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February 11, 2002

FEB 14 2002

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Sensitive Receptor Survey, Well Survey, Conduit Study and Cross-Sectional Diagram Report**
Former Shell Service Station
461 8th Street
Oakland, California
Incident #97093399
Cambria Project #244-1501

Dear Mr. Chan:

On behalf of Equiva Services LLC, Cambria Environmental Technology, Inc. (Cambria) is submitting this *Sensitive Receptor Survey, Well Survey, Conduit Study and Cross-Sectional Diagram Report*. The work was performed in response to an April 11, 2001 Alameda County Health Care Services (ACHCSA) letter. The scope of work was recommended in our May 11, 2001 *Agency Response* and approved in a July 2, 2001 ACHCSA letter. Presented below are the site summary, sensitive receptor survey, well survey, conduit study and cross-sectional diagram results, and our conclusions and recommendations.

SITE SUMMARY

Site Description: The site is currently a paved parking lot located at the southwest corner of the intersection of 8th Street and Broadway in Oakland, California (see Figure 1). The property was leased by American Oil Company from at least 1965 until 1972 when the lease was assigned to Shell Oil Products Company (Shell). A Shell service station operated on the property from 1972 to 1980. The underground storage tanks (USTs) associated with the former Shell service station were removed after Shell terminated operations at the site in May 1980.

Site History: In January 1979, separate phase hydrocarbons (SPH) were reported in a Bay Area Rapid Transit (BART) tunnel under the intersection of 7th Street and Broadway. Product line testing at the site indicated a pressure leak, and the product lines were replaced in January 1979. The USTs were also tested for tightness and passed. According to the *Bart Recovery Project Log* (chronological list of events – 1/10/97 through 12/3/81) and a 1981 Groundwater Technology, Inc. *Considerations on Infiltration of Gasoline into BART KE Line* report, one observation well is

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reported to have been drilled to a depth of 25 feet concurrent with piping replacement with no reports of contamination. Separate-phase product samples taken from the BART tube in January 1979 and in May 1981 identified the product as Shell Regular. Approximately 2,600 gallons (48 55-gallon drums) of a gasoline-and-water mixture are reported to have been removed from the BART tunnel between October 1979 and April 1980. The Shell station discontinued operation in May 1980, and all existing improvements, tanks and associated piping were removed at that time. It is unknown whether a UST and piping removal report exists; to date, it has not been located.

Seven monitoring wells (L-1 through L-7) were installed in 1981. Based on recommendations following this investigation, a recovery well was installed in the vicinity of well L-6 (now re-named S-6) in 1982. According to a September 14, 1993 GeoStrategies Inc. (GSI) *Work Plan*, groundwater extraction from the recovery well began in February 1982 and continued until August 1982, when the system was shut down because the effluent discharge exceeded permitted discharge levels.

Wells L-1 through L-3 were destroyed during construction in the mid-1980's and are no longer accessible. Records of the well destructions are not available. Wells L-4, L-5 and L-6 were renamed S-4, S-5 and S-6. Gettler-Ryan Inc. began gauging wells S-4 through S-6 in 1986 and collecting groundwater samples for analysis in 1988. A November 2, 1993 *Work Plan for Soil and Groundwater Sampling* prepared by Enviros, Inc. (Enviros) indicates that groundwater was extracted from wells S-5 and S-6 by bailing or by a vacuum truck beginning in October 1988.

Information collected by GSI and reported in a June 30, 1993 *Phase I Preliminary Site Assessment* identified seven sites with known UST leaks within a ¼-mile radius of the site. One of the seven sites identified is the Oakland Police Department site, which was noted in the *Bart Recovery Project Log* (Attachment A) to have replaced leaking USTs in October 1979 and to have accepted product deliveries by a local Shell gasoline distributor. During a review of available regulatory files, GSI noted a permit to repair the product lines and dispensers at the Oakland Police Department parking lot taken out in 1984 by Egan and Paradiso Company, but no additional information was available. It appears that no environmental investigation has been conducted for this site.

In July 1994, nine soil borings were installed in the vicinity of the former pump islands and the former USTs at the site. Investigation activities are described in an August 16, 1994 Enviros *Site Investigation Report.* The maximum total petroleum hydrocarbons as gasoline (TPHg) and benzene concentrations reported in soil samples were 15 parts per million (ppm) and 0.24 ppm, respectively, collected near the former pump islands. No TPHg or benzene was reported in the area of the former piping or the former UST locations.

