

C A M B R I A



**Site Conceptual Model  
And  
Workplan**

*For:*

**Former Chevron Station 9-0329  
340 Highland Avenue  
Piedmont, California**

*Submitted to:*

**Mr. Scott Seery  
Alameda County Environmental Health Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California**

October 21, 2003

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WORKPLAN**

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340 Highland Avenue  
Piedmont, California**

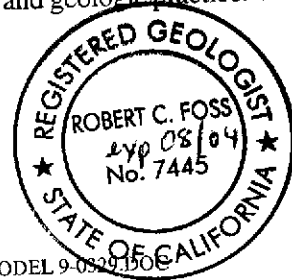
*Prepared by:*

**Cambria Environmental Technology, Inc.**  
5900 Hollis Street, Suite A  
Emeryville, California 94608

All work performed by Cambria Environmental Technology, Inc. for this project was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate and satisfy the scope of work prescribed by the client for this project. The data, findings, recommendations, specifications or professional opinions presented herein were prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied.

*Robert Foss for N. Scott MacLeod*

N. Scott MacLeod, R.G.  
Principal Geologist



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# CAMBRIA

## 1. OBJECTIVES

As required in a September 18, 2003 letter from the Alameda County Environmental Health Services (ACEHS), Cambria Environmental Technology Inc. (Cambria) has prepared this Site Conceptual Model for Fuel Leak Case No. R0269, Piedmont Chevron #9-0329 (dba Texaco Station), 340 Highland Ave., Piedmont. The driver for this work and the abbreviated schedule imposed by the ACEHS is apparently the City of Piedmont. We understand that the parcel upon which the station is located was apparently subdivided by the owner and either sold or developed outside the standard process for the City of Piedmont. This subdivision is affecting the normal pace of this project.

Our objective is to summarize site conditions, identify data gaps based on the previous investigations, and recommend future work to fill the data gaps. A summary of previous work and our conclusions and recommendations are presented below.

## 2. SITE BACKGROUND

The site is a former Chevron service station located at the intersection of Highland Avenue and Highland Way in Piedmont, California (Figure 1). Chevron sold the property and station facilities to Hoffman Investment Company in 1990. The site is currently operated as Texaco-branded station.

The site is on a south facing hillside and is approximately 345 feet above mean sea level (MSL) with a relatively steep topographic gradient (Figure 1). Surrounding land use is commercial, residential and recreational. Piedmont Park is across Highland Avenue immediately down-gradient of the site. The nearest surface water is a small creek located within Piedmont Park.

## 3. PREVIOUS ENVIRONMENTAL WORK

**1983 On-Site Well Installation:** In 1983, Gettler-Ryan installed groundwater monitoring wells C-1 through C-4 (Figure 2). Well C-2 contained  $\frac{3}{4}$ -inch of non-aqueous-phase liquid (NAPL) upon installation. No soil samples were collected during well installation. There is no groundwater analytical data from the wells until 1989. During the first sampling event in 1989, elevated hydrocarbon concentrations were detected in wells C-2 and C-4, with the highest concentrations detected in well C-2 (34,000 ug/l total petroleum hydrocarbons as gasoline [TPHg] and 580 ug/l benzene). Well C-1 was apparently never sampled. NAPL has not been encountered in any of the monitoring wells since sampling began in 1989. Historical figures are presented in Appendix A.

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**1990 On-Site Borings:** In November 1990, GeoStrategies drilled soil borings C-A through C-F on the site. Boring C-F was drilled between two USTs into and beneath the tank pit. The highest hydrocarbon concentrations detected were 1,600 mg/kg TPHg at 5.5 feet below grade (fbg) in C-A and 0.16 mg/kg benzene at 6.5 fbg in C-E.

**1993 Off-Site Soil Borings:** In 1993, Resna drilled shallow off-site borings and temporary wells B-1 through B-4. Groundwater samples could only be collected from borings B-2 and B-4. No hydrocarbons were detected in soil or groundwater. Resna also completed a survey of wells and potential hydrocarbon sources within 1 mile of the site. Forty-five wells were identified, but the locations were not plotted. Resna's well inventory table indicates that 11 were identified as irrigation wells, 17 as domestic, 9 as cathodic protection, 7 as monitoring wells and two of unidentified use. No municipal wells were identified in Resna's survey. Resna also identified Piedmont City Hall as a potential source of diesel subsurface impacts.

**1995 Off-Site Well Installation:** In May 1995, Canonic Environmental installed groundwater monitoring well MW-6. No petroleum hydrocarbons were detected in soil samples collected from the boring. The following day well MW-6 was flowing artesian and was subsequently destroyed. No water samples were collected.

**1996 Off-Site Well Installation:** In November 1996, Pacific Environmental Group (PEG) installed groundwater monitoring wells C-5 and C-6 across Highland Avenue. No hydrocarbons were detected in soil or groundwater.

**1998 Chromatogram Review:** In January 1998, Sierra Environmental Services worked with Superior Analytical Laboratory to review chromatograms for the presence of MTBE. No MTBE was detected in the in samples collected in 1989, 1991 or through the third quarter of 1992. The first indication of MTBE was 300 ug/l estimated in October 1992.

**1998 Well Survey:** In May 1998, PEG performed a water well and surface water survey of the site vicinity. PEG identified the City of Piedmont well #4, located 0.11 miles south of the site, and the creek in Piedmont Park as the nearest sensitive receptors. City of Piedmont well #4 appears to be used for irrigation at Piedmont Park and its completion depth and screened intervals are unknown. (untrue)

**2000 Utility Trench Investigation:** In March 2000, Cambria hand-augered borings U-1 through U-5 adjacent to utilities on and adjacent to the site to assess potential impacts from station operations. Because of drilling safety limitations, the borings were not augered within the utility backfill. The

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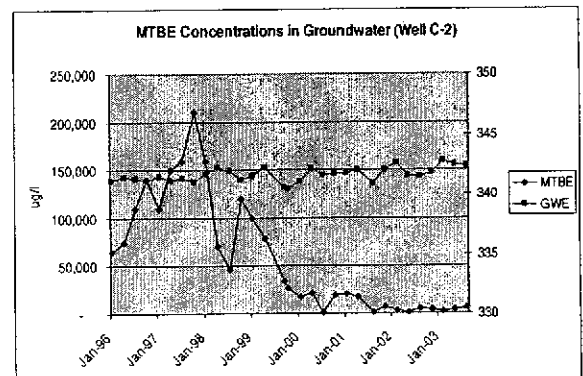
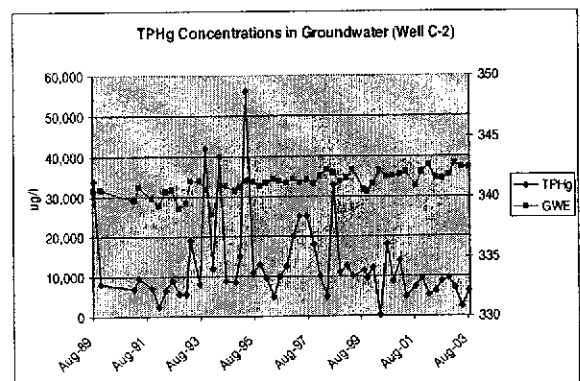
only TPHg detection was 1,900 mg/kg at 1 fbg in boring U-1, located adjacent to the sanitary sewer line at the southern end of the site. No benzene or MTBE were detected in soil. Groundwater from boring U-1 contained 1,000 ug/l TPHg and 39,000 ug/l MTBE. No benzene or fuel oxygenates other than MTBE were detected.

**2002 Utility Trench Investigation:** In March 2001, Delta Environmental attempted to hand-auger borings U-6 through U-10 within utility trench backfill. Borings U-6, U-8 and U-10 appear to have penetrated trench fill material and soil samples were collected from 5.5 to 6 fbg from these borings. No hydrocarbons were detected in soil. No water accumulated in the borings, therefore Delta concluded that the utility trenches did not appear to be conduits for preferential groundwater migration.

**2002 Risk-Based Corrective Action (RBCA) Assessment:** In July 2002, Delta submitted a Tier 2 RBCA. Delta concluded that benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations were below site specific target levels (SSTLs) for all pathways for residential site use, with the exception of groundwater ingestion. Two well surveys have identified wells in the area as domestic use. However, a high number of these wells were installed during the drought years of 1976-1977 and are likely used currently for irrigation, or not at all. Municipal water is supplied by East Bay Municipal Utility District (EBMUD) in Piedmont. Additionally, most of the wells identified as being of irrigation/domestic use appear to be located either up-gradient or cross-gradient of the subject site. Because groundwater beneath the site is not a drinking water source, Delta concluded that the SSTL exceedance for the groundwater ingestion pathway did not warrant additional action.

## 4. IDENTIFIED RELEASES

There are two to three generations of releases at the site. The fact that 3/4-inch of NAPL was detected in well C-2 upon installation in 1983 suggests a non-oxygenated fuel release prior to 1983. Increasing TPHg and benzene concentration trends from below saturation concentrations in well C-2 that peaked between 1993



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and 1995 indicates a likely second gasoline release (see adjacent graph). The third release is evidenced by increasing MTBE concentrations in C-2 that peaked in 1997 (see adjacent graph).

We did not locate copies of any filed Unauthorized Release Reports. The only evidence of releases is based on hydrocarbon detections in soil and groundwater.

## 5. SITE CONDITIONS

### 5.1. Site Geology

The site sits on a hillside that is underlain at shallow depths by siltstone and sandstone bedrock. Native sediments encountered during drilling were silts and sands that appear to be weathered siltstone and sandstone. Cross-sections parallel and perpendicular to the groundwater flow direction are presented in Figure 3. Based on these cross-sections, the bedrock/sediment interface parallels surface topography and results in a thin veneer of weathered material overlying more competent bedrock. Boring logs are presented in Appendix B.

The transition between weathered material and competent bedrock is somewhat gradational and subject to interpretation by the six different consultants that have logged borings at the site. The ACEHS was concerned that the log for well MW-6 may indicate deeper bedrock in this area compared to other areas. However, the materials logged deeper than about 5 fbg in well MW-6 are likely the same siltstones and sandstones that were logged elsewhere at the site for the following reasons:

- Blow counts increase to 50 or more per 6 inches below about 5 fbg in well MW-6, and these blow counts were similar to those logged for other borings where sandstone and/or siltstone was logged.
- Sediments in well MW-6 below about 5 fbg were logged as very dense, which would be consistent with siltstone and sandstone.
- The log for materials below about 5 fbg in well MW-6 is homogenous silty sand to the total depth explored, which would be typical for a bedrock, but atypical for a fluvial depositional environment.
- The materials below about 5 fbg in well MW-6 were logged as dry to damp until 13 fbg, yet this well was flowing artesian on the following day, indicating that the materials from 5 to 13 fbg were likely competent, low fracture index siltstone/sandstone.

see log  
for  
B-4

P



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Well MW-6 was the only well installed by Canonic and we suspect that the logging between this well and the other wells installed at the site is not consistent, and that the material logged below about 5 fbg is the same material classified as bedrock by the five other consulting firms that logged borings at the site.

Wells C-1 through C-4 were logged as having sandstone starting at 6 to 17 fbg. However, these logs were compiled by a construction firm and are not considered to be as reliable as logging by later geologists.

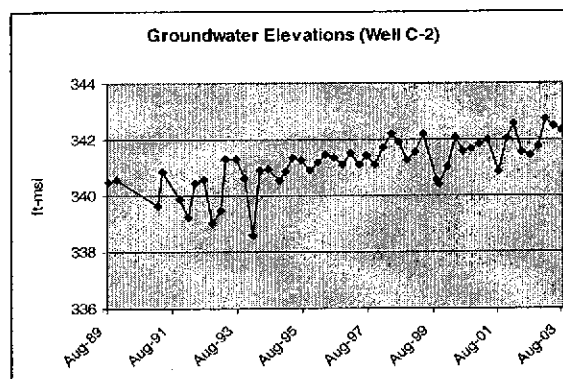
Because the site sits on a relatively steep hillside, sedimentary processes are primarily erosional and not depositional. It would be difficult for sediment to accumulate in this topographic setting. This is consistent with the observation that the creek immediately south of the site is eroding the hillside, not accumulating sediments in the creek bottom. Therefore, we would also not expect to encounter buried stream channels that could be preferential groundwater flow pathways.

*How about fill?*



## 5.2. Site Hydrogeology

Depth to groundwater data has been collected since August 1989. Groundwater is generally less than about 5 fbg, and commonly less than 1-2 fbg, with actual depth dependent upon well location. As indicated on the adjacent figure, groundwater in source area well C-2 has increased by about 2 ft over the last 15 years. Similar trends are observed in the other wells.



As previously indicated, well MW-6 was flowing artesian shortly after installation. The materials were logged as dry to damp to 13 fbg. Therefore, we suspect that this well encountered fractures at depth that produced the groundwater resulting in flowing artesian conditions. This also indicates a strong upward hydraulic gradient in the site vicinity.

The horizontal hydraulic gradient at the site is consistently steep, at about 0.05. This is roughly consistent with surface topography as well as the bedrock topography, and may indicate that groundwater is flowing along the bedrock - weathered bedrock interface.

*yes*

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## 5.3. Monitoring Well Construction

To date, 7 groundwater monitoring wells have been installed. Well MW-6 was abandoned shortly after installation. The status of well C-1 is unknown and there are no records of groundwater sampling or abandonment. Well construction details are presented in Table 1.

## 6. SITE INVESTIGATION RESULTS

### 6.1. Hydrocarbon Distribution in Soil

The two primary compounds of concern in soil at the site are TPHg and benzene, no MTBE has been detected in soil. The highest TPHg and benzene concentrations detected were 1,900 mg/kg (boring U-1) and 0.16 mg/kg (boring C-E), respectively. TPHg and benzene concentrations are highest immediately down-gradient of the tanks and dispensers (Figures 4 and 5). No TPHg or benzene have been detected off-site, indicating that the extent of hydrocarbons in soil is defined and confined to areas onsite. Soil analytical data is presented in Appendix C.

### 6.2. Hydrocarbon Distribution in Groundwater

The distribution of hydrocarbons in groundwater is generally coincident with the distribution in soil with the highest concentrations of TPHg, benzene and MTBE detected down-gradient of the tanks and dispensers (Figures 6, 7 and 8). Although no MTBE was detected in soil, 39,000 ug/l MTBE was detected in a grab sample from native material in boring U-1 and MTBE is detected consistently in well C-2. Groundwater analytical data is presented in Appendix D.

No groundwater was detected in boring U-6 completed within the utility trench backfill at the down-gradient corner of the site, therefore, the utility trench does not appear to be a preferential pathway affecting hydrocarbon distribution.

No hydrocarbons have ever been detected in well C-6, directly down-gradient of the hydrocarbon source area. Therefore, barring some as yet unidentified preferential flow pathway, the hydrocarbon plume does not extend to well C-6.

The fact that well MW-6 was flowing artesian shortly after installation indicates there is an upward hydraulic gradient at the site with higher pressures apparently in fractures in the bedrock. Therefore, it is unlikely that the hydrocarbon plume would have a downward vertical component. Instead, it is

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likely that hydrocarbons are migrating in groundwater along the weathered bedrock – bedrock interface.

### 6.3. NAPL Source and Distribution

Measurable NAPL was detected only once, 3/4-inch in well C-2 upon installation in 1983. Despite the fact that groundwater elevations have been at similar levels since that time, no NAPL has accumulated in C-2, or any other well, since then. This fact, coupled with the fact that TPHg and benzene concentrations are no longer indicative of hydrocarbon saturation concentrations in well C-2, indicates there is no NAPL remaining.

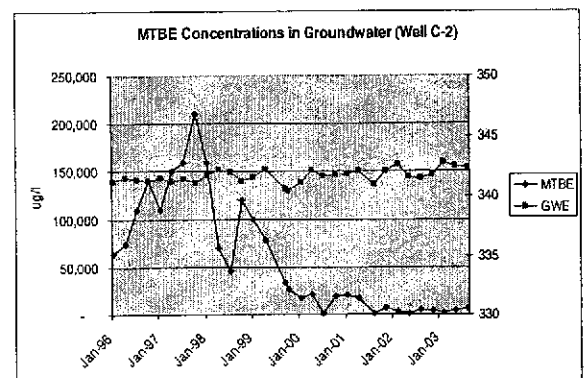
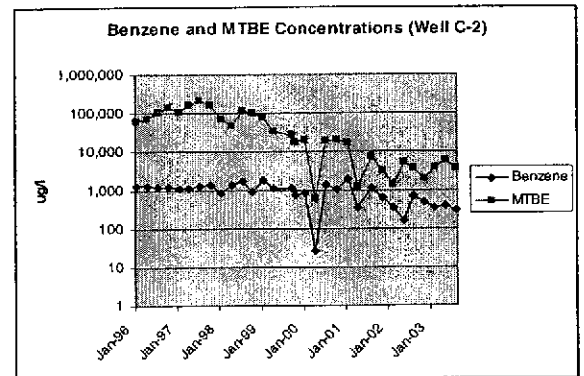
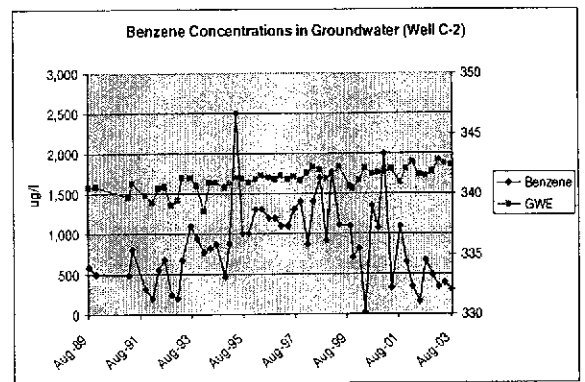


### 6.4. Hydrocarbon Concentration Trends in Groundwater

The only well in which hydrocarbons are consistently detected is well C-2. As indicated in the previous and adjacent graphs, TPHg and benzene concentrations seemed to increase until between 1993 and 1995, after which time concentrations began decreasing. MTBE concentrations exhibit a similar increasing then decreasing trend, but the concentrations do not peak until about 1997. A 1998 review of seven available historical chromatograms suggest that MTBE was first detected in October 1992, two years after Chevron ceased their operations at the site.

The fact that benzene and MTBE concentrations track well together over time (bottom graph) indicates that the MTBE may be sourced from a liquid release, and not vapor. Typically if MTBE is sourced from vapor, MTBE concentrations will not track parallel to benzene concentrations.

To determine concentration trends and compound half-lives in well C-2, we plotted concentrations over time starting from the point that hydrocarbon concentrations



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generally peaked in wells. We then applied a first order exponential decay trend line to the data set and determined the equation for the trend line ( $y = b e^{ax}$ , where  $y$  = concentration,  $x$  = time, and  $a$  and  $b$  are specific constants). The equation function in Excel is then used to determine the constants  $a$  and  $b$ . Solving the equation for  $x$  ( $x = \ln(y/b)/a$ ) lets us determine concentrations at specific times. We also determined compound half-lives using the equation: half-life =  $-\ln(2)/a$  (where  $a$  is the constant determined above). Concentration trend analyses are included in Appendix E and summarized in Table A.



Table A - Concentration Trend Analysis							
Well	Analyte	Maximum Concentration Detected (ug/l)	Water Quality Objective	Estimated Year to Reach WQO	Estimated Half-Life (years)	Estimated Concentration in 10 Years (ug/l)	Estimated Concentration in 20 Years (ug/l)
C-2	TPHg	56,000	50 ug/l	Oct-34	4.7	1,076	250
	Benzene	2,500	1 ug/l	Dec-35	3.8	58	9
	MTBE	210,000	5 ug/l	Aug-09	0.9	<5	<5

As indicated in Table A, MTBE concentrations are predicted to be below 5 ug/l in less than 10 years. While TPHg and benzene concentrations are not decreasing as rapidly as MTBE, they are decreasing none the less and will eventually reach water quality objectives.

The difference in attenuation rates for MTBE and TPHg/benzene may be due to a lower MTBE release mass and higher aqueous-phase dissolution rates compared to TPHg/benzene.

## 7. PREFERENTIAL PATHWAY ANALYSIS

Two potential preferential pathways were identified; the bedrock/sediment interface and underground utilities. The fact that Delta did not encounter groundwater in the three borings advanced beneath utilities in the site vicinity indicates that the utilities are not acting as preferential pathways.

The geologic cross-sections presented in Figure 3 indicate that there is no geologic pathway along which groundwater would preferentially flow. This is supported by the following facts: 1) Blow counts noted on boring logs below about 5 fbg in well MW-6 were similar to those noted for other

*not enough data to reach this conclusion!*

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borings where sandstone and/or siltstone was logged; 2) Sediments in well MW-6 below about 5 fbg were logged as very dense which would be consistent with siltstone and sandstone; 3) Sediments in MW-6 were noted as homogenous silty sand to the total depth explored, which would be typical for a bedrock, but atypical for a fluvial depositional environment; 4) The materials below about 5 fbg in well MW-6 were logged as dry to damp until 13 fbg, yet this well was flowing artesian on the following day, indicating that the materials from 5 to 13 fbg were likely competent, low fracture index siltstone/sandstone. Based on the data presented above, down-gradient well C-6 very likely monitors water quality in groundwater originating from the source areas at the station and is indicative of water quality at the tail end of the hydrocarbon plume.

## 8. SENSITIVE RECEPTORS

There is an unnamed creek that runs through Piedmont Park about 360 ft south of the station. The creek was flowing at an estimated 10 gallons per minute during a site visit on October 9, 2003. The creek originates from what appears to be a spring in Piedmont Park and flows south to southwestward.

Resna completed a survey of wells within 1 mile of the site. Forty-six wells were identified, but the locations were not plotted. PEG identified City well #4 0.11 miles south of the site. Well survey data is included in Appendix F.

### 8.1. Groundwater Use

The presence of numerous wells within 1 mile of the site suggests that shallow and/or deep groundwater may have been, and possibly still is, used in the site vicinity. Municipal water supply in the City of Piedmont is provided by EBMUD so it is likely that any groundwater use at the present time would be limited to irrigation.

## 9. RISK ASSESSMENT

### 9.1. Site Conceptual Exposure Model (Current and Future Uses)

Delta submitted a Tier 2 risk-based corrective action (RBCA) assessment for residential site use in July 2002. The assessment assumed an exposure model consisting of volatilization of hydrocarbons from soil and groundwater to indoor and outdoor air, groundwater ingestion, and dermal contact. The assessment assumed a residential setting and, therefore, a standard target risk of  $10^{-6}$ .

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## 9.2. Identified Human Exceedances

The only compound that exceeded Tier 2 site specific target levels using a  $10^{-6}$  risk target level was ingestion of groundwater. EBMUD provides water service to Piedmont. Because groundwater is not a drinking water source in the site vicinity, Delta concluded that the site was a candidate for case closure. Delta's RBCA is included in Appendix G.

## 10. REMEDIAL ACTIONS TAKEN

No engineered remediation has occurred at the site.

## 11. CONCLUSIONS AND RECOMMENDATIONS

Based on the site data, it appears that the hydrocarbon plume is small and confined to the area immediately down-gradient of the USTs and dispensers. There is no evidence of groundwater flow within the utility trenches, so the trench backfill is not a preferential hydrocarbon migration pathway. There is no evidence or reason to suspect that there are buried bedrock surface depressions that are acting as preferential pathways based on boring log data as well as the sedimentological setting. Finally, there is evidence of a strong upward hydraulic gradient observed in well MW-6. Therefore, the plume is defined and limited in extent horizontally by down-gradient well C-6, and vertically by the upward hydraulic gradient. Because of this, there is no apparent data gap with respect to site characterization.

Based on the September 18, 2003 letter, we understand that the ACEHS is unlikely to accept these conclusions and will require additional investigation. To that end, we recommend a transect of five temporary wells along Highland Avenue down-gradient of the site. We recommend drilling with 8-inch diameter augers and continuous coring the borings to 20 fbg for accurate lithologic logging.

*Do!* Based on the boring logs, we recommend installing three 1-ft long, 0.010" slotted screened wells nested in each boring with a hydrated bentonite seal between each well screen. The intervals screened will be based on lithology or, in the absence of lithologic change, at 5 ft intervals. After installation, the wells should be purged of at least 2-3 gallons each prior to sampling. Based on conversations with Karen Streich of Chevron, Mr. Scott Seery of the ACEHS indicated that temporary wells could be located within Piedmont Park to minimize utility clearance obstacles and traffic control.

- Geo Probe w/ depth-discriminate  
GW sampling

- advance until refusal

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Water samples from these temporary wells will be analyzed for TPHg, BTEX and fuel oxygenates including MTBE. Because no hydrocarbons have ever been encountered off site, we do not recommend any additional soil sampling.

We will also measure relative depths to water in the temporary wells to confirm the apparent flowing artesian conditions at the site. Proposed boring locations are shown on Figure 9. Standard field protocols are included in Appendix H.

The data collected will be used to calculate mass flux, if any, across the transect. Based upon this analysis, we will prepare a corrective action plan as required by the ACEHS. If no hydrocarbons are detected in any of the groundwater samples collected, we recommend closing the site as a low-risk groundwater case.

The previous well surveys were not well presented and need to be reviewed and resubmitted with better location controls on wells, as well as assessment into well construction and use. We recommend a thorough well survey including DWR records search and including analysis of screened depths with respect to the hydrocarbon plume.

The status of well C-1 is unknown. We recommend reviewing files and inspecting the site for evidence of its status. If the well is found, we recommend adding it to the sampling program. We also recommend determining the screen interval for wells C-1 through C-4 using a wire rubbed along the side of the well. This will help us assess whether the wells are screened appropriately to monitor possible NAPL accumulation. If the wells are not appropriately screened to monitor NAPL accumulation, we recommend a boring adjacent to well C-2 to screen soils for NAPL using a PID and field observations.

## 12. ADDITIONAL DISCUSSION

The ACEHS stated in its September 18, 2003 letter that MTBE was the primary compound of concern at this site. Because MTBE concentrations did not peak until 1997, well after ChevronTexaco had sold the property, it does not appear that ChevronTexaco could be responsible for the MTBE. We recommend that ChevronTexaco be assigned secondary responsible party status at this site. ChevronTexaco is willing to work with the current owner to get them into the UST Cleanup Fund for future work. However, it is not appropriate to force ChevronTexaco to take a leading role in future work at this site when that work is driven by MTBE that was released after their tenure at the site.

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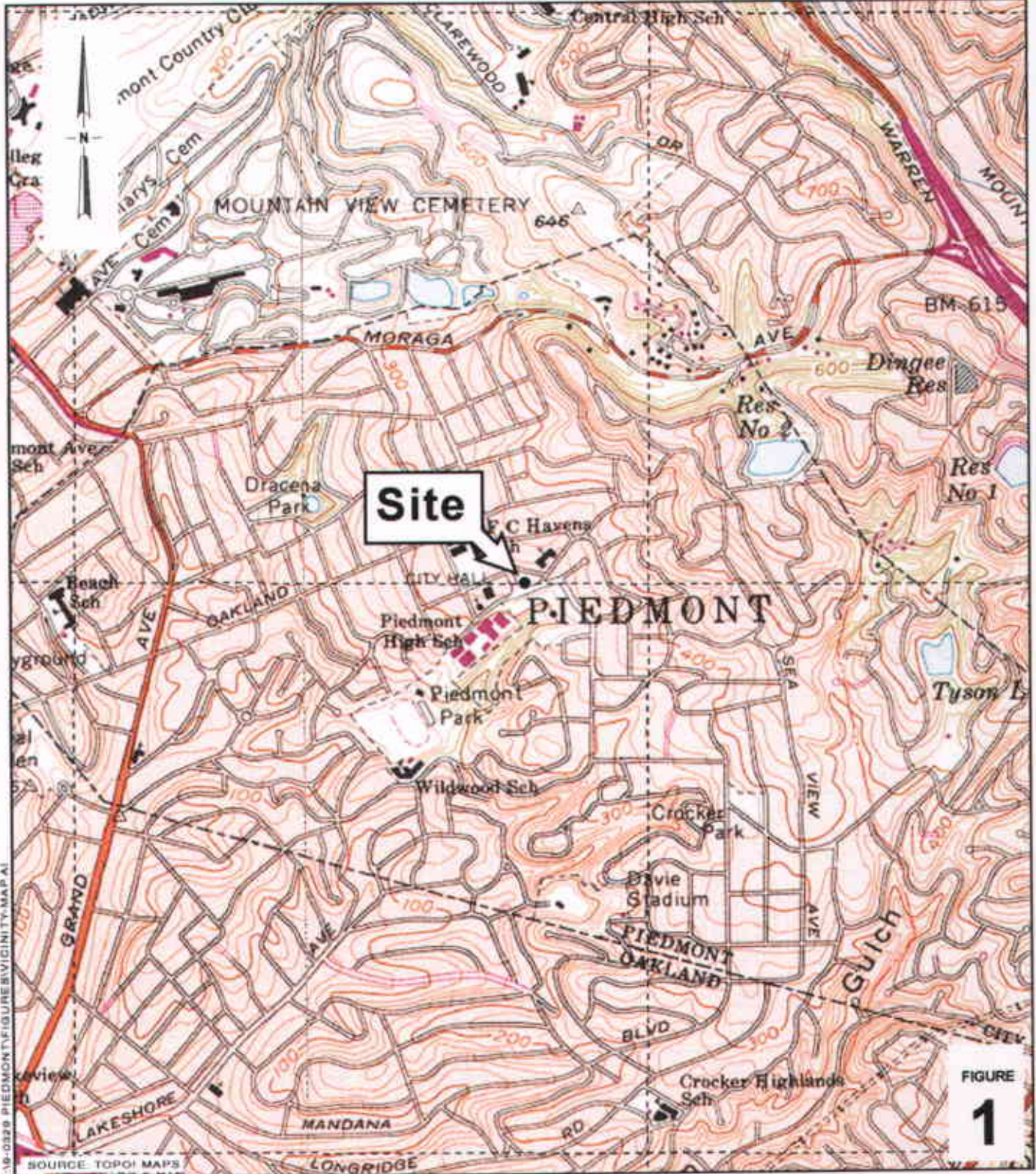
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9-0329 PIEDMONT VICINITY MAP AI

SOURCE: TOPOI MAPS

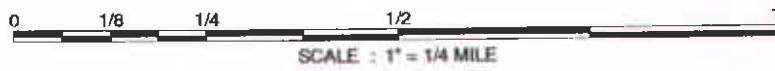


FIGURE 1







**Former Chevron Station 9-0329**  
 340 Highland Avenue  
 Piedmont, California





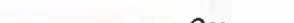



Vicinity Map

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**EXPLANATION**

- A  Tank backfill well
- C-1  Gettler-Ryan monitoring wells (1983)  
PEG monitoring wells (1996)
- U-1  Cambria (2000) soil boring
- B-2  Resna soil boring /  
Temporary wells (1993)
- MW-6  Resna (1994) Abandoned well
- C-A  Geostrategies soil boring (1990)

**Underground Utilities**

-  Electrical
-  Telephone
-  Gas
-  Storm Drain
-  Water
-  Sanitary Sewer

Basemap modified from Pacific Environmental Group, Inc.

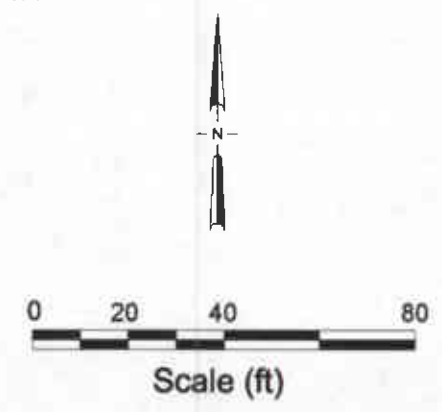
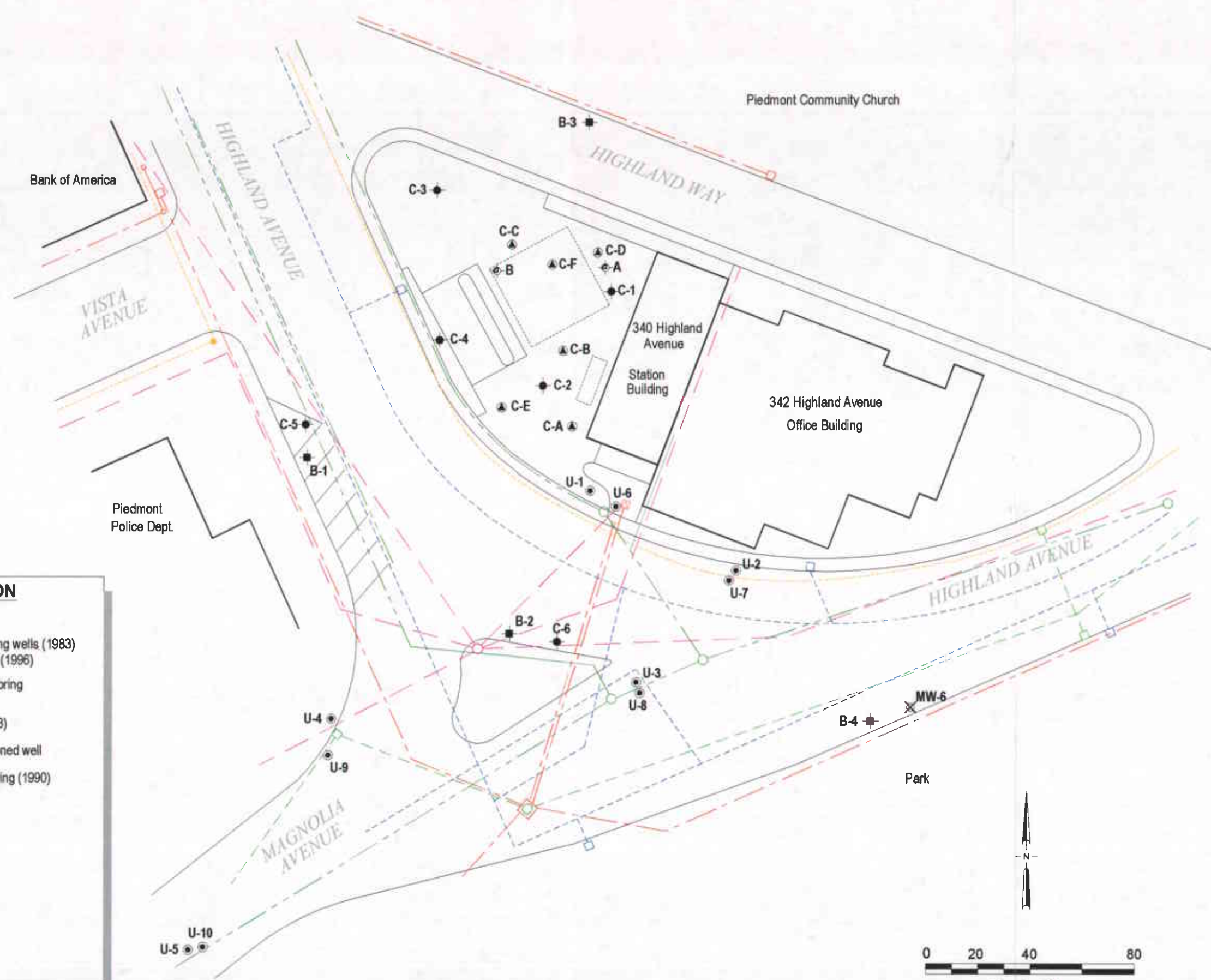
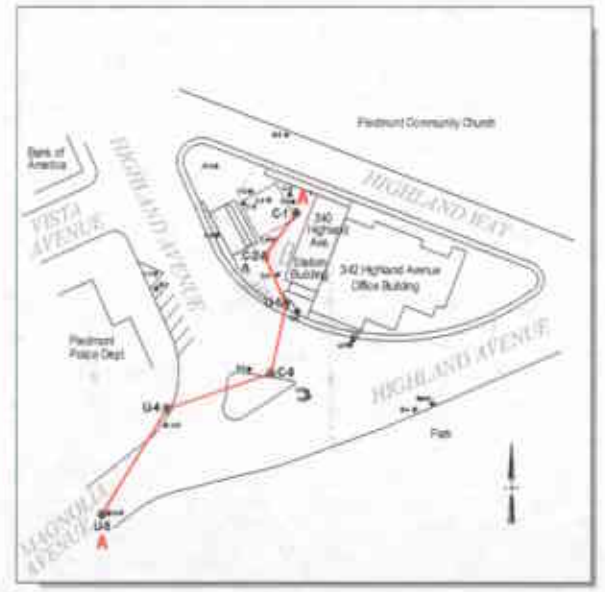
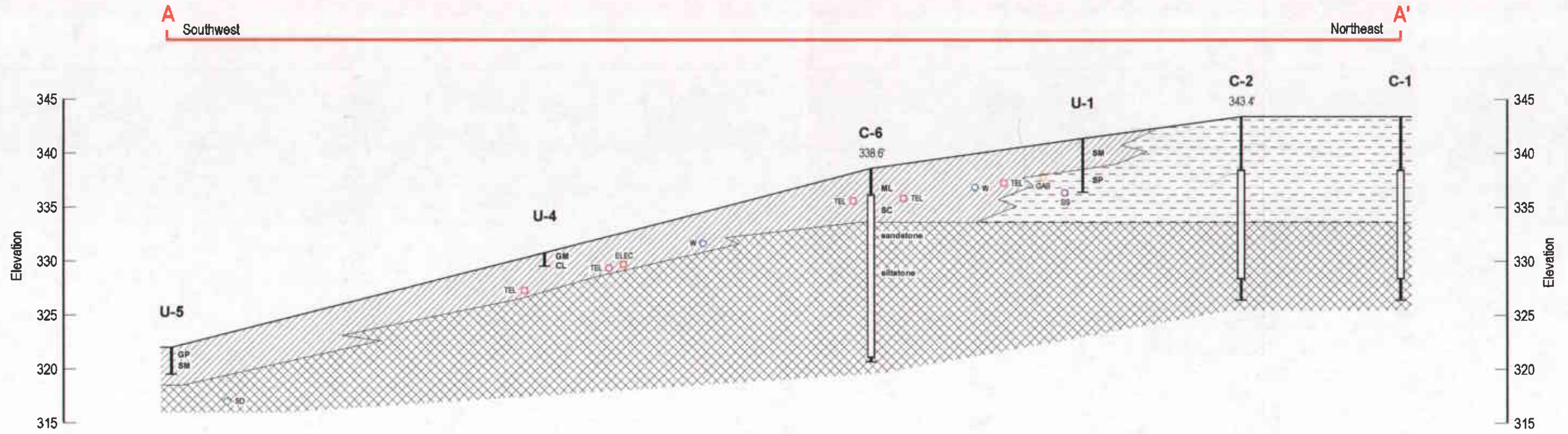


FIGURE  
**2**

1:18-0329 PIEDMONTFIGURESITEPLAN.DWG

1-N-0329 PIEDMONTFIGURESECTIONA.DWG



**EXPLANATION**

<ul style="list-style-type: none"> <li> = High Permeability Soils</li> <li>SP</li> <li>SW</li> <li>GP</li> <li> = Low to Moderate Permeability Soils</li> <li>GM SM</li> <li>ML SW</li> <li>SC CL</li> <li> = Bedrock</li> <li>Sandstone</li> <li>Siltstone</li> </ul>	<ul style="list-style-type: none"> <li><b>Well ID</b> — Well Designation</li> <li>Elev. — Top of Casing Elevation</li> <li> — Groundwater Monitoring Well</li> <li> — Well Screen Interval</li> <li> — Bottom of boring</li> </ul>
--	--

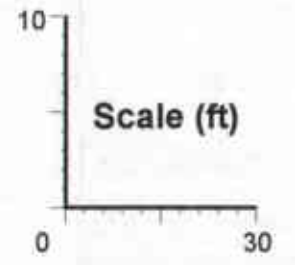
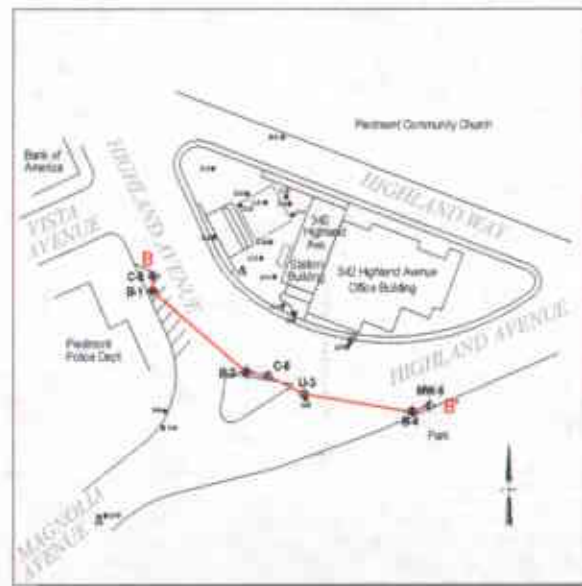
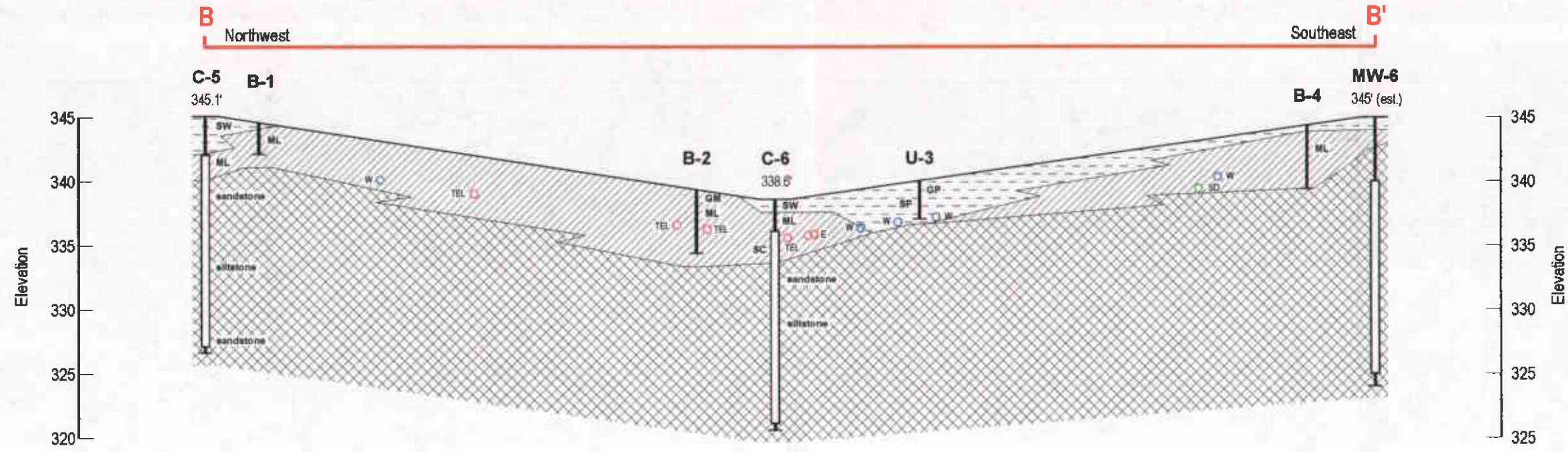


FIGURE  
**3a**



138-0329 PIEMONTE FIGURE 3b SECTION B-B.DWG



**EXPLANATION**

	= High Permeability Soils	<b>Well ID</b> — Well Designation
	= Low to Moderate Permeability Soils	Elev. — Top of Casing Elevation
	= Bedrock	
	Sandstone	
	Siltstone	

