concentration of 0.89 mg/kg in sample S-L2. Toluene, Ethylbenzene, and Total Xylenes were detected above laboratory reporting limits in four of the 20 soil samples collected at concentrations up to 220 mg/kg, 150 mg/kg, and 1,100 mg/kg, respectively, in sample S-D7. MTBE was detected above laboratory reporting limits in 14 of the 20 collected soil samples at concentrations up to 83 mg/kg in sample S-L3.

Two ground-water samples (T-1 and BT-1) were collected during product line replacement activities. Sample T-1 was collected at eight feet bgs from the area underneath Dispenser 8 (S-D8-5) and BT-1, collected from ground water extracted during excavation activities. A water sample (Sump-1) was also collected from the sump for UST1, which appeared to contain free product. Laboratory analysis of sample Sump-1 indicated very high concentrations of TPH-g, BTEX, and MTBE, most likely due to the presence of free product within the sump. TPH-g was detected above the laboratory reporting limit in sample T-1 at a concentration of 4,200 µg/L. BTEX was detected above the laboratory reporting limit in sample T-1 at concentrations of 300 µg/L, 3,200 µg/L, 1,300 µg/L, and 11,000 µg/L, respectively. MTBE was reported above the laboratory reporting limit in both samples T-1 and BT-1 at concentrations of 4,900 µg/L and 1,800 µg/L, respectively. Concentrations discovered during product line replacement activities indicated a potential release. Therefore, an Unauthorized Release Report was issued for the Site on 21 January 2003. Field activities are summarized in the URS *Product Line Removal and Upgrade Soil Sampling Report* dated 31 January 2003. A site map depicting sampling locations and a summary of laboratory analytical data are provided in Appendix B.

Following the Unauthorized Release Report (Fuel Leak Case #RO0002526), the ACEH sent a letter to Atlantic Richfield Company dated 25 April 2003 requesting a soil and ground-water investigation at the Site. URS submitted a *Work Plan for Additional Investigation* on 11 June 2003 proposing the installation of four ground-water monitoring wells on the Site. URS received a voicemail directive from ACEH to complete a soil and ground-water investigation prior to the installation of monitoring wells at the Site. In response, URS submitted an *Addendum to Work Plan for Additional Investigation* on 29 October 2003 proposing 10 soil borings. ACEH requested several modifications to the *Addendum to Work Plan for Additional Investigation* in a letter dated 9 January 2004. URS submitted a *Second Addendum to Work Plan for Additional Investigation* on 11 March 2004.

URS began fieldwork at the Site on 30 March 2004. Due to adverse drilling conditions, just three on-site soil borings (SB-1, SB-2, and SB-5) were advanced and fieldwork was rescheduled. URS returned to the Site on 7 May 2004 and advanced three additional on-site borings (SB-3, SB-4, and SB-6). A total of 20 soil samples and four ground-water samples were collected during the additional investigation. Gasoline-Range Organics (GRO) were detected above laboratory reporting limits in one of the 20 soil samples at a concentration of 350 mg/kg in sample SB-4-1.0. Toluene and Total Xylenes were detected above the laboratory reporting limits in one of the 20 soil samples collected at concentrations of 0.096 mg/kg and 0.016 mg/kg, respectively, in sample SB-1-5. MTBE was detected above laboratory reporting limits in three of the 20 soil samples at concentrations up to 0.027 mg/kg in samples SB-3-13 and SB-3-23.0. No other analytes were detected above their respective reporting limits.

GRO was detected above laboratory reporting limits in one of the four ground-water samples collected at a concentration of 88 µg/L in sample SB-3. Toluene was detected above the

laboratory reporting limit in one of the four ground-water samples collected at a concentration of 1.4 µg/L in sample SB-2. MTBE was detected above the laboratory reporting limit in two of the four samples at a concentration of 34 µg/L in both samples SB-3 and SB-5. No other analytes were detected above their respective reporting limits. A *Site Investigation Report and Well Installation Work Plan* was submitted on behalf of Atlantic Richfield Company to ACEH on 12 August 2004. On 30 August 2004 URS received a letter from ACEH requesting additional fieldwork at the Site to complete the scope of work proposed in the original work plan and addendum. ACEH additionally requested depth-discrete ground-water sampling.

These requests by ACEH were addressed in fieldwork conducted in October 2004. URS collected twelve depth-discrete ground-water samples from six locations (HP-3 through HP-8). URS also collected 26 soil samples from six onsite borings (SB-7 through SB-8 and HP-3). Soil analytical results from this investigation are summarized as follows:

- GRO was detected above the laboratory reporting limit in five of the 26 samples at concentrations ranging from 0.31 mg/kg (SB-11-6.5) to 220 mg/kg (SB-11-11.5);
- Total Xylenes were detected above the laboratory reporting limit in two of the 26 samples at concentrations of 0.011 mg/kg (SB-8-29.5) and 0.012 mg/kg (SB-11-29.5); and
- MTBE was detected above the laboratory reporting limit in 10 of the 26 soil samples at concentrations ranging from 0.0069 mg/kg (SB-9-19.5) and 0.56 mg/kg (SB-9-13.5).

Ground-water analytical results from this investigation are summarized as follows:

- GRO was detected above the laboratory reporting limit in six of the 12 samples collected at concentrations ranging from 72 µg/L (HP-6-30) and 1,300 µg/L (HP-7-20);
- Benzene was detected above the laboratory reporting limit in three of the 12 samples at concentrations ranging from 0.64 µg/L (HP-3-35) to 1.6 µg/L (HP-4-18);
- Toluene was detected above the laboratory reporting limit in eight of the 12 samples collected at concentrations ranging from 7.0 µg/L (HP-5-18) to 38 µg/L (HP-4-18);
- Ethylbenzene was detected above the laboratory reporting limit in seven of the 12 samples at concentrations ranging from 0.94 µg/L (HP-5-18) to 5.4 µg/L (HP-4-18);
- Total Xylenes were detected above the laboratory reporting limit in eight of the 12 samples at concentrations ranging from 6.2 µg/L (HP-5-18) to 27 µg/L (HP-4-18); and
- MTBE was detected above the laboratory reporting limit in seven of the 12 samples collected at concentrations ranging from 6.6 µg/L (HP-6-30) to 3,700 µg/L (HP-7-30).

Results of this subsurface investigation were reported by URS in the *Additional Site Investigation Report and Work Plan for Offsite Investigation* dated 30 November 2004.

In response to the above report and work plan, URS received a directive letter from ACEH dated 10 January 2005. URS responded by submitting the *Conduit and Well Survey Report and Work Plan Addendum for Offsite Investigation*, dated 5 April 2005. ACEH approved the 5 April 2005 work plan addendum with comments in their work plan approval letter dated 16 October 2006. After considering drilling at the base of the hillside north of Park Boulevard, Stratus

Environmental Inc. (Stratus) received the required permits from the City of Oakland and performed the proposed drilling and sampling activities in June 2007.

On June 25-26, 2007, Stratus observed RSI Drilling (RSI) advance a total of eight soil borings in four distinct locations on the north side of Park Boulevard, north of the Site, to evaluate the off-site horizontal extent of petroleum hydrocarbon impacted soil and ground water. Soil borings SB-12 through SB-15 and Hydropunch<sup>®</sup> borings HP-9 through HP-12 were installed along the north side of Park Boulevard. Each soil boring was advanced to a maximum depth of 30 feet bgs, with each Hydropunch<sup>®</sup> boring advanced to a maximum depth of 25 feet bgs.

MTBE was detected above the laboratory reporting limit of 0.005 mg/kg in two of the 16 soil samples collected June 25-26, 2007 at concentrations of 0.0087 mg/kg in boring sample SB12-15 and 0.0065 mg/kg in boring sample SB15-23. The remaining analytes were not detected above their respective reporting limits. GRO was detected above the laboratory reporting of 50 µg/L in three of the seven ground-water samples collected at concentrations of 51 µg/L in sample HP9-13, 59 µg/L in sample HP11-24, and 84 µg/L in sample HP12-25. Benzene was detected above the laboratory reporting limit of 0.50 µg/L in two of the seven ground-water samples collected at concentrations of 0.63 µg/L in sample HP11-24 and 0.80 µg/L in sample HP10-24. MTBE was detected above the laboratory reporting limit of 0.50 µg/L in each of the seven ground-water samples collected at concentrations ranging from 0.78 µg/L in sample HP10-16 to 110 µg/L in sample HP12-25. The remaining analytes were not detected above their respective reporting limits in the collected Hydropunch<sup>®</sup> samples. Results were reported by BAI in the *Offsite Soil and Ground-Water Investigation Report* dated 29 August 2007. Historical data following initial Site closure in 1997 including boring logs, geologic cross sections, boring location maps, and summarized soil and ground-water laboratory analytical results are provided in Appendix B.

### **3.0 SITE GEOLOGY AND HYDROGEOLOGY**

According to the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (California Regional Water Quality Control Board – San Francisco Bay Region/SFRWQCB, June 1999), the Site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet deep. There are no well-defined aquitards such as estuarine muds. The largest and deepest wells in this sub-area historically pumped one to two million gallons per day at depths greater than 200 feet. Overall, sustainable yields are low due in part to low recharge potential. The Merrit sand in West Oakland was an important part of the early water supply for the City of Oakland. It is shallow (up to 60 feet), but before the turn of the last century, septic systems contaminated the water supply wells.

Throughout most of the Alameda County portion of the East Bay Plain, from Hayward north to Albany, water level contours show that the general direction of ground-water flow is from east to west or from the Hayward Fault to the San Francisco Bay. Ground-water flow direction generally correlates to topography. Flow direction and velocity are also influenced by buried stream channels that typically are oriented in an east to west direction. In the southern end of the study area however, near the San Lorenzo Sub-Area, the direction of flow may not be this simple. According to information presented in *East Bay Plain Groundwater Basin Beneficial*



*Use Evaluation Report*, the small set of water level measurements available seemed to show that the ground water in the upper aquifers may be flowing south, with the deeper aquifers, the Alameda Formation, moving north. The nearest natural drainage is Sausal Creek, located approximately 1.0 mile southeast of the Site. Sausal Creek flows generally northeast to southwest near the Site vicinity.

The Site elevation is approximately 127 feet above mean sea level. The water table fluctuates seasonally. Historically, depth-to-water measurements have ranged from approximately 1.2 to 10 feet bgs. Ground-water flow direction is generally to the northwest.

According to the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report*, the City of Oakland does not have “any plans to develop local ground-water resources for drinking water purposes, because of existing or potential saltwater intrusion, contamination, or poor or limited quantity.” However, the RWQCB’s Basin Plan denotes existing beneficial uses of municipal and domestic supply (MUN), industrial process supply (PROC), industrial service supply (IND), and agricultural supply (AGR) for the East Bay Plain ground-water basin.

The Site is typically underlain by gravel, gravelly clay, and silt fill from zero to five ft bgs. The Site consists primarily of silty clay and clayey silt with lenses of silty sand, sand, and gravelly sand from approximately five to 30 feet bgs. A large layer of fine sands and silty sands has been observed from approximately 15 to 25 feet bgs in the northwest portion of the Site.

#### **4.0 PROPOSED SCOPE OF WORK**

At the request of ACEH, the purpose of the proposed ground-water investigation is to further evaluate hydrogeologic conditions, including an evaluation to determine whether vertical gradients exist at the Site, as well as delineating the vertical extent of ground-water contamination by Methyl-Tertiary Butyl Ether (MTBE) through ground-water contaminant plume monitoring. After a thorough review of boring logs and geologic cross-sections previously generated for the Site, BAI found little evidence of a uniform confining layer across the Property or off-site, which would imply two distinct water bearing formations. However, the presence of finer grained lithology that could act as a confining layer was observed in some boreholes but was not consistent. To fulfill this request, BAI recommends the installation of clustered ground-water monitoring wells at three distinct locations, two wells at each location. Details regarding the specific scope of work are provided in the following sections.

#### **4.1 Preliminary Activities**

Prior to initiating field activities, Stratus will obtain the necessary drilling permits from Alameda County, prepare a site health and safety plan (HASP) for the proposed work, clear the Site for subsurface utilities, and provide 72-hour advance notification to ACEH prior to start of field activities. The utility clearance will include notifying Underground Service Alert (USA) of the pending work a minimum of 48 hours prior to initiating the field investigation, and securing the services of a private utility locating company to confirm the absence of underground utilities at the boring location. The borehole will be physically cleared to five feet bgs using hand auger or air knife methods.

The Site-specific HASP will be prepared for use by personnel implementing the work plan. A copy of the HASP will be available on-site during work. The subcontractor(s) performing field activities will be provided with a copy of the HASP prior to initiating work. A safety tailgate meeting will also be conducted daily to review potential hazards and scope of work.

## **4.2 Soil Borings**

Soil borings will be completed under the supervision of a Stratus field geologist with the use of a drill rig equipped with 8-inch diameter hollow-stem augers. A limited access drill rig may be required for this project due to numerous underground utilities, the specific drilling locations and traffic issues. The borings will be advanced to a maximum total depth of 30 feet bgs. Soils will be classified according to the Unified Soil Classification System (USCS), and will be examined using visual and manual methods for parameters including odor, staining, color, grain size, and moisture content. No soil samples are anticipated to be collected during advancement of the borings due to the extensive soil sampling that has already occurred in the vicinity of the proposed well locations. The proposed boring locations are provided in Drawing 2.

Investigation-derived residuals will be temporarily accumulated onsite in 55-gallon, DOT-approved drums, pending characterization for proper management. Stratus will coordinate the removal and transportation of surplus soils and liquids to appropriate California-regulated facilities.

## **4.3 Monitoring Well Construction**

If appropriate, each boring will be converted into a 2-inch diameter ground-water monitoring well. The wells will be constructed of threaded Schedule 40 poly-vinyl chloride (PVC) and screened with 0.010-inch machine-cut slots. A filter pack consisting of No. 2/12 sand will be installed from total depth to two feet above the top of the well screen, which will be overlain by three feet of bentonite, and bentonite-cement grout to the surface. A traffic-rated locking vault will be installed to protect the well head.

Two wells, one with a shallow screen interval and the other a deeper screen interval, will be installed approximately two feet apart at each general boring location (Drawing 2). Well MW-11A will be installed at a total depth of 20 feet bgs and screened from 16 to 20 feet bgs. Well MW-11B will be installed at a total depth of 30 feet bgs and screened from 26 to 30 feet bgs. This location and the screened intervals correlate with Hydropunch<sup>®</sup> samples (HP-7) collected by URS in 2004. Well MW-12A will be installed at a total depth of 13.5 feet bgs and screened from 10.5 to 13.5 feet bgs. Well MW-12B will be installed at a total depth of 27 feet bgs and screened from 24 to 27 feet bgs. This location correlates with Hydropunch<sup>®</sup> samples (HP-12) collected by Stratus in 2007. The deeper screen interval does coincide directly with the sampling interval utilized during the previous Stratus investigation while the shallow interval does not. However, if two water bearing formations are present at this location, the screen for well MW-12A should be located just above the confining layer. Well MW-13A will be installed at a total depth of 14 feet bgs and screened from 11 to 14 feet bgs. Well MW-13B will be installed at a total depth of 22 feet bgs and screened from 19 to 22 feet bgs. This location and the screened intervals correlate with Hydropunch<sup>®</sup> samples (HP-9) collected by Stratus in 2007.

The total depths for the proposed, shallow off-site monitoring wells MW-12A and MW-13A may result in dry conditions due to the current depth to ground-water off-site. It is recommended that

the shallow, off-site borings be drilled to total depth first. The borehole will then be evaluated to determine whether sufficient water is present to construct the well. If sufficient water is not present, drilling will continue to the total depth of the deeper wells (MW-12B or MW-13B) and only the B well will be installed at the given location.

At least 48 hours after well installation the new wells will be developed. The well development process will consist of surging and bailing the well to remove fine-grained sediments from the well and sand filter pack. A minimum of three and a maximum of ten wetted casing volumes of ground water will be removed until water quality parameters have stabilized. Periodic measurements of the water quality parameters pH, temperature, conductivity, and turbidity will be recorded during the development to establish baseline values for ground water. Purge water generated during development activities will be handled according to BP protocols and procedures.

After well development, the monitoring wells will be surveyed. A California-licensed Professional Land Surveyor will be scheduled to survey the well heads for top of casing elevation with respect to mean sea level, and for lateral position using northings and eastings per NAD'88, and uploaded to GeoTracker.

#### **4.4 Monitoring Well Sampling**

The wells will be sampled no sooner than 48 hours after well development. The sampling procedure for the wells consists of first measuring the water level and depth to bottom, and checking for the presence of separate phase hydrocarbons (free product) using an electronic oil-water interface probe. If the well does not contain free product, it will be purged of approximately three wetted casing volumes of water (or until dewatered) using a centrifugal pump, gas displacement pump, or bailer. During purging, temperature, pH, and electrical conductivity will be monitored to document that these parameters have stabilized prior to collecting samples. After purging, water levels will be allowed to partially (at least 80%) recover. Ground-water samples will be collected using a dedicated disposable bailer, placed into appropriate Environmental Protection Agency (EPA) approved containers, labeled, logged onto chain-of-custody records, and transported on ice to the laboratory. Sample labels will include sample name, sampling time and date, analytical methods, and sampler's initials. If the well contains free product, it will not be sampled and free product will be removed according to California Code of Regulations, Title 23, Division 3, Chapter 16, Section 2655, UST Regulations.

Ground-water samples will be analyzed for the following: Gasoline-Range Organics (GRO, C4-C12) using EPA Method 8015B; BTEX, MTBE, di-isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE), and tertiary butyl alcohol (TBA) by EPA Method 8260B.

#### **4.5 Ground-Water Investigation Report**

Upon completion of field activities and receipt of a certified field data package (including copies of permits, field data sheets, and boring logs), BAI will prepare a Ground-Water Investigation Report. The report will document the results of the investigation, field activities, copies of required permit(s), copies of field notes, soil boring and well logs, discussion of findings, and

conclusions. Deviations from the work plan or data inconsistencies will be discussed in the report.

