STID - 906 EC

# GeoPlexus, Inc.

Health & Safety Training • Geo/Environmental Personnel • Engineering Geology Consultants • Environmental Management Consultants

April 30, 1997

Ms JoAnn Stewart, General Manager
Good Chevrolet
1630 Park Street
Alameda, California 94501

**Subject: Phase III Remedial Investigation Report**
**Good Chevrolet, 1630 Park Street, Alameda, CA.**

Dear Ms. Stewart:

As requested and authorized, the attached Phase III Remedial Investigation Report has been prepared to document the field investigation efforts performed at the subject site. The report presents the findings of the investigation and the results of the analytical testing performed on the soil and ground water samples obtained during the investigation along with conclusions and recommendations based on these findings.

In summary, the findings of the investigation indicate that gasoline contaminated soil remains in-place at the project site and is confined to depths ranging from 7- to 11-feet below the ground surface and is of limited extent. The concentrations of Benzene in the soil exceed the ASTM RBCA Tier-1 RBSL's for contaminant leaching to ground water and gas migration to indoor air; however, it is our opinion that the contaminants present do not warrant active soil remediation. — based on what? Similarly, the concentrations of Benzene in the ground water exceed the Tier-1 RBSL's for ground water ingestion and gas migration to indoor air; however, the concentrations are below the Tier-1 RBSL's for gas migration to outdoor air It is also our opinion that these site conditions do not warrant active ground water remediation. It is recommended that a passive bioremediation program be implemented to achieve site remediation and closure through the regulatory agencies.

One copy of this Report should be forwarded to:

Ms. Eva Chu
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

It has been a pleasure to be of service to you on this project. Questions or comments regarding the attached report should be addressed to the undersigned.

Respectfully submitted,
Geo Plexus, Incorporated


David C. Glick, CEG 1338, HG 32
Director, Geologic and Environmental Services

1900 Wyatt Drive, Suite 1 • Santa Clara, California 95054 • Phone 408/987-0210 • FAX 408/988-0815

**GOOD CHEVROLET**
1630 Park Street • Phone 510/522-9221
ALAMEDA, CA 94501

cleanup

May 23, 1997

Ms. Eva Chu
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

Re: 1630 Park Street, Alameda, CA

Dear Ms. Chu:

Enclosed please find copy of Remedial Investigaton Report prepared by Mr. David Glick of Geo Plexus, Inc.

Should you have any questions, please call or write Mr. Glick at Geo Plexus, Inc.

Thank you,

GOOD CHEVROLET

JoAnn Stewart

JKS:js

Enclosures

9/19/97
Need:
① Continue semi annual sampling of GW
② [Soil/GW] w/in building using summa canister

GeoPlexus, Inc.

Health & Safety Training • Geo/Environmental Personnel • Engineering Geology Consultants • Environmental Management Consultants

# PHASE III REMEDIAL INVESTIGATION

for

## GOOD CHEVROLET

## 1630 PARK STREET

## ALAMEDA, CALIFORNIA

Project C93013

April 30, 1997

1900 Wyatt Drive, Suite 1 • Santa Clara, California 95054 • Phone 408/987-0210 • FAX 408/988-0815

# PHASE III REMEDIAL INVESTIGATION
# for
# GOOD CHEVROLET
# 1630 PARK STREET
# ALAMEDA, CALIFORNIA

## INTRODUCTION

The project site is an automobile dealership and service center located at 1630 Park Street in the City of Alameda, in Alameda County, California as indicated on Figure 1.

## BACKGROUND

A 300 gallon waste oil storage tank and a 500 gallon underground gasoline storage tank were reportedly removed from the property by Petroleum Engineering, Inc. in October, 1986. A subsurface investigation including installation of three ground water monitoring wells (see Figure 2) was performed by Groundwater Technology, Inc. in January, 1987 (Groundwater Technology, Inc. Report Dated April 29, 1987).

The three monitoring wells have been monitored to evaluate the ground water conditions and to establish the direction(s) of ground water flow at the project site. The monitoring determined that the direction of flow beneath the site varies from a northwesterly direction to a northeasterly direction throughout the year. The quarterly sampling has also detected Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds at various concentrations throughout the year.

A supplemental investigation was performed by Geo Plexus which included advancing 7 soil borings across the parking area of the property. This investigation identified high concentrations of Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds (Benzene, Toluene, Ethyl Benzene, and Xylene) in the immediate vicinity of the former underground storage tanks at depths of 5-12 feet below the ground surface. The borings identified concentrations of Total Petroleum Hydrocarbons as gasoline as high as 15,000 parts per million (ppm) decreasing to 1,000 ppm within 30-feet from the former tanks (lateral direction) and decreasing to 1,800 ppm at the down-gradient property boundary.

Two additional ground water monitoring wells were installed by Geo Plexus in April, 1994 to further characterize the down-gradient water conditions. The findings of the initial ground water samples indicated a significant increase in concentrations of Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds down-gradient of the property.

The ground water levels recorded to date reflect fluctuations ranging from 3 to 13 feet below the ground surface and indicate that ground water generally flows in a northwest direction.

## REMEDIAL INVESTIGATION OBJECTIVES

The objectives of the investigation were: (1) to characterize to the extent practicable the residual contaminated soils in the immediate vicinity of the former underground storage tanks that could not be removed by the previous excavation; (2) to characterize to the extent practicable the limits of the ground water contaminant plume; (3) verify the singularity of the ground water plume or the existence of a multiple-party commingled plume; (4) perform a vapor extraction performance test; (5) perform a ground water extraction pump test; and (6) perform a feasibility study to evaluate and determine the most cost-effective and time-efficient remedial system for the project site.

The current phase of the investigation included the following scope of work:

(1) advancing eight geo-probes on-site to further define the limits of the soil and ground water contamination;
(2) collection of soil and ground water grab samples from the borings;
(3) collection of ground water samples from existing monitoring wells;
(4) performing analytical testing on the soil and ground water samples; and
(5) preparation of a report documenting the findings of the investigation and presenting the results of the analytical testing;

Specifics of the individual investigative phases are described in the following sections of this Report.

## SUBSURFACE INVESTIGATION

The scope of work for this investigative effort included advancing eight (8) subsurface exploratory geo-probes at locations which were immediately "up-", "down", and "cross-gradient" from the former underground storage tanks. Grab ground water samples were also obtained from the probes for analytical testing.

### Geo-Probes

Eight subsurface exploration geo-probes were advanced at the locations indicated on Figure 3. The probes were advanced by Precision Drilling, a State of California Licensed Drilling Contractor, and were logged under the supervision of a State of California Certified Engineering Geologist. The boring logs are presented in Appendix A. Soil samples were collected from geo-probes EB-8 through EB-12 but were not collected from probes P-1, P-2, and P-3.

The geo-probes were advanced to a depth of 9-13 feet below ground surface using a portable pneumatic drive assembly which advances a double casing system with a split barrel sampler (standard penetration sampler) as the inside casing. The casings are driven into the soil in three-foot intervals.

The inner casing is removed following each drive and replaced with a new sampler prior to advancing the boring. This drilling method achieves a "continuous core" sample of the soil materials which allows discrete sampling of any sample interval and is not restricted to the typical 5-foot sample intervals.

Soil samples were retained in pre-cleaned stainless steel liners. The individual liners were observed upon removal from the sampler and screened in the field with a photo-ionization detector for evidence of volatile hydrocarbon compounds and sample liners which were identified as representative of the subsurface conditions were retained for analytical testing. The samples were immediately sealed in the tubes and properly labeled including: the date, time, sample location, and project number. The samples were placed immediately into a chilled cooler and maintained at 4° C for transport to the laboratory under chain-of-custody documentation.

The drilling and sampling equipment used was thoroughly steam cleaned before drilling began to prevent the introduction of off-site contamination and steam cleaned again between the probe locations to prevent cross contamination.

Following collection of ground water "grab" samples, the probe borings were backfilled to the ground surface with a cement/bentonite slurry upon completion of the investigation.

## Subsurface Soil Profile

The geo-probes revealed near uniform subsurface soil conditions consisting of 2-3 feet of intermixed medium brown and dark-gray, loose, medium- to coarse-grained sand (interpreted to be fill soils). The fill soils were underlain by natural sediments composed of orange-brown to yellow-brown, loose to dense, fine- to medium-grained sand (Merritt Sand Formation) interbedded with coarse-grained sand lenses to a depth of 13 feet (limit of soil borings).

Gasoline vapors were detected in each of the probes and appeared to be confined to a medium- to coarse-grained sand lens at depths of 6- to 12-feet below the ground surface.

Ground water was encountered in the exploration borings at a depths ranging from 11-13 feet below the ground surface at the time of drilling.

## Ground Water "Grab" Samples

Ground water "grab" samples were obtained from the probes by temporarily installing a pre-cleaned 1-inch diameter slotted PVC well casing into the boring and removing the outer drill casing. Ground water was purged from each boring by lowering a stainless steel bailer through the well casing and removing approximately 2- to 3-casing volumes. Following, the water retained in the bailer was decanted into sterilized glass vials with Teflon lined screw caps. The samples were immediately sealed in the vials and properly labeled including: the date, time, sample location, project number, and indication of any preservatives added to the sample. The samples were placed immediately into a chilled cooler and maintained at 4° C for transport to the laboratory under chain-of-custody documentation.

The PVC well casing was removed from the borings and all of the borings were backfilled to the ground surface with a cement/bentonite slurry upon completion of the investigation.

## GRADIENT SURVEY

The elevation of the top of the casing of the monitoring wells at the site were established during previous investigations with reported vertical control of 0.01 foot. Ground water elevations were measured in each well to the nearest 0.01 foot with an electronic water level meter (prior to purging) to monitor the variations in the direction and gradient of ground water flow beneath the site.

Ground water elevations recorded suggest that the ground water flow is to the west as indicated on Figure 4. The ground water gradient was determined to be 0.015 ft/ft (see Figure 4). The direction of ground water deviates from the general northwesterly direction; however, this flow direction has been previously observed.

## MONITORING WELL SAMPLING

Free product measurements were obtained for each monitoring well at the time of sample acquisition utilizing a teflon bailer lowered into the well to obtain a water sample. Due to very high traffic flow, Monitoring Well MW-4, located in the center of Park Street, was not sampled during this event. The bailer was used to collect a water sample to observe the presence of hydrocarbon odors, visible sheen, or free product. Free product or visible sheens were not observed in the initial bailer water samples or following purging of the wells from Monitoring Wells MW-1 through MW-5. Monitoring Wells MW-2 and MW-5 exhibited moderate odors as purging continued.

Prior to sampling the monitoring wells, four to six well volumes were purged from each well through the use of a teflon bailer. Electrical conductivity, temperature, and pH of the ground water were recorded throughout the purging process. The purging activities continued until the electrical conductivity, temperature, and pH of the discharged water stabilized and the water appeared free of suspended solids.

Water samples for analytical testing were obtained through the use of a teflon bailer and were collected in sterilized glass vials with Teflon lined screw caps. The samples were immediately sealed in the vials and properly labeled including: the date, time, sample location, project number, and indication of any preservatives (HCl) added to the sample. The samples were placed on ice immediately for transport to the laboratory under chain-of-custody documentation.

The water obtained from the monitoring wells during the purging and sampling activities was contained on-site pending receipt of the laboratory test results.

## ANALYTICAL TESTING

The soil and ground water samples were submitted to and tested by McCampbell Analytical, Inc., a State of California certified laboratory. Analytical testing was scheduled and performed in accordance with the State of California, Regional Water Quality Control Board and Alameda County Department of Environmental Health Guidelines. The samples were tested for Total Petroleum Hydrocarbons as gasoline by Method GCFID 5030/8015 and Volatile Aromatic Compounds (BTEX and MTBE) by EPA Method 8020/5030. The Chain-of-Custody Form and analytical test data are attached in Appendix B.

The analytical test data for the geo-probe soil and ground water samples are summarized on Tables 1 and 2, respectfully. Table 3 summarizes the current analytical test results for the monitoring well samples, along with the results of the previous analytical testing.

### TABLE 1
### GEO-PROBE SOIL ANALYTICAL TEST DATA

soil samples were collected below GW (7 bgs) Text says GW at 11-13' bgs

| Sample | Total Petroleum Hydrocarbons | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|
| EB8-S2, 9.5-10' | 2,000 | 8.4 | 83 | 44 | 210 | ND |
| EB8-S3, 13.5-14' | 18 | 3.2 | 1.2 | 0.47 | 1.7 | 0.10 |
| EB9-S1, 6.5-7' | 1.8 | 0.071 | 0.052 | 0.026 | 0.074 | ND |
| EB9-S2, 9.5-10' | 1,300 | 7.1 | 54 | 29 | 130 | ND |
| EB10-S1, 8.5-9' | 2,300 | 9.1 | 100 | 50 | 190 | 9.3 |
| EB11-S1, 9.5-10' | 3,800 | 8.8 | 190 | 97 | 510 | ND |
| EB11-S2, 12-12.5' | 13 | 1.1 | 1.6 | 0.47 | 1.4 | ND |
| EB12-S1, 9.5-10' | 300 | 0.95 | 0.59 | 3.5 | 18 | ND |
| EB12-S2, 12-12.5' | 1,300 | 9.4 | 23 | 35 | 130 | 6.2 |

Notes: Concentrations reported as Parts Per Million (mg/kg).
ND indicates that concentrations below detection limit.

