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1301 Marina Village Parkway, Suite 200 • Alameda, California 94501 • (510) 769-0100 • Fax: (510) 769-9244

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13 November 1995
Ref: 726104

Ms. Madhulla Logan
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Subject: Quarterly Progress Report 4 and Annual Summary Assessment:
Redwood Regional Park Service Yard, Oakland, California

Dear Ms. Logan:

Attached is Quarterly Progress Report 4 and Annual Summary Assessment for the site investigation at Redwood Regional Park Service Yard, Oakland, California. This report describes November 1994 through August 1995 site characterization and groundwater monitoring activities related to two former leaking underground fuel storage tanks. This report also summarizes previous site characterization and remedial activities associated with the former tanks.

Current quarter activities include hydrologic and hydrochemical monitoring of the six site groundwater monitoring wells.

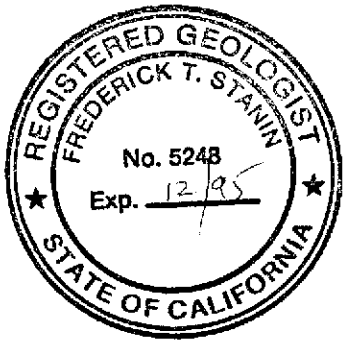
We trust that this submittal meets your needs. Please call if you have questions or require additional information.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Bruce M. Rucker

Bruce M. Rucker, REA
Project Manager



Frederick T. Stanin, C.E.G.
Principal Geologist

BMR/FTS/bd/14-01L.R2

Enclosure

cc: W. Gee, East Bay Regional Parks District

PARSONS

Quarterly Progress Report 4 and
Annual Summary Assessment

(November 1994 - August 1995)

REDWOOD REGIONAL PARK SERVICE YARD - OAKLAND, CALIFORNIA

Prepared for

EAST BAY REGIONAL PARKS DISTRICT

Oakland, California

November 1995

Prepared by

PARSONS ENGINEERING SCIENCE, INC.
PLANNING • DESIGN • CONSTRUCTION MANAGEMENT
1301 MARINA VILLAGE PARKWAY, ALAMEDA, CA 94501 • 510/769-0100
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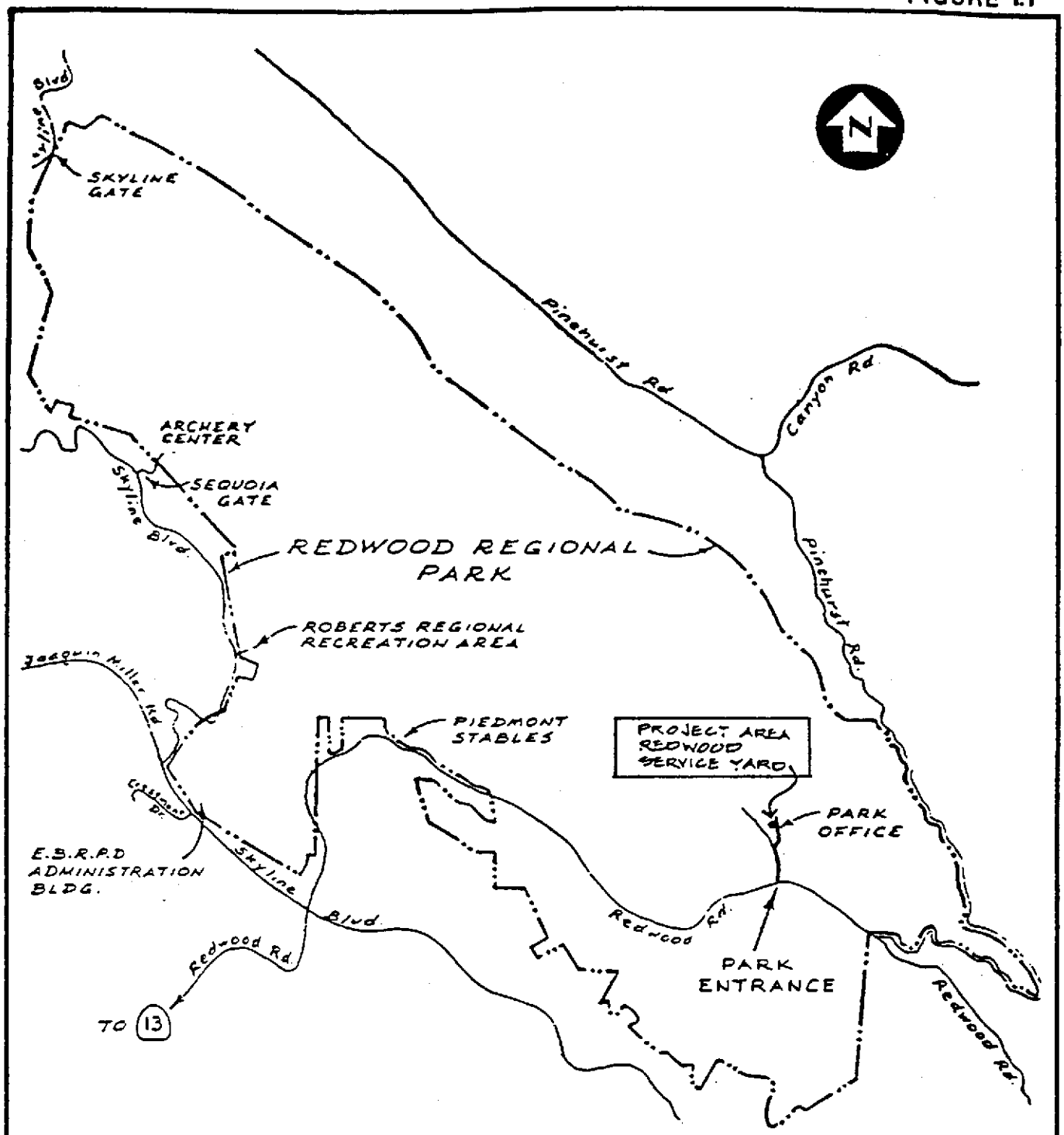
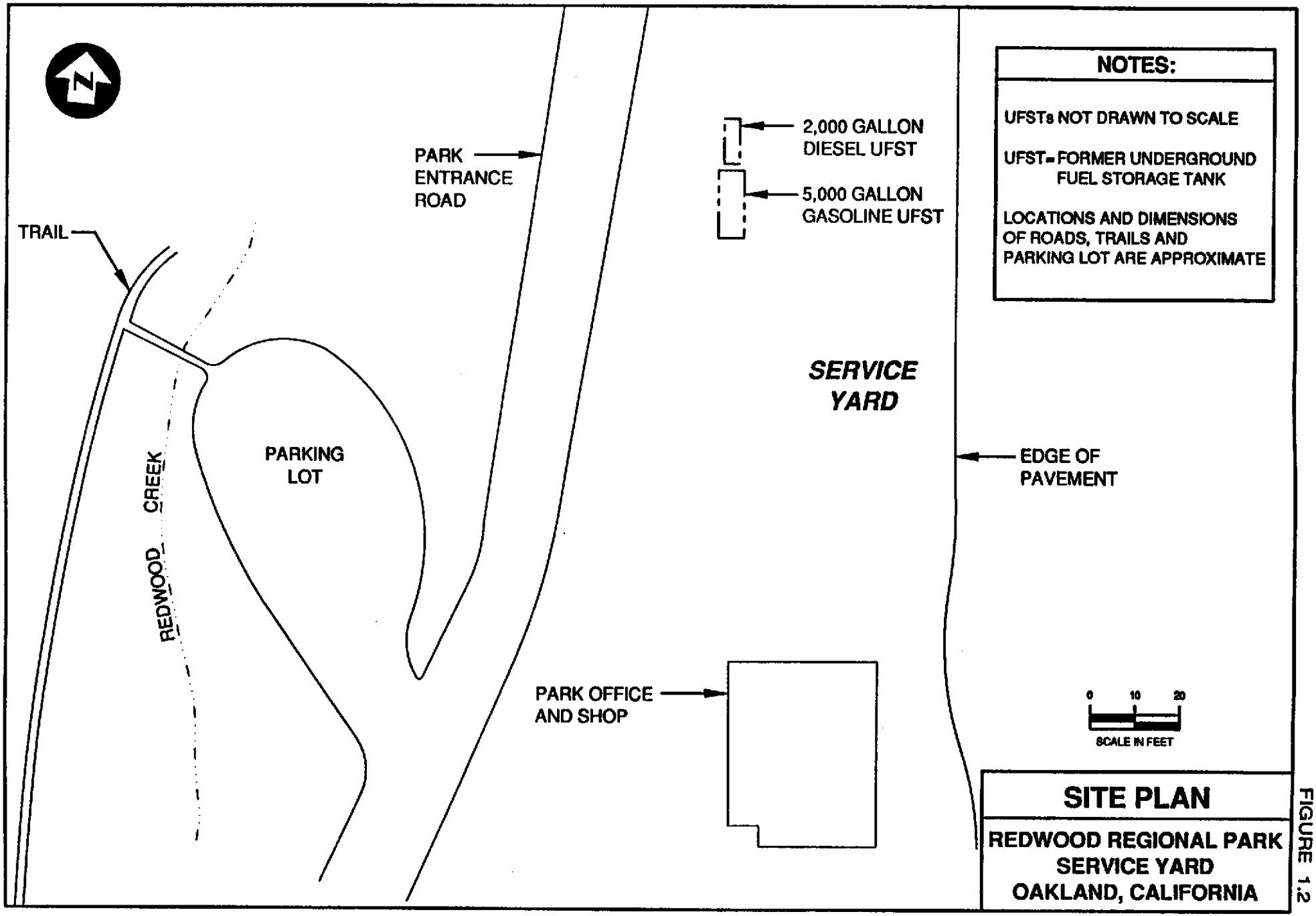
FIGURE 1.1



SITE LOCATION MAP

REDWOOD REGIONAL PARK
SERVICE YARD

OAKLAND, CALIFORNIA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N
PARK ENTRANCE ROAD
TRAIL
2,000 GALLON DIESEL UFST
5,000 GALLON GASOLINE UFST
NOTES:
UFSTs NOT DRAWN TO SCALE
UFST = FORMER UNDERGROUND FUEL STORAGE TANK
LOCATIONS AND DIMENSIONS OF ROADS, TRAILS AND PARKING LOT ARE APPROXIMATE
SERVICE YARD
REDWOOD CREEK
PARKING LOT
EDGE OF PAVEMENT
PARK OFFICE AND SHOP
0 10 20
SCALE IN FEET
SITE PLAN
REDWOOD REGIONAL PARK
SERVICE YARD
OAKLAND, CALIFORNIA
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FIGURE 1.2

1.2.1 UFST Closure and Soil Remedial Activities

The two project site UFSTs were excavated and transported off-site for disposal in April 1993, at which time discolored soil was observed in the excavation pit below the gasoline UFST location. Initial confirmation soil samples collected from beneath each UFST indicated soil contamination by total petroleum hydrocarbons - gasoline (TPH-G) range and aromatic hydrocarbons (benzene, toluene, ethylbenzene and total xylenes [BTEX]) (Parsons ES 1993a). No elevated levels of lead were detected in those soil samples.

Approximately 600 cubic yards of contaminated soil in the vicinity of the UFSTs were excavated and stockpiled for on site aeration in June 1993. The excavation covered a surface area of approximately 5,000 square feet, and had a maximum depth of approximately 25 feet (below grade relative to the eastern edge of the excavation). Soil excavation activities were halted due to the potential for slope instability, the presence of significant facility constraints (roads and buildings) and the infiltration of spring water into the excavation.