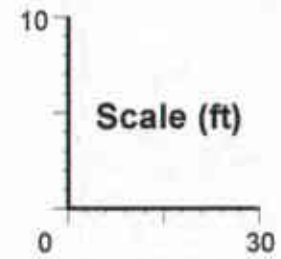
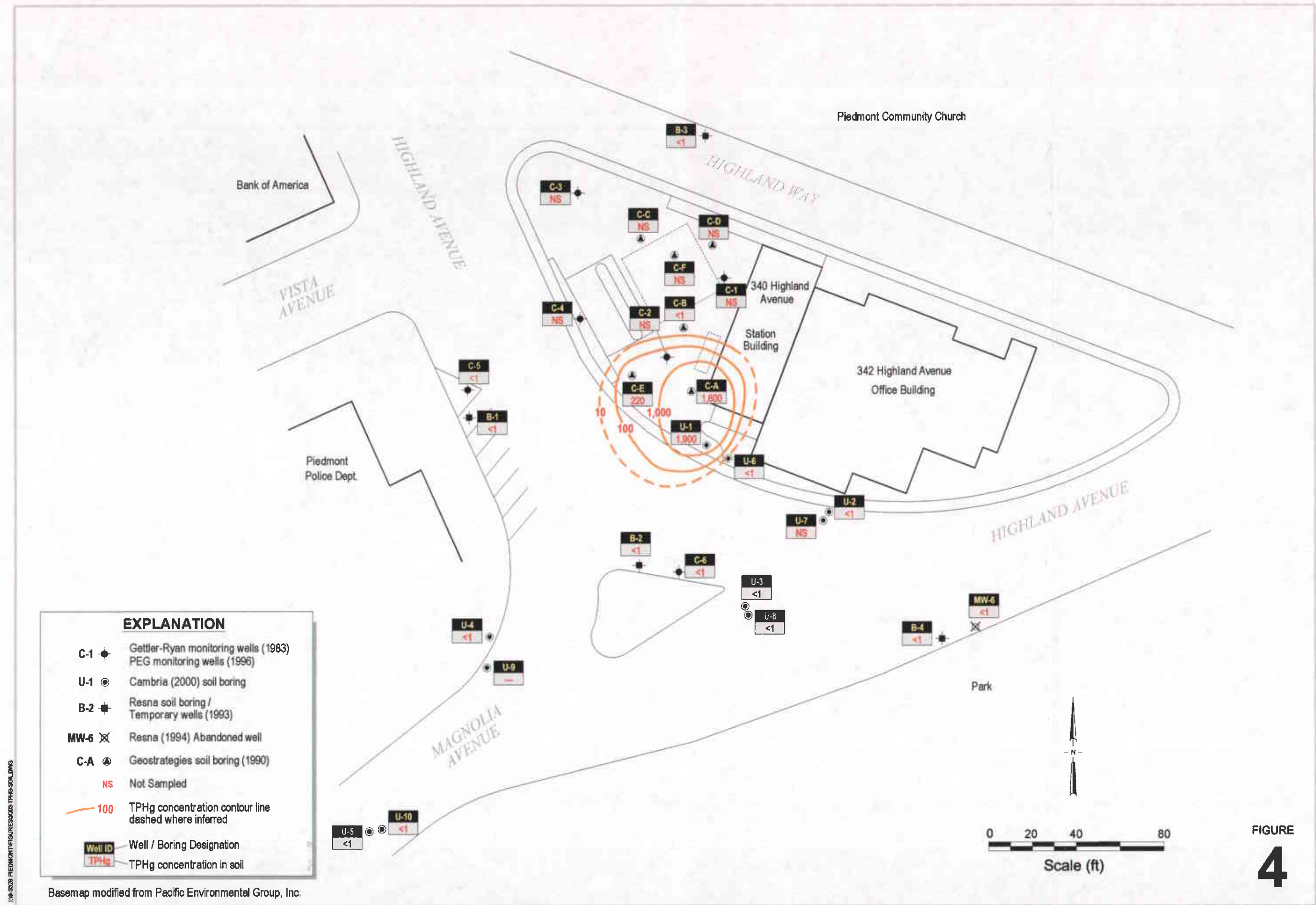


FIGURE  
**3b**





**EXPLANATION**

- C-1 ● Gettler-Ryan monitoring wells (1983)  
PEG monitoring wells (1996)
- U-1 ● Cambria (2000) soil boring
- B-2 ● Resna soil boring /  
Temporary wells (1993)
- MW-6 ✕ Resna (1994) Abandoned well
- C-A ● Geostrategies soil boring (1990)
- NS Not Sampled
- 100 TPHg concentration contour line  
dashed where inferred
- Well ID Well / Boring Designation
- TPHg TPHg concentration in soil

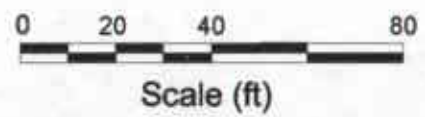
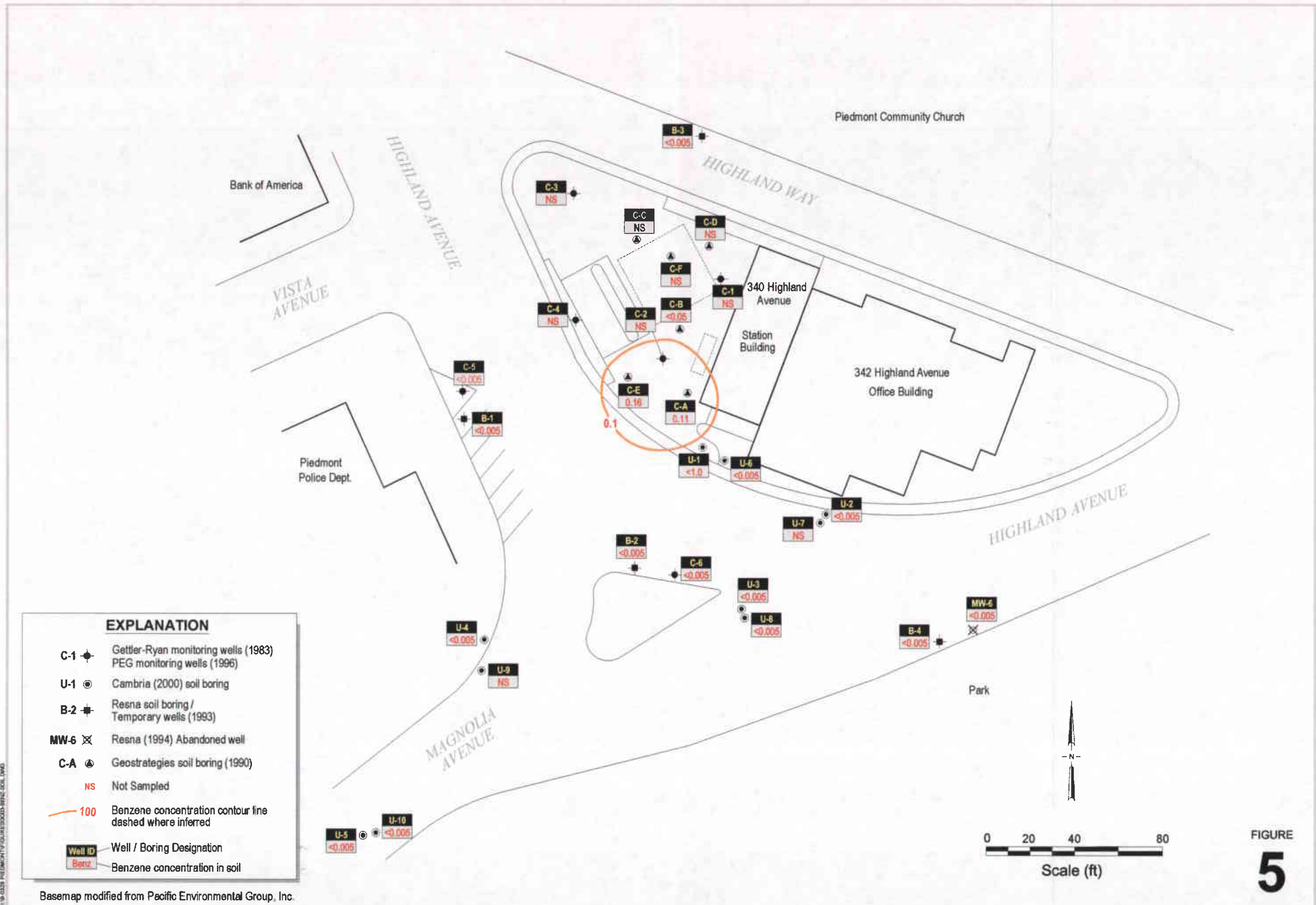


FIGURE  
**4**

Basemap modified from Pacific Environmental Group, Inc.

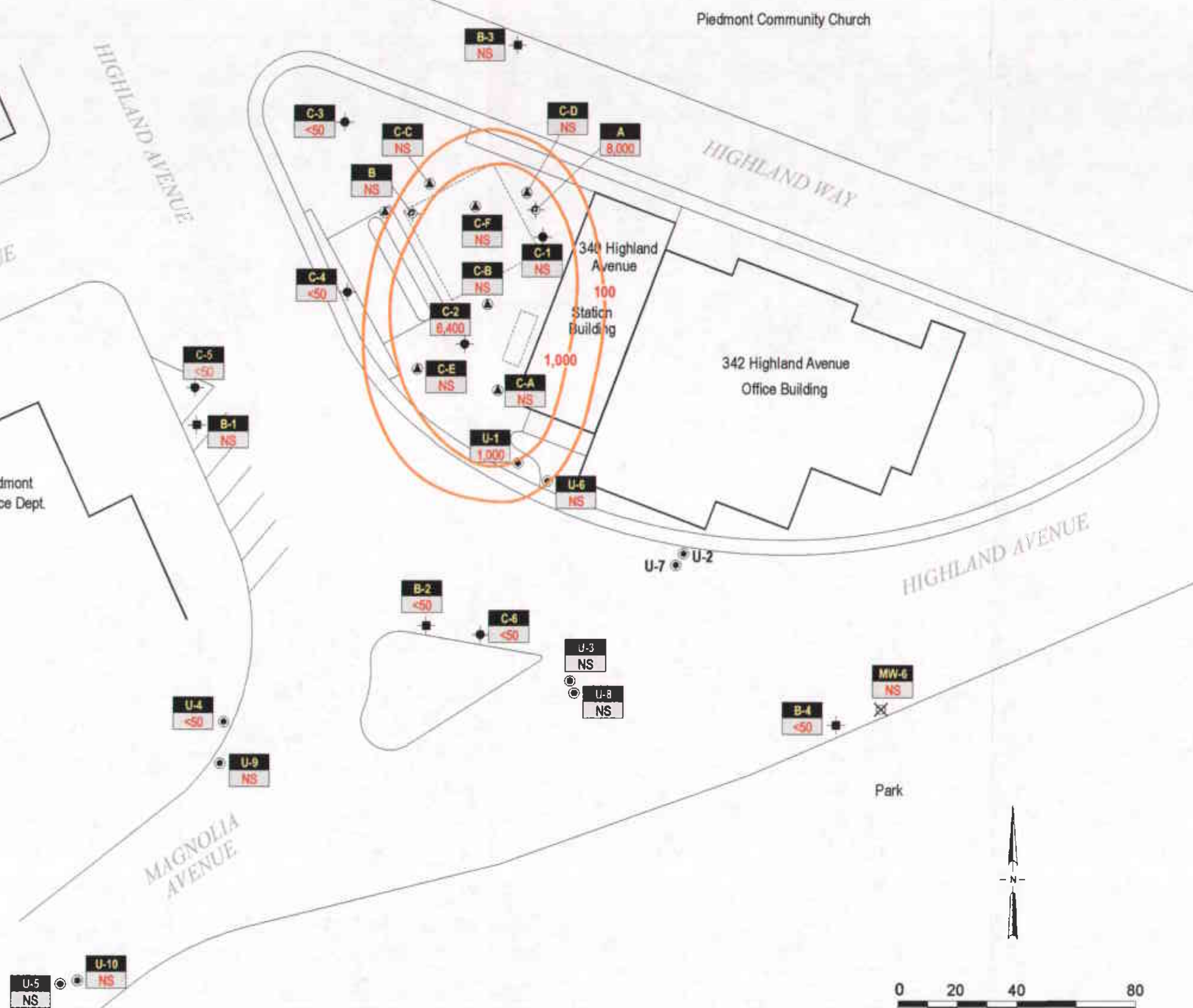
L:\9-0329 PIEDMONT\FIGURES\0305-TPHG-SOIL.DWG



18-0329 PIEDMONT/POLICE/STATION/MP/2000/01/01

**EXPLANATION**

- A Tank backfill well
- C-1 Gettler-Ryan monitoring wells (1983)  
PEG monitoring wells (1996)
- U-1 Cambria (2000) soil boring
- B-2 Resna soil boring /  
Temporary wells (1993)
- MW-6 Resna (1994) Abandoned well
- C-A Geostrategies soil boring (1990)
- NS Not Sampled
- 100 TPHg concentration contour line  
dashed where inferred
- Well ID Well / Boring Designation
- TPHg TPHg concentration in groundwater



Basemap modified from Pacific Environmental Group, Inc.

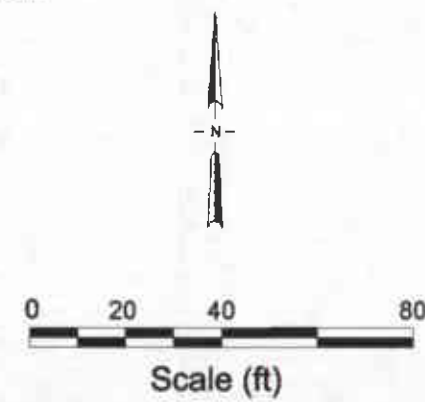
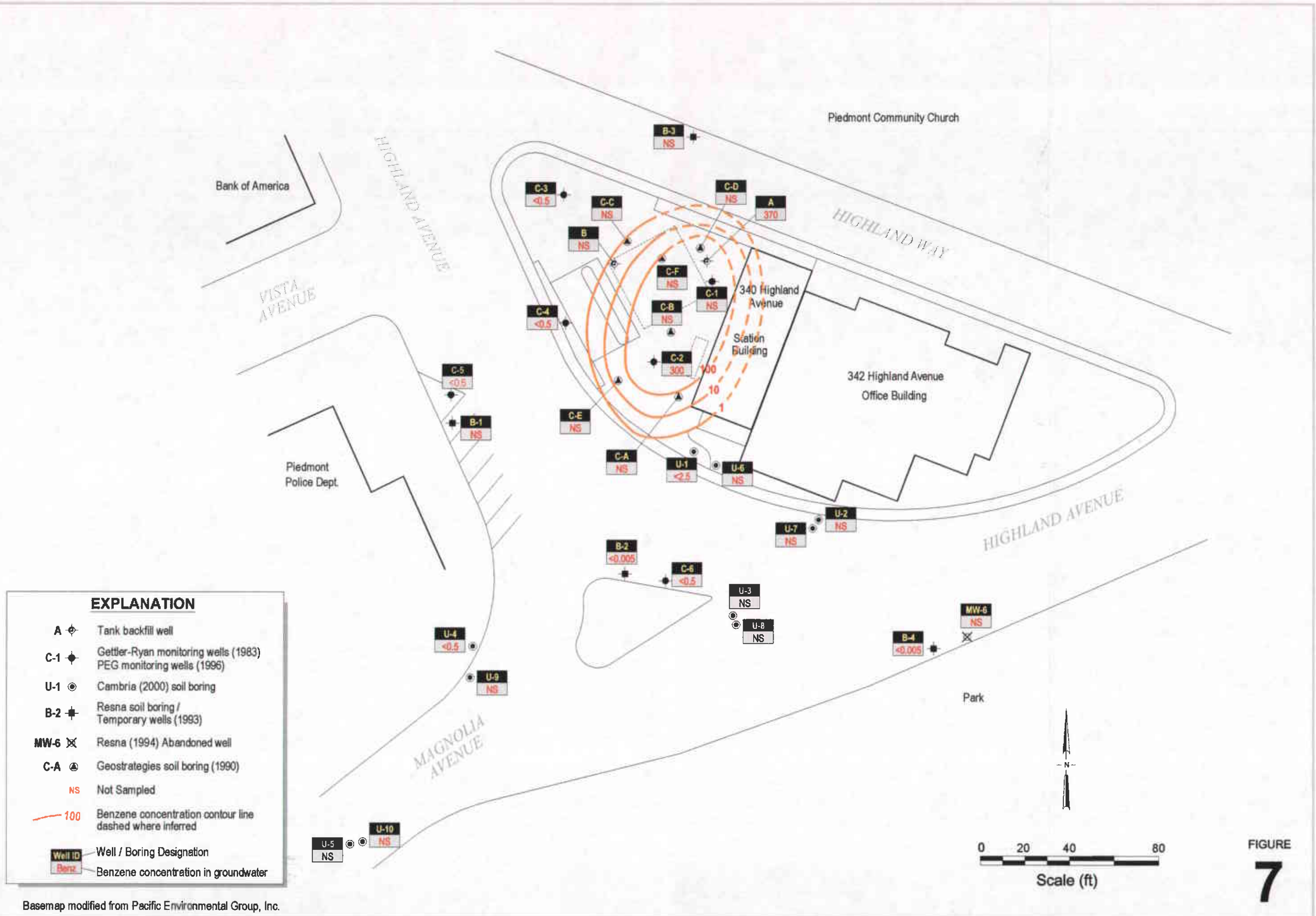


FIGURE 6

1/8/2009 10:00:00 AM C:\PROJECTS\9-0329\BENZ\CON.DWG



**EXPLANATION**

- A Tank backfill well
  - C-1 Gettler-Ryan monitoring wells (1983)  
PEG monitoring wells (1996)
  - U-1 Cambria (2000) soil boring
  - B-2 Resna soil boring /  
Temporary wells (1993)
  - MW-6 Resna (1994) Abandoned well
  - C-A Geostategies soil boring (1990)
  - NS Not Sampled
  - 100 Benzene concentration contour line  
dashed where inferred
- | Well ID | Well / Boring Designation   | Benzene concentration in groundwater |
|---------|---|--------------------------------------|
| A       | Tank backfill well  |                                      |
| C-1     | Gettler-Ryan monitoring wells (1983)<br>PEG monitoring wells (1996) |                                      |
| U-1     | Cambria (2000) soil boring  |                                      |
| B-2     | Resna soil boring /<br>Temporary wells (1993)                       |                                      |
| MW-6    | Resna (1994) Abandoned well   |                                      |
| C-A     | Geostategies soil boring (1990)                                     |                                      |
| NS      | Not Sampled   |                                      |
| 100     | Benzene concentration contour line<br>dashed where inferred         |                                      |
| Well ID | Well / Boring Designation   | Benzene concentration in groundwater |
| Benz    |   |                                      |

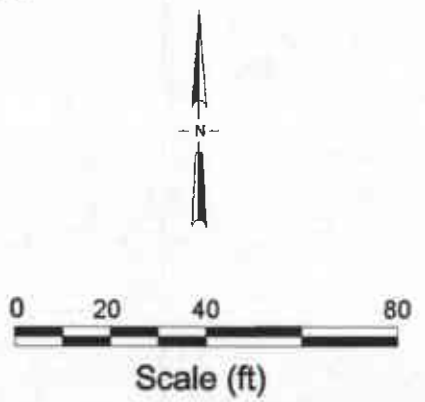


FIGURE  
**7**

Basemap modified from Pacific Environmental Group, Inc.

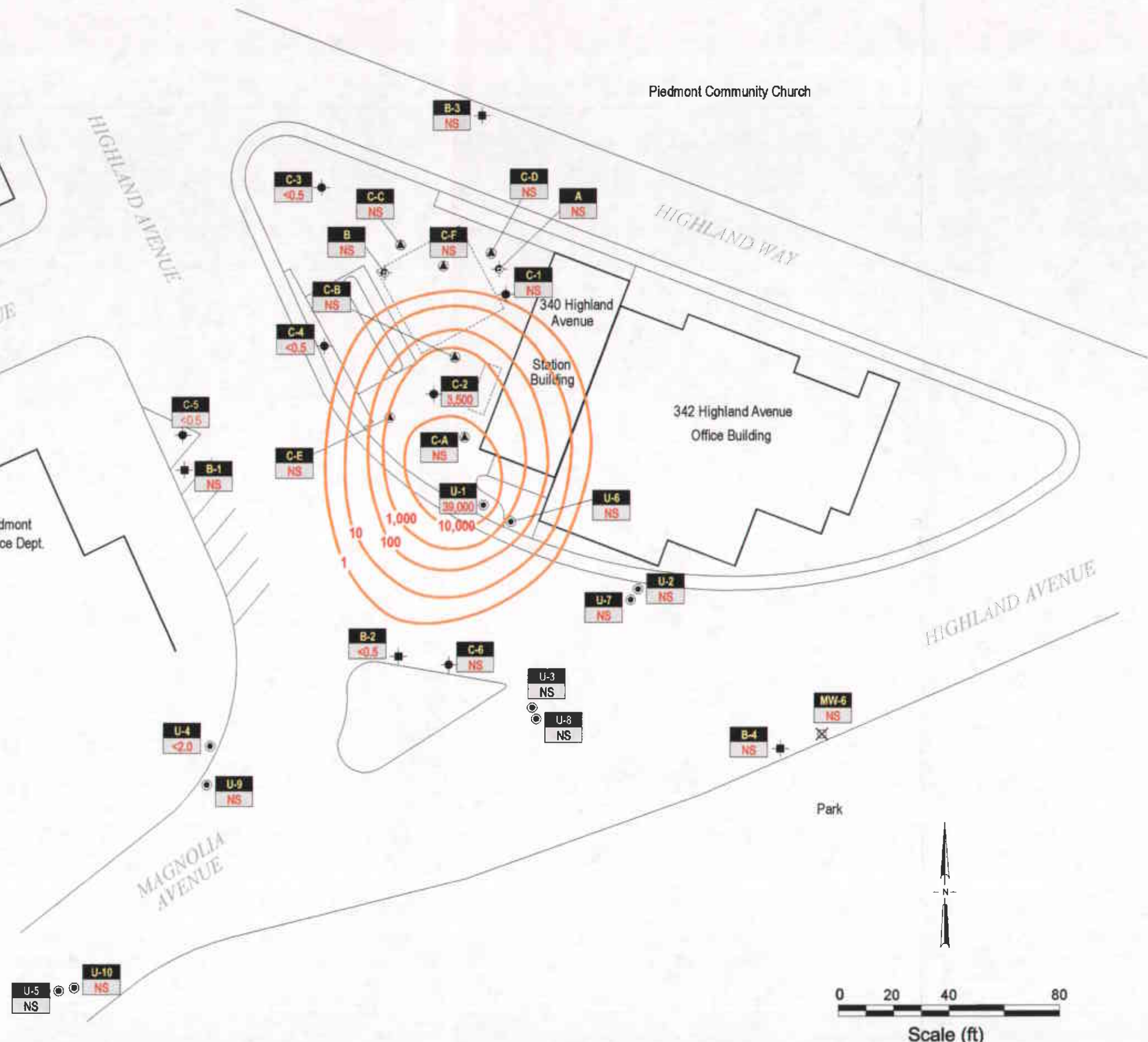


18-0028 PIEDMONT/POLICE/STATION/MTBE-OR10W

**EXPLANATION**

- A Tank backfill well
- C-1 Gettler-Ryan monitoring wells (1983)  
PEG monitoring wells (1996)
- U-1 Cambria (2000) soil boring
- B-2 Resna soil boring /  
Temporary wells (1993)
- MW-6 Resna (1994) Abandoned well
- C-A Geostrategies soil boring (1990)
- NS Not Sampled
- 100 MTBE concentration contour line  
dashed where inferred

Well ID	Well / Boring Designation	MTBE
A	Tank backfill well	
C-1	Gettler-Ryan monitoring wells (1983) PEG monitoring wells (1996)	
U-1	Cambria (2000) soil boring	
B-2	Resna soil boring / Temporary wells (1993)	
MW-6	Resna (1994) Abandoned well	
C-A	Geostrategies soil boring (1990)	
NS	Not Sampled	
100	MTBE concentration contour line dashed where inferred	
Well ID	Well / Boring Designation	
MTBE	MTBE concentration in groundwater	



Basemap modified from Pacific Environmental Group, Inc.

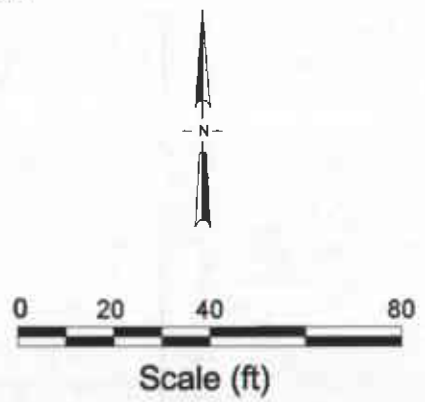
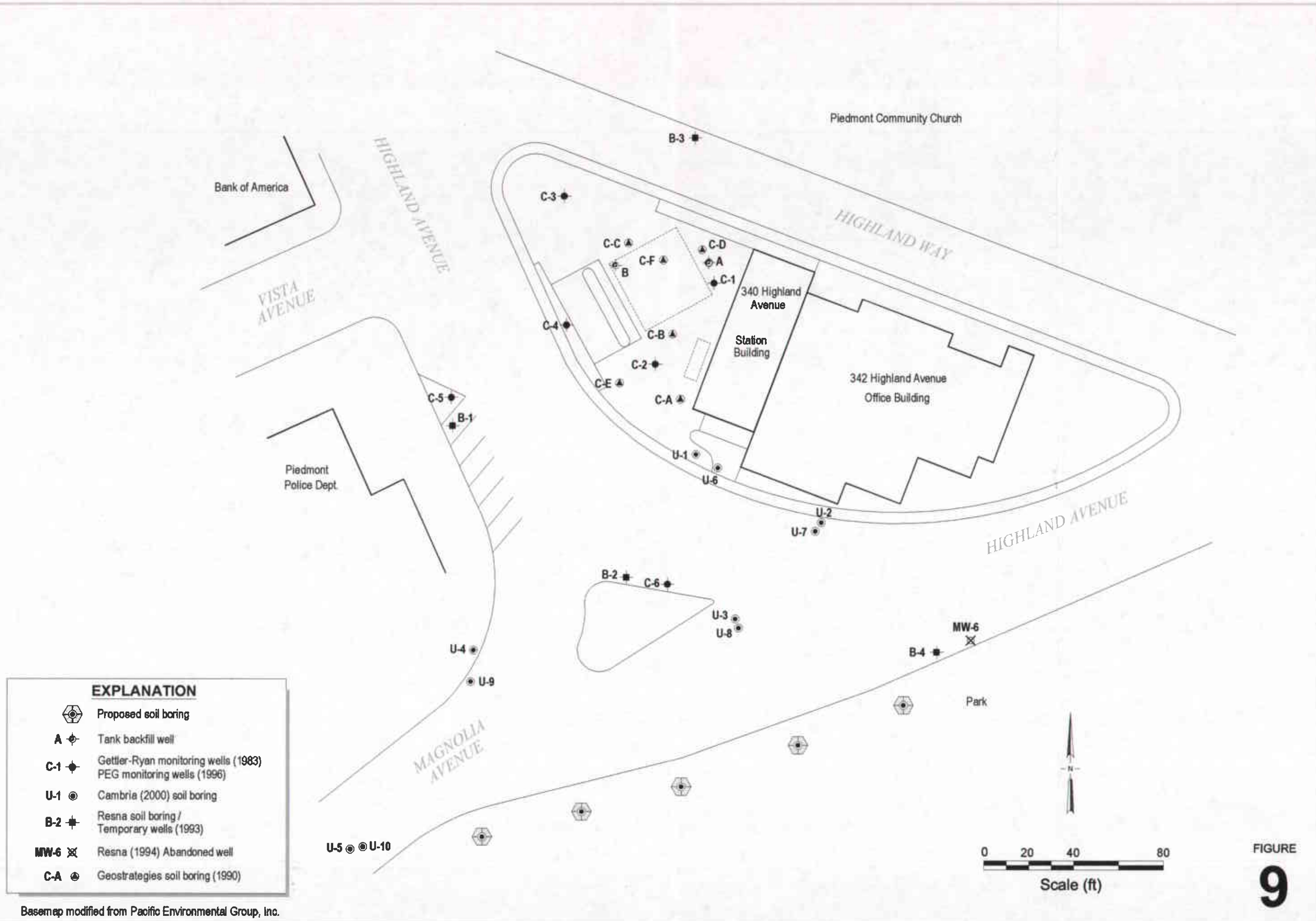


FIGURE 8

14-00000 PIEDMONT/POLARIS/PCP-BOB DAVIS



EXPLANATION	
	Proposed soil boring
<b>A</b>	Tank backfill well
<b>C-1</b>	Gettler-Ryan monitoring wells (1983) PEG monitoring wells (1996)
<b>U-1</b>	Cambria (2000) soil boring
<b>B-2</b>	Resna soil boring / Temporary wells (1993)
<b>MW-6</b>	Resna (1994) Abandoned well
<b>C-A</b>	Geostrategies soil boring (1990)

Basemap modified from Pacific Environmental Group, Inc.

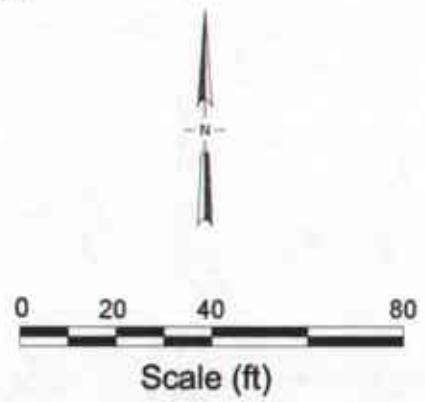


FIGURE 9

Former Chevron Station 9-0329  
340 Highland Avenue  
Piedmont, California

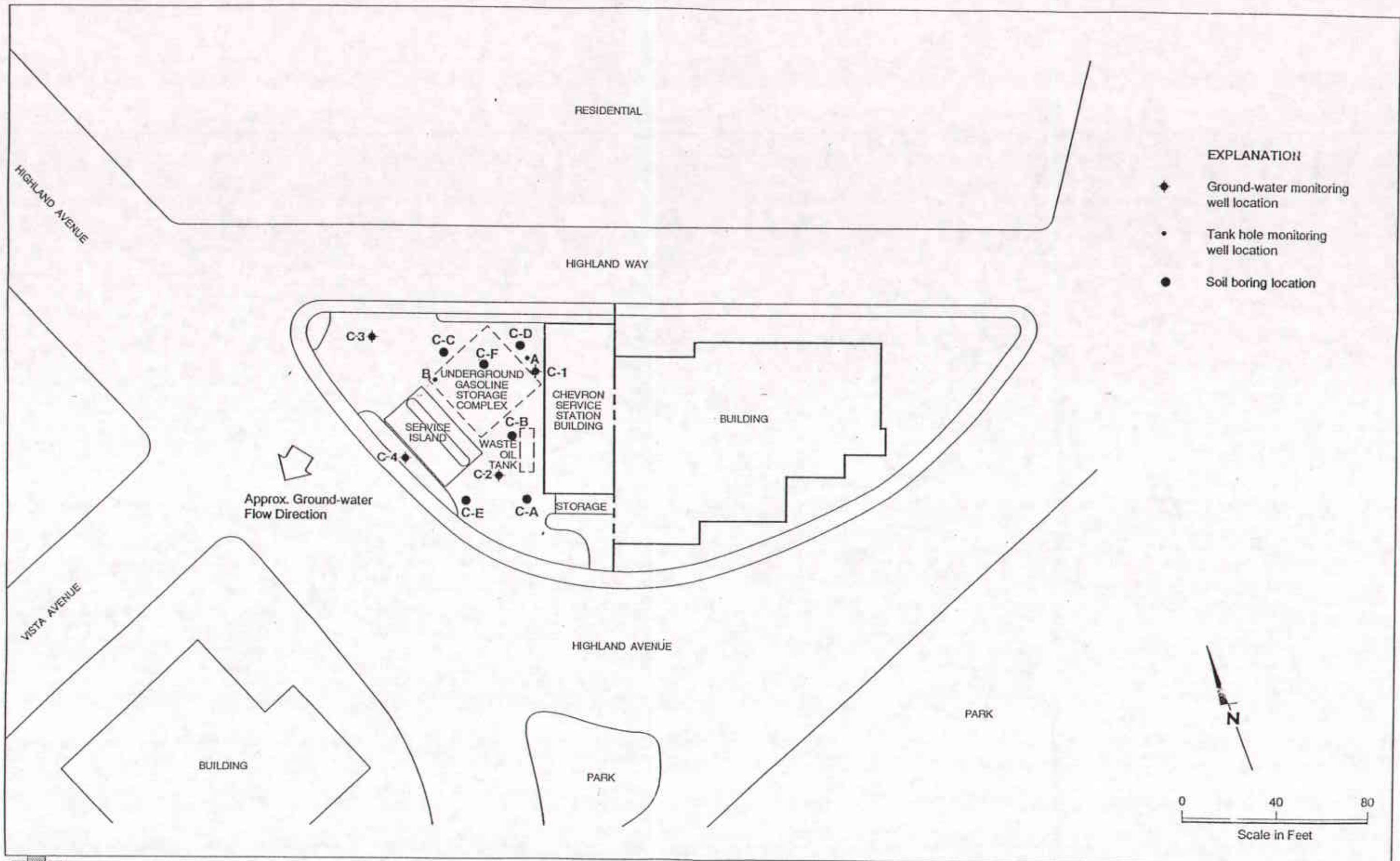


Proposed Soil Boring Locations

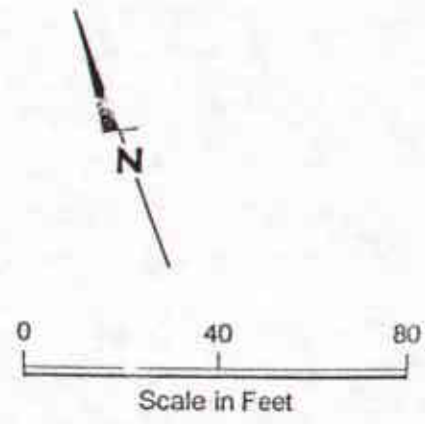
**Table 1 Well Construction Data, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California**

Well	Top of Casing Elevation (ft msl)	Total Depth (ft)	Diameter (In)	Screen Interval (fbg)	Comments
C-1	Unknown	17.0	2	Unknown	This well was never sampled. It's status is unknown.
C-2	343.39	17.0	2	Unknown	Logs do not indicate screen interval
C-3	347.08	17.0	2	Unknown	Logs do not indicate screen interval
C-4	344.94	13.0	2	Unknown	Logs do not indicate screen interval
C-5	345.14	18.0	2	3-18	
C-6	338.61	17.5	2	2.5-17.5	
MW-6	Not Surveyed	20.0	2	5-20	Well abandoned

ft = feet                                      msl = mean sea level  
fbg = ft below grade                      in = inches



- EXPLANATION**
- ◆ Ground-water monitoring well location
  - Tank hole monitoring well location
  - Soil boring location

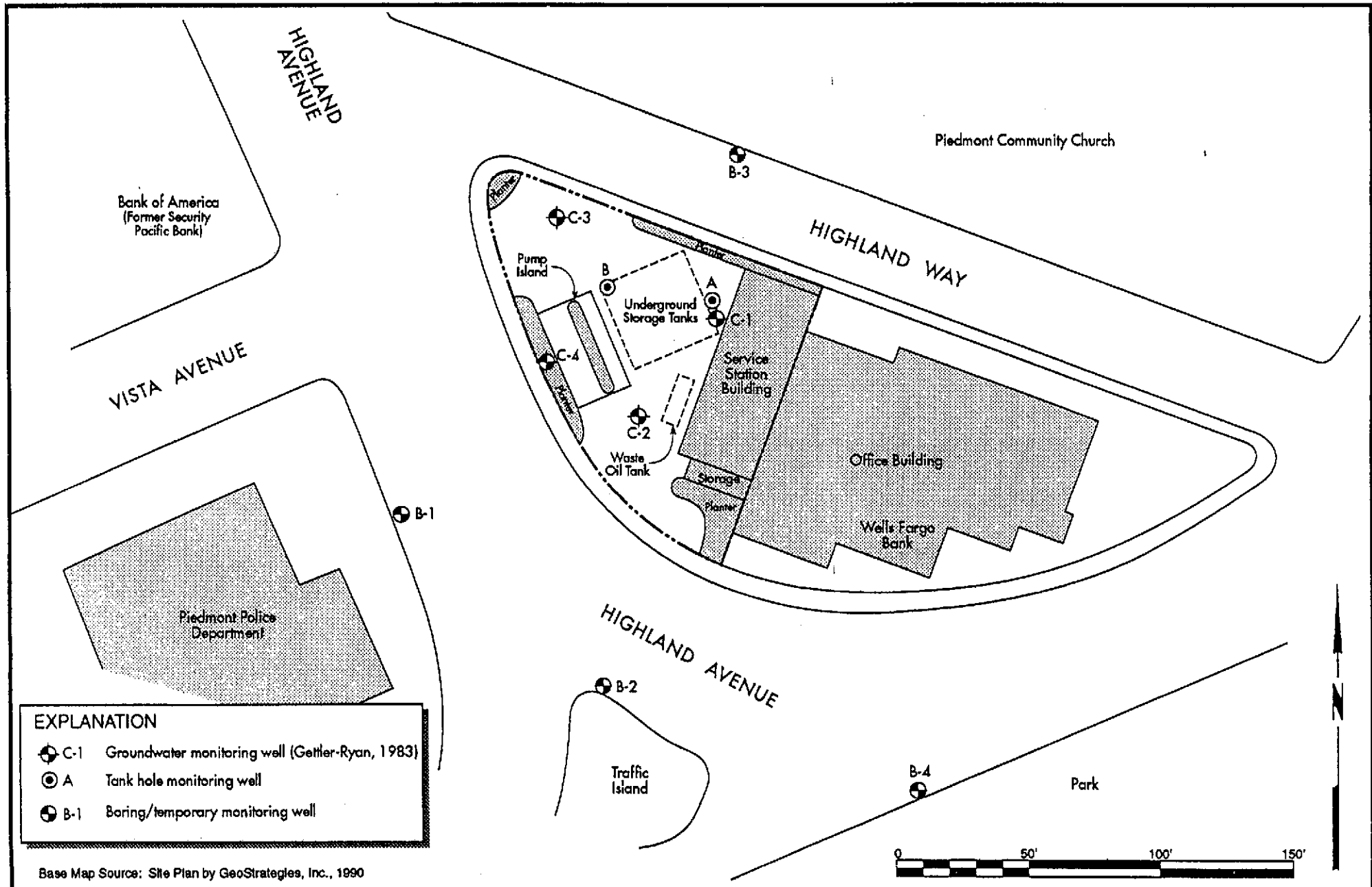


**GSI** GeoStrategies Inc.

JOB NUMBER 7261  
 REVIEWED BY RIGACES  
*RMP 04/26/97*

Site Plan  
 Chevron Service Station #0329  
 340 Highland Avenue  
 Piedmont, California

DATE 11/90  
 REVISED DATE  
 REVISED DATE



- EXPLANATION**
- ⊕ C-1 Groundwater monitoring well (Gettler-Ryan, 1983)
  - ⊙ A Tank hole monitoring well
  - ⊕ B-1 Boring/temporary monitoring well

Base Map Source: Site Plan by GeoStrategies, Inc., 1990

**RESNA**

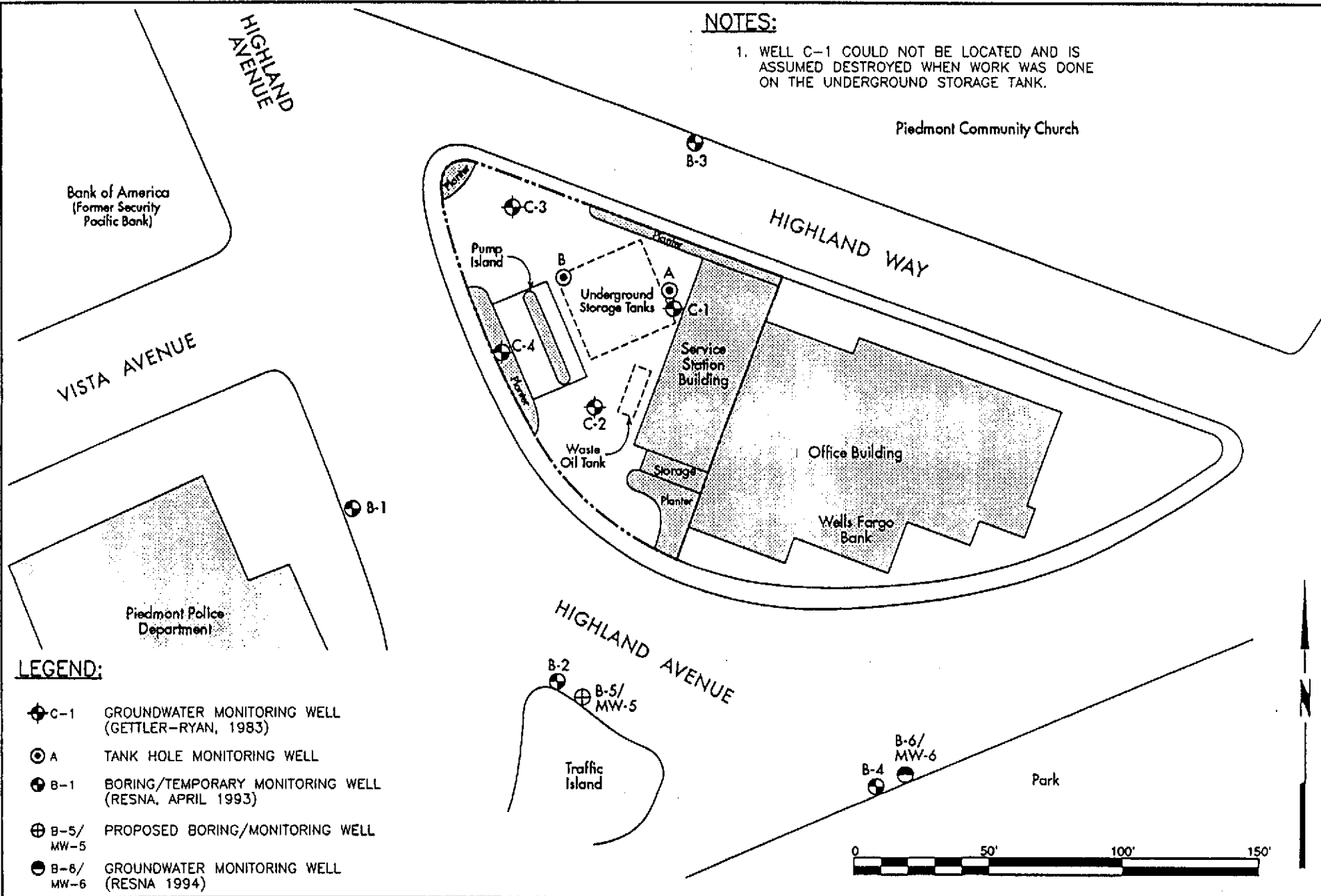
PROJECT NO. 170105.01      6/93

**GENERALIZED SITE PLAN**  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

PLATE  
**2**

**NOTES:**

1. WELL C-1 COULD NOT BE LOCATED AND IS ASSUMED DESTROYED WHEN WORK WAS DONE ON THE UNDERGROUND STORAGE TANK.



**LEGEND:**

- ⊕ C-1 GROUNDWATER MONITORING WELL (GETTLER-RYAN, 1983)
- ⊙ A TANK HOLE MONITORING WELL
- ⊕ B-1 BORING/TEMPORARY MONITORING WELL (RESNA, APRIL 1993)
- ⊕ B-5/ MW-5 PROPOSED BORING/MONITORING WELL
- ⊙ B-6/ MW-6 GROUNDWATER MONITORING WELL (RESNA 1994)

**Canonie** Environmental

DRAWING NO. 94-247-A4

GENERALIZED SITE PLAN  
 FORMER CHEVRON SERVICE STATION 9-0329  
 340 HIGHLAND AVENUE  
 PIEDMONT, CALIFORNIA

FIGURE  
 2

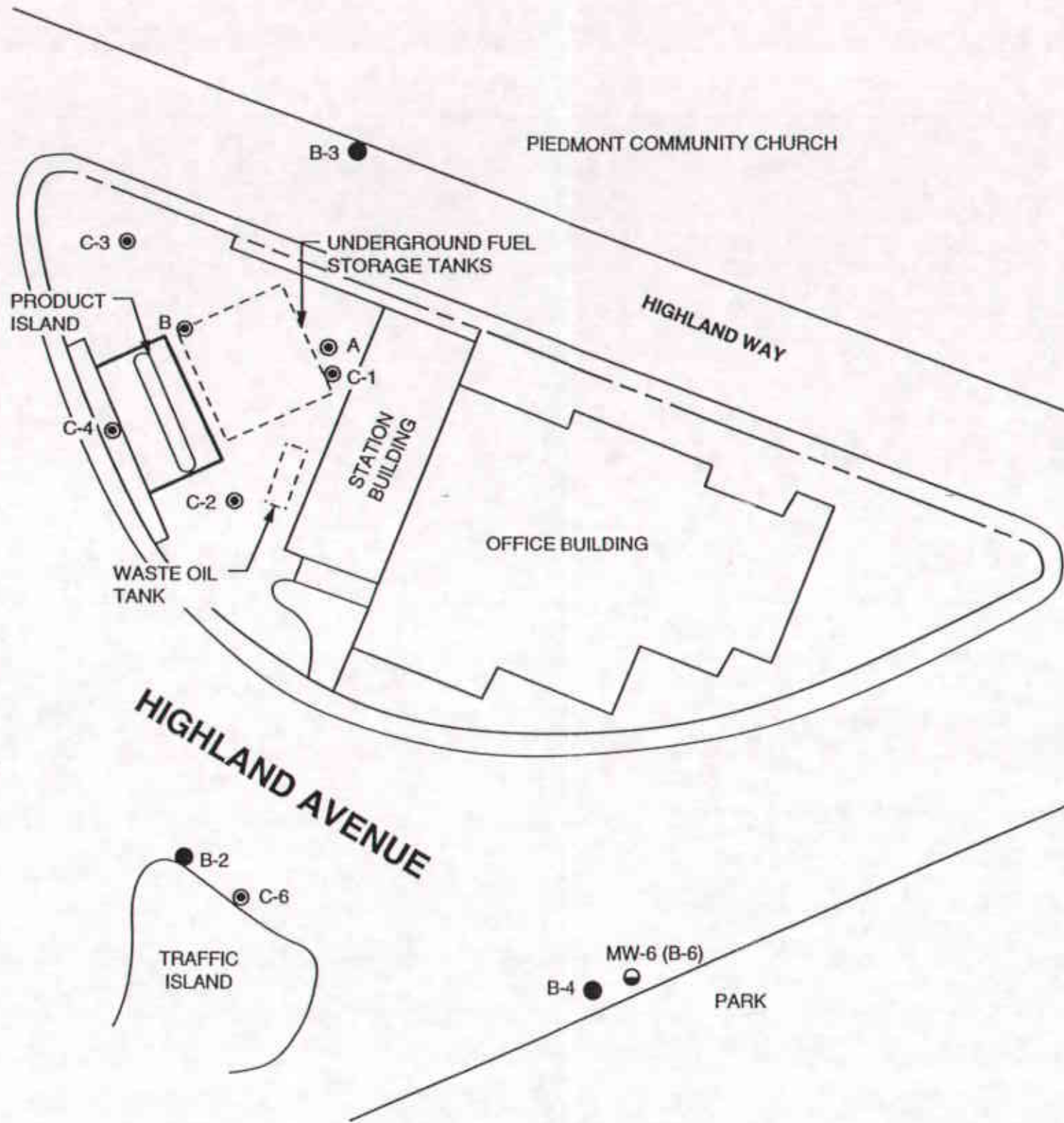


BANK OF AMERICA

HIGHLAND AVENUE

VISTA AVENUE

PIEDMONT POLICE DEPARTMENT



PIEDMONT COMMUNITY CHURCH

HIGHLAND WAY

HIGHLAND AVENUE

TRAFFIC ISLAND

PARK

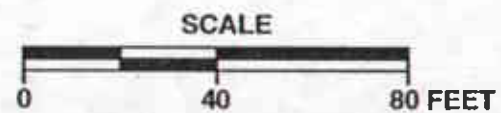
**LEGEND**

- C-1, A ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (GETTLER-RYAN, 1983 and PACIFIC, 1996)
- MW-6 (B-6) ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (RESNA, 1993)
- B-1 ● SOIL BORING TEMPORARY MONITORING WELL LOCATION AND DESIGNATION (RESNA, 1983)

SOURCE: MAP BY CANONIE ENVIRONMENTAL



PACIFIC ENVIRONMENTAL GROUP, INC.