In December 1994, onsite monitoring wells S-8, S-9 and S-10 were installed. Investigation activities are described in a February 14, 1995 Enviros *Site Investigation Report and Quarterly Monitoring Report – First Quarter 1995*. Except for 0.014 ppm benzene in sample S-8-21.5, no TPHg or benzene was reported in soil samples collected from wells S-8 and S-9. Except for 760 ppm TPHg and 0.0032 benzene reported in sample S-10-11.5, no TPHg or benzene was reported in soil samples collected from well S-10.

Groundwater Monitoring: Periodic gauging of the site wells began at the site in 1981, and quarterly groundwater monitoring began in late 1988. Depth-to-water has ranged historically between 12.82 and 25.84 feet below grade (fbg), and typically flows south/southwest. Historical groundwater monitoring data indicates that onsite monitoring wells S-8, S-9 and S-10 have reported TPHg concentrations ranging from below method detection limits to 4,800 parts per billion (ppb) and benzene concentrations ranging from 1.0 ppb to 1,800 ppb. No SPH have been reported onsite. Prior to 1998, offsite well S-5 consistently reported SPH. Wells S-5 and S-6 have historically reported up to 142,000 ppb TPHg and 29,000 ppb benzene. Currently, Blaine Tech Services, Inc. (Blaine) extracts groundwater from wells S-5 and S-6 during quarterly monitoring activities.

SENSITIVE RECEPTOR SURVEY, WELL SURVEY, CONDUIT STUDY, AND CROSS-SECTION DIAGRAM RESULTS

Sensitive Receptor Survey: Cambria reviewed maps of the site vicinity to evaluate the presence of potential sensitive receptors including surface water bodies, churches, schools, hospitals and wells within a ½-mile radius of the site. Based on a review of the Oakland West California USGS topographic quadrangle, the Oakland Inner Harbor, located approximately 2,400 feet south-southwest of the site at its closest point, is the only surface water body within the survey radius.

One school, located approximately 1,300 feet west of the site, is noted on the quadrangle within the ½-mile radius. Seven churches are noted on the quadrangle, all located between approximately 1,100 feet and 2,600 feet either west, north or east of the site.

A review of the 2001 Alameda County Thomas Guide confirmed the location of the Inner Harbor and the one school noted on the quadrangle, and showed two additional schools located approximately 1,800 feet northeast and 2,100 feet east of the site.

Well Survey: Cambria contacted the California Department of Water Resources (DWR) in Sacramento, California for records of wells within a ½ miles radius of the site. The DWR provided a total of 177 well completion report forms or equivalents, many of which documented multiple wells. These forms identified one irrigation well, two destroyed wells and one cathodic protection well within ½-mile of the site. Based on a groundwater flow direction of south to southwest for the site, the only well located in the general downgradient direction from the site is the cathodic protection well. This well is located approximately 1,300 feet south-southeast of the site and is sealed to its total depth. The remaining reports provided by the DWR were for monitoring wells, geotechnical borings or wells located outside the study area, none of which are shown on Figure 1. Results of the well survey are summarized in Table 1 and shown on Figure 1. Given the confidential nature of the DWR well information, copies of these records are not included in this report.

Utility Survey A utility conduit survey was performed to determine the location of potential preferential pathways in the site vicinity. Conduit trenches are often back-filled will materials which are more permeable than the surrounding native soils, and therefore provide preferential pathways for petroleum hydrocarbon migration. The utility survey consisted of reviewing maps and plans acquired from the City of Oakland Engineering Department, the East Bay Municipal Utility District (EBMUD), and the Pacific Gas and Electric Company (PG&E). Conduit locations, diameters and depths are mapped on Figure 2.