### TABLE 2
### GEO-PROBE GROUND WATER ANALYTICAL TEST DATA

| Sample | Total Petroleum Hydrocarbons | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|
| EB8-WS1 | 25,000 | 2,600 | 3,200 | 780 | 3,600 | ND<80 |
| EB10-WS1 | 81,000 | 13,000 | 12,000 | 3,300 | 8,000 | ND<370 |
| EB11-WS1 | 49,000 | 6,900 | 6,000 | 2,100 | 4,600 | ND<180 |
| EB12-WS1 | 38,000 | 1,400 | 1,400 | 1,800 | 7,400 | 110 |
| P1-WS1 | 74,000 | 1,100 | 5,800 | 3,800 | 18,000 | ND<78 |
| P2-WS1 | 6,800 | 2,200 | 290 | 310 | 560 | ND<10 |
| P3-WS1 | 220 | 1.9 | 17 | 10 | 49 | ND |

Notes: Concentrations reported as Parts Per Billion (ug/l).
ND indicates that concentrations below detection limit.

## TABLE 3
## SUMMARY OF GROUND WATER ANALYTICAL TEST DATA

| Date Sample | Total Petroleum Hydrocarbons | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|
| **Monitoring Well MW-1** | | | | | | |
| 1-21-87 [1] | 21,020 | 1,148 | 8,627 | 1,792 | 6,012 | |
| 1-11-89 [1] | 1,400 | 74 | 10 | 13 | 5 | |
| 7-12-89 [1] | 1,200 | 470 | 49 | 45 | 33 | |
| 4-09-91 [2] | 850 | 260 | 10 | 15 | 12 | |
| 7-14-92 [3] | 13,000 | 2,300 | 1,200 | 1,200 | 1,200 | |
| 10-7-92 [3] | 3,600 | 1,600 | 80 | 120 | 120 | |
| 1-11-93 [3] | 1,200 | 410 | 16 | 23 | 19 | |
| 4-23-93 [3] | 2,200 | 720 | 180 | 82 | 150 | |
| 7-08-93 [3] | 3,200 | 1,200 | 110 | 97 | 100 | |
| 10-15-93 [3] | 3,700 | 1,400 | 43 | 94 | 36 | |
| 1-25-94 [3] | 1,600 | 680 | 16 | 41 | 35 | |
| 4-28-94 [3] | 6,100 | 1,900 | 380 | 250 | 340 | |
| 7-27-94 [3] | 6,000 | 1,800 | 510 | 220 | 450 | |
| 10-27-94 [3] | 3,000 | 1,100 | 79 | 82 | 87 | |
| 1-26-95 [3] | 1,600 | 660 | 100 | 82 | 87 | |
| 4-13-95 [3] | 3,800 | 1,200 | 270 | 120 | 260 | |
| 7-21-95 [3] | 5,200 | 1,500 | 450 | 190 | 400 | |
| 10-25-95 [3] | 5,900 | 1,800 | 450 | 210 | 400 | |
| 1-21-97 [3] | 3,100 | 1,100 | 87 | 160 | 180 | ND<7.3 |
| **Monitoring Well MW-2** | | | | | | |
| 1-21-87 [1] | 5,018 | 386 | 1,981 | 285 | 1,432 | |
| 1-11-89 [1] | 10,000 | 3,000 | 410 | 240 | 190 | |
| 7-12-89 [1] | 7,600 | 2,700 | 540 | 250 | 320 | |
| 4-09-91 [2] | 4,900 | 910 | 210 | 130 | 200 | |
| 7-14-92 [3] | 13,000 | 4,400 | 1,500 | 610 | 1,100 | |
| 10-7-92 [3] | 11,000 | 5,200 | 1,500 | 500 | 1,200 | |
| 1-11-93 [3] | 17,000 | 940 | 1,100 | 480 | 930 | |
| 4-23-93 [3] | 52,000 | 13,000 | 8,400 | 1,700 | 5,300 | |
| 7-08-93 [3] | 6,400 | 2,500 | 470 | 280 | 530 | |
| 10-15-93 [3] | 17,000 | 3,900 | 870 | 500 | 940 | |
| 1-25-94 [3] | 16,000 | 5,400 | 1,140 | 640 | 1,500 | |
| 4-28-94 [3] | 15,000 | 4,000 | 910 | 480 | 1,200 | |
| 7-27-94 [3] | 18,000 | 6,000 | 760 | 630 | 1,600 | |
| 10-27-94 [3] | 9,500 | 2,700 | 230 | 320 | 640 | |
| 1-26-95 [3] | 5,900 | 1,900 | 290 | 230 | 500 | |
| 4-13-95 [3] | 10,000 | 3,300 | 620 | 360 | 930 | |
| 7-21-95 [3] | 9,900 | 3,300 | 320 | 390 | 830 | |
| 10-25-95 [3] | 13,000 | 4,900 | 400 | 580 | 990 | |
| 1-21-97 [3] | 7,600 | 2,600 | 310 | 330 | 660 | ND<20 |

## TABLE 3 (cont'd)
## SUMMARY OF GROUND WATER ANALYTICAL TEST DATA

| Date Sample | Total Petroleum Hydrocarbons | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|
| **Monitoring Well MW-3** | | | | | | |
| 1-21-87 [1] | 10,287 | 1,428 | 3,281 | 610 | 2,761 | |
| 1-11-89 [1] | 5,300 | 1,800 | 340 | 150 | 160 | |
| 7-12-89 [1] | 7,800 | 3,100 | 900 | 300 | 480 | |
| 4-09-91 [2] | 9,400 | 1,400 | 730 | 200 | 510 | |
| 7-14-92 [3] | 17,000 | 3,500 | 390 | 390 | 260 | |
| 10-7-92 [3] | 9,200 | 4,300 | 470 | 390 | 610 | |
| 1-11-93 [3] | 2,000 | 740 | 29 | 58 | 28 | |
| 4-23-93 [3] | 6,500 | 2,600 | 280 | 260 | 190 | |
| 7-08-93 [3] | 5,200 | 2,100 | 260 | 250 | 180 | |
| 10-15-93 [3] | 11,000 | 3,500 | 580 | 430 | 370 | |
| 1-25-94 [3] | 6,200 | 2,500 | 270 | 160 | 28 | |
| 4-28-94 [3] | 5,300 | 1,700 | 190 | 210 | 180 | |
| 7-27-94 [3] | 5,900 | 2,000 | 360 | 260 | 330 | |
| 10-27-94 [3] | 8,000 | 2,200 | 580 | 260 | 470 | |
| 1-26-95 [3] | 3,700 | 1,200 | 150 | 150 | 190 | |
| 4-13-95 [3] | 4,000 | 1,400 | 200 | 180 | 210 | |
| 7-21-95 [3] | 5,700 | 2,000 | 280 | 270 | 280 | |
| 10-25-95 [3] | 11,000 | 3,500 | 1,100 | 460 | 680 | |
| 1-21-97 [3] | 2,200 | 860 | 63 | 71 | 80 | ND |
| **Monitoring Well MW-4** | | | | | | |
| 4-28-94 [3] | 190 | 3.8 | 2.9 | 2.1 | 3.1 | |
| 7-27-94 [3] | 180 | 15 | 9.2 | 7.6 | 28 | |
| 10-27-94 [3] | 130 | 8.6 | 6.6 | 4.5 | 17 | |
| 1-26-95 [3] | 110 | 6.5 | 1.2 | 1.8 | 11 | |
| 4-13-95 [3] | 82 | 3.9 | N.D. | N.D | 2.5 | |
| 7-21-95 [3] | 130 | 8.8 | 1.3 | 4.5 | 7.6 | |
| 10-25-95 [3] | 95 | 6.6 | 1.7 | 4.3 | 7 0 | |
| 1-21-97 [3] | not sampled | | | | | |

TABLE 3 (cont'd)
SUMMARY OF GROUND WATER ANALYTICAL TEST DATA

| Date Sample | Total Petroleum Hydrocarbons | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|
| **Monitoring Well MW-5** | | | | | | |
| 4-28-94 (3) | 30,000 | 4,000 | 3,000 | 810 | 3,500 | |
| 7-27-94 (3) | 9,300 | 2,000 | 800 | 290 | 940 | |
| 10-27-94 (3) | 15,000 | 2,700 | 1,300 | 420 | 1,100 | |
| 1-26-95 (3) | 7,900 | 2,100 | 680 | 240 | 860 | |
| 4-13-95 (3) | 7,900 | 2,400 | 580 | 340 | 630 | |
| 7-21-95 (3) | 11,000 | 3,400 | 760 | 610 | 1,200 | |
| 10-25-95 (3) | 13,000 | 2,900 | 830 | 570 | 1,100 | |
| 1-21-97 (3) | 2,600 | 750 | 65 | 1860 | 280 | ND |

Note: (1) Concentrations reported by Groundwater Technology, Inc.
(2) Concentrations reported by Environmental Science & Engineering, Inc.
(3) Samples obtained and reported by Geo Plexus, Inc.

## REMEDIAL ACTION THRESHOLD CRITERIA

Various agencies have published criteria and guidelines related to investigation and remediation of soil and ground water contaminated with petroleum compounds. This section addresses the documents and guidelines which were considered applicable to the project site and addresses the technical approach used to develop evaluation criteria for the project site. The following standards and/or guidelines were used to evaluate the known site conditions and to assist in determining the threshold limits:

- State of California Leaking Underground Fuel Tank Field Manual

  This document provides regulatory agencies with guidelines in dealing with leaking fuel tank problems. The manual is intended to assist in assessing fuel leaks, by providing a framework for determining required investigation of sites and of cleanup levels, of screening sites, and for determining remedial actions. It provides general guidance, and is not a standard or specific guideline.

- State of California Regional Water Quality Control Board Tri-Regional Guidelines

  These documents present recommendations for the initial investigation of Underground Storage Tank (UST) releases and tank removal processes. The reports describe fuel leak indicators, and present the requirements for site investigations (soil and ground water).

•California Code of Regulations - Title 22

Presents environmental health standards for the classification and management of hazardous waste The document also establishes drinking water standards, waste treatment standards, and threshold limit concentrations for hazardous materials.

•Resource Conservation and Recovery Act

Provides framework for federal regulation of hazardous waste and controls the generations, transportation, treatment, storage, and disposal of hazardous waste. RCRA established the "cradle to grave" aspect of hazardous waste management and disposal.

•ASTM E-1739-95 Risk-Based Corrective Action Applied at Petroleum Release Sites

Provides a decision making process for the assessment and response to subsurface (soil and ground water) contamination based on risk to human health and environmental resources. The Risk-Based Corrective Action (RBCA) process recognizes the variability in complexity, physical and chemical characteristics and risk to human health and environmental resources of sites and utilizes a tiered approach to match appropriate assessments and remedial activities in consideration of more cost-effective remedial action.

•EPA SW846

Provides sampling and analytical testing methodology for solid waste.

•Federal OSHA and CAL OSHA guidelines

Documents provide guidelines, standards, and regulations to protect workers from occupational hazards, including mandating training in various aspects of hazardous materials handling and exposure.

•NIOSH and ACGIH Threshold Limit Values

Documents present published information on health effects and standards or guidelines for protection of workers from exposure to various chemicals and compounds.

## EVALUATION OF APPLICABLE CRITERIA

The principal guidance document applicable to estimating the human health and environmental risk of site contaminants is the ASTM Risk-Based Corrective Action (RBCA) document. The ASTM-RBCA document outlines general assessment criteria based on the risk of exposure to the contaminated soil (by off-gassing and/or direct contact), by the potential for contaminants to leach to the ground water, by off-gassing from ground water, and from ground water ingestion

Although the Tri-Regional Guidelines and State of California Drinking Water Standards have been used a standard for petroleum hydrocarbon clean-up activities throughout the San Francisco Bay Area, the ASTM-RBCA criteria provide a conservative level of assurance that potential risks have been mitigated. Using the ASTM-RBCA approach, the following site conditions and assumptions were used to assess the project site:

(1) the project site is a commercial land use and is likely to remain a commercial site;
(2) the site is not zoned or planned for future residential development;
(3) ground water is at a depth of 7- to 8-feet below the ground surface,
(4) the ground water is brackish and not a potable water source; and ~ was TDS measured?
(5) domestic ground water wells do not exist down-gradient from the site. Wlin 750 radius

The data analysis indicated that the critical compounds were Benzene and MTBE and the critical exposure pathways include: contaminant leaching to ground water and soil gas generation/ migration to indoor air. Due to the high traffic flow along Park Street, gas migration to outdoor air (from soil or ground water) was not one of the critical exposure pathways. Since there is no known domestic use/consumption of the shallow, brackish ground water, ground water ingestion was not considered to be one of the critical exposure pathways.

Based on the above factors, use of a commercial cancer risk of $1 \times 10^{-4}$ as outlined in the ASTM-RBCA document was considered to be conservative and applicable for the development of petroleum related evaluation levels for the project site. The risk-based analysis required establishing Tier-1 Evaluation Risk-Based Screening Levels (RBSL) for contaminants of concern.

