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November 15, 2002

Barney M. Chan
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-9335

Telephone: (510) 567-6765
FAX: (510) 337-9335

SUBJECT: **GROUNDWATER MONITORING OF HYDROCARBONS RELATED TO THE FORMER UNDERGROUND STORAGE TANKS AT THE FORMER BILL CHUN SERVICE STATION @ 2301 SANTA CLARA AVENUE, ALAMEDA, CA 94501**

Dear Barney:

Enclosed are the details of a subsurface hydrogeologic investigation for the above designated site as required according to the approved workplan. Three (3) groundwater extraction wells were installed on October 24 & 25, 2002 onsite to be utilized for groundwater pumping and vapor extraction pilot testing. On October 28, 2002 the wells were developed by Blaine Tech Services and the wells sampled on October 31, 2002.

Gasoline contamination was identified in soil and groundwater at the three extraction well locations. Groundwater monitoring well MW-11 was also sampled as it was inadvertently left out of the sampling suite during the past two groundwater monitoring sampling events. Data evaluation reported herein reveals no significant changes in the distribution of the dissolved contaminant plumes as reported in the past two groundwater monitoring events and therefore no change in the placement and location of the three extraction wells to be utilized for pilot testing was deemed applicable on this basis.

Sincerely,

Franklin J. Goldman

Franklin J. Goldman
Certified Hydrogeologist No. 466

REGISTERED GEOLOGIST FRANKLIN J. GOLDMAN CERTIFIED HYDROGEOLOGIST NO. 466 STATE OF CALIFORNIA

Alameda County
NOV 22 2002
Environmental Health

SUBSURFACE INVESTIGATION

SITE LOCATION AND DESCRIPTION

The site is located in a commercial area on the Island of Alameda. The site is bordered on the southeast by a flower shop which has residents living on the second story. A one story office building is located to the north and Oak and Santa Clara Avenues border the remainder of the site.

WORK ACTIVITIES COMPLETED, CORRECTIONS TO GROUNDWATER MONITORING REPORTING AND CHANGES TO THE WORKPLAN

Potential groundwater extraction well locations were marked at the site in white paint. The soil boring locations were marked for Underground Service Alert which was contacted prior to drilling. Each soil boring location was screened with a magnetometer and was then hand augered to a depth of 5 feet bgs prior to excavation with the hollow-stem auger drill rig to avoid damage to underground piping and utility lines.

On October 24, 2002, during the field investigation, Eva Chu of Alameda County Health identified MW-11 out in the field on the opposite side of the Flower Shop and requested that it be sampled and a lab analysis be performed for gasoline contaminants. The lab results for the groundwater grab sample collected from MW-11 revealed dissolved TPHg (59,000 ppb) and benzene (5,140 ppb) concentrations which were significantly less than what had been reported for the past two groundwater monitoring events [(July 04, 2002 - TPHg (140,000 ppb) and benzene (15,000 ppb) & September 07, 2000 - TPHg (220,000 ppb) and benzene (32,000 ppb)]. This indicates that the dissolved plume has not migrated as far down gradient as was displayed on the concentration gradient maps submitted for the past two groundwater monitoring events. Nothing has changed, however, with respect to the fact that the dissolved plume has migrated beneath the flower shop and that there is no apparent feasible location for placement of an extraction well within the flower shop building or between the flower shop and the greenhouse further to the east. Remediation efforts must still be focused onsite, as originally proposed, where the most effective remediation and practical cleanup can be attained in the least amount of time. During Eva Chu's field visit, a new location for EW-14 was discussed and a change in location was made based upon her advice as discussed below. On the next day, a discussion with Barney Chan of Alameda County in the field revealed that the proposed analyses for soil physical characteristics were perhaps redundant considering that fact that the soil vapor and groundwater pumping tests will provide more representative data between soil borings and wells than a few isolated soil samples collected from the well bores. Furthermore, since most of the soil samples were collected from non-cohesive sandy soils, which required a sand catcher, to retain the samples, the soil samples designated for physical lab testing could be too disturbed to provide useful data for bulk density testing and the gasoline content would skew the results for the fraction of organic carbon content testing (i.e. an attempt was made to chose soil samples in less contaminated locations, however, the final lab results showed gasoline contamination in soil which were too high for foc analysis).