## 5.0 PROPOSED SCHEDULE

The schedule for the above-noted work shall proceed as follows:

- Ground-Water Investigation – Upon approval of this work plan and obtaining the necessary permits;
- Initial Ground-Water Monitoring and Sampling – Following completion of well installation and development;
- Ground-Water Investigation Report – Within 60 days after receipt of certified field data package following completion of fieldwork; and
- Future Quarterly Ground-Water Monitoring Reports – Frequency (i.e. annual, semi-annual, or quarterly) to be determined.

## 6.0 CLOSURE

The findings presented in this document are based upon: observation of field personnel from previous consultants, the points investigated, and results of laboratory tests performed by various laboratories. Our services were performed in accordance with the generally accepted standard of practice at the time this document was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of Atlantic Richfield Company. It is possible that variations in soil or ground-water conditions could exist beyond points explored in this investigation. Also changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

## 7.0 REFERENCES

ACEH, 15 April 2003. *Fuel Leak Case No.RO0002526, Arco #2107, 3310 Park Blvd., Oakland, CA 94610.* Letter to Atlantic Richfield Company.

ACEH 30 August 2004. *Fuel Leak Case No.RO0002526, Arco #2107, Active Automobile Service Station at 3310 Park Blvd., Oakland, California.* Letter to Atlantic Richfield Company.

ACEH, 10 January 2005. *Fuel Leak Case No.RO0002526, ARCO #2107, Active Service Station at 3310 Park Blvd., Oakland, California – Response to Report and Workplan.* Letter to Atlantic Richfield Company.

ACEH, 16 October 2006. *Fuel Leak Case No.RO0002526, ARCO #2107, Active Service Station at 3310 Park Blvd., Oakland, California – Work Plan Approval.* Letter to Atlantic Richfield Company.

Broadbent & Associates, Inc., 29 August 2007. *Offsite Soil and Ground-Water Investigation Report, Atlantic Richfield Company Service Station #2107, 3310 Park Boulevard, Oakland, California; ACEH Case #RO0002526.*

California Regional Water Quality Control Board, San Francisco Bay Region, June 1999. *East Bay Plain Groundwater Basin, Beneficial Use Evaluation Report, Alameda and Contra Costa Counties, CA.*

Muir, Kenneth S., 1993. *Classification of Groundwater Recharge Potential in the East Bay Plain, Alameda County, California.* Alameda County Flood Control and Water Conservation District.

URS, 29 October 2003. *Addendum to Work Plan for Additional Investigation.* Letter to ACEH on behalf of Atlantic Richfield Company.

URS, 11 March 2004. *Second Addendum to Work Plan for Additional Investigation.* Letter to ACEH on behalf of Atlantic Richfield Company.

URS, 12 August 2004. *Site Investigation Report and Well Installation Workplan, Atlantic Richfield Company Service Station #2107, 3310 Park Boulevard, Oakland, California, Fuel Leak Case No. RO0002526, URS Project No. 38486908.0013601.* Letter to ACEH on behalf of Atlantic Richfield Company.

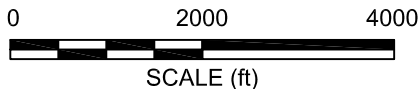
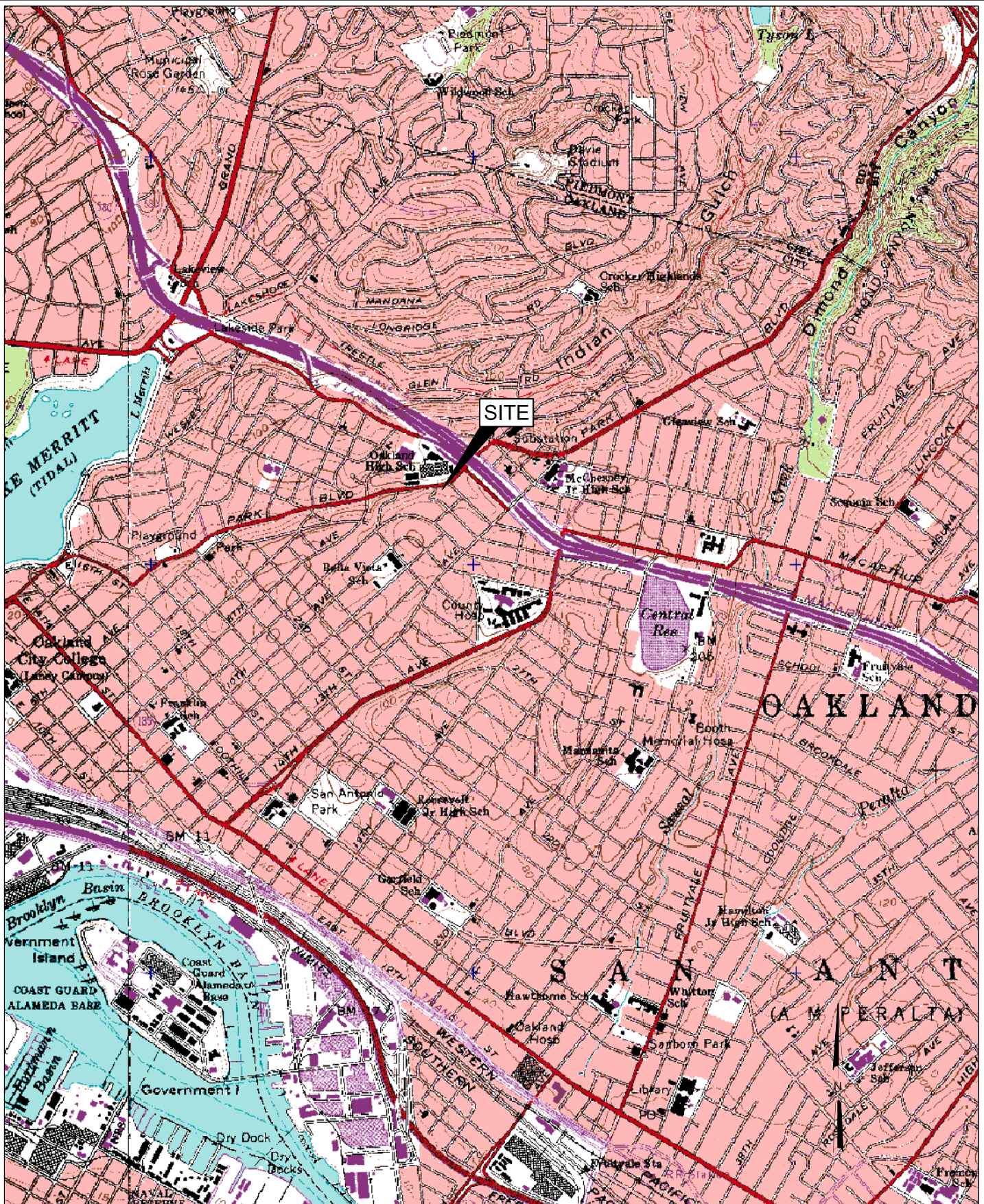
URS, 30 November 2004. *Additional Site Investigation Report and Workplan for Offsite Investigation, Atlantic Richfield Company Service Station #2107, 3310 Park Boulevard, Oakland, California, Alameda County Case No. RO-0002526.* Letter to ACEH on behalf of Atlantic Richfield Company.

URS, 5 April 2005. *Conduit and Well Survey Report and Work Plan Addendum for Offsite Investigation, Atlantic Richfield Company Service Station #2107, 3310 Park Boulevard, Oakland, California, Alameda County Case No. RO-0002526.* Letter to ACEH on behalf of Atlantic Richfield Company.

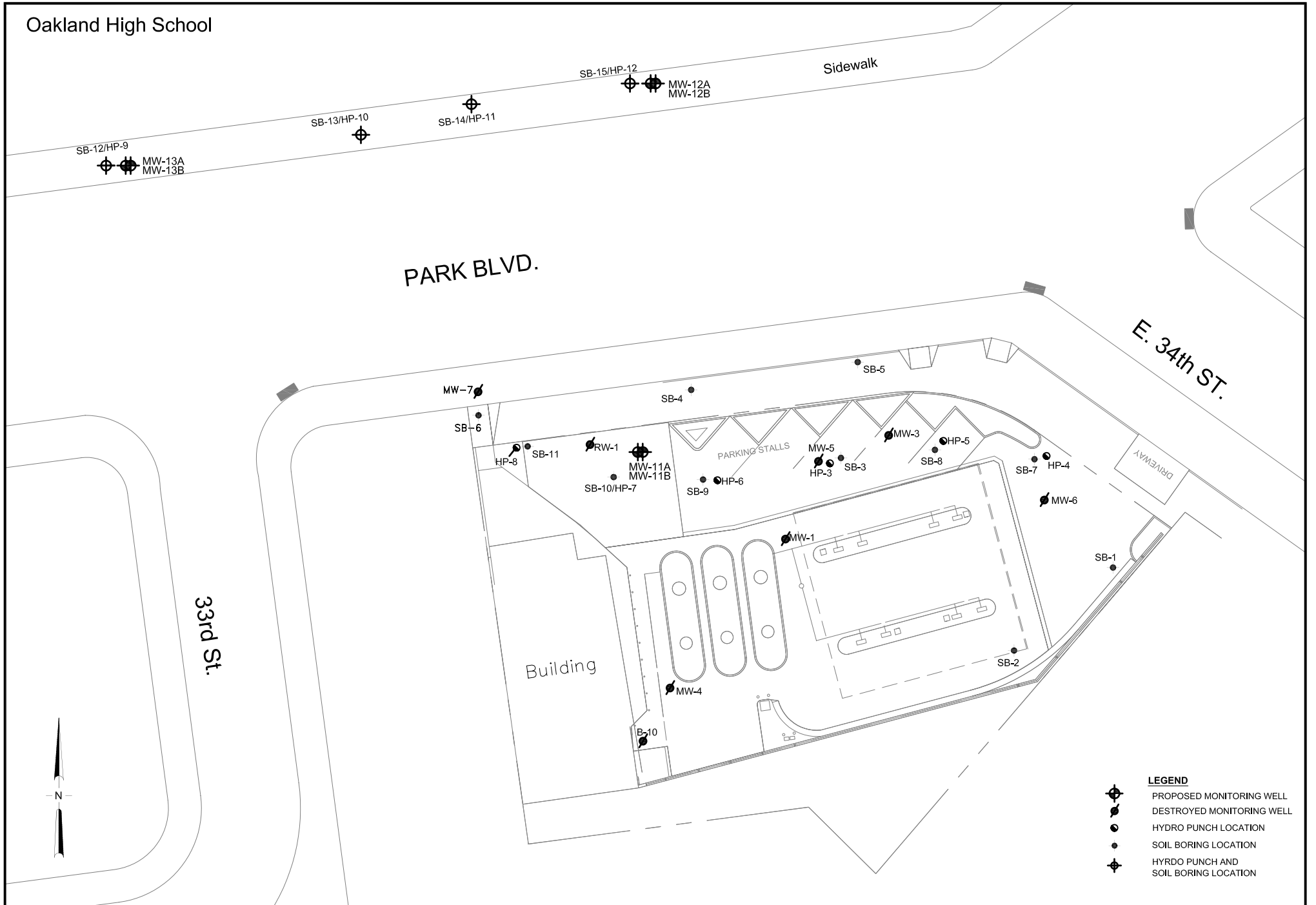
## LIST OF DRAWINGS

Drawing 1. Site Vicinity Map

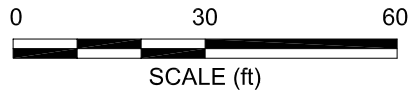
Drawing 2. Site Map with Proposed Monitoring Well Locations



Oakland High School



- LEGEND**
- PROPOSED MONITORING WELL
  - DESTROYED MONITORING WELL
  - HYDRO PUNCH LOCATION
  - SOIL BORING LOCATION
  - HYDRO PUNCH AND SOIL BORING LOCATION



**BROADBENT & ASSOCIATES, INC.**  
 ENGINEERING, WATER RESOURCES & ENVIRONMENTAL  
 1324 Mangrove Ave. Suite 212, Chico, California  
 Project No.: 06-08-614    Date: 8/25/08

Station #2107  
 3310 Park Boulevard  
 Oakland, California

Site Map with Proposed  
 Monitoring Well Locations

Drawing  
**2**



**APPENDIX A**

**RECENT REGULATORY CORRESPONDENCE**



ENVIRONMENTAL HEALTH SERVICES  
ENVIRONMENTAL PROTECTION  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577  
(510) 567-6700  
FAX (510) 337-9335

July 7, 2008

Paul Supple (Sent via Electronic Mail)  
Atlantic Richfield Company  
(A BP Affiliated Company)  
P.O. Box 1257  
San Ramon, CA 94583

Subject: Fuel Leak Case No. RO0002526 and Geotracker Global ID T06019734306, ARCO  
#2107, 3310 Park Boulevard, Oakland, CA 94610

Dear Mr. Supple:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site including the recently submitted document entitled, "Offsite Soil & Groundwater Investigation Report," dated August 29, 2007, which was prepared by Broadbent & Associates, Inc. (BAI) for the subject site. Based on a review of the above-mentioned report, low concentrations of petroleum hydrocarbons were detected off-site to the north. However, it is not clear whether BAI proposes additional assessment or believes the site is adequately characterized. Although in the Table of Contents of the subject report, Section 6.0 reads "Conclusions and Recommendations," no recommendations could be found in the report.

At this time, it appears necessary to clarify this Department's role in conducting remedial oversight as well as the role of your consultant. This Department provides guidance by reviewing, approving or denying recommendations and conclusions provided by your consultant. We commonly request additional clarification and/or justification supporting your consultant's recommendations and conclusions. However, we do not dictate or direct the course of site characterization and/or remediation. You have retained BAI to provide their professional expertise for site characterization and remediation. It is BAI and their Registered Professional's responsibility to analyze the data and make professional recommendations and/or judgments regarding appropriate and cost effective site assessment and/or corrective action.

With that being said, BAI's recommendations and conclusions in the subject report did not include a discussion of whether the site is adequately characterized or if additional characterization is necessary. In all future reports, please provide a complete recommendations and conclusions section.

ACEH requests that you address the following technical comments and send us the technical reports requested below.

## **TECHNICAL COMMENTS**

1. **Regional Geologic and Hydrogeologic Setting** – Depth to groundwater has ranged from approximately 5 to 9 feet below the ground surface (bgs). However, elevated concentrations of MtBE have been detected at depths of 20 to 30 feet bgs. For example, MtBE was detected at 1,200 micrograms per liter ( $\mu\text{g/L}$ ) in sample HP-7-20 collected between 16 and 20 feet bgs and 3,700  $\mu\text{g/L}$  in sample HP-7-30 collected between 26 and 30 feet bgs. Based on the analytical results, it appears that the vertical extent of contamination appears undefined. According to BAI, the site has been leveled by cutting into the hillside on the south side of the property. BAI further states that URS reported water may be collecting in the UST cavity and running down-gradient and may be the cause of the shallow first encountered water at boring locations along the north side of the site. Further evaluation of hydrogeologic conditions, including an evaluation to determine whether vertical gradients exist at the site appears warranted as well as delineating the vertical extent of MtBE impact in groundwater. Please submit a scope of work to address the above-mentioned concerns and submit a work plan.
2. **Groundwater Contaminant Plume Monitoring** – Based on groundwater sample analytical results from borings installed at the site, permanent groundwater monitoring points appear necessary to evaluate groundwater contaminant plume stability. In addition, since contaminants have been detected at multiple depths at the site, it may be advantageous to install multi-level monitoring wells, monitoring well clusters, or systems capable of monitoring multiple depths. Please propose a scope of work to address the above-mentioned concerns and submit a work plan by the date specified below.

## **TECHNICAL REPORT REQUEST**

Please submit technical reports to Alameda County Environmental Health (Attention: Paresh Khatri), according to the following schedule:

- **September 2, 2008** – Soil and Water Investigation Work Plan
- **October 30, 2008** - Quarterly Monitoring Report (3<sup>rd</sup> Quarter 2008)
- **January 30, 2009** - Quarterly Monitoring Report (4<sup>th</sup> Quarter 2008)
- **April 30, 2009** - Quarterly Monitoring Report (1<sup>st</sup> Quarter 2009)
- **July 30, 2009** - Quarterly Monitoring Report (2<sup>nd</sup> Quarter 2009)

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

### ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements ([http://www.swrcb.ca.gov/ust/electronic\\_submittal/report\\_rqmts.shtml](http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml)).

### PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

### PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

### UNDERGROUND STORAGE TANK CLEANUP FUND

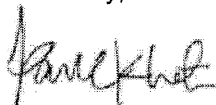
Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

**AGENCY OVERSIGHT**

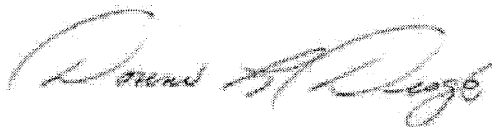
If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

If you have any questions, please call me at (510) 777-2478 or send me an electronic mail message at [paresh.khatri@acgov.org](mailto:paresh.khatri@acgov.org).

