PARSONS ENGINEERING SCIENCE, INC.

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

6 June 1996
Ref: 729457.05000

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

Attention: Ms. Madhulla Logan

Subject: Quarterly Progress Report 5, Groundwater Characterization Program at Redwood Regional Park Service Yard, Oakland, California

Dear Ms. Logan:

INTRODUCTION

This report presents the results of the May 1996 groundwater monitoring event conducted by Parsons Engineering Science, Inc. (Parsons ES) (formerly Engineering-Science, Inc. [ES]) at the East Bay Regional Park District (EBRPD) Redwood Regional Park Service Yard in Oakland, California. This report presents the results of the fifth quarterly groundwater monitoring event for the site Groundwater Characterization Program, which is designed to evaluate the extent and magnitude of groundwater contamination associated with two former leaking underground fuel storage tanks (UFSTs). A summary of previous site characterization and remedial activities associated with the former UFSTs is presented in the first quarterly progress report (Parsons ES 1994). An annual summary assessment report was presented for the first four quarterly monitoring events, November 1994 through August 1995 (Parsons ES 1995), and a second annual summary assessment report will be presented following the initial quarterly monitoring event of 1997 (scheduled for March 1997). That summary report will summarize the second year of quarterly groundwater monitoring activities, analyze hydrochemical trends, and evaluate regulatory agency criteria governing detected groundwater contaminants.

Site Description

The project site is located at 7867 Redwood Road in Oakland, Alameda County, California. Figure 1 shows the location of the project site. The project site is a service yard for Redwood Regional Park that utilized two UFSTs (one 2,000-gallon diesel fuel and one 5,000-gallon unleaded gasoline) from the mid-1960's until their removal in 1993. Figure 2 is a site plan which shows the limits of the former UFST remedial excavation and the groundwater monitoring wells which were installed in October 1994 to monitor groundwater impacts associated with the former UFSTs.

Site Stratigraphy and Hydrogeology

Shallow soil stratigraphy beneath the project site consists of a surficial 3 to 10 foot thick clayey silt unit underlain by a 5 to 15 foot thick silty clay unit. In all monitoring well borings, a 5- to 10-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.

Groundwater at the site occurs under predominantly unconfined conditions, as evidenced by the equilibrated static water levels relative to the water level in Redwood Creek and the level of water seepage out of the north face of the former excavation. Figure 2 shows groundwater elevations and inferred direction of groundwater flow during the May 1996 monitoring event. The May 1996 data indicate that the direction of local groundwater flow beneath the project site is approximately from northeast to southwest. This groundwater flow direction is consistent with previously recorded measurements made in site wells since November 1994 (Parsons ES 1995).

PROCEDURES AND CURRENT ACTIVITIES

The current groundwater monitoring program is in accordance with the Workplan for Groundwater Characterization Program (ES 1994b). The Alameda County Health Care Services Agency (ACHCSA) approved discontinuation of hydrochemical monitoring of site wells MW-1, MW-3 and MW-6 following the August 1995 event due to the absence of significant groundwater contamination in these wells over the first four quarters of monitoring (ACHCSA 1996). Creek surface water sampling procedures are in accordance with the 29 March 1994 Parsons ES letter to ACHCSA (ES 1994a).

Laboratory Analyses

All laboratory analyses were conducted by a laboratory certified by the California Environmental Protection Agency (Cal/EPA) Environmental Laboratory Accreditation Program (ELAP) for each required analytical method. All groundwater and surface water samples were analyzed for the following constituents:

- Total petroleum hydrocarbons - gasoline, diesel and kerosene ranges (TPH-G, -D, and -K) by the State of California Department of Toxic Substances Control (DTSC) Leaking Underground Fuel Tank (LUFT) Manual Method (equivalent to modified EPA Method 8015)

- Aromatic hydrocarbons (including benzene, toluene, ethylbenzene, and total xylenes [BTEX]) by EPA Method 8020

Groundwater Monitoring and Sampling

Parsons ES personnel measured static water levels (Table 1 and Attachment A) in all six site wells on 17 May 1996. Water level measurements were made using an electric water level indicator. Initial water level measurements were collected immediately upon removal of the airtight well casing caps. If either a positive or negative air pressure was observed in the well at the time the casing caps were removed, then water levels were then remeasured after a period no less than one-half hour to allow dissipation of air pressure and equilibration of static water levels. No wells displayed an observable pressure release during this event.