To asses the potential health risk of the project site, a risk based corrective action analysis was performed in accordance with the procedures presented in ASTM E 1739-95. This analysis (included as Appendix C) was performed using a commercially available, automated process known as "Tier 2 RBCA Tool Kit" published by Groundwater Services, Inc. This evaluation maintained the "commercial" health risk of $1 \times 10^{-4}$ as established and included the gasoline constituents known to be present.

Table 4 presents the ASTM-RBCA RBSL's for petroleum compounds in soil and ground water for the critical exposure pathways

## TABLE 4

## PETROLEUM COMPOUND THRESHOLD VALUES

| Constituent | Soil Threshold Values for Ground Water Protection RBCA- RBSL's | Threshold Values for Prevention of Soil Gas Migration (indoor) RBCA - RBSL's | Threshold Values for Ground Water Ingestion RBCA- RBSL's | Threshold Values for Prevention of Ground Water Gas Migration (indoor) RBCA - RBSL's |
|---|---|---|---|---|
| TPH gas | unlimited | unlimited | unlimited | unlimited |
| TPH diesel | unlimited | unlimited | unlimited | unlimited |
| Oil & Grease | unlimited | unlimited | unlimited | unlimited |
| Benzene | 1.68 ppm * | 0 4 ppm * | 0.29 ppm * | 0.41 ppm * |
| Toluene | 360 ppm | 93 ppm | 20 ppm | 92 ppm |
| Ethylbenzene | 130 ppm | not applicable | 10 ppm | not applicable |
| Xylenes | not applicable | not applicable | not applicable | not applicable |
| MTBE | 1.2 ppm | 700 ppm | 0.51 ppm | 3600 ppm |

* Calculated Benzene values multiplied by 0.29 in accordance with RWQCB Guidelines

## SUMMARY OF FINDINGS

The analytical test data indicates that low to moderate concentrations of Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds (BTEX) remains in the soil in the immediate vicinity of the former tanks; however, the extent of soil contamination is limited. There is no significant presence of MTBE in the soil. The highest concentrations of gasoline were detected in Borings EB-9, 10, and 11 which are located down-gradient of the former tanks and dispenser pump. The remaining samples indicate that the soil contamination extends in a radial pattern (cross- and down-gradient) from the former tank area. The large extent of the contamination appears to be a direct result of dispersion of the gasoline products with fluctuations in ground water levels of the project area The analytical test data suggests that the soil contamination extends off-site to the adjacent property (Winner Ford) and beneath Park Street.

The "grab" water samples contained high concentrations of Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds (Benzene, Toluene, Ethyl Benzene, and Xylene) particularly in the former tank area; however, the concentrations reduce significantly with distance from the source area (see Figure 5). There is no significant presence of MTBE in the ground water.

The monitoring wells continue to exhibit low to moderate concentrations of Total Petroleum Hydrocarbons as gasoline and Volatile Aromatic Compounds (Benzene, Toluene, Ethyl Benzene, and Xylene) suggesting that the source of these compounds is the former underground storage tanks. Figures 6 and 7 illustrate the distribution of Total Petroleum Hydrocarbons as gasoline and Benzene, respectfully.

The concentrations of Benzene in the soil exceed the Tier-1 RBSL's for contaminant leaching to ground water and gas migration to indoor air; however, the concentrations are not significantly elevated from the RBSL's (less than one order of magnitude difference). It is our opinion that the contaminants present do not warrant active soil remediation.

The concentrations of Benzene in the ground water exceed the Tier-1 RBSL's for ground water ingestion and gas migration to indoor air; however, the shallow ground water is not used for human consumption and that there are no buildings existing or planned within the boundaries of the plume. Noting that the concentrations of Benzene are below the Tier-1 RBSL's for gas migration to outdoor air, the two previous exposure pathways are of limited concern for the site conditions and active ground water remediation is not warranted.

what about immediately upgradient where some GW contam is indeed below the building

## RECOMMENDATIONS

It is recommended that a passive bioremediation program be implemented to achieve site remediation and closure through the regulatory agencies. It is proposed that the remediation be accomplished using oxygen releasing compounds (ORC manufactured by Regenisis) placed directly into the soil (boring backfill material) throughout the source area to promote oxygenation of the "shallow" soil and ground water.

Dissolved oxygen content, concentrations of contaminant gas constituents, and carbon dioxide levels should be monitored at the existing wells to evaluate the remedial progress and to support site closure.

## LIMITATIONS

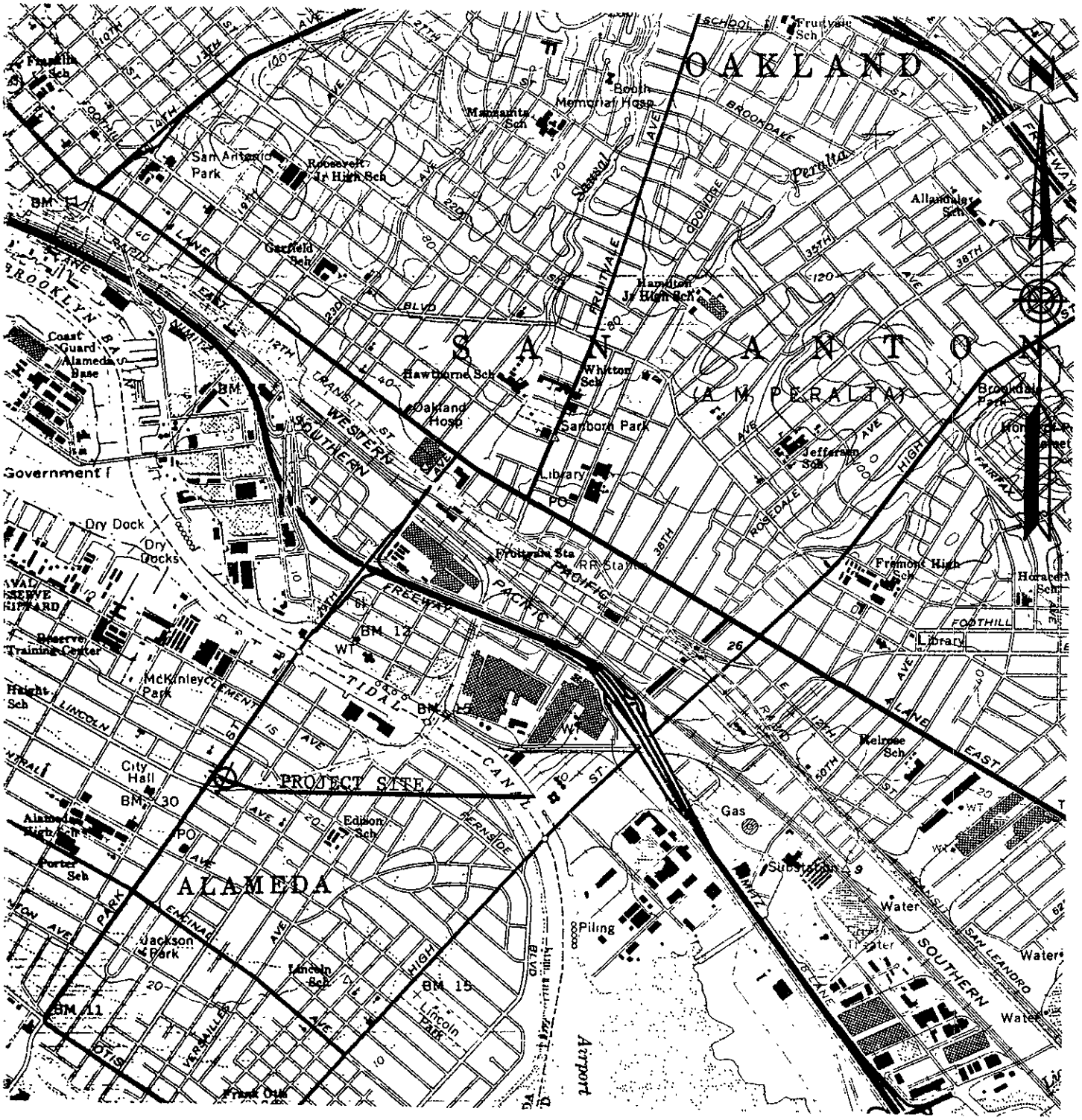
We have only observed a small portion of the pertinent subsurface and ground water conditions present at the site. The conclusions and recommendations made herein are based on the assumption that subsurface and ground water conditions do not deviate appreciably from those described in the reports and observed during the field investigation.

Geo Plexus, Incorporated provides consulting services in the fields of Geology and Engineering Geology performed in accordance with presently accepted professional practices. Professional judgments presented herein are based partly on information obtained from review of published documents, partly on evaluations of the technical information gathered, and partly on general experience in the fields of geology and engineering geology.

No attempt was made to verify the accuracy of the published information prepared by others used in preparation of this assessment report.

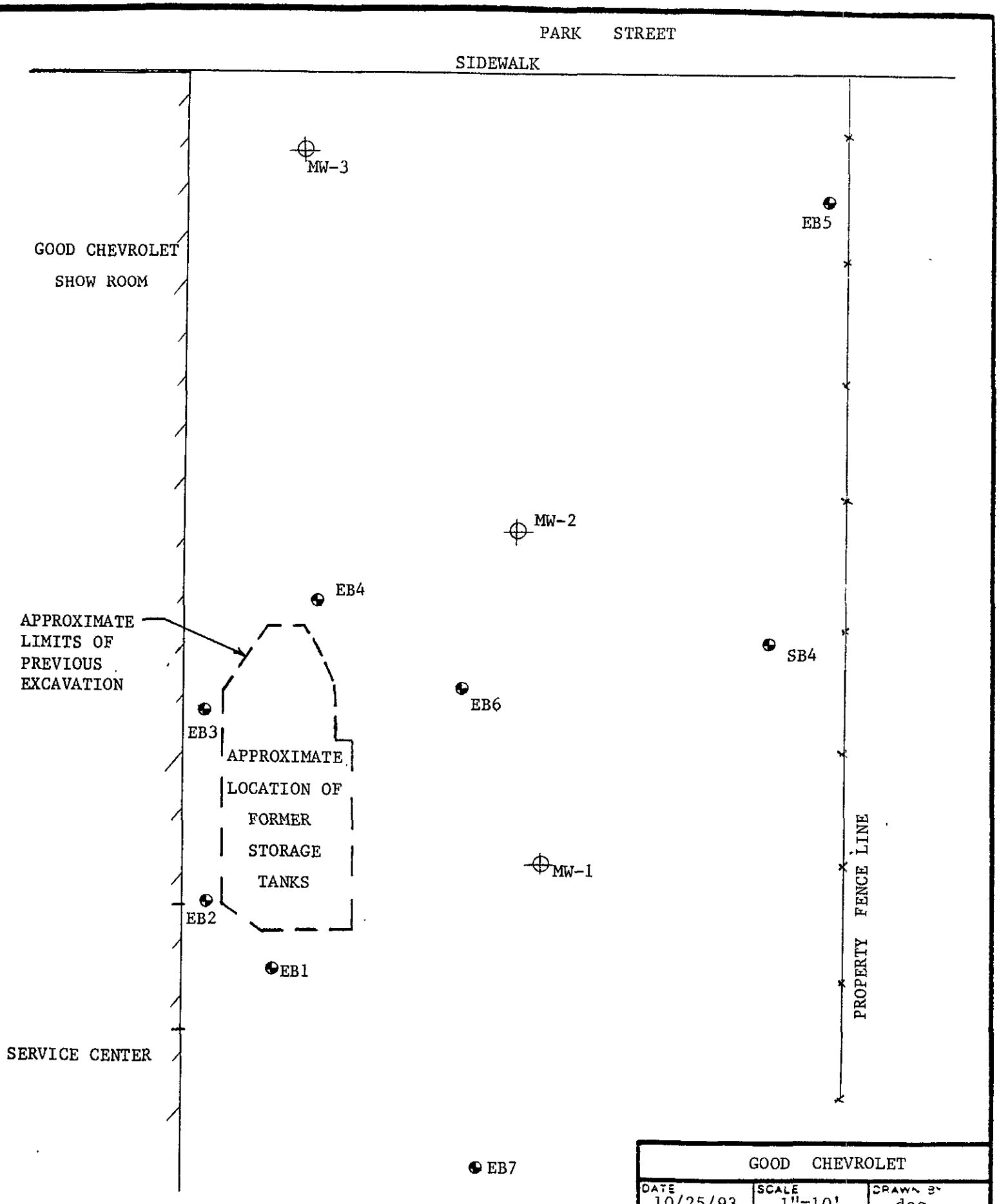
If you have questions regarding the findings, conclusions, or recommendations contained in this report, please contact us. We appreciate the opportunity to serve you.