Sincerely,



Paresh C. Khatri  
Hazardous Materials Specialist



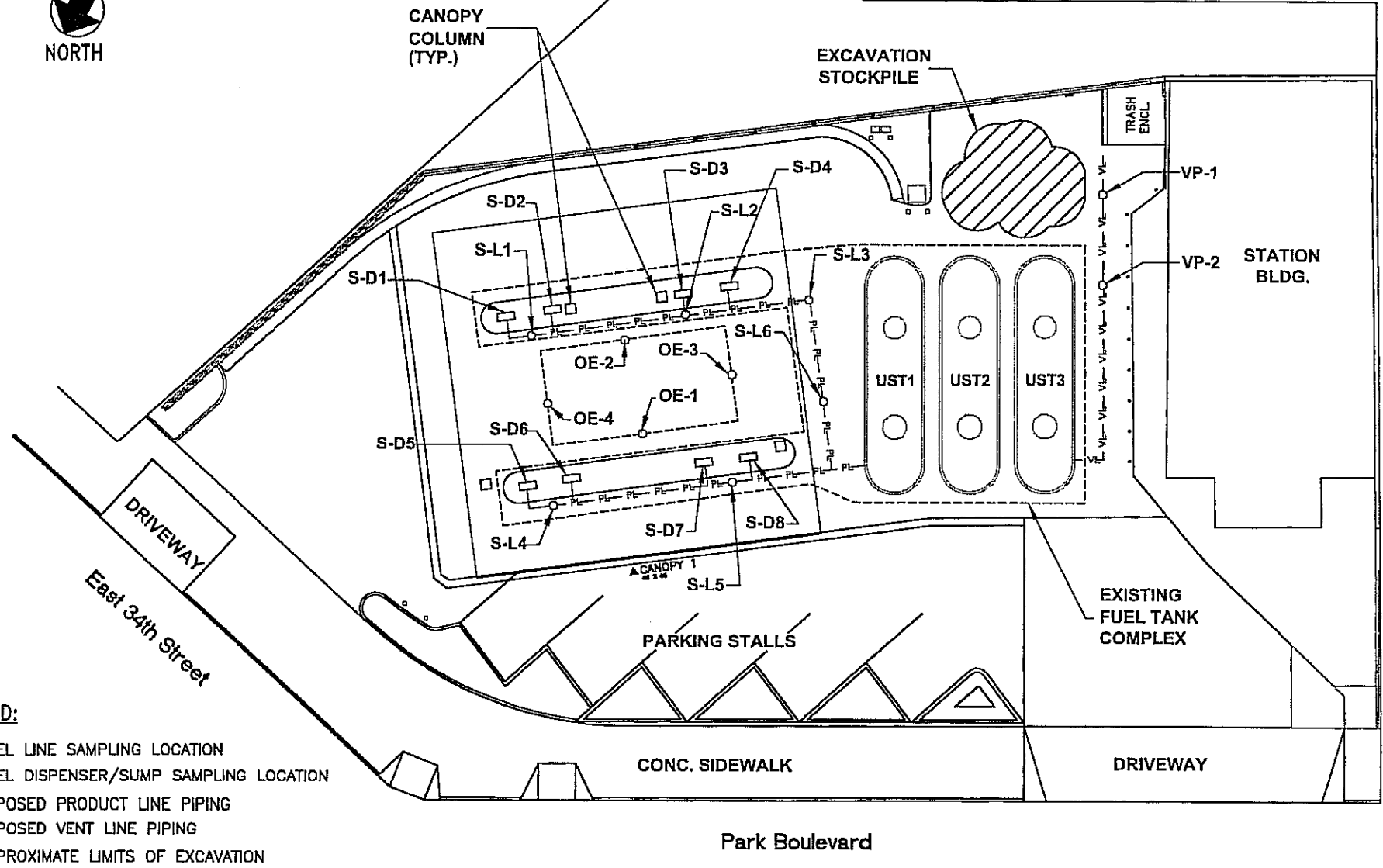
Donna L. Drogos, PE  
Supervising Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Tom Venus, [tvenus@broadbentinc.com](mailto:tvenus@broadbentinc.com) (sent via electronic mail)  
Leroy Griffin, via e-mail [lgriffin@oaklandnet.com](mailto:lgriffin@oaklandnet.com) (sent via electronic mail)  
Donna Drogos, ACEH (sent via electronic mail)  
Paresh Khatri, ACEH (sent via electronic mail)  
File

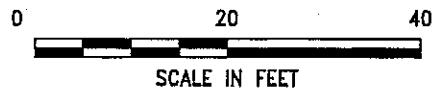
## **APPENDIX B**

**HISTORICAL SOIL AND GROUND-WATER DATA (INCLUDES BORING LOGS,  
GEOLOGIC CROSS-SECTIONS, BORING LOCATION MAPS, AND SUMMARIZED SOIL  
AND GROUND-WATER LABORATORY ANALYTICAL RESULTS)**



**LEGEND:**

- FUEL LINE SAMPLING LOCATION
- FUEL DISPENSER/SUMP SAMPLING LOCATION
- EXPOSED PRODUCT LINE PIPING
- EXPOSED VENT LINE PIPING
- APPROXIMATE LIMITS OF EXCAVATION



	Project No. 38486013	SOIL SAMPLING LOCATION PLAN OCTOBER 18, 2002	Figure 2
	ARCO Service Station 2107 3310 Park Boulevard Oakland, California		

Soil Water Analytical Data  
ARCO Service Station 2107  
3310 Park Boulevard  
Oakland, California

**TABLE 1**  
**Dispenser and Product Line Soil Sample Results**

Soil Sample ID	Sample Depth (feet)	Date Sampled	TPHg as Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	MTBE (ppm)	Pb (ppm)
S-D1	4	10/18/02	ND<0.5	ND<1.8	ND<1.8	ND<1.8	ND<1.8	0.061	6.7
S-D2	4	10/18/02	ND<0.5	ND<1.6	ND<1.6	ND<1.6	ND<1.6	ND<1.6	36
S-D3	3.5	10/18/02	ND<0.5	ND<0.78	ND<0.78	ND<0.78	ND<0.78	34	8.2
S-D4	3.5	10/18/02	ND<0.5	ND<1.1	ND<1.1	ND<1.1	ND<1.1	11	29
S-D5	5	10/18/02	ND<0.5	ND<0.98	ND<0.98	ND<0.98	ND<0.98	8.9	ND<5.0
S-D6	5	10/18/02	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<1.0	17	ND<5.0
S-D7	5	10/18/02	4,000	ND<10.0	220	150	1,100	19	7.6
S-D8	5	10/18/02	2,900	ND<10.0	52	46	400	6.7	8.9
S-L1	4.5	10/18/02	ND<0.5	ND<1.2	ND<1.2	ND<1.2	ND<1.2	19	ND<5.0
S-L2	4	10/18/02	ND<0.5	0.89	ND<0.62	ND<0.62	ND<0.62	19	ND<5.0
S-L3	4.5	10/18/02	ND<0.5	ND<1.0	ND<1.0	ND<1.0	2.3	83	10
S-L4	5	10/18/02	ND<0.5	ND<0.84	ND<0.84	ND<0.84	ND<0.84	37	ND<5.0
S-L5	5	10/18/02	450	ND<2.5	3.4	4.9	44	ND<1.2	ND<5.0
S-L6	6.5	10/18/02	37	ND<0.79	ND<0.79	ND<0.79	ND<0.79	0.099	6.7
VP-1	4	10/21/02	ND<0.5	ND<0.005	ND<0.005	ND<0.005	ND<0.01	ND<0.025	--
VP-2	4	10/21/02	ND<0.5	ND<0.005	ND<0.005	ND<0.005	ND<0.01	ND<0.025	--

**TABLE 2**  
**Grounwater Sample Results**

Water Sample ID	Sample Depth (feet)	Date Sampled	TPHg as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MTBE (ppb)
T-1	7.5	10/21/02	4,200	300	3,200	1,300	11,000	4,900
BT-1	N/A	10/18/02	ND<1000	ND<25	ND<25	ND<25	ND<25	1,800
Sump-1	N/A	10/18/02	640,000,000	4,000,000	70,000,000	170,000,000	990,000,000	53,000,000

**TABLE 3**  
**Over-excavation Sample Results**

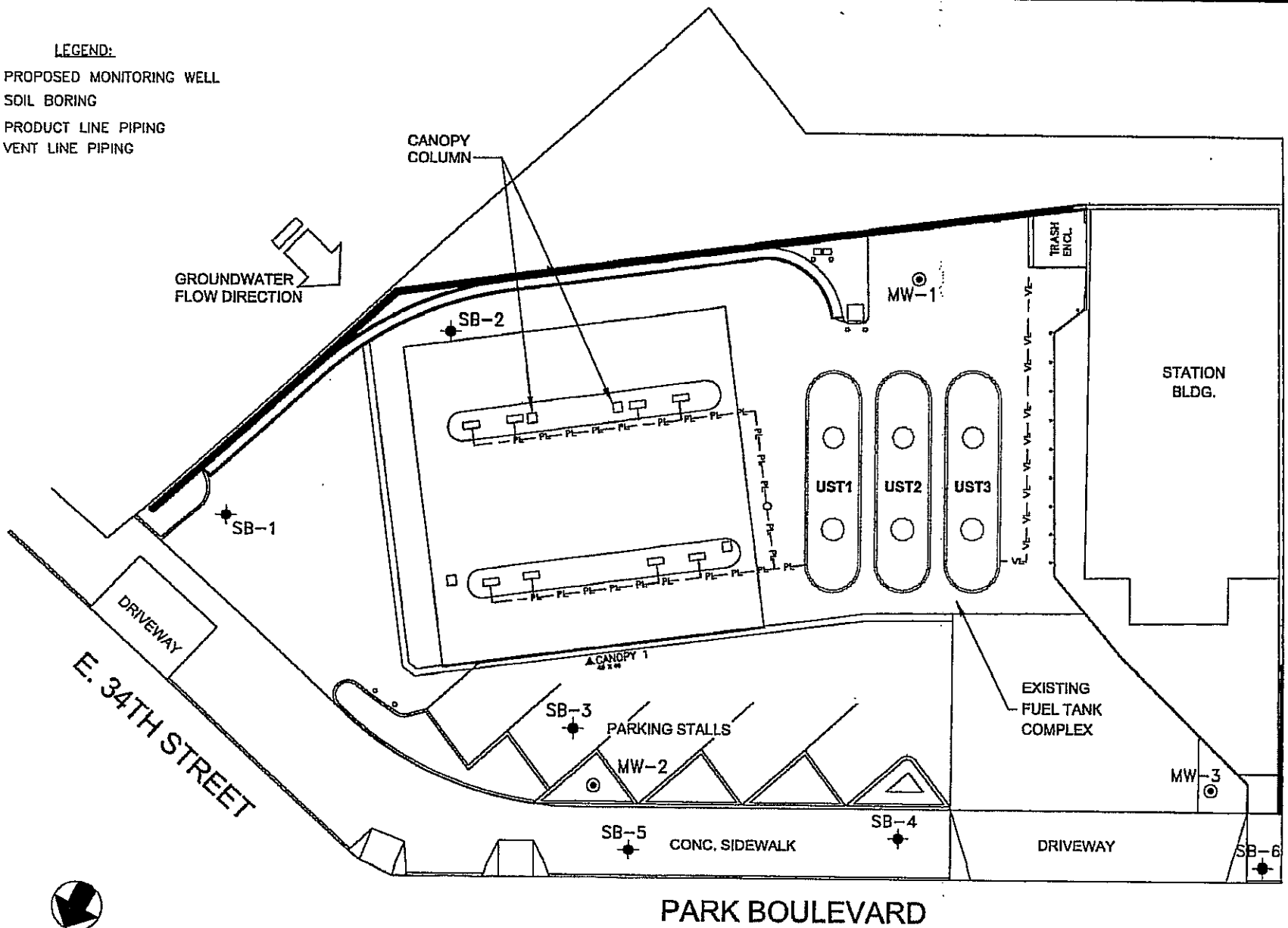
Soil Sample ID	Sample Depth (feet)	Date Sampled	TPHg as Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	MTBE (ppm)	Pb (ppm)
S-OE1	7.5	10/18/02	2,200	ND<2.5	7.9	7.1	40	3.4	5.5
S-OE2	7.5	10/18/02	21	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.4	8.1
OE-3	7	10/21/02	ND<0.5	ND<0.005	ND<0.005	ND<0.005	ND<0.01	ND<0.025	--
OE-4	7	10/21/02	ND<0.5	ND<0.005	ND<0.005	ND<0.005	ND<0.01	ND<0.025	--

TPH = Total purgeable petroleum hydrocarbons using EPA Method 8015, modified.  
BTEX = Benzene, toluene, ethylbenzene, total xylenes using EPA Method 8021B.  
MTBE = Methyl Tertiary Butyl Ether.  
ppb = Parts per billion.  
ppm = Parts per million.  
ND< = Less than stated laboratory detection limit.



**LEGEND:**

- ⊙ PROPOSED MONITORING WELL
- ✦ SOIL BORING
- PL — PRODUCT LINE PIPING
- VL — VENT LINE PIPING



<b>URS</b>	Project No. 38486908	<b>SOIL BORING LOCATIONS AND PROPOSED MONITORING WELL LOCATIONS</b>	FIGURE <b>2</b>
	ARCO Service Station 2107 3310 Park Boulevard Oakland, California		

**Table 1**  
**Soil Analytical Data**  
Atlantic Richfield Company Service Station #2107  
3310 Park Blvd, Oakland, CA

Soil Sample ID	Sample Depth (feet bgs)	Date Sampled	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	t-Butyl Alcohol (TBA) (mg/kg)	MTBE (mg/kg)	Diisopropal Alcohol (DIPE) (mg/kg)	Ethyl-t-Butyl-Ether (ETBE) (mg/kg)	t-Amyl Methyl Ether (TAME) (mg/kg)	Ethanol (mg/kg)
SB-1-5	5	3/30/04	ND<1.2	ND<0.0061	<b>0.096</b>	ND<0.0061	<b>0.016</b>	ND<0.012	ND<0.0061	ND<0.012	ND<0.0061	ND<0.0061	ND<0.1
SB-1-10	10	3/30/04	ND<1.3	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.013	ND<0.0063	ND<0.013	ND<0.0063	ND<0.0063	ND<0.1
SB-1-15	15	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-1-18	18	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-2-5	5	3/30/04	ND<1.3	ND<0.0067	ND<0.0067	ND<0.0067	ND<0.0067	ND<0.013	ND<0.0067	ND<0.013	ND<0.0067	ND<0.0067	ND<0.1
SB-2-10	10	3/30/04	ND<1.2	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.012	ND<0.0061	ND<0.012	ND<0.0061	ND<0.0061	ND<0.1
SB-2-15	15	3/30/04	ND<1.2	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.012	ND<0.0060	ND<0.012	ND<0.0060	ND<0.0060	ND<0.1
SB-2-20	20	3/30/04	ND<1.2	ND<0.0062	ND<0.0062	ND<0.0062	ND<0.0062	ND<0.012	ND<0.0062	ND<0.012	ND<0.0062	ND<0.0062	ND<0.1
SB-2-23	23	3/30/04	ND<1.2	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.012	ND<0.0060	ND<0.012	ND<0.0060	ND<0.0060	ND<0.1
SB-3-8.0	8.0	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	<b>0.024</b>	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-13	13.0	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	<b>0.027</b>	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-18	18.0	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.19</b>	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-23.0	23.0	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.29</b>	<b>0.027</b>	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-26.5	26.5	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-31.0	31	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-4-1.0	1	5/7/04	<b>350</b>	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<25
SB-5-8	8.0	3/30/04	ND<1.1	ND<0.0056	ND<0.0056	ND<0.0056	ND<0.0056	ND<0.011	ND<0.0056	ND<0.011	ND<0.0056	ND<0.0056	ND<0.1
SB-5-16	16.0	3/30/04	ND<1.3	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	<b>0.016</b>	ND<0.0065	ND<0.013	ND<0.0065	<b>0.0066</b>	ND<0.1
SB-5-19	19.0	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-6-1.0	1.0	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1

Notes:

- 1) Groundwater samples analyzed by EPA method 8260B.
- 2) Concentrations above laboratory reporting limits in **bold**.

GRO = Gasoline Range Organics  
bgs = below ground surface  
mg/kg = milligrams per kilogram  
MTBE = Methyl Tertiary Butyl Ether.  
ND< = Less than stated laboratory detection limit.

**Table 2**  
**Groundwater Analytical Data**  
Atlantic Richfield Company Service Station #2107  
3310 Park Blvd, Oakland, CA

Water Sample ID	Sample Depth (feet bgs)	Date Sampled	GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	t-Butyl Alcohol (TBA) (µg/L)	MTBE (µg/L)	Diisopropyl Alcohol (DIPE) (µg/L)	Ethyl-t-Butyl Ether (ETBE) (µg/L)	tert-Amyl Methyl Ether (TAME) (µg/L)	Ethanol (µg/L)
SB-1	18.5	3/30/04	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<50
SB-2	23.0	3/30/04	ND<50	ND<0.50	1.4	ND<0.50	ND<1.0	ND<5.0	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<50
SB-3	32.0	5/7/04	88	ND<0.50	ND<0.50	ND<0.50	ND<1.0	110	34	ND<1.0	ND<0.50	1.1	ND<50
SB-5	19.5	3/30/04	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	45	34	ND<1.0	ND<0.50	ND<0.50	ND<50

Notes:

- 1) Groundwater samples analyzed by EPA method 8260B.
- 2) Concentrations above laboratory reporting limits in bold.

GRO = Gasoline Range Organics  
bgs = below ground surface  
(mg/L) = micrograms per litre  
MTBE = methyl tertiary butyl ether.  
ND< = Less than stated laboratory detection limit.