Groundwater sampling of monitoring wells MW-2, MW-4 and MW-5 was conducted on 17 May 1996 in accordance with Cal/EPA guidelines (Cal/EPA 1994). Prior to collection of groundwater samples, a pre-cleaned Teflon™ bailer or submersible pump was used to purge a minimum of three casing volumes from each well. Electrical conductivity, pH, and temperature of purge water were measured during well purging, to document the presence of stabilized formation-water in the wells. Attachment A includes water level data and groundwater monitoring field notes from the current groundwater monitoring event.

Sample containers were filled with sample water from the pre-cleaned bailer. To prevent cross-contamination, groundwater sampling equipment was decontaminated prior to use and between each monitoring well with an Alconox™ 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 Cal/EPA ELAP-certified laboratory. Chain-of-custody records for the groundwater samples are included in Attachment B.

Creek Surface Water Sampling

Surface water samples were collected from three locations within Redwood Creek (Figure 2) 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. Creek surface water samples were collected approximately 24 hours following a significant precipitation event, and the creek was flowing briskly at the time of sampling.

Analytical Results

Groundwater Samples

Analytical results of the May 1996 monitoring event are presented in Table 2. Fuel hydrocarbons were detected only in monitoring well MW-4 during the current quarterly sampling event. Maximum concentrations of contamination detected include 1,100 µg/L TPH-G, 140 µg/L TPH-D/K and 98 µg/L total BTEX (all in MW-4). Detected concentrations reported for the present quarter are approximately within the same order of magnitude compared to concentrations reported for the previous sampling event.

Creek Surface Water Samples

Surface water samples collected from Redwood Creek (SW-1, -2 and -3 locations on Figure 2) were analyzed for TPH-G, TPH-D/K and BTEX. Extractable-range hydrocarbons were detected in sample SW-3 (downstream of the UST release site [Figure 1]) at a concentration of 74 µg/L.

Quality Control Samples

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 from the decontaminated bailer 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. These constituents were not detected in the rinsate blank.

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 (Table 2). These constituents were not detected in either the duplicate or the original samples.

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

Management of Investigation-Derived Waste

A total of approximately 81 gallons of wastewater (including monitoring well purge water and equipment decontamination rinsate) from the current quarter's groundwater sampling event was containerized on site in a plastic storage tank. It is anticipated that this waste water will be transported for off-site treatment and disposal following the May 1997 monitoring event.

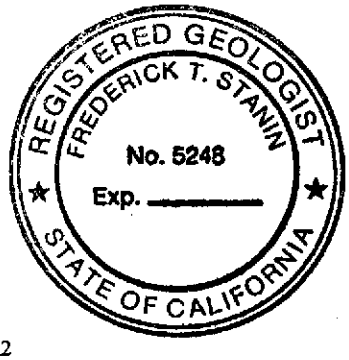
We trust that this submittal meets the needs of your agency. Please call us at our Alameda office (510-769-0100) if you have any questions or require clarification.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

Bruce M. Rucker

Bruce M. Rucker
Project Manager



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

REFERENCES

Alameda County Health Care Services Agency (ACHCSA) 1996, letter from Madhulla Logan, Hazardous Materials Specialist to Ken Berger of EBRPD. 9 January

ES 1994a, letter to Alameda County Health Care Services Agency (ACHCSA) summarizing proposed sampling activities at Redwood Creek, Redwood Regional Park Service Yard, Oakland, California. 27 January