Five confirmation excavation soil samples were collected by Parsons ES in June 1993. Discolored soil was noted only in the eastern wall of the excavation. However, confirmation soil samples from other areas contained up to 1,700 parts per million by volume (ppmv) total ionizable vapors as measured with a photoionization detector (PID) and a total hydrocarbon vapor analyzer (THVA). Maximum concentrations detected in excavation confirmation soil samples include 12,000 milligrams per kilogram (mg/Kg) TPH-G, 1,300 TPH-D/K, 80 mg/Kg benzene, 390 mg/Kg toluene, 230 mg/Kg ethylbenzene and 1,100 mg/Kg total xylenes (Parsons ES 1993c).

The excavation was backfilled between June and August 1993 with previously excavated clean overburden (estimated 270 cubic yards) and imported fill (estimated 330 cubic yards) and the surface was repaved with asphalt.

The approximately 600 cubic yards of contaminated soil were stockpiled on plastic sheeting at an open area behind the Redwood Park Fire Station #2 located on Redwood Road approximately 500 feet east of the project site. Confirmation soil samples were collected from the stockpiled soil in July 1993, and aeration of the stockpiled, contaminated soil began in August 1993 (Parsons ES 1993a). Following Alameda County Health Care Services Agency, Environmental Health Department, Hazardous Materials Division (ACHCSA) approval, the soil was relocated to Sibley Regional Preserve in Contra Costa County, California for further aeration (EBRPD 1995).

1.2.2 Initial Site Characterization

Following submittal of a technical workplan (Parsons ES 1993b), an initial site characterization was conducted in September and October 1993 in the vicinity of the former UFST excavation. Tasks conducted included: advancing 17 exploratory borings and converting five to temporary well points; collecting 27 soil and five "grab" groundwater samples for laboratory analysis; and measurement of static water levels (Parsons ES 1993c). No significant soil contamination was detected in soil borings immediately north, south or east of the former UFST remedial excavation. Soil contamination was detected in soil borings up to 90 feet southwest of the former UFST excavation; maximum soil

contamination detected included 1,900 mg/Kg TPH-G, 1,300 mg/Kg TPH-K and 198 mg/Kg BTEX constituents. Maximum groundwater contamination detected in temporary well points included 810,000 micrograms per liter (µg/L) TPH-G, 2,300,000 µg/L TPH-K, 570 µg/L TPH-D and 125,000 µg/L BTEX (including 12,000 µg/L benzene) (Parsons ES 1993c).

1.2.3 Creek Soil and Surface Water Sampling

Following observation of an area of discolored soil in the bed of Redwood Creek southwest of the former UFSTs, soil and "grab" surface water samples were collected for laboratory analysis in February and March 1994 (Parsons ES 1994a and 1994b). One soil sample was collected in February 1994 for laboratory analysis from the discolored soil. That sample contained 3 mg/Kg of TPH-D; neither TPH-G nor BTEX were detected. Two "grab" surface water samples were collected in February and March 1995 immediately downstream of the discolored soil. Those water samples contained up to 130 µg/L TPH-G and selected BTEX constituents; TPH-D/K was not detected. Creek surface water samples were not collected during the February or May 1995 sampling events because there was no water present in the creek at the time of the sampling. Creek surface water samples collected during the June 1995 sampling event contained no detectable TPH or BTEX (Parsons ES 1995b). One "grab" surface water sample was also collected in March 1994 approximately 500 feet upstream of the area of discolored soil. That water sample contained 50 µg/L TPH-G; neither TPH-D/K nor BTEX were detected (Parsons ES 1994a and 1994b). It is inferred that this upstream surface water contamination results from runoff of vehicle-sourced fuel compounds from parking areas and/or roadways.

The following conclusions regarding the extent of soil and groundwater contamination are based on the data collected by Parsons ES prior to August 1995:

- Soil excavation activities were effective in reducing the majority of soil contamination in the immediate vicinity of the former UFSTs to concentrations less than regulatory agency action levels.
- Capillary fringe soils and groundwater contaminated with petroleum fuel products and BTEX above regulatory agency action levels were detected up to 130 feet southwest (downgradient) of the UFST source area.
- Surface water in Redwood Creek has been impacted by TPH-G and BTEX.

SECTION 2

SITE HYDROGEOLOGY

The following evaluation of the hydrogeologic conditions at the project site is based on geologic logging and water level measurements collected at the site by Parsons ES beginning in September 1993. This section summarizes site geology and groundwater and surface water hydrology.

2.1 GEOLOGY

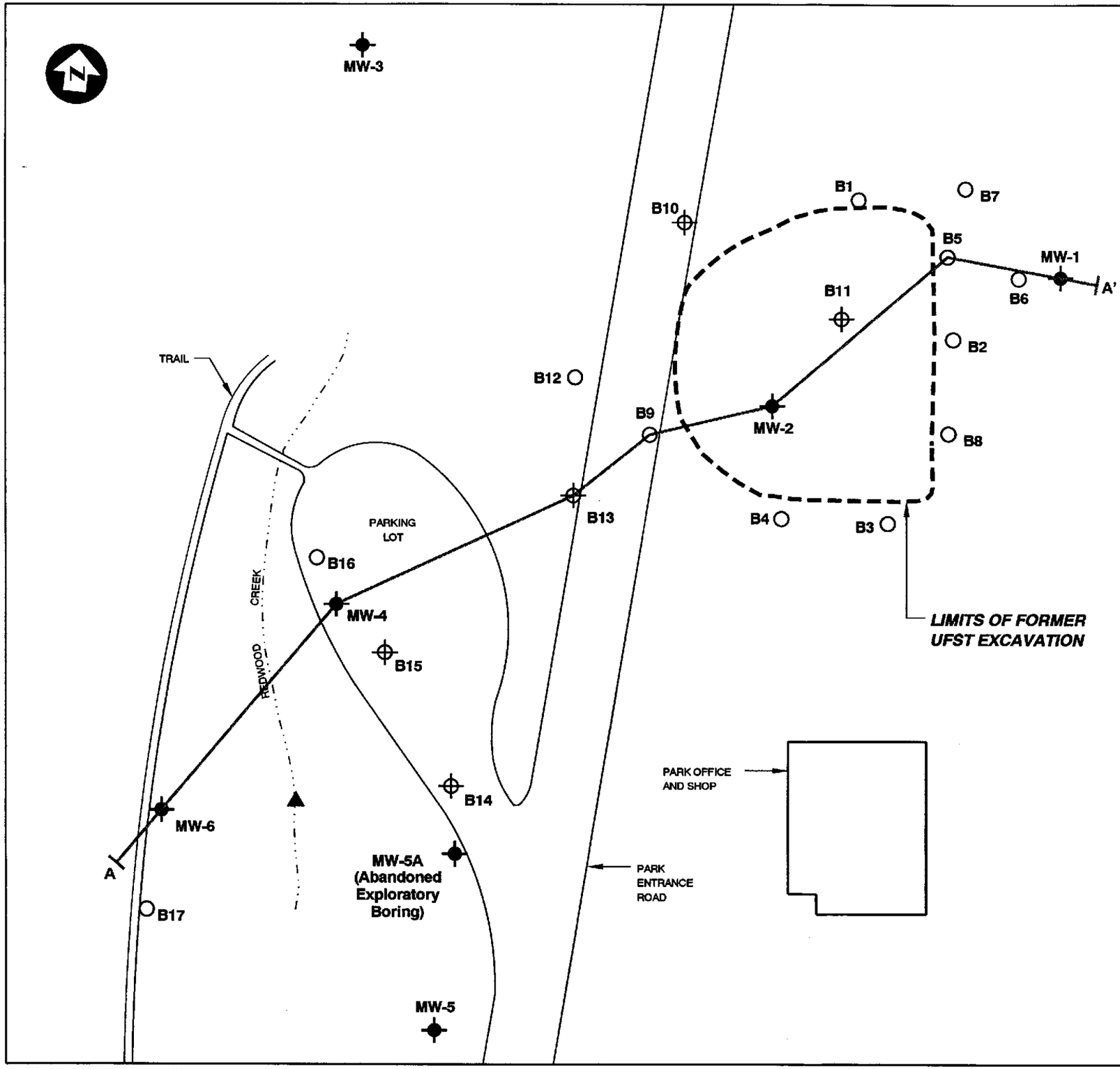
The site is located approximately seven miles east of the southeastern shoreline of San Francisco Bay, within the Coast Ranges physiographic province of California. The San Francisco Bay Area is an elongate structural depression bounded by the Santa Cruz Mountains on the west and the Diablo Range on the east. The Berkeley Hills are encompassed by the Diablo Range.

The San Francisco Bay Area is a seismically active region. The area's main geologic structures are associated with two major faults: the San Andreas Fault in the Santa Cruz Mountains and the Hayward Fault which forms the western boundary of the Diablo Range. The Diablo Range has been uplifted and the bay has gradually subsided over the last three million years. The site is located approximately 2.5 miles east of the Hayward Fault (Norris and Webb 1990, Nilsen et. al. 1979).

The bedrock in these mountain ranges is composed of sedimentary, metamorphic and volcanic rocks of Jurassic through Tertiary age (Borcherdt et. al. 1975). Overlying the bedrock in Redwood Creek canyon is Quaternary alluvium consisting of silt, sand and gravel. Subsurface stratigraphy at the site is illustrated in cross section A-A' (Figures 2.1 and 2.2) based on soil boring data acquired during the 1993 initial site characterization and the November 1994 well installation program. Shallow soil stratigraphy consists of a surficial three to ten foot-thick clayey silt unit underlain by a five- to fifteen- foot thick silty clay unit. In all monitoring well borings, a five- to ten-foot thick clayey coarse-grained sand and clayey gravel unit was encountered that laterally grades to a clay or silty clay. This unit overlies a weathered siltstone at the base of the observed soil profile. Soils in the vicinity of MW-1 are inferred to be landslide debris.

2.2 HYDROLOGY

Redwood Creek borders the site to the west and is a seasonal creek known for the occurrence of Rainbow Trout. The site lies approximately one mile upstream (northwest) of Upper San Leandro Reservoir (USGS 1959).