According to conversations with EBMUD, water mains in the vicinity are typically buried approximately 8 fbg. PG&E indicated that gas and electrical lines in the vicinity are typically buried between 2 and 3 fbg. City of Oakland engineering maps indicate flow-line elevations of the sanitary sewer to be between 13.5 and 17.5 feet above mean sea level (msl), and the flow-line elevations of storm drain lines to be approximately 13.3 feet above msl. Historical depths-to-groundwater at the site have ranged from 12.82 to 25.84 fbg, which corresponds to groundwater elevations between approximately 0.2 to 8.22 feet above msl. Based on this information, utility lines identified do not encounter groundwater, and are therefore not likely to affect groundwater flow.

Cambria also reviewed maps of the BART lines in the site vicinity. Locations of the lines are mapped on Figure 2. Based on the reviewed maps, there are five tunnels east of the site which join to one tunnel south of Seventh Street. The tunnels are approximately 18 feet in height, and the tops of three of the tunnels are at approximately 18 to 20.5 fbg, and the tops of the other two tunnels are at approximately 42 to 42.5 fbg. Therefore, these tunnels do encounter groundwater. Based on a groundwater flow direction at the site ranging from south to southwest, the BART lines parallel groundwater flow. Assuming that these lines were tunneled rather than dug and

installed, there would be no trenching and no backfill material around the tunnels. Based on this, it would be reasonable to assume that groundwater would not preferentially travel along the BART lines.

Cross-Sectional Diagrams: Cambria prepared two cross-sectional diagrams using boring logs for wells along a northwest to southeast transect across the site, perpendicular to groundwater flow direction (Figure 3), and for a northeast to southwest transect across the site, parallel to groundwater flow direction (Figure 4). The cross-sections present the observed soil types, the depth-to-first-observed groundwater during drilling, the static depth-to-water in existing wells as measured on July 25, 2001, and utility conduit and BART line locations. The soil-type descriptions include the interpreted soil permeability divided into low permeability soils (e.g., clayey sand and clay), high permeability soils (e.g., poorly graded sand) and fill material. As shown on the geologic cross-sections, the subsurface in the site vicinity mainly consists of high permeability soils with sparse low permeability intervals. South of the site across Seventh Street, the subsurface consists mainly of lower permeability soils with intervals of higher permeability soils.

CONCULSIONS

The sensitive receptor survey presented herein indicates that no known water-producing wells are located within ½-mile radius of the site. The nearest surface water body is the Oakland Inner Harbor, located approximately 2,400 feet south-southwest of the site.

The utility study completed indicates that utility conduits in the area do not encounter groundwater, and therefore do not act as preferential pathways for hydrocarbon migration. The BART lines in the area do encounter groundwater; however, they likely do not serve as preferential pathways because they parallel groundwater flow direction and likely do not have permeable back-fill surrounding them.

As stated previously, no SPH has ever been identified onsite. Recent TPHg and benzene concentrations in onsite wells S-8, S-9 and S-10 range from non-detect to 500 ppb and 1.45 ppb to 70 ppb, respectively. Up to 71,000 ppb TPHg and 9,800 ppb benzene have recently been reported in downgradient wells S-5 and S-6. The utility survey reported herein did not identify any preferential pathways which would allow hydrocarbon migration to bypass downgradient well S-9 and reach wells S-5 and S-6. Laws of chemical fate and transport dictate that SPH will never be identified at higher levels at any point downgradient of their source area. Based on data which shows that hydrocarbon concentrations are consistently lower in onsite wells S-8 through

S-10 and that no preferential pathways were identified between known source areas and wells S-5 and S-6, it is not possible that the contamination levels detected in these wells originated from the site.

RECOMMENDATIONS

We understand that the ACHCSA is evaluating other potential off-site sources for the SPH detected in wells S-5 and S-6. Shell, and recently Equiva, have coordinated groundwater extraction from wells S-5 and S-6 since 1993. At this time, Cambria recommends suspension of groundwater extraction from wells S-5 and S-6 pending ACHCSA's off-site source review. Cambria will contact the ACHCSA to ensure their concurrence prior to the second quarter 2002 monitoring event and direct Blaine to discontinue extraction at that time.