1333 Broadway, Suite 800  
Oakland, California 94612

**LOG OF BORING**

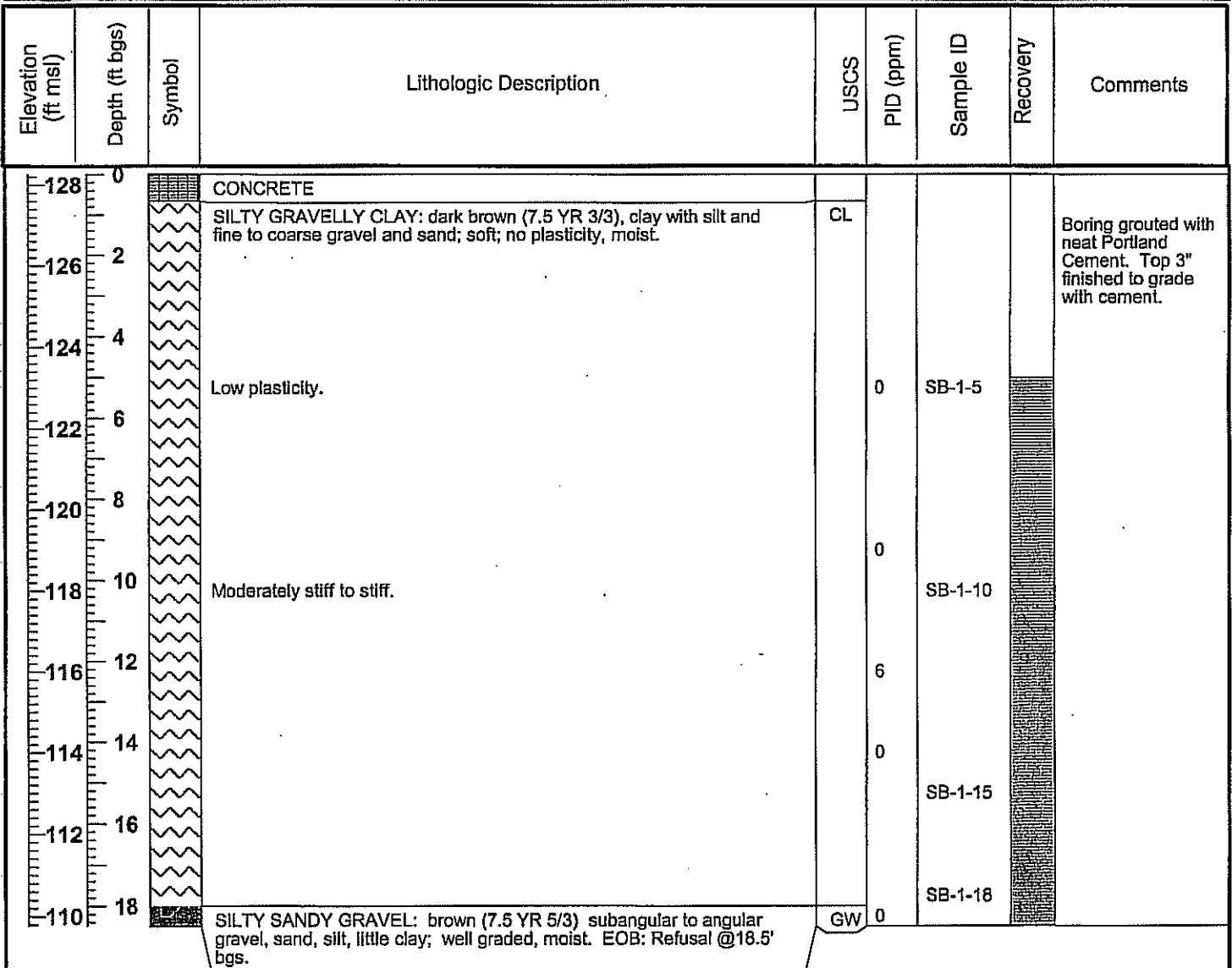
Borehole ID: SB-1

Total Depth: 18.5'

PROJECT INFORMATION	DRILLING INFORMATION
Project: Soil and Water Investigation	Drilling Company: Gregg Drilling and Testing, Inc.
Site Location: 3310 Park Blvd., Oakland, CA	Driller: Paul Rogers
Project Manager: Scott Robinson	Type of Drilling Rig: Geoprobe
RG: James Durkin	Drilling Method: 2" Direct Push
Geologist: Chris Sheridan	Sampling Method: Continuous Core
Job Number: 38486908.0013601	Date(s) Drilled: 3/30/04

**BORING INFORMATION**

Groundwater Depth: NA	Boring Location: East corner of property, near entrance on East 34th St.
Air Knife or Hand Auger Depth: 5.0 feet	Boring Diameter: 2"
Coordinates: X -122.2344641 Y 37.8031429	Boring Type: Exploratory





1333 Broadway, Suite 800  
Oakland, California 94612

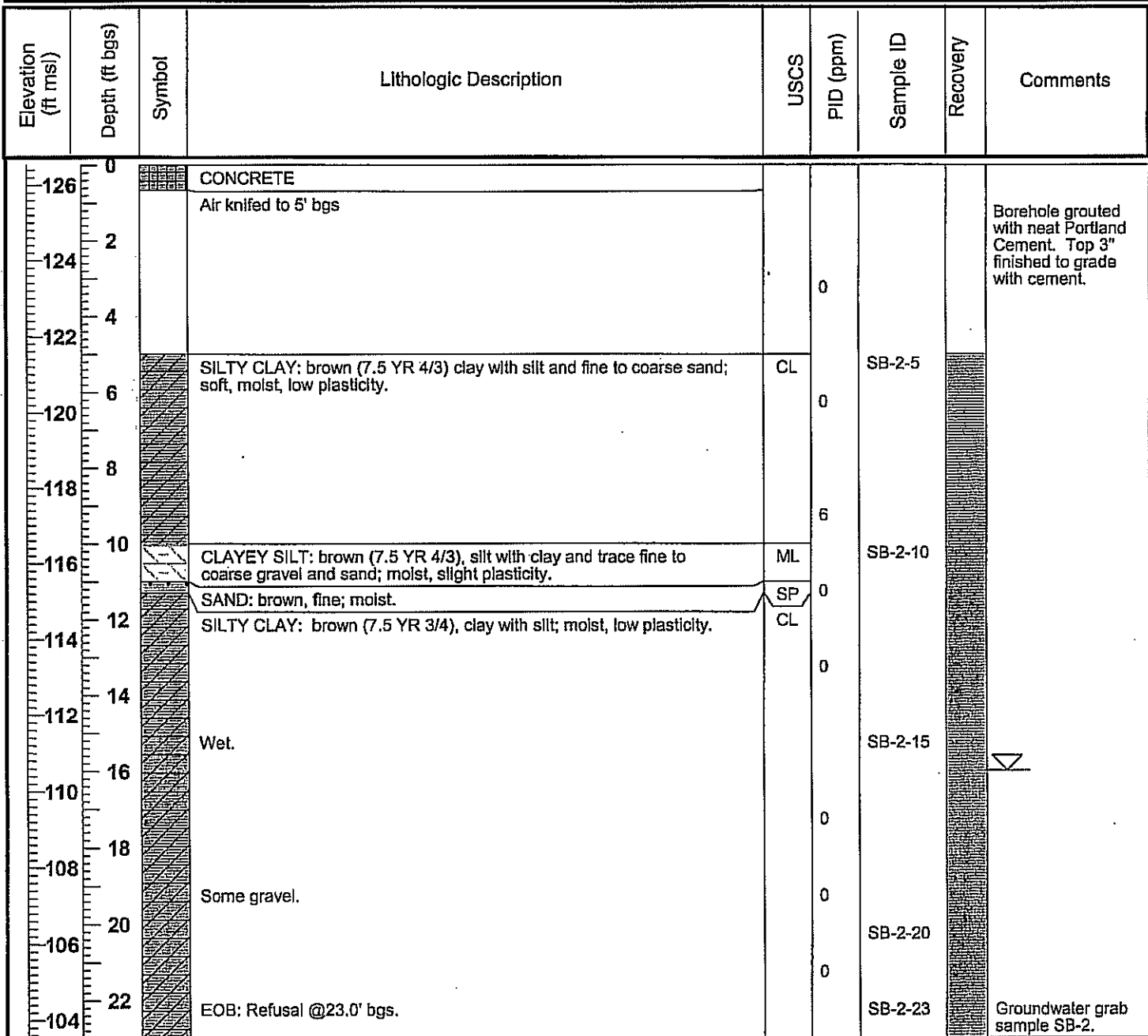
**LOG OF BORING**

Borehole ID: SB-2

Total Depth: 23.0'

PROJECT INFORMATION	DRILLING INFORMATION
<b>Project:</b> Soil and Water Investigation	<b>Drilling Company:</b> Gregg Drilling and Testing, Inc.
<b>Site Location:</b> 3310 Park Blvd., Oakland, CA	<b>Driller:</b> Paul Rogers
<b>Project Manager:</b> Scott Robinson	<b>Type of Drilling Rig:</b> Geoprobe
<b>RG:</b> James Durkin	<b>Drilling Method:</b> 2" Direct Push
<b>Geologist:</b> Chris Sheridan	<b>Sampling Method:</b> Continuous Core
<b>Job Number:</b> 38486908.0013601	<b>Date(s) Drilled:</b> 3/30/04

BORING INFORMATION	
<b>Groundwater Depth:</b> 16'	<b>Boring Location:</b> Under east corner of canopy
<b>Air Knife or Hand Auger Depth:</b> 5 feet	<b>Boring Diameter:</b> 2"
<b>Coordinates:</b> X -122.2345458 Y 37.8030865	<b>Boring Type:</b> Exploratory





1333 Broadway, Suite 800  
Oakland, California 94612

**LOG OF BORING**

Borehole ID: SB-3

Total Depth: 32.0 ft. bgs

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Soil and Water Investigation		Drilling Company: Gregg Drilling and Testing, Inc.	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul Rogers	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe	
RG: James Durkin		Drilling Method: 2" Direct Push	
Geologist: Kevin Uno		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 5/7/04	
BORING INFORMATION			
Groundwater Depth: 5.5 ft. bgs		Boring Location: Parking stall across from pump #6.	
Air Knife or Hand Auger Depth: 5 feet		Boring Diameter: 2"	
Coordinates: X -122.2347087 Y 37.8032083		Boring Type: Exploratory	

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0	0		ASPHALT: 3"	FILL				Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
-122	2		NO RECOVERY: Air knifed to 5'bgs.	NR				
-120	4		SILTY CLAY: Grey, mottled light brown clay with little silt, little rounded fine gravel, and trace sand; stiff, wet, medium plasticity.	CL	9.9	SB-3-8		Groundwater samples were collected from boring HP-3.
-118	6							
-116	8							
-114	10							
-112	12				7.7	SB-3-13		Groundwater samples were collected from boring HP-3.
-110	14		Black, round clasts (1.0-3.0 mm).					
-108	16							
-106	18				no odor	SB-3-18		
-104	20							Groundwater samples were collected from boring HP-3.
-102	22		SILTY SANDY CLAY: light brown clay, silt with fine to medium sand; rootlets, trace organic material. Stiff, wet; medium plasticity.		12.2	SB-3-23		
-100	24							

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
98 26		SILTY SAND: light brown, fine to coarse sand with little silt, loose, saturated.	SM			
96 28		CLAYEY SANDY SILT: grey, mottled light brown, silt, some clay and little fine to coarse sand and trace gravel, moderately stiff, wet, medium plasticity.	ML	12.1		SB-3-26
94 30		SAND: light brown, mostly coarse sand, little silt, trace gravel.	SM			
92 32		SAND: light brown, mostly coarse sand, little silt, trace gravel. Moderately dense, saturated. EOB: 32.0 ft. bgs.	SM	no odor		SB-3-31



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Oakland, California 94612

**LOG OF BORING**

Borehole ID: SB-4

Total Depth: 2.0 ft. bgs

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Soil and Water Investigation		Drilling Company: Gregg Drilling and Testing, Inc.	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul Rogers	
Project Manager: Scott Robinson		Type of Drilling Rig: Hand Auger	
RG: James Durkin		Drilling Method: Hand Auger	
Geologist: Kevin Uno		Sampling Method: Hand packed brass tube.	
Job Number: 38486908.0013601		Date(s) Drilled: 5/7/04	
BORING INFORMATION			
Groundwater Depth: 2.0 ft. bgs		Boring Location: Sidewalk along Park Blvd.	
Air Knife or Hand Auger Depth: NA		Boring Diameter: 2 inch	
Coordinates: X NA Y NA		Boring Type: Exploratory	

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CONCRETE: 9"					
		SAND: FILL, dark gray, sand with slit. Strong hydrocarbon odor. Wet.	SP	HC odor	SB-4-1.0		Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. ▽
2		EOB 2.0 ft' bgs. Boring abandoned when sloughing prevented air-knifing or hand augering to 5 ft. bgs.					





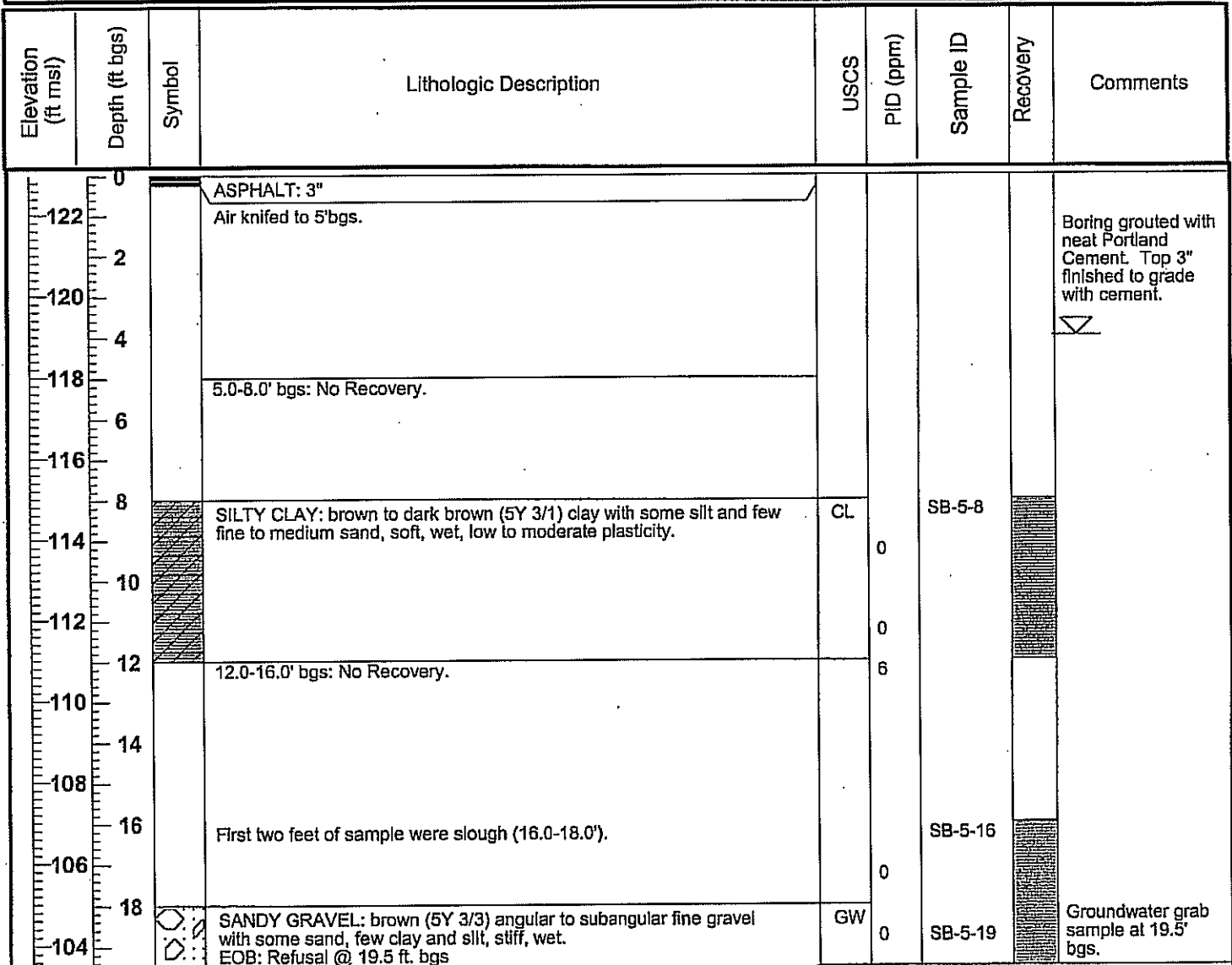
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**LOG OF BORING**

Borehole ID: SB-5

Total Depth: 19.5'

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Soil and Water Investigation		Drilling Company: Gregg Drilling and Testing, Inc.	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul Rogers	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe	
RG: James Durkin		Drilling Method: 2" Direct Push	
Geologist: Chris Sheridan		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 3/30/04	
BORING INFORMATION			
Groundwater Depth: 4.0'		Boring Location: Sidewalk along Park Blvd near intersection w/E 34th St.	
Air Knife or Hand Auger Depth: 5 feet		Boring Diameter: 2"	
Coordinates: X -122.2346814 Y 37.8032765		Boring Type: Exploratory	





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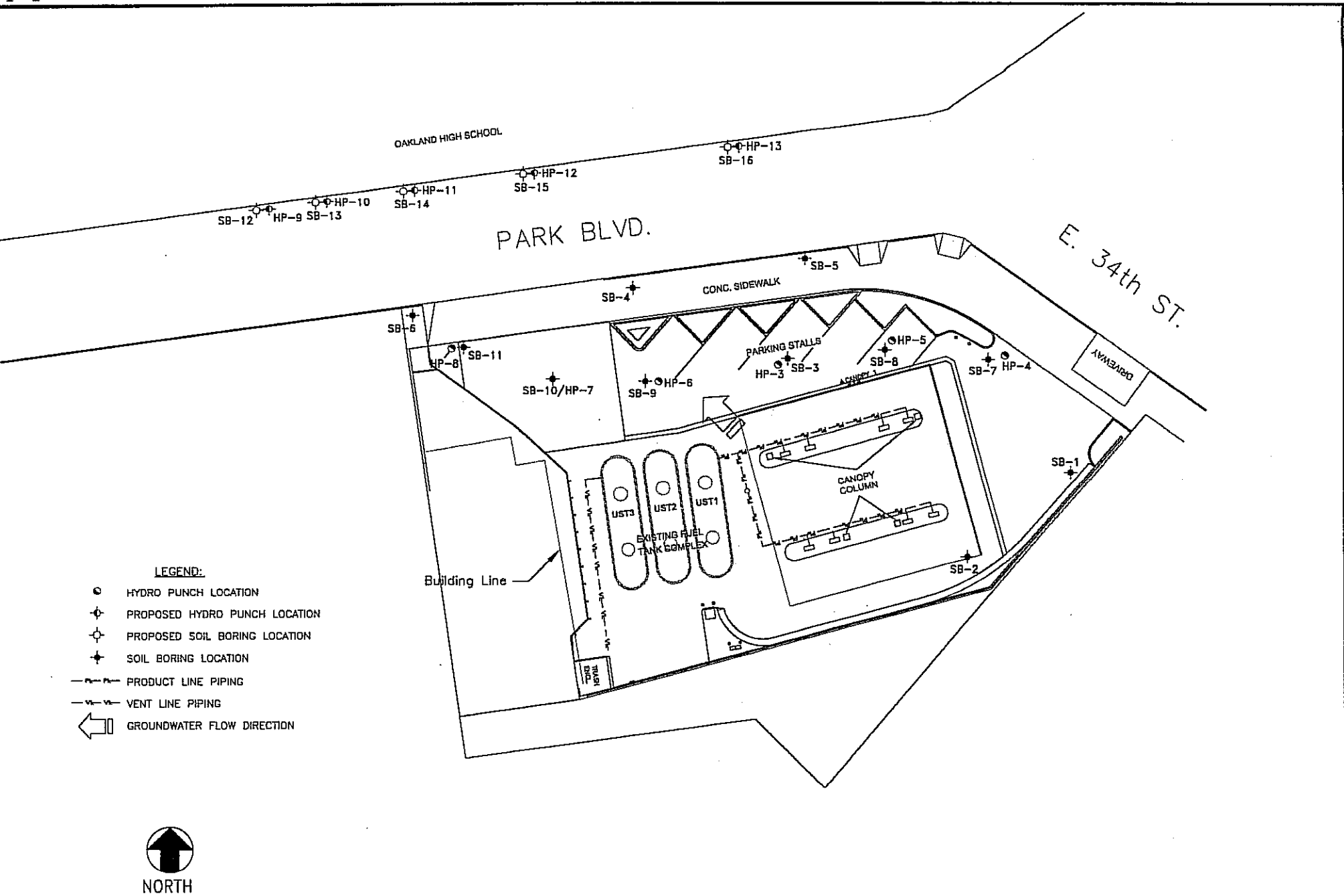
**LOG OF BORING**