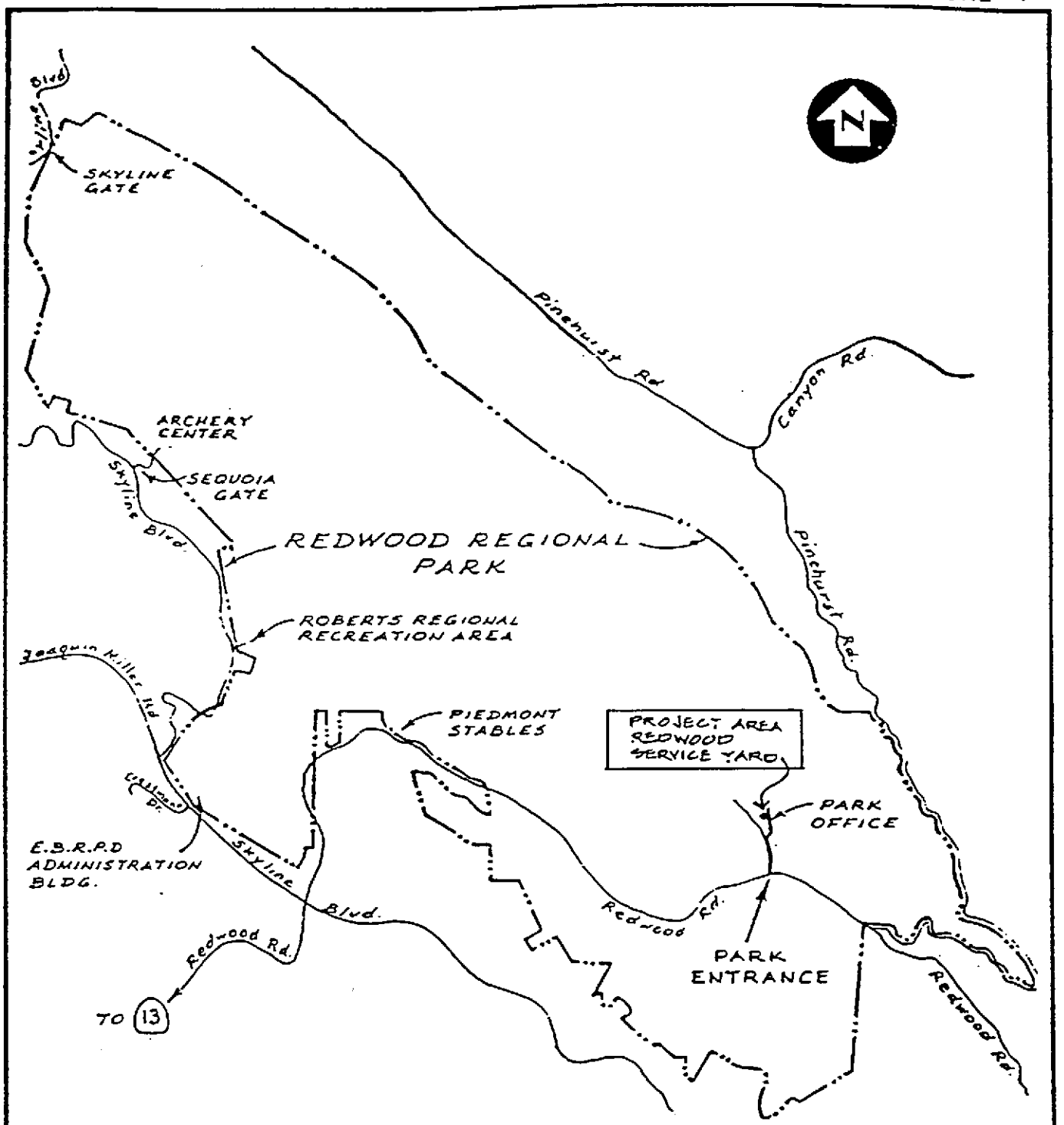
ES 1994b, Workplan for Groundwater Characterization Program at Redwood Regional Park Service Yard, Oakland, California. 17 August

Parsons ES 1994, Quarterly Progress Report 1 (October - December 1994), Redwood Regional Park Service Yard, Oakland, California. 28 December