CLOSING

We appreciate the opportunity to work with you on this project. Please call Jacquelyn Jones at (510) 420-3316 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc

Jacquelyn L. Jones
Project Geologist

Diane M. Lundquist, P.E.
Principal Engineer

Figures: 1 - Vicinity/Area Well Survey Map
2 - Underground Utility Locations and Underground BART Lines
3 - Geologic Cross Section A-A'
4 - Geologic Cross Section B-B'

Table: 1 - Well Survey Results

Attachment: A - Bart Recovery Project Log

cc: Karen Petryna, Equiva Services LLC, P.O. Box 7869, Burbank, California 91510-7869
Rory Campbell, Hanson, Bridgett, Marcus, Vlahos, & Rudy, 333 Market Street, Suite 2300, San Francisco, California 94105-2173
Wells Fargo Bank National Association, Tr. (Property Owners), c/o Pacific Property, 364 Bush Street, San Francisco, CA 94104-2805
R. Casteel & Co., P.O. Box 6839, Moraga, California 94570

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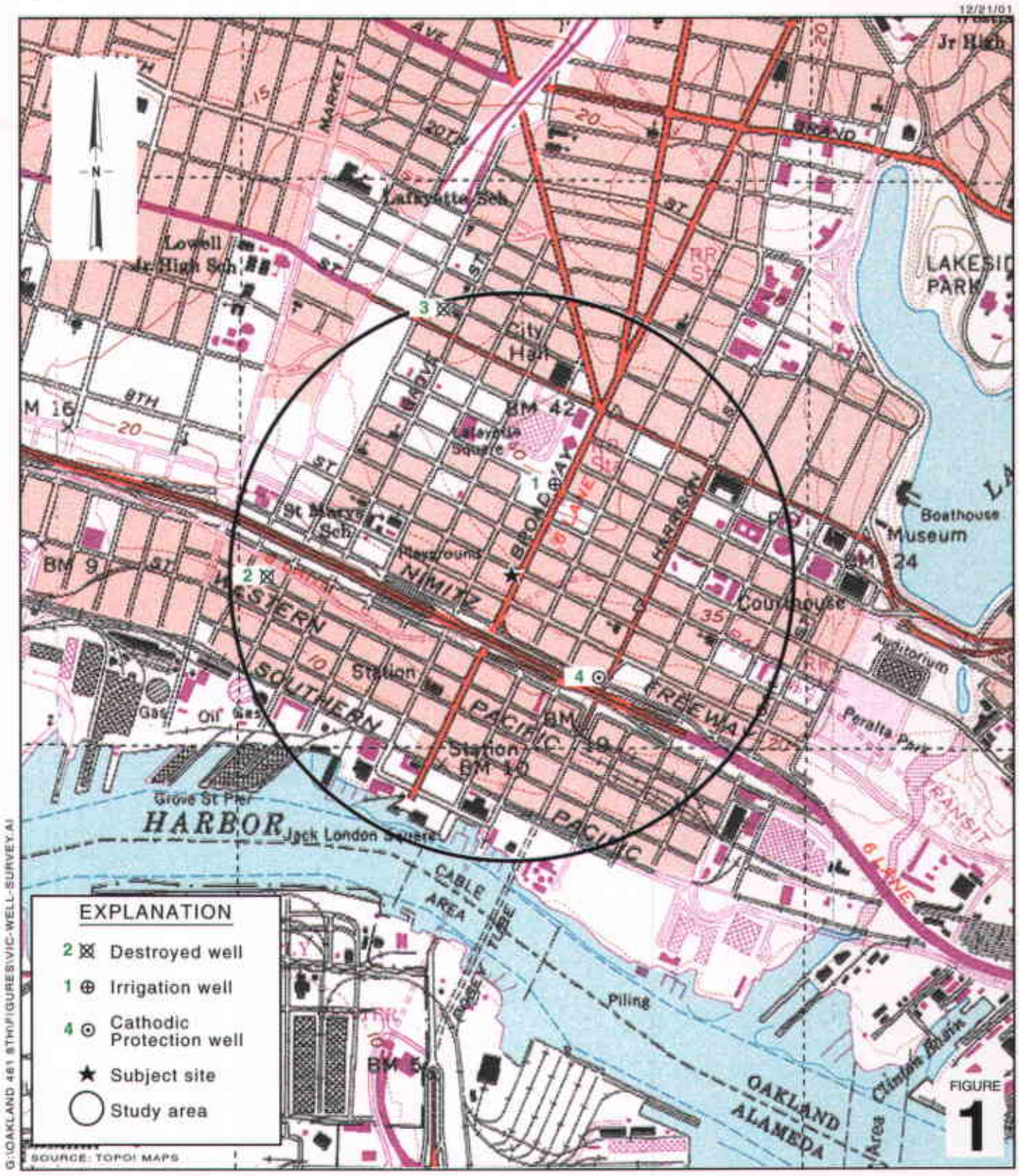