Geo Plexus, Incorporated



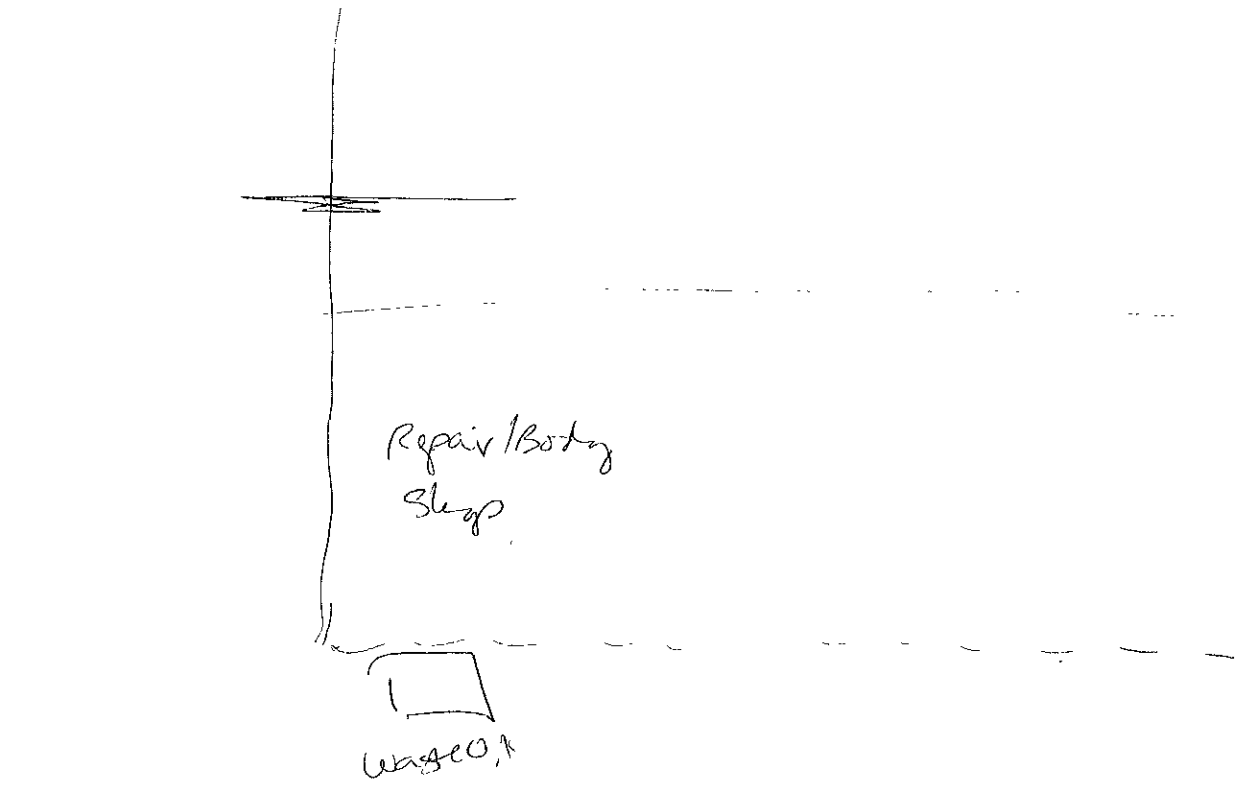

| GOOD CHEVROLET | | |
|---|---|---|
| DATE 10-9-92 | SCALE 1"=2000' | DRAWN BY dcg |
| LOCATION MAP | | |
| | | Figure 1 |

GeoPlexus, Inc.

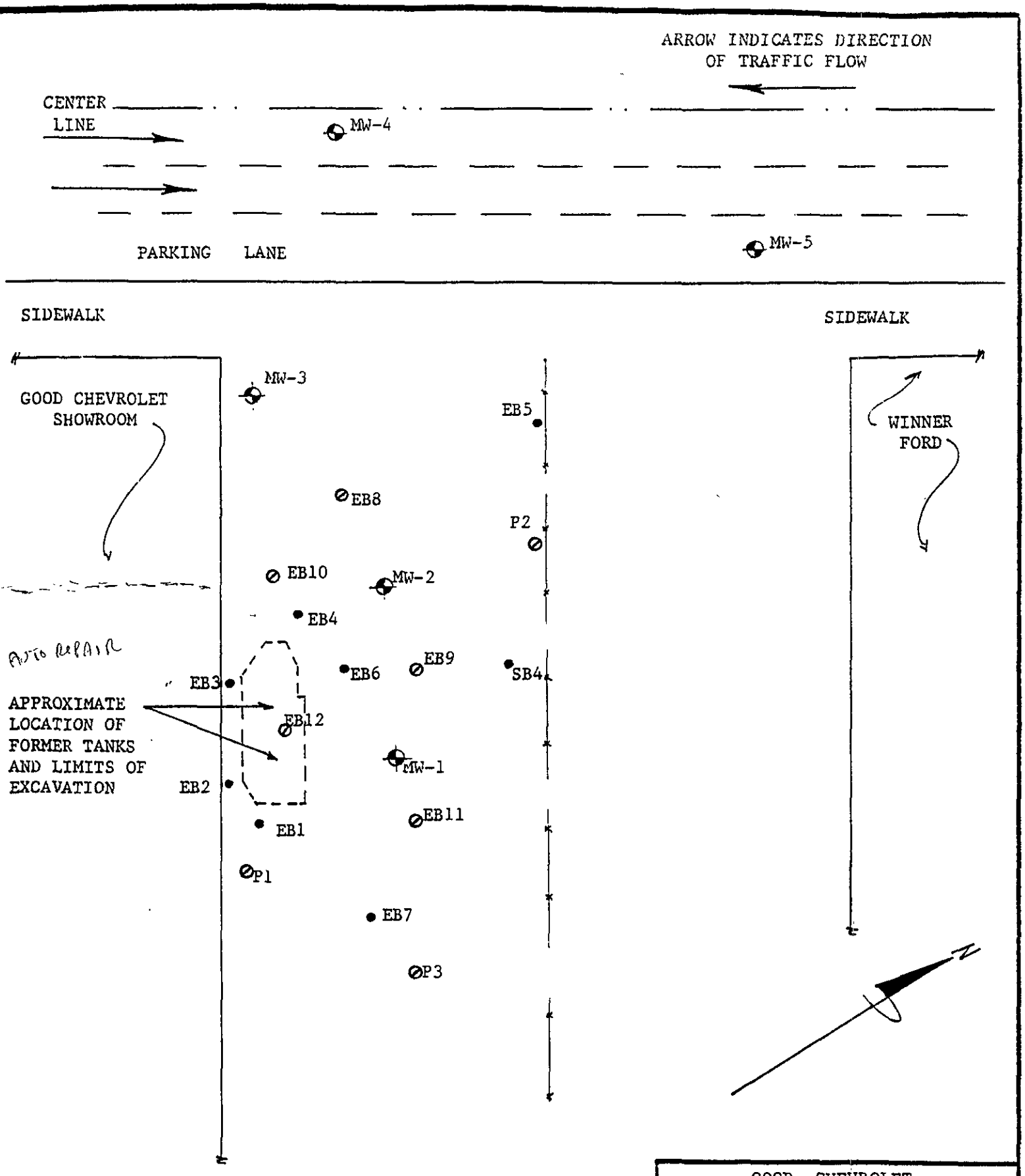



| GOOD CHEVROLET | | |
|---|---|---|
| DATE 10/25/93 | SCALE 1"=10' | DRAWN BY dcg |
| SITE PLAN | | |
| | Figure 2 | |

GeoPlexus, Inc.

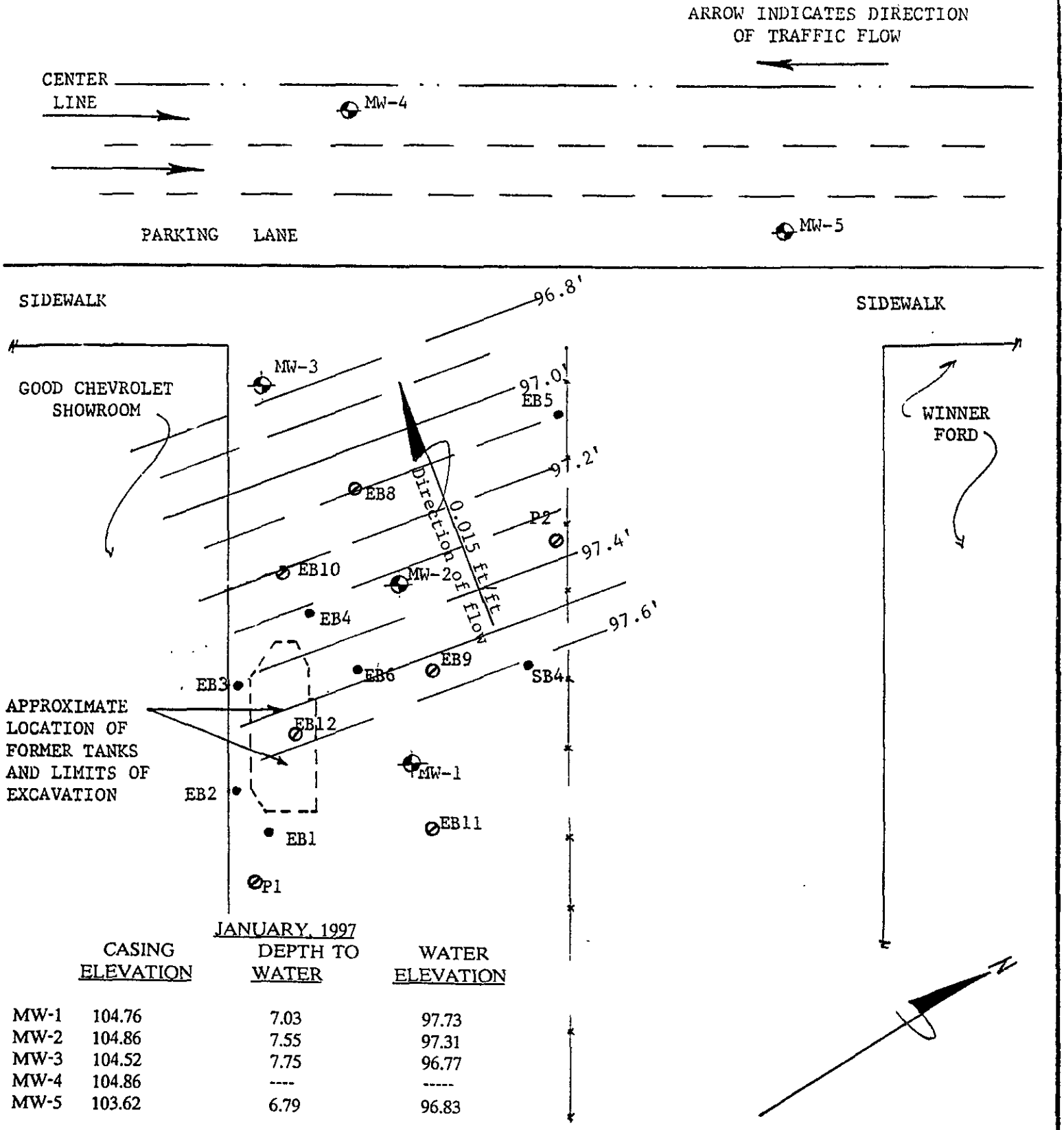



Existing
UST
10K gasoline
4k gasoline




GeoPlexus, Inc.

| GOOD CHEVROLET | | |
|---|---|---|
| DATE 1/21/97 | SCALE 1"=20' | DRAWN BY dcg |
| BORING LOCATION PLAN | | |
| | Figure 3 | |




JANUARY, 1997

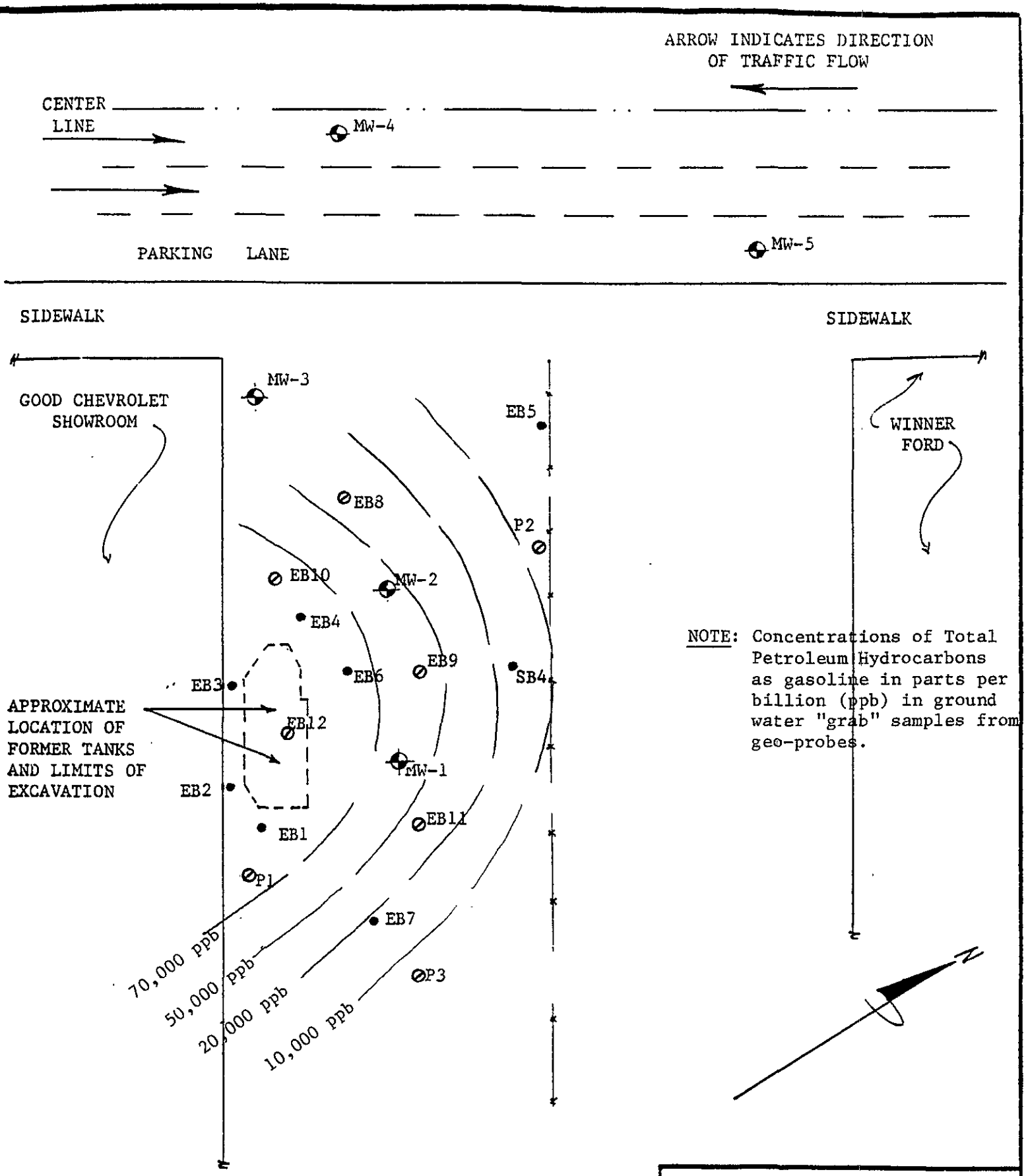
| | CASING ELEVATION | DEPTH TO WATER | WATER ELEVATION |
|---|---|---|---|
| MW-1 | 104.76 | 7.03 | 97.73 |
| MW-2 | 104.86 | 7.55 | 97.31 |
| MW-3 | 104.52 | 7.75 | 96.77 |
| MW-4 | 104.86 | ---- | ----- |
| MW-5 | 103.62 | 6.79 | 96.83 |