Borehole ID: SB-6

Total Depth: 2.0 ft. bgs

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Soil and Water Investigation		Drilling Company: Gregg Drilling and Testing, Inc.	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul Rogers	
Project Manager: Scott Robinson		Type of Drilling Rig: Hand Auger	
RG: James Durkin		Drilling Method: Hand Auger	
Geologist: Kevin Uno		Sampling Method: Hand packed brass tube.	
Job Number: 38486908.0013601		Date(s) Drilled: 5/7/04	
BORING INFORMATION			
Groundwater Depth: 2.0 ft. bgs		Boring Location: Sidewalk along Park Blvd.	
Air Knife or Hand Auger Depth: NA		Boring Diameter: 2 inch	
Coordinates: X NA Y NA		Boring Type: Exploratory	

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CONCRETE: 9"					Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
		SAND: (FILL), dark gray sand with silt. Strong hydrocarbon odor; wet.	SP	HC odor	SB-6-1.0		
2		EOB: 2.0 ft. bgs. Boring abandoned when sloughing prevented air-knifing or hand augering to 5 ft. bgs.					



	Project No. 38486908	<b>PROPOSED OFFSITE SOIL BORING                  LOCATIONS AND PROPOSED ONSITE                  MONITORING WELL LOCATIONS</b>	FIGURE <b>2</b>
	ARCO Service Station #2107 3310 Park Boulevard Oakland, California		

**Table 1**  
**Soil Analytical Data**  
 ARCO Service Station #2107  
 3310 Park Blvd, Oakland, CA

Soil Sample ID	Sample Depth (feet bgs)	Sample Elevation (feet msl)	Date Sampled	GRO/ TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	t-Butyl Alcohol (TBA) (mg/kg)	Methyl-tert butyl-ether (MTBE) (mg/kg)	Di-isopropal ether (DIPE) (mg/kg)	Ethyl-t-Butyl-Ether (ETBE) (mg/kg)	t-Amyl Methyl Ether (TAME) (mg/kg)	Ethanol (mg/kg)
SB-1-5	5	123.26	3/30/04	ND<1.2	ND<0.0061	0.096	ND<0.0061	0.016	ND<0.012	ND<0.0061	ND<0.012	ND<0.0061	ND<0.0061	ND<0.1
SB-1-10	10	118.26	3/30/04	ND<1.3	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.013	ND<0.0063	ND<0.013	ND<0.0063	ND<0.0063	ND<0.1
SB-1-15	15	113.26	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-1-18	18	110.26	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-2-5	5	121.53	3/30/04	ND<1.3	ND<0.0067	ND<0.0067	ND<0.0067	ND<0.0067	ND<0.013	ND<0.0067	ND<0.013	ND<0.0067	ND<0.0067	ND<0.1
SB-2-10	10	116.53	3/30/04	ND<1.2	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.012	ND<0.0061	ND<0.012	ND<0.0061	ND<0.0061	ND<0.1
SB-2-15	15	111.53	3/30/04	ND<1.2	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.012	ND<0.0060	ND<0.012	ND<0.0060	ND<0.0060	ND<0.1
SB-2-20	20	106.53	3/30/04	ND<1.2	ND<0.0062	ND<0.0062	ND<0.0062	ND<0.0062	ND<0.012	ND<0.0062	ND<0.012	ND<0.0062	ND<0.0062	ND<0.1
SB-2-23	23	103.53	3/30/04	ND<1.2	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.012	ND<0.0060	ND<0.012	ND<0.0060	ND<0.0060	ND<0.1
SB-3-8.0	8	115.87	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	0.024	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-13	13	110.87	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	0.027	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-18	18	105.87	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	0.19	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-23.0	23	100.87	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	0.29	0.027	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-26.5	26.5	97.37	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-3-31.0	31	92.87	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
HP-3-39.5	39.5	84.37	10/15/04	ND<0.1	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
HP-3-46	46	77.87	10/15/04	ND<0.1	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-4-1.0	1	NM	5/7/04	350	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<25
SB-5-8	8	114.96	3/30/04	ND<1.1	ND<0.0056	ND<0.0056	ND<0.0056	ND<0.0056	ND<0.011	ND<0.0056	ND<0.011	ND<0.0056	ND<0.0056	ND<0.1
SB-5-16	16	106.96	3/30/04	ND<1.3	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	0.016	ND<0.0065	ND<0.013	ND<0.0065	0.0066	ND<0.1
SB-5-19	19	103.96	3/30/04	ND<1.2	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.012	ND<0.0059	ND<0.012	ND<0.0059	ND<0.0059	ND<0.1
SB-6-1.0	1	NM	5/7/04	ND< 1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.010	ND<0.0050	ND<0.01	ND<0.0050	ND<0.0050	ND<0.1
SB-7- 6.0	6	120.22	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-7- 11.5	11.5	114.72	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-7- 16.0	16	110.22	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	0.0056	ND<0.0050	ND<0.0050	NA
SB-7- 19.5	19.5	106.72	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-8-6.0	6	118.82	10/15/04	ND<0.1	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	0.048	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-8-14.0	14	110.82	10/15/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-8-16.0	16	108.82	10/15/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-8-25.0	25	99.82	10/15/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA

**Table 1**  
**Soil Analytical Data**  
 ARCO Service Station #2107  
 3310 Park Blvd, Oakland, CA

Soil Sample ID	Sample Depth (feet bgs)	Sample Elevation (feet msl)	Date Sampled	GRO/ TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	t-Butyl Alcohol (TBA) (mg/kg)	Methyl-tert butyl-ether (MTBE) (mg/kg)	Di-isopropal ether (DIPE) (mg/kg)	Ethyl-t-Butyl-Ether (ETBE) (mg/kg)	t-Amyl Methyl Ether (TAME) (mg/kg)	Ethanol (mg/kg)
SB-8-29.5	29.5	95.32	10/15/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.011</b>	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-9-10.5	10.5	112.29	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-9-13.5	13.5	109.29	10/14/04	ND<2.5	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<5.0	<b>0.56</b>	ND<0.025	ND<0.025	ND<0.025	NA
SB-9-17.5	17.5	105.29	10/14/04	ND<0.50	ND<0.025	ND<0.025	ND<0.025	ND<0.025	ND<0.10	<b>0.22</b>	ND<0.025	ND<0.025	ND<0.025	NA
SB-9-19.5	19.5	103.29	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.026</b>	<b>0.0069</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-10-6.5	6.5	115.29	10/20/04	<b>0.51</b>	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	<b>0.025</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-10-14.0	14	107.79	10/20/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.048</b>	<b>0.034</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-10-20.5	20.5	101.29	10/20/04	ND<2.5	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<5.0	<b>0.21</b>	ND<0.025	ND<0.025	ND<0.025	NA
SB-10-22.5	22.5	99.29	10/20/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	<b>0.059</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-10-31.5	31.5	90.29	10/20/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	<b>0.011</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-11-6.5	6.5	113.73	10/14/04	<b>0.31</b>	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-11-11.5	11.5	108.73	10/14/04	<b>220</b>	ND<0.25	ND<0.25	ND<0.25	ND<0.25	ND<0.25	ND<0.12	ND<0.12	ND<0.12	ND<0.12	NA
SB-11-16.5	16.5	103.73	10/14/04	<b>14</b>	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<5.0	ND<0.025	ND<0.025	ND<0.025	ND<0.025	NA
SB-11-21.5	21.5	98.73	10/14/04	<b>24</b>	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<5.0	ND<0.025	ND<0.025	ND<0.025	ND<0.025	NA
SB-11-26.0	26	94.23	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	<b>0.012</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA
SB-11-28.5	28.5	91.73	10/14/04	ND<0.10	ND<0.0050	ND<0.0050	ND<0.0050	<b>0.012</b>	ND<0.020	<b>0.022</b>	ND<0.0050	ND<0.0050	ND<0.0050	NA

Notes:

- 1) Samples analyzed by EPA method 8260B.
- 2) Concentrations above laboratory reporting limits in **bold**.

bgs = below ground surface

GRO = Gasoline Range Organics

mg/kg = milligrams per kilogram

msl = mean sea level

NA = Not analyzed

ND< = Not detected below stated laboratory reporting limit

NM = Not measured

TPH-g = Total petroleum hydrocarbons as gasoline

**Table 2**  
**Groundwater Analytical Data**

ARCO Service Station #2107  
3310 Park Blvd, Oakland, CA

Sample ID	Elevation (msl)	Sample Depth/ Interval (feet bgs)	Sample elevation (msl)	Date Sampled	GRO/ TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	t-Butyl Alcohol (TBA) (µg/L)	MTBE (µg/L)	Di-isopropal ether (DIPE) (µg/L)	Ethyl-t-Butyl-Ether (ETBE) (µg/L)	tert-Amyl Methyl Ether (TAME) (µg/L)	Ethanol (µg/L)
SB-1	128.26	18.5	109.8	03/30/04	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<50
SB-2	126.532	23	103.532	03/30/04	ND<50	ND<0.50	<b>1.4</b>	ND<0.50	ND<1.0	ND<5.0	ND<0.50	ND<1.0	ND<0.50	ND<0.50	ND<50
SB-3	123.867	32	91.867	05/07/04	<b>88</b>	ND<0.50	ND<0.50	ND<0.50	ND<1.0	<b>110</b>	<b>34</b>	ND<1.0	ND<0.50	<b>1.1</b>	ND<50
SB-5	122.964	19.5	103.464	03/30/04	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	<b>45</b>	<b>34</b>	ND<1.0	ND<0.50	ND<0.50	ND<50
HP-3-35	123.867	31-35	88.9- 92.9	10/15/04	ND<50	<b>0.64</b>	<b>10</b>	<b>1.5</b>	<b>8.9</b>	ND<5.0	<b>3.8</b>	ND<1.0	ND<0.50	ND<0.50	ND<50
HP-4-18	126.217	18-22	104.2- 108.2	10/14/04	<b>140</b>	<b>1.6</b>	<b>38</b>	<b>5.4</b>	<b>27</b>	ND<20	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA
HP-4-30	126.217	26-30	96.2- 100.2	10/14/04	<b>96</b>	<b>0.91</b>	<b>23</b>	<b>3.5</b>	<b>17</b>	ND<20	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA
HP-5-18	124.821	18-22	102.8- 106.8	10/20/04	ND<50	ND<0.50	<b>7</b>	<b>0.94</b>	<b>6.2</b>	ND<20	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA
HP-5-29	124.821	25-29	95.8- 99.8	10/20/04	ND<50	ND<0.50	<b>9.2</b>	<b>1.2</b>	<b>7</b>	ND<20	ND<0.50	ND<0.50	ND<0.50	ND<0.50	NA
HP-6-8	122.792	8-12	110.8- 114.8	10/14/04	ND<250	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<100	<b>92</b>	ND<2.5	ND<2.5	ND<2.5	NA
HP-6-20	122.792	16-20	102.8- 106.8	10/14/04	<b>170</b>	ND<1.0	<b>15</b>	<b>2.9</b>	<b>16</b>	<b>76</b>	<b>82</b>	ND<1.0	ND<1.0	ND<1.0	NA
HP-6-30	122.792	26-30	92.8- 96.8	10/14/04	<b>72</b>	ND<0.50	<b>13</b>	<b>2.2</b>	<b>13</b>	ND<20	<b>6.6</b>	ND<0.50	ND<0.50	ND<0.50	NA
HP-7-20	121.791	16-20	101.8- 105.8	10/20/04	<b>1300</b>	ND<10	ND<10	ND<10	ND<10	ND<400	<b>1200</b>	ND<10	ND<10	ND<10	NA
HP-7-30	121.791	26-30	91.8- 95.8	10/20/04	ND<5,000	ND<50	ND<50	ND<50	ND<50	ND<2,000	<b>3700</b>	ND<50	ND<50	ND<50	NA
HP-8-27	120.229	23-27	93.2- 97.2	10/15/04	ND<2,500	ND<25	<b>28</b>	ND<25	<b>28</b>	ND<1,000	<b>2100</b>	ND<25	ND<25	ND<25	NA
HP-8-34	120.229	30-34	86.2- 90.2	10/15/04	ND<2,500	ND<25	ND<25	ND<25	ND<25	ND<1,000	<b>880</b>	ND<25	ND<25	ND<25	NA

Notes:

- 1) Groundwater samples analyzed by EPA method 8260B.
- 2) Concentrations above laboratory reporting limits in **bold**.
- 3) SB- indicates groundwater grab sample from bottom of soil boring. HP- indicates depth distrete groundwater sample using a hydropunch.

bgs = below ground surface

ESL =Environmental Screening Level

GRO = Gasoline Range Organics

(mg/L) = micrograms per litre

msl =Mean sea level

MTBE = methyl tertiary butyl ether.

NA = Not Analyzed

ND< = Not detected below stated laboratory reporting limit

TPH-g = Total petroleum hydrocarbons as gasoline



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**LOG OF BORING**

Borehole ID: SB-7

Total Depth: 30 ft

PROJECT INFORMATION	DRILLING INFORMATION
Project: Soil and Water Investigation	Drilling Company: Vironex
Site Location: 3310 Park Blvd., Oakland, CA	Driller: Paul White
Project Manager: Scott Robinson	Type of Drilling Rig: Geoprobe 6610DT
RG: Bob Horwath	Drilling Method: 2" Direct Push
Geologist: Kevin Uno	Sampling Method: Continuous Core
Job Number: 38486908.0013601	Date(s) Drilled: 10/14/04

BORING INFORMATION	
Groundwater Depth: 16'	Boring Location: Along curb at E 34th St. entrance to Site.
Air Knife or Hand Auger Depth: Air knife to 5' bgs	Boring Diameter: 2"
Coordinates: X -122.2345316 Y 37.8032140	Boring Type: Exploratory

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
-126	0		ASPHALT: 3"	GP				Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
	1		SANDY CLAYEY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity.					
-124	2		CLAYEY SILT: (2.5Y 2.5/1) Black. 75% silt, 25% clay. Moderately stiff, moist, low to medium plasticity.	ML				
	3		60% silt, 40% clay. Medium plasticity.					
	4		SILTY SAND: (2.5Y 3/2) Very dark greyish brown. 65% fine sand, 30% silt, 5% clay. Loose, moist to wet, low plasticity.	SM				
-120	6		SANDY SILT: (2.5Y 4/2) Dark grayish brown. 65% silt, 20% sand, 15% clay, trace gravel. Stiff, moist, low plasticity.	ML		SB-7-6.0		
	7		NO RECOVERY		0			
-118	8		NO RECOVERY					
-116	10		CLAYEY SILT: (2.5Y 4/2) Dark grayish brown. 75% silt, 15% clay, 10% sand. Stiff, moist, medium plasticity.	ML				
-114	12		Oxidation, mottling (Very dark gray and olive).			SB-7-11.5		
	13		NO RECOVERY					
-112	14		NO RECOVERY					
-110	16		SANDY CLAYEY SILT: (2.5Y 4/2) Dark grayish brown. 65% silt, 25% sand, 10% clay. Mottling (Very dark gray and olive), stiff, moist to wet, medium plasticity.		0	SB-7-16.0		
	17		NO RECOVERY		No Odor			
-108	18		SANDY CLAYEY SILT: (2.5Y 4/2) Dark grayish brown. 65% silt, 25% sand, 10% clay. Mottling (Very dark gray and olive), stiff, moist to wet, medium plasticity.		No Odor	SB-7-19.5		
	19		NO RECOVERY					
-106	20		NO RECOVERY					
	21		NO RECOVERY					
-104	22		NO RECOVERY					
	23		NO RECOVERY					
-102	24		NO RECOVERY					

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
		<p>CLAYEY SILT: Recovered cutting shoe: Olive. 85% silt, 15% clay, trace sand and clay. NO RECOVERY</p>	ML			
30		<p>GRAVELLY SILTY SAND: Recovered cutting shoe: Olive brown. 65% fine to coarse sand, 25% gravel, 10% silt. Moist to wet, no plasticity. EOB: Refusal @30.0' bgs.</p>	SW			





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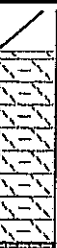


**LOG OF BORING**

Borehole ID: SB-8

Total Depth: 30 ft

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Soil and Water Investigation		Drilling Company: Vironex	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul White	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe 6610 DT	
RG: Bob Horwath		Drilling Method: 2" Direct Push	
Geologist: Kevin Uno		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 10/15/04	
BORING INFORMATION			
Groundwater Depth: 20'		Boring Location: Located in parking stall closest to E 34th St. entrance.	
Air Knife or Hand Auger Depth: Hand auger to 5' bgs		Boring Diameter: 2"	
Coordinates: X -122.2346152 Y 37.8032190		Boring Type: Exploratory	

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PIID (ppm)	Sample ID	Recovery	Comments
0	0		ASPHALT: 2"	GM				Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
-124	2		SANDY CLAYEY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity.					
-122	4		CLAYEY SILT: (2.5Y 2.5/1) Black. 88% silt, 10% clay, 2% sand. Moderately stiff, moist, low to medium plasticity.	ML				
-120	6		SANDY SILT: 70% silt, 20% fine sand, 10% clay. Stiff, moist to wet, low plasticity.			SB-8-6.0		
-118	8		CLAYEY SILT: (10Y 4/1) Dark greenish gray. 85% silt, 15% clay. Stiff, moist, medium plasticity.					Groundwater samples were collected from boring HP-5.
-116	10							
-114	12							
-112	14		CLAYEY SANDY SILT: (2.5Y 4/3) Olive brown. 70% silt, 15% clay, 15% sand. Stiff, moist to wet, medium plasticity.			SB-8-14		
-110	16		Mottling: Dark olive brown and olive brown.			SB-8-16.0		
-108	18							
-106	20					SB-8-19.5		
-104	22		NO RECOVERY					
-102	24							

Depth (ft. bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
100 26 98 28 96 30		CLAYEY SILT: 75% silt, 20% clay, 5% fine sand. Moderately stiff, moist, low to medium plasticity.	ML			
30		SILTY SAND: 65% fine sand, 30% silt, 5% clay. Moist to wet, no to low plasticity.	SM			
30		CLAYEY SILT: 70% silt, 30% clay. Very stiff, moist, medium plasticity.	ML		SB-8-29.5	30 ft. bgs: End of Boring



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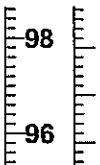


**LOG OF BORING**

Borehole ID: SB-9

Total Depth: 27.5 ft.