Three (3) groundwater extraction wells EW-12, EW-13, and EW-14 were installed on October 24 & 25, 2002 to 25 feet bgs (See Figure 1 for extraction well locations). EW-12 was placed in the same location as recommended in the workplan, immediately adjacent to SV-1, which was not shown on figures 3, 4, and 9 of the June 1998 ENSR Corrective Action Evaluation and Feasibility Study. There was no indication in the field that SV-1 was anything other than a monitoring well as there was no extraction equipment in the well. Since identification of SV-1 was not readily apparent in the field, SV-1 had been sampled and reported in the past two groundwater monitoring reports as groundwater monitoring well MW-2; MW-2 was sampled and reported as MW-7; MW-7 was sampled and reported as MW-11; and MW-11 was never sampled and reported. As a result, groundwater monitoring data for the past two groundwater monitoring events were re-evaluated (See Attachment A for revised groundwater monitoring tables and map comparisons of last quarters plume and groundwater

gradient distributions). In spite of the discrepancy, the reported distribution of the dissolved plumes are essentially the same as the reevaluated distribution due to the very close proximity of the monitoring wells to one another on site and the fact that the wells were mislabeled in the predominant downgradient direction. Since the pilot extraction well testing designs and configuration as well as the remediation engineering designs were based upon a plume centered onsite, which were designed to capture subsurface contamination where accessible, and the recent re-evaluation of the data for the past two groundwater monitoring events has demonstrated that the majority of the mass of the gasoline plume is still within the reach of the proposed system, no change to the field pilot testing or remediation design is considered applicable at this time. EW-13 was placed in the northeast corner of the site as proposed in the workplan. EW-14 was placed a little further to the north, in the most down gradient corner of the former UST excavation so that the well would be more effectively used as an interim remediation measure after the groundwater pump testing is completed. In addition, the extraction well location for EW-14 will provide better field data regarding the influence that the UST backfill material will have on the effectiveness of a future groundwater and vapor extraction pumping system.

Soil Sampling Procedures for Extraction Well Excavations and Lab Results

Three (3) soil borings were drilled by Clearheart Drilling, a C-57 drilling licensed driller. All borehole logging was performed by a State Certified Hydrogeologist who kept a detailed hydrostratigraphic log of each borehole, noting lithologic changes, hydrogeological characteristics, sample locations, and well construction. Soil sampling was performed on the day of the subsurface investigation. Soil sampling was performed where appropriate in order of identify significant changes in soil hydrostratigraphy. The well excavations sampled at a minimum of every five (5) vertical feet. Most of the soils encountered to a depth of 25 feet bgs were predominantly comprised of non-cohesive medium sands (See Appendix A for Soil Boring Logs).

All soil borings were continuously cored to obtain a representative distribution of gasoline contaminants in soil. Soil samples were collected with a two (2) inch inner diameter, three (3) foot long, split spoon sampler depending upon the soil stratigraphy and contaminants encountered. The soil samples were obtained by the compressive force of a 140 lb hammer dropped from a height of 18 inches. The soil samples were be extruded into six (6)-inch long steel sample liners. Soil samples were chosen for lab analyses based upon obvious olfactory and visual evidence of contamination, by photoionization detector (PID) screening and/or at significant changes in hydrostratigraphic horizons. Non-detect levels of benzene were verified in soil at a depth of 25 feet bgs in all three soil boring excavations identified in soil (See table I for lab results and Appendix B for Laboratory Data Sheets).