LEGEND

- B7 — EXPLORATORY BORING B7 (PARSONS ES 1993c)
- B11 — EXPLORATORY BORING B11 WITH TEMPORARY WELL POINT (PARSONS ES 1993c)
- A — A' — CROSS SECTION A-A'
- MW-1 — GROUNDWATER MONITORING WELL MW-1
- ▲ — AREA OF DISCOLORED SOIL AND CREEK SOIL AND "GRAB" SURFACE WATER SAMPLES (PARSONS ES 1994a AND 1994b)

NOTES:

LOCATIONS AND DIMENSIONS OF ROADS, TRAILS AND PARKING LOT ARE APPROXIMATE

UFST=UNDERGROUND FUEL STORAGE TANK

0 10 20
SCALE IN FEET

CROSS SECTION A-A' LOCATION

REDWOOD REGIONAL PARK SERVICE YARD OAKLAND, CALIFORNIA

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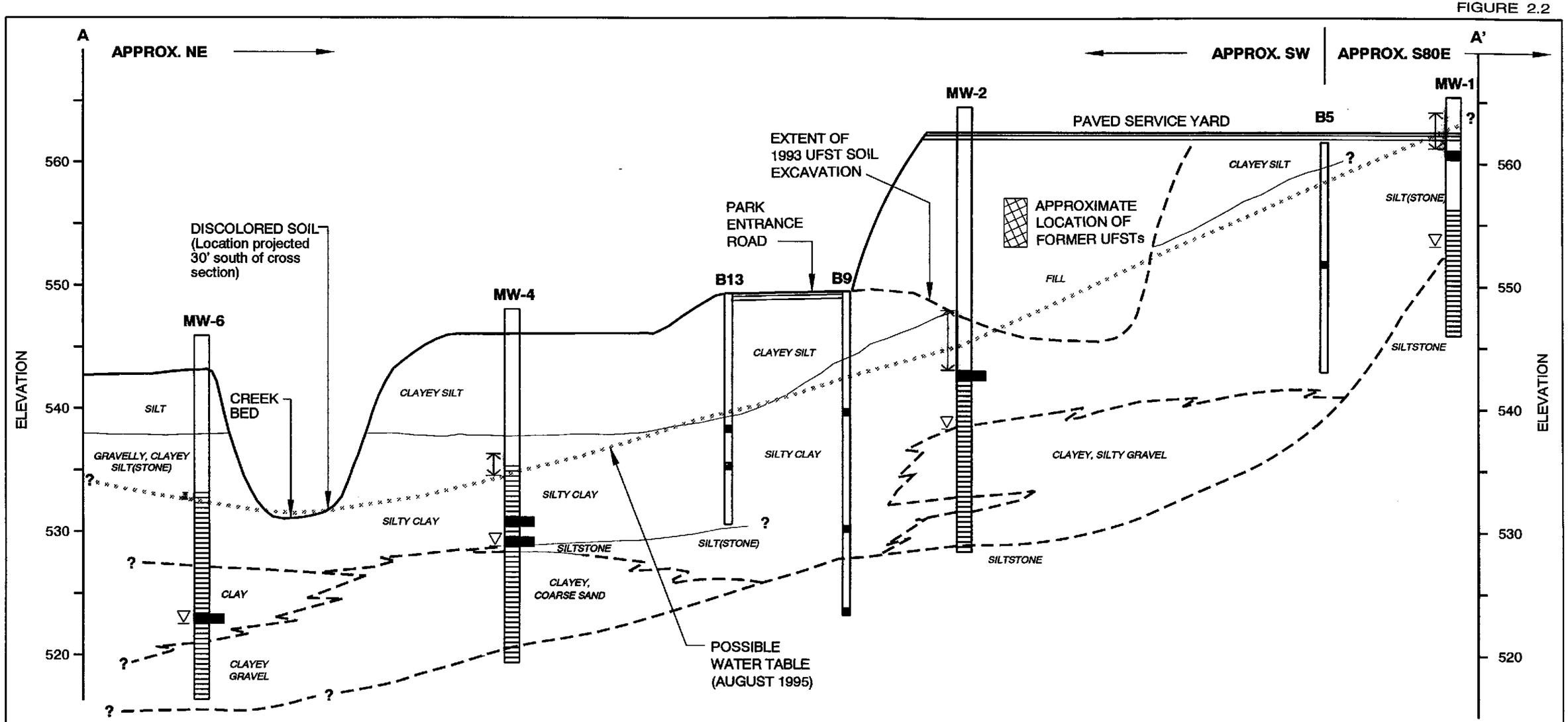
FIGURE 2.2



LEGEND	
B1 — EXPLORATORY BORING B1 LOCATION OF SOIL SAMPLE COLLECTED FOR LABORATORY ANALYSIS	MW-1 — MONITORING WELL MW-1 SHOWING LOCATION OF SOIL SAMPLE COLLECTED FOR LABORATORY ANALYSIS
▽ FIRST ENCOUNTERED GROUNDWATER DURING DRILLING (10/94)	RANGE OF STATIC WATER LEVELS MEASURED BETWEEN NOVEMBER 1994 AND AUGUST 1995

NOTES:

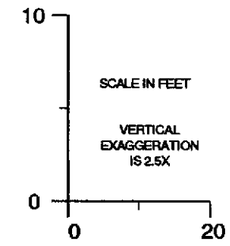
LOCATIONS AND DIMENSIONS OF ROADS, TRAILS AND PARKING LOT ARE APPROXIMATE

UFST=UNDERGROUND FUEL STORAGE TANK

UFSTs NOT DRAWN TO SCALE

ALL ELEVATIONS SURVEYED BY EBRPD RELATIVE TO UNITED STATES GEOLOGICAL SURVEY (USGS) SURVEY BENCHMARK NO. JHF-49 AND ARE EXPRESSED AS FEET ABOVE MEAN SEA LEVEL (MSL)

WELL CASING AND BORING WIDTHS NOT TO SCALE



CROSS SECTION A-A'

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

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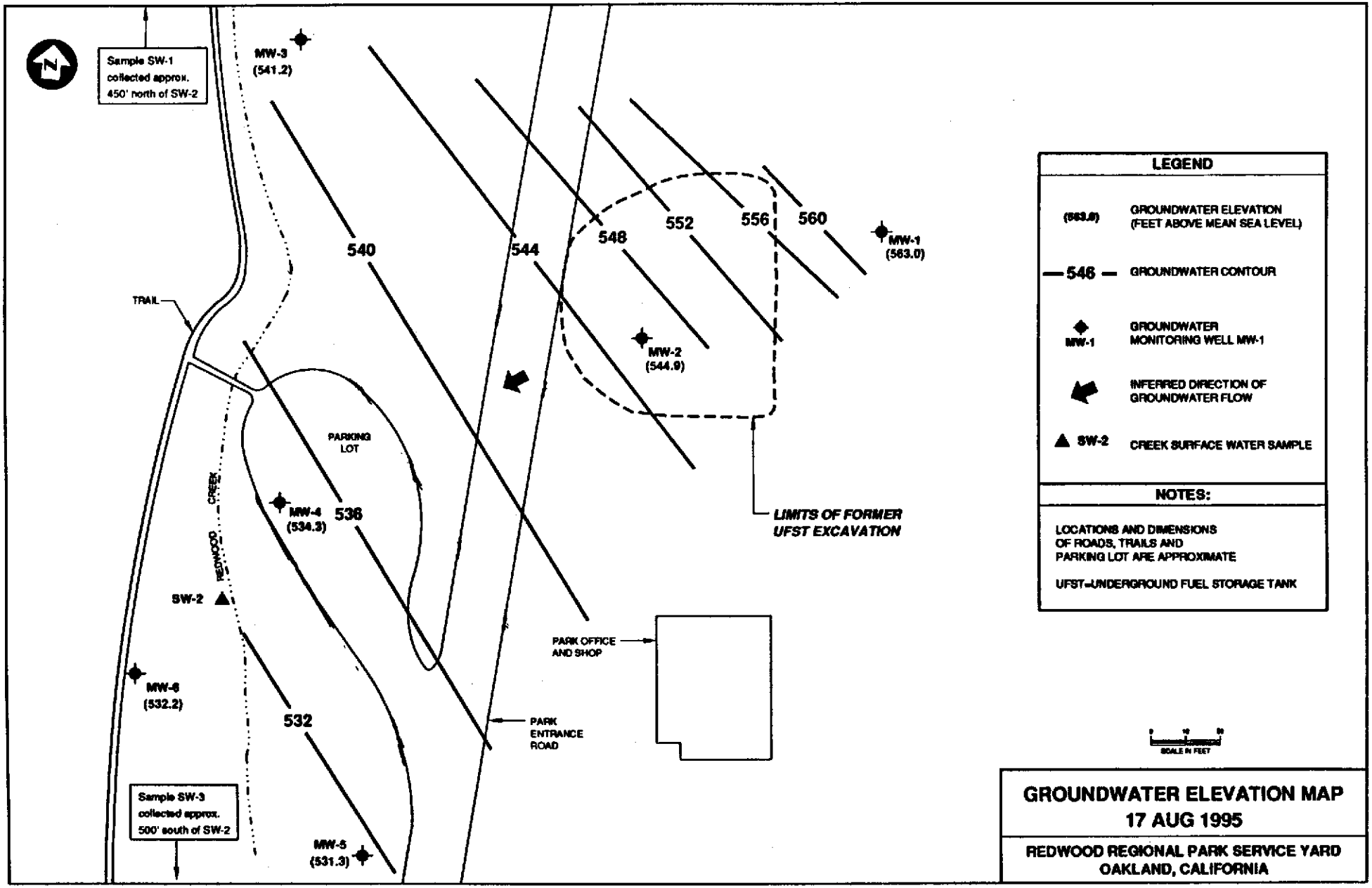
PARSONS ENGINEERING-SCIENCE, INC.

Groundwater at the site occurs under unconfined and/or confining conditions, as evidenced by the equilibration of static water levels relative to the first occurrence of groundwater encountered during drilling for the 1993 site characterization and November 1994 well installation program. Groundwater was first observed at the top of the clayey, silty sand-gravel zone in all monitoring well borings except MW-1. First occurrence of groundwater during drilling was encountered from approximately 3 to 25 feet bgs, and equilibrated water levels ranged from 2 to 18 feet bgs (Parsons ES 1993c and Appendices B and C). The difference between first occurrence of groundwater and equilibrated water level ranged from 0 to 13 feet. These differences were the greatest in areas east of the road and were much less west of the road.

Figure 2.3 is a groundwater elevation map constructed from the 17 August 1995 monitoring well static water levels. The direction of local groundwater flow in the portion of the study area east of Redwood Creek is from northeast to southwest. This groundwater flow direction is consistent with previously recorded measurements made in site wells and boreholes since September 1993. For comparison, historical groundwater elevation maps are presented in Appendix A. It is inferred that local groundwater flow direction west of Redwood Creek is toward the east (toward the creek). The groundwater gradient is approximately 0.1 feet per feet between wells MW-2 and Redwood Creek, and is approximately 2 feet per feet between well MW-1 and the former UFST source area. The increased groundwater gradient in that area is inferred to result from the topography and the highly disturbed nature of sediments in the landslide debris.

As discussed above, the materials encountered at the water table in borings in the vicinity of the former UFSTs are predominantly clayey silt and silty clay. A hydraulic conductivity value of approximately 0.003 ft/day and an effective porosity value of 30 percent are representative values of these parameters for this soil type (Fetter 1988). Given a groundwater gradient of 0.1 feet per feet as estimated from static water level measurements west of the UFST source area, the average linear groundwater velocity would be approximately 0.4 feet per year. Materials encountered a few feet below the water table in five of the six monitoring wells include a five- to ten-foot thick clayey coarse-grained sand/clayey gravel unit. This is probably the major water-transmitting unit in the observed soil profile. A hydraulic conductivity value of approximately 0.05 ft/day and an effective porosity of 35 percent are representative of these parameters for this soil type (Fetter 1988), yielding an average linear groundwater velocity of approximately five feet per year (approximately ten times the value for the upper silty clay, clayey silt unit). These values are approximations only, and actual groundwater velocities could vary substantially. There is no comprehensive data on groundwater hydrology in the area of the project site (ACFCWCD 1988).

FIGURE 2.3



GROUNDWATER ELEVATION MAP
17 AUG 1995

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

PARSONS ENGINEERING SCIENCE, INC.

SECTION 3

CURRENT QUARTER ACTIVITIES

This section summarizes recent (17 August 1995) field activities conducted at the project site related to the current groundwater characterization investigation. These activities were conducted in accordance with specifications contained in a technical workplan (Parsons ES 1994c), and included:

- Measurement of static water levels data and collection of groundwater analytical samples from site wells
- Collection and laboratory analysis of creek surface water samples
- Off-site transport and recycling of purge water from the previous four quarterly groundwater sampling events

The locations of all site monitoring wells are shown on Figures 1.2 and 2.1. Well construction information is summarized in Table 3.1.