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Arco Site 2107 Soil and Water Investigation		Drilling Company: Vironex	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul White	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe 6610 DT	
RG: Bob Horwath		Drilling Method: 2" Direct Push	
Geologist: Kevin Uno		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 10/14/04	
BORING INFORMATION			
Groundwater Depth: 2.5 ft. bgs		Boring Location: Parking stall closest to Park Blvd..	
Air Knife or Hand Auger Depth: Airknife to 5' bgs		Boring Diameter: 2"	
Coordinates: X -122.2348093 Y 37.8031964		Boring Type: Exploratory	

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0	0		ASPHALT: 4"					
122	2		SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity.	GM				
120	4		GRAVELLY CLAY: (10GY 4/1) Dark greenish gray. 60% clay, 25% gravel, 15% silt. Stiff, wet, high plasticity.	CL				
118	6		NO RECOVERY					Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
116	8							
114	10		SANDY GRAVEL: (2.5Y 3/1) Very dark gray. 55% fine to medium subangular gravel, 30% fine to coarse sand, 10% silt, 5% clay. Stiff, wet, low plasticity.	ML		SB-9-10.5		
112	12		CLAYEY SILT: (2.5Y 5/3) Light olive brown. 80% silt, 20% clay. Mottling, stiff, wet, medium plasticity.			SB-9-13.0		
110	14		NO RECOVERY					
108	16		CLAYEY SILT: (2.5Y 5/3) Light olive brown. 80% silt, 20% clay. Mottling, stiff, wet, medium plasticity.	ML				Groundwater samples were collected from boring HP-6.
106	18		GRAVELLY SANDY SILT: 40% silt, 30% gravel, 25% sand, 5% clay. Mottling, stiff, wet, no to low plasticity.			SB-9-17.5		
104	20		SANDY SILT: 90% silt, 10% fine sand. Wet; low plasticity. Grades to silty sand.					
102	20		SILTY SAND: 60% fine sand, 40% silt. Wet; low plasticity. Grades to silty sand.	SM		SB-9-19.5		
102	20		SANDY GRAVELLY SILT: 50% silt, 25% sand, 15% gravel, 10% clay. Wet, no to low plasticity.	ML				
100	22		NO RECOVERY					
100	24		GRAVELLY SILT: 50% silt, 25% gravel, 10% fine sand, 15% clay.	ML				

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
		<p>Wet, no to low plasticity.</p> <p>SILTY SAND: 2.5Y 4/3 Olive brown. 70% sand, 30% silt. Moist, no plasticity.</p>	SM			



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**LOG OF BORING**

Borehole ID: SB-10

Total Depth: 32 ft.

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Arco Site 2107 Soil and Water Investigation		Drilling Company: Vironex	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul White	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe 6610 DT	
RG: Bob Horwath		Drilling Method: 2" Direct Push	
Geologist: Kevin Uno		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 10/20/04	
BORING INFORMATION			
Groundwater Depth: 1.3 ft. bgs		Boring Location: Middle of driveway on Park Blvd..	
Air Knife or Hand Auger Depth: Hand auger to 5' bgs		Boring Diameter: 2"	
Coordinates: X -122.2348842 Y 37.8031970		Boring Type: Exploratory	

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0	0		ASPHALT: 3"	GM				
120	2		SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. Gravel and concrete pieces (to 1.0 ft. bgs), sand, and clay. Loose, moist to wet, low plasticity.					
118	4		CLAYEY SILT: (10Y 2.5/1) Greenish black. 70% silt, 20% clay, 5% fine to coarse rounded sand and gravel. Stiff, moist, medium plasticity.	ML				
116	6		(2.5Y 4/3) Olive brown.			SB-10-6.5		Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
114	8							
112	10		Core sample sleeve destroyed from 10-13.5 ft. bgs.					
110	12							
108	14		Mottling.			SB-10-14.0		
106	16		NO RECOVERY					Groundwater samples collected from boring labeled as HP-7.
104	18		NO RECOVERY: Hydropunch: HP-7-20					
102	20		CLAYEY SANDY SILT: (5Y 4/2) Olive gray. 70% silt, 20% clay, 10% sand. Moderately stiff to stiff, moist, medium plasticity.	ML		SB-10-20.5		
100	22		SILTY SAND: (2.5Y 5/4) Light olive brown. 45% sand, 40% silt, 15% clay. Moist, dense, no to low plasticity.	SM				
98	24		CLAYEY SANDY SILT: (5Y 4/2) Olive gray. 70% silt, 20% clay, 10% sand. Moderately stiff to stiff, moist, medium plasticity.	ML		SB-10-22.5		

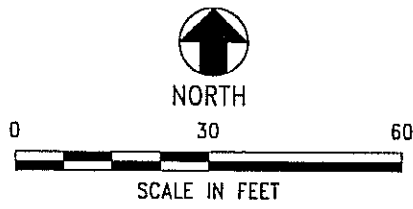
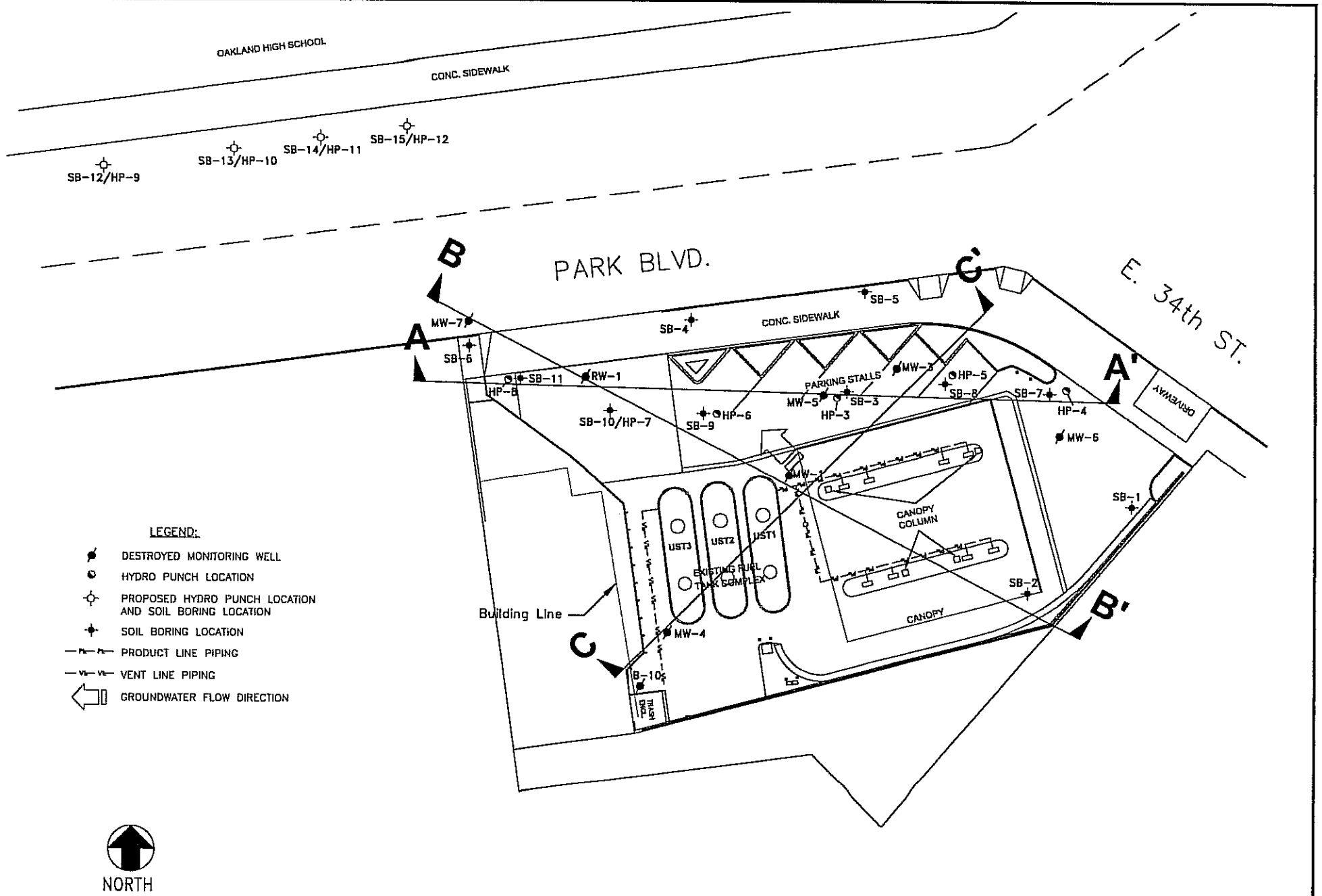
Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
96 26		NO RECOVERY				
94 28		NO RECOVERY: Hydropunch: HP-7-30				
92 30		GRAVELLY SILTY SAND: (2.5Y 4/3) Olive brown. 45% sand, 30% subangular to angular gravel, 20% silt, 5% clay. Moderately dense, moist, no plasticity.	SM			
90 32		Refusal: End of Boring at 32' bgs			SB-10-31.5	

PROJECT INFORMATION		DRILLING INFORMATION	
Project: Arco Site 2107 Soil and Water Investigation		Drilling Company: Vironex	
Site Location: 3310 Park Blvd., Oakland, CA		Driller: Paul White	
Project Manager: Scott Robinson		Type of Drilling Rig: Geoprobe 6610 DT	
RG: Bob Horwath		Drilling Method: 2" Direct Push	
Geologist: Kevin Uno		Sampling Method: Continuous Core	
Job Number: 38486908.0013601		Date(s) Drilled: 10/14/04	
BORING INFORMATION			
Groundwater Depth: 3.8 ft. bgs		Boring Location: W side of driveway on Park Blvd..	
Air Knife or Hand Auger Depth: Airknife to 5' bgs		Boring Diameter: 2"	
Coordinates: X -122.2349568 Y 37.8032163		Boring Type: Exploratory	

Elevation (ft msl)	Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
-120	0		ASPHALT: 6"					
	1		SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity.	GM ML				
-118	2		CLAYEY SILT: (10Y 2.5/1) Greenish black. 70% silt, 20% clay, 10% fine to coarse rounded gravel. Moderately stiff, moist, medium plasticity.					
-116	4							
-114	6		2.5Y 2.5/1 Black Increase to 10% fine to coarse sand; decrease clay.			SB-11-6.5		Boring grouted with neat Portland Cement. Top 3" finished to grade with cement.
-112	8							
-110	10		(5Y 4/2) Olive gray. 75% silt, 15% clay, 10% fine to coarse sand. Moist; Low to medium plasticity.					
-108	12		(2.5Y 5/1) Gray. Wet, soft.			SB-11-11.5		
-106	14							
-104	16		SANDY CLAYEY SILT: (5Y 4/2) Olive gray. 70% silt, 25% sand, 5% clay. Stiff, moist to wet, low plasticity.					
-102	18		(2.5Y 2.5/1) Black			SB-11-16.5		Groundwater samples were collected from boring HP-8.
-100	20		NO RECOVERY					
-98	22		SANDY CLAYEY SILT: (5Y 4/2) Olive gray. 65% silt, 20% fine to coarse sand, 10% clay. Low plasticity.	ML				
	24		(2.5Y 2.5/1) Black			SB-11-21.5		
	24		SILTY SAND: (5Y 5/3) Olive. 70% sand, 30% silt, trace gravel. Low plasticity.	SM				

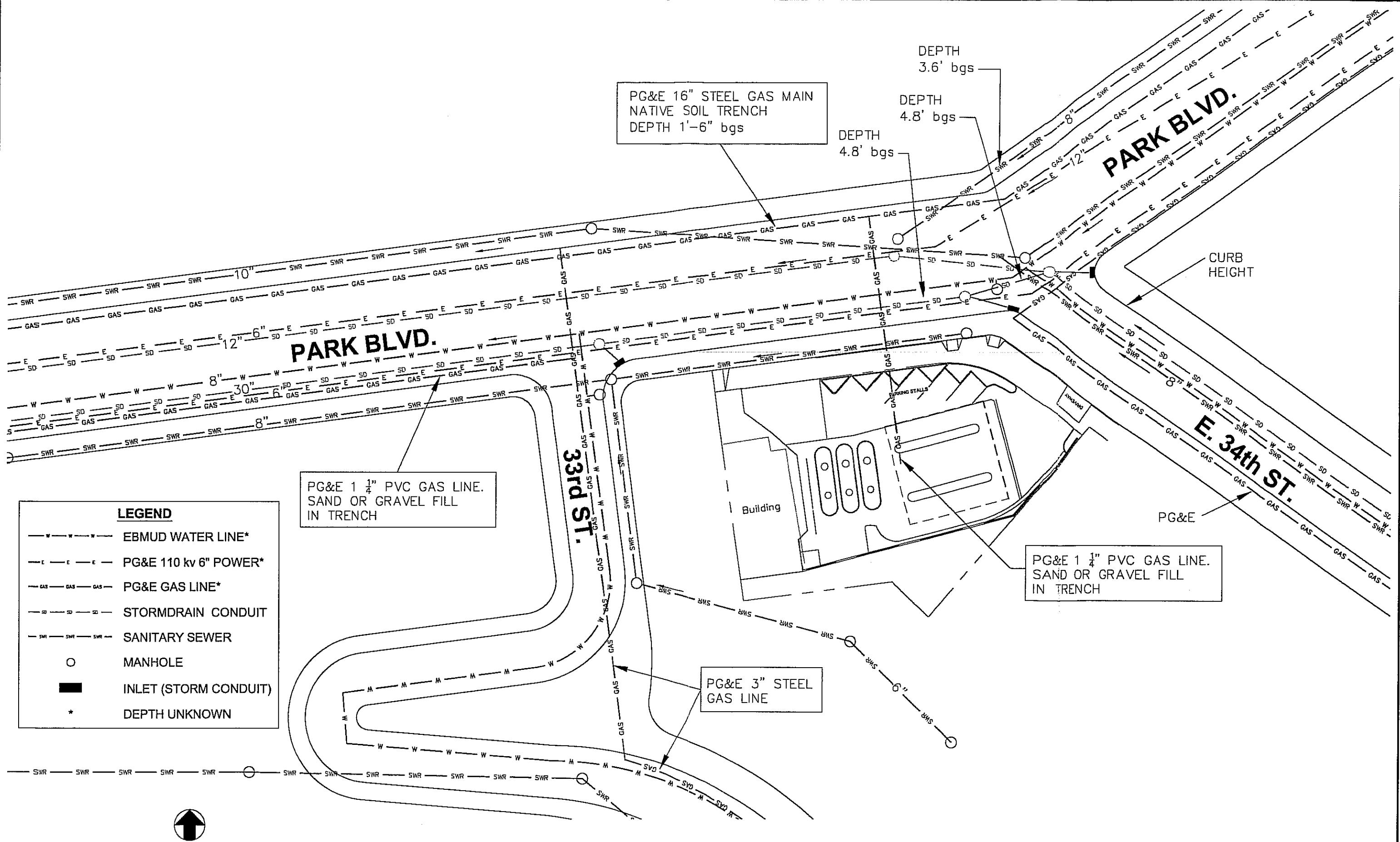
Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Recovery	Sample ID / Comments
96 94 26 28 92 30		<p>23.5 ft : Color change to (5G 4/1) dark greenish gray.</p> <p>GRAVELLY SILTY SAND: 65% sand, 20% gravel, 15% silt. Dense, wet, no plasticity.</p> <p>NO RECOVERY</p>			SB-11-26  SB-11-28.5	



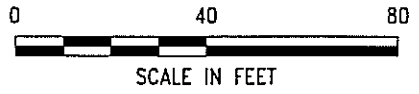


<b>URS</b>	Project No. 38487287	<b>PROPOSED OFFSITE SOIL BORING HYDROPUNCH LOCATIONS</b>	FIGURE <b>2</b>
	ARCO Service Station #2107 3310 Park Boulevard Oakland, California		