Each soil sample collected was covered at each end of the metal cylinder with Teflon tape, plastic end caps, and sealed with non-VOC "duct tape" to adhere the caps to the liners at each end, to hermetically seal the samples. The soil samples were labeled with a non-toxic ink field marker as to the depth and location the sample was collected, the sample number, and the project name and inserted into a plastic Zip-Lock bag and then placed into an ice chest for transport back to the laboratory. The chain-of-custody was similarly designated and included the date and time the sample was collected as well as the depth interval. All soil samples were analyzed for TPH(g)/BTEX by EPA Method 8015 modified/8020.

The sampler was decontaminated before and after each use by rinsing with an Alconox solution wash and fresh tap water rinse. All rinseate water, purge water, and soil waste were stored in 55 gallon DOT approved drums. The drums have been stored onsite until authorization for transport to legal point of disposal is made.

Hydrocarbon contaminants were identified in soil in all three extractions well excavations (See table I for lab results and Appendix B for Laboratory Data Sheets).

WELL CONSTRUCTION

The three (3) wells were constructed with a 0.02 inch PVC schedule 40 slotted casing from 25 to 7 feet bgs and schedule 40, 2 inch diameter PVC blank casing from 7 to approximately ½ foot bgs. No. 212 silica sand pack was placed in the annular space between the screened casing and the open borehole to one foot above the top of the screen. The bentonite seal was three feet thick and was placed on top of the sand pack in the annular space from 6 to 3 feet bgs. A Type II Cement bentonite grout was then tremmied from the bottom up to within approximately 1 foot from the top of the surface cover. A continuous concrete pour was then be placed on top of the grout to the surface where it will be finished with a 3 inch high concrete apron around a Boart Longyear well box and locking well cap (See Figure 2 for extraction well construction detail).

WELL DEVELOPMENT, PURGING, SAMPLING ACTIVITIES AND LAB RESULTS

On October 28, 2002 the wells were swabbed, bailed and pumped by a qualified field technician from Blaine Tech Services until the water was relatively clear. The resulting turbidity was relatively low. On October 20, 2002 the wells were purged and sampled according to the following procedures.

On October 31, 2002 a Slope Indicator water level meter was used to measure the depth to groundwater in the groundwater extraction wells prior to well development and sampling. The measurements were read to the nearest 100th of an inch from the top of casing.

The three wells were then purged and developed to obtain a representative groundwater samples. Each well purged of approximately three (3) borehole volumes allowing the water level to recover to at least 80% of the original, static level. Temperature, electrical conductivity, and pH were monitored during each purging, so that the three parameters were within a 10% error difference from one another, over a minimum of three consecutive readings. The data was used to verify that water had been removed from well casing storage and that the well water was representative of the aquifer, prior to sampling. Low turbidity was observed in the wells after well development and purging (See Appendix D for Well Development Logs).

For reference purposes, EW-12, EW-13, and EW-14 were labeled in the field by Clearheart drilling as EW-1, EW-3, and EW-2, respectively. The groundwater flow direction is to the east at 0.004 ft/ft. (See Figure 1 for gradient and water table elevations and Appendix C for Well Survey).

Water samples were collected by lowering a plastic disposable check valve bailor down the center of each PVC well casing after the static water level had recovered. The bailor was lowered to the bottom of the well casing and pulled to the surface to be decanted from the bottom of the bailor by temporarily unplugging the check valve until water flowed freely into the glass sample container. Water samples were contained in 40-milliliter VOA vials for TPH-g, MTBE, BTEX, oxygenates, and lead scavenger analyses. The samples were labeled and stored on ice at 4 degrees centigrade until delivered, under chain-of-custody procedures, to State-certified analytical laboratory. All samples were analyzed by appropriate and applicable EPA test methods.

Hydrocarbon contaminants were identified in groundwater in all three extraction wells and in groundwater monitoring well MW-11 (See Table 1 and Appendix B for Laboratory Data Sheets). TPHg and BTEX was identified in all wells sampled. Low levels of TBA were identified in EW-13 & 14. Low levels of MTBE were identified in MW-11, and EW-13 & 14. Di-Isopropyl ether was identified in EW-14. EDB was identified in MW-11 and EW-14.1,2 DCA was identified in all wells.