TABLE 3.1

GROUNDWATER MONITORING WELL CONSTRUCTION DATA

Well	Well Depth	Screened Interval	Depth to TOC	Ground Surface Elevation	TOC Elevation
MW-1	18	7-17	-2.3	563.6	565.9
MW-2	36	20-35	-2.4	564.1	566.5
MW-3	42	7-41	-2.8	558.1	560.9
MW-4	26	10-25	-2.1	546.0	548.1
MW-5	26	10-25	-2.3	545.2	547.5
MW-6	26	10-25	-2.3	543.3	545.6

Remarks:
1) TOC = Top of Casing
2) All depths are feet below ground surface unless otherwise specified. Negative values for "Depth to TOC" indicate that the TOC is above ground surface.
3) All elevations are feet above USGS mean sea level (MSL). Elevations were surveyed by EBRPD relative to USGS Benchmark No. JHF-49.

3.1 GROUNDWATER MONITORING

Parsons ES personnel measured static water levels (Appendix B) in all six site wells on 17 August 1995. All water level measurements were made using an electric water level indicator.

3.2 GROUNDWATER SAMPLING

Groundwater sampling was conducted in accordance with California Water Resources Control Board (WRCB 1989) guidelines for sampling dissolved product in groundwater associated with leaking UFSTs. Prior to collection of groundwater samples, a pre-cleaned Teflon (tradename) bailer or submersible pump was used to purge a minimum of three casing volumes from each well. To minimize potential loss of volatile constituents in groundwater samples, well purging rates were maintained at 2 gallons per minute (gpm) or less, and water level drawdown was not allowed to exceed 2 feet below the top of the well casing screened interval. Electrical conductivity (EC), hydrogen ion index (pH), and temperature (T) of purge water were measured during well purging, to document the stabilization of formation-water in the wells. Appendix B includes water level data and groundwater monitoring field notes from the groundwater monitoring event.

Glass sample containers were filled with sample water from a pre-cleaned Teflon (tradename) bailer. None of the groundwater samples displayed a petroleum sheen or odor. To prevent cross-contamination, groundwater sampling equipment was decontaminated prior to use and between each monitoring well with an Alconox (tradename) wash followed by three deionized water rinses. Following sample collection, sample containers were labeled, placed in a cooler packed with "blue ice," and transported under chain-of-custody the same day to a laboratory accredited by the California Environmental Protection Agency (Cal EPA) Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP). A total of 220 gallons of purge water and decontamination rinsate from the current groundwater sampling event was containerized in the on-site plastic tank. Chain-of-custody records for the groundwater samples are included in Appendix C.

3.3 CREEK SURFACE WATER SAMPLING

Surface water samples were collected on 17 August 1995 from locations SW-2 and SW-3 in Redwood Creek (Figure 2). No sample was collected from the upstream location SW-1 because there was no water present in the vicinity of that location during the sampling event. Surface water samples were collected by immersing the sample containers just under the water surface, and immediately capping the containers, which were then labeled, chilled and transported under chain-of-custody the same day to the analytical laboratory. No sheen or odor was noted in any of the surface water samples, although a sheen was noted on the creek surface water approximately 250 feet downstream (south) of the sampling location SW-2.

3.4 PURGE WATER DISPOSAL

Approximately 1,100 gallons of purge water from site environmental investigations were transported offsite on 25 August 1995 for treatment and recycling. Activities generating this purge water included the November 1994 and February, May and August 1995

SECTION 4

EVALUATION OF RESULTS

This section describes the results of the fourth (August 1995) quarterly groundwater and surface water sampling event. Also presented is a summary of the groundwater and surface water results from the previous four quarterly groundwater sampling events (November 1994 through August 1995).

4.1 AUGUST 1995 GROUNDWATER AND SURFACE WATER ANALYTICAL RESULTS

The current groundwater and surface water monitoring and sampling program is consistent with the Parsons ES workplan for groundwater characterization at the site (Parsons ES 1994c). Groundwater and surface water samples collected in August 1995 were analyzed for the following constituents:

- TPH-G,D/K by the California Department of Toxic Substances Control (DTSC) Leaking Underground Fuel Tank (LUFT) Manual Method (equivalent to modified EPA Method 8015)
- BTEX by EPA Method 8020

4.1.1 Groundwater Samples

Table 4.1 summarizes groundwater sample analytical results from the August 1995 groundwater sampling event. Maximum groundwater contamination by TPH-G (1,800 µg/L), TPH-D/K (240 µg/L) and total BTEX constituents (227.3 µg/L) was detected in downgradient well MW-4. Benzene was the only groundwater contaminant detected in well MW-2 (5.7 µg/L). No groundwater contamination was detected in wells MW-1, MW-3, MW-5 or MW-6.

4.1.2 Creek Surface Water

Surface water samples collected from Redwood Creek (SW-2 and -3 locations on Figure 1.2) were analyzed for TPH-G, TPH-D/K and BTEX. None of these constituents were detected in any of the surface water samples.

TABLE 4.1

GROUNDWATER SAMPLE ANALYTICAL RESULTS
17 August 1995
Redwood Regional Park Service Yard, Oakland, California

	Concentration (µg/L)					
Compound:	TPH-G	TPH-D/K	Benzene	Toluene	Ethylbenzene	Total Xylenes
Reporting Limit:	50	50	0.5	0.5	0.5	0.5
Sample Location						
MW-1	ND	ND	ND	ND	ND	ND
MW-2	ND	ND	5.7	ND	ND	ND
MW-2*	ND	NA	5.1	ND	ND	ND
MW-3	ND	ND	ND	ND	ND	ND
MW-4	1,800	240	65	6.8	89	66.5
MW-5	ND	ND	ND	ND	ND	ND
MW-6	ND	ND	ND	ND	ND	ND

Notes:
* = Quality control field duplicate sample designated MW-0A on the chain-of-custody and analytical laboratory report
TPH-G = Total petroleum hydrocarbons - gasoline range
TPH-D/K = Total petroleum hydrocarbons - diesel/kerosene ranges
NA - Not Analyzed
ND = Not Detected
µg/L = Micrograms per liter, equivalent to parts per billion (ppb)

4.1.3 Quality Control Sample Analytical Results

Two types of field quality control (QC) samples were used to assess whether field or laboratory procedures affected analytical results of the current groundwater sampling event. One equipment rinsate blank (MW-0B) was collected following sampling and decontamination activities at well MW-4 to monitor potential cross-contamination in the field due to inadequate decontamination of sampling equipment and/or sample contamination during transport. That sample was analyzed for TPH-G and BTEX; none of these constituents were detected, verifying the integrity of field decontamination procedures and sample containers.

One field duplicate sample (MW-0A) was collected from well MW-2 and analyzed for TPH-G and BTEX to assess whether field procedures produced reproducible results. The field duplicate sample contained 5.1 µg/L benzene (compared to 5.7 µg/L in the field sample), which is a variance of approximately 11 percent from the mean (aka relative percent difference [RPD]).

Laboratory QC samples (e.g. method blanks, matrix spikes, surrogate spikes, etc.) were analyzed by the laboratory in accordance with requirements of each analytical method. All laboratory QC sample results and sample holding times were within the acceptance limits of the methods (Appendix C).

4.2 SUMMARY OF GROUNDWATER AND SURFACE WATER CONTAMINATION

The following summarizes available data regarding detected groundwater and surface water contamination at the project site, collected by Parsons ES since September 1993. Documentation of specific analytical methods and individual analyses may be found in the referenced documents.

4.2.1 Summary of Groundwater Contamination

Maximum groundwater contamination detected in temporary well points installed in September 1993 included 810,000 µg/L TPH-G, 2,300,000 µg/L TPH-K, 570 µg/L TPH-D and 125,000 µg/L BTEX (including 12,000 µg/L benzene) (ES 1993c). Table 4.2 summarizes groundwater analytical results collected during quarterly monitoring of the six site groundwater monitoring wells since November 1994. The lateral extent of former site UFST-sourced groundwater contamination has been well defined by the six site wells, and appears to extend from the former UFST remedial excavation downgradient (west) to Redwood Creek (Figure 1.2). Gasoline and/or BTEX has been consistently detected in wells MW-2 and MW-4, has not been detected since February 1995 in wells MW-3 and MW-5, and has never been detected in wells MW-1 and MW-6. Diesel contamination has been detected only in well MW-4. All detected groundwater contamination has shown a generally decreasing trend since February 1995, which may be a result of seasonal variations.

4.2.2 Summary of Creek Surface Water Contamination

Table 4.3 summarizes analytical results of surface water samples collected from Redwood Creek (downgradient of the former UFSTs) in February 1994 and May and August 1995. Gasoline and BTEX constituents were detected in February 1994 (maximum concentrations of 130 and 9.5 µg/L, respectively) at creek locations both upstream and downstream of the observed soil contamination in the creekbed (west of the former UFST location). No contamination has been detected in creek surface water samples in subsequent sampling events.

TABLE 4.2

GROUNDWATER ANALYTICAL SUMMARY

November 1994 - August 1995

Redwood Regional Park Service Yard, Oakland, California

Sample ID	Analyte	MRL (µg/L)	November 1994	February 1995	May 1995	August 1995
MW-1	TPH-G	50	ND	ND	ND	ND
	TPH-D/K	50	ND	ND	ND	ND
	BTEX	0.5	ND	ND	ND	ND
MW-2	TPH-G	50	66	89	ND	ND
	TPH-D/K	50	ND	ND	ND	ND
	BTEX	0.5	4.3	29.6	8.0	5.7
MW-3	TPH-G	50	ND	ND	ND	ND
	TPH-D/K	50	ND	ND	ND	ND
	BTEX	0.5	ND	0.8	ND	ND
MW-4	TPH-G	50	2,600	11,000	7,200	1,800
	TPH-D/K	50	230	330	440	240
	BTEX	0.5	362.8	1,337	1,033	227.3
MW-5	TPH-G	50	50	70	ND	ND
	TPH-D/K	50	ND	ND	ND	ND
	BTEX	0.5	ND	0.6	ND	ND
MW-6	TPH-G	50	ND	ND	ND	ND
	TPH-D/K	50	ND	ND	ND	ND
	BTEX	0.5	ND	ND	ND	ND

Notes:

TPH-G = Total petroleum hydrocarbons, gasoline range (California Department of Toxic Substances Control [DTSC] Leaking Underground Fuel Tank [LUFT] Field Manual Method).
TPH-D/K = Total petroleum hydrocarbons, diesel and kerosene range (California Department of Toxic Substances Control [DTSC] Leaking Underground Fuel Tank [LUFT] Field Manual Method).
BTEX = Benzene, toluene, ethylbenzene and total xylenes (EPA Method 8020).
ND = Not detected above MRL.
MRL = Method reporting limit.

TABLE 4.3

CREEK SURFACE WATER ANALYTICAL SUMMARY

February 1994 - August 1995

Redwood Regional Park Service Yard, Oakland, California

Sample ID	Analyte	MRL (µg/L)	February/March 1994	February 1995	May 1995	August 1995
SW-1[a]	TPH-G	50	130	NS	ND	NS
	TPH-D/K	50	ND	NS	ND	NS
	BTEX	0.5	9.5	NS	ND	NS
SW-2[b]	TPH-G	50	50	NS	ND	ND
	TPH-D/K	50	ND	NS	ND	ND
	BTEX	0.5	ND	NS	ND	ND
SW-3[c]	TPH-G	50	80	NS	ND	ND
	TPH-D/K	50	ND	NS	ND	ND
	BTEX	0.5	4.6	NS	ND	ND

Notes:

[a] Sample ID is CW-2 for February 1994 sampling event.
[b] Sample ID is CW-1 for March 1994 sampling event.
[c] Sample ID is CW-3 for March 1994 sampling event.