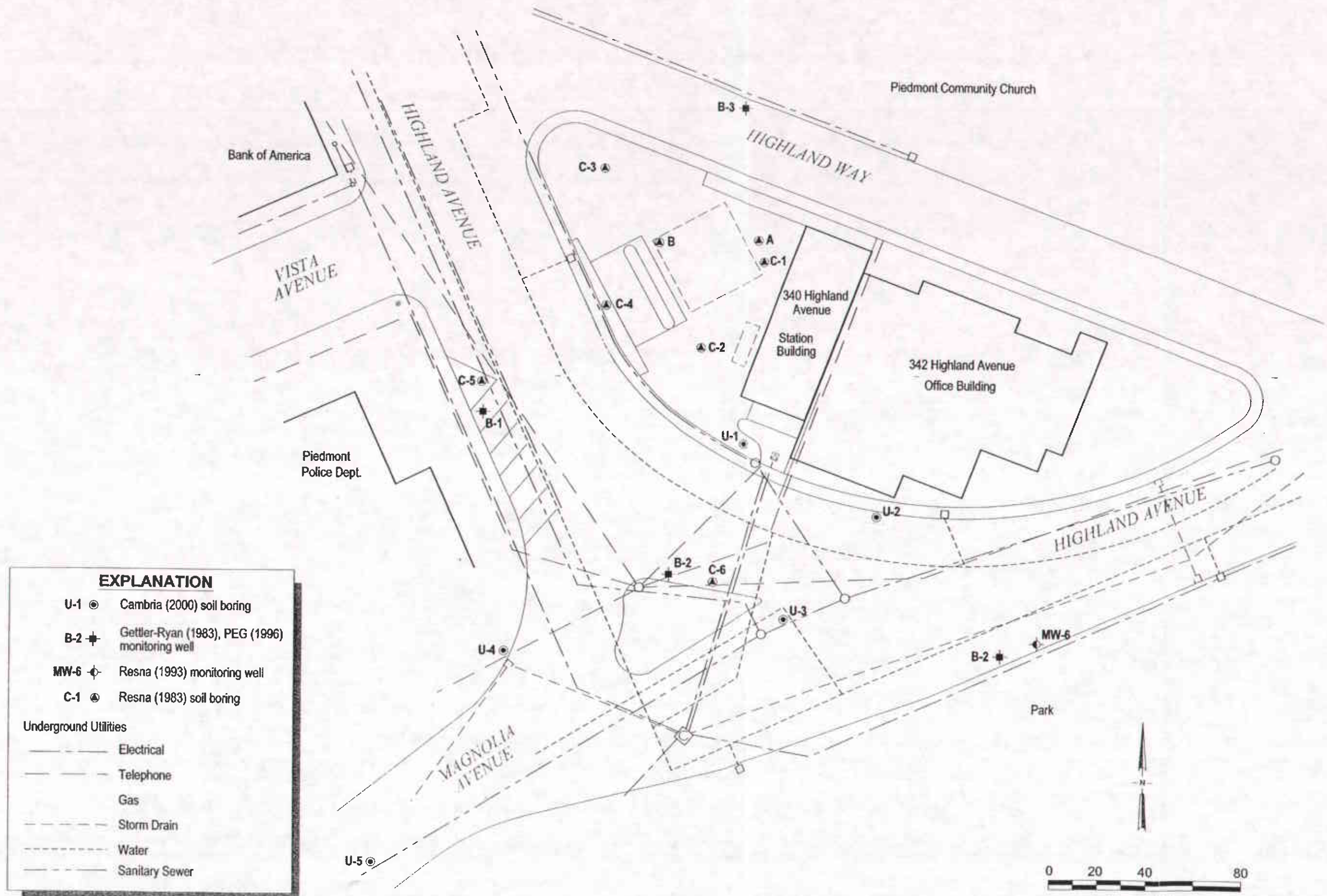


CHEVRON SERVICE STATION 9-0329  
340 Highland Avenue at Vista Avenue  
Piedmont, California

SITE MAP

FIGURE:  
2

PROJECT:  
320-160.1A



Basemap modified from Pacific Environmental Group, Inc.

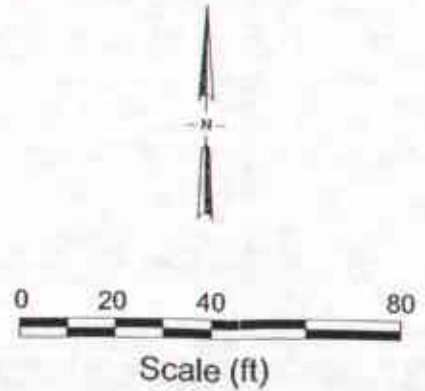


FIGURE  
**2**

1:9-0329 PIEDMONT-GUINESITEPLAN.DWG



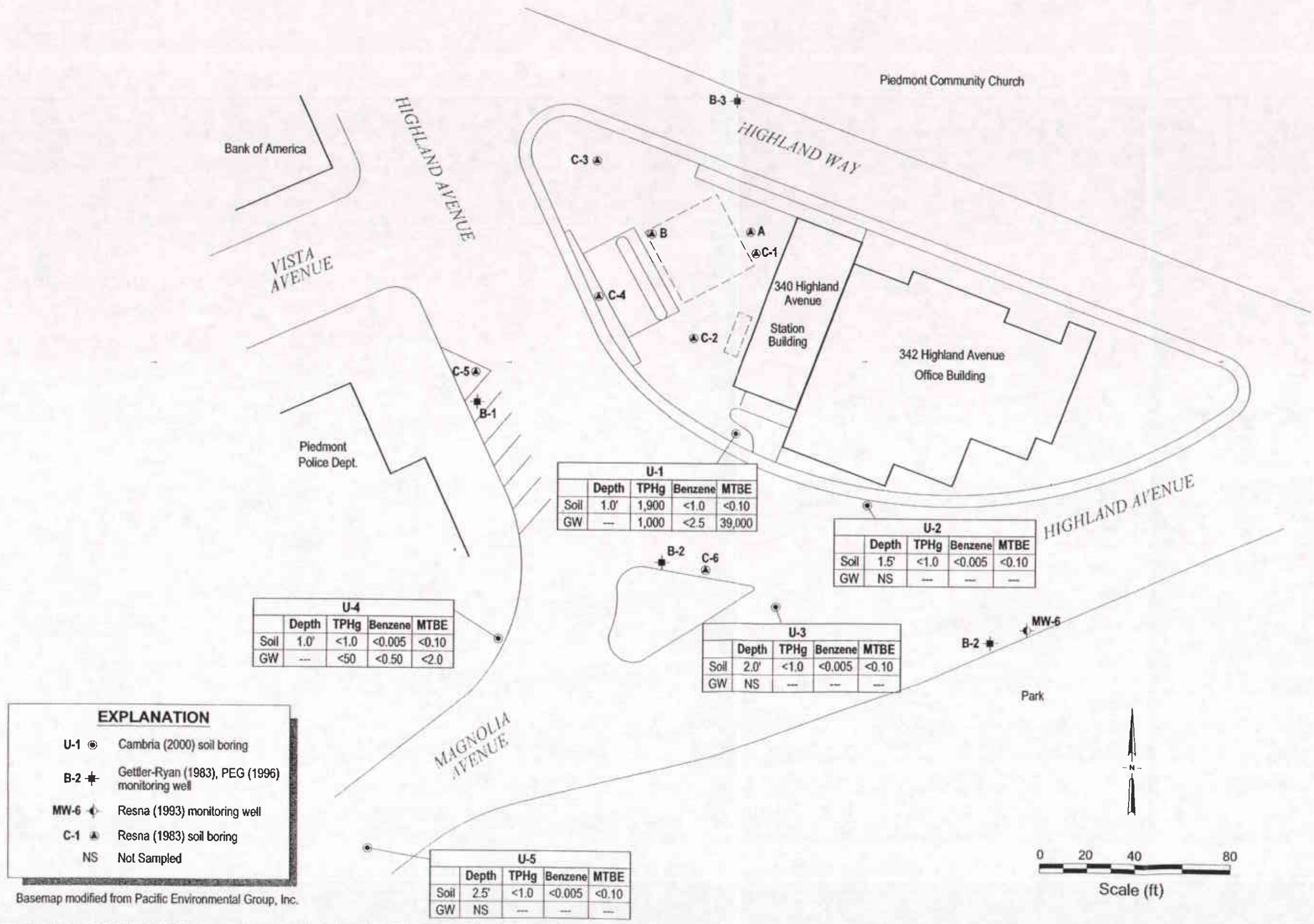


FIGURE  
**3**

13-0329 PIEDMONT/HYDROCARBONS.DWG

Basemap modified from Pacific Environmental Group, Inc.







COMPANY: Chevron USA

JOB #: OR 5026

LOCATION: 340 Highland @ Vista

DATE: 1-19-83

CITY: Piedmont

WELL #: 4

DEPTH	SAMPLE NO.	SOIL DESCRIPTION
0 ft.		
2'		Top soil
11'		Weathered Sandstone
13'		Sandstone

Cased to 13' with 2" PVC well screen and backfilled with pea gravel

FOREMAN: Jeff Ryan

SHEET: 1 OF: 1

Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station No. 0329		C-A
	Location: 340 Highland/Vista		
	City: Piedmont, California		Sheet 1
	Logged by: RCM	Driller: Bayland	of 1

Drilling method: Hollow Stem Auger

Hole diameter: 8-Inches

Water Level	4.0'			
Time	10:20			
Date	11/02/90			

PID (ppm)	Blow/ft. or Pressure (ps)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.3 feet.
				2				
				3				FILL - Sand with Silt (SM) - very dark gray (5Y 3/1), damp; 70% fine to medium sand; 25% silt; 5% clay; strong chemical odor.
				4				
845	250 250 3	S&H	C-A-5.0	5				FILL - Sand (SW) - dark greenish gray (5GY 4/1), loose, saturate; 95% fine to medium sand; 5% silt; brick fragments; shell fragments; strong chemical odor.
				6				
				7				
				8				
				9				
30	1 1 1	S&H	C-A-10.5	10				Increasing gravel to 10%; weak chemical odor at 10.5 feet.
				11				
				12				
				13				Hard drilling at 11.5 feet.
				14				
212	50/2"	S&H		14.2				Switch to GSA Rock Color Chart at 14.5 feet.
				15				SANDSTONE (SS) - dark grayish orange (10YR 7/4), damp, medium hardness, moderately weathered; 95% fine to medium sand; 5% silt; massive; black stained fractures; no chemical odor.
				16				
				17				
				18				Bottom of sample at 14.2 feet Bottom of boring at 14.2 feet 11/02/90
				19				
				20				

Remarks: PID reading for sample at 14.2 may be due to slough in augers.



GeoStrategies Inc.

Log of Boring

BORING NO.

C-A

Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station No. 0329		C-B
	Location: 340 Highland/Vista		
	City: Piedmont, California		Sheet 1
	Logged by: RCM	Driller: Bayland	of 1
Casing installation data:			

Drilling method: Hollow Stem Auger  
Hole diameter: 8-Inches

Top of Box Elevation:	Datum:
Water Level	
Time	
Date	

PID (ppm)	Blow/ft or Pressure (psi)	Type of Sample	Sample Number	Depth (ft)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.5 feet.
				2				
				3				SILTY SAND (SM) - olive gray (5Y 4/2), damp; 70% fine sand; 25% silt; 5% clay; weak chemical odor.
				4				
165	400	S&H	C-B-5.5	5				Switch to GSA Rock Color Chart.
	11			6				SANDSTONE (SS) - dark grayish orange (10YR 7/4), damp, medium hardness, moderately weathered; 95% fine to medium sand; 5% silt; massive; black stained; no chemical odor.
				7				
				8				
				9				
0	10/3"	S&H		10				No chemical odor.
				11				
				12				Bottom of sample at 10.25 feet.
				13				Bottom of boring at 10.25 feet.
				14				11/02/90
				15				
				16				
				17				
				18				
				19				
				20				

Remarks: Hydraulic fluid leaked from hoses connecting driver hammer.

Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station No. 0329		C-C
	Location: 340 Highland/Vista		Sheet 1
	City: Piedmont, California		of 1
	Logged by: RCM	Driller: Bayland	

Drilling method: Hollow Stem Auger  
Hole diameter: 8-Inches  
Casing installation data:  
Top of Box Elevation: \_\_\_\_\_ Datum: \_\_\_\_\_

PID (ppm)	Blow/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description			
								Water Level	Time	Date	
				1				PAVEMENT SECTION - 1.0 foot.			
				2				SILTY SAND (SM) - yellowish brown (10YR 5/6), damp; 65% sand; 30% silt; 5% clay; no chemical odor.			
				3							
				4							
				5							
0	300 300 400	S&H push	C-C-6.5	6				COLOR CHANGE to brownish yellow (10YR 6/6); increasing clay to 10%; rootholes; no chemical odor.			
				7							
				8							
				9							
0	50+	S&H	C-C-10.5	10				Harder drilling at 9.0 feet. Switch to GSA Rock Color Chart at 9.0 feet. SANDSTONE (SS) - dark grayish orange (10YR 7/4), damp, medium hardness, moderately weathered; 95% fine to medium sand; 5% silt; massive; black stained fractures; no chemical odor.			
				11							
				12							
0	10/2"	S&H		13				No chemical odor.			
				14							
				15							
				16				Bottom of sample at 13.2 feet. Bottom of boring at 13.2 feet. 11/02/90			
				17							
				18							
				19							
				20							

Remarks: Groundwater was not encountered



Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station No. 0329		C-D
	Location: 340 Highland/Vista		Sheet 1
	City: Piedmont, California		of 1
	Logged by: RCM	Driller: Bayland	
Casing installation data:			

Drilling method: Hollow Stem Auger	Top of Box Elevation:	Datum:
Hole diameter: 8-Inches		

PID (ppm)	Blows/ft or Pressure (psf)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Water Level				Description
								Time				
				1								PAVEMENT SECTION - 1.5 feet.
				2								SILTY SAND (SM) - yellowish brown (10YR 5/4), stiff, damp; 60% sand; 25% silt; 15% clay; no chemical odor.
				3								
				4								
				5								
0	500	S&H		6								Sand increasing to 80%; rootholes; no chemical odor at 6.5 feet. -
	500	push	C-D-6.5	7								
				8								
				9								
				10								Switch to GSA Rock Color Chart at 9.0 feet.
0	37	S&H		11								SANDSTONE (SS) - dark grayish orange (10YR 7/4), damp, medium hardness, moderately weathered; 95% fine to medium sand; 5% silt; massive; black stained fractures; no chemical odor.
				12								
				13								
				14								Bottom of sample at 10.5 feet.
				15								Bottom of boring at 10.5 feet.
				16								11/02/90
				17								
				18								
				19								
				20								

Remarks: Groundwater was not encountered

**GSI** GeoStrategies Inc. Log of Boring BORING NO. C-D

Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station	C-E	
	Location: 340 Highland/Vista	City: Piedmont, California	Sheet 1
	Logged by: RCM	Driller: Bayland	of 1
Casing installation data:			

Drilling method: Hollow Stem Auger	Top of Box Elevation:	Datum:
Hole diameter: 8-Inches		

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.5 feet
				2				FILL - Sand (SP) - dark gray (5Y 4/1), damp; 95% sand; 5% silt; moderate chemical odor.
				3				
				4				
				5				
575	500 4	S&H	C-E-6.0	6				Large size pieces of asphalt, shell fragments, brick fragments, saturated, loose; strong chemical odor at 6.0 feet.
				7				
				8				
				9				
				10				
1540	6 16 24	S&H	C-E-11.0	11				SILTY SAND (SM) - pale olive (5Y 6/4), moist, dense; 75% fine to medium sand; 25% silt; strong chemical odor.
				12				
				13				
138	18 28	S&H	C-E-14.0	14				COLOR CHANGE to yellowish brown (10YR 5/8) at 14.0 feet; no chemical odor. Note: Switch to GSA Rock Color Chart at 14.0 feet.
				15				
90.9	30/3*	S&H		15.25				SANDSTONE (SS) - dark grayish orange (10YR 7/4), damp, medium hardness, moderately weathered; 95% fine to medium sand; 5% silt; massive; black stained fractures; no chemical odor.
				16				
				17				
				18				Bottom of sample at 15.25 feet.
				19				Bottom of boring at 15.25 feet.
				20				11/02/90

Remarks:

Field location of boring:  (See Plate 2)	Project No.: 7261	Date: 11/02/90	Boring No:
	Client: Chevron Service Station No. 0323		C-F
	Location: 340 Highland/Vista		
	City: Piedmont, California		Sheet 1
	Logged by: RCM	Driller: Bayland	of 1

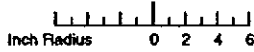
Drilling method: Hollow Stem Auger	Casing installation data:
------------------------------------	---------------------------

Hole diameter: 8-Inches	Top of Box Elevation:	Datum:
-------------------------	-----------------------	--------

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.0 feet
				2				
				3				
				4				
				5				FILL - Pea Gravel - olive (5Y 4/4), damp, loose; 100% gravel.
				6				
				7				
				8				
				9				No chemical odor observed from cuttings above 13.5 feet.
				10				
				11				
				12				
				13				
4.1	37	S&H		14				Concrete pillar at 13.5 feet.
	13/2"			15				Bottom of sample at 13.7 feet. Bottom of boring at 13.7 feet.
				16				
				17				
				18				
				19				
				20				

Remarks:

Grout



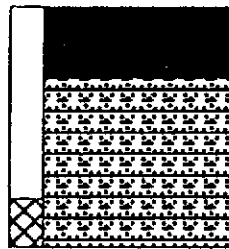
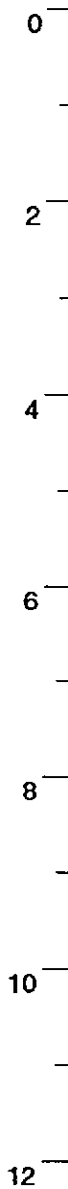
Depth Below Ground Surface (Feet)

Blew Counts

PID (ppmv)

### GRAPHIC LOG

### DESCRIPTION



Asphalt

Silt (ML); gray; damp; stiff

Silt (ML); same as above (weathered bedrock) (auger refusal)  
TD @ 2.5 ft.

#### EXPLANATION

	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
	Sample sealed for chemical analysis		
	Sieve sample	NR	No recovery
	Grab sample		
	Core sample		
			Water level during drilling
			Water level in completed well

#### CONTACTS:

	Solid where certain
	Dotted where approximate
	Dashed where uncertain
	Hachured where gradational

Logged by: Erich Neupert  
 Project Mgr: Justin Power  
 Dates Drilled: 4/28/93

Drilling Company: RESNA  
 Drilling Method: 3" Hand Auger  
 Driller: Erich Neupert

Well Head Completion: none  
 Type of Sampler: 1.5" split barrel  
 TD (Total Depth): 2.5 feet

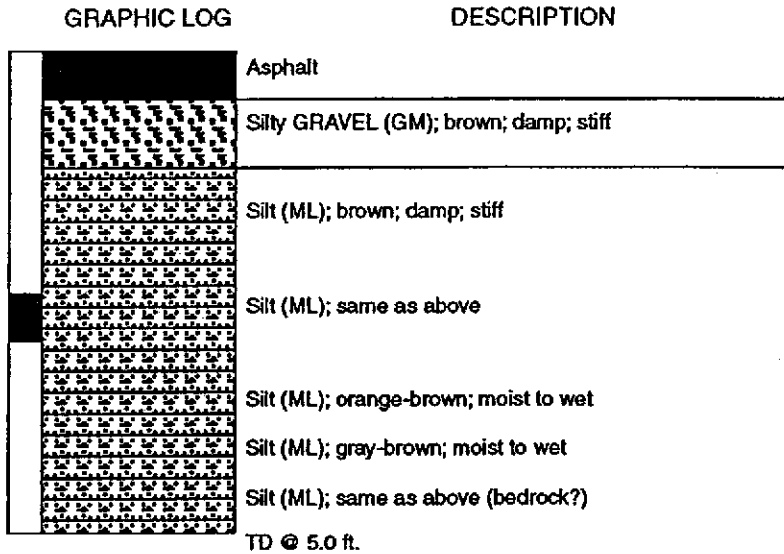
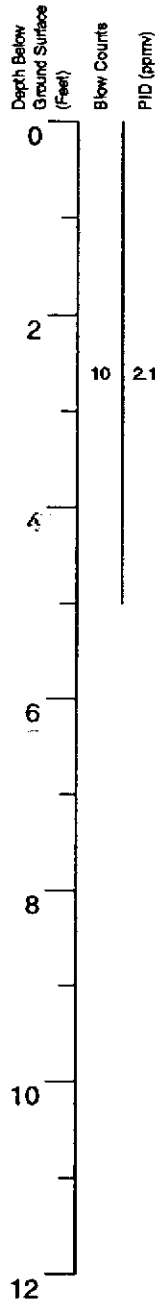
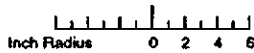
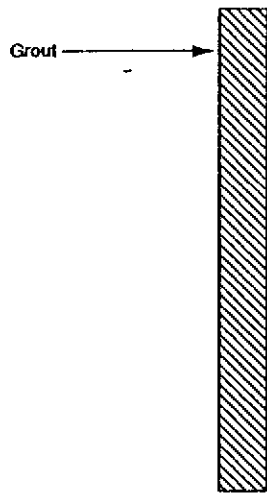


PROJECT NO. 170105.01

5/93

**BORING LOG—Boring B-1**  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

**BORING**  
**B-1**



**EXPLANATION**

- |  |                                     |                             |   |
|--|-------------------------------------|-----------------------------|---|
|  | Recovered drill sample              | est K                       | Estimated permeability (hydraulic conductivity) |
|  | Sample sealed for chemical analysis | 1K = primary 2K = secondary |   |
|  | Sieve sample                        | NR                          | No recovery                                     |
|  | Grab sample                         | ∇                           | Water level during drilling                     |
|  | Core sample                         | ∇                           | Water level in completed well                   |

**CONTACTS:**

- |  |                            |
|--|----------------------------|
|  | Solid where certain        |
|  | Dotted where approximate   |
|  | Dashed where uncertain     |
|  | Hachured where gradational |

Logged by: Erich Neupert  
 Project Mgr: Justin Power  
 Dates Drilled: 4/28/93

Drilling Company: RESNA  
 Drilling Method: 3" Hand Auger  
 Driller: Erich Neupert

Well Head Completion: none  
 Type of Sampler: 1.5" split barrel  
 TD (Total Depth): 5.0 feet

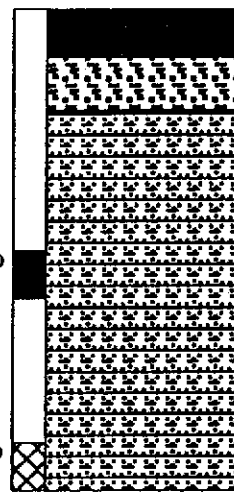
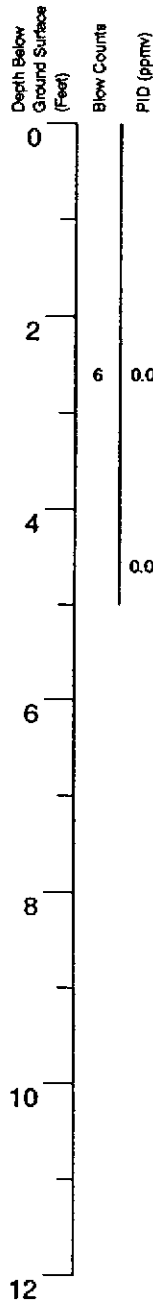
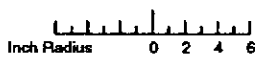
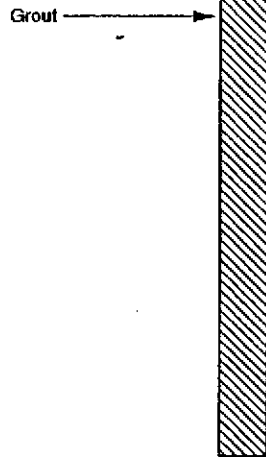


PROJECT NO. 170105.01

5/93

**BORING LOG—Boring B-2**  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

**BORING**  
**B-2**



**DESCRIPTION**

Asphalt

Silty GRAVEL (GM), fine- to coarse-grained; brown; damp

Silt (ML) with trace fine sand; orange; damp; medium stiff

Silt (ML); same as above (weathered bedrock) (auger refusal)  
TD @ 5.0 ft.

**EXPLANATION**

	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)
	Sample sealed for chemical analysis	1K = primary 2K = secondary	
	Sieve sample	NR	No recovery
	Grab sample		Water level during drilling
	Core sample		Water level in completed well

**CONTACTS:**

	Solid where certain
	Dotted where approximate
	Dashed where uncertain
	Hachured where gradational

Logged by: Erich Neupert  
 Project Mgr: Justin Power  
 Dates Drilled: 4/28/93

Drilling Company: RESNA  
 Drilling Method: 3" Hand Auger  
 Driller: Erich Neupert

Well Head Completion: none  
 Type of Sampler: 1.5" split barrel  
 TD (Total Depth): 5.0 feet



PROJECT NO. 170105.01

5/93

**BORING LOG—Boring B-3**  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

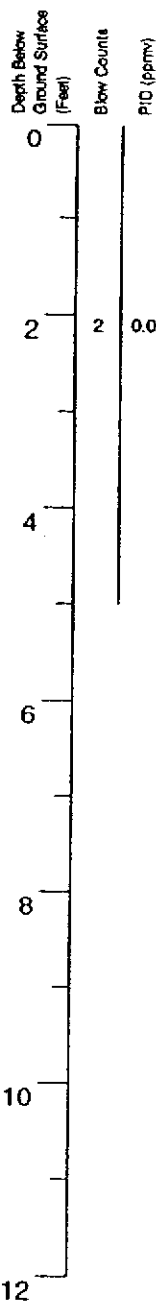
**BORING  
 B-3**

Grout

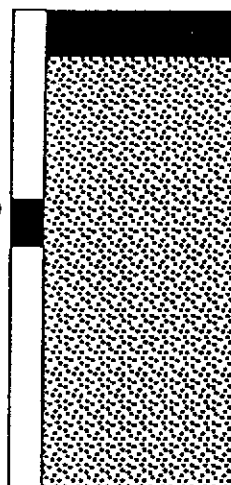


4-28-93  
10:30

Inch Radius 0 2 4 6



GRAPHIC LOG



DESCRIPTION

Asphalt  
 SAND (SP); brown; damp; very loose (fill)  
 SAND (SP); same as above  
 SAND (SP); same as above; wet  
 SAND (SP); same as above; flowing sands  
 TD @ 5.0 ft.

EXPLANATION

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity)  
1K = primary 2K = secondary
- NR No recovery
- Water level during drilling
- Water level in completed well

CONTACTS:

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

Logged by: Erich Neupert  
 Project Mgr: Justin Power  
 Dates Drilled: 4/28/93  
 Drilling Company: RESNA  
 Drilling Method: 3" Hand Auger  
 Driller: Erich Neupert  
 Well Head Completion: none  
 Type of Sampler: 1.5" split barrel  
 TD (Total Depth): 5.0 feet

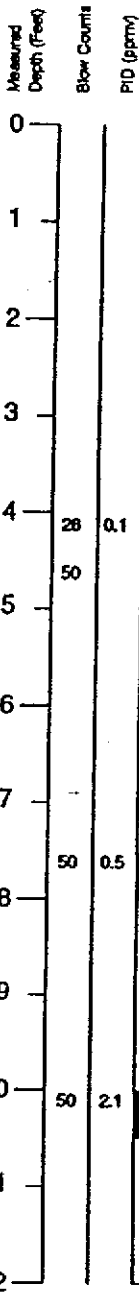
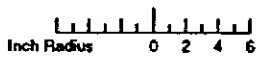
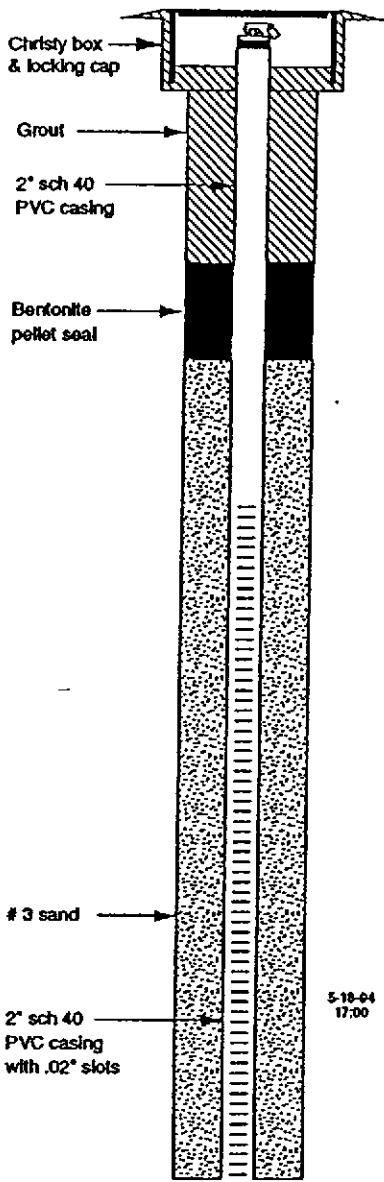


PROJECT NO. 170105.01

5/93

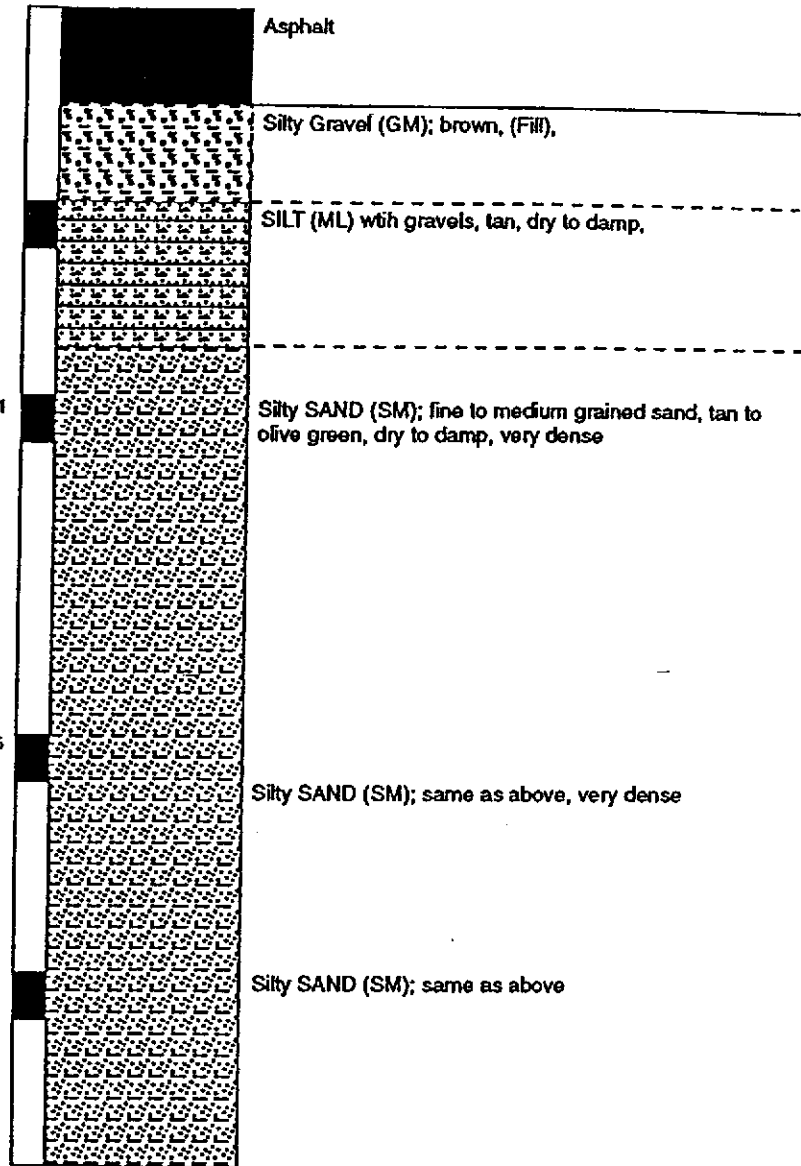
BORING LOG—Boring B-4  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

BORING  
**B-4**



**GRAPHIC LOG**

**DESCRIPTION**



continues

**EXPLANATION**

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity)  
1K = primary 2K = secondary
- NR No recovery
- ☒ Water level during drilling
- ☒ Water level in completed well

**CONTACTS:**

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

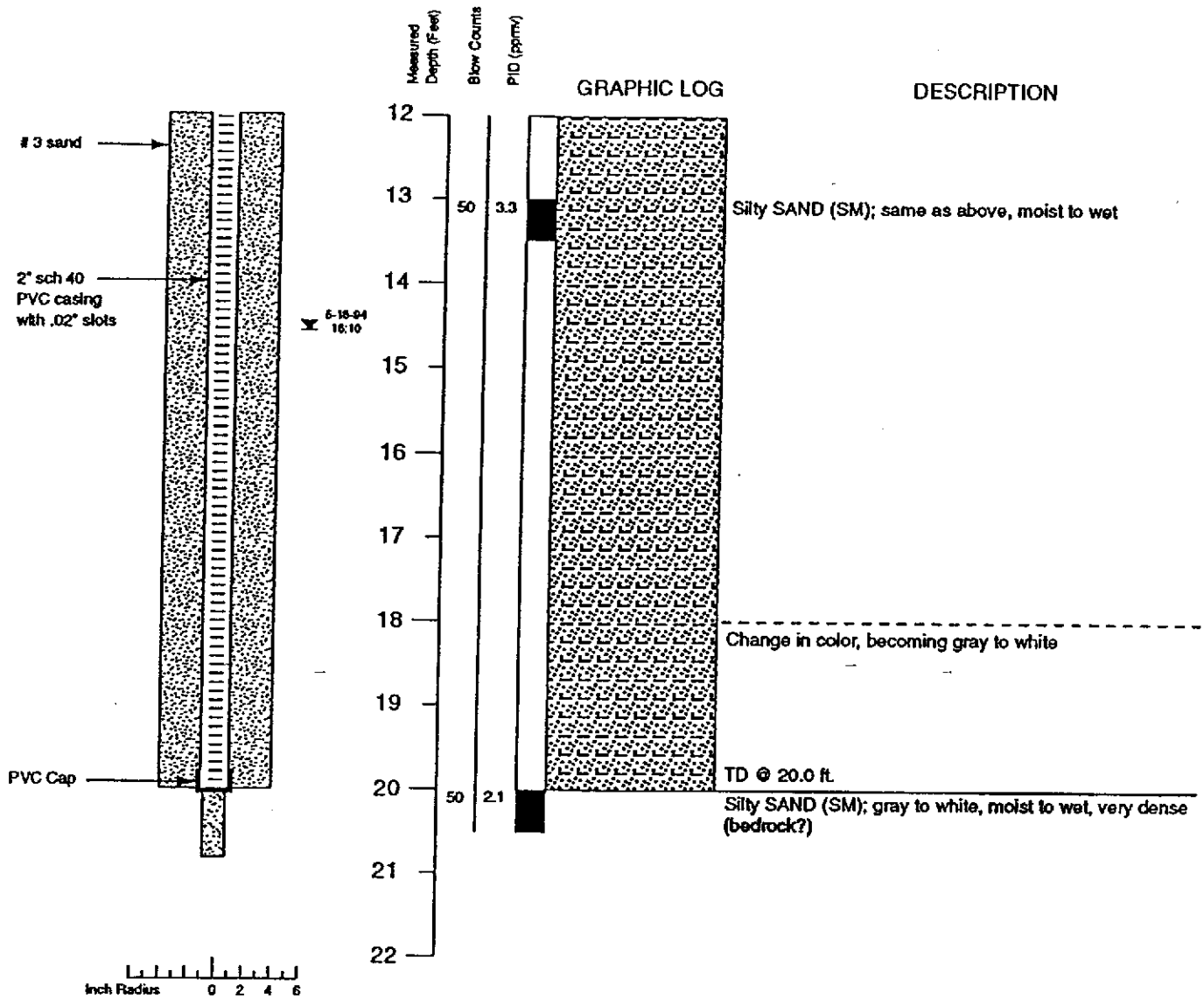
Logged by:	C.W. Lawrence
Project Mgr:	Erich Neupert
Dates Drilled:	5/18/94
Drilling Company:	West Hazmat
Drilling Method:	8" Hollow Stem Auger
Driller:	Jeff and John
Well Head Completion:	Christy box & locking cap
Type of Sampler:	2 1/2" split spoon
TD (Total Depth):	20.0 feet

**Canonie** Environmental

DRAWING NO. 94-247-A2

BORING LOG - BORING B-6  
(MONITORING WELL MW-6)  
FORMER CHEVRON SERVICE STATION 9-0329  
340 HIGHLAND AVENUE  
PIEDMONT, CALIFORNIA





**EXPLANATION**

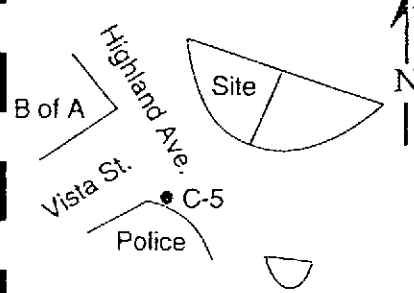
	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)	<b>CONTACTS:</b>	
	Sample sealed for chemical analysis	1K = primary 2K = secondary			
	Sieve sample	NR	No recovery		Solid where certain
	Grab sample	W	Water level during drilling		Dotted where approximate
	Core sample	Σ	Water level in completed well		Dashed where uncertain
					Hachured where gradational

**Canonie** Environmental

DRAWING NO. 94-247-A3

BORING LOG - BORING B-6  
 (MONITORING WELL MW-6)  
 FORMER CHEVRON SERVICE STATION 9-0329  
 340 HIGHLAND AVENUE  
 PIEDMONT, CALIFORNIA

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-5  
PAGE 1 OF 1

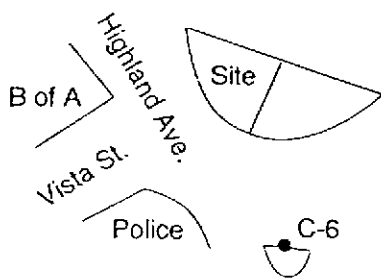
PROJECT NO. 320-160.1A  
LOGGED BY: C.W.R.  
DRILLER: West Hazmat  
DRILLING METHOD: HSA  
SAMPLING METHOD: CAL MOD  
CASING TYPE: SCH 40 PVC  
SLOT SIZE: 0.020"  
WELL PACK: #3 SAND