CONCLUSIONS

Most of the contaminant hydrocarbon mass appears to be onsite, however, some of the dissolved plume has migrated beneath the Flower Shop and as far northeast as groundwater monitoring well MW-11. The soils encountered beneath the site appear to be sandier than was anticipated and may be more conducive to remediation efforts as well. Although low levels of oxygenates and lead scavengers were identified in groundwater the concentrations do not appear to be significant enough to warrant any alterations to the field pilot testing of the remediation plan at this time.

RECOMMENDATIONS

Groundwater sampling events should be performed immediately before and after the groundwater pumping and vapor pilot tests are completed in order to make a comparison as to the effectiveness of short term remediation activities in order to calibrate the remediation system. In addition, a comparison should be made between hydrocarbons identified in soil onsite during the past soil investigations and the soil lab results from samples obtained from the extraction well excavations. Also, a rose diagram should be developed for all groundwater monitoring events performed in the past; although it is readily apparent, based upon consistent plume distributions that the predominant groundwater gradient is spreading the plume to the east beneath the Flower Shop. It is not advisable to perform groundwater extraction at, or in the vicinity of, MW-11 at this time, as this may draw the dissolved plume underneath the building; perhaps inducing a greater health threat.

LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied, is made as to the professional advice presented herein. The analyses, conclusions and recommendations contained in this report are based upon site conditions as they existed at the time of the investigation and they are subject to change. The conclusions presented in this report are professional opinions based solely upon visual observations made within individual soil excavations and of the site and vicinity as well as on interpretations of available information as designated in this report. Franklin J. Goldman, maintains that the limited scope of services performed in the execution of this investigation may not be sufficient to satisfy the needs, and/or requirements of all regulatory agencies or other users. Any use or reuse of this document, its findings, its conclusions and/or recommendations presented herein, is done so at the sole risk of the said user.

Table 1

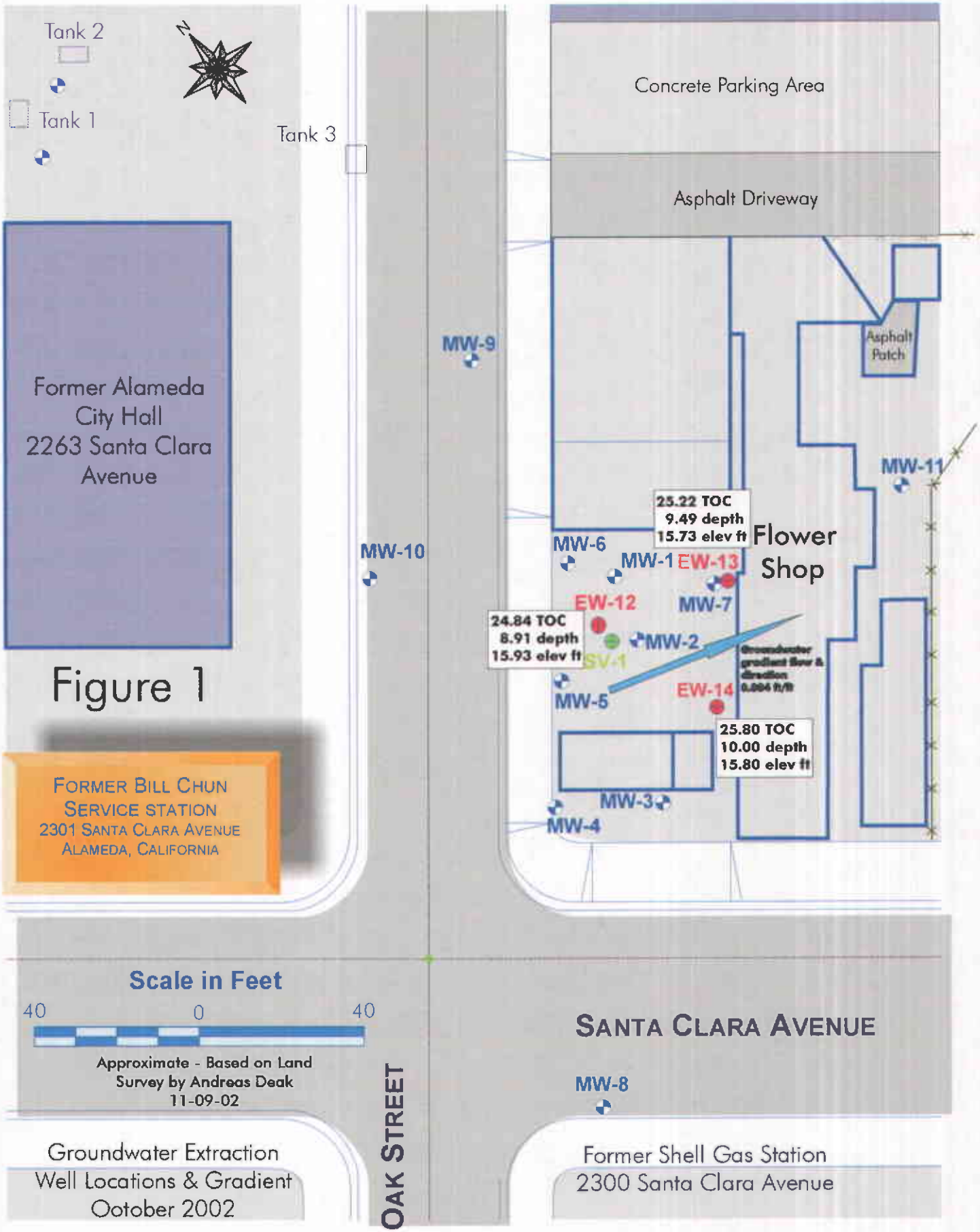
Hydrocarbons in Groundwater in MW-11, and EW-12, 13, & 14 in ppb for Samples collected for Chun