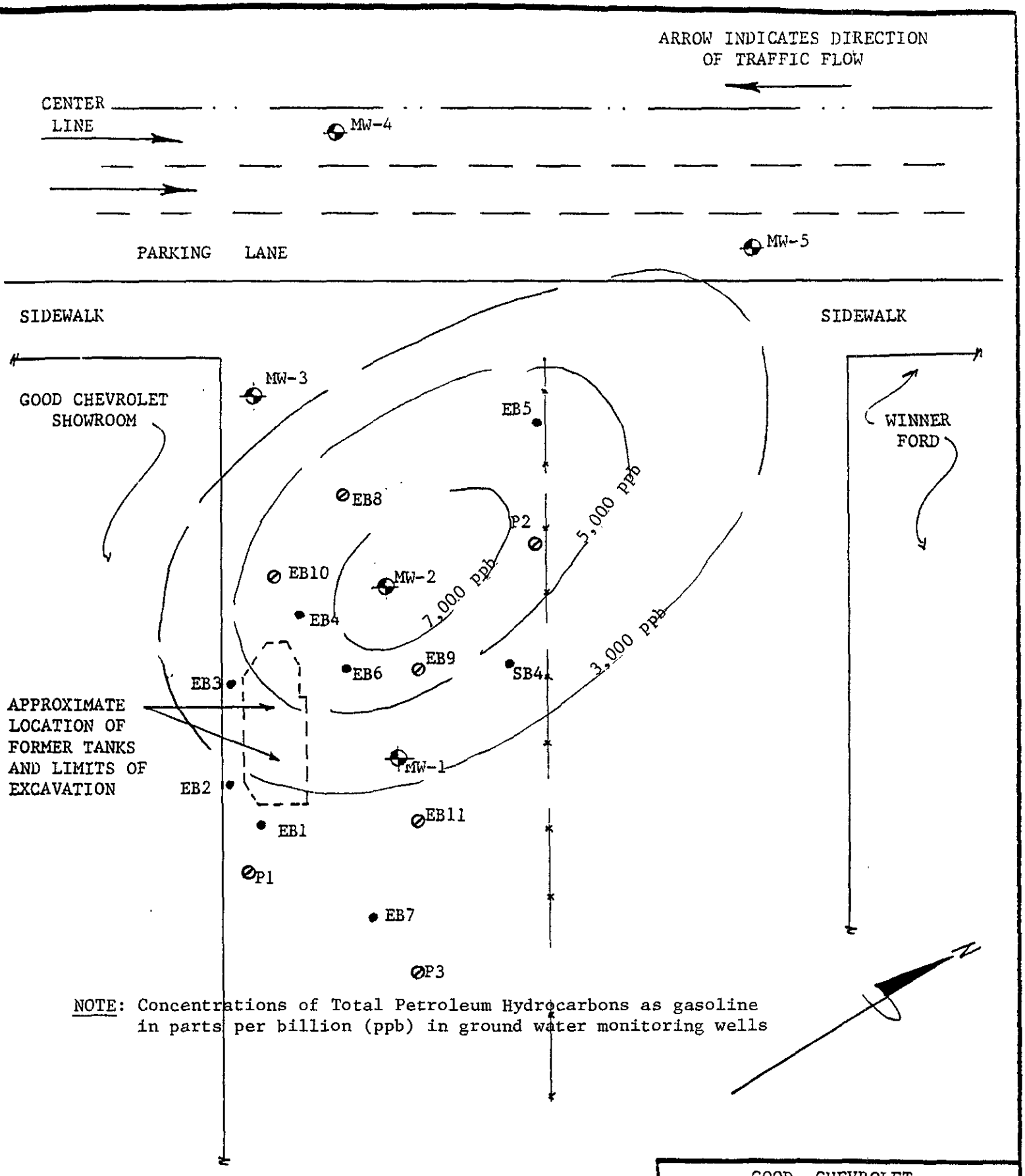
Note: Casing and ground water elevations based on Temporary Bench Mark (TBM) with an assumed elevation of 100.00 feet.

- Monitoring Wells
- Borings Previous Studies
- Borings Current Study

GeoPlexus, Inc.

| GOOD CHEVROLET | | |
|---|---|---|
| DATE 1/21/97 | SCALE 1"=20' | DRAWN BY dcg |
| JAN, 97 GRADIENT PLAN | | |
| | Figure 4 | |


ARROW INDICATES DIRECTION
OF TRAFFIC FLOW
CENTER
LINE
MW-4
PARKING LANE
MW-5
SIDEWALK
SIDEWALK
GOOD CHEVROLET
SHOWROOM
WINNER
FORD
MW-3
EB5
EB8
P2
EB10
MW-2
EB4
EB9
EB6
SB4
EB3
EB12
APPROXIMATE
LOCATION OF
FORMER TANKS
AND LIMITS OF
EXCAVATION
MW-1
EB2
EB1
EB11
P1
EB7
P3
70,000 ppb
50,000 ppb
20,000 ppb
10,000 ppb
N
NOTE: Concentrations of Total Petroleum Hydrocarbons as gasoline in parts per billion (ppb) in ground water "grab" samples from geo-probes.
Monitoring Wells
Borings Previous Studies
Borings Current Study
GeoPlexus, Inc.
GOOD CHEVROLET
DATE 1/22/97
SCALE 1"=20'
DRAWN BY dcg
TPHgas GROUNDWATER GRAB SAMPLES
Figure 5

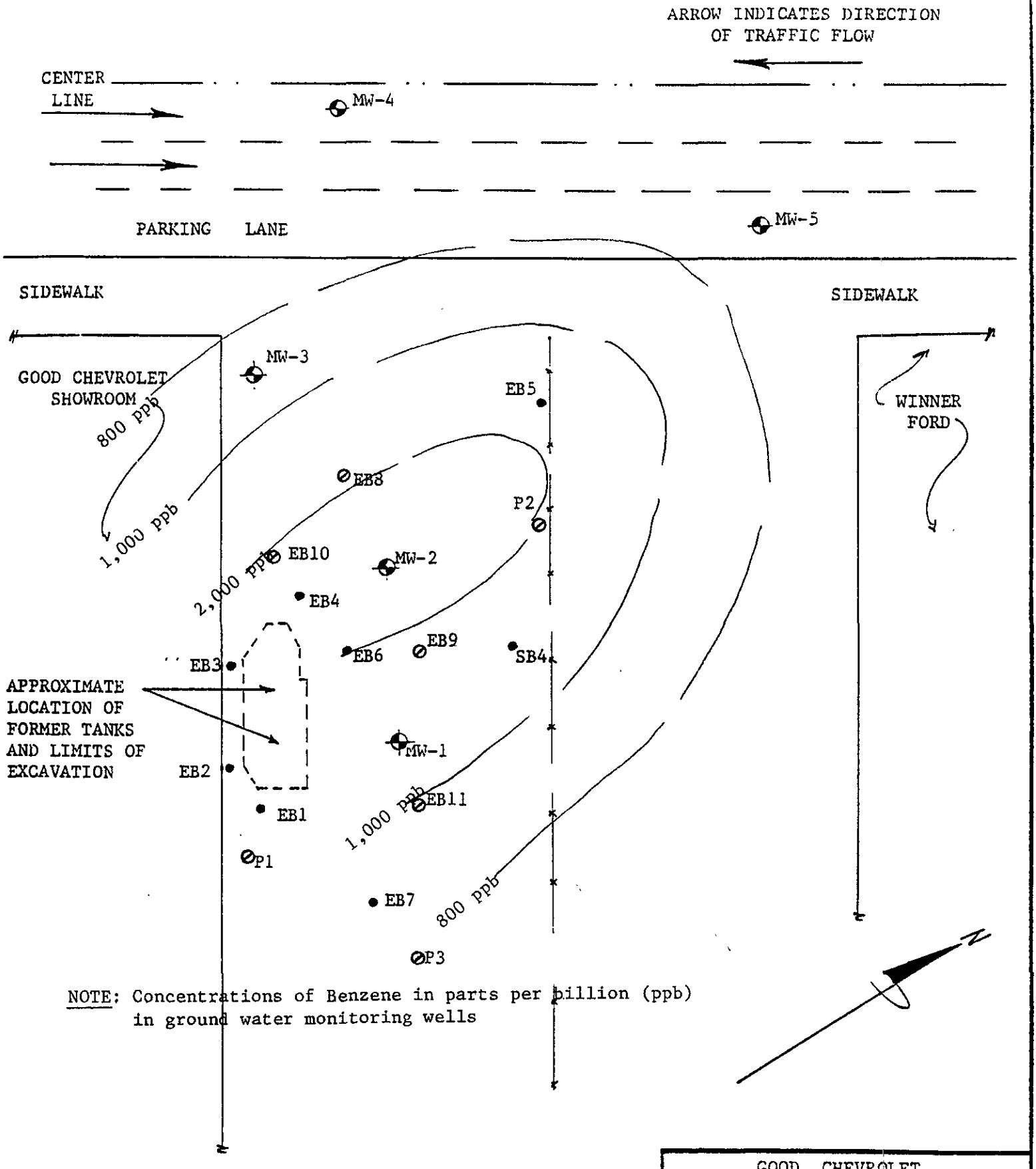



NOTE: Concentrations of Total Petroleum Hydrocarbons as gasoline in parts per billion (ppb) in ground water monitoring wells

- Monitoring Wells
- Borings Previous Studies
- Borings Current Study

GeoPlexus, Inc.

| GOOD CHEVROLET | | |
|---|---|---|
| DATE 1/22/97 | SCALE 1"=20' | DRAWN BY dcg |
| TPHgas IN GROUND WATER | | |
| | Figure 6 | |


ARROW INDICATES DIRECTION OF TRAFFIC FLOW
CENTER LINE
MW-4
PARKING LANE
MW-5
SIDEWALK
SIDEWALK
GOOD CHEVROLET SHOWROOM
WINNER FORD
MW-3
EB5
800 ppb
EB8
P2
1,000 ppb
2,000 ppb
EB10
MW-2
EB4
EB3
EB6
EB9
SB4
APPROXIMATE LOCATION OF FORMER TANKS AND LIMITS OF EXCAVATION
MW-1
EB2
EB11
EB1
1,000 ppb
P1
EB7
800 ppb
P3
N
NOTE: Concentrations of Benzene in parts per billion (ppb) in ground water monitoring wells
Monitoring Wells
Borings Previous Studies
Borings Current Study
GeoPlexus, Inc.
GOOD CHEVROLET
DATE 1/22/97
SCALE 1"=20'
DRAWN BY dcg
BENZENE IN GROUND WATER
Figure 7

# APPENDIX A

## BORING LOGS

# BORING LOG

LOCATION Good Chevrolet, Alameda, CA

DATE 1/21/97

DRILLER Precision Sampling, Inc.

BORING No. EB8

| DEPTH (ft.) | DESCRIPTION | U.S.C. | OVM/PID | WELL DESIGN | SAMPLE | BLOW COUNT | COMMENTS |
|---|---|---|---|---|---|---|---|
| 5 | CLAYEY SAND, red-brown, moist, dense | SC | 120 | | S1 | | strong gas odors |
| 10 | | | 950 | | S2 | | |
| | CLAYEY SAND, green (vapor stained) wet, dense | SC | 970 | | S3 | | |
| 15 | CLAYEY SAND, brown, wet, dense | SC | 120 | | | | |
| | Bottom of boring 16-feet | | | | | | |
| 20 | | | | | | | |

GeoPlexus, Inc.