TPH-G = Total petroleum hydrocarbons, gasoline range (California Department of Toxic Substances Control [DTSC] Leaking Underground Fuel Tank [LUFT] Field Manual Method).
TPH-D/K = Total petroleum hydrocarbons, diesel and kerosene range (California Department of Toxic Substances Control [DTSC] Leaking Underground Fuel Tank [LUFT] Field Manual Method).
BTEX = Benzene, toluene, ethylbenzene and total xylenes (EPA Method 8020).
ND = Not detected above MRL.
NS = Not sampled due to lack of surface water.
MRL = Method reporting limit.

SECTION 5

REGULATORY CONSIDERATIONS

The ACHCSA is the designated lead agency for oversight of environmental investigations at the project site, and is therefore the principal contact regarding interpretation of applicable regulations. The California Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) provides oversight of ACHCSA decisions.

5.1 RELEVANT CRITERIA FOR SOIL CONTAMINATION

As described in Section 2, contaminants detected in site soils include TPH and BTEX. In general, impacts of contamination on the environment by these compounds are evaluated on a case-by-case basis. The following is a discussion of Applicable, Relevant, and Appropriate Requirements (ARARs) for each of these contaminants.

The DTSC uses 1,000 mg/Kg TPH in soil (considered hazardous by virtue of its ignitability index) as a minimum criterion for remediation. The RWQCB uses 100 mg/Kg TPH in soil as a minimum criterion for assessing impacts to groundwater in investigations related to LUFTs (WRCB 1989). This LUFT guidance also discusses the Designated Level Methodology (DLM) which is used to evaluate the likelihood of impacts to groundwater from contaminated soil. The principal DLM factors considered include: depth to groundwater; subsurface characteristics; and amount of precipitation (water availability). A possible scenario from using the DLM methodology is where the depth to groundwater is shallow, the soil TPH cleanup requirement could therefore be 10 mg/Kg or less.

Current ARARs for residual soil contaminants detected in site soils include: <10 to 1,000 mg/Kg TPH; 0.3 to 1.0 mg/Kg benzene; 0.3 to 50 mg/Kg toluene; and 1 to 50 mg/Kg ethylbenzene and total xylenes). All these ARARs are evaluated on a case-by-case risk assessment basis using DTSC/LUFT Manual guidance.

5.2 SOIL CONTAMINATION REGULATORY EVALUATION

Maximum residual soil contaminants detected in the sidewalls of the excavation pit include: 12,000 mg/Kg TPH-G; 1,300 mg/Kg TPH-K; 80 mg/Kg benzene; 390 mg/Kg toluene; 230 mg/Kg ethylbenzene; and 1,100 mg/Kg total xylenes. Excavation of additional UFST-sourced soil contamination was halted due to infiltrating groundwater and the potential for landslides.

5.3 RELEVANT CRITERIA FOR GROUNDWATER AND SURFACE WATER CONTAMINATION

5.3.1 Drinking Water Standards

Measured electrical conductivity values of groundwater at the site range from approximately 200 to 500 μmhos/cm (Appendix D) and rarely exceed the maximum value of 5,000 μmhos/cm (equivalent to μS/cm) established by WRCB for potential public water supplies. Additionally, sustained yield of site wells is likely to be greater than the 200 gallons per day [gpd]) criterion for potentially suitable drinking water (WRCB 1988). Based on these data, groundwater at the site may be considered as a potential drinking water source, and therefore drinking water standards (i.e. Maximum Contaminant Levels [MCLs]) may be applicable to contaminated groundwater at the site.

Numerical drinking water quality standards are published for several contaminants detected in groundwater at the site. Relevant standards include:

Benzene	1 μg/L	(California Primary MCL)
Toluene	1,000 μg/L	(Proposed Federal Primary MCL)
	40 μg/L	(Proposed Federal Secondary MCL)
Xylenes	1,750 μg/L	(California Primary MCL)
	20 μg/L	(Proposed Federal Secondary MCL)
Ethylbenzene	680 μg/L	(California Primary MCL)
	30 μg/L	(Proposed Federal Secondary MCL)

However, it should be noted that specific MCLs for drinking water are not published for total petroleum hydrocarbons in groundwater. This contaminant would therefore be regulated under the RWQCB general "nondegradation of beneficial use" policy (RWQCB 1992).

5.3.2 Beneficial Uses and Water Quality Objectives

Beneficial uses of surface water quality in California are used to establish water quality standards and discharge prohibitions (RWQCB 1992). There are no listed beneficial uses for Redwood Creek. However, there are listed beneficial uses for Upper San Leandro Reservoir (located approximately 4,000 feet south [downstream] of the project site), into which Redwood Creek flows. Existing beneficial uses for Upper San Leandro Reservoir include: water contact recreation; municipal and domestic supply; warm and cold fresh water habitats; wildlife habitat; and fish spawning. Potential beneficial uses include non-contact water recreation.

Groundwater seepage occurs along the eastern boundary of Redwood Creek approximately 130 feet west (downgradient) of the UFST source area. Surface water originating at the seeps flows into Upper San Leandro Reservoir approximately 4,000 feet south (downstream).

The only contaminant detected in surface or groundwater at the site in excess of a published water quality objective (WQO) is benzene (0.34 μg/L in inland surface waters that are existing or potential sources of drinking water) and 21 μg/L for "other waters") (WRCB

1991). These WQOs are based on 30-day average concentrations, however the available site analytical results do not represent an average concentration over a 30-day period.

5.4 GROUNDWATER AND SURFACE WATER CONTAMINATION REGULATORY EVALUATION

Maximum contaminant concentrations detected in site groundwater samples during the current event (all in well MW-4) in excess of published regulatory agency ARARs include:

- Benzene (420 µg/L; exceeds the 1 µg/l California Primary MCL and the 0.34 µg/L and 21 µg/L WQOs for inland surface waters)
- Ethylbenzene (440 µg/L; exceeds the proposed Federal Secondary MCL)
- Total xylenes (460 µg/L; exceeds the proposed Federal Secondary MCL)

The only contaminant historically detected in the creek surface water samples in excess of published regulatory agency ARARs is benzene at 1.8 µg/L (exceeds the 0.34 µg/L WQO for inland surface waters that are potential drinking water sources), however, this concentration is not an average concentration over a 30-day period, upon which the WQO is based. A creek surface water sample was not collected downstream of the sampling location with the 1.8 µg/L benzene concentration. However, it is probable that dilution would result in a benzene concentration lower than the 0.34 µg/L ARAR prior to creek discharge into Upper San Leandro Reservoir. Future creek surface water sample analytical results will be evaluated to confirm this hypothesis.

SECTION 6

RECOMMENDATIONS

RECOMMENDATIONS

Parsons Engineering Science recommends a continuation of the current program of groundwater and surface water monitoring, with the revision discussed below. This recommendation is predicated on the assumption that present hydrochemical trends will continue. However, all analytical data collected during ensuing monitoring events will be reviewed to determine whether changes in hydrochemical trends warrant additional characterization and/or remediation measures.

- Discontinue hydrochemical sampling and analysis of onsite wells MW-1, MW-3 and MW-6 based on the lack of significant detectable groundwater contamination over four consecutive quarterly groundwater sampling events.

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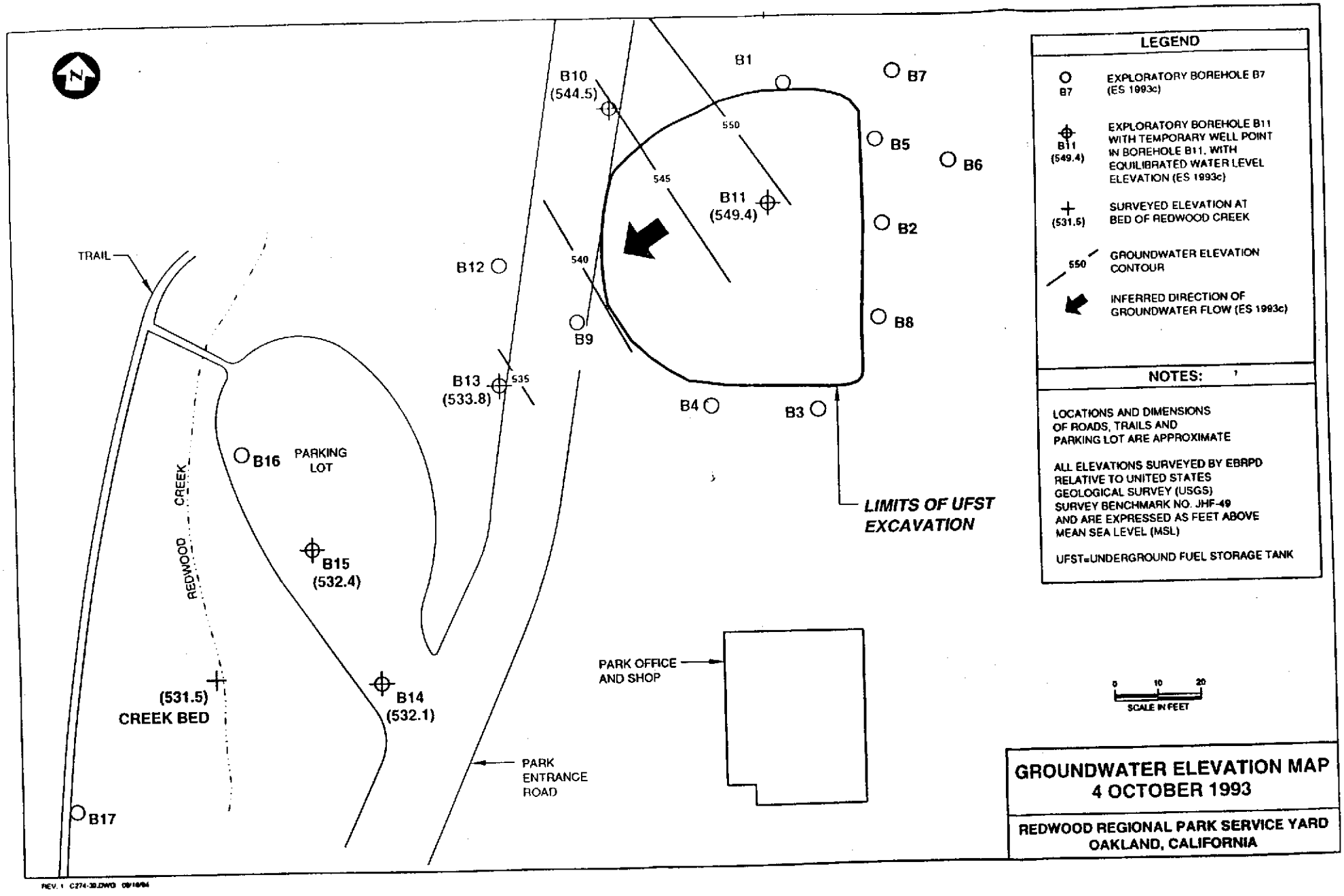
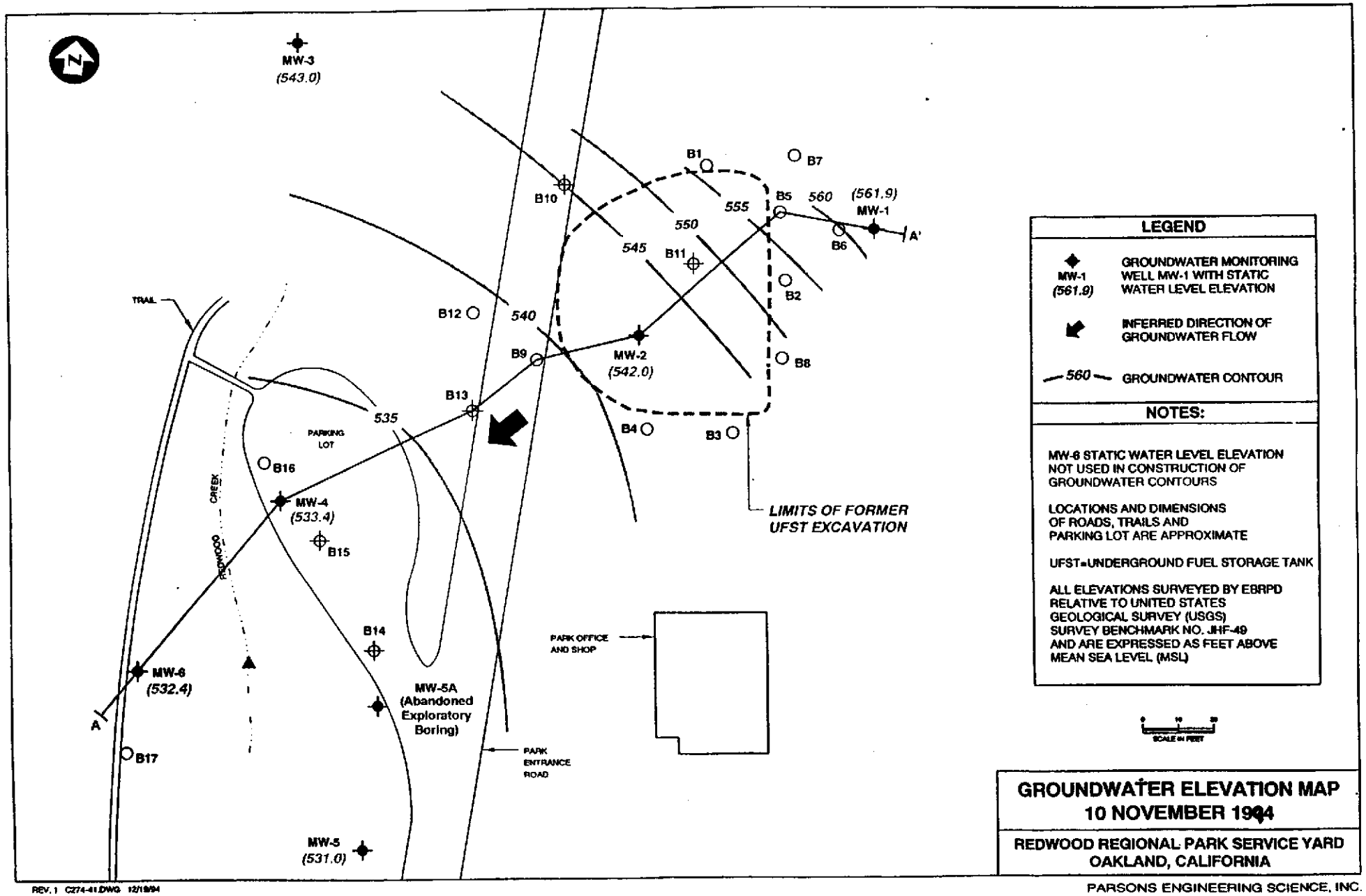
APPENDIX A