Sample	Date	TPH(g)+	Benzene	Toluene	Ethyl-benzene	Xylenes
MW-11	10-24-02	59,000	5,140	5,940	1,640	9,230
EW-12	10-31-02	5,840	75.7	358	210	96.2
EW-13	10-31-02	109,200	9,120	13,440	1,908	8,228
EW-14	10-31-02	101,880	7,360	13,160	1,360	7,200

Sample	Date	TBA	MTBE	Di-isopropyl ether	tert Butyl ethyl ether	TAME	EDB	1,2 DCA
MW-11	10-24-02	ND	2.6	ND	ND	ND	5.8	10.7
EW-12	10-31-02	ND	ND	ND	ND	ND	ND	1.48
EW-13	10-31-02	50.8	12.2	ND	ND	ND	ND	14.7
EW-14	10-31-02	22.9	8.6	1.63	ND	ND	1.86	34.9

Hydrocarbons in Soil in ppm for Samples collected for Chun

Sample	Date	TPH(g)+	Benzene	Toluene	Ethyl-benzene	Xylenes
EW-12 5 - 5 ½	10-24-02	0.06	ND	ND	ND	0.009
EW-12 10 - 10 ½	10-24-02	0.616	ND	0.05	ND	0.10
EW-12 15 - 15 ½	10-24-02	ND	ND	ND	ND	ND
EW-12 20 - 20 ½	10-24-02	0.05	ND	ND	ND	ND
EW-12 24½ - 25	10-24-02	0.05	ND	ND	ND	0.009
Sample	Date	TPH(g)+	Benzene	Toluene	Ethyl-benzene	Xylenes
EW-13 4 ½ - 5	10-24-02	8.7	ND	0.065	0.178	0.994
EW-13 10 - 10 ½	10-24-02	2,760	45.9	271	72.3	375
EW-13 15 - 15 ½	10-24-02	11.4	0.047	0.248	0.053	0.029
EW-13 19 ½ - 20	10-24-02	0.065	0.02	0.06	0.015	0.094
EW-13 24½ - 25	10-24-02	0.10	ND	0.01	ND	0.016
Sample	Date	TPH(g)+	Benzene	Toluene	Ethyl-benzene	Xylenes
EW-14 4 ½ - 5	10-24-02	0.09	ND	0.008	ND	0.017
EW-14 9 - 9 ½	10-24-02	7.19	0.045	0.245	0.053	0.284
EW-14 14 ½ - 15	10-24-02	0.16	0.007	0.012	ND	0.017
EW-14 19 - 19 ½	10-24-02	ND	ND	ND	ND	0.007
EW-14 24½ - 25	10-24-02	ND	ND	ND	ND	ND