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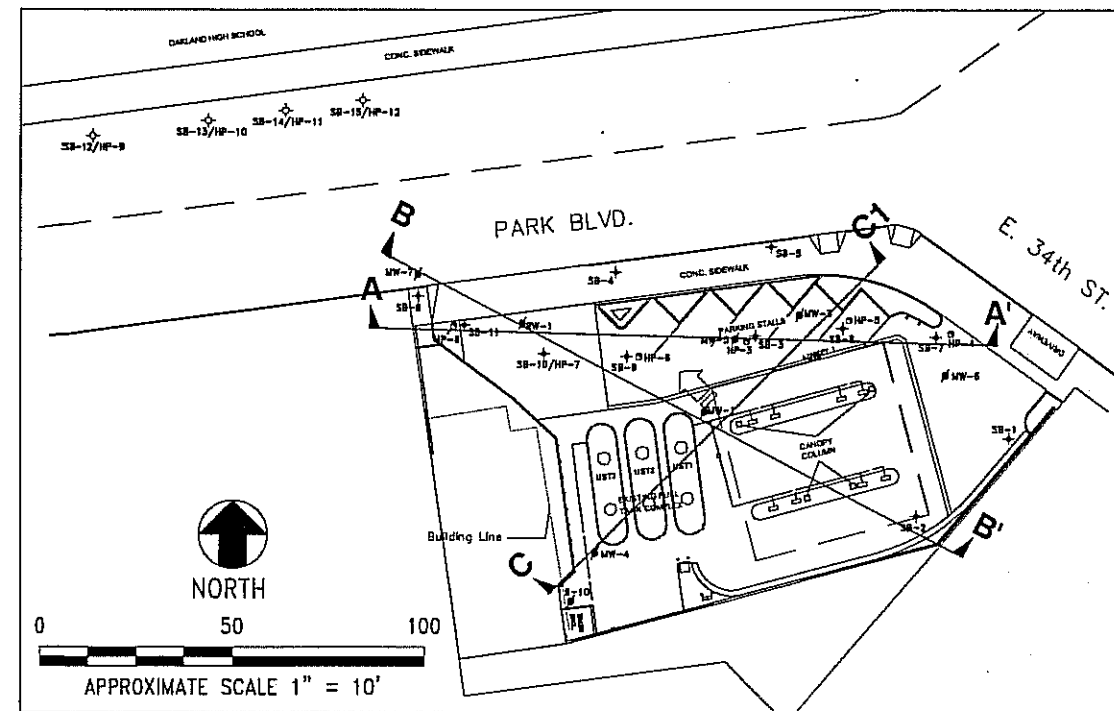
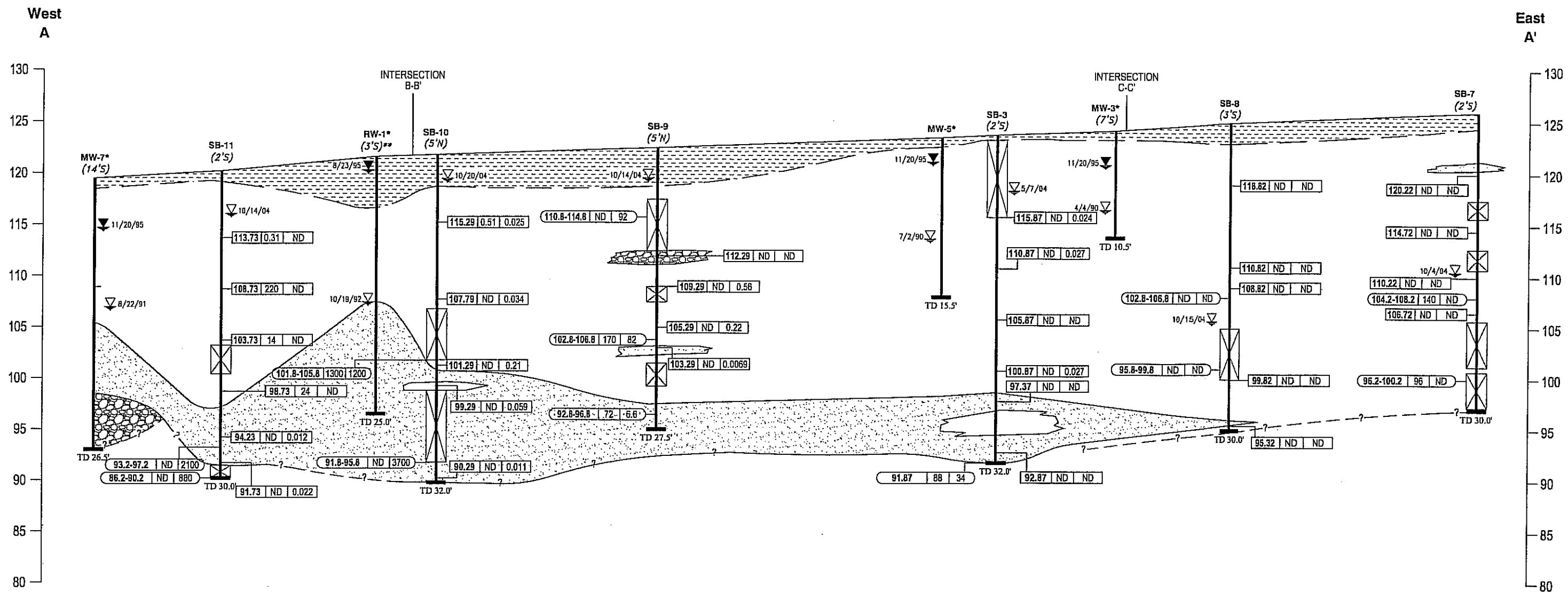


- LEGEND**
- W — W — W — EBMUD WATER LINE\*
  - E — E — E — PG&E 110 kv 6" POWER\*
  - GAS — GAS — GAS — PG&E GAS LINE\*
  - SD — SD — SD — STORMDRAIN CONDUIT
  - SWR — SWR — SWR — SANITARY SEWER
  - MANHOLE
  - INLET (STORM CONDUIT)
  - \* DEPTH UNKNOWN



<b>URS</b>	Project No. 38487287	<b>CONDUIT STUDY</b>	FIGURE <b>3</b>
	ARCO Service Station #2107 3310 Park Boulevard Oakland, California		

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**LEGEND**

- SP/SW/SC/SM [Pattern] Well to poorly graded sands or gravelly sands, minor to no fines.
- ML/CL [Pattern] Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
- GM/GP/GW [Pattern] Well to poorly graded gravel-sand mixtures, little to no fines.
- [Pattern] Fill/Asphalt
- ▽ First encountered groundwater
- ▽ Static water level
- Wells were destroyed in 1997
- \*\* RW-1 depth to water not measured 11/25/98

MW-7 (10'N) — Well or soil boring number  
 (10'N) — Distance in feet and direction of projection  
 [Symbol] — No recovery  
 TD 26.5' — Total depth 26.5 feet below ground surface  
 112.29 | ND | ND — MTBE (mg/kg)  
 — GRO (mg/kg)  
 — Soil sample elevation (ft/MSL)  
 86.2-90.2 | ND | 880 — MTBE (µg/L)  
 — GRO (µg/L)  
 — Groundwater sample elevation (ft/MSL)

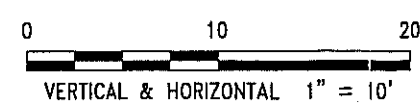
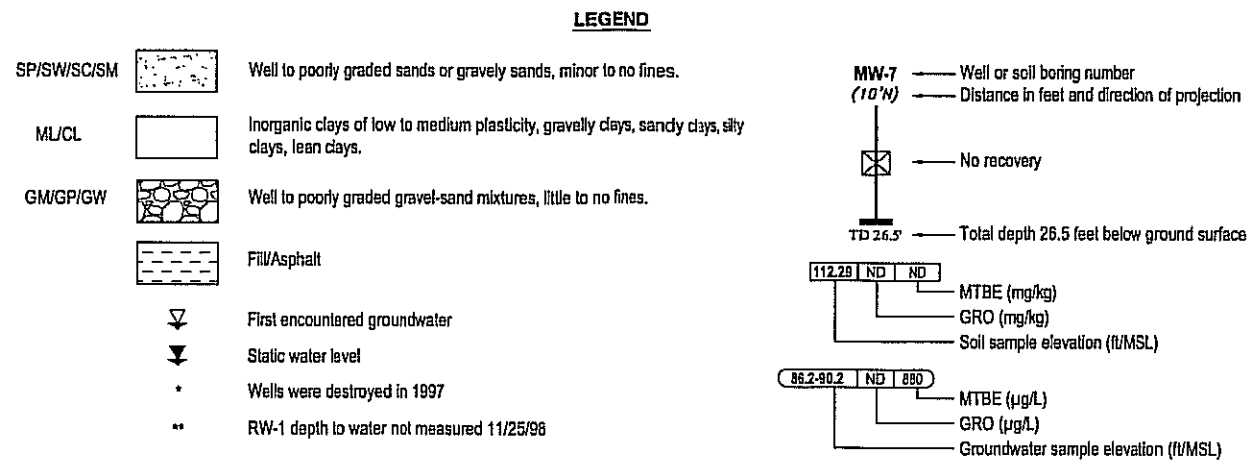
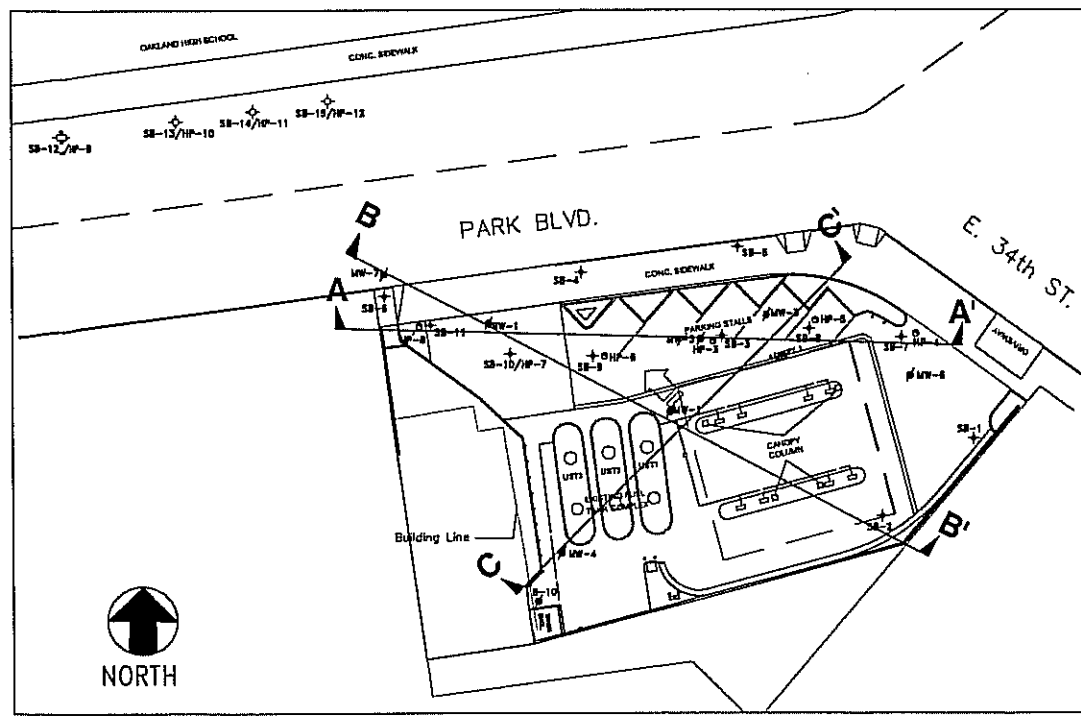
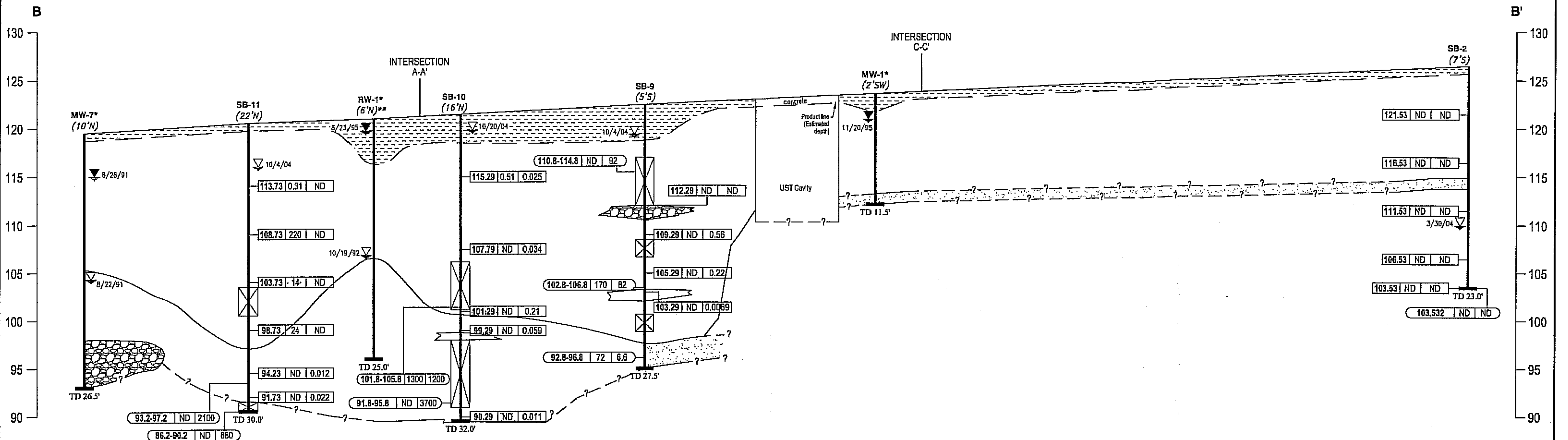
0 10 20  
 VERTICAL & HORIZONTAL 1" = 10'

<b>URS</b>	Project No. 38487194	<b>FIGURE</b> 4
	ARCO Service Station #2107	

**GEOLOGIC CROSS SECTION A - A'**

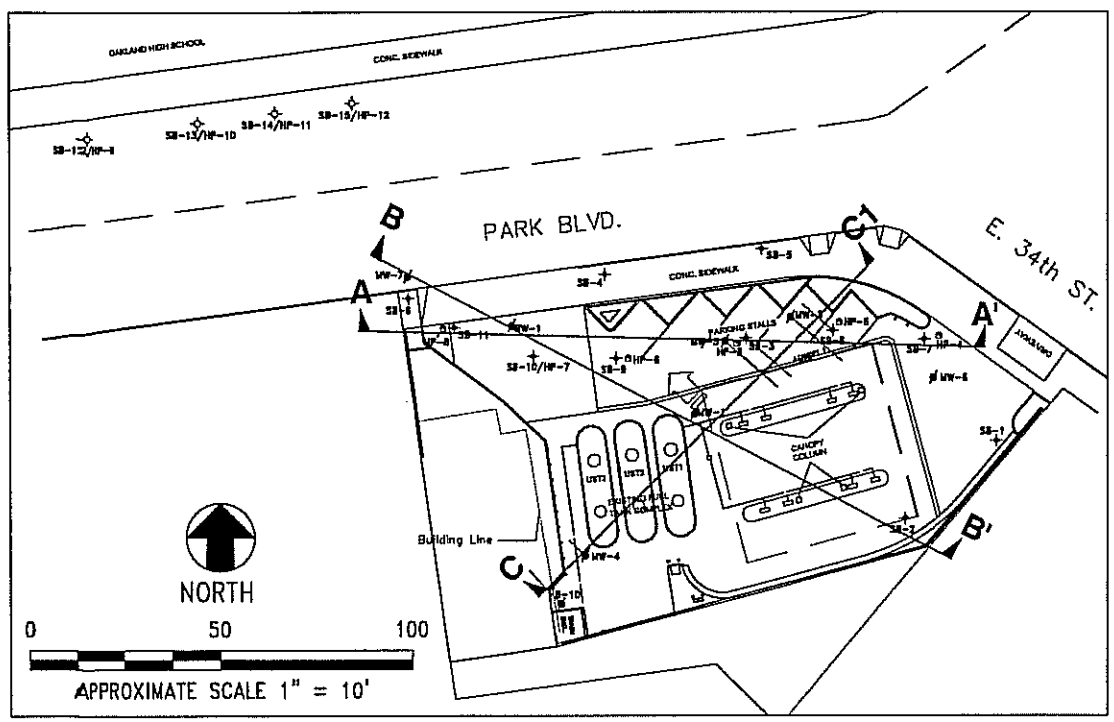
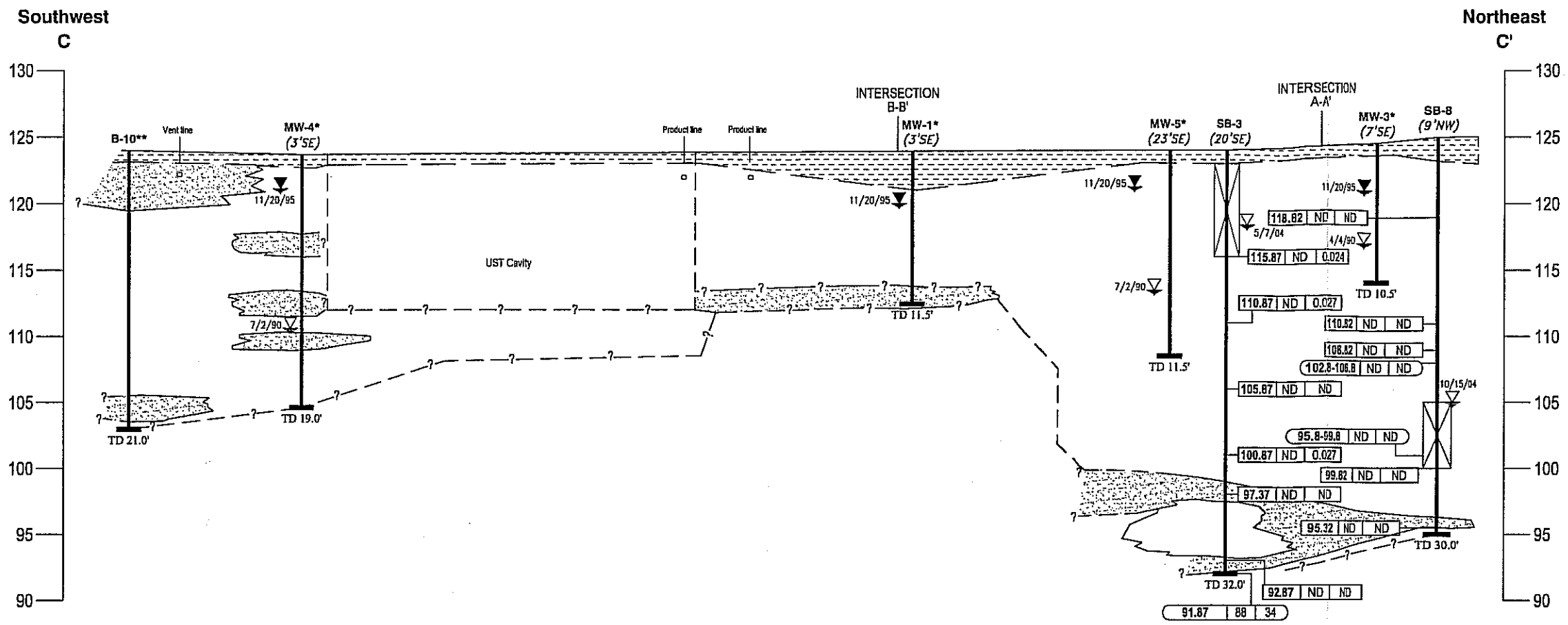
Northwest