Parsons ES 1995, Quarterly Progress Report 4 and Annual Summary Assessment (November 1994 - August 1995), Redwood Regional Park Service Yard, Oakland, California. 13 November

State of California Environmental Protection Agency (Cal/EPA) 1994, Guidance Manual for Ground Water Investigations. August

FIGURE 1

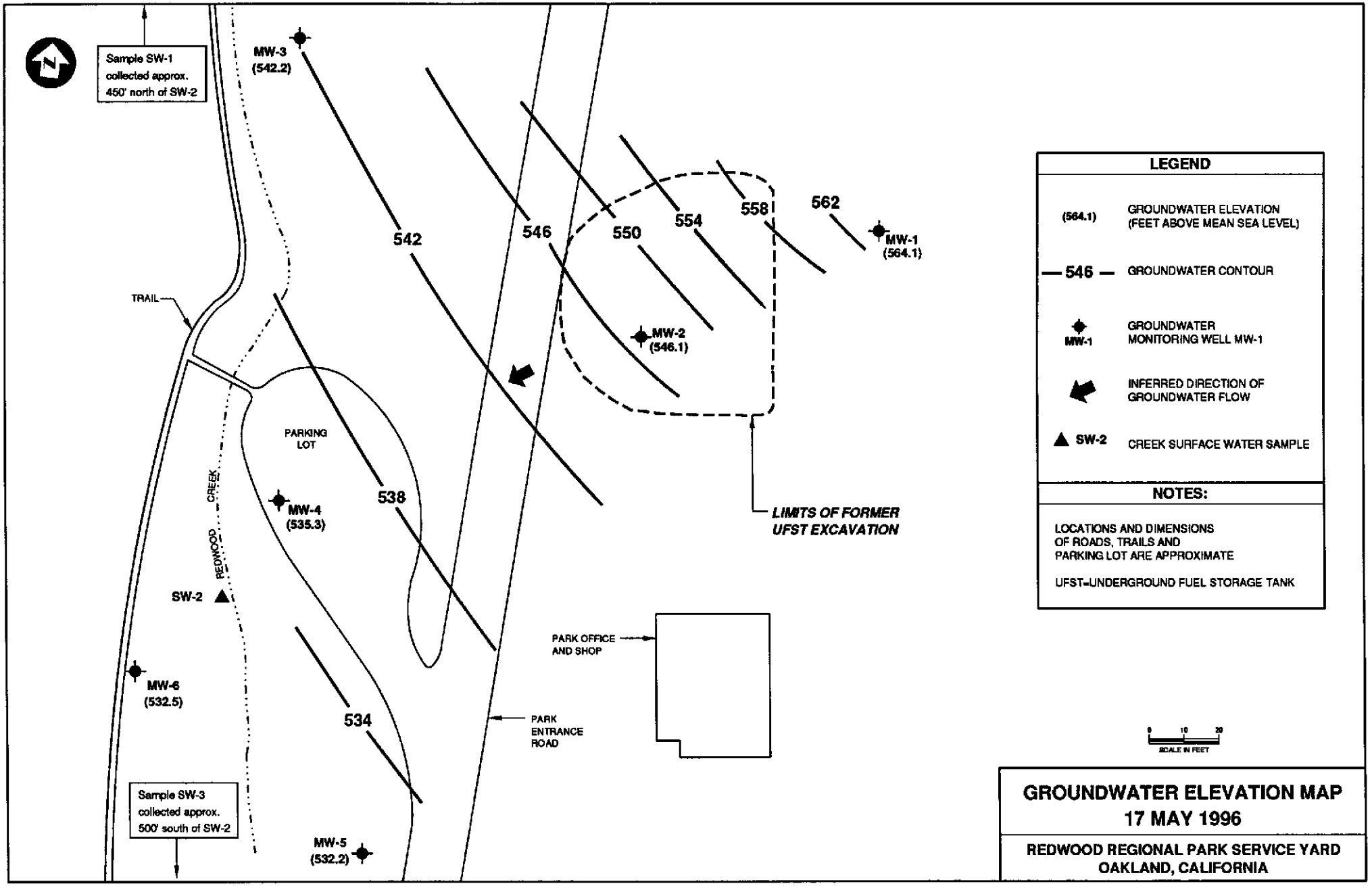


SITE LOCATION MAP

REDWOOD REGIONAL PARK
SERVICE YARD

OAKLAND, CALIFORNIA

FIGURE 2



GROUNDWATER ELEVATION MAP
17 MAY 1996

REDWOOD REGIONAL PARK SERVICE YARD
OAKLAND, CALIFORNIA

REV. 2 R400-27.DWG 05/23/96

PARSONS ENGINEERING SCIENCE, INC.

TABLE 1

WELL ELEVATIONS AND WATER LEVEL MEASUREMENTS
17 MAY 1996

Well		Well Elevation (TOC)	Water Levels
MW-1	Depth		1.81
	Elevation	565.9	564.1
MW-2	Depth		20.41
	Elevation	566.5	546.1
MW-3	Depth		18.70
	Elevation	560.9	542.2
MW-4	Depth		12.81
	Elevation	548.1	535.3
MW-5	Depth		15.32
	Elevation	547.5	532.2
MW-6	Depth		13.10
	Elevation	545.6	532.5

Remarks:

1) All water level depths are feet below top of well casing (TOC).
2) All elevations are feet above USGS mean sea level (MSL). Elevations were surveyed by EBRPD relative to USGS Survey Benchmark No. JHF-49.
3) Additional water level and well construction data are included in Attachment A.

TABLE 2

GROUNDWATER AND SURFACE WATER ANALYTICAL RESULTS
17 May 1996
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
Monitoring Well Samples						
MW-2	ND	ND	ND	ND	ND	ND
MW-2*	ND	NA	ND	ND	ND	ND
MW-4	1,100	140**	51	ND	ND	47
MW-5	ND	ND	ND	ND	ND	ND
Surface Water Samples						
SW-1	ND	ND	ND	ND	ND	ND
SW-2	ND	ND	ND	ND	ND	ND
SW-3	ND	74**	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 above method reporting limit