CLIENT: CHEVRON  
DATE DRILLED: 10-18-96  
LOCATION: 340 Highland Ave., Piedmont  
HOLE DIAMETER: 8"  
HOLE DEPTH: 18.5'  
WELL DIAMETER: 2"  
WELL DEPTH: 18'  
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
				1			SW	ASPHALT 3"
				2				SAND: yellowish brown with minor reddish brown oxidation; 10% fines as clay and silt; 70% fine to medium sand; 20% subangular gravel up to 3" diameter; no product odor.
				3				
				4			ML	SILT with sand and gravel: greenish gray; low plasticity; 60-70% silt with clay; 20% fine sand; 10-20% fine subangular gravel; hard; no product odor.
			>50	5			SS	SANDSTONE - BEDROCK - weathered: yellowish brown; fine sand with silt; poorly lithified; 1-10mm planar laminae; friable; no product odor.
				6				
				7				
				8			SLst	SILTSTONE: pale yellow; minor sand; friable; poorly lithified; massive; no product odor.
			>50	9				
				10				
				11				
				12				
				13				
			>50	14				
				15				@15': as above; pale yellow; decreased sand content; moderate hardness; massive; no product odor.
				16				
				17			SS	SANDSTONE - weathered: yellowish brown, gray, and reddish brown; friable; poorly lithified; massive; fine sand with silt; moisture in fractures; no product odor.
			>50	18				
				19				
				20				
				21				
				22				

BOTTOM OF BORING 18.5'

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. C-6  
PAGE 1 OF 1

PROJECT NO. 320-160.1A  
LOGGED BY: C.W.R.  
DRILLER: West Hazmat  
DRILLING METHOD: HSA  
SAMPLING METHOD: CAL MOD  
CASING TYPE: SCH 40 PVC  
SLOT SIZE: 0.020"  
WELL PACK: #3 SAND

CLIENT: CHEVRON  
DATE DRILLED: 10-18-96  
LOCATION: 340 Highland Ave., Piedmont  
HOLE DIAMETER: 8"  
HOLE DEPTH: 18'  
WELL DIAMETER: 2"  
WELL DEPTH: 17.5'  
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS	
	Dp			1			SW	ASPHALT 4"	
	Mst			2			ML	SAND with gravel: yellowish brown; 10% fines as silt and clay; 70% fine to medium sand; 10-20% subangular gravel up to 3" in diameter; no product odor.	
	Mst			3			SC	SILT with sand: dark gray; low plasticity; 65-75% silt with clay; 20-30% fine sand; trace coarse sand; roots; soft; no product odor.	
	Mst-Wt		>50	4				CLAYEY SAND: dark greenish gray; 30-40% fines as clay and silt; 60-70% fine to medium sand; trace black roots; loose; no product odor.	
	Dp			5			SS	SANDSTONE - BEDROCK - weathered: yellowish brown and greenish gray; abundant silt; fine sand with silt; poorly lithified; friable; hard; no product odor.	
					6				
					7				
					8				
					9			SLst	SILTSTONE - weathered: pale yellow; trace sand; friable; poorly lithified; massive; moderate hardness; no product odor.
				>50	10				
					11				
					12				
					13				
					14				
				>50	15				@15': as above; pale yellow; decreased sand content; moderate hardness; massive; no product odor.
					16				
					17				
				>50	18				@18': as above; dark yellowish brown with dark gray; and minor reddish brown; massive; moderate hardness; increased lithification; difficult drilling; no product odor.
					19				
					20				
					21				
					22				

BOTTO M OF BORING 18'



Cambria Environmental Technology, Inc.  
 1144 - 65th St.  
 Oakland, CA 94608  
 Telephone: (510) 420-0700  
 Fax: (510) 420-9170

# BORING/WELL LOG

CLIENT NAME	<u>Chevron Products Company</u>	BORING/WELL NAME	<u>U-1</u>
JOB/SITE NAME	<u>9-0329</u>	DRILLING STARTED	<u>21-Mar-00</u>
LOCATION	<u>340 Highland Avenue, Piedmont, CA</u>	DRILLING COMPLETED	<u>21-Mar-00</u>
PROJECT NUMBER	<u>31A-1776</u>	WELL DEVELOPMENT DATE (YIELD)	<u>NA</u>
DRILLER	<u></u>	GROUND SURFACE ELEVATION	<u>Not Surveyed</u>
DRILLING METHOD	<u>Hand Auger</u>	TOP OF CASING ELEVATION	<u>NA</u>
BORING DIAMETER	<u>3 inch</u>	SCREENED INTERVAL	<u>NA</u>
LOGGED BY	<u>David Gregory</u>	DEPTH TO WATER (First Encountered)	<u>▽</u>
REVIEWED BY	<u>Jim Perkins, RG</u>	DEPTH TO WATER (Static)	<u>NA</u> ▼
REMARKS	<u></u>		

TPHg (mg/kg)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
		US1-1					Asphalt	0.3	
					SM		<b>Silty GRAVEL with sand:</b> Olive grey; Most, 10% clay, 10% silt, 40% medium grained sand, 40% medium grained subrounded gravels, high estimated permeability	1.0	
					SP		<b>Silty SAND:</b> dark greyish brown; most, 5% clay, 25% silt, 70% fine grained well sorted sand, medium estimated permeability.	3.0	← Bentonite Seal
		US1-5		5			<b>SAND:</b> brownish yellow; damp, 100% fine grained well sorted sand, high estimated permeability.	5.0	Bottom of Boring @ 5 ft
							Sample U1 - 4 voa's collected @ 5.10 pm		

WELL LOG (TPHG) 119-0329.GIANT.GPJ DEFAULT.GDT 3/24/00



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 1144 - 65th St.  
 Oakland, CA 94608  
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# BORING/WELL LOG

CLIENT NAME	Chevron Products Company	BORING/WELL NAME	U-2
JOB/SITE NAME	9-0329	DRILLING STARTED	21-Mar-00
LOCATION	340 Highland Avenue, Piedmont, CA	DRILLING COMPLETED	21-Mar-00
PROJECT NUMBER	31A-1776	WELL DEVELOPMENT DATE (YIELD)	NA
DRILLER		GROUND SURFACE ELEVATION	Not Surveyed
DRILLING METHOD	Hand Auger	TOP OF CASING ELEVATION	NA
BORING DIAMETER	3 inch	SCREENED INTERVAL	NA
LOGGED BY	David Gregory	DEPTH TO WATER (First Encountered)	▽
REVIEWED BY	Jim Perkins, RG	DEPTH TO WATER (Static)	NA ▽
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
		US2-1.5					<p>Asphalt</p> <p><b>Silty SAND with gravel:</b> dark greyish brown; dry, 15% silt, 45% medium grained sand, 40% fine grained angular gravels, high estimated permeability.</p> <p><b>SAND:</b> olive grey; dry, 10% silt, 90% fine grained well sorted sand, high estimated permeability.</p>	0.5 1.0 2.5	<p>← Bentonite Seal</p> <p>Bottom of Boring @ 2.5 ft</p>
							refusal @ 2.5 feet, sandstone bedrock		



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# BORING/WELL LOG

CLIENT NAME	Chevron Products Company	BORING/WELL NAME	U-3
JOB/SITE NAME	9-0329	DRILLING STARTED	21-Mar-00
LOCATION	340 Highland Avenue, Piedmont, CA	DRILLING COMPLETED	21-Mar-00
PROJECT NUMBER	31A-1776	WELL DEVELOPMENT DATE (YIELD)	NA
DRILLER		GROUND SURFACE ELEVATION	Not Surveyed
DRILLING METHOD	Hand Auger	TOP OF CASING ELEVATION	NA
BORING DIAMETER	3 inch	SCREENED INTERVAL	NA
LOGGED BY	David Gregory	DEPTH TO WATER (First Encountered)	▽
REVIEWED BY	Jim Perkins, RG	DEPTH TO WATER (Static)	NA ▼

REMARKS

TPHg (mg/kg)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
		US3-2			GP SP		<p>Poorly graded GRAVEL with sand: dark olive gray; damp, 40% medium-coarse grained sand, 60% medium grained subrounded gravels, high estimated permeability.</p> <p>SAND: brownish yellow, damp, 100% fine grained well sorted sand, moderate estimated permeability.</p>	0.5 1.0 3.0	<p>← Bentonite Seal</p> <p>Bottom of Boring @ 3 ft</p>
							refusal @ 3 feet, sandstone bedrock		

WELL LOG (TPH-G) I:\9-0329\GINT.GPJ DEFAULT.GDT 3/24/00



Cambria Environmental Technology, Inc.  
 1144 - 65th St.  
 Oakland, CA 94608  
 Telephone: (510) 420-0700  
 Fax: (510) 420-9170

# BORING/WELL LOG

CLIENT NAME	Chevron Products Company	BORING/WELL NAME	U-4
JOB/SITE NAME	9-0329	DRILLING STARTED	21-Mar-00
LOCATION	340 Highland Avenue, Piedmont, CA	DRILLING COMPLETED	21-Mar-00
PROJECT NUMBER	31A-1776	WELL DEVELOPMENT DATE (YIELD)	NA
DRILLER		GROUND SURFACE ELEVATION	Not Surveyed
DRILLING METHOD	Hand Auger	TOP OF CASING ELEVATION	NA
BORING DIAMETER	3 inch	SCREENED INTERVAL	NA
LOGGED BY	David Gregory	DEPTH TO WATER (First Encountered)	0.2 ft
REVIEWED BY	Jim Perkins, RG	DEPTH TO WATER (Static)	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
		US4-1			GM CL		Concrete <b>Silty GRAVEL:</b> dark reddish brown; wet, 15% clay, 20% silt, 75% angular coarse gravel and cobbles, high estimated permeability. <b>CLAY:</b> greyish green, damp, 70% clay, 30% silt, low estimated permeability.	0.2 0.8 1.2	Bentonite Seal Bottom of Boring @ 1.2 ft
							Sample U4 - 3 voa's @ 4.30pm		



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 Telephone: (510) 420-0700  
 Fax: (510) 420-9170

# BORING/WELL LOG

CLIENT NAME	Chevron Products Company	BORING/WELL NAME	U-5
JOB/SITE NAME	9-0329	DRILLING STARTED	21-Mar-00
LOCATION	340 Highland Avenue, Piedmont, CA	DRILLING COMPLETED	21-Mar-00
PROJECT NUMBER	31A-1776	WELL DEVELOPMENT DATE (YIELD)	NA
DRILLER		GROUND SURFACE ELEVATION	Not Surveyed
DRILLING METHOD	Hand Auger	TOP OF CASING ELEVATION	NA
BORING DIAMETER	3 inch	SCREENED INTERVAL	NA
LOGGED BY	David Gregory	DEPTH TO WATER (First Encountered)	
REVIEWED BY	Jim Perkins, RG	DEPTH TO WATER (Static)	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
		US5-2.5			GP SM		<p>Asphalt</p> <p>Poorly graded GRAVEL with sand: olive gray; dry, 20% coarse grained sand, 80% medium grained subrounded gravel, high estimated permeability.</p> <p>Silty SAND with gravel: yellowish brown; damp, 15% silt, 45% medium grained sand, 40% medium grained subangular gravels, high estimated permeability.</p> <p>refusal @ 2.5 feet, sandstone bedrock</p>	0.5 1.0 2.5	Bottom of Boring @ 2.5 ft

WELL LOG (TPH-G) I:\9-0329\GINT.GPJ\_DEFAULT.GDT 3/24/00



**Appendix C**

**Analytical Results for Soil**

TABLE 1

## SOIL ANALYSIS DATA

WELL/BORING NO.	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TOG (PPM)
C-A-5.5	02-Nov-90	15-Nov-90	1600	.11	1.2	12	37	280
C-A-10.5	02-Nov-90	15-Nov-90	1	<.010	<.015	<.015	.035	55
C-B-5.5	02-Nov-90	12-Nov-90	<1	<.005	<.005	0.005	0.021	----
C-E-6.5	02-Nov-90	13-Nov-90	20	0.16	0.10	0.10	0.26	----
C-E-11.5	02-Nov-90	15-Nov-90	220	0.051	0.51	0.51	1.4	----
C-E-14.0	02-Nov-90	12-Nov-90	2	0.007	<.005	0.019	0.016	----

TPH-G = Total Petroleum Hydrocarbon calculated as Gasoline

TOG = Total Oil and Grease

PPM = Parts Per Million

Note: 1. All data shown as <x are reported as ND (none detected).

2. BTEX for samples C-A-5.5 and C-A-10.5 were reported in micrograms per kilogram.

Table 1

SOIL ANALYTICAL RESULTS  
Chevron Service Station No. 9-0329  
340 Highland Avenue  
Piedmont, California

Sample Number	Date Sampled	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg
S2.5B1	4/28/93	<0.005	<0.005	<0.005	<0.015	<1.0
S3.0B2	4/28/93	<0.005	<0.005	<0.005	<0.015	<1.0
S3.0B3	4/28/93	<0.005	<0.005	<0.005	<0.015	<1.0
S2.5B4	4/28/93	<0.005	<0.005	<0.005	<0.015	<1.0
Cuttings (A-D)	4/28/93	<0.005	<0.005	<0.005	<0.015	<1.0

All results in parts per million (ppm)

TPHg = Total Petroleum Hydrocarbons as Gasoline.

< = Less than the detection limit established by the laboratory

TABLE 1

SOIL ANALYTICAL RESULTS  
 CHEVRON SERVICE STATION 9-0329  
 340 HIGHLAND AVENUE  
 PIEDMONT, CALIFORNIA

Sample No.	Date	Concentrations in mg/kg				
		TPH-G	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
S-2.0-B6	05/18/94	<1	<0.005	<0.005	<0.005	<0.015
S-4.5-B6	05/18/94	<1	<0.005	<0.005	<0.005	<0.015
S-7.5-B6	05/18/94	<1	<0.005	<0.005	<0.005	<0.015
S-10.0-B6	05/18/94	<1	<0.005	<0.005	<0.005	<0.015
S-15.0-B6	05/18/94	<1	<0.005	<0.005	<0.005	<0.015

Notes:

mg/kg denotes milligrams per kilogram.  
 TPH-G denotes total petroleum hydrocarbons as gasoline.  
 < denotes less than indicated detection limit established by the laboratory.

Table 1  
**Soil Analytical Data**  
 Total Petroleum Hydrocarbons  
 (TPPH as Gasoline, BTEX Compounds, and MtBE)

Chevron Service Station 9-0329  
 340 Highland Avenue at Vista Avenue  
 Piedmont, California

Well Number	Sample Depth (feet)	Date Sampled	TPPH as			Ethyl-benzene (ppm)	Xylenes (ppm)	MtBE (ppm)
			Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)			
C-5	5	10/18/96	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
	10		<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
C-6	5	10/18/96	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
	10		<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
TPPH = Total purgeable petroleum hydrocarbons MtBE = Methyl tert-butyl ether ppm = Parts per million								

**Table 1. Soil Analytical Data -Former Chevron Station 9-0329, 340 Highland Ave., Piedmont, California**

Sample ID	Date	Depth (feet)	TPHg	Benzene Concentrations in parts per million (ppm)	Toluene	Ethylbenzene	Xylenes	MTBE	Fuel Oxygenates
U1-1	3/21/00	1	1900	< 1.0	< 1.0	3.7	8.1	< 0.10	ND
U2-1.5	3/21/00	1.5	< 1.0	< 0.005	< 0.005	< 0.005	0.021	< 0.10	ND
U3-2	3/21/00	2	< 1.0	< 0.005	< 0.005	< 0.005	0.012	< 0.10	ND
U4-1	3/21/00	1	< 1.0	< 0.005	< 0.005	< 0.005	< 0.005	< 0.10	ND
U5-2.5	3/21/00	2.5	< 1.0	< 0.005	< 0.005	< 0.005	0.0082	< 0.10	ND

**Abbreviations / Notes**

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015

Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020

MTBE = methyl tert-butyl ether by EPA Method 8260.

Fuel Oxygenates = Ethanol, tert-butyl alcohol, Di-isopropyl ether, Ethyl tert-butyl ether, tert-Amyl methyl ether, 1,2-Dichloroethane, Ethylene dibromide by EPA Method 8260.

<x = concentration less than the laboratory reporting limits

ND=not detected above laboratory reporting limits

**Table 1 - Soil Chemical Analytical Data**

Former Chevron Service Station #9-0329

340 Highland Avenue  
Piedmont, California

Sample No.	Sample Date	Sample Depth (feet)	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MtBE <sup>(1)</sup> (ppm)	TBA (ppm)	DIPE (ppm)	ETBE (ppm)	TAME (ppm)	Ethanol (ppm)	1,2-DCA (ppm)	EDB (ppm)
U-6	3/21/01	5.5	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0500/<0.00200	<0.200	<0.00200	<0.00200	<0.00200	<3.000	<0.00200	<0.00200
U-8	3/21/01	6	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0500/<0.00200	<0.200	<0.00200	<0.00200	<0.00200	<3.000	<0.00200	<0.00200
U-10	3/21/01	6	<1.00	<0.00500	<0.00500	<0.00500	<0.00500	<0.0500/<0.00200	<0.200	<0.00200	<0.00200	<0.00200	<3.000	<0.00200	<0.00200

**Explanation:**

TPHg = Total Petroleum Hydrocarbons as gasoline  
BTEX = Benzene, toluene, ethylbenzene, xylenes  
MtBE = Methyl tert-butyl ether  
TBA = Tert-butyl alcohol  
DIPE = Di-isopropyl ether

ETBE = Ethyl tert-butyl ether  
TAME = Tert-amyl methyl ether  
1,2-DCA = 1,2-Dichloroethane  
EDB = Ethylene dibromide  
ppm = parts per million

**Analytical Methods**

TPHg, BTEX, and MtBE by DHS LUFT Method  
1,2-DCA and EDB by EPA Method 8260A  
Oxygenates by EPA Method 8260A

**Analytical Laboratories**

Sequoia Analytical (ELAP #1624)

**Notes:**

<sup>(1)</sup>MtBE by DHS LUFT Method/MtBE by EPA Method 8260A

**Appendix D**

**Analytical Results for Groundwater**



**Environmental Management  
Company**  
6001 Bollinger Canyon Rd, L4050  
P.O. Box 6012  
San Ramon, CA 94583-2324  
Tel 925-842-1589  
Fax 925-842-8370

**Karen Streich**  
Project Manager

**Alameda County**

OCT 24 2003

**Environmental Health**

October 21, 2003

**ChevronTexaco**

Mr. Scott Seery  
Alameda County Health Care Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

Re: Former Chevron Service Station #9-0329  
340 Highland Ave, Piedmont, CA  
Site Conceptual Model and Workplan

Dear Scott,

I have reviewed the Site Conceptual Model and Workplan that Cambria submitted to you today.

I agree with the conclusions and recommendations presented in the referenced report. The information in this report is accurate to the best of my knowledge and all local Agency/Regional Board guidelines have been followed. This report was prepared by Cambria Environmental Technology, Inc., upon whose assistance and advice I have relied.

This letter is submitted pursuant to the requirements of California Water Code Section 13267(b)(1) and the regulating implementation entitled Appendix A pertaining thereto.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,



Karen Streich  
Project Manager

COMPANY: CHEVRON USA  
 LOCATION: HIGHLAND VISTA  
 CITY: Piedmont

JOB#: OR 5026  
 DATE: 1-24-83  
 TIME: 11:00

WELL	LIQUID DEPTH	HYDROCARBON THICKNESS	AMOUNT PUMPED
1	10"	∅	
2	39"	3/4"	
3	8"	∅	
4	58"	∅	
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRODUCT TANK: TOTAL LIQUID: \_\_\_\_\_ IN. WATER: \_\_\_\_\_ IN.  
 AMOUNT PUMPED OUT: \_\_\_\_\_ GALLONS

FLOWMETER: \_\_\_\_\_ READING: \_\_\_\_\_

WATER TABLE DEPRESSION PUMP: \_\_\_\_\_ DISCHARGE \_\_\_\_\_

SCAVENGER OPERATION: \_\_\_\_\_ CLEANED: \_\_\_\_\_

PROBE OPERATION: \_\_\_\_\_ CLEANED: \_\_\_\_\_

OTHER COMMENTS: Wells # 1 & 3 were filled with water in sidewalk boxes, pumped out by water from

FOREMAN: Mike Pirita ASSISTANTS: CHEVRON PERS.

COMPANY: Chevron USA  
 LOCATION: 340 Highland @ Vista  
 CITY: Piedmont

JOB#: OR-5026  
 DATE: 1-19-83  
 TIME: 3:00 PM

WELL	LIQUID DEPTH	HYDROCARBON THICKNESS	AMOUNT PUMPED
1	—	—	—
2	51"	—	—
3	—	—	—
4	59"	—	—
5	—	—	—
6	—	—	—
7	—	—	—
8	—	—	—
9	—	—	—
10	—	—	—
11	—	—	—
12	—	—	—
13	—	—	—
14	—	—	—
15	—	—	—

PRODUCT TANK: TOTAL LIQUID: \_\_\_\_\_ IN. WATER: \_\_\_\_\_ IN.  
 AMOUNT PUMPED OUT: \_\_\_\_\_ GALLONS

FLOWMETER: \_\_\_\_\_ READING: \_\_\_\_\_

WATER TABLE DEPRESSION PUMP: \_\_\_\_\_ DISCHARGE \_\_\_\_\_

SCAVENGER OPERATION: \_\_\_\_\_ CLEANED: \_\_\_\_\_

PROBE OPERATION: \_\_\_\_\_ CLEANED: \_\_\_\_\_

OTHER COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_

FOREMAN: Jeff Ryan ASSISTANTS: \_\_\_\_\_

TABLE 2

## HISTORICAL GROUND-WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	O & G (PPB)
07-Aug-89	C-2	34000.	580.	60.	170.	270.	12000.
15-Nov-89	C-2	8100	500	36	420	180	<5000
01-Feb-91	C-2	6800	490	21	310	86	7000
16-Apr-91	C-2	9600	810	43	550	270	<5000
07-Aug-89	C-3	<50.	<0.5	<1.	<1.	<3.	N/A
15-Nov-89	C-3	<500	<0.5	2.8	<0.5	1.1	<5000
01-Feb-91	C-3	<50	<0.5	<0.5	<0.5	<0.5	N/A
16-Apr-91	C-3	<50	<0.5	<0.5	<0.5	<0.5	N/A
15-Nov-89	C-4	1300	2.9	310	0.5	2.9	<5000
01-Feb-91	C-4	72	<0.5	9	<0.5	<0.5	N/A
16-Apr-91	C-4	<50	<0.5	<0.5	<0.5	<0.5	N/A
07-Aug-89	A	1000.	50.	6.	5.	22.	N/A
15-Nov-89	A	3700	98	2.1	4.3	55	<5000
01-Feb-91	A	36000	1100	750	130	6100	N/A
16-Apr-91	A	8000	370	6	86	750	N/A
16-Apr-91	YB	<50	<0.5	<0.5	<0.5	<0.5	N/A

TABLE 2

HISTORICAL GROUND-WATER QUALITY DATABASE

Current Regional Water Quality Control Board Maximum Contaminant Levels  
Benzene 1. ppb    Xylenes 1750. ppb    Ethylbenzene 680. ppb

Current DHS Action Levels    Toluene 100.0 ppb

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline

PPB = Parts Per Billion    TB = Trip Blank

O&G = Oil and Grease

- NOTE:
1. DHS Action levels and MCL's are subject to change pending State of California review.
  2. Oil and Grease chemical analytical data for sample point C-2 collected on 2/1/91, was originally reported in milligrams per liter (mg/L).
  3. All data shown as <X are reported as ND (none detected).

Table 2  
**Groundwater Analytical Data**  
 Total Petroleum Hydrocarbons  
 (TPPH as Gasoline, BTEX Compounds, and MtBE)

Chevron Service Station 9-0329  
 340 Highland Avenue at Vista Avenue  
 Piedmont, California

Well Number	Date Sampled	TPPH as			Ethyl-		MtBE (ppb)
		Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	benzene (ppb)	Xylenes (ppb)	
C-5	11/25/96	<50	<0.50	<0.50	<0.50	<0.50	<2.5
C-6	11/25/96	<50	<0.50	<0.50	<0.50	<0.50	<2.5
TPPH = Total purgeable petroleum hydrocarbons MtBE = Methyl tert-butyl ether ppb = Parts per billion							

Table 2

GROUNDWATER ANALYTICAL RESULTS

Chevron Service Station No. 9-0329  
340 Highland Avenue  
Piedmont, California

Sample Number	Date Sampled	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg
B-1	NS	NA	NA	NA	NA	NA
B-2	4/28/93	<0.005	<0.005	<0.005	<0.005	<50
B-3	NS	NA	NA	NA	NA	NA
B-4	4/28/93	<0.005	<0.005	<0.005	<0.005	<50

All results in parts per billion (ppb)

TPHg = Total Petroleum Hydrocarbons as Gasoline.

NS = Not Sampled (groundwater not present above bedrock)

NA = Not Analyzed

# CAMBRIA

**Table 2. Groundwater Analytical Data - Chevron Station 9-0329, 340 Highland Ave., Piedmont, CA**

Sample ID	Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Fuel Oxygenates
Concentrations in parts per billion (ppb)								
U-1	3/21/00	1,000	< 2.5	< 2.5	2.9	< 2.5	39,000	ND
U-4	3/21/00	< 50	< 0.50	< 0.50	< 0.50	3.1	< 2.0	ND

**Abbreviations / Notes**

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015

Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020

MTBE = methyl tert-butyl ether by EPA Method 8260.

Fuel Oxygenates = Ethanol, tert-butyl alcohol, Di-isopropyl ether, Ethyl tert-butyl ether, tert-Amyl methyl ether, 1,2-Dichloroethane, Ethylene dibromide by EPA Method 8260.

<x = concentration less than the laboratory reporting limits

ND=not detected above laboratory reporting limits





# GETTLER-RYAN INC.

## TRANSMITTAL

September 17, 2003

G-R #386493

TO: Ms. Karen Streich  
Chevron Products Company  
P.O. Box 6004  
San Ramon, California 94583

CC: Mr. Bob Foss  
Cambria Environmental, Inc.  
5900 Hollis Street, Suite A  
Emeryville, California 94608

FROM: Deanna L. Harding  
Project Coordinator  
Gettler-Ryan Inc.  
6747 Sierra Court, Suite J  
Dublin, California 94568

RE: **Former Chevron Service Station  
#9-0329  
340 Highland Avenue  
Piedmont, California**

WE HAVE ENCLOSED THE FOLLOWING:

COPIES	DATED	DESCRIPTION
1	September 16, 2003	Groundwater Monitoring and Sampling Report Third Quarter - Event of August 18, 2003

### COMMENTS:

Please provide any comments/changes and propose any groundwater monitoring modifications for the next event prior to **October 1, 2003**, at which time the final report will be distributed to the following:

cc: Mr. Chuck Headlee, RWQCB-S.F. Bay Region, 1515 Clay Street, Suite 1400, Oakland, CA 94612  
Mr. Scott Seery, Alameda County Health Care Services, Dept. of Environmental Health, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502-6577  
Mr. John M. Robinson, Hoffman Investment Co., 1035 Edwards Road, Burlingame, CA 94010  
Mr. Ravi Randawa, Texaco Service Station, 340 Highland, Ave, Piedmont, CA 94611  
Mr. Jon Robbins, Chevron Products Law, P.O. Box 6004, Building T, Room T-4284, San Ramon, CA 94583 (w/o attachments)

Enclosures

trans/9-0329-KS

6747 Sierra Court, Suite J • Dublin, CA 94568 • (925) 551-7555 • Fax (925) 551-7888  
3140 Gold Camp Drive, Suite 170 • Rancho Cordova, CA 95670 • (916) 631-1300 • Fax (916) 631-1317  
1364 N. McDowell Blvd., Suite B2 • Petaluma, CA 94954 • (707) 789-3255 • Fax (707) 789-3218



# GETTLER-RYAN Inc.

September 16, 2003  
G-R Job #386493

Ms. Karen Streich  
Chevron Products Company  
P.O. Box 6004  
San Ramon, CA 94583

**RE: Third Quarter Event of August 18, 2003**  
Groundwater Monitoring & Sampling Report  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

Dear Ms. Streich:

This report documents the most recent groundwater monitoring and sampling event performed by Gettler-Ryan Inc. (G-R) at the referenced site. All field work was conducted in accordance with G-R Standard Operating Procedure - Groundwater Sampling (attached).

Static groundwater levels were measured and the wells were checked for the presence of separate-phase hydrocarbons. Static water level data, groundwater elevations, and separate-phase hydrocarbon thickness (if any) are presented in the attached Table 1. A Potentiometric Map is included as Figure 1.

Groundwater samples were collected from the monitoring wells and submitted to a state certified laboratory for analyses. The field data sheets for this event are attached. Analytical results are presented in the table(s) listed below. The chain of custody document and laboratory analytical report are also attached.

Please call if you have any questions or comments regarding this report. Thank you.

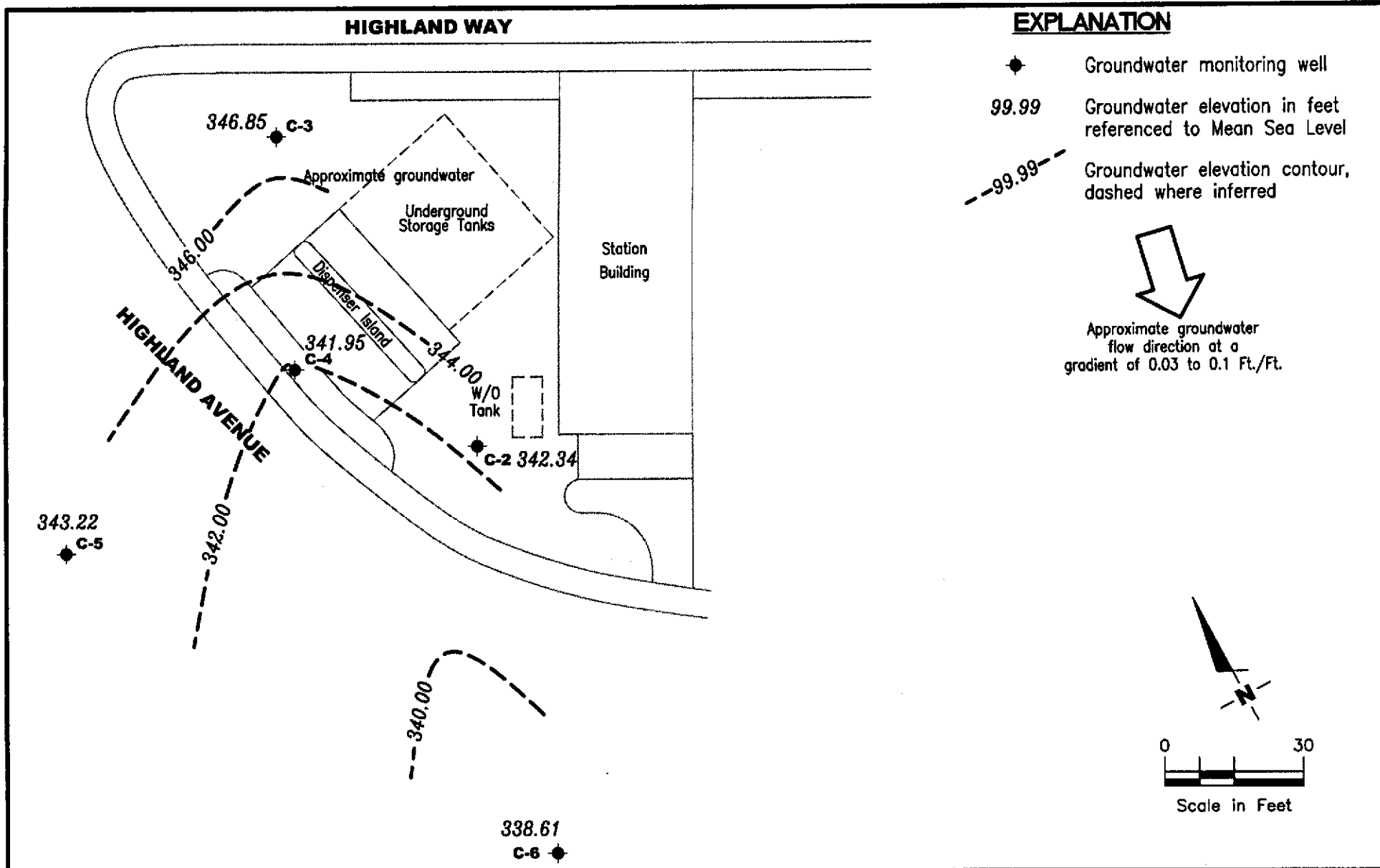
Sincerely,

Deanna L. Harding  
Project Coordinator

Robert C. Mallory  
Registered Geologist, No. 7285



Figure 1: Potentiometric Map  
Table 1: Groundwater Monitoring Data and Analytical Results  
Table 2: Groundwater Analytical Results - Oxygenate Compounds  
Attachments: Standard Operating Procedure - Groundwater Sampling  
Field Data Sheets  
Chain of Custody Document and Laboratory Analytical Reports



**GETTLER - RYAN INC.**  
 6747 Sierra Ct., Suite J  
 Dublin, CA 94568 (925) 551-7555

**POTENTIOMETRIC MAP**  
 Former Chevron Service Station #9-0329  
 340 Highland Avenue  
 Piedmont, California

FIGURE  
**1**

JOB NUMBER  
**386493**

REVIEWED BY

DATE  
 August 18, 2003

REVISED DATE

FILE NAME: P:\ENVIRO\CHEVRON\9-0329\003-9-0329.DWG | Layout Tab: Pot3

Groundwater Monitoring Data and Analytical Results

Former Chevron Service Station #9-0329

340 Highland Avenue

Piedmont, California

WELL ID/ TOC*(ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-2									
94.19	08/07/89	2.88	91.31	34,000	580	60	170	270	--
	11/15/89	2.80	91.39	8,100	500	36	420	180	--
	02/01/91	3.75	90.44	6,800	490	21	310	86	--
	04/16/91	2.55	91.64	9,600	810	43	550	270	--
	10/16/91	3.52	90.67	7,100	320	23	200	60	--
	01/08/92	4.15	90.04	2,400	190	9.0	83	22	--
	04/10/92	2.96	91.23	6,600	550	33	340	170	--
	07/14/92	2.83	91.36	9,000	680	330	580	690	--
	10/05/92	4.38	89.81	5,500	250	17	130	82	--
	01/06/93	3.94	90.25	5,500	190	32	41	54	--
	03/29/93	2.09	92.10	19,000	670	40	180	370	--
	07/02/93	2.09	92.10	8,000	1,100	41	420	500	--
	10/11/93	2.76	91.43	42,000	940	34	140	87	--
	01/10/94	4.82	89.37	12,000	770	20	220	74	--
	04/06/94	2.49	91.70	40,000	820	33	190	110	--
	07/06/94	2.47	91.72	8,800	870	28	140	95	--
	11/11/94	2.87	91.32	8,600	460	81	180	120	--
	01/06/95	2.55	91.64	15,000	880	48	270	140	--
	04/13/95	2.06	92.13	56,000	2,500	130	730	360	--
	07/25/95	2.14	92.05	11,000	1,000	34	540	160	--
	10/05/95	2.51	91.68	13,000	1,000	<20	160	170	--
	01/02/96	2.22	91.97	9,500	1,300	<50	380	87	64,000
	04/11/96	1.92	92.27	<10,000	1,300	<100	<100	<100	74,000
	07/08/96	2.05	92.14	<20,000	1,200	<200	<200	<200	110,000
	10/03/96	2.29	91.90	<25,000	1,200	<250	<250	<250	140,000
343.39	01/23/97	1.90	341.49	20,000	1,100	<200	460	<200	110,000
	02/14/97	1.97	341.42	--	--	--	--	--	150,000 <sup>1</sup>
	04/08/97	2.27	341.12	<50,000	1,100	<500	<500	<500	160,000
	07/09/97	1.98	341.41	<50,000	1,300	<500	<500	<500	210,000
	10/08/97	2.30	341.09	18,000	1,400	<50	300	95	160,000
	01/22/98	1.68	341.71	10,000	860	10	140	37	70,000
	04/15/98	1.20	342.19	<10,000	1,400	<100	510	<100	46,000
	07/09/98	1.47	341.92	33,000	1,700	<50	650	<50	120,000

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-2 (cont)	10/02/98	2.13	341.26	11,000	920	11	130	76	100,000
	01/18/99	1.84	341.55	<25,000	1,770	<250	<250	<250	48,400/78,300 <sup>1</sup>
	04/19/99	1.17	342.22	9,900	1,110	26.6	455	82	33,300
	09/28/99	2.81	340.58	11,500	1,100	<50	93.9	53.1	26,200
	10/27/99	2.98	340.41	9,440	711	<20	74.9	42.4	17,500
	01/17/00	2.35	341.04	12,200	813	<50	133	<50	21,200
	04/11/00	1.31	342.08	210 <sup>4</sup>	26	<0.50	3.7	1.1	580
	07/12/00	1.79	341.60	18,100 <sup>5</sup>	1,350	480	800	1,240	19,200
	10/07/00	1.70	341.69	8,860 <sup>5</sup>	1,070	<20.0	406	90.5	20,000
	01/05/01	1.57	341.82	14,000 <sup>4</sup>	2,000	55	560	120	17,000
	04/05/01	1.37	342.02	4,900 <sup>4</sup>	330	38	120	32	1,200
	08/20/01	2.52	340.87	7,300	1,100	42	290	55	7,200
	11/26/01	1.35	342.04	9,500	650	13	66	44	3,100
	02/25/02	0.82	342.57	5,300	340	6.9	83	22	1,200/1,400 <sup>7</sup>
	05/17/02	1.85	341.54	6,300	160	5.1	45	14	5,100
	08/13/02	1.95	341.44	8,800	670	16	380	73	3,700
	11/23/02	1.62	341.77	9,400	490	11	250	47	1,900
	02/17/03	0.65	342.74	7,000	340	9.9	160	35	4,200/3,800 <sup>7</sup>
	05/19/03 <sup>8</sup>	0.92	342.47	2,500	390	8	90	26	6,000
	08/18/03 <sup>8</sup>	1.05	342.34	6,400	300	7	62	23	3,500
C-3 97.65	08/07/89	4.29	93.36	<50	<0.5	<1.0	<1.0	<3.0	--
	11/15/89	5.17	92.48	<500	<0.5	2.8	<0.5	1.1	--
	02/01/91	6.38	91.27	<50	<0.5	<0.5	<0.5	<0.5	--
	04/16/91	3.72	93.93	<50	<0.5	<0.5	<0.5	<0.5	--
	10/16/91	8.20	89.45	<50	<0.5	<0.5	<0.5	<0.5	--
	01/08/92	6.68	90.97	<50	<0.5	<0.5	<0.5	<0.5	--
	04/10/92	4.50	93.15	<50	<0.5	<0.5	<0.5	<0.5	--
	07/14/92	6.21	91.44	<50	<0.5	<0.5	<0.5	<0.5	--
	10/05/92	9.31	88.34	<50	<0.5	<0.5	<0.5	<0.5	--
	01/06/93	3.41	94.24	<50	<0.5	<0.5	<0.5	<0.5	--
	03/29/93	0.50	97.15	<50	<0.5	<0.5	<0.5	0.8	--

**Groundwater Monitoring Data and Analytical Results**  
 Former Chevron Service Station #9-0329  
 340 Highland Avenue  
 Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-3 (cont)	07/02/93	2.59	95.06	<50	4.0	3.0	<0.5	3.0	--
	10/11/93	4.90	92.75	<50	<0.5	<0.5	<0.5	<0.5	--
	01/10/94	4.39	93.26	<50	<0.5	1.0	<0.5	0.8	--
	04/06/94	2.68	94.97	<50	<0.5	1.0	0.7	4.5	--
	07/06/94	2.10	95.55	<50	2.2	4.1	<0.5	2.8	--
	11/11/94	1.23	96.42	<50	<0.5	0.8	<0.5	<0.5	--
	01/06/95	0.60	97.05	<50	<0.5	<0.5	<0.5	<0.5	--
	04/13/95	0.60	97.05	<50	<0.5	<0.5	<0.5	<0.5	--
	07/25/95	1.65	96.00	<50	<0.5	<0.5	<0.5	<0.5	--
	10/05/95	3.63	94.02	<50	<0.5	<0.5	<0.5	<0.5	--
	01/02/96	3.12	94.53	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/11/96	0.82	96.83	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/08/96	1.50	96.15	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/03/96	2.48	95.17	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	347.08	01/23/97	0.21	346.87	<50	<0.5	<0.5	<0.5	<0.5
04/08/97		0.75	346.33	<50	<0.5	<0.5	<0.5	<0.5	<2.5
07/09/97		1.47	345.61	<50	<0.5	<0.5	<0.5	<0.5	<2.5
10/08/97		2.04	345.04	<50	<0.5	<0.5	<0.5	<0.5	<2.5
01/22/98		FLOODED	--	<50	<0.5	<0.5	<0.5	<0.5	40
04/15/98		FLOODED	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
347.20	05/13/98 <sup>2</sup>	--	--	--	--	--	--	--	--
	07/09/98	0.47	346.73	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/02/98	0.98	346.22	<50	<0.5	<0.5	<0.5	<1.5	<2.5
	01/18/99	0.77	346.43	<50	<0.5	<0.5	<0.5	<1.5	<2.0
	04/19/99	0.53	346.67	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	07/19/99	0.81	346.39	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	10/27/99	1.47	345.73	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	01/17/00	0.94	346.26	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/11/00	0.30	346.90	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	07/12/00	0.42	346.78	<50.0	<0.500	<0.500	<0.500	<0.500	<2.500
	10/07/00	1.01	346.19	<50.0	<0.500	<0.500	<0.500	<0.500	<2.500
	01/05/01	1.38	345.82	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	04/05/01	0.35	346.85	<50	<0.50	<0.50	<0.50	<0.50	<2.5
08/20/01	0.80	346.40	<50	<0.50	<0.50	<0.50	<0.50	<2.5	

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-3 (cont)	11/26/01	0.36	346.84	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	02/25/02	0.36	346.84	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<2 <sup>7</sup>
	05/17/02	0.45	346.75	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	08/13/02	1.11	346.09	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	11/23/02	1.49	345.71	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	02/17/03	0.51	346.69	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<0.5 <sup>7</sup>
	05/19/03 <sup>8</sup>	0.30	346.90	<50	<0.5	<0.5	<0.5	<0.5	<0.5
	08/18/03 <sup>8</sup>	0.35	346.85	<50	<0.5	<0.5	<0.5	<0.5	<0.5
C-4 95.60	08/07/89	DRY	--	--	--	--	--	--	--
	11/15/89	4.95	90.65	1300	2.9	310	0.5	2.9	--
	02/01/91	4.78	90.82	72	<0.5	9.0	<0.5	<0.5	--
	04/16/91	4.83	90.77	<50	<0.5	<0.5	<0.5	<0.5	--
	10/16/91	4.23	91.37	<50	<0.5	<0.5	<0.5	<0.5	--
	01/08/92	4.81	90.79	<50	<0.5	<0.5	<0.5	<0.5	--
	04/10/92	4.26	91.34	<50	<0.5	<0.5	<0.5	<0.5	--
	07/14/92	4.28	91.32	<50	<0.5	3.8	<0.5	<0.5	--
	10/05/92	4.29	91.31	<50	<0.5	<0.5	<0.5	<0.5	--
	01/06/93	4.29	91.31	<50	0.7	<0.5	<0.5	<0.5	--
	03/29/93	4.30	91.30	<50	0.5	1.0	<0.5	2.0	--
	07/02/93	4.22	91.38	<50	<0.5	<0.5	<0.5	<0.5	--
	10/11/93	4.30	91.30	<50	0.6	<0.5	<0.5	<0.5	--
	01/10/94	4.44	91.16	<50	0.7	3.0	<0.5	1.0	--
	04/06/94	4.24	91.36	130	2.2	5.4	3.3	24	--
	07/06/94	4.24	91.36	99	5.9	7.5	2.0	12	--
	11/11/94	4.21	91.39	<50	<0.5	9.5	<0.5	<0.5	--
	01/06/95	4.42	91.18	<50	0.7	1.0	<0.5	1.1	--
	04/13/95	4.24	91.36	67	0.54	7.2	<0.5	1.1	--
	07/25/95	4.24	91.36	390	<2.0	150	<2.0	<2.0	--
10/05/95	4.38	91.22	130	<0.5	66	<0.5	<0.5	--	
01/02/96	4.26	91.34	<50	<0.5	<0.5	<0.5	<0.5	34	
04/11/96	4.39	91.21	<50	<0.5	0.93	<0.5	<0.5	56	