Southeast



<b>URS</b>	Project No. 38487287	<b>GEOLOGIC CROSS SECTION B - B'</b>	FIGURE <b>5</b>
	ARCO Service Station #2107 3310 Park Boulevard Oakland, California		

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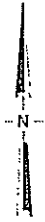


**LEGEND**

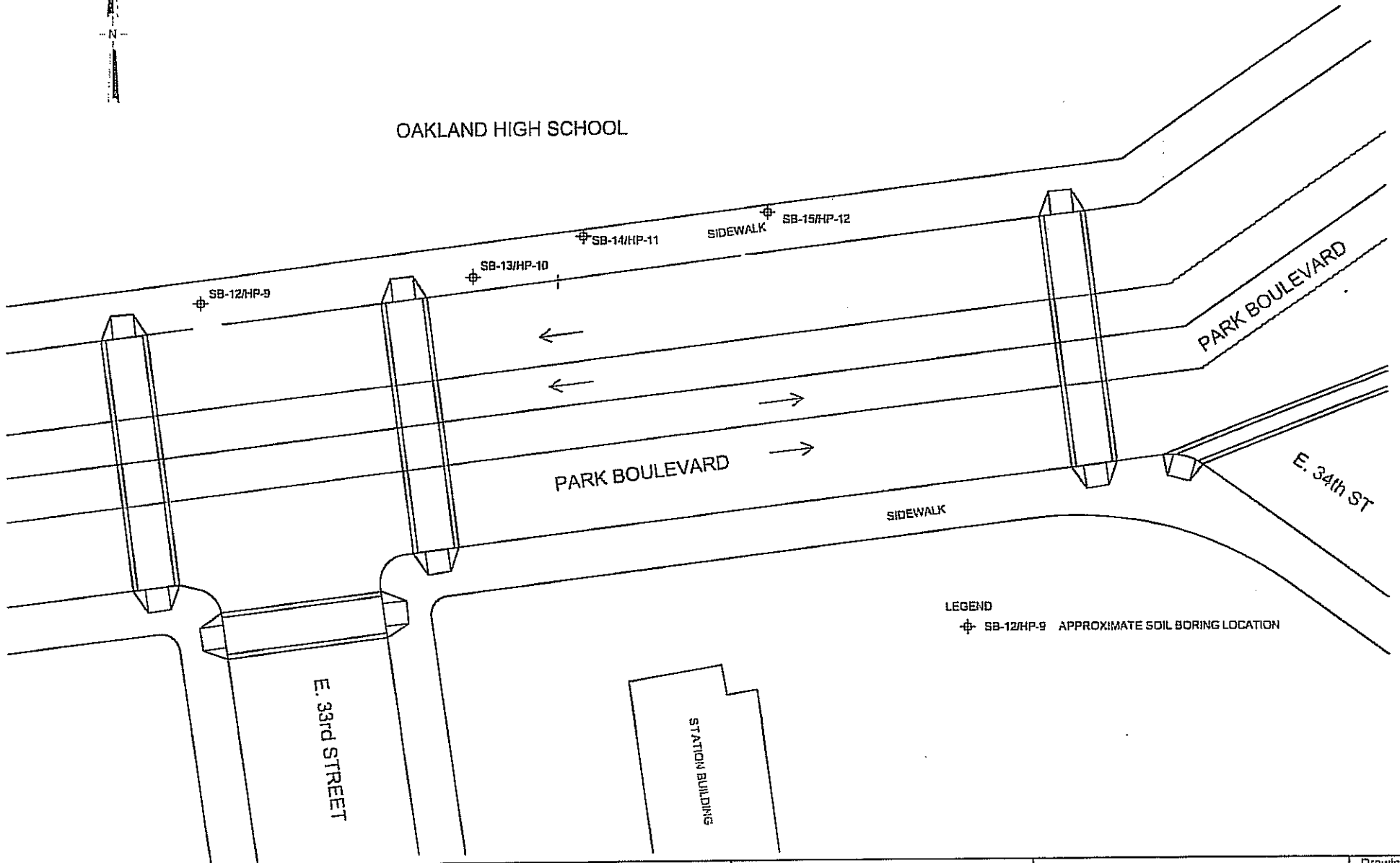
SP/SW/SC/SM		Well to poorly graded sands or gravely sands, minor to no fines.	SB-3	Well or soil boring number
ML/CL		Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays.	20'SE	Distance in feet and direction of projection
		Fill/Asphalt		No recovery
		First encountered groundwater	TD 32.0'	Total depth 32 feet below ground surface
		Static water level	100.87 ND ND	MTBE (mg/kg)
		Wells were destroyed in 1997		GRO (mg/kg)
		Lithology adapted from previous cross section (Resna, 1992)		Soil sample elevation (ft/MSL)
			91.87 88 34	MTBE (µg/L)
				GRO (µg/L)
				Groundwater sample elevation (ft/MSL)

	Project No. 38487287 ARCO Service Station #2107 3310 Park Boulevard Oakland, California	<b>GEOLOGIC CROSS SECTION C - C'</b>	FIGURE <b>6</b>
	APPROXIMATE SCALE 1" = 10' VERTICAL & HORIZONTAL 1" = 10'		

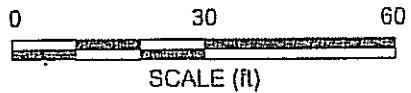
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OAKLAND HIGH SCHOOL



LEGEND  
⊕ SB-12/HP-9 APPROXIMATE SOIL BORING LOCATION



**BROADBENT & ASSOCIATES, INC.**  
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL  
1324 Mangrove Ave. Suite 212, Chico, California  
Project No.: 09-06-514 Date: 8/24/07

Station #2107  
3310 Park Boulevard  
Oakland, California

Site Plan

Drawing  
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**Table 1. Summary of Depth-Discrete Soil Sampling Data**  
**BP Service Station No. 2107**  
**3310 Park Boulevard, Oakland, California (ACEH Case No. RO0002526)**

Boring I.D.	Date	Laboratory Analytical Results (mg/kg)												
		GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	DIPE	ETBE	TBA	TAME	Ethanol	EDB	1,2 DCA
SB12-9	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB12-15	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	0.0087	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB12-23	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB12-27	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB13-11	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB13-15	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB13-21	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB13-29	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB14-9	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB14-15	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB14-19	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB14-29	6/26/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB15-9	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB15-17	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB15-23	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
SB15-29	6/25/2007	<0.10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.10	<0.0050	<0.0050
Soil Quality Objectives*		5.0	1.0	42	29	17	5.0	0.8	13	12	13	---	0.05	0.5

EDB = 1,2-Dibromoethane

1,2 DCA = 1,2 Dichloroethane

TAME = Tertiary amyl methyl ether

TBA = Tertiary butyl alcohol

GRO = Gasoline Range Organics, C4-C12

DIPE = Di-isopropyl ether

ETBE = Ethyl tert-butyl ether

MTBE = Methyl tert-butyl ether

\* = Water Quality Objectives compiled from the CRWQCB's *A Compilation of Water Quality Goals - August 2003* and from other CRWQCB sources.

**Table 2. Summary of Depth-Discrete Ground-Water Sampling Data  
BP Service Station No. 2107  
3310 Park Boulevard, Oakland, California (ACEH Case No. RO0002526)**

Boring I.D.	Date	Laboratory Analytical Results (µg/l)												
		GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	DIPE	ETBE	TBA	TAME	Ethanol	EDB	1,2 DCA
HP9-13	6/26/2007	51 <sup>1</sup>	<0.50	<0.50	<0.50	<0.50	67	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP9-21	6/26/2007	<50	<0.50	<0.50	<0.50	<0.50	7.4	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP10-16	6/26/2007	<50	<0.50	<0.50	<0.50	<0.50	0.78	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP10-24	6/26/2007	<50	0.80	<0.50	<0.50	<0.50	50	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP11-24	6/26/2007	59	0.63	<0.50	<0.50	<0.50	66	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP12-19	6/25/2007	<50	<0.50	<0.50	<0.50	<0.50	30	<0.50	<0.50	<20	<0.50	<300	<0.50	<0.50
HP12-25	6/25/2007	84 <sup>1</sup>	<1.0	<1.0	<1.0	<1.0	110	<1.0	<1.0	<40	<1.0	<600	<1.0	<1.0
Water Quality Objectives*		50	1.0	1.0	1.0	1.0	5.0	0.8	1.0	2	1.0	0.05	0.5	

EDB = 1,2-Dibromoethane  
 1,2 DCA = 1,2 Dichloroethane  
 TAME = Tertiary amyl methyl ether  
 TBA = Tertiary butyl alcohol

GRO = Gasoline Range Organics, C4-C12  
 DIPE = Di-isopropyl ether  
 ETBE = Ethyl tert-butyl ether  
 MTBE = Methyl tert-butyl ether

<sup>1</sup> = Hydrocarbon result partly due to individual peak(s) in quantitation range

\* = Water Quality Objectives compiled from the CRWQCB's *A Compilation of Water Quality Goals - August 2003* and from other CRWQCB sources.





SOIL BORING LOG

Boring No. SB-12

Sheet 1 of 2

Client ARCO Station No. 2107 Date 6/26/2007  
 Address 3310 Park Boulevard Drilling Company RSI rig type: Geoprobe 6600  
Oakland, CA Drilling Foreman Art  
 Project No. E-2107 Method Direct Push hole diam.: 2"  
 Logged By: Scott Bittinger

grout: 0 ft. to 28 ft.

Sample		Blow Count	Sample		Well Constr. ct.	Depth Scale	LITHO COLUMN	Descriptions of Materials and Conditions	PID (PPM)
Type	No.		Time	Recov.					
						1	Concrete		
						2			
						3	air knife to 7.2' bgs. Not logged.		
						4			
						5			
						6			
						7			
						8	SC CLAYEY SAND with SILT, 7.2'-8.5', light olive brown, 60% fine grained sand, 40% silty clay, moist		
						9	SP-SC SAND with CLAY 8.5'-9.2', light olive brown, 90% fine grained sand, 10% silty clay, damp		
S	SB12-9		11:36			10	CL SILTY CLAY 9.2'-11.2', light olive brown, 0-10% fine grained sand, dry, stiff	0	
						11			
S	SB12-11		11:38			12	SP-SC SAND with CLAY and SILT, 11.2'-14', dark yellowish brown, 85-90% fine grained sand, 10-15% silty clay, damp to wet	0	
						13			
						14			
						15	SC CLAYEY SAND 14'-15.8', grayish brown, 50-60% fine grained sand, 40-50% silty clay, moist		
S	SB12-15		11:42			16		0	
						17			
S	SB12-17		11:45			18	SW-SC SAND with CLAY and SILT 15.8'-22', fine to coarse grained, 5% fine gravel, 10-15% silty clay, damp to wet	0	
						19			
S	SB12-19		11:47			20		0	

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 28 feet bgs. Boring backfilled to surface grade with neat cement.





SOIL BORING LOG

Boring No. SB-13

Sheet 1 of 2

Client ARCO Station No. 2107 Date 6/25/2007  
 Address 3310 Park Boulevard Drilling Company RSI rig type: Geoprobe 6600  
Oakland, CA Drilling Foreman Art  
 Project No. E-2107 Method Direct Push hole diam.: 2"  
 Logged By: Scott Blittinger  
 grout: 0 ft. to 30 ft.

Sample Type	Sample No.	Blow Count	Sample		Well Constr. ct.	Depth Scale	LITHO COLUMN	Descriptions of Materials and Conditions	PID (PPM)
			Time	Recov.					
						1	Concrete		
						2			
						3	air knife to 7.2' bgs. Not logged.		
						4			
						5			
						6			
						7			
						8	SC CLAYEY SAND 7.2'-10', very dark gray, 55% fine grained sand, 45% clayey fines, damp		
						9			
S	SB13-9		13:53			10	CL SILTY CLAY 10'-12', olive brown, moist, stiff	1	
						11			
S	SB13-11		13:59			12	SANDY CLAY with SILT 12'-12.8', olive gray, 65% silty clay, 35% fine grained sand, moist, stiff	3.5	
						13	CL SILTY CLAY 12.8'-13.6', olive gray, moist, stiff		
S	SB13-13		14:02			14	SANDY CLAY with SILT 13.6'-14', dark yellowish brown, 70% silty clay, 30% fine grained sand, moist		
						15	SC CLAYEY SAND 14'-16.5', dark yellowish brown, 70-90% fine grained sand, 10-30% silty clay, damp		
S	SB13-15		14:07			16		0	
						17	SW-SC SAND with CLAY and SILT, 16.5'-18', dark yellowish brown, fine to coarse grained, 5% fine gravel, 10-15% silty clay, damp to wet		
S	SB13-17		14:09			18		0	
						19	CL SILTY CLAY 18'-20', light olive gray with iron oxide staining, moist, stiff		
S	SB13-19		14:12			20		0	

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.





SOIL BORING LOG

Boring No. SB-14

Sheet 1 of 2

Client ARCO Station No. 2107 Date 6/26/2007  
 Address 3310 Park Boulevard Drilling Company RSI rig type: Geoprobe 6600  
Oakland, CA Drilling Foreman Art  
 Project No. E-2107 Method Direct Push hole diam.: 2"  
 Logged By: Scott Bittinger

grout: 0 ft. to 30 ft.

Sample		Blow Count	Sample		Well Construc. c.L.	Depth Scale	LITHO COLUMN	Descriptions of Materials and Conditions	PID (PPM)
Type	No.		Time	Recov.					
						1	Concrete		
						2			
						3	air knife to 6.5' bgs. Not logged.		
						4			
						5			
						6			
						7			
						8	SC CLAYEY SAND with SILT, 6.5'-11.5', light olive brown 6.5'-10', dark yellowish brown 10'-11.5', 50-65% fine grained sand, 35-50% silty clay, moist		
						9			
S	SB14-9		8:44			10			
						11			
S	SB14-11		8:46			12	CL SILTY CLAY with SAND 11.5'-12', dark yellowish brown, 85% silty clay, 15% fine grained sand, moist		
						13	SC CLAYEY SAND with SILT, 12'-13.3', grayish brown, 60% fine grained sand, 40% silty clay, moist		
S	SB14-13		8:48			14	CL SILTY CLAY 13.3'-15', grayish brown, 8% fine grained sand, dry to moist, stiff		
						15			
S	SB14-15		8:50			16	SP-SC SAND with CLAY and SILT 15'-16', fine grained, 7-10% silty clay, damp		
						17	CL SANDY CLAY with SILT 16'-17.2', grayish brown, 80% silty clay, 20% fine grained sand, moist		
S	SB14-17		8:52			18	SC CLAYEY SAND with SILT, 17.2'-20', grayish brown to light olive brown, 55-65% fine grained sand, 35-45% silty clay, moist		
						19			
S	SB14-19		8:54			20		0	

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.





**SOIL BORING LOG**

Boring No. SB-15

Sheet 1 of 2

Client	ARCO Station No. 2107	Date	6/25/2007
Address	3310 Park Boulevard Oakland, CA	Drilling Company	RSI rig type: Geoprobe 6600
Project No.	E-2107	Drilling Foreman	Art
Logged By:	Scott Bittinger	Method	Direct Push hole diam.: 2"
grout: 0 ft. to 30 ft.			

Sample Type	Sample No.	Blow Count	Sample		Well Construct.	Depth Scale	LITHO COLUMN	Descriptions of Materials and Conditions	PID (PPM)
			Time	Recov.					
						1	Concrete		
						2			
						3	air knife to 6.5' bgs. Not logged.		
						4			
						5			
						6			
						7			
S	SB15-7		11:28			8	CL SILTY CLAY 6.5'-8.3', dark grayish brown, moist, stiff	0	
						9			
S	SB15-9		11:30			10	SC CLAYEY SAND with SILT 9.3'-12', dark yellowish brown, 80% fine to coarse grained sand, 20% silty clay, damp	0	
						11			
S	SB15-11		11:33			12	SC CLAYEY SAND 12'-13.5', grayish brown, 85% fine grained sand, 15% silty clay, moist	0	
						13			
						14	CL SILTY CLAY 13.5'-16.5', light olive brown, moist, stiff		
						15			
						16			
						17			
S	SB15-17		12:20			18	SP-SC SAND with CLAY and SILT 16.5'-18', dark yellowish brown, 85% fine grained sand, 5% medium grained sand, 10% silty clay, wet	0	
						19			
S	SB15-19		12:22			20	SW SAND with CLAY and SILT 18'-27', fine to coarse grained, 5% fine gravel, 10% silty clay, wet	0	

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.