µg/L = Micrograms per liter, equivalent to parts per billion (ppb)

** = Sample chromatogram does not resemble hydrocarbon standard.

Sample locations are shown on Figure 2.

ATTACHMENT A

WATER LEVEL DATA AND GROUNDWATER MONITORING NOTES

WATER LEVEL DATA

PARSONS ENGINEERING SCIENCE

DATE: 35202

PROJECT/LOCATION: Redwood Regional Park Service Yard, Oakland, California

PROJECT No.: 729457

PERSONNEL: Bruce Rucker

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	1.81	18.0	-2.3	-0.5	4	NS	565.9	564.09
MW-2	20.41	36.5	-2.4	18.0	4	10.5	566.5	546.09
MW-3	18.70	45.0	-2.8	15.9	4	NS	560.9	542.20
MW-4	12.81	26.0	-2.1	10.7	4	8.6	548.1	535.29
MW-5	15.32	26.0	-2.3	13.0	4	6.9	547.5	532.18
MW-6	13.10	27.0	-2.3	10.8	4	NS	545.6	532.50

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)

NS: Not Sampled

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

GROUNDWATER SAMPLING FIELD NOTES

PARSONS ENGINEERING SCIENCE

PROJECT/LOCATION REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA **PERSONNEL:** Bruce Rucker

PROJECT NUMBER: 729457 **DATE:** 17-May-96

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	NS	1.81 4" 18.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-2	BMR 5/17/96 11:02	20.41 4" 36.5	21.10	10.5	B	NA	NA	13.8 13.8 13.9 14.1	600 600 650 625	7.13 7.07 7.14 7.16	3 11 22 33	B	(a) (b) & (c)	Sample semi-turbid; no sheen
MW-3	NS	18.70 4" 45.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-4	BMR 5/17/96 11:02	12.81 4" 26.0	13.51	8.6	B	NA	NA	13.0 12.9 13.0 12.9	450 450 460 460	6.55 6.59 6.62 6.67	3 9 18 27	B	(a) (b) & (c)	Sample semi-turbid; slight petroleum sheen and odor