Table 1  
**Groundwater Monitoring Data and Analytical Results**  
 Former Chevron Service Station #9-0329  
 340 Highland Avenue  
 Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-4	07/08/96	4.28	91.32	<50	<0.5	<0.5	<0.5	<0.5	21
(cont)	10/03/96	4.22	91.38	80	<0.5	31	<0.5	<0.5	9.9
344.94	01/23/97	4.39	340.55	<50	<0.5	<0.5	<0.5	<0.5	23
	04/08/97	4.25	340.69	87	<0.5	3.6	<0.5	1.7	7.0
	07/09/97	4.21	340.73	93	<0.5	32	<0.5	<0.5	26
	10/08/97	4.34	340.60	<50	<0.5	0.63	<0.5	<0.5	12
	01/22/98	4.26	340.68	<50	<0.5	4.3	<0.5	<0.5	10
	04/15/98	1.01	343.93	SAMPLED SEMI-ANNUALLY		--	--	--	--
	07/09/98	4.25	340.69	<50	<0.5	<0.5	<0.5	<0.5	37
	10/02/98	4.35	340.59	--	--	--	--	--	--
	01/18/99	4.21	340.73	<50	<0.5	<0.5	<0.5	<0.5	25.4
	04/19/99	2.31	342.63	--	--	--	--	--	--
	07/19/99 <sup>3</sup>	1.53	343.41	10,000	1,160	23	178	50.4	45,600
	09/28/99	4.70	340.24	<50	<0.5	0.919	<0.5	<0.5	<2.5
	10/27/99	1.26	343.68	--	--	--	--	--	--
	01/17/00	4.22	340.72	<50	<0.5	21.4	<0.5	<0.5	4.6
	04/11/00	4.21	340.73	--	--	--	--	--	--
	07/12/00	4.21	340.73	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50
	10/07/00	4.23	340.71	--	--	--	--	--	--
	01/05/01	4.22	340.72	<50	<0.50	<0.50	<0.50	<0.50	27
	04/05/01	4.23	340.71	--	--	--	--	--	--
	08/20/01	4.27	340.67	<50	<0.50	<0.50	<0.50	<0.50	18
	11/26/01	4.26	340.68	SAMPLED SEMI-ANNUALLY		--	--	--	--
	02/25/02	4.25	340.69	<50	<0.50	1.8	<0.50	<1.5	24/24 <sup>7</sup>
	05/17/02	3.30	341.64	SAMPLED SEMI-ANNUALLY		--	--	--	--
	08/13/02	4.10	340.84	<50	<0.50	<0.50	<1.0	<1.5	7.3
	11/23/02	3.04	341.90	SAMPLED SEMI-ANNUALLY		--	--	--	--
	02/17/03	2.12	342.82	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<0.5 <sup>7</sup>
	05/19/03	2.57	342.37	SAMPLED SEMI-ANNUALLY		--	--	--	--
	08/18/03 <sup>8</sup>	2.99	341.95	<50	<0.5	<0.5	<0.5	<0.5	<0.5



**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-5	11/25/96	3.30	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
345.14	01/23/97	1.45	343.69	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/08/97	2.32	342.82	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/09/97	2.30	342.84	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/08/97	3.00	342.14	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	01/22/98	1.00	344.14	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/15/98	3.25	341.89	SAMPLED ANNUALLY		--	--	--	--
	07/09/98	0.20	344.94	--	--	--	--	--	--
	10/02/98	2.32	342.82	--	--	--	--	--	--
	01/18/99	2.13	343.01	<50	<0.5	<0.5	<0.5	<0.5	<2.0
	04/19/99	2.07	343.07	--	--	--	--	--	--
	07/19/99	2.42	342.72	--	--	--	--	--	--
	10/27/99	2.37	342.77	--	--	--	--	--	--
	01/17/00	2.50	342.64	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/11/00	2.18	342.96	--	--	--	--	--	--
	07/12/00	2.08	343.06	--	--	--	--	--	--
	10/07/00	2.38	342.76	--	--	--	--	--	--
	01/05/01	2.13	343.01	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	04/05/01	1.80	343.34	--	--	--	--	--	--
	08/20/01	2.08	343.06	--	--	--	--	--	--
	11/26/01	2.25	342.89	SAMPLED ANNUALLY		--	--	--	--
	02/25/02	2.80	342.34	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<2 <sup>7</sup>
	05/17/02	1.81	343.33	SAMPLED ANNUALLY		--	--	--	--
	08/13/02	1.82	343.32	SAMPLED ANNUALLY		--	--	--	--
	11/23/02	2.36	342.78	SAMPLED ANNUALLY		--	--	--	--
	02/17/03	1.89	343.25	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<0.5 <sup>7</sup>
	05/19/03	1.91	343.23	SAMPLED ANNUALLY		--	--	--	--
	08/18/03	1.92	343.22	SAMPLED ANNUALLY		--	--	--	--
C-6	11/25/96	2.13	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
338.61	01/23/97	FLOODED	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/08/97	FLOODED	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/09/97	2.77	335.84	<50	<0.5	<0.5	<0.5	<0.5	<2.5

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**Groundwater Monitoring Data and Analytical Results**

Former Chevron Service Station #9-0329

340 Highland Avenue

Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-6	10/08/97	1.44	337.17	<50	<0.5	<0.5	<0.5	<0.5	<2.5
(cont)	01/22/98	1.54	337.07	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/15/98	1.30	337.31	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/09/98	FLOODED	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/02/98	2.80	335.81	<50	<0.5	<0.5	<0.5	<1.5	<2.5
	01/18/99	1.29	337.32	<50	<0.5	<0.5	<0.5	<0.5	<2.0
	04/19/99	1.31	337.30	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	07/19/99	1.56	337.05	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	10/27/99	1.45	337.16	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	01/17/00	1.65	336.96	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/11/00	1.56	337.05	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	07/12/00	1.01	337.60	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50
	10/07/00	1.19	337.42	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50
	01/05/01	0.87	337.74	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	04/05/01	0.32	338.29	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	08/20/01	-- <sup>6</sup>	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	11/26/01	0.76	337.85	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	02/25/02	-- <sup>6</sup>	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<2 <sup>7</sup>
	05/17/02	-- <sup>6</sup>	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	08/13/02	0.90	337.71	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	11/23/02	1.03	337.58	<50	<0.50	<0.50	<0.50	<1.5	<2.5
	02/17/03	0.85	337.76	<50	<0.50	<0.50	<0.50	<1.5	<2.5/<0.5 <sup>7</sup>
	05/19/03 <sup>8</sup>	-- <sup>6</sup>	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
	08/18/03 <sup>8</sup>	0.00	338.61	<50	<0.5	<0.5	<0.5	<0.5	<0.5

**Backfill Well: A**

08/07/89	2.10	--	1,000	50	6.0	5.0	22	--
11/15/89	2.04	--	3,700	98	2.1	4.3	55	--
02/01/91	3.05	--	36,000	1,100	750	130	6,100	--
04/16/91	2.01	--	8,000	370	6.0	86	750	--
10/16/91	4.15	--	--	--	--	--	--	--

NOT MONITORED/SAMPLED

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

WELL ID/ TOC*(ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
<b>Backfill Well: B</b>									
	08/07/89	4.12	--	--	--	--	--	--	--
	11/15/89	--	--	--	--	--	--	--	--
	02/01/91	5.03	--	--	--	--	--	--	--
	04/16/91	4.00	--	--	--	--	--	--	--
	10/16/91	6.24	--	--	--	--	--	--	--
	NOT MONITORED/SAMPLED								
<b>Trip Blank</b>									
TB-LB	01/06/93	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	03/29/93	--	--	<50	<0.5	<0.5	<0.5	1.0	--
	07/02/93	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	10/11/93	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	01/10/94	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	04/06/94	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	07/06/94	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	11/11/94	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	01/06/95	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	04/13/95	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	07/25/95	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	10/05/95	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	01/02/96	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/11/96	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/08/96	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/03/96	--	--	<50	<0.5	<0.5	<0.5	<0.5	--
	01/23/97	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	04/08/97	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/09/97	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/08/97	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	01/22/98	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	07/09/98	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	10/02/98	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
	01/18/99	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0

**Groundwater Monitoring Data and Analytical Results**

Former Chevron Service Station #9-0329

340 Highland Avenue

Piedmont, California

WELL ID/ TOC* (ft.)	DATE	DTW (ft.)	GWE (msl)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	
TB-LB (cont)	04/19/99	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	
	07/19/99	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	
	10/27/99	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	
	01/17/00	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	
	04/11/00	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	
	07/12/00	--	--	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	
	10/07/00	--	--	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	
	01/05/01	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	
	04/05/01	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	
	08/20/01	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	
	QA	11/26/01	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
		02/25/02	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
		05/17/02	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
		08/13/02	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
11/23/02		--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	
02/17/03		--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	
05/19/03 <sup>s</sup>		--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	
08/18/03 <sup>s</sup>	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5		

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

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**EXPLANATIONS:**

Groundwater monitoring data and laboratory analytical results prior to April 11, 2000, were compiled from reports prepared by Blaine Tech Services, Inc.

TOC = Top of Casing

(ft.) = Feet

DTW = Depth to Water

GWE = Groundwater Elevation

(msl) = Mean sea level

TPH-G = Total Petroleum Hydrocarbons as Gasoline

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes

MTBE = Methyl tertiary butyl ether

(ppb) = Parts per billion

-- = Not Measured/Not Analyzed

QA = Quality Assurance/Trip Blank

\* TOC elevations are relative to msl.

<sup>1</sup> MTBE confirmation run.

<sup>2</sup> TOC elevation adjusted due to broken top of casing.

<sup>3</sup> Anomalous results: Results for this sample are likely the result of a mislabeling of sample containers; results most closely resemble those of well C-2.

<sup>4</sup> Laboratory report indicates gasoline C6-C12.

<sup>5</sup> Laboratory report indicates weathered gasoline C6-C12.

<sup>6</sup> Unable to determine DTW, water overflowing TOC.

<sup>7</sup> MTBE by EPA Method 8260.

<sup>8</sup> BTEX and MTBE by EPA Method 8260.

Table 2  
**Groundwater Analytical Results - Oxygenate Compounds**  
 Former Chevron Service Station #9-0329  
 340 Highland Avenue  
 Piedmont, California

WELL ID	DATE	ETHANOL (ppb)	TBA (ppb)	MTBE (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	1,2-DCA (ppb)	EDB (ppb)
C-2	02/25/02	<500	210	1,400	<2	2	97	<2	<2
	02/17/03	--	890	3,800	<1	6	110	<1	<1
	05/19/03	--	--	6,000	--	--	--	--	--
	08/18/03	<250	--	3,500	--	--	--	--	--
C-3	02/25/02	<500	<100	<2	<2	<2	<2	<2	<2
	02/17/03	--	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/19/03	--	--	<0.5	--	--	--	--	--
	08/18/03	<50	--	<0.5	--	--	--	--	--
C-4	02/25/02	<500	<100	24	<2	<2	<2	<2	<2
	02/17/03	--	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/19/03	SAMPLED SEMI-ANNUALLY		--	--	--	--	--	--
	08/18/03	<50	--	<0.5	--	--	--	--	--
C-5	02/25/02	<500	<100	<2	<2	<2	<2	<2	<2
	02/17/03	--	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/19/03	SAMPLED ANNUALLY		--	--	--	--	--	--
C-6	02/25/02	<500	<100	<2	<2	<2	<2	<2	<2
	02/17/03	--	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/19/03	--	--	<0.5	--	--	--	--	--
	08/18/03	<50	--	<0.5	--	--	--	--	--

**Table 2**  
**Groundwater Analytical Results - Oxygenate Compounds**  
Former Chevron Service Station #9-0329  
340 Highland Avenue  
Piedmont, California

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**EXPLANATIONS:**

TBA = Tertiary butyl alcohol  
MTBE = Methyl tertiary butyl ether  
DIPE = Di-isopropyl ether  
ETBE = Ethyl tertiary butyl ether  
TAME = Tertiary amyl methyl ether  
1,2-DCA = 1,2-Dichloroethane  
EDB = 1,2-Dibromoethane  
(ppb) = Parts per billion  
-- = Not Analyzed

**ANALYTICAL METHOD:**

EPA Method 8260 for Oxygenate Compounds

## STANDARD OPERATING PROCEDURE - GROUNDWATER SAMPLING

Gettler-Ryan Inc. field personnel adhere to the following procedures for the collection and handling of groundwater samples prior to analysis by the analytical laboratory. Prior to sample collection, the type of analysis to be performed is determined. Loss prevention of volatile compounds is controlled and sample preservation for subsequent analysis is maintained.

Prior to sampling, the presence or absence of free-phase hydrocarbons is determined using an interface probe. Product thickness, if present, is measured to the nearest 0.01 foot and is noted in the field notes. In addition, all depth to water level measurements are collected with a static water level indicator and are also recorded in the field notes, prior to purging and sampling any wells.

After water levels are collected and prior to sampling, if purging is to occur, each well is purged a minimum of three well casing volumes of water using pre-cleaned pumps (stack, suction, Grundfos), or disposable bailers. Temperature, pH and electrical conductivity are measured a minimum of three times during the purging. Purging continues until these parameters stabilize.

Groundwater samples are collected using disposable bailers. The water samples are transferred from the bailer into appropriate containers. Pre-preserved containers, supplied by analytical laboratories, are used when possible. When pre-preserved containers are not available, the laboratory is instructed to preserve the sample as appropriate. Duplicate samples are collected for the laboratory to use in maintaining quality assurance/quality control standards. The samples are labeled to include the job number, sample identification, collection date and time, analysis, preservation (if any), and the sample collector's initials. The water samples are placed in a cooler, maintained at 4°C for transport to the laboratory. Once collected in the field, all samples are maintained under chain of custody until delivered to the laboratory.

The chain of custody document includes the job number, type of preservation, if any, analysis requested, sample identification, date and time collected, and the sample collector's name. The chain of custody is signed and dated (including time of transfer) by each person who receives or surrenders the samples, beginning with the field personnel and ending with the laboratory personnel.

A laboratory supplied trip blank accompanies each sampling set. For sampling sets greater than 20 samples, 5% trip blanks are included. The trip blank is analyzed for some or all of the same compounds as the groundwater samples.

As requested by Chevron Products Company, the purge water and decontamination water generated during sampling activities is transported by IWM to McKittrick Waste Management located in McKittrick, California.





# GETTLER-RYAN INC.

## WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/Facility #: ChevronTexaco #9-0329 Job Number: 386493  
 Site Address: 340 Highland Avenue Event Date: 8-18-03 (inclusive)  
 City: Piedmont, CA Sampler: ET

Well ID: C-2 Date Monitored: 8-18-03 Well Condition: OK

Well Diameter: 2 in.

Total Depth: 12.21 ft.

Depth to Water: 1.05 ft.

Volume	3/4" = 0.02	1" = 0.04	2" = 0.17	3" = 0.38
Factor (VF)	4" = 0.66	5" = 1.02	6" = 1.50	12" = 5.80

11.16 xVF .17 = 1.89 x3 (case volume) = Estimated Purge Volume: 5.69 gal.

### Purge Equipment:

Disposable Bailer   
 Stainless Steel Bailer \_\_\_\_\_  
 Stack Pump \_\_\_\_\_  
 Suction Pump \_\_\_\_\_  
 Grundfos \_\_\_\_\_  
 Other: \_\_\_\_\_

### Sampling Equipment:

Disposable Bailer   
 Pressure Bailer \_\_\_\_\_  
 Discrete Bailer \_\_\_\_\_  
 Other: \_\_\_\_\_

Time Started: \_\_\_\_\_ (2400 hrs)  
 Time Bailed: \_\_\_\_\_ (2400 hrs)  
 Depth to Product: \_\_\_\_\_ ft  
 Depth to Water: \_\_\_\_\_ ft  
 Hydrocarbon Thickness: \_\_\_\_\_ ft  
 Visual Confirmation/Description: \_\_\_\_\_  
 Skimmer / Absorbant Sock (circle one)  
 Amt Removed from Skimmer: \_\_\_\_\_ gal  
 Amt Removed from Well: \_\_\_\_\_ gal  
 Product Transferred to: \_\_\_\_\_

Start Time (purge): 4:12 Weather Conditions: SUNNY  
 Sample Time/Date: 4:24 / 8-18-03 Water Color: CLEAR Odor: YES/STRONG  
 Purging Flow Rate: 1 gpm. Sediment Description: \_\_\_\_\_  
 Did well de-water? NO If yes, Time: \_\_\_\_\_ Volume: \_\_\_\_\_ gal.

Time (2400 hr.)	Volume (gal.)	pH	Conductivity (u mhos/cm)	Temperature (°F)	D.O. (mg/L)	ORP (mV)
<u>4:15</u>	<u>2.0</u>	<u>7.12</u>	<u>105.5</u>	<u>24.7</u>	_____	_____
<u>4:18</u>	<u>4.0</u>	<u>7.14</u>	<u>102.5</u>	<u>23.5</u>	_____	_____
<u>4:21</u>	<u>5.5</u>	<u>7.17</u>	<u>99.6</u>	<u>22.1</u>	_____	_____
_____	_____	_____	_____	_____	_____	_____

### LABORATORY INFORMATION

SAMPLE ID	(#) CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
<u>C-2</u>	<u>6</u> x vov vial	<u>YES</u>	<u>HCL</u>	<u>LANCASTER</u>	<u>TPH-G(8015)/BTEX+MTBE(8260)/ ETHANOL(8260)</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### COMMENTS:

Add/Replaced Lock: \_\_\_\_\_

Add/Replaced Plug: \_\_\_\_\_ Size: \_\_\_\_\_



# GETTLER - RYAN INC.

## WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/Facility #: ChevronTexaco #9-0329  
 Site Address: 340 Highland Avenue  
 City: Piedmont, CA

Job Number: 386493  
 Event Date: 8-18-03 (inclusive)  
 Sampler: FT

Well ID: C-4 Date Monitored: 8-18-03 Well Condition: OK  
 Well Diameter: 2 in.  
 Total Depth: 9.75 ft.  
 Depth to Water: 2.99 ft.  
6.76 xVF 17 = 1.14 x3 (case volume) = Estimated Purge Volume: 3.44 gal.

Volume	3/4"= 0.02	1"= 0.04	2"= 0.17	3"= 0.38
Factor (VF)	4"= 0.66	5"= 1.02	6"= 1.50	12"= 5.80

Purge Equipment:  
 Disposable Bailer   
 Stainless Steel Bailer \_\_\_\_\_  
 Stack Pump \_\_\_\_\_  
 Suction Pump \_\_\_\_\_  
 Grundfos \_\_\_\_\_  
 Other: \_\_\_\_\_

Sampling Equipment:  
 Disposable Bailer   
 Pressure Bailer \_\_\_\_\_  
 Discrete Bailer \_\_\_\_\_  
 Other: \_\_\_\_\_

Time Started: \_\_\_\_\_ (2400 hrs)  
 Time Bailed: \_\_\_\_\_ (2400 hrs)  
 Depth to Product: \_\_\_\_\_ ft  
 Depth to Water: \_\_\_\_\_ ft  
 Hydrocarbon Thickness: \_\_\_\_\_ ft  
 Visual Confirmation/Description: \_\_\_\_\_  
 Skimmer / Absorbant Sock (circle one)  
 Amt Removed from Skimmer: \_\_\_\_\_ gal  
 Amt Removed from Well: \_\_\_\_\_ gal  
 Product Transferred to: \_\_\_\_\_

Start Time (purge): 2:46 Weather Conditions: SUNNY  
 Sample Time/Date: 3:04 / 8-18-03 Water Color: LT. BRN. Odor: NO  
 Purging Flow Rate: 1 gpm. Sediment Description: SILTY  
 Did well de-water? NO If yes, Time: \_\_\_\_\_ Volume: \_\_\_\_\_ gal.

Time (2400 hr.)	Volume (gal.)	pH	Conductivity (umhos/cm)	Temperature (°F)	D.O. (mg/L)	ORP (mV)
<u>2:49</u>	<u>1.0</u>	<u>7.03</u>	<u>86.5</u>	<u>22.1</u>	_____	_____
<u>2:53</u>	<u>2.0</u>	<u>7.02</u>	<u>86.3</u>	<u>21.6</u>	_____	_____
<u>2:58</u>	<u>3.5</u>	<u>7.05</u>	<u>85.2</u>	<u>21.7</u>	_____	_____
_____	_____	_____	_____	_____	_____	_____

### LABORATORY INFORMATION

SAMPLE ID	(#) CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
<u>C-4</u>	<u>6</u> x voa vial	<u>YES</u>	<u>HCL</u>	<u>LANCASTER</u>	<u>TPH-G(8015)/BTEX+MTBE(8260)/ ETHANOL(8260)</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Add/Replaced Lock: \_\_\_\_\_ Add/Replaced Plug: \_\_\_\_\_ Size: \_\_\_\_\_



# GETTLER-RYAN INC.

## WELL MONITORING/SAMPLING FIELD DATA SHEET

Client/Facility #: ChevronTexaco #9-0329 Job Number: 386493  
 Site Address: 340 Highland Avenue Event Date: 8-15-03 (inclusive)  
 City: Piedmont, CA Sampler: FT

Well ID: C-6 Date Monitored: 8-15-03 Well Condition: OK  
 Well Diameter: 2 in.  
 Total Depth: 17.21 ft.  
 Depth to Water: .00 ft.  
17.21 x VF .17 = 2.93 x3 (case volume) = Estimated Purge Volume: 8.77 gal.

Volume	3/4"= 0.02	1"= 0.04	2"= 0.17	3"= 0.38
Factor (VF)	4"= 0.66	5"= 1.02	6"= 1.50	12"= 5.80

Purge Equipment:  
 Disposable Bailer   
 Stainless Steel Bailer \_\_\_\_\_  
 Stack Pump \_\_\_\_\_  
 Suction Pump \_\_\_\_\_  
 Grundfos \_\_\_\_\_  
 Other: \_\_\_\_\_

Sampling Equipment:  
 Disposable Bailer   
 Pressure Bailer \_\_\_\_\_  
 Discrete Bailer \_\_\_\_\_  
 Other: \_\_\_\_\_

Time Started: \_\_\_\_\_ (2400 hrs)  
 Time Bailed: \_\_\_\_\_ (2400 hrs)  
 Depth to Product: \_\_\_\_\_ ft  
 Depth to Water: \_\_\_\_\_ ft  
 Hydrocarbon Thickness: \_\_\_\_\_ ft  
 Visual Confirmation/Description: \_\_\_\_\_  
 Skimmer / Absorbant Sock (circle one)  
 Amt Removed from Skimmer: \_\_\_\_\_ gal  
 Amt Removed from Well: \_\_\_\_\_ gal  
 Product Transferred to: \_\_\_\_\_

Start Time (purge): 3:22 Weather Conditions: SUNNY  
 Sample Time/Date: 3:50 / 8-18-03 Water Color: CLEAR Odor: NO  
 Purging Flow Rate: 1 gpm. Sediment Description: \_\_\_\_\_  
 Did well de-water? NO If yes, Time: \_\_\_\_\_ Volume: \_\_\_\_\_ gal.

Time (2400 hr.)	Volume (gal.)	pH	Conductivity (umhos/cm)	Temperature (°F)	D.O. (mg/L)	ORP (mV)
<u>3:29</u>	<u>3.0</u>	<u>7.31</u>	<u>97.2</u>	<u>21.5</u>	_____	_____
<u>3:35</u>	<u>6.0</u>	<u>7.34</u>	<u>98.1</u>	<u>20.9</u>	_____	_____
<u>3:42</u>	<u>9.0</u>	<u>7.35</u>	<u>96.7</u>	<u>20.1</u>	_____	_____
_____	_____	_____	_____	_____	_____	_____

### LABORATORY INFORMATION

SAMPLE ID	(#) CONTAINER	REFRIG.	PRESERV. TYPE	LABORATORY	ANALYSES
<u>C-6</u>	<u>6</u> x voc vial	<u>YES</u>	<u>HCL</u>	<u>LANCASTER</u>	<u>TPH-G(8015)/BTEX+MTBE(8260)/ ETHANOL(8260)</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Add/Replaced Lock: \_\_\_\_\_ Add/Replaced Plug: \_\_\_\_\_ Size: \_\_\_\_\_



# Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

## ANALYTICAL RESULTS

Prepared for:

ChevronTexaco  
6001 Bollinger Canyon Rd L4310

San Ramon CA 94583  
925-842-8582

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

## SAMPLE GROUP

The sample group for this submittal is 864015. Samples arrived at the laboratory on Thursday, August 21, 2003. The PO# for this group is 99011184 and the release number is STREICH.

<u>Client Description</u>		<u>Lancaster Labs Number</u>
QA-T-030818	NA Water	4105977
C-2-W-030818	Grab Water	4105978
C-3-W-030818	Grab Water	4105979
C-4-W-030818	Grab Water	4105980
C-6-W-030818	Grab Water	4105981

ELECTRONIC      Gettler-Ryan  
COPY TO  
1 COPY TO      Cambria C/O Gettler- Ryan

Attn: Cheryl Hansen

Attn: Deanna L. Harding

**Lancaster Laboratories Sample No. WW 4105977**

Collected: 08/18/2003 00:00

Account Number: 10904

Submitted: 08/21/2003 09:30

ChevronTexaco

Reported: 09/05/2003 at 16:56

6001 Bollinger Canyon Rd L4310

Discard: 10/06/2003

QA-T-030818

NA

Water

San Ramon CA 94583

Facility# 90329 Job# 386493

GRD

340 Highland Piedmont T0600101885 QA

885TB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
01728	TPH-GRO - Waters	n.a.	N.D.	50.	ug/l	1
The reported concentration of TPH-GRO does not include MTBE or other gasoline constituents eluting prior to the C6 (n-hexane) TPH-GRO range start time. A site-specific MSD sample was not submitted for the project. A LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.						
06054	BTEX+MTBE by 8260B					
02010	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.5	ug/l	1
05401	Benzene	71-43-2	N.D.	0.5	ug/l	1
05407	Toluene	108-88-3	N.D.	0.5	ug/l	1
05415	Ethylbenzene	100-41-4	N.D.	0.5	ug/l	1
06310	Xylene (Total)	1330-20-7	N.D.	0.5	ug/l	1

State of California Lab Certification No. 2116

### Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
01728	TPH-GRO - Waters	N. CA LUFT Gasoline Method	1	08/22/2003 14:44	K. Robert Caulfeild-James	1
06054	BTEX+MTBE by 8260B	SW-846 8260B	1	08/23/2003 23:04	Elizabeth M Taylor	1
01146	GC VOA Water Prep	SW-846 5030B	1	08/22/2003 14:44	K. Robert Caulfeild-James	n.a.
01163	GC/MS VOA Water Prep	SW-846 5030B	1	08/23/2003 23:04	Elizabeth M Taylor	n.a.

Lancaster Laboratories Sample No. **WW 4105979**

Collected: 08/18/2003 14:36 by FT

Account Number: 10904

Submitted: 08/21/2003 09:30

ChevronTexaco

Reported: 09/05/2003 at 16:57

6001 Bollinger Canyon Rd L4310

Discard: 10/06/2003

03-W-030818

Grab Water

San Ramon CA 94583

Facility# 90329 Job# 386493

GRD

40 Highland Piedmont T0600101885 C-3

885C3

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
01728	TPH-GRO - Waters	n.a.	N.D.	50.	ug/l	1
	The reported concentration of TPH-GRO does not include MTBE or other gasoline constituents eluting prior to the C6 (n-hexane) TPH-GRO range start time.					
	A site-specific MSD sample was not submitted for the project. A LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.					
01594	BTEX+5 Oxygenates+EDC+EDB+ETOH					
01587	Ethanol	64-17-5	N.D.	50.	ug/l	1
02010	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.5	ug/l	1
05401	Benzene	71-43-2	N.D.	0.5	ug/l	1
05407	Toluene	108-88-3	N.D.	0.5	ug/l	1
05415	Ethylbenzene	100-41-4	N.D.	0.5	ug/l	1
06310	Xylene (Total)	1330-20-7	N.D.	0.5	ug/l	1

State of California Lab Certification No. 2116

### Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
01728	TPH-GRO - Waters	N. CA LUFT Gasoline	1	08/22/2003 16:47	K. Robert Caulfeild-James	1
01594	BTEX+5 Oxygenates+EDC+EDB+ETOH	SW-846 8260B	1	08/24/2003 14:39	Elizabeth M Taylor	1
01146	GC VOA Water Prep	SW-846 5030B	1	08/22/2003 16:47	K. Robert Caulfeild-James	n.a.
01163	GC/MS VOA Water Prep	SW-846 5030B	1	08/24/2003 14:39	Elizabeth M Taylor	n.a.

**Lancaster Laboratories Sample No. WW 4105981**

Collected: 08/18/2003 15:50 by FT

Account Number: 10904

 Submitted: 08/21/2003 09:30  
 Reported: 09/05/2003 at 16:57  
 Discard: 10/06/2003

 ChevronTexaco  
 6001 Bollinger Canyon Rd L4310

C-6-W-030818 Grab Water

San Ramon CA 94583

 Facility# 90329 Job# 386493 GRD  
 340 Highland Piedmont T0600101885 C-6

885C6

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
01728	TPH-GRO - Waters	n.a.	N.D.	50.	ug/l	1
The reported concentration of TPH-GRO does not include MTBE or other gasoline constituents eluting prior to the C6 (n-hexane) TPH-GRO range start time. A site-specific MSD sample was not submitted for the project. A LCS/LCSD was performed to demonstrate precision and accuracy at a batch level.						
01594	BTEX+5 Oxygenates+EDC+EDB+ETOH					
01587	Ethanol	64-17-5	N.D.	50.	ug/l	1
02010	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.5	ug/l	1
05401	Benzene	71-43-2	N.D.	0.5	ug/l	1
05407	Toluene	108-88-3	N.D.	0.5	ug/l	1
05415	Ethylbenzene	100-41-4	N.D.	0.5	ug/l	1
06310	Xylene (Total)	1330-20-7	N.D.	0.5	ug/l	1

State of California Lab Certification No. 2116

### Laboratory Chronicle

CAT No.	Analysis Name	Method	Analysis		Analyst	Dilution Factor
			Trial#	Date and Time		
01728	TPH-GRO - Waters	N. CA LUFT Gasoline Method	1	08/22/2003 17:48	K. Robert Caulfeild-James	1
01594	BTEX+5 Oxygenates+EDC+EDB+ETOH	SW-846 8260B	1	08/24/2003 16:41	Elizabeth M Taylor	1
01146	GC VOA Water Prep	SW-846 5030B	1	08/22/2003 17:48	K. Robert Caulfeild-James	n.a.
01163	GC/MS VOA Water Prep	SW-846 5030B	1	08/24/2003 16:41	Elizabeth M Taylor	n.a.

## Quality Control Summary

Client Name: ChevronTexaco  
Reported: 09/05/03 at 04:57 PM

Group Number: 864015

### Sample Matrix Quality Control

Analysis Name	MS	MSD	MS/MSD	RPD	BKG	DUP	DUP	Dup RPD Max
	%REC	%REC	Limits	RPD	MAX	Conc	Conc	RPD
Ethyl Tertiary Butyl Ether	110	105	69-134	4	30			
Benzene	112	111	83-128	1	30			
Toluene	106	104	83-127	2	30			
Ethylbenzene	107	106	82-134	1	30			
Xylene (Total)	110	107	82-130	3	30			

### Surrogate Quality Control

Analysis Name: TPH-GRO - Waters  
Batch number: 03236A16A  
Trifluorotoluene-F

105977	113
105978	126
105979	112
4105980	111
4105981	110
Blank	112
LCS	116
LCSD	117
MS	115

Limits: 57-146

Analysis Name: BTEX+5 Oxygenates+EDC+EDB+ETOH  
Batch number: P032351AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
105977	104	101	100	98
105978	102	102	100	103
Blank	104	101	101	97
LCS	101	103	101	103
MS	103	109	103	103
MSD	102	103	103	106

Limits: 81-120

82-112

85-112

83-113

Analysis Name: BTEX+5 Oxygenates+EDC+EDB+ETOH  
Batch number: P032351AB

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
4105979	103	102	100	98
4105981	101	99	101	97
Blank	103	100	100	97
LCS	101	103	101	103
MS	103	109	103	103
MSD	102	103	103	106

Limits: 81-120

82-112

85-112

83-113

Analysis Name: BTEX+5 Oxygenates+EDC+EDB+ETOH  
Batch number: P032361AA

\*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The background result was more than four times the spike added.



# Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

<b>N.D.</b>	none detected	<b>BMQL</b>	Below Minimum Quantitation Level
<b>TNTC</b>	Too Numerous To Count	<b>MPN</b>	Most Probable Number
<b>IU</b>	International Units	<b>CP Units</b>	cobalt-chloroplatinate units
<b>.mhos/cm</b>	micromhos/cm	<b>NTU</b>	nephelometric turbidity units
<b>C</b>	degrees Celsius	<b>F</b>	degrees Fahrenheit
<b>meq</b>	milliequivalents	<b>lb.</b>	pound(s)
<b>g</b>	gram(s)	<b>kg</b>	kilogram(s)
<b>ug</b>	microgram(s)	<b>mg</b>	milligram(s)
<b>ml</b>	milliliter(s)	<b>l</b>	liter(s)
<b>m3</b>	cubic meter(s)	<b>ul</b>	microliter(s)
<b>&lt;</b>	less than - The number following the sign is the <u>limit of quantitation</u> , the smallest amount of analyte which can be reliably determined using this specific test.		
<b>&gt;</b>	greater than		
<b>J</b>	estimated value - The result falls within the Method Detection Limit (MDL) and Limit of Quantitation (LOQ).		
<b>ppm</b>	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.		
<b>ppb</b>	parts per billion		
<b>Dry weight basis</b>	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

## J.S. EPA CLP Data Qualifiers:

Organic Qualifiers		Inorganic Qualifiers	
<b>A</b>	TIC is a possible aldol-condensation product	<b>B</b>	Value is <CRDL, but ≥IDL
<b>B</b>	Analyte was also detected in the blank	<b>E</b>	Estimated due to interference
<b>C</b>	Pesticide result confirmed by GC/MS	<b>M</b>	Duplicate injection precision not met
<b>D</b>	Compound quantitated on a diluted sample	<b>N</b>	Spike sample not within control limits
<b>E</b>	Concentration exceeds the calibration range of the instrument	<b>S</b>	Method of standard additions (MSA) used for calculation
<b>N</b>	Presumptive evidence of a compound (TICs only)	<b>U</b>	Compound was not detected
<b>P</b>	Concentration difference between primary and confirmation columns >25%	<b>W</b>	Post digestion spike out of control limits
<b>U</b>	Compound was not detected	<b>*</b>	Duplicate analysis not within control limits
<b>X,Y,Z</b>	Defined in case narrative	<b>+</b>	Correlation coefficient for MSA <0.995

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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**Appendix E**

**Hydrocarbon Concentration Trend Analyses**

Hydrocarbon Concentrations in Well C-2, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California

Raw Data

Date	GWE	TPHg (ug/l)	Benzene (ug/l)	MTBE (ug/L)
8/7/89	340.51	34,000	580	
11/15/89	340.59	8,100	500	
2/1/91	339.64	6,800	490	
4/16/91	340.84	9,600	810	
10/16/91	339.87	7,100	320	
1/8/92	339.24	2,400	190	
4/10/92	340.43	6,600	550	
7/14/92	340.56	9,000	680	
10/5/92	339.01	5,500	250	
1/6/93	339.45	5,500	190	
3/29/93	341.30	19,000	670	
7/2/93	341.30	8,000	1,100	
10/11/93	340.63	42,000	940	
1/10/94	338.57	12,000	770	
4/6/94	340.90	40,000	820	
7/6/94	340.92	8,800	870	
11/11/94	340.52	8,600	460	
1/6/95	340.84	15,000	880	
4/13/95	341.33	56,000	2,500	
7/25/95	341.25	11,000	1,000	
10/5/95	340.88	13,000	1,000	
1/2/96	341.17	9,500	1,300	64,000
4/11/96	341.47	<10,000	1,300	74,000
7/8/96	341.34	<20,000	1,200	110,000
10/3/96	341.10	<25,000	1,200	140,000
1/23/97	341.49	20,000	1,100	110,000
2/14/97	341.42	---	---	150,000
4/8/97	341.12	<50,000	1,100	160,000
7/9/97	341.41	<50,000	1,300	210,000
10/8/97	341.09	18,000	1,400	210,000
1/22/98	341.71	18,000	860	160,000
4/15/98	342.19	10,000	860	70,000
7/9/98	341.92	<10,000	1,400	46,000
10/2/98	341.92	33,000	1,700	120,000
1/18/99	341.26	11,000	920	100,000
4/19/99	341.55	<25,000	1,770	78,300
7/28/99	342.22	9,900	1,110	78,300
10/27/99	340.58	11,500	1,100	33,300
1/17/00	340.41	9,440	711	26,200
4/11/00	341.04	12,200	813	17,500
7/12/00	342.08	210	26	21,200
10/7/00	341.60	18,100	1,350	580
1/5/01	341.69	8,860	1,070	19,200
4/5/01	341.82	8,860	1,070	20,000
8/20/01	341.82	14,000	2,000	20,000
11/26/01	342.02	4,900	330	17,000
2/25/02	342.02	340.87	7,300	1,200
5/17/02	342.04	9,500	1,100	7,200
8/13/02	342.04	9,500	650	3,100
11/23/02	342.57	5,300	340	1,400
2/17/03	342.57	5,300	340	1,400
5/19/03	341.54	6,300	160	5,100
8/13/02	341.44	8,800	670	5,100
11/23/02	341.44	8,800	670	3,700
2/17/03	341.77	9,400	490	1,900
5/19/03	342.74	7,000	340	3,800
8/18/03	342.47	2,500	390	6,000
11/23/02	341.77	9,400	490	1,900
2/17/03	342.74	7,000	340	3,800
5/19/03	342.47	2,500	390	6,000
8/18/03	342.34	6,400	300	3,500

Edited Data

Date	GWE	TPHg (ug/l)	Benzene (ug/l)	Date	GWE	MTBE (ug/L)
8/7/89	340.51	34,000	580	8/7/89	340.51	
11/15/89	340.59	8,100	500	11/15/89	340.59	
2/1/91	339.64	6,800	490	2/1/91	339.64	
4/16/91	340.84	9,600	810	4/16/91	340.84	
10/16/91	339.87	7,100	320	10/16/91	339.87	
1/8/92	339.24	2,400	190	1/8/92	339.24	
4/10/92	340.43	6,600	550	4/10/92	340.43	
7/14/92	340.56	9,000	680	7/14/92	340.56	
10/5/92	339.01	5,500	250	10/5/92	339.01	
1/6/93	339.45	5,500	190	1/6/93	339.45	
3/29/93	341.30	19,000	670	3/29/93	341.30	
7/2/93	341.30	8,000	1,100	7/2/93	341.30	
10/11/93	340.63	42,000	940	10/11/93	340.63	
1/10/94	338.57	12,000	770	1/10/94	338.57	
4/6/94	340.90	40,000	820	4/6/94	340.90	
7/6/94	340.92	8,800	870	7/6/94	340.92	
11/11/94	340.52	8,600	460	11/11/94	340.52	
1/6/95	340.84	15,000	880	1/6/95	340.84	
4/13/95	341.33	56,000	2,500	4/13/95	341.33	
7/25/95	341.25	11,000	1,000	7/25/95	341.25	
10/5/95	340.88	13,000	1,000	10/5/95	340.88	
1/2/96	341.17	9,500	1,300	1/2/96	341.17	64,000
4/11/96	341.47	<10,000	1,300	4/11/96	341.47	74,000
7/8/96	341.34	<20,000	1,200	7/8/96	341.34	110,000
10/3/96	341.10	<25,000	1,200	10/3/96	341.10	140,000
1/23/97	341.49	20,000	1,100	1/23/97	341.49	110,000
2/14/97	341.42	---	---	2/14/97	341.42	150,000
4/8/97	341.12	<50,000	1,100	4/8/97	341.12	160,000
7/9/97	341.09	18,000	1,400	7/9/97	341.09	210,000
10/8/97	341.71	18,000	860	10/8/97	341.71	160,000
1/22/98	342.19	10,000	860	1/22/98	342.19	70,000
4/15/98	341.92	<10,000	1,400	4/15/98	341.92	46,000
7/9/98	341.92	33,000	1,700	7/9/98	341.92	120,000
10/2/98	341.26	11,000	920	10/2/98	341.26	100,000
1/18/99	341.55	<25,000	1,770	1/18/99	341.55	78,300
4/19/99	342.22	9,900	1,110	4/19/99	342.22	78,300
7/28/99	340.58	11,500	1,100	7/28/99	340.58	33,300
10/27/99	340.41	9,440	711	10/27/99	340.41	26,200
1/17/00	341.04	12,200	813	1/17/00	341.04	17,500
4/11/00	342.08	210	26	4/11/00	342.08	21,200
7/12/00	341.60	18,100	1,350	7/12/00	341.60	580
10/7/00	341.69	8,860	1,070	10/7/00	341.69	19,200
1/5/01	341.82	8,860	1,070	1/5/01	341.82	20,000
4/5/01	341.82	14,000	2,000	4/5/01	341.82	20,000
8/20/01	342.02	4,900	330	8/20/01	342.02	17,000
11/26/01	342.02	340.87	7,300	11/26/01	342.02	1,200
2/25/02	342.04	9,500	1,100	2/25/02	342.04	7,200
5/17/02	342.57	5,300	340	5/17/02	342.57	3,100
8/13/02	341.54	6,300	160	8/13/02	341.54	1,400
11/23/02	341.44	8,800	670	11/23/02	341.44	5,100
2/17/03	341.77	9,400	490	2/17/03	341.77	3,700
5/19/03	342.74	7,000	340	5/19/03	342.74	1,900
8/18/03	342.47	2,500	390	8/18/03	342.47	3,800
11/23/02	341.77	9,400	490	11/23/02	341.77	1,900
2/17/03	342.74	7,000	340	2/17/03	342.74	3,800
5/19/03	342.47	2,500	390	5/19/03	342.47	6,000
8/18/03	342.34	6,400	300	8/18/03	342.34	3,500