FIGURE 1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Former Shell Service Station
461 Eighth Street
Oakland, California
Incident #97093399

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Vicinity / Area Well Survey Map

1/2 Mile Radius

10/12/2021

Underground Utility Locations and Underground BART Lines

EIGHTH STREET

SEVENTH SRTEET

SIXTH STREET

BROADWAY

Former Chevron Station

A'

A

B

B'

S-1

S-4

S-5
FL = 13.27'

S-6

S-8

S-9

S-10

Former Shell Station

dispenser islands

dispenser islands

6" W

SS

3" Gas

8" W

SS

16" SS

12" W

FL = 16.50'

8" Gas

18" SD

8" Gas

8" W

14" SS

MH

FL = 17.50'

FL = 13.25'

MH

FL = 13.90'

MH

8" SS

MH

FL = 17.00'

8" W

4" Gas

SS

MH

FL = 19.12'

8" W

12" Gas

16" Gas

12" W

SS

EXPLANATION

- MW-1 — Chevron monitoring well
- MW-1 — Abandoned monitoring well
- MH — Manhole
- FL = 16.50' — Flow line depth below ground surface
- Flow direction indicator
- Underground BART line
- Storm Drain line
- Water line
- Sanitary Sewer line
- Pacific Bell line
- Gas line
- Electrical line
- A — A' Cross Section transect line

0 25 50 100

Scale (ft)

FIGURE

2

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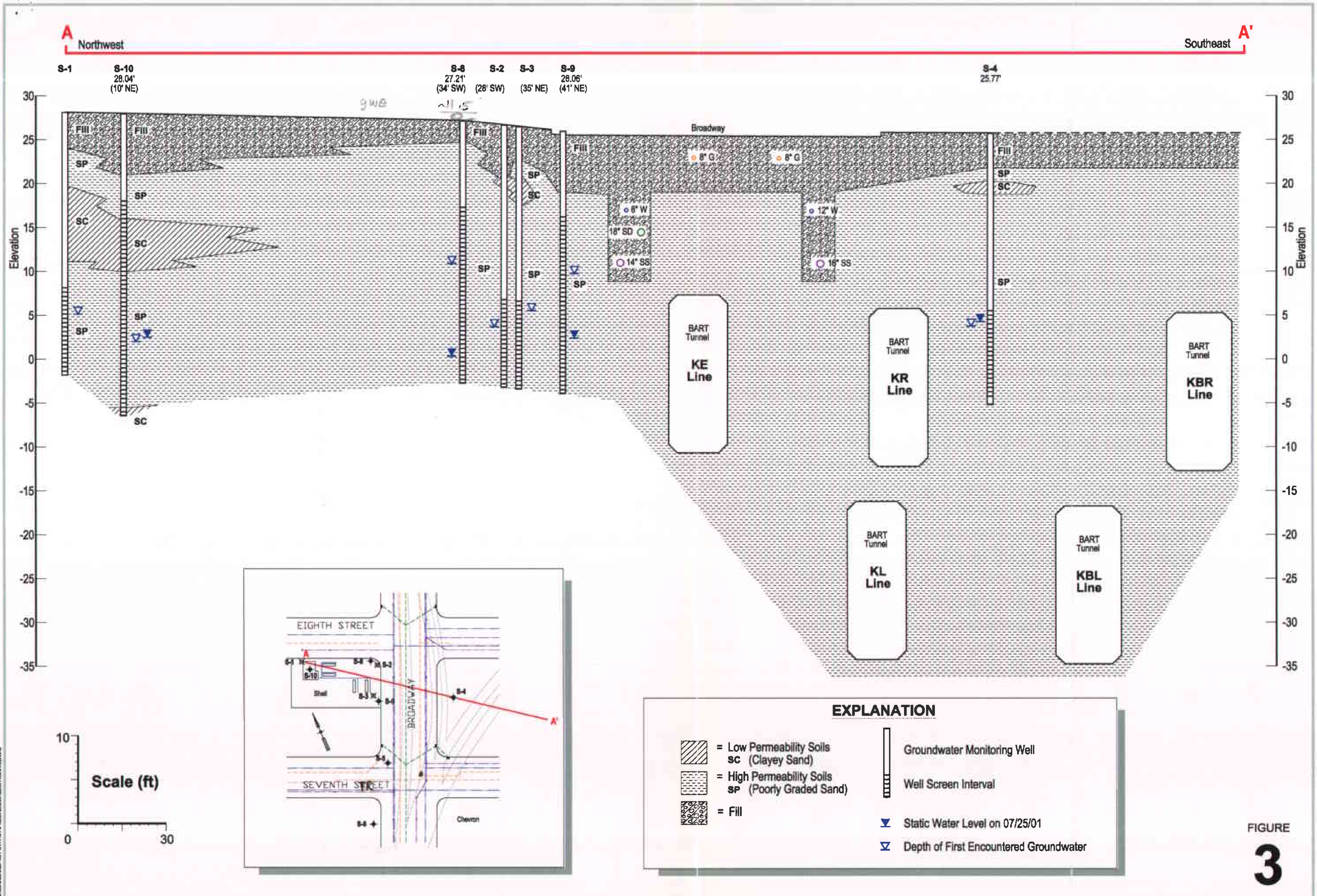
Former Shell-branded Station