HISTORICAL GROUNDWATER ELEVATION MAPS


N
B1
B7
B10
(544.5)
B5
B6
550
545
B11
(549.4)
B2
B12
540
B9
B8
B13
(533.8)
535
B4
B3
TRAIL
B16
PARKING
LOT
CREEK
REDWOOD
LIMITS OF UFST
EXCAVATION
B15
(532.4)
(531.5)
CREEK BED
B14
(532.1)
PARK OFFICE
AND SHOP
PARK
ENTRANCE
ROAD
B17
LEGEND
B7
EXPLORATORY BOREHOLE B7
(ES 1993c)
B11
(549.4)
EXPLORATORY BOREHOLE B11
WITH TEMPORARY WELL POINT
IN BOREHOLE B11, WITH
EQUILIBRATED WATER LEVEL
ELEVATION (ES 1993c)
(531.5)
SURVEYED ELEVATION AT
BED OF REDWOOD CREEK
550
GROUNDWATER ELEVATION
CONTOUR
INFERRED DIRECTION OF
GROUNDWATER FLOW (ES 1993c)
NOTES:
LOCATIONS AND DIMENSIONS
OF ROADS, TRAILS AND
PARKING LOT ARE APPROXIMATE
ALL ELEVATIONS SURVEYED BY EBRPD
RELATIVE TO UNITED STATES
GEOLOGICAL SURVEY (USGS)
SURVEY BENCHMARK NO. JHF-49
AND ARE EXPRESSED AS FEET ABOVE
MEAN SEA LEVEL (MSL)
UFST=UNDERGROUND FUEL STORAGE TANK
0
10
20
SCALE IN FEET
GROUNDWATER ELEVATION MAP
4 OCTOBER 1993
REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA
REV. 1 C274-39.DWG 09/16/94

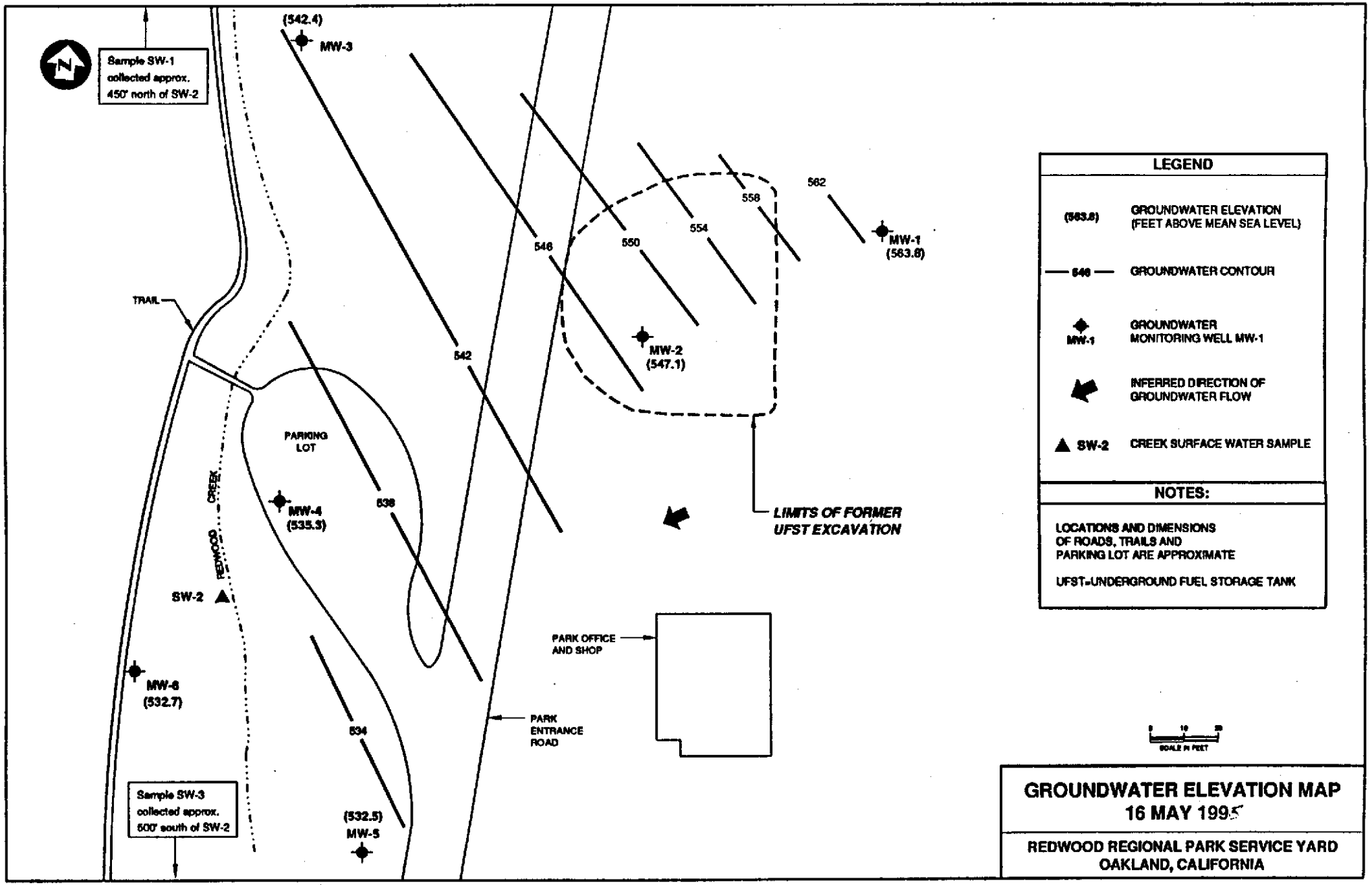


GROUNDWATER ELEVATION MAP
10 NOVEMBER 1994

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

REV. 1 C274-41.DWG 12/19/94

PARSONS ENGINEERING SCIENCE, INC.



GROUNDWATER ELEVATION MAP
16 MAY 1995

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

PARSONS ENGINEERING SCIENCE, INC.

APPENDIX B

AUGUST 1995 WATER LEVEL DATA AND GROUNDWATER MONITORING NOTES

WATER LEVEL DATA

PARSONS ENGINEERING SCIENCE

DATE: 17 August 1995 **PROJECT/LOCATION:** Redwood Regional Park Service Yard, Oakland, California

PROJECT NO.: 726104 **PERSONNEL:** Alan C. Peel

Well No	Water Level from T.O.C.	Well Depth From T.O.C	Depth to T.O.C	Water Level from G.S.	Well Casing Dia.	Gallons/ Casing Vol.	T.O.C. Elev. USGS	Water Level USGS
MW-1	2.92	18.0	-2.3	0.6	4	9.8	565.9	563.0
MW-2	21.59	36.5	-2.4	19.2	4	9.7	566.5	544.9
MW-3	19.74	45.0	-2.8	16.9	4	16.4	560.9	541.2
MW-4	13.79	26.0	-2.1	11.7	4	7.9	548.1	534.3
MW-5	16.21	26.0	-2.3	13.9	4	6.4	547.5	531.3
MW-6	13.36	27.0	-2.3	11.1	4	8.9	545.6	532.2

NOTES:

T.O.C. = Top of Casing

Gallons/casing volume for 4" inner diameter casing = 0.65 gallons per linear foot

Negative value for "Depth to T.O.C." indicates that T.O.C. is above ground surface

G.S. - Ground Surface

USGS = U.S. Geological Survey mean sea level (MSL)

All elevations surveyed by East Bay Regional Parks District relative to USGS Survey Benchmark No. JHF-49

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GROUNDWATER SAMPLING FIELD NOTES

PARSONS ENGINEERING SCIENCE

PROJECT/LOCATION: REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA **PERSONNEL:** Alan Peel