FIGURE

# BORING LOG

LOCATION Good Chevrolet, Alameda, CA DATE 1/21/97

DRILLER Precision Sampling, Inc. BORING No. EB9

| DEPTH (ft.) | DESCRIPTION | U.S.C. | OVM/PID | WELL DESIGN | SAMPLE | BLOW COUNT | COMMENTS |
|---|---|---|---|---|---|---|---|
| | SAND, medium-grained, dark-brown, moist, medium dense | SM | | | | | |
| 5 | | | 90 | | S1 | | |
| 10 | -slight green coloration (staining) | | 340 | | S2 | | |
| | Bottom of boring 13-feet. | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |

GeoPlexus, Inc.

FIGURE

# BORING LOG

LOCATION Good Chevrolet, Alameda, CA

DATE 1/21/97

DRILLER Precision Sampling, Inc.

BORING No. EB10

| DEPTH (ft.) | DESCRIPTION | U.S.C. | OVM/PID | WELL DESIGN | SAMPLE | BLOW COUNT | COMMENTS |
|---|---|---|---|---|---|---|---|
| | SAND, medium-grained, brown, moist, dense | SM | | | | | |
| 5 | SAND, medium-grained, orange-brown, moist, dense | SP/SM | 120 | | | | |
| | SAND, gray-brown, moist, dense | SM | 850 | | S1 | | strong gas odor |
| 10 | SAND, red-bronw, wet, dense | SP/SM | 250 | | | | |
| 15 | Bottom of boring 13-feet. | | | | | | |
| 20 | | | | | | | |

GeoPlexus, Inc.

FIGURE

# BORING LOG

LOCATION Good Chevrolet, Alameda, CA

DATE 1/21/97

DRILLER Precision Sampling, Inc.

BORING No. EB11

| DEPTH (ft.) | DESCRIPTION | U.S.C. | OVM/PID | WELL DESIGN | SAMPLE | BLOW COUNT | COMMENTS |
|---|---|---|---|---|---|---|---|
| | SANDY GRAVEL, dark brown, moist, dense | GM | | | | | |
| | SAND, tan, damp, dense | SP | | | | | |
| 5 | SAND, brown, moist, dense | SM | 80 | | | | |
| | CLAYEY SAND, red-brown, moist, dense | SC | | | | | |
| | CLAYEY SAND, mottled red-green (vapor stain) moist, dense | SC | | | | | |
| 10 | | | 160 | | S1 | | |
| | SAND, blue-green, wet, dense | SM | 340 | | S2 | | |
| 15 | Bottom of boring 13-feet. | | | | | | |
| 20 | | | | | | | |

GeoPlexus, Inc.

FIGURE

# BORING LOG

LOCATION Good Chevrolet, Alameda, CA

DATE 1/21/97

DRILLER Precision Sampling, Inc.

BORING No. EB12

| DEPTH (ft.) | DESCRIPTION | U.S.C. | OVM/PID | WELL DESIGN | SAMPLE | BLOW COUNT | COMMENTS |
|---|---|---|---|---|---|---|---|
| | SANDY GRAVEL, gray, moist, loose | GP | | | | | tank backfill |
| 5 | SAND, red-brown, moist, dense | SM | | | | | |
| | CLAYEY SAND, green, moist, dense (stained) | SC | 340 | | | | native |
| 10 | SAND, medium-grained, gray-green (vapor stained) wet, dense | SM | 380 | | S1 | | |
| | | | 650 | | S2 | | |
| 15 | SAND, brown, wet, dense | SP | 40 | | | | |
| | Bottom of boring 16-feet. | | | | | | |
| 20 | | | | | | | |

GeoPlexus, Inc.

FIGURE

# APPENDIX B

## CHAIN-OF-CUSTODY FORM
## AND
## ANALYTICAL TEST DATA

GeoPlexus, Inc.

# CHAIN-OF-CUSTODY AGP300

1900 Wyatt Drive, Suite 1, Santa Clara, California 95054
Phone 408/987-0210 Fax 408/988-0815

| PROJECT NUMBER | PROJECT NAME |
|---|---|
| 93013 | ICED CHEVROLET |

| Send Report Attention of: | Report Due | Verbal Due |
|---|---|---|
| DAVID GILL | / / | / / |

| Sample Number | Date | Time | Comp | Grab | Station Location | Number of Cntnrs | Type of Containers | Type of Analysis: TPH-gas/BTEX MTBE | Condition of | Initial |
|---|---|---|---|---|---|---|---|---|---|---|
| SB8-S2 | 1/21/97 | 920 | | / | BORING SB8 9.5-10' | 12 | STAINLESS STEEL TUBE | / | 73089 | |
| SB8-S3 | | 930 | | / | BORING SB8 13.5-14' | | | / | 73090 | |
| SB9-S1 | | 1020 | | / | BORING SB9 6.5-7' | | | / | 73091 | |
| SB9-S2 | | 1025 | | / | BORING SB9 9.5-10' | | | / | 73092 | |
| SB10-S1 | | 1130 | | / | BORING SB10 8.5-9' | | | / | 73093 | |
| SB11-S1 | | 1245 | | / | BORING SB11 9.5-10' | | | / | 73094 | |
| SB11-S2 | | 1300 | | / | BORING SB11 12-12.5' | | | / | 73095 | |
| SB12-S1 | | 1340 | | / | BORING SB12 9.5-10 | | | / | 73096 | |
| SB12-S2 | | 1350 | | / | BORING SB12 12-12.5 | 1 | | / | 73097 | |

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
|---|---|---|---|
| | 1/22/97 950 | | 1-22 9:50 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | 1-22 12:50 | | 1-22-97 17:57 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | | | |

Remarks: STANDARD TURNAROUND

| | VOAS | O&G | METALS | OTHER |
|---|---|---|---|---|
| ICE/T° ✓ | | | | |
| GOOD CONDITION ✓ | | | | |
| HEAD SPACE ABSENT ✓ | | | | |
| PRESERVATIVE APPROPRIATE ✓ | | | | |
| CONTAINERS ✓ | | | | |

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

| | | |
|---|---|---|
| Geo Plexus, Inc.<br>1900 Wyatt Drive, Suite 1<br>Santa Clara, CA 95054 | Client Project ID: # 93013; Good Chevrolet | Date Sampled: 01/21/97 |
| | | Date Received: 01/22/97 |
| | Client Contact: David Glick | Date Extracted: 01/22/97 |
| | Client P.O: | Date Analyzed: 01/22-01/24/97 |

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX***

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

| Lab ID | Client ID | Matrix | TPH(g)+ | MTBE | Benzene | Toluene | Ethylben-zene | Xylenes | % Rec. Surrogate |
|---|---|---|---|---|---|---|---|---|---|
| 73089 | EB8-S2 | S | 2000,a | ND< 4 | 8.4 | 83 | 44 | 210 | 116# |
| 73090 | EB8-S3 | S | 18,a | 0.10 | 3.2 | 1.2 | 0.47 | 1.7 | 106 |
| 73091 | EB9-S1 | S | 1.8,a | ND | 0.071 | 0.052 | 0.026 | 0.074 | 111# |
| 73092 | EB9-S2 | S | 1300,a | ND< 4 | 7.1 | 54 | 29 | 130 | 111# |
| 73093 | EB10-S1 | S | 2300,a | 9.3 | 9.1 | 100 | 50 | 190 | 119# |
| 73094 | EB11-S1 | S | 3800,b,d | ND< 9 | 8.8 | 190 | 97 | 510 | 113# |
| 73095 | EB11-S2 | S | 13,a | ND< 0.1 | 1.1 | 1.6 | 0.47 | 1.4 | 104 |
| 73096 | EB12-S1 | S | 300,b,d | ND< 0.6 | 0.95 | 0.59 | 3.5 | 18 | 105 |
| 73097 | EB12-S2 | S | 1300,a | 6.2 | 9.4 | 23 | 35 | 130 | 115# |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Reporting Limit unless otherwise stated; ND means not detected above the reporting limit | | W | 50 ug/L | 5.0 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | | S | 1.0 mg/kg | 0.05 | 0.005 | 0.005 | 0.005 | 0.005 | |

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, and all TCLP extracts in mg/L

# cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

# QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/22/97-01/23/97 Matrix: Soil/Sludge

| Analyte | Concentration (mg/kg) Sample (#68842) | MS | MSD | Amount Spiked | % Recovery MS | MSD | RPD |
|---|---|---|---|---|---|---|---|
| TPH (gas) | 0.000 | 2.058 | 1.909 | 2.03 | 101 | 94 | 7.5 |
| Benzene | 0.000 | 0.180 | 0.180 | 0.2 | 90 | 90 | 0.0 |
| Toluene | 0.000 | 0.198 | 0.190 | 0.2 | 99 | 95 | 4.1 |
| Ethylbenzene | 0.000 | 0.212 | 0.208 | 0.2 | 106 | 104 | 1.9 |
| Xylenes | 0.000 | 0.642 | 0.614 | 0.6 | 107 | 102 | 4.5 |
| TPH (diesel) | 0 | 300 | 302 | 300 | 100 | 101 | 0.5 |
| TRPH (oil and grease) | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

# QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/24/97-01/25/97 Matrix: Soil

| Analyte | Concentration (mg/kg) Sample (#68845) | MS | MSD | Amount Spiked | % Recovery MS | MSD | RPD |
|---|---|---|---|---|---|---|---|
| TPH (gas) | 0.000 | 2.138 | 2.134 | 2.03 | 105 | 105 | 0.2 |
| Benzene | 0.000 | 0.204 | 0.202 | 0.2 | 102 | 101 | 1.0 |
| Toluene | 0.000 | 0.204 | 0.206 | 0.2 | 102 | 103 | 1.0 |
| Ethylbenzene | 0.000 | 0.200 | 0.202 | 0.2 | 100 | 101 | 1.0 |
| Xylenes | 0.000 | 0.582 | 0.586 | 0.6 | 97 | 98 | 0.7 |
| TPH (diesel) | 0 | 301 | 296 | 300 | 100 | 99 | 1.6 |
| TRPH (oil and grease) | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

GeoPlexus, Inc.
1900 Wyatt Drive, Suite 1, Santa Clara, California 95054
Phone 408/987-0210 Fax 408/988-0815

# CHAIN-OF-CUSTODY

AGP301

| PROJECT NUMBER | PROJECT NAME |
|---|---|
| | GOOD CHEVROLET |

| Send Report Attention of: | Report Due | Verbal Due |
|---|---|---|
| DAVID GICK | / / | / / |

| | Sample Number | Date | Time | Comp | Grab | Station Location | Number of Cntnrs | Type of Containers | TPHgas/BTEX MTBE | Condition of Samples | Initial |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EB8-WS1 | 1/21/97 | 1100 | | / | BORING EB8 | 1 | ACIDIFIED 40 ml VOA | / | 73098 | |
| 3 | EB10-WS1 | | 1200 | | / | BORING EB10 | | | / | 73099 | |
| 4 | EB11-WS1 | | 1348 | | / | BORING EB 11 | | | / | 73100 | |
| 5 | EB12-WS1 | | 1410 | | / | BORING EB12 | | | / | 73101 | |
| 6 | P1-WS1 | | 1550 | | / | PROBE 1 | | | / | 73102 | |
| 7 | P2-WS1 | | 1535 | | / | PROBE 2 | | | / | 73103 | |
| 8 | P3-WS1 | | 1600 | | / | PROBE 3 | | | / | 73104 | |

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
|---|---|---|---|
| | 1/21/97 935 | C Ranger GCA | 1-22 9:50 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| C Ranger | 1-22 12:50 | Angela Rydelius | 1-22-97 1250 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |

Remarks: STANDARD TURNAROUND

ICE/T ✓
COOD CONDITION ✓
HEAD SPACE ABSENT ✓

| VOAs | O&G | METALS | OTHER |
|---|---|---|---|
| PRESERVATIVE ✓ | | | |
| APPROPRIATE CONTAINERS ✓ | | | |

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

| | | |
|---|---|---|
| Geo Plexus, Inc.<br>1900 Wyatt Drive, Suite 1<br>Santa Clara, CA 95054 | Client Project ID: Good Chevrolet | Date Sampled: 01/21/97 |
| | | Date Received: 01/22/97 |
| | Client Contact: David Glick | Date Extracted: 01/22-01/23/97 |
| | Client P.O: | Date Analyzed: 01/22-01/23/97 |