NOTES

* Measured from top of casing in feet

** WW -- Well Wizard; 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:** Bruce Rucker

PROJECT NUMBER: 729457 **DATE:** 17-May-96

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-5	BMR 5/17/96 10:20	15.32 4" 26.0	16.21	6.9	B	NA	NA	13.2 12.8 12.9 12.9	480 425 430 430	6.77 7.35 7.48 7.47	3 7 14 21	B	(a) (b) & (c)	Sample semi-clear; no sheen
MW-6	NS	13.1 4" 27.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	
MW-0A	BMR 5/17/96 11:05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		(b) & (c)	Field duplicate collected at well MW-2
MW-0B	BMR 5/17/96 12:30	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	(a)	Total Petroleum Hydrocarbons as diesel (TPH-D), unpreserved {1: 1L amber bottles}.
**	WW -- Well Wizard; G -- Grundfos Pump; B - Bailer	(b)	BTEX, EPA Method 8020, HCl preserved {2: 40ml VOAs}.
NA	Not Applicable	(c)	Total Petroleum Hydrocarbons as gasoline (TPH-G), HCl preserved {2: 40ml VOAs}.
NR	Not Recorded	NS	Not sampled

ATTACHMENT B

CHAIN-OF-CUSTODY RECORDS 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: 23-MAY-96
Lab Job Number: 125628
Project ID: 729457
Location: Redwood G.Water & Surface

Reviewed by: _____

Reviewed by: _____

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
125628-001	MW-5	27660	05/17/96	05/17/96	05/21/96	
125628-002	MW-2	27660	05/17/96	05/17/96	05/21/96	
125628-003	MW-4	27660	05/17/96	05/17/96	05/21/96	
125628-004	SW-3	27660	05/17/96	05/17/96	05/21/96	

Matrix: Water

Analyte	Units	125628-001	125628-002	125628-003	125628-004
Diln Fac:		1	1	1	1
Diesel C12-C22	ug/L	<50	<50	140 YLZ	74 Y
Surrogate					
Hexacosane	%REC	98	99	96	100

Y: Sample exhibits fuel pattern which does not resemble standard
Z: Sample exhibits unknown single peak or peaks
L: Lighter hydrocarbons than indicated standard

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
125628-005	SW-2	27660	05/17/96	05/17/96	05/21/96	
125628-006	SW-1	27660	05/17/96	05/17/96	05/21/96	

Matrix: Water

Analyte Diln Fac:	Units	125628-005 1	125628-006 1
Diesel C12-C22	ug/L	<50	<50
Surrogate			
Hexacosane	%REC	96	91

Z: Sample exhibits unknown single peak or peaks
L: Lighter hydrocarbons than indicated standard

Curtis & Tompkins, Ltd.

Lab #: 125628 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

METHOD BLANK

Matrix: Water
Batch#: 27660
Units: ug/L
Diln Fac: 1

Prep Date: 05/17/96
Analysis Date: 05/21/96

MB Lab ID: QC21992

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	%Rec	Recovery Limits
Hexacosane	98	60-140

Curtis & Tompkins, Ltd.

Lab #: 125628 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 27660
Units: ug/L
Diln Fac: 1

Prep Date: 05/17/96
Analysis Date: 05/21/96

BS Lab ID: QC21993

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C12-C22	2475	2248	91	60-140
Surrogate	%Rec	Limits		
Hexacosane	99	60-140		

BSD Lab ID: QC21994

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	2272	92	60-140	1	<35
Surrogate	%Rec	Limits				
Hexacosane	97	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

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
125628-001	MW-5	27698	05/17/96	05/20/96	05/20/96	
125628-002	MW-2	27698	05/17/96	05/20/96	05/20/96	
125628-003	MW-4	27698	05/17/96	05/21/96	05/21/96	
125628-004	SW-3	27698	05/17/96	05/21/96	05/21/96	