PROJECT NUMBER: 726104 **DATE:** 17 August 1995

Well ID	*Sampler Date Time*	*Water Level Before, Well Diameter and Depth**	*Water Level After **	*Gallons per Casing Volume*	*Well Purging Method ***	*Pump On*	*Pump Off*	*Temp. (o C)*	*Specific Cond (umhos/ cm)*	*pH*	*Total Water Purged (gals)*	*Sample Coll. Method*	*Analysis & Number/type of Containers*	*Comments*
MW-1	ACP 08/17/95 1425	2.92 4" 18	2.95	9.8	B	NA	NA	18.7 15.6 15.5 15.5	650 680 680 680	7.71 7.50 7.43 7.40	1 10 20 30	B	(a) (b) & (c)	
MW-2	ACP 08/17/95 1450	21.59 4" 36.5	30.05	9.7	G	1325	1442	22.3 17.8 18.3 20.3	NR 720 710 720	8.49 7.42 7.47 7.47	1 10 20 30	B	(a) (b) & (c)	
MW-3	ACP 08/17/95 1112	19.74 4" 45	21.57	16.4	G	1022	1110	17.1 14.9 14.8 14.9	490 480 480 482	7.59 7.66 7.66 7.67	1 17 34 51	B	(a) (b) & (c)	
MW-4	ACP 08/17/95 1740	13.79 4" 26	15.97	7.9	G	1553	1735	18.9 17.8 17.3 17.1	600 510 580 580	7.14 7.01 7.02 7.05	1 8 16 24	B	(a) (b) & (c)	

C:\ebrpd\AUG95gw.xls

NOTES

* Measured from top of casing in feet

** G -- Grundfos Pump; B - Bailer

NA Not Applicable

NR Not Recorded

(a) Total Petroleum Hydrocarbons as diesel (TPH-D), unpreserved {1: 1L amber bottles}.

(b) BTEX, EPA Method 8020, HCl preserved {2: 40ml VOAs}.

(c) Total Petroleum Hydrocarbons as gasoline (TPH-G), HCl preserved {2: 40ml VOAs}.

GROUNDWATER SAMPLING FIELD NOTES

PARSONS ENGINEERING SCIENCE

PROJECT/LOCATION: REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA **PERSONNEL:** Alan Peel

PROJECT NUMBER: 726104 **DATE:** 17 August 1995

Well ID	*Sampler Date Time*	*Water Level Before, Well Diameter and Depth**	*Water Level After **	*Gallons per Casing Volume*	*Well Purging Method ***	*Pump On*	*Pump Off*	*Temp. (o C)*	*Specific Cond (umhos/ cm)*	*pH*	*Total Water Purged (gals)*	*Sample Coll. Method*	*Analysis & Numberltype of Containers*	*Comments*
MW-5	ACP 08/17/95 1245	16.21 4" 26	18.66	6.4	G	1150	1233	15.3 15.1 15.7 15.8 16.1	500 475 470 488 500	8.17 8.01 7.94 7.77 7.7	1 7 14 21 28	B	(a) (b) & (c)	
MW-6	ACP 08/17/95 1710	13.36 4" 27	NR	8.9	B	NA	NA	14.6 13.6 13.7 13.5	480 480 475 470	7 7.39 7.41 7.51	1 9 18 27	B	(a) (b) & (c)	Turbid
MW-0A	ACP 08/17/95 1455	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	B	(b) & (c)	Field duplicate collected at MW-2
MW-0B	ACP 08/17/95 1810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	(b) & (c)	Equipment rinsate blank, collected after decon. at Well MW-4

NOTES

* Measured from top of casing in feet

** G -- Grundfos Pump; B - Bailer

NA Not Applicable

NR Not Recorded

(a) Total Petroleum Hydrocarbons as diesel (TPH-D), unpreserved (1: 1L amber bottles).

(b) BTEX, EPA Method 8020, HCl preserved (2: 40ml VOAs).

(c) Total Petroleum Hydrocarbons as gasoline (TPH-G), HCl preserved (2: 40ml VOAs).

APPENDIX C

AUGUST 1995 CHAIN-OF-CUSTODY RECORD AND ANALYTICAL LABORATORY REPORT

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Parsons Engineering Science, Inc.
1301 Marina Village Parkway
Suite 200
Alameda, CA 94501

Date: 06-SEP-95
Lab Job Number: 122257
Project ID: 726104.04
Location: Redwood Regional Park

Reviewed by: _____

Reviewed by: _____

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-001	MW-3	22808	08/17/95	08/24/95	08/24/95	
122257-002	MW-5	22808	08/17/95	08/24/95	08/24/95	
122257-003	MW-1	22808	08/17/95	08/24/95	08/24/95	
122257-004	MW-2	22808	08/17/95	08/24/95	08/24/95	

Analyte Diln Fac:	Units	122257-001 1	122257-002 1	122257-003 1	122257-004 1
Gasoline C4-C12	ug/L	<50	<50	<50	<50
Surrogate					
Trifluorotoluene	%REC	90	91	91	90
Bromobenzene	%REC	80	81	81	81

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-001	MW-3	22808	08/17/95	08/24/95	08/24/95	
122257-002	MW-5	22808	08/17/95	08/24/95	08/24/95	
122257-003	MW-1	22808	08/17/95	08/24/95	08/24/95	
122257-004	MW-2	22808	08/17/95	08/24/95	08/24/95	

Analyte Diln Fac:	Units	122257-001 1	122257-002 1	122257-003 1	122257-004 1
Benzene	ug/L	<0.5	<0.5	<0.5	5.7
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5
Surrogate					
Trifluorotoluene	%REC	99	100	101	99
Bromobenzene	%REC	95	97	96	96

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-005	MW-OA	22808	08/17/95	08/24/95	08/24/95	
122257-006	MW-6	22808	08/17/95	08/24/95	08/24/95	
122257-007	MW-4	22808	08/17/95	08/24/95	08/24/95	
122257-008	MW-OB	22808	08/17/95	08/24/95	08/24/95	

Analyte Diln Fac:	Units	122257-005 1	122257-006 1	122257-007 1	122257-008 1
Benzene	ug/L	5.1	<0.5	65	<0.5
Toluene	ug/L	<0.5	<0.5	6.8	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	89	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	63	<0.5
o-Xylene	ug/L	<0.5	<0.5	3.5	<0.5
Surrogate					
Trifluorotoluene	%REC	99	101	106	100
Bromobenzene	%REC	96	96	102	96

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: BTXE
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-009	SW-2	22808	08/17/95	08/24/95	08/24/95	
122257-010	SW-3	22808	08/17/95	08/24/95	08/24/95	

Analyte	Units	122257-009	122257-010
Diln Fac:		1	1
Benzene	ug/L	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5
Surrogate			
Trifluorotoluene	%REC	102	101
Bromobenzene	%REC	97	96

Curtis & Tompkins, Ltd.

Lab #: 122257 BATCH QC REPORT

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: BTXE
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 22808
Units: ug/L
Diln Fac: 1

Prep Date: 08/23/95
Analysis Date: 08/23/95

MB Lab ID: QC02142

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	103	65-135
Bromobenzene	101	65-135

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: BTXE
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 22808
Units: ug/L
Diln Fac: 1

Prep Date: 08/23/95
Analysis Date: 08/23/95

LCS Lab ID: QC02141

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	20.6	20	103	85-115
Toluene	20.2	20	101	85-115
Ethylbenzene	20.1	20	101	85-115
m,p-Xylenes	20.5	20	103	85-115
o-Xylene	19.8	20	99	85-115

Surrogate	%Rec	Limits
Trifluorotoluene	104	65-135
Bromobenzene	102	65-135

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 5 outside limits

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-001	MW-3	22793	08/17/95	08/22/95	09/04/95	
122257-002	MW-5	22793	08/17/95	08/22/95	09/04/95	
122257-003	MW-1	22793	08/17/95	08/22/95	09/04/95	
122257-004	MW-2	22793	08/17/95	08/22/95	09/04/95	

Analyte	Units	122257-001	122257-002	122257-003	122257-004
Diln Fac:		1	1	1	1
Diesel Range	ug/L	<50	<50	<50	<50
Motor Oil Range	ug/L	<1300	<1300	<1300	<1300
Surrogate					
Hexacosane	%REC	104	105	110	105

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
122257-006	MW-6	22793	08/17/95	08/22/95	09/04/95	
122257-007	MW-4	22793	08/17/95	08/22/95	09/04/95	
122257-009	SW-2	22793	08/17/95	08/22/95	09/04/95	
122257-010	SW-3	22793	08/17/95	08/22/95	09/04/95	

Analyte	Units	122257-006	122257-007	122257-009	122257-010
Diln Fac:		1	1	1	1
Diesel Range	ug/L	<50	240 LY	<50	<50
Motor Oil Range	ug/L	<1300	<1300	<1300	<1300
Surrogate					
Hexacosane	%REC	116	116	104	112

Y: Sample exhibits fuel pattern which does not resemble standard
L: Lighter hydrocarbons than indicated standard

Curtis & Tompkins, Ltd.

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: 3520

METHOD BLANK

Matrix: Water
Batch#: 22793
Units: ug/L
Diln Fac: 1

Prep Date: 08/22/95
Analysis Date: 08/24/95

MB Lab ID: QC02078

Analyte	Result	
Diesel Range	<50	
Motor Oil Range	<1300	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	92	60-140

Curtis & Tompkins, Ltd.

Lab #: 122257 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 726104.04
Location: Redwood Regional Park

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: 3520

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 22793
Units: ug/L
Diln Fac: 1

Prep Date: 08/22/95
Analysis Date: 08/24/95

BS Lab ID: QC02079

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2565	2123	83	60-140
Surrogate	**%Rec**	**Limits**		
Hexacosane	83	60-140		

BSD Lab ID: QC02080

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2565	2563	100	60-140	19	<35
Surrogate	**%Rec**	**Limits**				
Hexacosane	89	60-140				

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

ES Engineering-Science, Inc.
1301 Marina Village Parkway, Suite 200
Alameda, California 94501
Phone: (510) 769-0100 Fax: (510) 769-9244

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

LABORATORY:	PROJECT MANAGER:	PROJ. #:
CAT	Bruce Rucker	726104.04

PROJECT NAME/LOCATION: Redwood Regional Park

SAMPLER(S): (SIGNATURE) AC Peek

	SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	ANALYSIS REQUIRED: METHOD PRESERVED	TPH g (8015 mod) HCl	TPH d (8015 mod) —	BTEX (EPA 8021) HCl	TO BE COMPOSITED BY LAB	TURN AROUND TIME	REMARKS
1	MW-3	8/17/95	1112	H2O	well 3	3		X	X	X		5 day	
2	MW-5		1245		5	3		X	X	X			
3	MW-1		1425		1	3		X	X	X			
4	MW-2		1450		2	3		X	X	X			
5	MW-0A		1455		0A	2		X		X			
6	MW-6		1710		6	3		X	X	X			
7	MW-4		1740		4	3		X	X	X			
8	MW-0B		1810		0B	2		X		X			
9	SW-2		1230		surface sample 2	3		X	X	X			
10	SW-3		1725		" " 3	3		X	X	X			

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY(SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
	8/18	0750					

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	REMARKS:
			Noel Shay	8/18	0750	

DISTRIBUTION: WHITE: ACCOMPANIES SHIPMENT & RET'N WITH LAB REPORT, CANARY: LAB COPY, PINK: FIELD COPY

c:\user\ed\fence

Project: 726104.04
Site: Redwood Regional Park
Account #: ES
Logged By: JOW
PO#: MSA# 95-006S
Proj. Mgr: TLB

Report To: Parsons Engineering Science, Inc.
1301 Marina Village Parkway
Suite 200
Alameda , CA 94501
ATTN: Bruce Rucker
(510) 769 - 0100

Bill To: Parsons Engineering Science, Inc. ES
1301 Marina Village Parkway
Suite 200
Alameda , CA 94501
ATTN: Bruce Rucker
(510) 769 - 0100

Sample #	Alias	Client ID / Supp Id.	Samp	Ord	Recv	Hold	Due	Matrix	Loc	Analyses	
122257-001		MW-3	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-002		MW-5	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-003		MW-1	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-004		MW-2	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-005		MW-0A	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-006		MW-6	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-007		MW-4	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-008		MW-0B	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-009		SW-2	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:
122257-010		SW-3	08/17	08/18	08/18	COMMENTS:					
							08/31	08/24	Water	BK	TEH Comments:
							08/31	08/24	Water	BK	TVH/BTXE Comments:

LETTER OF TRANSMITTAL

PARSONS ENGINEERING SCIENCE, INC.
1301 Marina Village Parkway
Suite 200
Alameda, CA 94501
Phone: (510) 769-0100
Fax: (510) 769-9244

DATE: 18 June 1996

PARSONS ES PROJECT: 729457

TO:
Alameda County Health Care Services Agency
Division of Hazardous Materials
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

ATTN: Ms. Madhulla Logan

RE: Redwood Regional Park Site Investigation, Oakland, California

---

WE ARE SENDING YOU:

ATTACHED XXX

UNDER SEPARATE COVER ____.