461 Eighth Street

Oakland, California

G:\OAKLAND 461 EIGHTH\FIGURES\UTILITIES.DWG



01/03/02
A
Northwest
Southeast
A'
S-1
S-10
28.04'
(10' NE)
S-8
27.21'
(34' SW)
S-2
(28' SW)
S-3
(35' NE)
S-9
28.06'
(41' NE)
S-4
25.77'
gwe
~11.5
Broadway
Elevation
Fill
SP
SC
8" G
8" W
18" SD
14" SS
12" W
16" SS
BART Tunnel
KE Line
KR Line
KBR Line
KL Line
KBL Line
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
EIGHTH STREET
SEVENTH STREET
BROADWAY
Shell
Chevron
10
Scale (ft)
0
30
EXPLANATION
= Low Permeability Soils
SC (Clayey Sand)
= High Permeability Soils
SP (Poorly Graded Sand)
= Fill
Groundwater Monitoring Well
Well Screen Interval
Static Water Level on 07/25/01
Depth of First Encountered Groundwater

FIGURE 3

Geologic Cross Section A-A'

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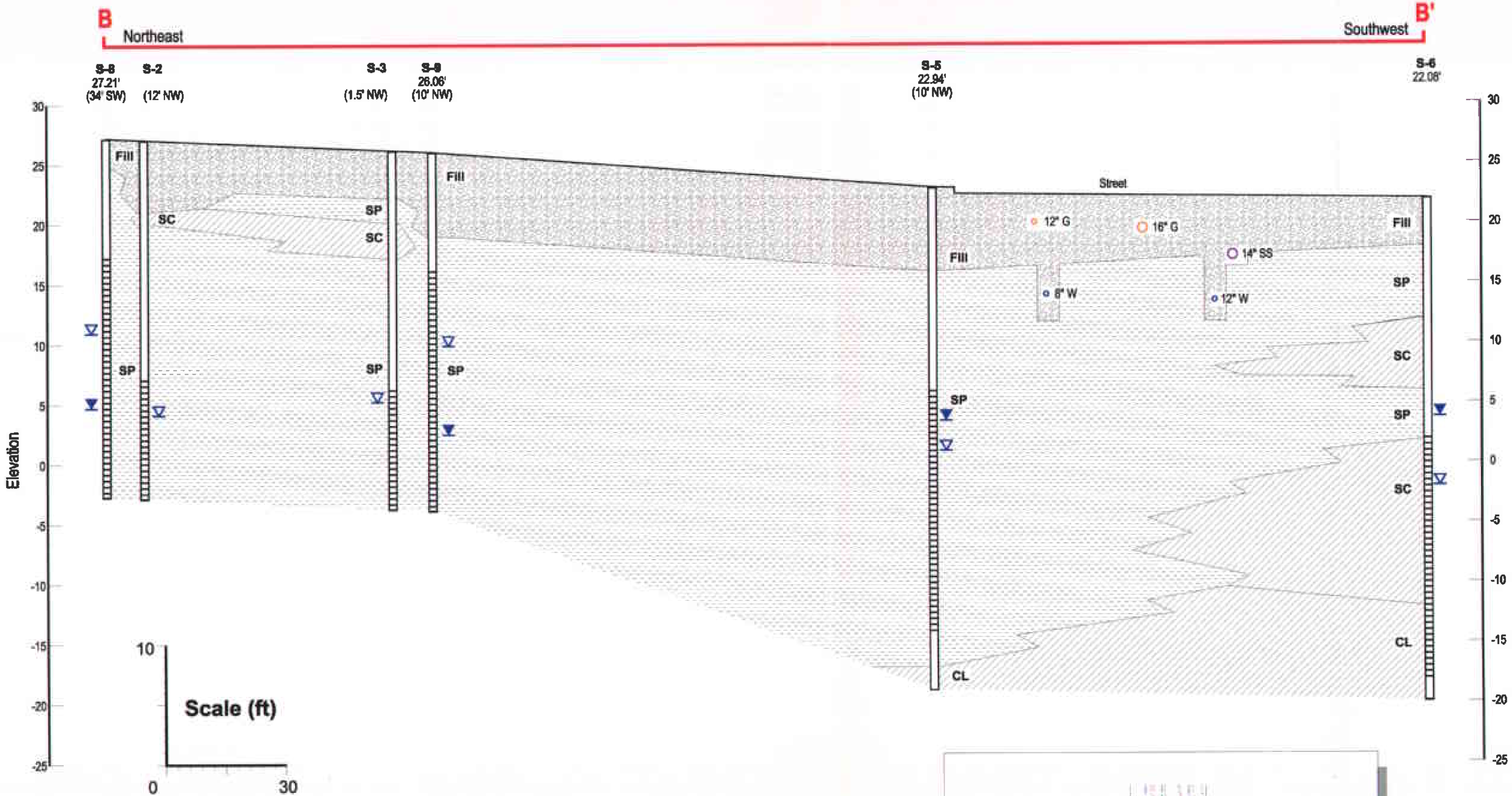
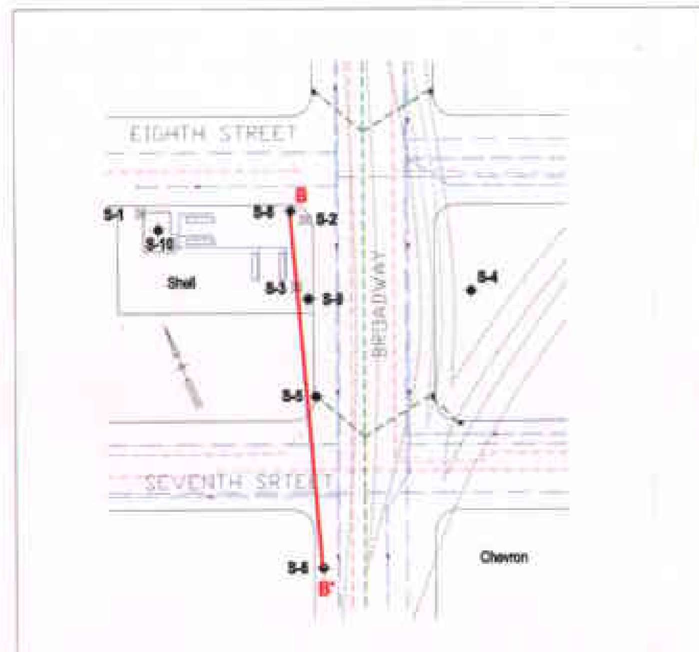
Former Shell Service Station
461 Eighth Street
Oakland, California

01/02/02



EXPLANATION

= Low Permeability Soils SC (Clayey Sand) CL (Clay)	Groundwater Monitoring Well
= High Permeability Soils SP (Poorly Graded Sand)	Well Screen Interval
= Fill	Static Water Level on 07/25/01
	Depth of First Encountered Groundwater



Geologic Cross Section B-B'

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FIGURE

4

Former Shell Service Station
461 Eighth Street
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