Matrix: Water

Analyte Diln Fac:	Units	125628-001 1	125628-002 1	125628-003 1	125628-004 1
Gasoline	ug/L	<50	<50	1100	<50
Surrogate					
Trifluorotoluene	%REC	96	97	94	91
Bromobenzene	%REC	86	87	92	79

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
125628-001	MW-5	27698	05/17/96	05/20/96	05/20/96	
125628-002	MW-2	27698	05/17/96	05/20/96	05/20/96	
125628-003	MW-4	27698	05/17/96	05/21/96	05/21/96	
125628-004	SW-3	27698	05/17/96	05/21/96	05/21/96	

Matrix: Water

Analyte	Units	125628-001	125628-002	125628-003	125628-004
Diln Fac:		1	1	1	1
Benzene	ug/L	<0.5	<0.5	51	<0.5
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	47	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5
Surrogate					
Trifluorotoluene	%REC	109	110	111	107
Bromobenzene	%REC	99	101	105	94

TVH-Total Volatile Hydrocarbons

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

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

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
125628-005	SW-2	27698	05/17/96	05/21/96	05/21/96	
125628-006	SW-1	27698	05/17/96	05/21/96	05/21/96	
125628-007	MW-OA	27719	05/17/96	05/21/96	05/21/96	
125628-008	MW-OB	27719	05/17/96	05/21/96	05/21/96	

Matrix: Water

Analyte Diln Fac:	Units	125628-005 1	125628-006 1	125628-007 1	125628-008 1
Gasoline	ug/L	<50	<50	<50	<50
Surrogate					
Trifluorotoluene	%REC	90	90	85	84
Bromobenzene	%REC	78	78	85	85

Curtis & Tompkins, Ltd.

Lab #: 125628 BATCH QC REPORT

BTXE

Client: Parsons Engineering Science, Inc.
Project#: 729457
Location: Redwood G.Water & Surface

Analysis Method: EPA 8020
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 27698
Units: ug/L
Diln Fac: 1

Prep Date: 05/20/96
Analysis Date: 05/20/96

LCS Lab ID: QC22127

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	21.9	20	110	80-120
Toluene	23.2	20	116	80-120
Ethylbenzene	22.8	20	114	80-120
m,p-Xylenes	47.6	40	119	80-120
o-Xylene	23.9	20	119	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	106	58-130
Bromobenzene	91	62-131

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

ES Engineering-Science, Inc.
1501 Marina Village Parkway, Suite 200
Alameda, California 94501
Phone: (510) 769-0100 Fax: (510) 769-9244

CHAIN OF CUSTODY RECORD

12568

PAGE ___ OF ___

LABORATORY:	PROJECT MANAGER:	PROJ. #:
Curtis & Tompkins	B. Rucker	729457

PROJECT NAME/LOCATION: Redwood Groundwater & Surface Water - Oakland CA

SAMPLER(S): (SIGNATURE) B.M. Rucker Bruce M. Rucker

	SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	METHOD (PRESERVED) DTSC LUFT/8015-TVH (HCl)	EPA 8020 - BTEX (HCl)	DTSC LUFT - TEH						TO BE COMPOSITED BY LAB	TURN AROUND TIME	REMARKS
1	MW-5	5/17/96	1030	Water	Monitoring well MW-5	3	✓	✓	✓							5 day	
2	MW-2		1105		" " MW-2	3	✓	✓	✓								
3	MW-4		1220		" " MW-4	3	✓	✓	✓								
4	SW-3		1230		Creek Surface Water #3	3	✓	✓	✓								
5	SW-2		1240		" " #2	3	✓	✓	✓								
6	SW-1		1250		" " #1	3	✓	✓	✓								
7	MW-0A				Quality control	2	✓	✓									
8	MW-0B				Quality control	2	✓	✓									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY(SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
B.M. Rucker.	5/17/96	1523	[signature] 1523				

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	REMARKS:

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

c:\user\cdr\coceg.cdr