Tank 2
Tank 1
Tank 3
N
Concrete Parking Area
Asphalt Driveway
Asphalt Patch
Former Alameda City Hall 2263 Santa Clara Avenue
MW-9
MW-10
MW-11
25.22 TOC
9.49 depth
15.73 elev ft
MW-6
MW-1
EW-13
Flower Shop
EW-12
MW-7
24.84 TOC
8.91 depth
15.93 elev ft
MW-2
SV-1
MW-5
EW-14
25.80 TOC
10.00 depth
15.80 elev ft
MW-3
MW-4
Figure 1
FORMER BILL CHUN SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, CALIFORNIA
Scale in Feet
40
0
40
Approximate - Based on Land Survey by Andreas Deak 11-09-02
SANTA CLARA AVENUE
MW-8
OAK STREET
Groundwater Extraction Well Locations & Gradient Ootober 2002
Former Shell Gas Station
2300 Santa Clara Avenue

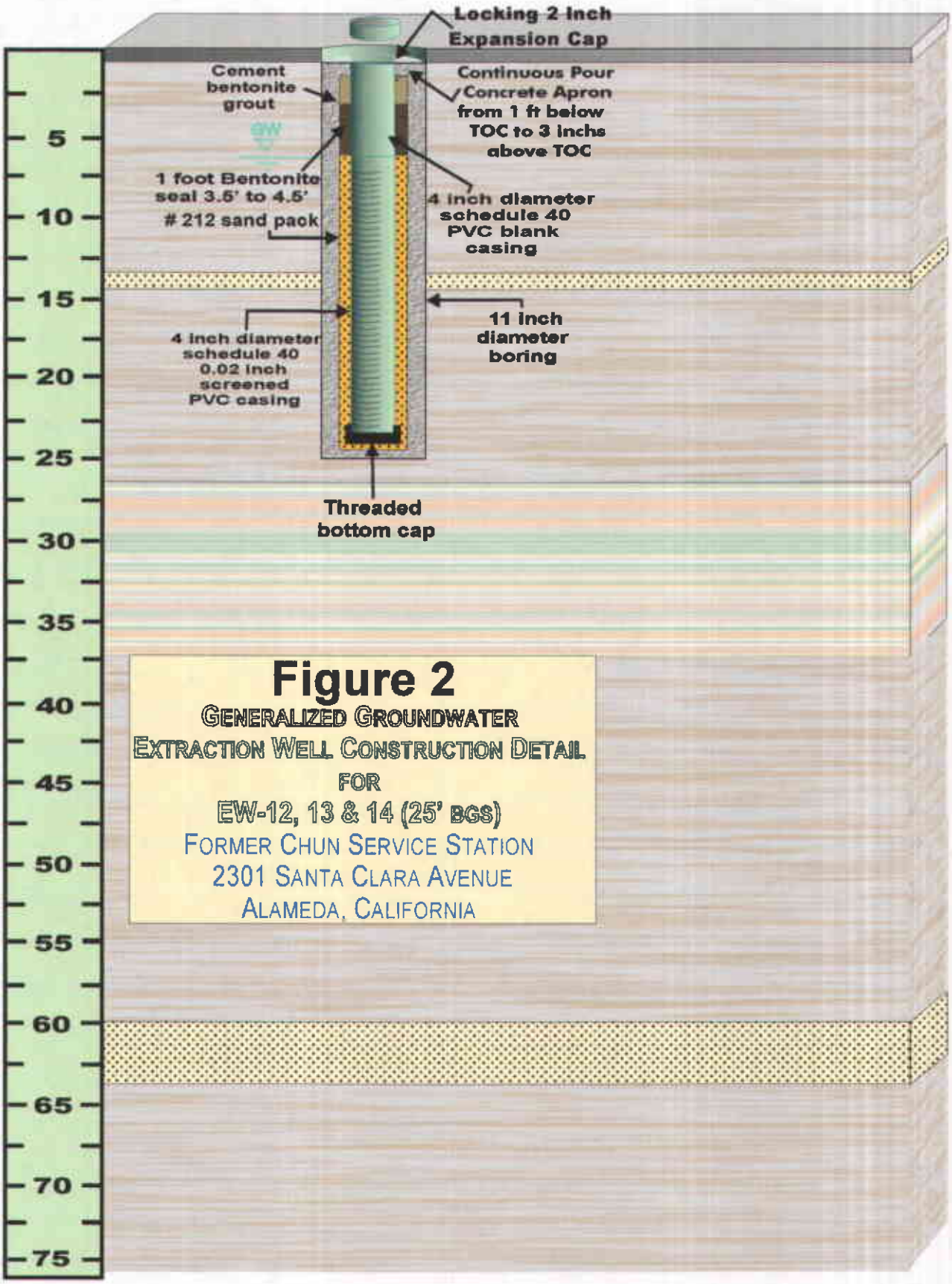


Figure 2

Generalized Groundwater Extraction Well Construction Detail

for

EW-12, 13 & 14 (25' bgs)

Former Chun Service Station

2301 Santa Clara Avenue

Alameda, California

Appendix A
Soil Boring Logs

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
Silty Sand, ~~med~~ red brn, med dense, med, sl moist.			1 2 3 4 5			
silty sand, grn, med dense, med, sl moist mild old gasoline odor Water @ 6½'	X	EW-12 5-5½ 10:30 AM 5 ppm	6 7 8 9			
siltier w/depth, mod gas odor very moist	X	EW-12 10-10½ 10:45 AM 15 ppm	10 11 12 13 14			
mod gas odor, wet	X	EW-12 11:15 AM 0 ppm	15 16 17 18 19			