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX***

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

| Lab ID | Client ID | Matrix | TPH(g)+ | MTBE | Benzene | Toluene | Ethylben-zene | Xylenes | % Rec. Surrogate |
|---|---|---|---|---|---|---|---|---|---|
| 73098 | EB8-WS1 | W | 25,000,a | ND< 80 | 2600 | 3200 | 780 | 3600 | 102 |
| 73099 | EB10-WS1 | W | 81,000,a,h | ND< 370 | 13,000 | 12,000 | 3300 | 8000 | 104 |
| 73100 | EB11-WS1 | W | 49,000,a | ND< 180 | 6900 | 6000 | 2100 | 4600 | 100 |
| 73101 | EB12-WS1 | W | 38,000,a,i | 110 | 1400 | 1400 | 1800 | 7400 | 101 |
| 73102 | P1-WS1 | W | 74,000,a,i | ND< 78 | 1100 | 5800 | 3800 | 18,000 | 102 |
| 73103 | P2-WS1 | W | 6800,a | ND< 10 | 2200 | 290 | 310 | 560 | 103 |
| 73104 | P3-WS1 | W | 220,a | ND | 1.9 | 17 | 10 | 49 | 103 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Reporting Limit unless otherwise stated; ND means not detected above the reporting limit | | W | 50 ug/L | 5.0 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | | S | 1.0 mg/kg | 0.05 | 0.005 | 0.005 | 0.005 | 0.005 | |

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, and all TCLP extracts in mg/L

# cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

# QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/22/97-01/23/97 Matrix: Water

| Analyte | Concentration (mg/L) Sample (#73037) | MS | MSD | Amount Spiked | % Recovery MS | MSD | RPD |
|---|---|---|---|---|---|---|---|
| TPH (gas) | 0.0 | 89.5 | 87.3 | 100.0 | 89.5 | 87.3 | 2.5 |
| Benzene | 0.0 | 7.9 | 8.0 | 10.0 | 79.0 | 80.0 | 1.3 |
| Toluene | 0.0 | 8.6 | 8.7 | 10.0 | 86.0 | 87.0 | 1.2 |
| Ethyl Benzene | 0.0 | 9.1 | 9.4 | 10.0 | 91.0 | 94.0 | 3.2 |
| Xylenes | 0.0 | 27.5 | 29.4 | 30.0 | 91.7 | 98.0 | 6.7 |
| TPH (diesel) | 0 | 150 | 148 | 150 | 100 | 98 | 1.5 |
| TRPH (oil & grease) | 0 | 26400 | 24900 | 23700 | 111 | 105 | 5.8 |

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

# GeoPlexus, Inc.

## CHAIN-OF-CUSTODY

AGP303

1900 Wyatt Drive, Suite 1, Santa Clara, California 95054
Phone 408/987-0210 Fax 408/988-0815

| PROJECT NUMBER | PROJECT NAME |
|---|---|
| 93013 | Good Chevrolet |

Send Report Attention of: DAVID GLICK

Report Due: / /

Verbal Due: / /

| | Sample Number | Date | Time | Comp | Grab | Station Location | Number of Cntnrs | Type of Containers | Type of Analysis: TPH-gas/BTEX/MTBE | Condition of Cont. | Initial |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (†) | MW1-WS1A,B | 1/21/97 | 1010 | | / | mon well 1 | Zea | 1 addl 40 ml VOA | X | 73108 | |
| (†) | MW2-WS1A,B | 1/21/97 | 1050 | | / | mon well 2 | | | X | 73109 | |
| (†) | MW3-WS1A,B | 1/21/97 | 930 | | / | mon well 3 | | | X | 73110 | |
| (†) | MW5-WS1A,B | 1/21/97 | 1115 | | / | mon well 5 | | | X | 73111 | |

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
|---|---|---|---|
| | 1/21/97 2:50 | | 1-22 9:50 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | 1-22 12:50 | | 1-22-97 12:50 |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Date/Time |
| | | | |

Remarks: STANDARD TURNAROUND

VOAS ✓ | O&G | METALS | OTHER

ICE/T ✓ PRESERVATIVE ✓

GOOD CONDITION ✓ APPROPRIATE

HEAD SPACE ABSENT ✓ CONTAINERS ✓

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

| | | |
|---|---|---|
| Geo Plexus, Inc.<br>1900 Wyatt Drive, Suite 1<br>Santa Clara, CA 95054 | Client Project ID: # 93013; Good Chevrolet | Date Sampled: 01/21/97 |
| | | Date Received: 01/22/97 |
| | Client Contact: David Glick | Date Extracted: 01/22-01/23/97 |
| | Client P.O: | Date Analyzed: 01/22-01/23/97 |

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX***

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

| Lab ID | Client ID | Matrix | TPH(g)+ | MTBE | Benzene | Toluene | Ethylben-zene | Xylenes | % Rec. Surrogate |
|---|---|---|---|---|---|---|---|---|---|
| 73108 | MW1-WS1A | W | 3100,a | ND< 7.3 | 1100 | 87 | 160 | 180 | 103 |
| 73109 | MW2-WS1A | W | 7600,a | ND< 20 | 2600 | 310 | 330 | 660 | 104 |
| 73110 | MW3-WS1A | W | 2200,a | ND | 860 | 63 | 71 | 80 | 103 |
| 73111 | MW5-WS1A | W | 2600,a | ND | 750 | 65 | 180 | 280 | 102 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Reporting Limit unless otherwise stated; ND means not detected above the reporting limit | | W | 50 ug/L | 5.0 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | | S | 1.0 mg/kg | 0.05 | 0.005 | 0.005 | 0.005 | 0.005 | |

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, and all TCLP extracts in mg/L

# cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

# QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/22/97-01/23/97 Matrix: Water

| Analyte | Concentration (mg/L) Sample (#73037) | MS | MSD | Amount Spiked | % Recovery MS | MSD | RPD |
|---|---|---|---|---|---|---|---|
| TPH (gas) | 0.0 | 89.5 | 87.3 | 100.0 | 89.5 | 87.3 | 2.5 |
| Benzene | 0.0 | 7.9 | 8.0 | 10.0 | 79.0 | 80.0 | 1.3 |
| Toluene | 0.0 | 8.6 | 8.7 | 10.0 | 86.0 | 87.0 | 1.2 |
| Ethyl Benzene | 0.0 | 9.1 | 9.4 | 10.0 | 91.0 | 94.0 | 3.2 |
| Xylenes | 0.0 | 27.5 | 29.4 | 30.0 | 91.7 | 98.0 | 6.7 |
| TPH (diesel) | 0 | 150 | 148 | 150 | 100 | 98 | 1.5 |
| TRPH (oil & grease) | 0 | 26400 | 24900 | 23700 | 111 | 105 | 5.8 |

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

# APPENDIX C

## ASTM RBCA TIER-1 DATA

# RBCA TIER 1/TIER 2 EVALUATION

## Output Table 1

Site Name: Good Chevrolet
Site Location: 1630 Park Street, Alameda, CA

Job Identification:
Date Completed: 3/18/97
Completed By: David Glick

Software: GSI RBCA Spreadsheet
Version: v 1.0

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined

## DEFAULT PARAMETERS

| Exposure Parameter | Definition (Units) | Residential Adult | Residential (1-6yrs) | Residential (1-16 yrs) | Commercial/Industrial Chronic | Commercial/Industrial Constrctn |
|---|---|---|---|---|---|---|
| ATc | Averaging time for carcinogens (yr) | 70 | | | | |
| ATn | Averaging time for non-carcinogens (yr) | 30 | 6 | 16 | 25 | 1 |
| BW | Body Weight (kg) | 70 | 15 | 35 | 70 | |
| ED | Exposure Duration (yr) | 30 | 6 | 16 | 25 | 1 |
| EF | Exposure Frequency (days/yr) | 350 | | | 250 | 180 |
| EF Derm | Exposure Frequency for dermal exposure | 350 | | | 250 | |
| IRgw | Ingestion Rate of Water (l/day) | 2 | | | 1 | |
| IRs | Ingestion Rate of Soil (mg/day) | 100 | 200 | | 50 | 100 |
| IRadj | Adjusted soil ing rate (mg-yr/kg-d) | 1.1E+02 | | | 9.4E+01 | |
| IRa in | Inhalation rate indoor (m^3/day) | 15 | | | 20 | |
| IRa out | Inhalation rate outdoor (m^3/day) | 20 | | | 20 | 10 |
| SA | Skin surface area (dermal) (cm^2) | 5 8E+03 | | 2 0E+03 | 5.8E+03 | 5 8E+03 |
| SAadj | Adjusted dermal area (cm^2-yr/kg) | 2 1E+03 | | | 1.7E+03 | |
| M | Soil to Skin adherence factor | 1 | | | | |
| AAFs | Age adjustment on soil ingestion | FALSE | | | FALSE | |
| AAFd | Age adjustment on skin surface area | FALSE | | | FALSE | |
| tox | Use EPA tox data for air (or PEL based) | TRUE | | | | |
| gwMCL? | Use MCL as exposure limit in groundwater? | FALSE | | | | |

| Matrix of Exposed Persons to Complete Exposure Pathways | | Residential | Commercial/Industrial Chronic | Commercial/Industrial Constrctn |
|---|---|---|---|---|
| Groundwater Pathways: | | | | |
| GW i | Groundwater Ingestion | FALSE | TRUE | |
| GW v | Volatilization to Outdoor Air | FALSE | TRUE | |
| GW b | Vapor Intrusion to Buildings | FALSE | TRUE | |
| Soil Pathways | | | | |
| S v | Volatiles from Subsurface Soils | FALSE | TRUE | |
| SS.v | Volatiles and Particulate Inhalation | FALSE | TRUE | TRUE |
| SS.d | Direct Ingestion and Dermal Contact | FALSE | TRUE | TRUE |
| S l | Leaching to Groundwater from all Soils | FALSE | TRUE | |
| S b | Intrusion to Buildings - Subsurface Soils | FALSE | TRUE | |

| Matrix of Receptor Distance and Location on- or off-site | | Residential Distance | Residential On-Site | Commercial/Industrial Distance | Commercial/Industrial On-Site |
|---|---|---|---|---|---|
| GW | Groundwater receptor (cm) | | TRUE | | TRUE |
| S | Inhalation receptor (cm) | | TRUE | | TRUE |

| Matrix of Target Risks | | Individual | Cumulative |
|---|---|---|---|
| TRab | Target Risk (class A&B carcinogens) | ***1.0E-04*** | |
| TRc | Target Risk (class C carcinogens) | ***1.0E-04*** | |
| THQ | Target Hazard Quotient | 1 0E+00 | |
| Opt | Calculation Option (1, 2, or 3) | 1 | |
| Tier | RBCA Tier | 1 | |

| Surface Parameters | Definition (Units) | Residential | Commercial/Industrial Chronic | Commercial/Industrial Construction |
|---|---|---|---|---|
| t | Exposure duration (yr) | 30 | 25 | 1 |
| A | Contaminated soil area (cm^2) | 2.2E+06 | | 1 0E+06 |
| W | Length of affected soil parallel to wind (cm) | 1 5E+03 | | 1 0E+03 |
| W.gw | Length of affected soil parallel to groundwater (c | 1 5E+03 | | |
| Uair | Ambient air velocity in mixing zone (cm/s) | 2 3E+02 | | |
| delta | Air mixing zone height (cm) | 2 0E+02 | | |
| Lss | Definition of surficial soils (cm) | 1 0E+02 | | |
| Pe | Particulate areal emission rate (g/cm^2/s) | 2 2E-10 | | |

| Groundwater | Definition (Units) | Value |
|---|---|---|
| delta.gw | Groundwater mixing zone depth (cm) | 2 0E+02 |
| I | Groundwater infiltration rate (cm/yr) | 3.0E+01 |
| Ugw | Groundwater Darcy velocity (cm/yr) | 2 5E+03 |
| Ugw.tr | Groundwater Transport velocity (cm/yr) | 6 6E+03 |
| Ks | Saturated Hydraulic Conductivity(cm/s) | |
| grad | Groundwater Gradient (cm/cm) | |
| Sw | Width of groundwater source zone (cm) | |
| Sd | Depth of groundwater source zone (cm) | |
| BC | Biodegradation Capacity (mg/L) | |
| BIO? | Is Bioattenuation Considered | FALSE |
| phi eff | Effective Porosity in Water-Bearing Unit | 3 8E-01 |
| foc sat | Fraction organic carbon in water-bearing unit | 1 0E-03 |

| Soil | Definition (Units) | Value |
|---|---|---|
| hc | Capillary zone thickness (cm) | ***6.1E+00*** |
| hv | Vadose zone thickness (cm) | ***2.1E+02*** |
| rho | Soil density (g/cm^3) | 1.7 |
| foc | Fraction of organic carbon in vadose zone | 0 01 |
| phi | Soil porosity in vadose zone | 0.38 |
| Lgw | Depth to groundwater (cm) | ***2.1E+02*** |
| Ls | Depth to top of affected soil (cm) | 1.0E+02 |
| Lsubs | Thickness of affected subsurface soils (cm) | 2.0E+02 |
| pH | Soil/groundwater pH | 6.5 |

| | | capillary | vadose | foundation |
|---|---|---|---|---|
| phi w | Volumetric water content | 0 342 | 0 12 | 0 12 |
| phi a | Volumetric air content | 0.038 | 0 26 | 0 26 |

| Building | Definition (Units) | Residential | Commercial |
|---|---|---|---|
| Lb | Building volume/area ratio (cm) | 2 0E+02 | 3 0E+02 |
| ER | Building air exchange rate (s^-1) | 1 4E-04 | 2 3E-04 |
| Lcrk | Foundation crack thickness (cm) | 1 5E+01 | |
| eta | Foundation crack fraction | 0 01 | |

| Dispersive Transport Parameters | Definition (Units) | Residential | Commercial |
|---|---|---|---|
| Groundwater | | | |
| ax | Longitudinal dispersion coefficient (cm) | | |
| ay | Transverse dispersion coefficient (cm) | | |
| az | Vertical dispersion coefficient (cm) | | |
| Vapor | | | |
| dcy | Transverse dispersion coefficient (cm) | | |
| dcz | Vertical dispersion coefficient (cm) | | |