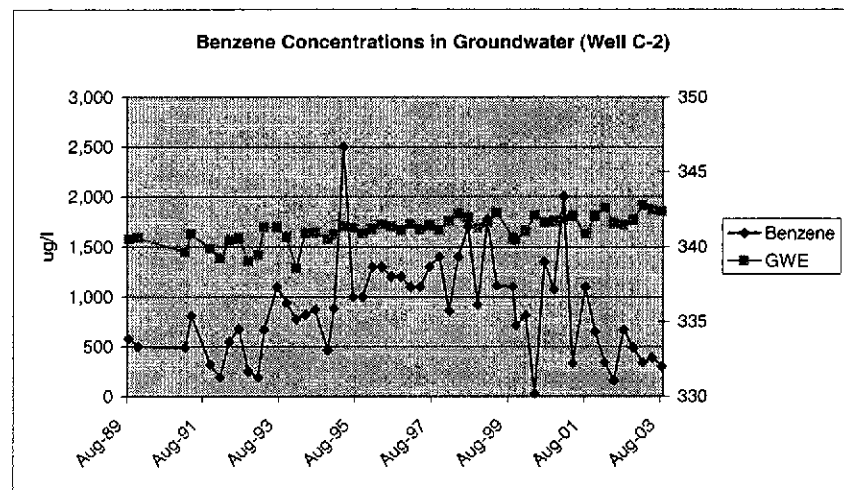
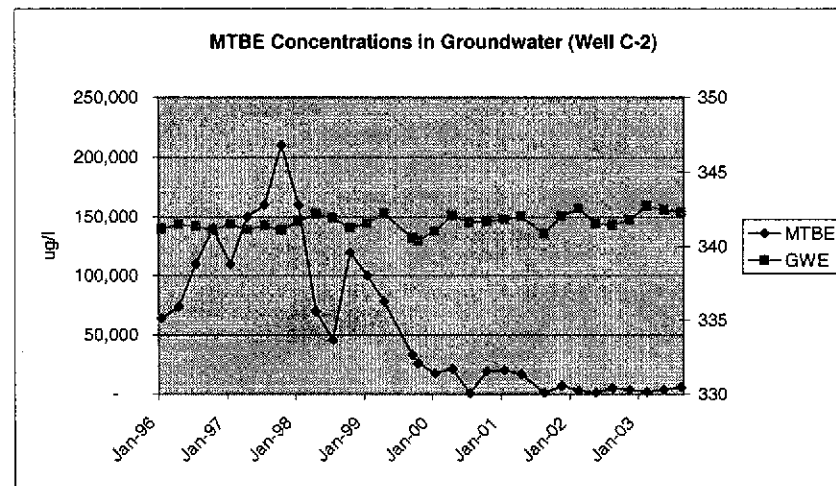
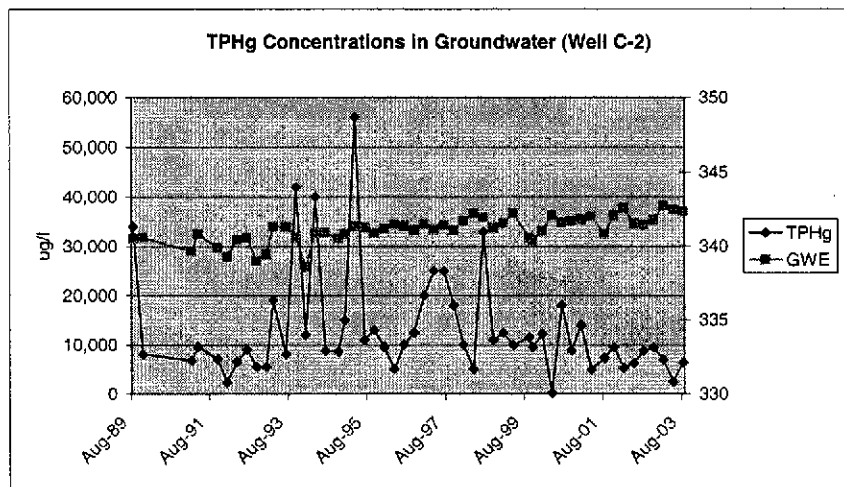
Data Used for Trend Analysis

Days Since 10/11/1993	TPHg (ug/L)	Days Since 4/13/1995	Benzene (ug/L)	Days Since 7/9/1997	MTBE (ug/L)
0	42,000				
91	12,000				
177	40,000				
268	8,800				
396	8,600				
452	15,000				
549	56,000	0	2,500		
652	11,000	103	1,000		
724	13,000	175	1,000		
813	9,500	264	1,300		
913	5,000	364	1,300		
1,001	10,000	452	1,200		
1,088	12,500	539	1,200		
1,200	20,000	651	1,100		
1,275	25,000	726	1,100		
1,367	25,000	818	1,300		
1,458	18,000	909	1,400	0	210,000
1,564	10,000	1,015	860	91	160,000
1,647	5,000	1,098	1,400	197	70,000
1,732	33,000	1,183	1,700	280	46,000
1,817	11,000	1,268	920	365	120,000
1,925	12,500	1,376	1,770	450	100,000
2,016	9,900	1,467	1,110	558	78,300
2,178	11,500	1,629	1,100	649	33,300
2,207	9,440	1,658	711	811	26,200
2,289	12,200	1,740	813	840	17,500
2,374	210	1,825	26	922	21,200
2,466	18,100	1,917	1,350	1,007	580
2,553	8,860	2,004	1,070	1,099	19,200
2,643	14,000	2,094	2,000	1,186	20,000
2,733	4,900	2,184	330	1,276	17,000
2,870	7,300	2,321	1,100	1,366	1,200
2,968	9,500	2,419	650	1,503	7,200
3,059	5,300	2,510	340	1,601	3,100
3,140	6,300	2,591	160	1,692	1,400
3,228	8,800	2,679	670	1,773	5,100
3,330	9,400	2,781	490	1,861	3,700
3,416	7,000	2,867	340	1,963	1,900
3,507	2,500	2,958	390	2,049	3,800
3,598	6,400	3,049	300	2,140	6,000
				2,231	3,500

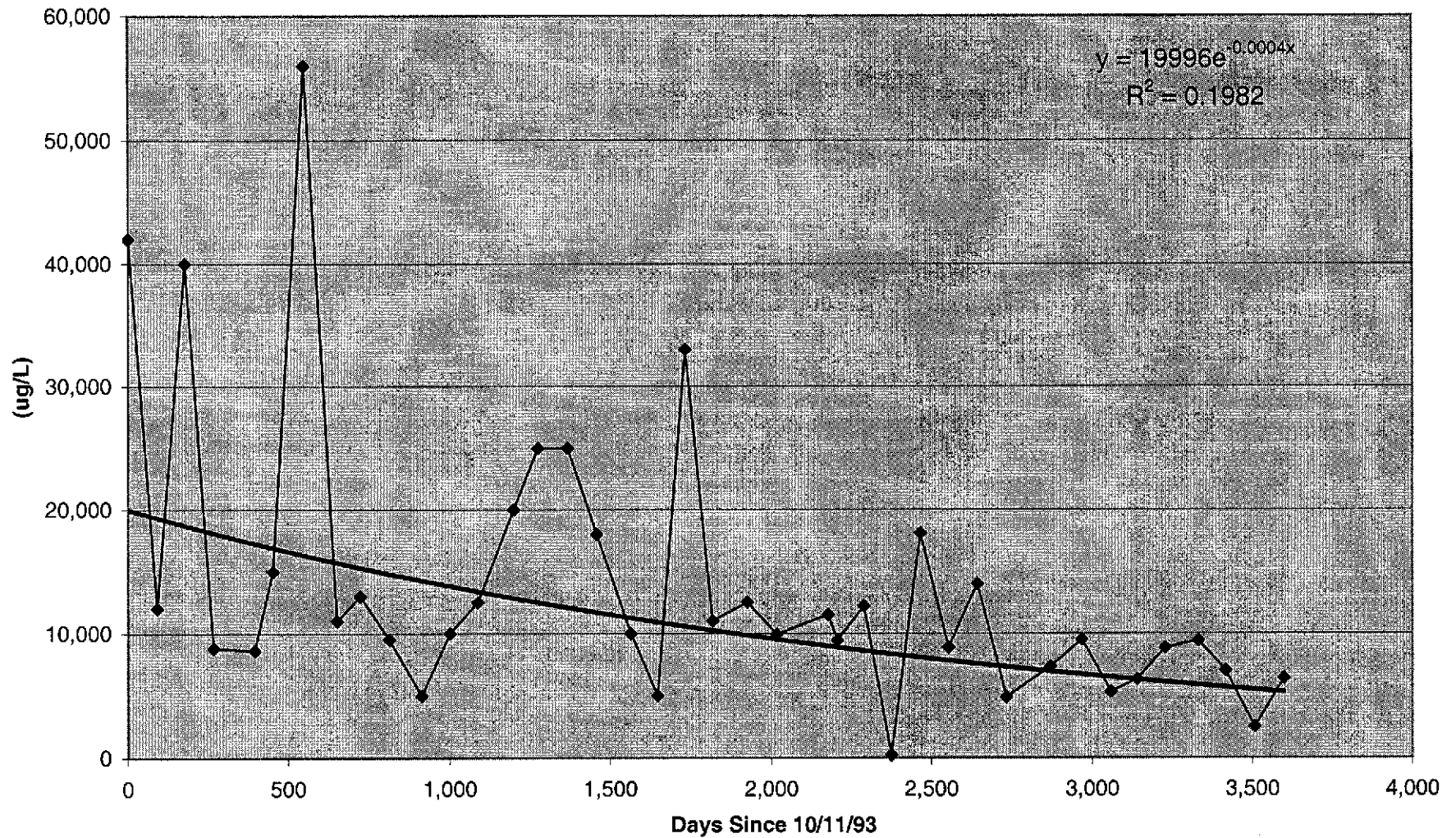
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Assumed <X=X/2

Hydrocarbon Concentrations in Groundwater, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California



**TPHg Concentration Trends in Groundwater (Well C-2)**  
**Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, CA**



Predicted Time to Cleanup of TPHg in Well C-2, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California

Calculate "time to cleanup" given the first-order decay equation:  
 $y = b e^{ax}$        $\implies$        $x = \ln(y/b) / a$

Site: **Former Chevron Station 9-0329**  
 Well: **C-2**  
 Constituent: **TPHg**

Given

Water Quality Objective:	y	<input type="text" value="50"/>	ug/L
Constant:	b	<input type="text" value="19996"/>	
Constant:	a	<input type="text" value="-0.0004"/>	
Date of first sample:		<input type="text" value="10/11/1993"/>	

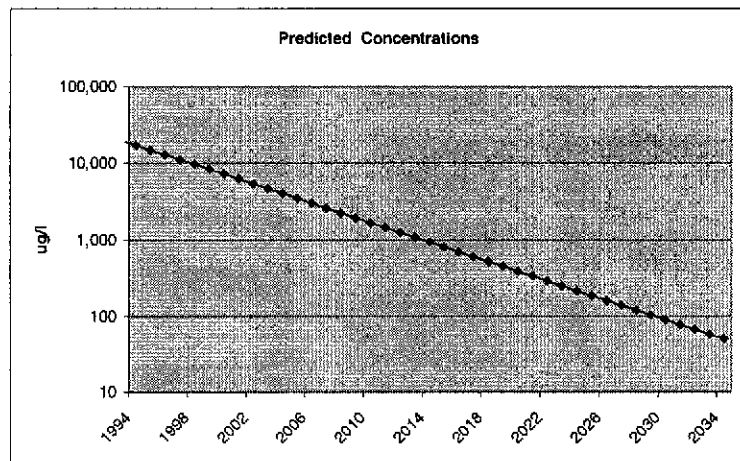
Calculate

Days from first sample:	x	<input type="text" value="14.978"/>	Days
Years from first sample:		<input type="text" value="41.0"/>	Years
Estimated date of cleanup:		<input type="text" value="Oct-2034"/>	

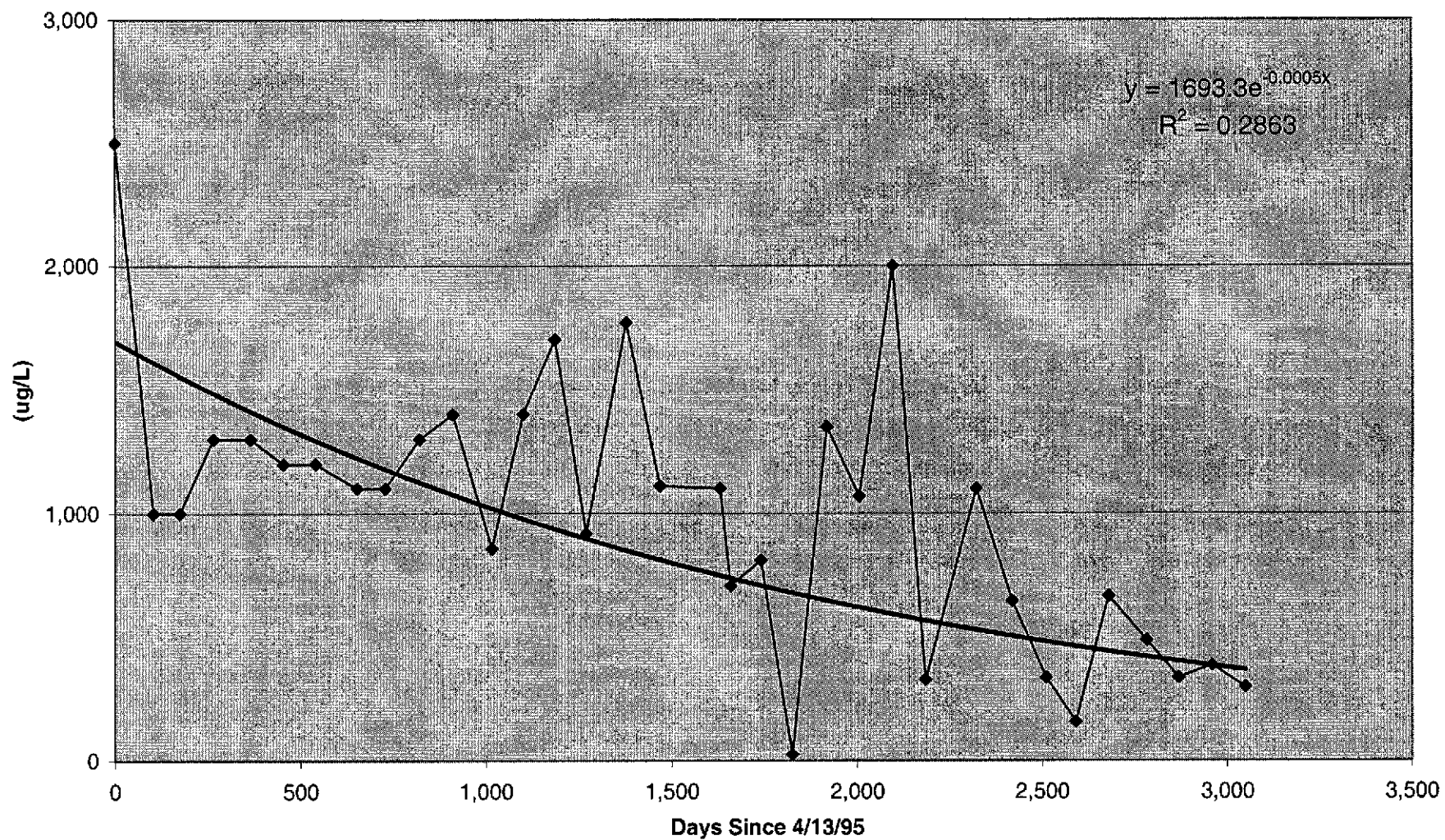
Calculated Half Life =  $-\ln(2)/a$   
 Days  
 Years

Concentration Trend Prediction

Date	Days from First Sample	Predicted Concentration (ug/l)
10/11/1993	0	19,996
10/11/1994	365	17,280
10/11/1995	730	14,932
10/11/1996	1,096	12,899
10/11/1997	1,461	11,147
10/11/1998	1,826	9,632
10/11/1999	2,191	8,324
10/11/2000	2,557	7,190
10/11/2001	2,922	6,214
10/11/2002	3,287	5,369
10/11/2003	3,652	4,640
10/11/2004	4,018	4,008
10/11/2005	4,383	3,464
10/11/2006	4,748	2,993
10/11/2007	5,113	2,587
10/11/2008	5,479	2,234
10/11/2009	5,844	1,931
10/11/2010	6,209	1,669
10/11/2011	6,574	1,442
10/11/2012	6,940	1,245
10/11/2013	7,305	1,076
10/11/2014	7,670	930
10/11/2015	8,035	804
10/11/2016	8,401	694
10/11/2017	8,766	600
10/11/2018	9,131	518
10/11/2019	9,496	448
10/11/2020	9,862	387
10/11/2021	10,227	334
10/11/2022	10,592	289
10/11/2023	10,957	250
10/11/2024	11,323	216
10/11/2025	11,688	186
10/11/2026	12,053	161
10/11/2027	12,418	139
10/11/2028	12,784	120
10/11/2029	13,149	104
10/11/2030	13,514	90
10/11/2031	13,879	78
10/11/2032	14,245	67
10/11/2033	14,610	58
10/11/2034	14,975	50



**Benzene Concentration Trends in Groundwater (Well C-2)**  
**Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, CA**



**Predicted Time to Cleanup of Benzene in Well C-2, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California**

Calculate "time to cleanup" given the first-order decay equation:  

$$y = b e^{-ax} \quad \implies \quad x = \ln(y/b) / a$$

Site: **Former Chevron Facility 9-0329**  
 Well: **C-2**  
 Constituent: **Benzene**

Given

Water Quality Objective:	y	<input type="text" value="1"/>	ug/L
Constant:	b	<input type="text" value="1693.3"/>	
Constant:	a	<input type="text" value="0.0003"/>	
Date of first sample:		<input type="text" value="4/13/1995"/>	

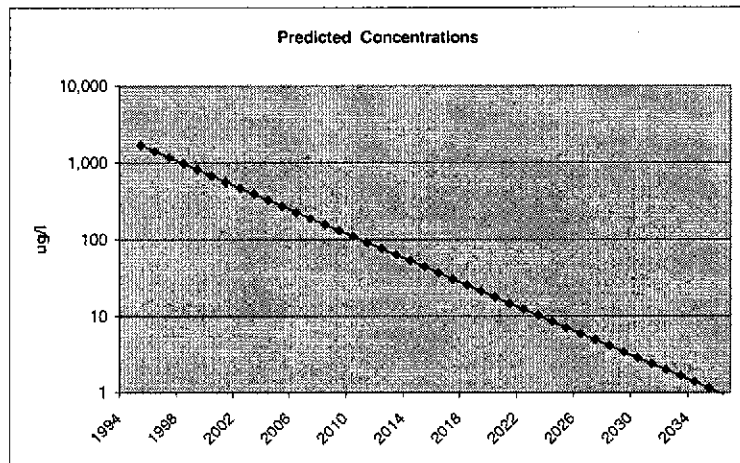
Calculate

Days from first sample:	x	<input type="text" value="14,869"/>	Days
Years from first sample:		<input type="text" value="40.7"/>	Years
Estimated date of cleanup:		<input type="text" value="Dec-2035"/>	

Calculated Half Life =  $-\ln(2)/a$   
 Days  
 Years

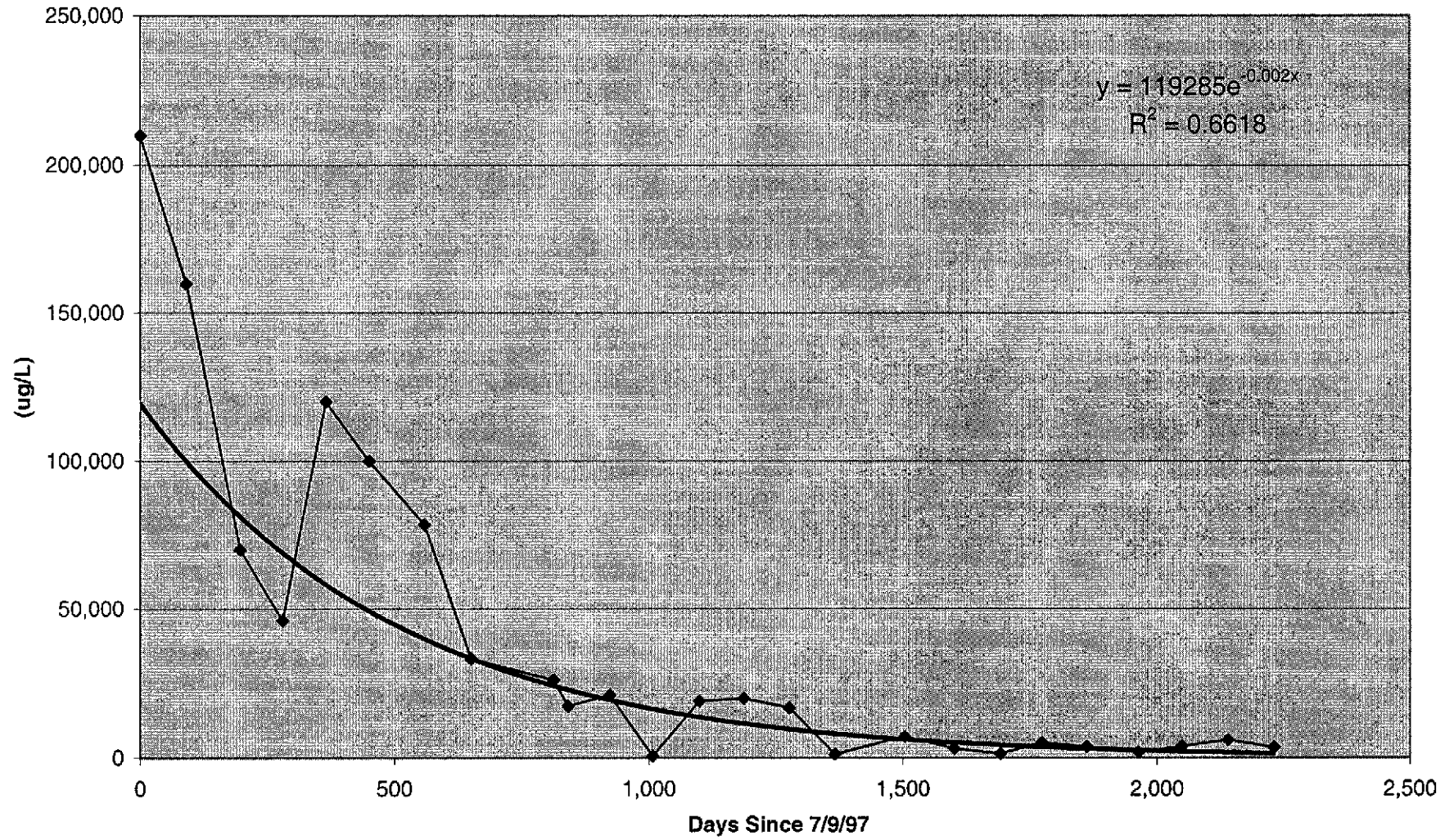
**Concentration Trend Prediction**

Date	Days from First Sample	Predicted Concentration (ug/l)
4/13/1995	0	1,693
4/13/1996	366	1,410
4/13/1997	731	1,175
4/13/1998	1,096	979
4/13/1999	1,461	816
4/13/2000	1,827	679
4/13/2001	2,192	566
4/13/2002	2,557	472
4/13/2003	2,922	393
4/13/2004	3,288	327
4/13/2005	3,653	273
4/13/2006	4,018	227
4/13/2007	4,383	189
4/13/2008	4,749	158
4/13/2009	5,114	131.3
4/13/2010	5,479	109.4
4/13/2011	5,844	91.1
4/13/2012	6,210	75.9
4/13/2013	6,575	63.2
4/13/2014	6,940	52.7
4/13/2015	7,305	43.9
4/13/2016	7,671	36.6
4/13/2017	8,036	30.5
4/13/2018	8,401	25.4
4/13/2019	8,766	21.1
4/13/2020	9,132	17.6
4/13/2021	9,497	14.7
4/13/2022	9,862	12.2
4/13/2023	10,227	10.2
4/13/2024	10,593	8.5
4/13/2025	10,958	7.1
4/13/2026	11,323	5.9
4/13/2027	11,688	4.9
4/13/2028	12,054	4.1
4/13/2029	12,419	3.4
4/13/2030	12,784	2.8
4/13/2031	13,149	2.4
4/13/2032	13,515	2.0
4/13/2033	13,880	1.6
4/13/2034	14,245	1.4
4/13/2035	14,610	1.1
4/13/2036	14,976	0.9





**MTBE Concentration Trends in Groundwater (Well C-2)**  
**Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, CA**



Predicted Time to Cleanup of MTBE in Well C-2, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California

Calculate "time to cleanup" given the first-order decay equation:

$$y = b e^{ax} \quad \implies \quad x = \ln(y/b) / a$$

Site: **Former Chevron Station 9-0329**  
 Well: **C-2**  
 Constituent: **MTBE**

Given

Water Quality Objective:	y	<input type="text" value="5"/>	ug/L
Constant:	b	<input type="text" value="119285"/>	
Constant:	a	<input type="text" value="-0.002"/>	
Date of first sample:		<input type="text" value="10/24/1995"/>	

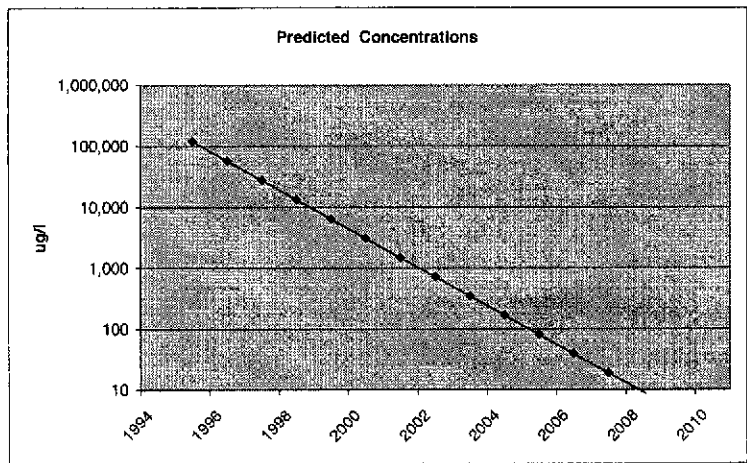
Calculate

Days from first sample:	x	<input type="text" value="5,040"/>	Days
Years from first sample:		<input type="text" value="13.8"/>	Years
Estimated date of cleanup:		<input type="text" value="Aug-2009"/>	

Calculated Half Life =  $-\ln(2)/a$   
 Days  
 Years

Concentration Trend Prediction

Date	Days from First Sample	Predicted Concentration (ug/l)
10/24/1995	0	119,285
10/24/1996	366	57,370
10/24/1997	731	27,647
10/24/1998	1,096	13,323
10/24/1999	1,461	6,421
10/24/2000	1,827	3,088
10/24/2001	2,192	1,488
10/24/2002	2,557	717
10/24/2003	2,922	346
10/24/2004	3,288	166
10/24/2005	3,653	80
10/24/2006	4,018	39
10/24/2007	4,383	19
10/24/2008	4,749	9
10/24/2009	5,114	4



**Table 1 Well Construction Data, Former Chevron Station 9-0329, 340 Highland Avenue, Piedmont, California**

Well	Top of Casing Elevation (ft msl)	Total Depth (ft)	Diameter (in)	Screen Interval (fbg)	Comments
C-1	Unknown	17.0	2	Unknown	This well was never sampled. It's status is unknown.
C-2	343.39	17.0	2	Unknown	Logs do not indicate screen interval
C-3	347.08	17.0	2	Unknown	Logs do not indicate screen interval
C-4	344.94	13.0	2	Unknown	Logs do not indicate screen interval
C-5	345.14	18.0	2	3-18	
C-6	338.61	17.5	2	2.5-17.5	
MW-6	Not Surveyed	20.0	2	5-20	Well abandoned

ft = feet

msl = mean sea level

fbg = ft below grade

in = inches

**Appendix F**  
**Well Survey Data**

FROM  
6/25/93  
RESNA  
REPORT

**APPENDIX A**

**WATER WELL INVENTORY**

15

4W

24, 25

Inventory of Wells Located in Township 15 Range 3N Section 17, 19, County Alameda  
30, 29, 20, 18

<u>Owner</u>	<u>Owner's Address</u>	<u>Well Location</u>	<u>Year Drilled</u>	<u>Use</u>
② P. G. & L	4201 Oakport St, Oakland	5070 Rockwood Ave OK	1975	Catholic
EBMUD	2130 Adelphi St	5301 Cleveland Dr	1981	Catholic
① Mr. Mastrom	#7 Highland, Piedmont		1979	Domestic
		132 Dracena St, Pm.	1974	Catholic
EBMUD		Grand & Holly Pt.	1976	Cat? ?
City of Piedmont		Dracena Park	1977	Irrig.
"		"	"	"
EBMUD		Grand Ave & Holly Pt	1982	Cath
John W. Bartel Jr	125 Hillside Ave, Pt.		88	Irr
Travis	326 El Cerrito		77	Dom.
Albee	304 Hillside		77	Dom
Paul Hoffenberg	321 Hillside		91	Dom
Frank Adams	781 Highland Ave Pt.		77	Dom
City of Piedmont	Highland & Val Vista		77	Irr
Mr. Mastrom	151 Hazel Ln Pt		88	Dom.
Thomas B. Crowley	55 Hazel Ln Pt.		85	Irr.
Alan B. Dachs	321 Mountain Ave Pt		88	Irr.
Ernest J. Sweetland	321 Hillside Pt		?	?
Albert Hermans	1600 Fernwood Ok		91	Irr.
EBMUD		Maxwellton Rd & Harbord Dr	86	Cath.
Robert Green	607 Lasalle Montclair		77	Irr
Gary Torre	6363 Estates Dr Ok		91	Dom.
EBMUD		5980 Wood Dr.	81	Cath
P. G. & L		Blair Ave & Mountain Ave	75	Cath
Brechtel Corp	50 Bank St San Francisco	26 Scavens, Pt.	77	Irr.
Albee	445 Mountain Pt, Piedmont		?	Dom



Facility Number 9-0329  
General Cont.   
Service Requests/Proposals   
Permits/Orders   
Drawings/Photos/Notes   
Spill & Leak Reports   
Legal/Environmental/Lic. Reports



**Chevron**

June 1, 1998

**Chevron Products Company**  
6001 Bollinger Canyon Road  
Building L  
San Ramon, CA 94583  
P.O. Box 6004  
San Ramon, CA 94583-0904

**Marketing - Sales West**  
Phone 510 842-9500

Ms. Pamela J. Evans  
Alameda County Health Care Services  
Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

**Re: Former Chevron Service Station #9-0329**  
**340 Highland Avenue**  
**Piedmont, California**

Dear Ms. Evans:

Enclosed is the Water Well and Surface Water Survey that was conducted by our consultant Pacific Environmental Group Inc., for the above noted site. This survey was requested in your letter of March 18, 1998, and was for an area within 1/4 mile of the site.

The water well survey conducted at the Department of Water Resources determined that four domestic and four irrigation wells are located within the surveyed area. Four of these wells are located southerly and down gradient of the site.

The closest down gradient well to the site is the City of Piedmont well #4, which is used for irrigation. This well is located approximately 0.11 miles (580 feet) south of the site. The well is screened from 150 to 170 feet and 190 to 210 feet below ground surface. The closest site monitoring wells MW-5 and MW-6 to City well #4 are screened from about 2 1/2 to 18 feet and are in a high recharge aquifer near the surface (<5 feet). The soil lithology for these wells below the 5-foot level, is siltstone and sandstone, which would act as a confining barrier between the lower aquifer (copy of well logs enclosed).

The other three down gradient wells #7, #6 and #5 are located 0.17 miles (897 feet), 0.19 miles (1003 feet) and 0.19 miles (1003 feet) respectively south of the site. Well #7 is used for irrigation and is screened from 55 to 275 feet. Well #6 is used for irrigation and is screened from 57 to 157 feet. Well #5 is used for domestic water supply and is screened from 40 to 100 feet.



June 1, 1998  
Ms. Pamela Evans  
Former Chevron Service Station #9-0329  
Page 2

None of the down gradient wells are screened in the upper aquifer and with the confining siltstone/sandstone barrier between the upper and lower aquifers, it would not be expected that the down gradient wells would be impacted from the hydrocarbons that have been detected at the site.

If you have any questions or comments please call me at (510) 842-9136.

Sincerely,  
**CHEVRON PRODUCTS COMPANY**

Philip R. Briggs  
Site Assessment and Remediation Project Manager

Enclosure

Cc. Mr. Chuck Headlee  
RWQCB-San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, CA 94612

Mr. Frank Hoffman  
Hoffman Investment Company  
1760 Willow Road  
Hillsborough, CA 94010

Mir Ghafari & Fred Manoucheri  
Piedmont Enterprises  
340 Highland Avenue  
Piedmont, CA 94611

Ms. Bette Owen, Chevron

Ms. Anne Payne, Chevron, ChvPkv/V-1156



PACIFIC  
ENVIRONMENTAL  
GROUP, INC.

AN  COMPANY

May 29, 1998  
Project 320-160.1B

Mr. Phil Briggs  
Chevron Products Company  
P.O. Box 6004  
San Ramon, California 94583-804

Re: **Water Well and Surface Water Survey**  
Chevron Service Station 9-0329  
340 Highland Avenue at Vista Avenue  
Piedmont, California

Dear Mr. Briggs:

The water well survey conducted at the Department of Water Resources for the site referenced above (Figure 1) determined that four domestic water-supply wells, and four irrigation wells are located within 1/4 mile of the site. Available well details are presented in Table 1 and brief descriptions of these wells follows:

- The domestic water-supply wells are owned by individuals for use at their private residences. The nearest domestic well to the site is Well #2 (19P4) located approximately 0.17 miles west-southwest of the site.
- Three of the irrigation wells are owned by individuals, the closest of which, Well #7 (19Q) is approximately 0.17 miles southeast of the site.
- The City of Piedmont well (Well #4, 19Q2) used for irrigation, is the closest well to the site at 0.11 miles to the south. The well is screened from 150 to 170 feet and 190 to 210 feet below ground surface. Further well construction details are not currently known.

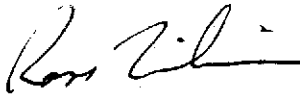
The surface water survey identified only one creek within a 1/4-mile radius of the site. A small intermittent creek flows through Piedmont Park and is located approximately 360 feet southeast of the site.

Groundwater gradient at the site has been generally to the southwest. Therefore, the City of Piedmont irrigation well #4 and the intermittent creek located in Piedmont Park are the closest downgradient receptors. Elevated concentrations of methyl tert-butyl ether have been identified in on-site Well C-2. Wells C-5, C-6 should continue to be monitored to evaluate plume status (Figure 2).

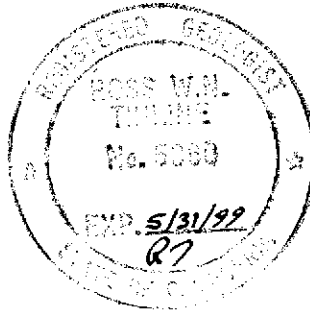
If you have any questions or require further information, please call.

Sincerely,

**Pacific Environmental Group, Inc.**



Ross Tinline  
Project Geologist  
RG 5860



Attachments: Table 1 - Summary of Water Wells  
Figure 1 - Site Location Map  
Figure 2 - Site Map

Table 1  
**Summary of Water Wells**  
 Located Within 1/4-Mile Radius of

Chevron Service Station 9-0329  
 340 Highland Avenue at Vista Avenue  
 Piedmont, California

Well ID	Section	Location (if listed in DWR records)	Well Use	Date Drilled	Well Diameter (inches)	Total Depth (feet, bgs)	Screened Interval (feet, bgs)	Distance From Site (miles)
1	19P3	304 Hillside Near Oakland	Domestic	1977	6	220	NA	0.20 NW
2	19P4	321 Hillside at Vista	Domestic	02/04/91	5	161	54-74	0.17 WSW
3	19Q1	781 Highland	Domestic	5/14/77	6	200	NA	0.23 SE
4	19Q2	Piedmont Park	Irrigation	8/77	6	250	150-170, 190-210	0.11 S
5	19Q3	141 Hazel Lane	Domestic	5/17/88	4.5	100	40-100	0.19 S
6	19Q4	55 Hazel Lane near Highland Avenue	Irrigation	9/19/88	4.5	157	57-157	0.19 SE
7	19Q	120 Hazel Lane	Irrigation	11/3/92	4.5	300	55-275	0.17 SE
8	19R1	321 Mountain between Mountain and Sharon	Irrigation	6/23/88	4.5	220	80-180	0.23 E

bgs = Below ground surface  
 NA = Not available



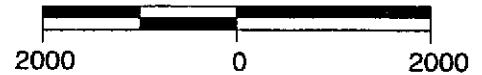
QUADRANGLE  
LOCATION

**LEGEND**

- 1 ▲ WATER SUPPLY WELL LOCATION AND DESIGNATION

**REFERENCES:**  
USGS 7.5 MIN. TOPOGRAPHIC MAP  
TITLED: OAKLAND EAST, CALIFORNIA  
DATED: 1959 REVISED: 1980

SCALE IN FEET



PACIFIC  
ENVIRONMENTAL  
GROUP, INC.

CHEVRON SERVICE STATION 9-0329  
340 Highland Avenue at Vista Avenue  
Piedmont, California

SITE LOCATION MAP

FIGURE:  
**1**  
PROJECT:  
320-160.1b

COMPANY \_\_\_\_\_ JOB # \_\_\_\_\_

LOCATION \_\_\_\_\_ DATE \_\_\_\_\_

CITY \_\_\_\_\_ TIME \_\_\_\_\_

Well ID. \_\_\_\_\_ Well Condition \_\_\_\_\_

Well Diameter \_\_\_\_\_ in. Hydrocarbon Thickness \_\_\_\_\_ ft.

Total Depth \_\_\_\_\_ ft.

Depth to Liquid- \_\_\_\_\_ ft.

Volume Factor (VF)	2" = 0.17	6" = 1.50	12" = 5.80
	3" = 0.30	8" = 2.60	
	4" = 0.66	10" = 4.10	

(# of casing volumes) \_\_\_\_\_ x \_\_\_\_\_ x(VF) \_\_\_\_\_ = (Estimated Purge Volume) \_\_\_\_\_ gal.

Purging Equipment \_\_\_\_\_

Sampling Equipment \_\_\_\_\_

Starting Time \_\_\_\_\_ Purging Flow Rate \_\_\_\_\_ gpm.

(Estimated Purge Volume) \_\_\_\_\_ gal. / (Purging Flow Rate) \_\_\_\_\_ gpm. = (Anticipated Purging Time) \_\_\_\_\_ min.

Time	pH	Conductivity	Temperature	Volume
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Did well dewater? \_\_\_\_\_ If yes, time \_\_\_\_\_ Volume \_\_\_\_\_

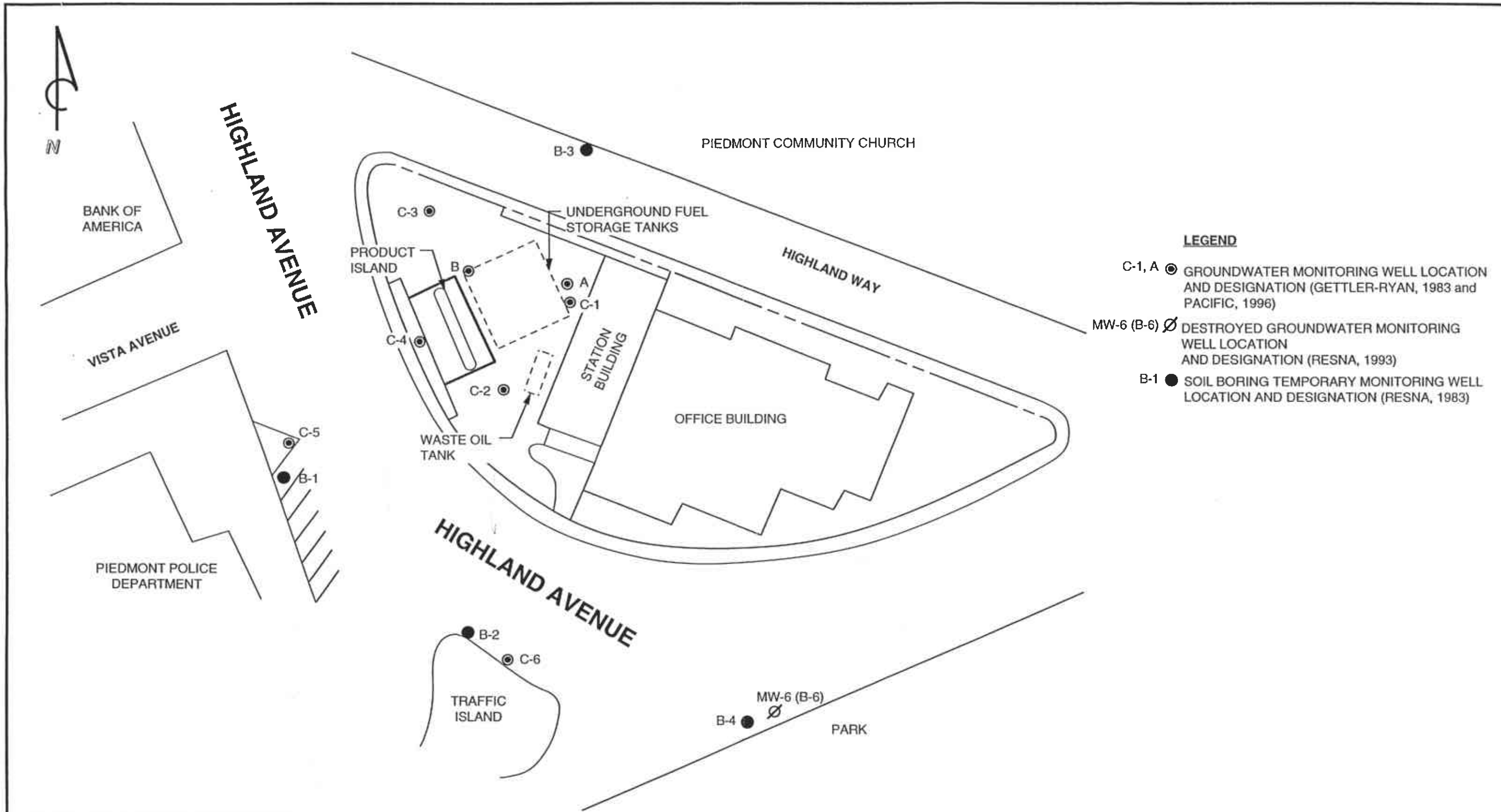
Sampling Time \_\_\_\_\_ Weather Conditions \_\_\_\_\_

Analysis \_\_\_\_\_ Bottles Used \_\_\_\_\_

Chain of Custody Number \_\_\_\_\_

COMMENTS \_\_\_\_\_

FOREMAN \_\_\_\_\_ ASSISTANT \_\_\_\_\_



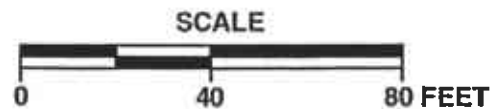
**LEGEND**

- C-1, A ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (GETTLER-RYAN, 1983 and PACIFIC, 1996)
- MW-6 (B-6) ∅ DESTROYED GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (RESNA, 1993)
- B-1 ● SOIL BORING TEMPORARY MONITORING WELL LOCATION AND DESIGNATION (RESNA, 1983)

SOURCE: MAP BY CANONIE ENVIRONMENTAL



PACIFIC ENVIRONMENTAL GROUP, INC.