no odor	X	11:30 AM EW-12 20-20½ 0 ppm	20			

EW-12

PROJECT NAME: Chun

ADDRESS: 2301 Santa Clara Ave
Alameda, CA

BORING number ~~MW-12~~ EW-12

DATE: 10/24/02

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
		EW-12 24½-25 1145 0ppm	21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40			

End @ 25'
7-25' screen
1' sand
3' bent

PROJECT NAME: Chun
ADDRESS: 2301 Santa Clara Ave Alameda, CA
BORING number EW-12
DATE: 10/24/02

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
Silty sand, red brn, med dense, med, sl moist to moist			1 2 3 4			
	X	4½-5	5			
Silty sand, grn, med dense med sl moist to moist; mod strong gas odor.		2²⁰ PM 20 ppm	6 7 8 9			
Water @ 9½'		2²⁰	10			
Silter with depth, mod strong gas odor, very moist	X X	10-10½ 10½-11 2²⁵ 410 ppm	11 12 13 14			
		2³⁰	15			
mild gas odor, wet	X X	15-15½ 15½-16 2⁵⁵ 15 ppm	16 17 18 19			
No odor	X	EW-13 3²⁰ PM 19½-20 0 ppm	20			

PROJECT NAME: Chun

ADDRESS: 2301 Santa Clara Ave Alameda, CA

BORING number EW-13

DATE: 10/24/02

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
		EW-13 $24\frac{1}{2}$-25 3:30 PM	21 22 23 24 25			
End @ 25'		0ppm	26 27 28 29			
Screen 7-25'			30			
Sand 6-25			31 32 33 34			
Bend 3-6			35			
Grout 1-3			36 37 38 39 40			