**Physical Property Data**

| CAS Number | Constituent | type | Molecular Weight (g/mole) MW | ref | Diffusion Coefficients in air (cm2/s) Dair | re | Diffusion Coefficients in water (cm2/s) Dwat | re | log (Koc) or log(Kd) (@ 20 - 25 C) (l/kg) Koc | ref | Henry's Law Constant (@ 20 - 25 C) (atm-m3/mol) | Henry's Law Constant (@ 20 - 25 C) (unitless) | re | Vapor Pressure (@ 20 - 25 C) (mm Hg) Pure Component | ref | Solubility (@ 20 - 25 C) (mg/l) Pure Component | ref | acid pKa | base pKb | ref |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | A | 78.1 | 5 | 9.30E-02 | A | 1.10E-05 | A | 1.58 | A | 5.29E-03 | 2.20E-01 | A | 9.52E+01 | 4 | 1.75E+03 | A | | | |
| 100-41-4 | Ethylbenzene | A | 106.2 | 5 | 7.60E-02 | A | 8.50E-06 | A | 1.98 | A | 7.69E-03 | 3.20E-01 | A | 1.00E+01 | 4 | 1.52E+02 | 5 | | | |
| 1634-04-4 | Methyl t-Butyl Ether | O | 88.146 | 5 | 7.92E-02 | 6 | 9.41E-05 | 7 | 1.08 | A | 5.77E-04 | 2.40E-02 | | 2.49E+02 | | 4.80E+04 | A | | | |
| 108-88-3 | Toluene | A | 92.4 | 5 | 8.50E-02 | A | 9.40E-06 | A | 2.13 | A | 6.25E-03 | 2.60E-01 | A | 3.00E+01 | 4 | 5.15E+02 | 29 | | | |
| 1330-20-7 | Xylene (mixed isomers) | A | 106.2 | 5 | 7.20E-02 | A | 8.50E-06 | A | 2.38 | A | 6.97E-03 | 2.90E-01 | A | 7.00E+00 | 4 | 1.98E+02 | 5 | | | |

Site Name: Good Chevrolet  Site Location: 1630 Park Street, Al  Completed By: David Glick  Date Completed: 3/18/1997

Software version: v 1.0

## Toxicity Data

| CAS Number | Constituent | Reference Dose (mg/kg/day) Oral RfD_oral | ref | Inhalation RfD_Inhal | re | Slope Factors 1/(mg/kg/day) Oral SF_oral | ref | Inhalation SF_inhal | ref | EPA Weight of Evidence | Is Constituent Carcinogenic ? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | - | R | 1.70E-03 | R | 2.90E-02 | A | 2.90E-02 | A | A | TRUE |
| 100-41-4 | Ethylbenzene | 1.00E-01 | A | 2.86E-01 | A | - | R | - | R | D | FALSE |
| 1634-04-4 | Methyl t-Butyl Ether | 5.00E-03 | R | 8.57E-01 | R | - | R | - | R | | FALSE |
| 108-88-3 | Toluene | 2.00E-01 | A,R | 1.14E-01 | , | - | R | - | R | D | FALSE |
| 1330-20-7 | Xylene (mixed isomers) | 2.00E+00 | A,R | 2.00E+00 | A | - | R | - | R | D | FALSE |

Site Name: Good Chevrol Site Location: 1630 Park Street, Ala Completed By: David Glick Date Completed: 3/18/1997

Software version: v 1.0

## Miscellaneous Chemical Data

| CAS Number | Constituent | Maximum Contaminant Level MCL (mg/L) | Maximum Contaminant Level reference | Permissible Exposure Limit PEL/TLV (mg/m3) | PEL/TLV ref | Relative Absorption Factors Oral | Relative Absorption Factors Dermal | Detection Limits Groundwater (mg/L) | Groundwater ref | Detection Limits Soil (mg/kg) | Soil re | Half Life (First-Order Decay) (days) Saturated | Half Life (First-Order Decay) (days) Unsaturated | Half Life ref |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 5.00E-03 | 52 FR 25690 | 3.20E+00 | OSHA | 1 | 0.5 | 0.002 | C | 0.005 | S | 720 | 720 | H |
| 100-41-4 | Ethylbenzene | 7.00E-01 | 6 FR 3526 (30 Jan 91 | 4.34E+02 | ACGIH | 1 | 0.5 | 0.002 | C | 0.005 | S | 228 | 228 | H |
| 1634-04-4 | Methyl t-Butyl Ether | | | 1.44E+02 | ACGIH | 1 | 0.5 | | | | | 360 | 360 | H |
| 108-88-3 | Toluene | 1.00E+00 | 6 FR 3526 (30 Jan 91 | 1.47E+02 | ACGIH | 1 | 0.5 | 0.002 | C | 0.005 | S | 28 | 28 | H |
| 1330-20-7 | Xylene (mixed isomers) | 1.00E+01 | 6 FR 3526 (30 Jan 91 | 4.34E+02 | ACGIH | 1 | 0.5 | 0.005 | C | 0.005 | S | 360 | 360 | H |

Site Name: Good Chevrol Site Location: 1630 Park Street, Alameda, CA Completed By: David Glick Date Completed: 3/18/1997

Software version: v 1.0

Tier 1 Worksheet 6.1

Site Name: Good Chevrolet

Site Location: 1630 Park Street, Alameda, CA

Completed By: David Glick

Date Completed: 3/18/1997



# SURFACE SOIL RBSL VALUES (< 3 FT BGS)

Target Risk (Class A & B) 1.0E-4

Target Risk (Class C) 1.0E-4

Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?

☐ PEL exposure limit?

Calculation Option: 1

**RBSL Results For Complete Exposure Pathways ("x" If Complete)**

| CONSTITUENTS OF CONCERN | | Representative Concentration | X | Soil Leaching to Groundwater | | | X | Ingestion, Inhalation and Dermal Contact | | X | Construction Worker | Applicable RBSL | RBSL Exceeded ? | Required CRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Name | (mg/kg) | | Residential (on-site) | Commercial (on-site) | Regulatory(MCL) (on-site) | | Residential (on-site) | Commercial (on-site) | | Commercial: (on-site) | (mg/kg) | "■" If yes | Only if "yes" left |
| 71-43-2 | Benzene | 9.1E+0 | | NA | 5.8E+0 | NA | | NA | 3.2E+2 | | >Res | 5.8E+0 | ■ | 2.0E+00 |
| 100-41-4 | Ethylbenzene | 9.7E+1 | | NA | 1.3E+2 | NA | | NA | >Res | | >Res | 1.3E+2 | ☐ | <1 |
| 1634-04-4 | Methyl t-Butyl Ether | 9.3E+0 | | NA | 1.2E+0 | NA | | NA | 1.7E+2 | | 2.4E+2 | 1.2E+0 | ■ | 8.0E+00 |
| 108-88-3 | Toluene | 1.9E+2 | | NA | 3.6E+2 | NA | | NA | >Res | | >Res | 3.6E+2 | ☐ | <1 |
| 1330-20-7 | Xylene (mixed isomers) | 5.1E+2 | | NA | >Res | NA | | NA | >Res | | >Res | >Res | ☐ | <1 |



Software: GSI RBCA Spreadsheet Serial: 0

Version: v 1.0

Tier 1 Worksheet 6.2

Site Name: Good Chevrolet
Site Location: 1630 Park Street, Alameda, CA

Completed By: David Glick
Date Completed: 3/18/1997



## SUBSURFACE SOIL RBSL VALUES (> 3 FT BGS)

Target Risk (Class A & B) 1.0E-4
Target Risk (Class C) 1.0E-4
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

**Calculation Option: 1**

**RBSL Results For Complete Exposure Pathways ("x" if Complete)**

| CONSTITUENTS OF CONCERN | | Representative Concentration | X Soil Leaching to Groundwater | | | X Soil Volatilization to Indoor Air | | X Soil Volatilization to Outdoor Air | | Applicable RBSL | RBSL Exceeded ? | Required CRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Name | (mg/kg) | Residential (on-site) | Commercial: (on-site) | Regulatory(MCL): (on-site) | Residential (on-site) | Commercial. (on-site) | Residential (on-site) | Commercial: (on-site) | (mg/kg) | "■" If yes | Only if "yes" left |
| 71-43-2 | Benzene | 3.2E+0 | NA | 5.8E+0 | NA | NA | 1.4E+0 | NA | 6.0E+2 | 1.4E+0 | ■ | 2.0E+00 |
| 100-41-4 | Ethylbenzene | 4.7E-1 | NA | 1.3E+2 | NA | NA | >Res | NA | >Res | 1.3E+2 | ☐ | <1 |
| 1634-04-4 | Methyl t-Butyl Ether | 1.0E-1 | NA | 1.2E+0 | NA | NA | 7.0E+2 | NA | >Res | 1.2E+0 | ☐ | <1 |
| 108-88-3 | Toluene | 1.6E+0 | NA | 3.6E+2 | NA | NA | 9.3E+1 | NA | >Res | 9.3E+1 | ☐ | <1 |
| 1330-20-7 | Xylene (mixed isomers) | 1.4E+0 | NA | >Res | NA | NA | >Res | NA | >Res | >Res | ☐ | <1 |



Software: GSI RBCA Spreadsheet Serial: 0
Version: v 1.0

Site Name: Good Chevrolet
Site Location: 1630 Park Street, Alameda, CA

Completed By: David Glick
Date Completed: 3/18/1997



Tier 1 Worksheet 6.3

## GROUNDWATER RBSL VALUES

Target Risk (Class A & B) 1.0E-4
Target Risk (Class C) 1.0E-4
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

**Calculation Option: 1**

**RBSL Results For Complete Exposure Pathways ("x" if Complete)**

| CONSTITUENTS OF CONCERN | | Representative Concentration | X | Groundwater Ingestion | | | X | Groundwater Volatilization to Indoor Air | | X | Groundwater Volatilization to Outdoor Air | | Applicable RBSL | RBSL Exceeded ? | Required CRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Name | (mg/L) | | Residential (on-site) | Commercial (on-site) | Regulatory(MCL) (on-site) | | Residential (on-site) | Commercial (on-site) | | Residential (on-site) | Commercial (on-site) | (mg/L | "■" If yes | Only if "yes" left |
| 71-43-2 | Benzene | 1.3E+1 | | NA | 9.9E-1 | NA | | NA | 1.4E+0 | | NA | 3.7E+2 | 9.9E-1 | ■ | 1.3E+01 |
| 100-41-4 | Ethylbenzene | 3.8E+0 | | NA | 1.0E+1 | NA | | NA | >Sol | | NA | >Sol | 1.0E+1 | ☐ | <1 |
| 1634-04-4 | Methyl t-Butyl Ether | 1.0E-1 | | NA | 5.1E-1 | NA | | NA | 3.6E+3 | | NA | >Sol | 5.1E-1 | ☐ | <1 |
| 108-88-3 | Toluene | 1.2E+1 | | NA | 2.0E+1 | NA | | NA | 9.2E+1 | | NA | >Sol | 2.0E+1 | ☐ | <1 |
| 1330-20-7 | Xylene (mixed isomers) | 1.8E+1 | | NA | >Sol | NA | | NA | >Sol | | NA | >Sol | >Sol | ☐ | <1 |



Software: GSI RBCA Spreadsheet Serial: 0
Version: v 1.0

Site Name: Good Chevrolet | Site Location: 1630 Park Street, Alameda, CA | Completed By: David Glick | Date Completed: 3/18/1997 | 5 OF 6

## TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SOIL: LEACHING TO GROUNDWATER/ INGESTION

*Exposure Concentration*

| Constituents of Concern | 1) Source Medium: Soil Concentration (mg/kg) | 2) NAF Value (L/kg) Receptor: On-Site Commercial | | 3) Exposure Medium: Groundwater - POE Conc. (mg/L) (1)/(2) On-Site Commercial | | 4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg-day) On-Site Commercial | | 5) Average Daily Intake Rate (mg/kg-day) On-Site Commercial | |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 9.1E+0 | 5.9E+0 | | 1.6E+0 | | 3.5E-3 | | 5.4E-3 | |
| Ethylbenzene | 9.7E+1 | 1.3E+1 | | 7.5E+0 | | 9.8E-3 | | 7.3E-2 | |
| Methyl t-Butyl Ether | 9.3E+0 | 2.4E+0 | | 3.9E+0 | | 9.8E-3 | | 3.9E-2 | |
| Toluene | 1.9E+2 | 1.8E+1 | | 1.1E+1 | | 9.8E-3 | | 1.1E-1 | |
| Xylene (mixed isomers) | 5.1E+2 | 3.0E+1 | | 1.7E+1 | | 9.8E-3 | | 1.6E-1 | |

NOTE. AT = Averaging time (days) | BW = Body Weight (kg) | CF = Units conversion factor | ED = Exp duration (yrs) | EF = Exposure frequencey (days/yr) | IR = Intake rate (L/day) | POE = Point of exposure