**CHEVRON SERVICE STATION 9-0329**  
 340 Highland Avenue at Vista Avenue  
 Piedmont, California

**SITE MAP**

FIGURE: **2**  
 PROJECT: 320-160.1B

Monitoring Well Sampling Protocol Schematic

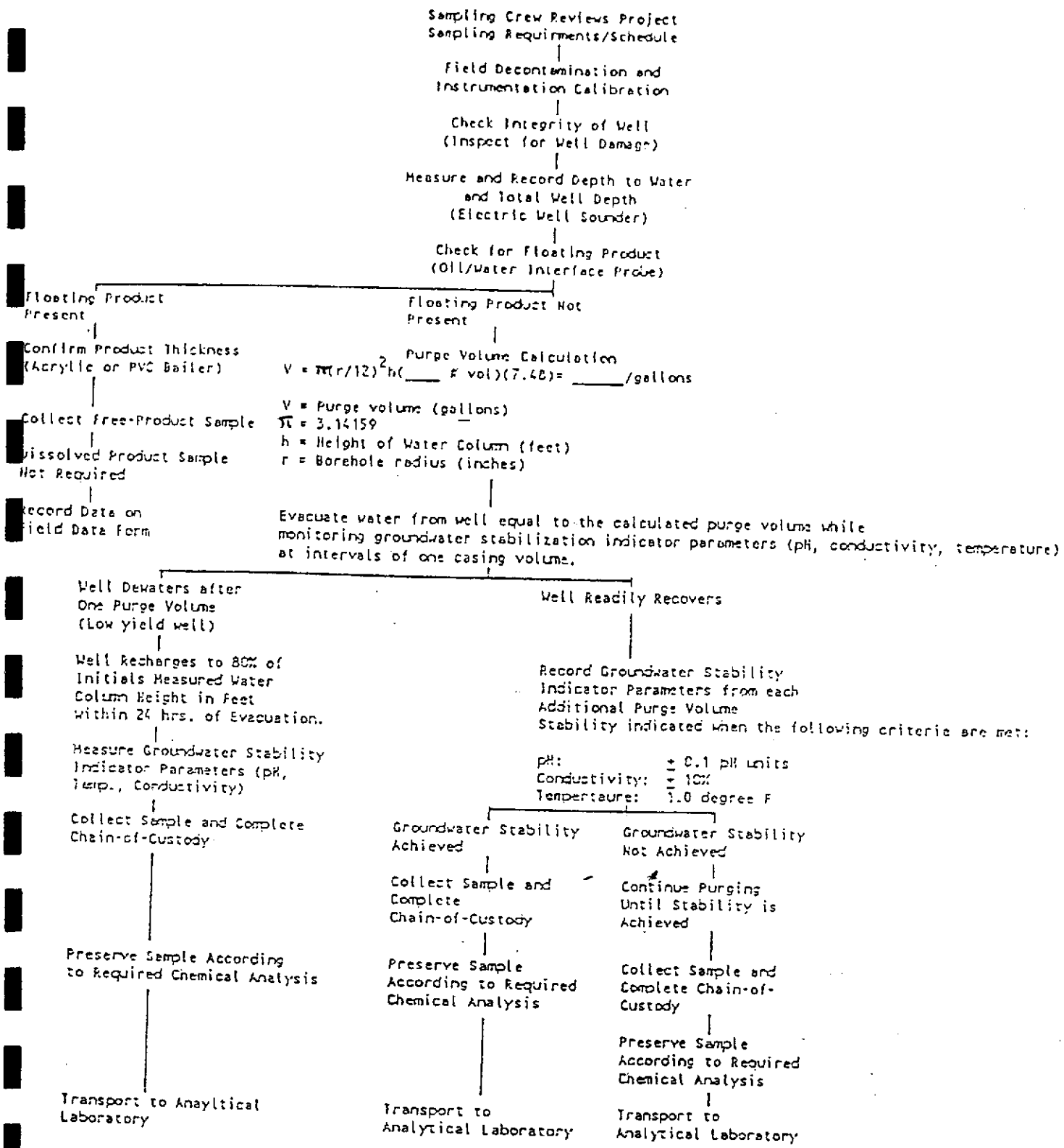


FIGURE 4





3164 Gold Camp Drive  
Suite 200  
Rancho Cordova, California 95670-6021  
916/638-2085  
FAX: 916/638-8385

July 15, 2002

Mr. Scott Seery  
Alameda County Health Care Services  
1153 Harbor Bay Parkway, Suite 250  
Alameda, California 94502

Facility Number 9-0329  
General Correspondences   
Service Reqs./Proposals   
Permits/Bonds   
Drawings/Photos/Notes   
Spill & Leak Reports   
Legal/Easements/Lic.   
Reports

Subject: *Risk-Based Corrective Action Evaluation*  
Former Chevron Service Station No. 9-0329  
340 Highland Avenue  
Piedmont, California  
DG90329H.3C01

Mr. Seery:

At the request of Chevron Products Company (Chevron), Delta Environmental Consultants, Inc. network associate Gettler-Ryan Inc. (GR) is submitting this report to document the results of implementation of the Risk-Based Corrective Action (RBCA) planning process, as described in ASTM E2081-00 "Standard Guide for Risk-Based Corrective Action". This Tier 2 RBCA was conducted with site-specific data from the former Chevron service station located at 340 Highland Avenue in Piedmont, California. This RBCA was prepared to evaluate a future residential use scenario. The purpose of this work was to evaluate whether the residual hydrocarbons in the site soils and groundwater pose a risk to human health. This report describes site conditions and the RBCA model results for the site (Groundwater Services, Inc. RBCA Toolkit for Chemical Releases, version 1.3a).

**Risk-Based Corrective Action (RBCA)**

Tier 1 of the RBCA process involves comparison of the site constituent concentrations to generic Risk-Based Screening Levels (RBSL) to evaluate whether further evaluation and/or active remediation is warranted. RBSL values are derived from standard exposure equations and reasonable maximum exposure (RME) estimates per U.S. EPA guidelines. RBSL concentrations are designed to be protective of human health even if exposure occurs directly within the onsite area of impacted soil or groundwater, and inherently provides conservative estimates of potential threats to human health and the environment. According to the RBCA process, if Tier 1 limits are not exceeded, the user may proceed directly to compliance monitoring and/or no further action. However, if these defined screening levels are exceeded, the affected media may be addressed by: 1) remediating to the generic Tier 1 limits, if practicable; 2) conducting Tier 2 evaluation to develop site-specific remediation goals; or 3) implement an interim remedial action to abate risk "hot spots". Tier 2 analysis evaluates baseline risks both on and offsite, utilizing site specific soil, groundwater and air parameters. Additionally, Tier 2 analyses allow the use of transport models in calculating risks and cleanup standards related to offsite receptors, and utilizes Site Specific Target Levels (SSTL). The SSTL is a chemical of concern (COC) concentration limit (clean-up level) in the source medium derived by multiplying the risk-based exposure limit at the point of exposure by the natural attenuation factor for the exposure pathway.

## Site Parameters

Complete exposure pathways are those that could pose a reasonable potential for contaminant contact with human or environmental receptors. Under Tier 2 RBCA, both onsite and offsite receptors apply. For the purpose of this Tier 2 evaluation, a residential exposure pathway with a risk factor of  $1.0E-6$  was evaluated for the site. Groundwater beneath and in the site vicinity is not used for drinking water purposes, however, groundwater ingestion and subsurface soil leaching to groundwater (ingestion) exposure pathways were evaluated as a worst case scenario. The following risk pathways were evaluated: subsurface soil and groundwater volatilization to indoor and outdoor air; and ingestion, dermal contact and inhalation from groundwater, surficial and subsurface soils.

Where available, site specific physical data were used in this RBCA evaluation. Site specific parameters included contaminated soil area ( $5,000 \text{ ft}^2$ ), depth to top of affected soil (5 ft), soil type (silty sand), length of affected soil parallel to wind (75 ft), length of affected soil parallel to groundwater flow (60 ft), groundwater gradient (0.13 ft/ft), thickness of affected subsurface soils (9 ft), groundwater plume width (60 ft) and groundwater plume thickness (12 ft). The depth of groundwater is estimated to be approximately 2 feet below ground surface (GR Fourth Quarter Event of November 26, 2001 Groundwater Monitoring and Sampling Report). Where appropriate and consistent with site conditions, default values were used. The Chemicals of Concern (COC) were evaluated with a conservative 95% Upper Control Limit (UCL) factor as well as the California adjusted oral slope factor for benzene (0.1) for this RBCA analysis. Total Petroleum Hydrocarbons as gasoline (TPHg) were evaluated by inputting the reported TPHg values from soil and groundwater into the aromatic fraction C8-C10 (Total Petroleum Hydrocarbon Criteria Working Group Series, Volume 5, June 1999).

## Results of RBCA Analysis

Based on information from previous site investigations and current groundwater monitoring and sampling data, the Tier 2 RBCA program evaluated the complete exposure pathways identified at the site. The RBCA program findings for the identified pathways are surface soil exposure with a cumulative risk factor of  $1.3E-8$ , subsurface soil and groundwater volatilization to outdoor and indoor air exposures with cumulative risk factors of  $3.7E-9$  and  $2.4E-7$ , respectively, and groundwater ingestion with a cumulative risk factor of  $2.7E-5$  (Appendix A, Tier 2 Baseline Risk Summary Table). Using the residential risk factor of  $1.0E-6$  and site conditions, the SSTLs for benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MtBE), and TPHg were determined to be below established Tier 2 SSTLs (Appendix A, SSTL Values) for all pathways except the groundwater ingestion pathway. According to the RBCA decision making process, further work is warranted to protect against exposure via the groundwater ingestion pathway. However, since the groundwater beneath the site is not utilized for drinking purposes, GR is of the opinion that no further work is warranted at the site. Pertinent input and output data including site specific parameters used in the analysis are presented in Appendix A.

Mr. Scott Seery  
July 15, 2002  
Page 3

### Conclusions And Recommendations

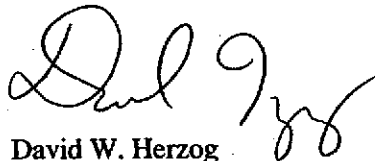
GR performed the RBCA evaluation for the assessment and response to petroleum hydrocarbons in the subsurface soil and groundwater beneath the subject site. A Tier 2 evaluation was performed utilizing available site specific data. The results of these analyses confirm that current site conditions do not exceed the calculated Tier 2 SSTLs specific to the site (Appendix A), except with respect to benzene concentrations in groundwater. Based on the RBCA program and findings presented in this report, and that the shallow groundwater beneath and in the vicinity of the site is not used for drinking water purposes, it is GR's opinion that no further work is warranted and the site should be considered for case closure.

If you have any questions or comments on the enclosed materials, please feel free to contact us at (916) 631-1300.

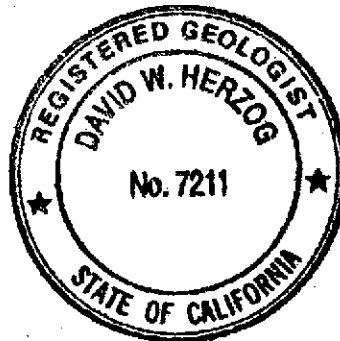
DELTA ENVIRONMENTAL CONSULTANTS, INC.  
Network Associate GETTLER-RYAN INC.



Ted A. Douglas  
Senior Geologist



David W. Herzog  
Senior Geologist  
R.G. 7211



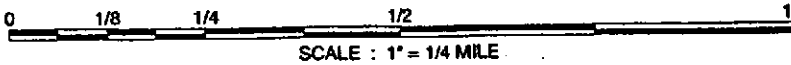
Attachments: Figure 1. Site Location Map  
Figure 2. Site Plan  
Appendix A. Tier 2 RBCA Input/Output Data

Cc: Ms. Karen Streich, Chevron Products Company, P.O. Box 6004, San Ramon, CA 94583  
Mr. Chuck Headlee, RWQCB-SFB, 1515 Clay Street, Suite 1400, Oakland, CA 94612  
Mr. Frank Hoffman, Hoffman Investment Co., 1760 Willow Road, Hillsborough, CA 94010  
Mir Ghafari & Fred Manoucheri, Texaco Service Station 340 Highland Ave., Piedmont, CA 94611  
Mr. Jeff Orwig, Texaco Service Station, 340 Highland Ave., Piedmont, CA 94611  
Mr. Jon Robbins, Chevron Products Law, P.O. Box 6004, Building T, Room T-4284, San Ramon, CA 94583  
Mr. James Brownell, Delta Environmental Consultants, Inc.



1:19-0329 PIEDMONTFIGUREVICINITY-MAP.AI

SOURCE: TOPOI MAPS



FIGURE

1

Former Chevron Station 9-0329

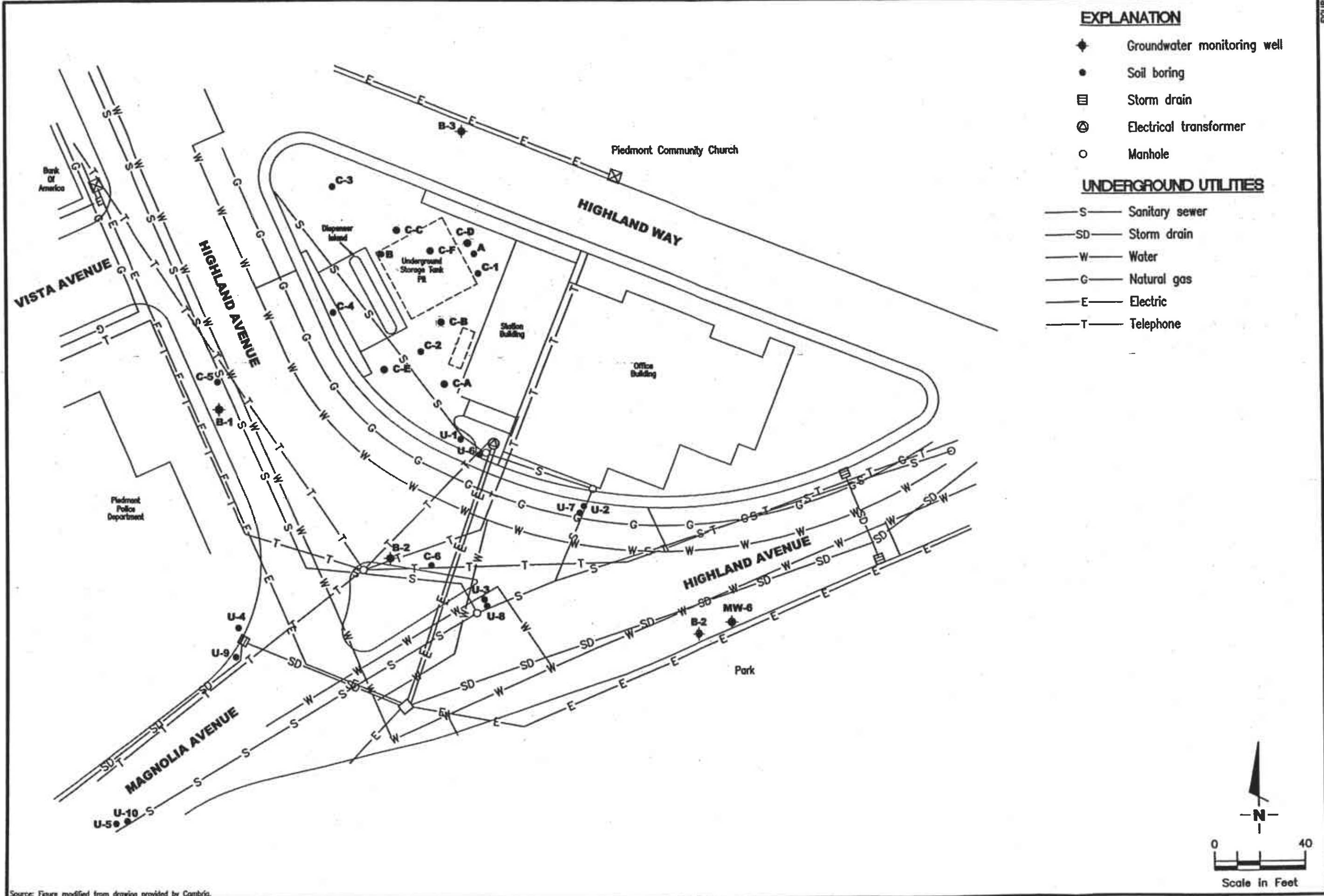
340 Highland Avenue

Piedmont, California



C A M B R I A

Vicinity Map

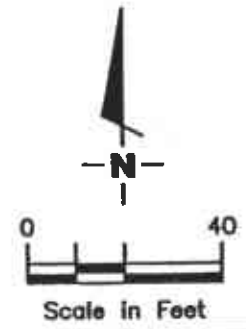


**EXPLANATION**

- ◆ Groundwater monitoring well
- Soil boring
- ≡ Storm drain
- ⊗ Electrical transformer
- Manhole

**UNDERGROUND UTILITIES**

- S— Sanitary sewer
- SD— Storm drain
- W— Water
- G— Natural gas
- E— Electric
- T— Telephone



Source: Figure modified from drawing provided by Cambria.

**UTILITY MAP**  
 Chevron Service Station No. 9-0329  
 340 Highland Avenue  
 Piedmont, California

**GETTLER - RYAN INC.**  
 6747 Sierra Ct., Suite J  
 Dublin, CA 94568  
 (925) 551-7555

PROJECT NUMBER: DG90329C.4C01  
 FILE NAME: P:\ARCHIVE\CHEVRON\9-0329\01-9-0329.DWG | Layout (tbl: Boring Rpt 4-0)  
 REVIEWED BY: \_\_\_\_\_  
 DATE: 4/01  
 REVISED DATE: \_\_\_\_\_

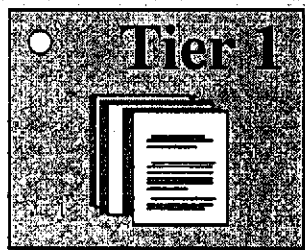
# Main Screen

RBCA Tool Kit for Chemical Releases  
Version 1.3a © 2000

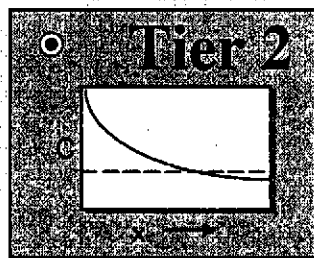
## 1. Project Information

Site Name: Former Chevron Service Station No. 9-0329  
 Location: 340 Highland Ave., Piedmont, CA  
 Compl. By: J. Douglas  
 Date: 10-May-02 Job ID: DG90329H.3C01

## 2. Which Type of RBCA Analysis? (?)



Generic Values  
On-Site  
Exposure



Site-Specific Values  
On- or Off-Site Exposure

## 3. Calculation Options (?)

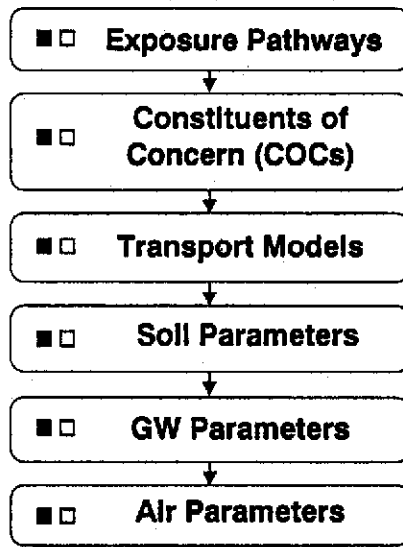
*Affects which input data are required*

- Baseline Risks (Forward mode)**
- RBCA Cleanup Standards (Backward mode)**

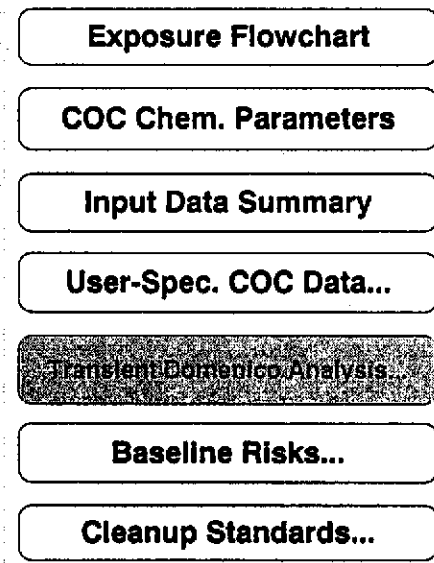
## 4. RBCA Evaluation Process

### Prepare Input Data

Data Complete? (  = yes,  = no)



### Review Output

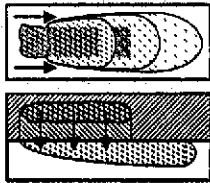


## 5. Commands and Options

New Site	Load Data...	Save Data As...	Quit
Print Sheet	Set Units	Custom Chem. Data...	Help

# Exposure Pathway Identification

## 1. Groundwater Exposure



### Groundwater Ingestion/ Surface Water Impact

Receptor Res.    
 Type: On-site

#### Source Media:

Affected Groundwater

Affected Soils Leaching to Groundwater

#### Distance to GW receptors

0	0	0	(ft)
On-site	Off-site1	Off-site2	
0	0	0	(ft)

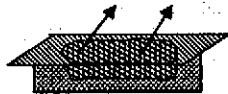
#### GW Discharge to Surface Water Exposure



- Swimming  
 Fish Consumption  
 Aquatic Life Protection

## 2. Surface Soil Exposure

### Direct Ingestion and Dermal Contact



Receptor Res.   
 Type: On-site

Construction Worker

Site Name: Former Chevron Service Station No. 9-0329

Location: 340 Highland Ave., Piedmont, CA

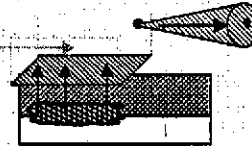
Compl. By: J. Douglas

Job ID: DG90329H.3C01

Date: 10-May-02

## 3. Air Exposure

### Volatilization and Particulates to Outdoor Air Inhalation



Receptor Res.    
 Type: On-site    
 0 0 0 (ft)

Construction worker

- Affected Soils--Volatilization to Ambient Outdoor Air  
 Affected Groundwater--Volatilization to Ambient Outdoor Air  
 Affected Surface Soils--Particulates to Ambient Outdoor Air



### Volatilization to Indoor Air Inhalation

Receptor Res.   
 Type: On-site

- Affected Soils--Volatilization to Enclosed Space  
 Affected Groundwater--Volatilization to Enclosed Space

## 4. Commands and Options

Main Screen

Print Sheet

Set Units

Help

Exposure Factors & Target Risks

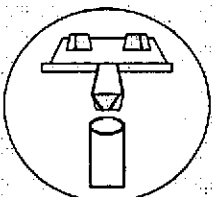
Exposure Flowchart

# Exposure Factors and Target Risk Limits

Site Name: Former Chevron Service Station No. 9-0329  
 Location: 340 Highland Ave., Piedmont, CA  
 Compl. By: J. Douglas  
 Job ID: DG90329H.3C01 Date: 10-May-02

## 1. Exposure Parameters

Age Adjustment?	Residential		Commercial		
	Adult	(Age 0-6)	(Age 0-16)	Chronic Construc.	
Averaging time, carcinogens (yr)	70				
Averaging time, non-carcinogens (yr)	30			25   1	
Body weight (kg)	70	15	35	70	
Exposure duration (yr)	30	6	16	25	1
Exposure frequency (days/yr)	350			250	180
Dermal exposure frequency (days/yr)	350			250	
Skin surface area, soil contact (cm <sup>2</sup> )	<input type="checkbox"/> 5800	2023		5800	5800
Soil dermal adherence factor (mg/cm <sup>2</sup> /day)	1				
Water ingestion rate (L/day)	2			1	
Soil ingestion rate (mg/day)	<input type="checkbox"/> 100	200	<input type="checkbox"/> 50   100		
Swimming exposure time (hr/event)	3				
Swimming event frequency (events/yr)	12	12	12		
Swimming water ingestion rate (L/hr)	<input type="checkbox"/> 0.05	0.5			
Skin surface area, swimming (cm <sup>2</sup> )	<input type="checkbox"/> 23000	8100			
Fish consumption rate (kg/day)	0.025				
Contaminated fish fraction (unitless)	1				



## 2. Risk Goal Calculation Options

- Individual Constituent Risk Goals Only
- Individual and Cumulative Risk Goals

## 3. Target Health Risk Limits

	Individual	Cumulative
Target Risk (Class A/B carcin.)	1.0E-6	1.0E-5
Target Risk (Class C carcinogens)	1.0E-5	
Target Hazard Quotient	1.0E+0	
Target Hazard Index		1.0E+0

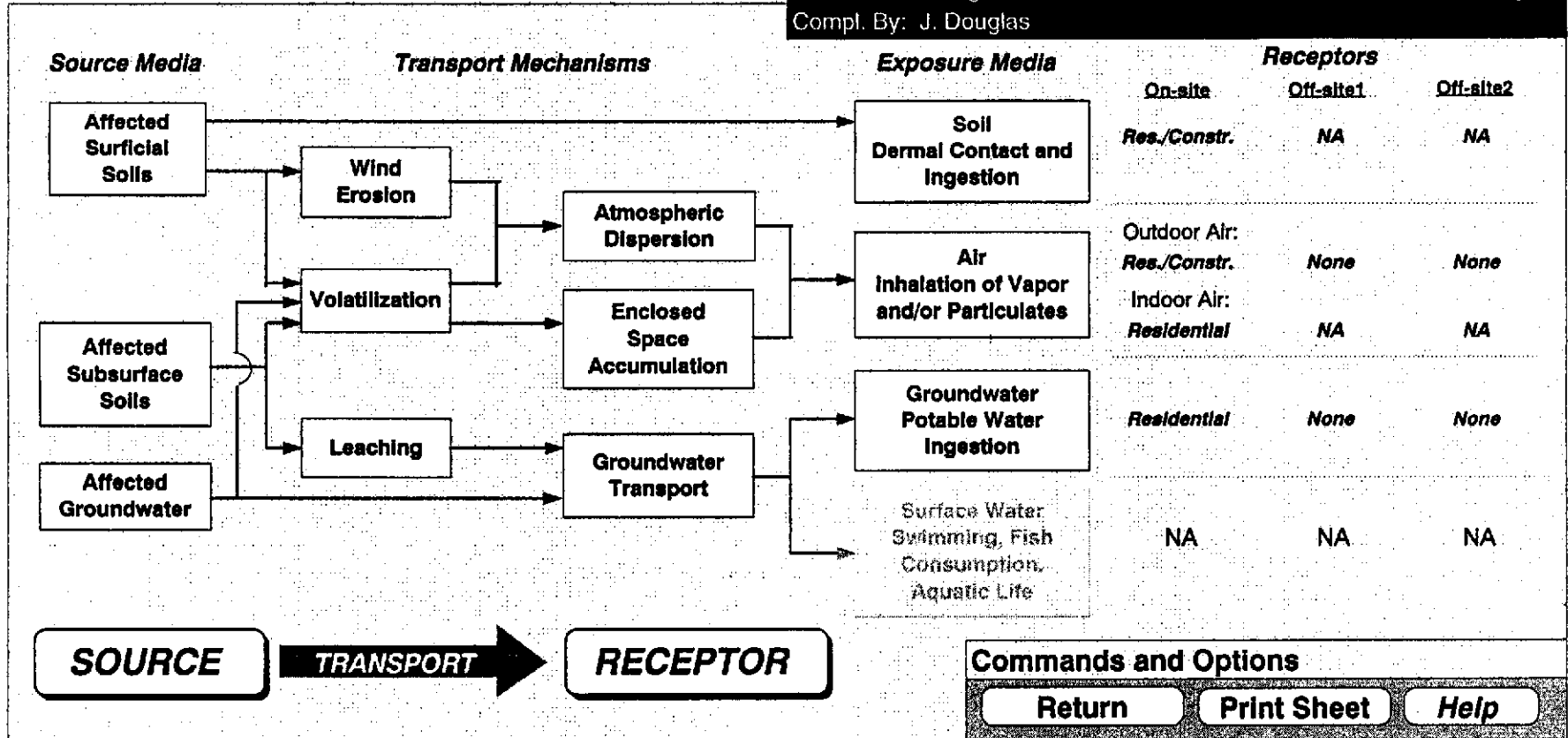
## 4. Commands and Options

**Return to Exposure Pathways**



# Exposure Pathway Flowchart

Site Name: Former Chevron Service Station No. 050329DG90329H.3C01  
 Location: 340 Highland Ave., Piedmont, CA  
 Date: 10-May-02  
 Compl. By: J. Douglas





<b>Commands and Options</b>			Site Name: Former Chevron Service Station: NDC# 0329H.3C01
<b>Return</b>	<b>Print Sheet</b>	<b>Help</b>	Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02
			Compl. By: J. Douglas

## Groundwater Source Zone Concentration Calculator

Paste Defaults

Mean Option

UCL Percentile  
95%

<i>Constituent</i>	Detection Limit (mg/L)	No. of Samples	No. of Detects	Estimated Distribution of Data	Max. Conc. (mg/L)	Mean Conc. (mg/L)	UCL on Mean (mg/L)
Benzene*	5.0E-4	12	12	Lognormal	1.1E+0	3.2E-3	2.3E-2
Toluene	5.0E-4	12	12	Lognormal	4.2E-2	1.3E-3	3.8E-3
Ethylbenzene	5.0E-4	12	12	Lognormal	2.9E-1	1.9E-3	9.4E-3
Xylene (mixed isomers)	5.0E-4	12	12	Lognormal	5.5E-2	1.7E-3	5.7E-3
Methyl t-Butyl ether	2.5E-3	12	12	Lognormal	7.2E+0	3.2E-2	1.9E-1
TPH - Arom >C08-C10	5.0E-2	12	12	Lognormal	9.5E+0	1.6E-1	6.6E-1

\* = Chemical with user-specified data

RBCA Tool Kit for Chemical Releases, Version 1.3a

Enter Analytical Data from  
Groundwater Source Zone  
(up to 50 Data Points)

Analytical Data

	1	2	3	4	5	6	7	8	9	10	11	12	13
ID	C-2	C-2	C-2	C-2	C-3	C-3	C-3	C-3	C-4	C-4	C-4	C-4	
Date	25-Feb-02	20-Aug-01	5-Apr-01	26-Nov-01	25-Feb-02	20-Aug-01	5-Apr-01	26-Nov-01	20-Aug-01	5-Jan-01	12-Jul-00	25-Feb-02	
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
	3.40E-1	1.10E+0	3.30E-1	6.50E-1	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	
	6.90E-3	4.20E-2	3.80E-2	1.30E-2	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	1.80E-3	
	8.30E-2	2.90E-1	1.20E-1	6.60E-2	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	2.50E-4	
	2.20E-2	5.50E-2	3.20E-2	4.40E-2	7.50E-4	2.50E-4	2.50E-4	7.50E-4	2.50E-4	2.50E-4	2.50E-4	7.50E-4	
	1.40E+0	7.20E+0	1.20E+0	3.10E+0	1.00E-3	1.25E-3	1.25E-3	1.25E-3	1.80E-2	2.70E-2	1.25E-3	2.40E-2	
	5.30E+0	7.30E+0	4.90E+0	9.50E+0	2.50E-2	2.50E-2	2.50E-2	2.50E-2	2.50E-2	2.50E-2	2.50E-2	2.50E-2	

<b>Commands and Options</b>			Site Name: Former Chevron Service Station 69329H.3C01
<input type="button" value="Return"/>	<input type="button" value="Print Sheet"/>	<input type="button" value="Help"/>	Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02
			Compl. By: J. Douglas

## Soil Source Zone Concentration Calculator

UCL  
Percentile

Estimated

Constituent	Detection Limit	No. of Samples	No. of Detects	Distribution of Data	Max. Conc.	Mean Conc.	UCL on Mean
	(mg/kg)				(mg/kg)	(mg/kg)	(mg/kg)
Benzene*	5.0E-3	7	7	Lognormal	1.6E-1	1.5E-2	5.7E-2
Toluene	5.0E-3	7	7	Lognormal	1.2E+0	2.6E-2	1.8E-1
Ethylbenzene	5.0E-3	7	7	Lognormal	1.2E+1	4.7E-2	4.7E-1
Xylene (mixed isomers)	5.0E-3	7	7	Lognormal	3.7E+1	1.2E-1	1.3E+0
Methyl t-Butyl ether	5.0E-2	1	1	-	1.0E-3	1.0E-3	NA
TPH - Arom >C08-C10	1.0E+0	7	7	Lognormal	1.6E+3	8.6E+0	9.0E+1

\* = Chemical with user-specified data

RBCA Tool Kit for Chemical Releases, Version 1.3a

Enter Analytical Data from  
Soil Source Zone  
(up to 50 Data Points)

Analytical Data

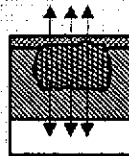
	1	2	3	4	5	6	7	8	9	10	11	12	13
ID	U-6	C-A-5.5	C-A-10.5	C-B-5.5	C-E-6.5	C-E-11.5	C-E-14						
Date	21-Mar-01	15-Nov-90	15-Nov-90	12-Nov-90	13-Nov-90	15-Nov-90	12-Nov-90						
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
	2.50E-3	1.10E-1	5.00E-3	2.50E-3	1.60E-1	5.10E-2	7.00E-3						
	2.50E-3	1.20E+0	7.50E-3	2.50E-3	1.00E-1	5.10E-1	2.50E-3						
	2.50E-3	1.20E+1	7.50E-3	2.50E-3	1.00E-1	5.10E-1	1.90E-2						
	2.50E-3	3.70E+1	3.50E-2	2.10E-2	2.60E-1	1.40E+0	1.60E-2						
	1.00E-3												
	5.00E-1	1.60E+3	1.00E+0	5.00E-1	2.00E+1	2.20E+2	2.00E+0						

# Transport Modeling Options

## 1. Vertical Transport, Surface Soil Column

### Outdoor Air Volatilization Factors ?

- Surface soil volatilization model only
- Combination surface soil/Johnson & Ettinger models
- Thickness of surface soil zone  (ft)
- User-specified VF from other model



### Indoor Air Volatilization Factors ?

- Johnson & Ettinger model
- User-specified VF from other model

### Soil-to-Groundwater Leaching Factor ?

- ASTM Model
  - Apply Soil Attenuation Model (SAM)
  - Allow first-order biodecay
- User-specified LF from other model

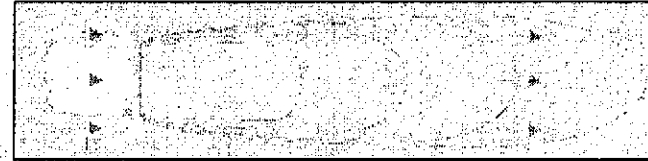
## 2. Lateral Air Dispersion Factor ?



- 3-D Gaussian dispersion model
- User-Specified ADF
  - Off-site 1
  - Off-site 2  (-)

Site Name: Former Chevron Service Station No. J60029DG90329H.3C01  
 Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02  
 Compl. By: J. Douglas

## 3. Groundwater Dilution Attenuation Factor ?



### Calculate DAF using Domenico Model ?

- Domenico equation with dispersion only (no biodegradation)
- Domenico equation first-order decay
- Modified Domenico equation using electron acceptor superposition
- Biodegradation Capacity  (mg/L)

— or —

### User-Specified DAF Values

- DAF values from other model or site data

## 4. Commands and Options

Main Screen

Print Sheet

Help

## Site-Specific Soil Parameters

### 1. Soil Source Zone Characteristics ?

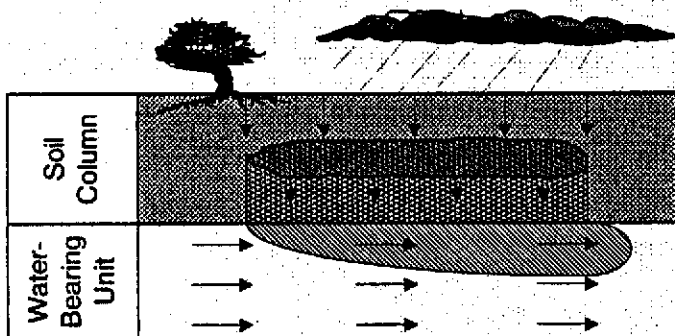
#### Hydrogeology

General Case Construction

Depth to water-bearing unit  (ft)  
 Capillary zone thickness  (ft)  
 Soil column thickness  (ft)

#### Affected Soil Zone

Depth to top of affected soils  (ft)  
 Depth to base of affected soils  (ft)  
 Affected soil area   (ft<sup>2</sup>)  
 Length of affected soil parallel to assumed wind direction   (ft)  
 Length of affected soil parallel to assumed GW flow direction  (ft)



Site Name: Former Chevron Service Station No. 9-0389 ID: DG90329H.3C01  
 Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02  
 Compl. By: J. Douglas

### 2. Surface Soil Column

Vadose Zone Capillary Fringe

#### Predominant USCS Soil Type

SM: Silty Sand ?

or

Total porosity  (-)  
 Volumetric water content   (-)  
 Volumetric air content   (-)  
 Dry bulk density  (kg/L)  
 Vertical hydraulic conductivity  (cm/d)  
 Vapor permeability  (ft<sup>2</sup>)  
 Capillary zone thickness  (ft)

#### Net Rainfall Infiltration

Net infiltration estimate  (in/yr)  
 or   
 Average annual precipitation  (in/yr)

#### Partitioning Parameters

Fraction organic carbon  (-)  
 Soil/water pH  (-)

### 3. Commands and Options



## Site-Specific Groundwater Parameters

### 1. Water-Bearing Unit ?

**Hydrogeology**

Groundwater Darcy velocity		8.9E+1	(cm/d)
Groundwater seepage velocity		2.3E+2	(cm/d)
or	<input type="button" value="Enter Directly"/>	↑ or	
Hydraulic conductivity		6.9E+2	(cm/d)
Hydraulic gradient		1.3E-1	(-)
Effective porosity		0.38	(-)

**Sorption**

Fraction organic carbon-saturated zone			(-)
Groundwater pH			(-)

---

### 2. Groundwater Source Zone ?

Groundwater plume width at source		60	(ft)
Plume (mixing zone) thickness at source		12	(ft)
or	<input type="button" value="Calculate"/>	↑ or	
Saturated thickness		0	(ft)
Length of source zone			(ft)

Site Name: Former Chevron Service Station No. ~~94889~~ DG90329H.3C01  
 Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02  
 Compl. By: J. Douglas

### 3. Groundwater Dispersion ?

Model:  GW Ingestion Soil Leaching to GW

	Off-site 1	Off-site 2	Off-site 1	Off-site 2
Distance to GW receptors	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
or	↓	or ↓	↓	or ↓
Longitudinal dispersivity	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Transverse dispersivity	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vertical dispersivity	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

---

### 4. Groundwater Discharge to Surface Water ?

Distance to GW/SW discharge point		Off-site 2	
		<input type="text" value="NA"/>	(ft)
Plume width at GW/SW discharge		<input type="text" value="0"/>	(ft)
Plume thickness at GW/SW discharge		<input type="text" value="0"/>	(ft)
Surface water flowrate at GW/SW discharge		<input type="text" value="0.0E+0"/>	(ft <sup>3</sup> /s)

---

### 5. Commands and Options

Main Screen

Use Default Values

Print Sheet

Set Units

Help

# Site-Specific Air Parameters

Site Name: Former Chevron Service Station Job # 0032090329H.3C01  
 Location: 340 Highland Ave., Piedmont, CA Date: 10-May-02  
 Compl. By: J. Douglas

### 1. Outdoor Air Pathway

**Dispersion in Air**

Distance to offsite air receptor:  Off-site 1  Off-site 2 (ft) ?

or

Horizontal dispersivity:  (ft)

Vertical dispersivity:  (ft)

**Air Source Zone**

Air mixing zone height:  6.56167979 (ft)

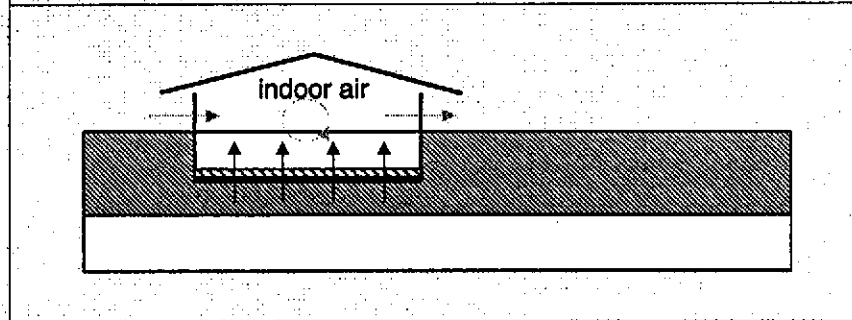
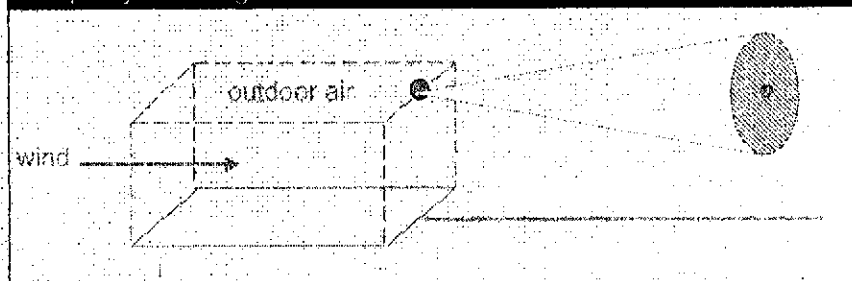
Ambient air velocity in mixing zone:  7.381889764 (ft/s)

Areal particulate emission flux:  6.9E-14 (g/cm<sup>2</sup>/s)

### 2. Indoor Air Pathway

**Building Parameters**

	Residential	Commercial	
Building volume/area ratio	6.56168	0.84252	(ft)
Foundation area	753.474	753.474	(ft <sup>2</sup> )
Foundation perimeter	111.549	111.549	(ft)
Building air exchange rate	1.4E-3	2.3E-4	(1/s)
Depth to bottom of foundation slab	0.49213	0.49213	(ft)
Convective air flow through cracks	0.0E+0	0.0E+0	(ft <sup>3</sup> /s)
Foundation thickness	0.492125984		(ft)
Foundation crack fraction	0.01		(-)
Volumetric water content of cracks	0.12		(-)
Volumetric air content of cracks	0.26		(-)
Indoor/Outdoor differential pressure	0		(g/cm <sup>2</sup> /s <sup>2</sup> )



### 3. Commands and Options

Main Screen      Use Default Values      Print Sheet

Set Units      Help

<b>RBCA SITE ASSESSMENT</b>	<b>Baseline Risk Summary-All Pathways</b>
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Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

<b>TIER 2 BASELINE RISK SUMMARY TABLE</b>										
EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
<b>OUTDOOR AIR EXPOSURE PATHWAYS</b>										
Complete:	3.7E-9	1.0E-6	3.7E-9	1.0E-5	<input type="checkbox"/>	2.6E-3	1.0E+0	2.8E-3	1.0E+0	<input type="checkbox"/>
<b>INDOOR AIR EXPOSURE PATHWAYS</b>										
Complete:	2.4E-7	1.0E-6	2.4E-7	1.0E-5	<input type="checkbox"/>	5.8E-2	1.0E+0	7.0E-2	1.0E+0	<input type="checkbox"/>
<b>SOIL EXPOSURE PATHWAYS</b>										
Complete:	1.3E-8	1.0E-6	1.3E-8	1.0E-5	<input type="checkbox"/>	2.1E-2	1.0E+0	2.1E-2	1.0E+0	<input type="checkbox"/>
<b>GROUNDWATER EXPOSURE PATHWAYS</b>										
Complete:	2.7E-5	1.0E-6	2.7E-5	1.0E-5	<input checked="" type="checkbox"/>	5.3E-1	1.0E+0	1.2E+0	1.0E+0	<input checked="" type="checkbox"/>
<b>SURFACE WATER EXPOSURE PATHWAYS</b>										
Complete:	NA	NA	NA	NA	<input type="checkbox"/>	NA	NA	NA	NA	<input type="checkbox"/>
<b>CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)</b>										
	2.7E-5	1.0E-6	2.7E-5	1.0E-5	<input checked="" type="checkbox"/>	5.3E-1	1.0E+0	1.2E+0	1.0E+0	<input checked="" type="checkbox"/>
	Groundwater		Groundwater			Groundwater		Groundwater		