DOCUMENTS XXX

OTHER:_____.

VIA MAIL XXX EXPRESS MAIL ___ FED EX ___ OTHER: _____.

QUANTITY	DATE	ITEM
1	06/06/96	Quarterly Progress Report 5, Groundwater Characterization Program at Redwood Regional Park Service Yard Site, Oakland, California

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REMARKS:

cc: W. Gee, East Bay Regional Parks District

SIGNED: Bruce M. Rucker

Bruce M. Rucker, Project Manager

AC-tran.doc

APPENDIX D

PURGE WATER DISPOSAL DOCUMENTATION

REGIONAL PARKS

EAST BAY REGIONAL PARK DISTRICT

August 21, 1995

Mr. Rick Matthews
Gibson Environmental
3300 Truxtun Avenue, Suite 300
Bakersfield, CA 93301

Re: Treatment/Recycling of Non-Hazardous Liquid

Dear Mr. Matthews:

This letter is to confirm that the waste liquid that has been generated at the East Bay Regional Park District's Redwood Regional Park Service Yard in Oakland, California will be treated and recycled at the Gibson Environmental facility in Bakersfield, California. This material consists of approximately 1,100 gallons of purge water generated during development and quarterly groundwater sampling of six wells between October 1994 and August 1995. This material is non-hazardous based on laboratory analytical results of previous (November 1994, and February and May 1995) water samples collected from the groundwater monitoring wells following purging (summary table attached), in accordance with both the Code of Federal Regulation (40 CFR) Part 261 and the California Code of Regulations, Title 22.

Mr. Bruce Rucker of Parsons Engineering Science, Inc. (project consultant) will be coordinating transport and treatment of this wastewater, and should be contacted at (510) 769-0100 regarding any questions that you may have.

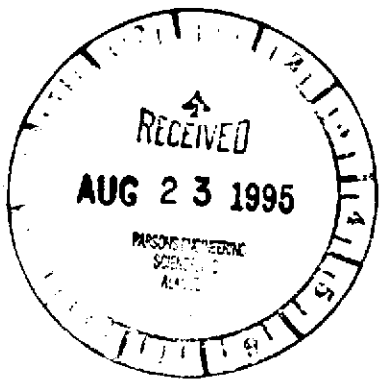
Sincerely,

Warren Gee

Warren Gee
Parkland Design
East Bay Regional Park District

WG/fjb

Attachment



2950 Peralta Oaks Court • P.O. Box 5381 • Oakland CA 94605 0381 • 510.635.0135 • FAX 510.569 4319

Gibson Environmental

Liquid Waste Profile Sheet

Effective May, 1995

Please complete all areas that apply to your material. This is an application, not an approval!
You must sign both sides of this profile sheet.

GENERATOR East Bay Regional Parks District
FACILITY ADDRESS 7867 Redwood Road Oakland CA
MAILING ADDRESS P.O. Box 5381 Oakland CA 94605-0381
TELEPHONE 510 635-0135 x 2311
EPA ID # not applicable
TECHNICAL CONTACT Mr. Warren Gee
TITLE Project Manager

TRANSPORTER Erickson (subcontractor to Gibson)
CONTACT Mr. Sash Migay
TELEPHONE (510) 970-7445
STATE # 0019 (hauler I.D)
TITLE Technical Sales Rep.
EPA ID# CAD 009 466 392

NAME OF WASTE waste water
ACTIVITY PRODUCING WASTE purging of environmental groundwater monitoring wells

Does this waste contain Petroleum Hydrocarbons? ☒ YES ☐ NO

Approximate Concentrations (Account for 100%)

Petroleum Hydrocarbons _____ % Solids _____ %
Water _____ % Other _____ %
pH _____ Flash _____ Odor _____

See attached summary of analytical results from previous groundwater sampling events.

Does this waste contain:

Reactive Cyanides or Sulfides of 1 ppm or more, PCB's of 2 ppm or more, Total Organic Halogens of 1000 ppm or more? ☐ YES ☐ NO

Reportable Lead, Chromium or other "C.A.M. 17" metals? ☐ YES ☐ NO

If yes, what substances and at what concentrations (mg/L or mg/kg)?

Is this a RCRA F-, K-, P- or U-Listed water? ☐ YES ☒ NO

Is this waste a RCRA TCLP? ☐ YES ☒ NO If this waste is RCRA TCLP waste, then which D-codes will be used in the EPA box? _____, _____, _____. If so, you must use "R.Q." (reportable quantity) before the description and (D0_____) after description in Box 11a

How will this waste be manifested?

Non-Hazardous on a Bill of Lading or Data Form? ☒ YES ☐ NO

On a Uniform Hazardous Waste Manifest in Box 11a as:

	State Waste Code
☐ Non-RCRA Hazardous Waste, Liquid	
☐ Waste Combustible Liquid, n.o.s. (oil), NA1993, III	
☐ Waste Petroleum Oil, 3, UN1270, I or II or III	
☐ Hazardous Waste, Liquid, n.o.s., 9 NA3082, III	
☐ Waste Environmentally Hazardous Substances Liquid, n.o.s., 9, UN3082, III	

I certify that the above is true and correct. I have read the terms and conditions on the back and understand that I may be held liable for any mis-description of my waste.

Signature Warren Gee Title SENIOR CIVIL ENGINEER TECH Date 8/21/95

Facility Decision

Accept _____ Sample # _____ Release # _____ Facility _____

Manager _____ Date _____

3300 Truxtun Avenue, Suite 200, Bakersfield, CA 93301 • 805/327-0413 • 800/582-3935 • Fax 805/861-0229

August 28, 1995

EAST BAY REGIONAL PARK DIST
OAKLAND/7867 REDWOOD RD
PO BOX 5381
OAKLAND,CA 94605-0381

EPA# CA* (025369)

This letter is to inform you that Gibson Environmental has the appropriate permits and/or interim status and has accepted your material for recycling.
Gibson certifies that the material received on the manifests indicated below has been properly treated and recycled.

Date	Manifest	Movement	Quantity	UOM
08/28/95	2387	00111543	1,000	GAL

If this information does not agree with your records, please notify us within ten days so we can resolve any discrepancies.

Generators, know your wastestream. Gibson Bakersfield is only permitted to accept the following wastes that are varying combinations of oil, water and solids under California Waste Codes 221, 222, 223, 241. In addition, Gibson at Bakersfield may accept waste codes D004 through D043.

For information as to approved codes for Gibson's Wilmington and Redwood City facilities, please call (800) 582-3935.

This notice is required by the Department of Toxic Substance Control.

Gibson Environmental
Customer Service
3300 Truxtun Avenue Suite 200
Bakersfield, CA 93301
(805) 327-0413

PROFILE # 18281

2387

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME EAST BAY REGIONAL PARKS DISTRICT

ADDRESS 7867 REDWOOD RD. EPA I.D. NO.

CITY, STATE, ZIP OAKLAND, CA 94605 PHONE NO 510, 635-0138

CONTAINERS: No. _____ VOLUME 1000 gal WEIGHT _____

TYPE: ☑ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER _____

WASTE DESCRIPTION WASTE WATER GENERATING PROCESS MONITORING WELS

COMPONENTS OF WASTE	PPM	%	COMPONENTS OF WASTE	PPM	%
1.			5.		
2.			6.		
3.			7.		
4.			8.		

PROPERTIES: pH 5-9 ☐ SOLID ☑ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER _____

HANDLING INSTUCTIONS: _____

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

Bruce M. Ruckts B.M. Ruckts 8/25/95

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME ERICKSON, INC EPA I.D. NO.

ADDRESS 255 PARR BLVD. SERVICE ORDER NO. _____

CITY, STATE, ZIP RICHMOND, CA PICK UP DATE _____

PHONE NO. (800) 788-1393

TRUCK, UNIT, I.D. NO. 4V02 Dan Bailey Dan Bailey 8-25-95

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME GIBSON BAKERSFIELD EPA I.D. NO. CIA 0 1 9 1 8 1 0 1 8 1 8 1 3 1 1 7 1 7

ADDRESS 3300 TRUXTON AVE. DISPOSAL METHOD ☐ LANDFILL ☒ OTHER RECYCLE

CITY, STATE, ZIP BAKERSFIELD, CA 93301

PHONE NO. 800-582-3935

ROBERT BROADWAY Robert Broadway 08/28/95

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L A	TONS	
TRANS		S B		
C/Q		RT/CD	HWDF NONE	DISCREPANCY

Gibson Environmental

3300 TRUXTUN AVENUE, SUITE 200
BAKERSFIELD, CA 93301
(805) 327-0413

Agreement No# 95-021S-1

BAYER

ORIGIN:

95 AUG 23 P12 : 55

95 AUG 23 P1 : 58

DESTINATION: GIBSON ENVIRONMENTAL
COMMERCIAL DRIVE
BAKERSFIELD, CA 93308

IGHT TAG NUMBER ~~[illegible]~~ 224716

DATE 08/28/95

MANIFEST# 2133 25360
NH2 2386 - 2387

INVOICE TO:

PRICE:

CARRIER #	CARRIER	RELEASE#	COMMODITY	TDS	PH	GRAV.	NET GALLONS /BBLS
4002	FERGUSON	18281	O/W		7-0	100	1200. Gal ~~[illegible]~~ Gals

ARRIVED TO UNLOAD	START TO UNLOAD	FINISH UNLOADING	SOLIDS %	1%
AM PM	AM PM	AM PM	WASHOUT GALLONS	YES
LOADED FROM: TRUCK	UNLOADED TO: 3002		DEDUCT B S & W %	99%
LOADER'S SIGNATURE: Brad	DRIVER'S SIGNATURE: [signature]		NET BARRELS	

REMARKS: CO-NEG

FLASH 102 F.

1200

SEE 32599

*95-021S-1

RECEIPT TICKET

B 32601 ~~111496~~ ~~111507~~

3M/10-94