## CHEMICAL DATA FOR SELECTED COCs

## Physical Property Data

Constituent	CAS Number	type	Molecular Weight		Diffusion Coefficients				log (Koc) or log(Kd)			Henry's Law Constant			Vapor Pressure		Solubility			acid pKa	base pKb	ref
			(g/mole)	ref	in air (cm <sup>2</sup> /s)	ref	in water (cm <sup>2</sup> /s)	ref	log(L/kg)	partition	ref	(atm-m <sup>3</sup> )	(unitless)	ref	(@ 20 - 25 C)	(mm Hg)	ref	(@ 20 - 25 C)	(mg/L)			
Benzene*	71-43-2	A	78.1	PS	8.80E-02	PS	9.80E-06	PS	1.77	Koc	PS	5.55E-03	2.29E-01	PS	9.52E+01	PS	1.75E+03	PS	-	-	-	
Toluene	108-88-3	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	Koc	A	8.30E-03	2.80E-01	A	3.00E+01	4	5.15E+02	29	-	-	-	
Ethylbenzene	100-41-4	A	106.2	PS	7.50E-02	PS	7.80E-06	PS	2.56	Koc	PS	7.88E-03	3.25E-01	PS	1.00E+01	PS	1.69E+02	PS	-	-	-	
Xylene (mixed isomers)	1330-20-7	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	Koc	A	7.03E-03	2.80E-01	A	7.00E+00	4	1.98E+02	5	-	-	-	
Methyl t-Butyl ether	1634-04-4	O	88.146	5	7.82E-02	6	9.41E-05	7	1.08	Koc	A	5.77E-04	2.38E-02	-	2.49E+02	-	4.80E+04	A	-	-	-	
TPH - Arom >C08-C10	0-00-0	T	120	T	1.00E-01	T	1.00E-05	T	3.20	Koc	T	1.18E-02	4.80E-01	T	4.79E+00	-	6.50E+01	T	-	-	-	

\* = Chemical with user-specified data

Site Name: Former Chevron Service Station No. 9-0329

Completed By: J. Douglas

Job ID: DG90329M.3C01

Site Location: 340 Highland Ave., Piedmont, CA

Date Completed: 10-May-02

**CHEMICAL DATA FOR SELECTED COCs** **Toxicity Data**

Constituent	Reference Dose (mg/kg/day)				Reference Conc. (mg/m3)				Slope Factors 1/(mg/kg/day)				Unit Risk Factor 1/(ug/m3)			EPA Weight of Evidence	Is Constituent Carcinogenic ?
	Oral		Dermal		Inhalation		Oral		Dermal		Inhalation		URF	Inhal	ref		
	RfD	ref	RfD	ref	RfC	Inhal	SF	oral	SF	dermal	URF	Inhal					
Benzene*	3.00E-03	R	-	-	5.95E-03	R	1.00E-01	PS	2.99E-02	TX	8.29E-06	PS	A	TRUE			
Toluene	2.00E-01	A,R	1.60E-01	TX	4.00E-01	A,R	-	-	-	-	-	-	D	FALSE			
Ethylbenzene	1.00E-01	PS	9.70E-02	TX	1.00E+00	PS	-	-	-	-	-	-	D	FALSE			
Xylene (mixed isomers)	2.00E+00	A,R	1.84E+00	TX	7.00E+00	A	-	-	-	-	-	-	D	FALSE			
Methyl t-Butyl ether	1.00E-02	31	8.00E-03	TX	3.00E+00	R	-	-	-	-	-	-	-	FALSE			
TPH - Arom >C08-C10	4.00E-02	T	-	-	2.00E-01	T	-	-	-	-	-	-	D	FALSE			

\* = Chemical with user-specific

Site Name: Former Chevron Sei

Site Location: 340 Highland A

Miscellaneous Chemical Data

Constituent	Maximum Contaminant Level		Time-Weighted Average Workplace Criteria		Aquatic Life Prot. Criteria		Bioconcentration Factor (L-wat/kg-flesh)
	MCL (mg/L)	ref	TWA (mg/m3)	ref	AQL (mg/L)	ref	
Benzene*	5.00E-04	-	3.25E+00	-	-	-	12.6
Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	-	-	70
Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.35E+02	PS	-	-	1
Xylenes (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	-	-	1
Methyl t-Butyl ether	-	-	6.00E+01	NIOSH	-	-	1
TPH - Arom >C08-C10	-	-	-	-	-	-	1

\* = Chemical with user-specific

Site Name: Former Chevron S&I

Site Location: 340 Highland A

**CHEMICAL DATA FOR SELECTED COCs** **Miscellaneous Chemical Data**

Constituent	Dermal Relative Absorp. Factor (unitless)	Water Dermal Permeability Data						Detection Limits				Half Life (First-Order Decay) (days)		
		Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Groundwater (mg/L)		Soil (mg/kg)		Saturated	Unsaturated	ref
								ref	ref	ref	ref			
Benzene*	0.5	0.021	0.26	0.63	0.013	7.3E-2	D	0.002	S	0.005	S	720	720	H
Toluene	0.5	0.045	0.32	0.77	0.054	1.6E-1	D	0.002	S	0.005	S	28	28	H
Ethylbenzene	0.5	0.074	0.39	1.3	0.14	2.7E-1	D	0.002	S	0.005	S	228	228	H
Xylene (mixed isomers)	0.5	0.08	0.39	1.4	0.16	2.9E-1	D	0.005	S	0.005	S	360	360	H
Methyl t-Butyl ether	0.5	-	-	-	-	-	-	-	-	-	-	360	180	H
TPH - Arom >C08-C10	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-

\* = Chemical with user-specific  
 Site Name: Former Chevron Site  
 Site Location: 340 Highland Ave

### RBCA SITE ASSESSMENT

### Input Parameter Summary

Site Name: Former Chevron Service Station No. 6-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

1 OF 1

Exposure Parameters	Residential		Commercial/Industrial	
	Adult	Child (1-6 yrs)	Child (7-18 yrs)	General
AT <sub>c</sub> Averaging time for carcinogens (yr)	70			1
AT <sub>n</sub> Averaging time for non-carcinogens (yr)	30			1
BW Body weight (kg)	70	15	35	70
ED Exposure duration (yr)	30	6	16	25
τ Averaging time for vapor flux (yr)	30			25
EF Exposure frequency (days/yr)	350			250
EF <sub>D</sub> Exposure frequency for dermal exposure	350			250
IR <sub>w</sub> Ingestion rate of water (L/day)	2			1
IR <sub>s</sub> Ingestion rate of soil (mg/day)	100	200		50
SA Skin surface area (dermal) (cm <sup>2</sup> )	5800		2023	5800
M Soil to skin adherence factor	1			1
ET <sub>swim</sub> Swimming exposure time (hr/event)	3			3
EV <sub>swim</sub> Swimming event frequency (events/yr)	12	12	12	12
IR <sub>swim</sub> Water ingestion while swimming (L/hr)	0.05	0.5		0.05
SA <sub>swim</sub> Skin surface area for swimming (cm <sup>2</sup> )	23000		8100	23000
IR <sub>fish</sub> Ingestion rate of fish (kg/yr)	0.025			0.025
f <sub>fish</sub> Contaminated fish fraction (unitless)	1			1

Surface Parameters	General		Construction	Units
	A	W		
A Source zone area	5.0E+3		5.0E+3	(ft <sup>2</sup> )
W Length of source-zone area parallel to wind	7.5E+1		7.5E+1	(ft)
W <sub>gw</sub> Length of source-zone area parallel to GW flow	6.0E+1			(ft)
U <sub>air</sub> Ambient air velocity in mixing zone	7.4E+0			(ft/s)
δ <sub>air</sub> Air mixing zone height	6.6E+0			(ft)
P <sub>a</sub> Areal particulate emission rate	6.9E-14			(g/cm <sup>2</sup> /s)
L <sub>soil</sub> Thickness of affected surface soils	2.0E+0			(ft)

Surface Soil Column Parameters	Value	Units
h <sub>cap</sub> Capillary zone thickness	3.0E-1	(ft)
h <sub>v</sub> Vadose zone thickness	1.7E+0	(ft)
ρ <sub>s</sub> Soil bulk density	1.7E+0	(g/cm <sup>3</sup> )
f <sub>oc</sub> Fraction organic carbon	1.0E-2	(-)
θ <sub>T</sub> Soil total porosity	4.1E-1	(-)
K <sub>vs</sub> Vertical hydraulic conductivity	8.6E+1	(cm/d)
k <sub>v</sub> Vapor permeability	1.1E-12	(ft <sup>2</sup> )
L <sub>gw</sub> Depth to groundwater	2.0E+0	(ft)
L <sub>t</sub> Depth to top of affected soils	5.0E+0	(ft)
L <sub>base</sub> Depth to base of affected soils	1.4E+1	(ft)
L <sub>soil</sub> Thickness of affected soils	9.0E+0	(ft)
pH Soil/groundwater pH	6.8E+0	(-)
B <sub>w</sub> Volumetric water content	0.369	(-)
B <sub>a</sub> Volumetric air content	0.041	(-)

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
<b>Groundwater:</b>			
Groundwater Ingestion	Residential	None	None
Soil Leaching to Groundwater Ingestion	Residential	None	None
<b>Applicable Surface Water Exposure Routes:</b>			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
<b>Soil:</b>			
Direct Ingestion and Dermal Contact	Res./Constr.		
<b>Outdoor Air:</b>			
Particulates from Surface Soils	Res./Constr.	None	None
Volatilization from Soils	Res./Constr.	None	None
Volatilization from Groundwater	Residential	None	None
<b>Indoor Air:</b>			
Volatilization from Subsurface Soils	Residential	NA	NA
Volatilization from Groundwater	Residential	NA	NA

Building Parameters	Residential	Commercial	Units
L <sub>b</sub> Building volume/area ratio	6.58E+0	NA	(ft)
A <sub>b</sub> Foundation area	7.53E+2	NA	(ft <sup>2</sup> )
X <sub>ext</sub> Foundation perimeter	1.12E+2	NA	(ft)
ER Building air exchange rate	1.40E-3	NA	(1/s)
L <sub>ext</sub> Foundation thickness	4.92E-1	NA	(ft)
Z <sub>ext</sub> Depth to bottom of foundation slab	4.92E-1	NA	(ft)
η Foundation crack fraction	1.00E-2	NA	(-)
dP Indoor/outdoor differential pressure	0.00E+0	NA	(g/cm/s <sup>2</sup> )
Q <sub>c</sub> Convective air flow through slab	0.00E+0	NA	(ft <sup>3</sup> /s)

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	Units
Groundwater receptor	0	NA	NA	(ft)
Soil leaching to groundwater receptor	0	NA	NA	(ft)
Outdoor air inhalation receptor	0	NA	NA	(ft)

Groundwater Parameters	Value	Units
δ <sub>gw</sub> Groundwater mixing zone depth	1.2E+1	(ft)
I <sub>g</sub> Net groundwater infiltration rate	3.0E-1	(in/yr)
U <sub>gw</sub> Groundwater Darcy velocity	8.9E+1	(cm/d)
V <sub>gw</sub> Groundwater seepage velocity	2.3E+2	(cm/d)
K <sub>s</sub> Saturated hydraulic conductivity	NA	(cm/d)
I Groundwater gradient	NA	(-)
B <sub>w</sub> Width of groundwater source zone	NA	(ft)
S <sub>d</sub> Depth of groundwater source zone	NA	(ft)
θ <sub>eff</sub> Effective porosity in water-bearing unit	NA	(-)
f <sub>oc, gw</sub> Fraction organic carbon in water-bearing unit	NA	(-)
pH <sub>gw</sub> Groundwater pH	NA	(-)
Biodegradation considered?	NA	(-)

Target Health Risk Values	Individual	Cumulative
TR <sub>100</sub> Target Risk (class A&B carcinogens)	1.0E-6	1.0E-5
TR <sub>10</sub> Target Risk (class C carcinogens)	1.0E-5	
THQ Target Hazard Quotient (non-carcinogenic risk)	1.0E+0	1.0E+0

Transport Parameters	Off-site 1	Off-site 2	Off-site 1	Off-site 2	Units
<b>Lateral Groundwater Transport</b>			<b>Groundwater Ingestion</b>	<b>Soil Leaching to GW</b>	
α <sub>L</sub> Longitudinal dispersivity	NA	NA	NA	NA	(ft)
α <sub>T</sub> Transverse dispersivity	NA	NA	NA	NA	(ft)
α <sub>V</sub> Vertical dispersivity	NA	NA	NA	NA	(ft)
<b>Lateral Outdoor Air Transport</b>			<b>Soil to Outdoor Air Inhal.</b>	<b>GW to Outdoor Air Inhal.</b>	
α <sub>L</sub> Transverse dispersion coefficient	NA	NA	NA	NA	(ft)
α <sub>V</sub> Vertical dispersion coefficient	NA	NA	NA	NA	(ft)
ADF Air dispersion factor	NA	NA	NA	NA	(-)

Modeling Options	Tier 2
RBCA tier	Tier 2
Outdoor air volatilization model	Surface & subsurface models
Indoor air volatilization model	Johnson & Ettinger model
Soil leaching model	ASTM leaching model
Use soil attenuation model (SAM) for leachate?	No
Air dilution factor	NA
Groundwater dilution-attenuation factor	NA

Surface Water Parameters	Off-site 2	Units
Q <sub>sw</sub> Surface water flowrate	NA	(ft <sup>3</sup> /s)
W <sub>pl</sub> Width of GW plume at SW discharge	NA	(ft)
δ <sub>pl</sub> Thickness of GW plume at SW discharge	NA	(ft)
UF <sub>sw</sub> Groundwater-to-surface water dilution factor	NA	(-)

NOTE: NA = Not applicable



RBCA SITE ASSESSMENT

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

SOIL (5 - 14 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6  
 Target Risk (Class C) 1.0E-6  
 Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration (mg/kg)	Soil Leaching to Groundwater Ingestion			Soil Vol. to Indoor Air	Soil Volatilization and Surface Soil Particulates to Outdoor Air					Surface Soil Inhalation, Ingestion, Dermal Contact		Applicable SSTL (mg/kg)	SSTL Exceeded? "X" if yes	Required CRF Only if "yes" left
			X			X	X					X				
			On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)			Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)				
CAS No.	Name	(mg/kg)	Residential	None	None	Residential	Residential	Construction Worker	None	None	Residential	Construction Worker	(mg/kg)			
71-43-2	Benzene*	2.4E-2	5.1E-2	NA	NA	1.7E-1	1.2E+1	>1.2E+3	NA	NA	1.8E+0	7.6E+1	5.1E-2	<input type="checkbox"/>	<1	
108-88-3	Toluene	5.3E-2	>7.5E+2	NA	NA	2.4E+2	>7.5E+2	>7.5E+2	NA	NA	3.9E+3	5.5E+3	2.4E+2	<input type="checkbox"/>	<1	
100-41-4	Ethylbenzene	1.1E-1	>6.3E+2	NA	NA	>6.3E+2	>6.3E+2	>6.3E+2	NA	NA	2.4E+3	3.3E+3	2.4E+3	<input type="checkbox"/>	<1	
1330-20-7	Xylene (mixed isomers)	2.4E-1	>5.0E+2	NA	NA	>5.0E+2	>5.0E+2	>5.0E+2	NA	NA	4.5E+4	6.3E+4	4.5E+4	<input type="checkbox"/>	<1	
1634-04-4	Methyl t-Butyl ether	1.0E-3	6.1E+0	NA	NA	1.9E+3	>9.4E+3	>9.4E+3	NA	NA	2.0E+2	2.8E+2	6.1E+0	<input type="checkbox"/>	<1	
0-00-0	TPH - Arom >C08-C10	2.0E+1	>1.0E+3	NA	NA	4.1E+2	>1.0E+3	>1.0E+3	NA	NA	9.7E+2	1.4E+3	4.1E+2	<input type="checkbox"/>	<1	

\* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

**RBCA SITE ASSESSMENT**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

**GROUNDWATER SSTL VALUES**

Target Risk (Class A & B) 1.0E-6  
 Target Risk (Class C) 1.0E-5  
 Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

**SSTL Results For Complete Exposure Pathways ("X" if Complete)**

CONSTITUENTS OF CONCERN		Representative Concentration (mg/L)	X Groundwater Ingestion			X	GW Vol. to Indoor Air	X Groundwater Volatilization to Outdoor Air			Applicable SSTL (mg/L)	SSTL Exceeded? "■" if yes	Required CRF Only if "yes" left
			On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None	On-site (0 ft) Residential	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None				
71-43-2	Benzene*	2.3E-2	8.5E-4	NA	NA	2.3E-1	1.3E+1	NA	NA	8.5E-4	■	2.7E+1	
108-88-3	Toluene	3.8E-3	7.3E+0	NA	NA	3.1E+2	>5.2E+2	NA	NA	7.3E+0	□	<1	
100-41-4	Ethylbenzene	9.4E-3	3.7E+0	NA	NA	>1.7E+2	>1.7E+2	NA	NA	3.7E+0	□	<1	
1330-20-7	Xylene (mixed isomers)	5.7E-3	7.3E+1	NA	NA	>2.0E+2	>2.0E+2	NA	NA	7.3E+1	□	<1	
1634-04-4	Methyl t-Butyl ether	1.9E-1	3.7E-1	NA	NA	9.5E+3	>4.8E+4	NA	NA	3.7E-1	□	<1	
0-00-0	TPH - Arom >C08-C10	8.6E-1	1.5E+0	NA	NA	>6.5E+1	>6.5E+1	NA	NA	1.5E+0	□	<1	

\* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated.

**RBCA SITE ASSESSMENT**

TPH Criteria SSTL Worksheet

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

1 OF 1

**CALCULATION OF SSTL VALUES FOR TPH**

CONSTITUENTS OF CONCERN		Mass Fractions		Representative Concentrations		Calculated Concentration Limits		Applicable SSTL Values	
		Soil	Groundwater	Soil	Groundwater	Residual Soil Concentration	Solubility	Soils (5 - 14 ft)	Groundwater
CAS No.	Name	(-)	(-)	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)
0-00-0	TPH - Arom >C08-C10	1.0E+0	1.0E+0	2.0E+1	6.6E-1	1.0E+3	6.5E+1	4.1E+2	1.5E+0
* = Chemical with user-specified data									
<b>Total</b>		1.0E+0	1.0E+0	2.0E+1	6.6E-1	<b>Total TPH SSTL value</b>		4.1E+2	1.5E+0

\*> Indicates risk-based target concentration greater than constituent residual saturation value. NC = Not calculated.

<b>RBCA SITE ASSESSMENT</b>	<b>Cumulative Risk Worksheet</b>
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Site Name: Former Chevron Service Station No. 9-0329

Completed By: J. Douglas

Job ID: DG90329H.3C01

Site Location: 340 Highland Ave., Piedmont, CA

Date Completed: 10-May-02

1 OF 3

**CUMULATIVE RISK WORKSHEET**

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene*	2.4E-2	2.3E-2			2.4E-2	2.3E-2
108-88-3	Toluene	5.3E-2	3.8E-3			5.3E-2	3.8E-3
100-41-4	Ethylbenzene	1.1E-1	9.4E-3			1.1E-1	9.4E-3
1330-20-7	Xylene (mixed isomers)	2.4E-1	5.7E-3			2.4E-1	5.7E-3
1634-04-4	Methyl t-Butyl ether	1.0E-3	1.9E-1			1.0E-3	1.9E-1
0-00-0	TPH - Arom >C08-C10	2.0E+1	6.6E-1			2.0E+1	6.6E-1

*Cumulative Values:*

**RBCA SITE ASSESSMENT**

**Cumulative Risk Worksheet**

Site Name: Former Chevron Service Station No. 9-Site Name: Former Chevron Service Station No. 9-0: Completed By: J. Douglas

Job ID: DG90329H.3C01

Site Location: 340 Highland Ave., Piedmont, CA Site Location: 340 Highland Ave., Piedmont, CA Date Completed: 10-May-02

2 OF 3

Cumulative Target Risk: 1.0E-6 Target Hazard Index: 1.0E+0

**CUMULATIVE RISK WORKSHEET**

**ON-SITE RECEPTORS**

CONSTITUENTS OF CONCERN		Outdoor Air Exposure:		Indoor Air Exposure:		Soil Exposure:		Groundwater Exposure:	
		Residential		Residential		Residential		Residential	
CAS No.	Name	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0
		Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene*	3.7E-9	1.8E-4	2.4E-7	1.1E-2	1.3E-8	3.2E-4	2.7E-5	2.1E-1
108-88-3	Toluene		3.4E-6		2.4E-4		1.4E-5		5.2E-4
100-41-4	Ethylbenzene		2.7E-6		1.3E-4		4.5E-5		2.6E-3
1330-20-7	Xylene (mixed isomers)		8.4E-7		4.7E-5		5.3E-6		7.8E-5
1634-04-4	Methyl t-Butyl ether		3.4E-6		2.1E-5		5.1E-6		5.3E-1
0-00-0	TPH - Arom >C08-C10		2.6E-3		5.8E-2		2.1E-2		4.5E-1
<b>Cumulative Values:</b>		<b>3.7E-9</b>	<b>2.8E-3</b>	<b>2.4E-7</b>	<b>7.0E-2</b>	<b>1.3E-8</b>	<b>2.1E-2</b>	<b>2.7E-5</b> ■	<b>1.2E+0</b> ■

■ Indicates risk level exceeding target risk

<b>RBCA SITE ASSESSMENT</b>	<b>Cumulative Risk Worksheet</b>
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Site Name: Former Chevron Service Station No. 9-Site Name: Former Chevron Service Station No. 9-03 Completed By: J. Douglas Job ID: DG90329H.3C01  
 Site Location: 340 Highland Ave., Piedmont, CA Site Location: 340 Highland Ave., Piedmont, CA Date Completed: 10-May-02 3 OF 3

<b>CUMULATIVE RISK WORKSHEET</b>		Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0 Groundwater DAF Option: FALSE							
<b>OFF-SITE RECEPTORS</b>									
<b>CONSTITUENTS OF CONCERN</b>		<b>Outdoor Air Exposure:</b>				<b>Groundwater Exposure:</b>			
		None		None		None		None	
		Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0
<b>CAS No.</b>	<b>Name</b>	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene*								
108-88-3	Toluene								
100-41-4	Ethylbenzene								
1330-20-7	Xylene (mixed isomers)								
1634-04-4	Methyl t-Butyl ether								
0-00-0	TPH - Arom >C08-C10								
<b>Cumulative Values:</b>		0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

\* indicates risk level exceeding target risk

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS:

VAPOR AND DUST INHALATION

Constituents of Concern	1) Source Medium	2) NAF Value (m <sup>3</sup> /kg) Receptor				3) Exposure Medium Outdoor Air: POE Conc. (mg/m <sup>3</sup> ) (1) / (2)			
	Soil Conc. (mg/kg)	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)
		Residential	Construction Worker	None	None	Residential	Construction Worker	None	None
Benzene*	2.4E-2								
Toluene	5.3E-2								
Ethylbenzene	1.1E-1								
Xylene (mixed isomers)	2.4E-1								
Methyl t-Butyl ether	1.0E-3								
TPH - Arom >C08-C10	2.0E+1								

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

SURFACE SOILS:

VAPOR AND DUST INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)				5) Average Inhalation Exposure Concentration (mg/m <sup>3</sup> ) (3) X (4)			
	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	Construction Worker	None	None	Residential	Construction Worker	None	None
Benzene*								
Toluene								
Ethylbenzene								
Xylene (mixed isomers)								
Methyl t-Butyl ether								
TPH - Arom >C08-C10								

\* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01



**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS (5 - 14 ft):

VAPOR INHALATION

Constituents of Concern	1) Source Medium	2) NAF Value (m <sup>3</sup> /kg) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m <sup>3</sup> ) (1) / (2)		
	Soil Conc. (mg/kg)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)
		Residential	None	None	Residential	None	None
Benzene*	2.4E-2	4.0E+4			5.9E-7		
Toluene	5.3E-2	4.0E+4			1.3E-6		
Ethylbenzene	1.1E-1	4.0E+4			2.6E-6		
Xylene (mixed isomers)	2.4E-1	4.0E+4			6.0E-6		
Methyl t-Butyl ether	1.0E-3	4.0E+4			2.5E-8		
TPH - Arom >C08-C10	2.0E+1	4.0E+4			5.1E-4		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329

Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas

Date Completed: 10-May-02

Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

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**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

SUBSURFACE SOILS (5 - 14 ft):  
 VAPOR INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EF×ED)/(AT×365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m <sup>3</sup> ) (3) X (4)		
	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	None	None	Residential	None	None
Benzene*	4.1E-1			2.4E-7		
Toluene	9.6E-1			1.3E-6		
Ethylbenzene	9.6E-1			2.5E-6		
Xylene (mixed isomers)	9.6E-1			5.7E-6		
Methyl t-Butyl ether	9.6E-1			2.4E-8		
TPH - Arom >C08-C10	9.6E-1			4.9E-4		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR  
INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m <sup>3</sup> /L) Receptor			3) Exposure Medium Outdoor Air: POE Conc. (mg/m <sup>3</sup> ) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)
		Residential	None	None	Residential	None	None
Benzene*	2.3E-2	4.5E+4			5.1E-7		
Toluene	3.8E-3	4.3E+4			8.8E-8		
Ethylbenzene	9.4E-3	4.3E+4			2.2E-7		
Xylene (mixed isomers)	5.7E-3	4.7E+4			1.2E-7		
Methyl t-Butyl ether	1.9E-1	1.8E+4			1.1E-5		
TPH - Arom >C08-C10	6.6E-1	2.5E+4			2.7E-5		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329  
Site Location: 340 Highland Ave., Piedmont, CA  
Completed By: J. Douglas

Date Completed: 10-May-02  
Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

GROUNDWATER: VAPOR

INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m <sup>3</sup> ) (3) X (4)		
	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	None	None	Residential	None	None
Benzene*	4.1E-1			2.1E-7		
Toluene	9.6E-1			8.5E-8		
Ethylbenzene	9.6E-1			2.1E-7		
Xylene (mixed isomers)	9.6E-1			1.2E-7		
Methyl t-Butyl ether	9.6E-1			1.0E-5		
TPH - Arom >C08-C10	9.6E-1			2.6E-5		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name: Former Chevron Service Station No. 9-0329

Date Completed: 10-May-02

Site Location: 340 Highland Ave., Piedmont, CA

Job ID: DG90329H.3C01

Completed By: J. Douglas

**RBCA SITE ASSESSMENT**

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**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

TOTAL PATHWAY EXPOSURE (mg/m<sup>3</sup>)

(Sum average exposure concentrations from soil and groundwater routes.)

Constituents of Concern	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	Construction Worker	None	None
Benzene*	4.5E-7			
Toluene	1.4E-6			
Ethylbenzene	2.7E-6			
Xylene (mixed isomers)	5.8E-6			
Methyl t-Butyl ether	1.0E-5			
TPH - Arom >C08-C10	5.1E-4			

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAYS ARE ACTIVE)

**CARCINOGENIC RISK**

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Exposure (mg/m <sup>3</sup> )				(3) Inhalation Unit Risk Factor (μg/m <sup>3</sup> ) <sup>-1</sup>	(4) Individual COC Risk (2) x (3) x 1000			
		On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)
		Residential	Construction Worker	None	None		Residential	Construction Worker	None	None
Benzene*	A	4.5E-7				8.3E-6	3.7E-9			
Toluene	D									
Ethylbenzene	D									
Xylene (mixed isomers)	D									
Methyl t-Butyl ether	-									
TPH - Arom >C08-C10	D									

**Total Pathway Carcinogenic Risk =**

**3.7E-9**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

**OUTDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAYS ARE ACTIVE)

**TOXIC EFFECTS**

Constituents of Concern	(5) Total Toxicant Exposure (mg/m <sup>3</sup> )				(6) Inhalation Reference Conc. (mg/m <sup>3</sup> )	(7) Individual COC Hazard Quotient (5) / (6)			
	On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)		On-site (0 ft)		Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	Construction Worker	None	None		Residential	Construction Worker	None	None
Benzene*	1.1E-6				6.0E-3	1.8E-4			
Toluene	1.4E-6				4.0E-1	3.4E-6			
Ethylbenzene	2.7E-6				1.0E+0	2.7E-6			
Xylene (mixed isomers)	5.8E-6				7.0E+0	8.4E-7			
Methyl t-Butyl ether	1.0E-5				3.0E+0	3.4E-6			
TPH - Arom >C08-C10	5.1E-4				2.0E-1	2.6E-3			

**Total Pathway Hazard Index =**

**2.8E-3**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
 Date Completed: 10-May-02

Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**INDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

SOILS (5 - 14 ft): VAPOR

INTRUSION INTO ON-SITE BUILDINGS

Constituents of Concern	1) Source Medium	2) NAF Value (m <sup>3</sup> /kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m <sup>3</sup> ) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m <sup>3</sup> ) (3) X (4)
	Soil Conc. (mg/kg)	Residential	Residential	Residential	Residential
Benzene*	2.4E-2	5.7E+2	4.2E-5	4.1E-1	1.7E-5
Toluene	5.3E-2	5.7E+2	9.4E-5	9.6E-1	9.0E-5
Ethylbenzene	1.1E-1	9.0E+2	1.2E-4	9.6E-1	1.1E-4
Xylene (mixed isomers)	2.4E-1	7.0E+2	3.4E-4	9.6E-1	3.3E-4
Methyl t-Butyl ether	1.0E-3	6.0E+2	1.7E-6	9.6E-1	1.6E-6
TPH - Arom >C08-C10	2.0E+1	1.9E+3	1.0E-2	9.6E-1	1.0E-2

\* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329

Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas

Date Completed: 10-May-02

Job ID: DGG0329H.3C01



**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**INDOOR AIR EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INTRUSION  
INTO ON-SITE BUILDINGS

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m <sup>3</sup> /L) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m <sup>3</sup> ) (1) / (2)	4) Exposure Multiplier (EF×ED)/(AT×365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m <sup>3</sup> ) (3) X (4)
	Groundwater Conc. (mg/L)	Residential	Residential	Residential	Residential
Benzene*	2.3E-2	7.8E+2	2.9E-5	4.1E-1	1.2E-5
Toluene	3.8E-3	7.4E+2	5.2E-6	9.6E-1	5.0E-6
Ethylbenzene	9.4E-3	7.2E+2	1.3E-5	9.6E-1	1.3E-5
Xylene (mixed isomers)	5.7E-3	7.9E+2	7.2E-6	9.6E-1	6.9E-6
Methyl t-Butyl ether	1.9E-1	3.0E+3	6.3E-5	9.6E-1	6.0E-5
TPH - Arom >C08-C10	6.6E-1	4.0E+2	1.7E-3	9.6E-1	1.6E-3

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure  
 Site Name: Former Chevron Service Station No. 9-0329 Date Completed: 10-May-02  
 Site Location: 340 Highland Ave., Piedmont, CA Job ID: DG90329H.3C01  
 Completed By: J. Douglas

**RBCA SITE ASSESSMENT**

3 OF 3

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**INDOOR AIR EXPOSURE PATHWAYS**

**TOTAL PATHWAY EXPOSURE (mg/m<sup>3</sup>)**  
*(Sum average exposure concentrations  
 from soil and groundwater routes.)*

Constituents of Concern	Residential
Benzene*	2.9E-5
Toluene	9.5E-5
Ethylbenzene	1.3E-4
Xylene (mixed isomers)	3.3E-4
Methyl t-Butyl ether	6.2E-5
TPH - Arom >C08-C10	1.2E-2

Site Name: Former Chevron Service Station No. 9 Date Completed: 10-May-02  
 Site Location: 340 Highland Ave., Piedmont, CA Job ID: DG90329H.3C01  
 Completed By: J. Douglas

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

**INDOOR AIR EXPOSURE PATHWAYS**  (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	CARCINOGENIC RISK			
	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Exposure (mg/m <sup>3</sup> ) Residential	(3) Inhalation Unit Risk Factor (µg/m <sup>3</sup> ) <sup>-1</sup>	(4) Individual COC Risk (2) x (3) x 1000 Residential
Benzene*	A	2.9E-5	8.3E-6	2.4E-7
Toluene	D			
Ethylbenzene	D			
Xylene (mixed isomers)	D			
Methyl t-Butyl ether	-			
TPH - Arom >C08-C10	D			

**Total Pathway Carcinogenic Risk = 2.4E-7**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

4 OF 10

**TIER 2 PATHWAY RISK CALCULATION**

**INDOOR AIR EXPOSURE PATHWAYS**  **(CHECKED IF PATHWAYS ARE ACTIVE)**

Constituents of Concern	TOXIC EFFECTS		
	(5) Total Toxicant Exposure (mg/m <sup>3</sup> )	(6) Inhalation Reference Concentration (mg/m <sup>3</sup> )	(7) Individual COC Hazard Quotient (5) / (6)
	Residential		Residential
Benzene*	6.8E-5	6.0E-3	1.1E-2
Toluene	9.5E-5	4.0E-1	2.4E-4
Ethylbenzene	1.3E-4	1.0E+0	1.3E-4
Xylene (mixed isomers)	3.3E-4	7.0E+0	4.7E-5
Methyl t-Butyl ether	6.2E-5	3.0E+0	2.1E-5
TPH - Arom >C08-C10	1.2E-2	2.0E-1	5.8E-2

**Total Pathway Hazard Index = 7.0E-2**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

Site Name: Former Chevron Service Station Site Location: 340 Highland Ave., Piedmont Completed By: J. Douglas

Date Completed: 10-May-02

1 OF 1

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**SOIL EXPOSURE PATHWAY**

(CHECKED IF PATHWAY IS ACTIVE)

**SURFACE SOILS OR SEDIMENTS:**

**ON-SITE INGESTION AND  
DERMAL CONTACT**

Constituents of Concern	1) Source/Exposure Medium	2) Exposure Multiplier (IR+SAxMxRAF)xEFxED/(BWxAT) (kg/kg/day)		3) Average Daily Intake Rate (mg/kg/day) (1) x (2)	
	Surface Soil Conc. (mg/kg)	Residential	Construction Worker	Residential	Construction Worker
Benzene*	2.4E-2	1.8E-5	4.2E-7	4.2E-7	9.8E-9
Toluene	5.3E-2	4.1E-5	2.9E-5	2.2E-6	1.5E-6
Ethylbenzene	1.1E-1	4.1E-5	2.9E-5	4.3E-6	3.1E-6
Xylene (mixed isomers)	2.4E-1	4.1E-5	2.9E-5	9.8E-6	6.9E-6
Methyl t-Butyl ether	1.0E-3	4.1E-5	2.9E-5	4.1E-8	2.9E-8
TPH - Arom >C08-C10	2.0E+1	4.1E-5	2.9E-5	8.3E-4	5.9E-4

NOTE: RAF = Relative absorption factor (-)  
M = Adherence factor (mg/cm<sup>2</sup>)

AT = Averaging time (days)  
BW = Body weight (kg)

ED = Exposure duration (yrs)  
EF = Exposure frequency (days/yr)

IR = Soil Ingestion rate (mg/day)  
SA = Skin exposure area (cm<sup>2</sup>/day)

Site Name: Former Chevron Service Station No. 9-0329

Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas

Date Completed: 10-May-02

Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

SOIL EXPOSURE PATHWAY

(CHECKED IF PATHWAY IS ACTIVE)

**CARCINOGENIC RISK**

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day)				(3) Slope Factor (mg/kg/day) <sup>-1</sup>		(4) Individual COC Risk	
		(a) via Ingestion		(b) via Dermal Contact		(a) Oral	(b) Dermal	(2a)x(3a) + (2b)x(3b)	
		Residential		Construction Worker				Residential	Construction Worker
Benzene*	A	1.4E-8	4.0E-7	2.4E-10	9.6E-9	1.0E-1	3.0E-2	1.3E-8	3.1E-10
Toluene	D								
Ethylbenzene	D								
Xylene (mixed isomers)	D								
Methyl t-Butyl ether	-								
TPH - Arom >C08-C10	D								

\* No dermal slope factor available--oral slope factor used.

**Total Pathway Carcinogenic Risk =** 1.3E-8 3.1E-10

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DGG0329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

**SOIL EXPOSURE PATHWAY**

(CHECKED IF PATHWAY IS ACTIVE)

**TOXIC EFFECTS**

Constituents of Concern	(5) Total Toxicant Intake Rate (mg/kg/day)				(6) Oral Reference Dose (mg/kg-day)		(7) Individual COC Hazard Quotient	
	(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(6a)/(6a) + (5b)/(6b)	(5c)/(6a) + (5d)/(6b)
	Residential		Construction Worker				Residential	Construction Worker
Benzene*	3.2E-8	9.4E-7	1.7E-8	6.7E-7	3.0E-3	3.0E-3*	3.2E-4	2.3E-4
Toluene	7.3E-8	2.1E-6	3.8E-8	1.5E-6	2.0E-1	1.6E-1	1.4E-5	9.6E-6
Ethylbenzene	1.4E-7	4.2E-6	7.4E-8	3.0E-6	1.0E-1	9.7E-2	4.5E-5	3.2E-5
Xylene (mixed isomers)	3.3E-7	9.5E-6	1.7E-7	6.8E-6	2.0E+0	1.8E+0	5.3E-6	3.8E-6
Methyl t-Butyl ether	1.4E-9	4.0E-8	7.0E-10	2.8E-8	1.0E-2	8.0E-3	5.1E-6	3.6E-6
TPH - Arom >C08-C10	2.8E-5	8.1E-4	1.4E-5	5.8E-4	4.0E-2	4.0E-2*	2.1E-2	1.5E-2

\* No dermal reference dose available—oral reference dose used.

**Total Pathway Hazard Index =** 2.1E-2 1.5E-2

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

1 OF 5

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**  (CHECKED IF PATHWAY IS ACTIVE)

SOILS (5 - 14 R): LEACHING TO  
GROUNDWATER INGESTION

Constituents of Concern	1) Source Medium	2) NAF Value (L/kg) Receptor			3) Exposure Medium Groundwater: POE Conc. (mg/L) (1)/(2)		
	Soil Conc. (mg/kg)	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None
Benzene*	2.4E-2	6.0E+1			3.9E-4		
Toluene	5.3E-2	1.3E+2			4.2E-4		
Ethylbenzene	1.1E-1	3.2E+2			3.3E-4		
Xylene (mixed isomers)	2.4E-1	2.2E+2			1.1E-3		
Methyl t-Butyl ether	1.0E-3	1.7E+1			5.9E-5		
TPH - Arom >C08-C10	2.0E+1	1.4E+3			1.5E-2		

\* = Chemical with user-specified data

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329  
Site Location: 340 Highland Ave., Piedmont, CA  
Completed By: J. Douglas

Date Completed: 10-May-02  
Job ID: DG90329H.3C01



**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

SOILS (5 - 14 ft): LEACHING TO  
GROUNDWATER INGESTION (cont'd)

Constituents of Concern	4) Exposure Multiplier (IRxEPxED)/(BWxAT) (L/kg-day)			5) Average Daily Intake Rate (mg/kg/day) (3) x (4)		
	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None
	Benzene*	1.2E-2			4.6E-6	
Toluene	2.7E-2			1.2E-5		
Ethylbenzene	2.7E-2			8.9E-6		
Xylene (mixed isomers)	2.7E-2			3.0E-5		
Methyl t-Butyl ether	2.7E-2			1.6E-6		
TPH - Arom >C08-C10	2.7E-2			4.0E-4		

\* = Chemical with user-specified data

NOTE: AT = Averaging time (days)  
BW = Body weight (kg)

ED = Exposure duration (yr)  
EF = Exposure frequency (days/yr)

IR = Ingestion rate (mg/day)

Site Name: Former Chevron Service Station No. 9-0329  
Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
Date Completed: 10-May-02

Job ID: DG90329H.30

**RBCA SITE ASSESSMENT**

3 OF 5

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

**GROUNDWATER: INGESTION**

Constituents of Concern	1) Source Medium	2) NAF Value (unitless) Receptor			3) Exposure Medium Groundwater: POE Conc. (mg/L) (1)/(2)		
	Groundwater Conc. (mg/L)	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None	On-site (0 ft) Residential	Off-site 1 (0 ft) None	Off-site 2 (0 ft) None
Benzene*	2.3E-2	1.0E+0			2.3E-2		
Toluene	3.8E-3	1.0E+0			3.8E-3		
Ethylbenzene	9.4E-3	1.0E+0			9.4E-3		
Xylene (mixed isomers)	5.7E-3	1.0E+0			5.7E-3		
Methyl t-Butyl ether	1.9E-1	1.0E+0			1.9E-1		
TPH - Arom >C08-C10	6.6E-1	1.0E+0			6.6E-1		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

**GROUNDWATER INGESTION (cont'd)**

Constituents of Concern	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg/day)			5) Average Daily Intake Rate (mg/kg/day) (3) x (4)		
	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)
	Residential	None	None	Residential	None	None
Benzene*	1.2E-2			2.7E-4		
Toluene	2.7E-2			1.0E-4		
Ethylbenzene	2.7E-2			2.6E-4		
Xylene (mixed isomers)	2.7E-2			1.6E-4		
Methyl t-Butyl ether	2.7E-2			5.3E-3		
TPH - Arom >C08-C10	2.7E-2			1.8E-2		

\* = Chemical with user-specified data

NOTE: AT = Averaging time (days)  
BW = Body weight (kg)

ED = Exposure duration (yr)  
EF = Exposure frequency (days/yr)

IR = Ingestion rate (mg/day)

Site Name: Former Chevron Service Station No. 9-0329  
Site Location: 340 Highland Ave., Piedmont, CA

Completed By: J. Douglas  
Date Completed: 10-May-02

Job ID: DG90329H.3

**RBCA SITE ASSESSMENT**

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**TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

**MAXIMUM PATHWAY INTAKE (mg/kg/day)**

*(Maximum intake of active pathways  
soil leaching & groundwater routes.)*

Constituents of Concern	On-site (0 ft)	Off-site 1	Off-site 2
	Residential	None	None
Benzene*	2.7E-4		
Toluene	1.0E-4		
Ethylbenzene	2.6E-4		
Xylene (mixed isomers)	1.6E-4		
Methyl t-Butyl ether	5.3E-3		
TPH - Arom >C08-C10	1.8E-2		

\* = Chemical with user-specified data

Site Name: Former Chevron Service Station No. 9-0329  
 3C Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

**TIER 2 PATHWAY RISK CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

(CHECKED IF PATHWAYS ARE ACTIVE)

**CARCINOGENIC RISK**

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Maximum Carcinogenic Intake Rate (mg/kg/day)			(3) Oral Slope Factor (mg/kg-day) <sup>-1</sup>	(4) Individual COC Risk (2) x (3)		
		On-site (0 ft) Residential	Off-site 1 None	Off-site 2 None		On-site (0 ft) Residential	Off-site 1 None	Off-site 2 None
Benzene*	A	2.7E-4			1.0E-1	2.7E-5		
Toluene	D							
Ethylbenzene	D							
Xylene (mixed isomers)	D							
Methyl t-Butyl ether	-							
TPH - Arom >C08-C10	D							

**Total Pathway Carcinogenic Risk = 2.7E-5**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**RBCA SITE ASSESSMENT**

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**TIER 2 PATHWAY RISK CALCULATION**

**GROUNDWATER EXPOSURE PATHWAYS**

(CHECKED IF PATHWAYS ARE ACTIVE)

**TOXIC EFFECTS**

Constituents of Concern	(5) Maximum Toxicant Intake Rate (mg/kg/day)			(6) Oral Reference Dose (mg/kg/day)	(7) Individual COC Hazard Quotient (5) / (6)		
	On-site (0 ft) Residential	Off-site 1 None	Off-site 2 None		On-site (0 ft) Residential	Off-site 1 None	Off-site 2 None
Benzene*	6.3E-4			3.0E-3	2.1E-1		
Toluene	1.0E-4			2.0E-1	5.2E-4		
Ethylbenzene	2.6E-4			1.0E-1	2.6E-3		
Xylene (mixed isomers)	1.6E-4			2.0E+0	7.8E-5		
Methyl t-Butyl ether	5.3E-3			1.0E-2	5.3E-1		
TPH - Arom >C08-C10	1.8E-2			4.0E-2	4.5E-1		

**Total Pathway Hazard Index =**

**1.2E+0**

Site Name: Former Chevron Service Station No. 9-0329  
 Site Location: 340 Highland Ave., Piedmont, CA  
 Completed By: J. Douglas

Date Completed: 10-May-02  
 Job ID: DG90329H.3C01

**Appendix H**  
**Standard Field Procedures**

# CAMBRIA

## STANDARD FIELD PROCEDURES FOR SOIL BORING AND MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

### SOIL BORINGS

#### Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

#### Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

#### Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

#### Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.



# CAMBRIA

## **Water Sampling**

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

## **Grouting**

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

## **MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING**

### **Well Construction and Surveying**

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

# CAMBRIA

## Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

## Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.