PROJECT NAME: Chun

ADDRESS: 2301 Santa Clara Ave
Alameda, CA

BORING number EW-13

DATE: 10/24/92

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
Silty sand, med brn, ~~slightly dense~~ loose, med/sl moist; no odor			1			
Drilling easy to 9', likely tank backfill.			2			
			3			
		EW-14	4			
No odor →	X	4½-5	5			
	X	9:20 5-5½ 9:25	6			
		0 ppm	7			
Drilling dense @ 9'			8			
		9:30	9			
Silty sand, grn, dense, med, moist,	X	9-9½				
Strong odor @ 9-10'	X	9½-10	10			
		9:35	11			
		8 ppm	12			
			13			
			14			
mod strong odor of old gasoline	X	14½-15	15			
wet		9:45 AM	16			
		2 ppm	17			
			18			
		10:10	19			
	X	19-19½				
	X	19½-20	20			
		10:5				
		0 ppm				

PROJECT NAME: Chun

ADDRESS: 2301 Santa Clara Ave
Alameda, CA

BORING number EW-14

DATE: 10/25/02

EXPLORATORY BORING LOG

DRILL COMPANY: Clear Heart	SURFACE ELEVATION:	LOGGED BY: Frank Goldman
DEPTH TO GROUNDWATER:	BORING DIAMETER:	DRILLING METHOD: HSA

LITHOLOGIC DESCRIPTION	SAMPLE INTERVALS	LITHOLOGIC LOG	DEPTH	WATER LEVEL	WELL CONSTRUCTION DETAIL	USCS SYMBOLS
			21			
			22			
			23			
			24			
	X	24½-25	25			
End @ 25'		0ppm	26			
Screen 25-7'			27			
Sand 25-6'			28			
Bent 6-3'			29			
Grout 1-3			30			
			31			
			32			
			33			
			34			
			35			
			36			
			37			
			38			
			39			
			40			

PROJECT NAME: Chun

ADDRESS: 2301 Santa Clara Ave
Alameda, CA

BORING number EW-14

DATE: 10/25/02

Appendix B
Laboratory Data Sheets

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Attention:Franklin J. Goldman

Ref.:	R7419_400 s
Method	5030 GCFID/ 8020/8015M
Sampled:	10/31/02
Received:	11/5/02
Matrix:	Water
Analyzed:	11/12/02
Reported:	11/12/02
Units:	ug/L

Laboratory Results for TPH-G + BTEX Analysis

Analyte	Detection Limit ug/L	Results		
		Sample ID		
		EW-12	EW-13	EW-14
		7419-1	7419-2	7419-3
BTEX				
Benzene	0.5	75.7	9120	7360
Toluene	0.5	358	13440	13160
Ethylbenzen	0.5	210	1908	1360
total-Xylene	1.0	96.2	8228	7200
TPH-Gas	50	5840	109200	101880

ND:Not Detected

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA
ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Ref.:	R7419_oxyw
Method	8260B
Sampled:	10/31/02
Received:	11/5/02
Matrix:	Water
Analyzed:	11/7/02
Reported:	11/12/02
Units:	ug/L
QC Batch:	110302

Attention:Franklin J. Goldman

Laboratory Results for Oxygenates & lead Excavengers Analysis

Analyte	Detection Limit ug/L	Results		
		Sample ID		
		EW-12	EW-13	EW-14
		7419-1	7419-2	7419-3
ter-Butyl alcohol(t-Butanol)	20	ND	50.8	22.9
Methyl ter-butyl ether(MTBE)	0.5	ND	12.2	8.60
Di-isopropyl ether	0.5	ND	ND	1.63
ter-Butyl ethyl ether	0.5	ND	ND	ND
ter-Amyl methyl ether	0.5	ND	ND	ND
Lead Excavengers				
1,2-Dibromoethane (EDB)	0.5	ND	ND	1.86
1,2-Dichloethane (1,2-DCA)	0.5	1.48	14.7	34.9
Surrogate	Conc.	% Recovery		
Toluene-d8	25.0	101	104	103

ND:Not Detected

Delta Environmental Laboratories
Hossein Khosh Khoo, Ph.D.

Franklin J. Goldman
PO BOX 9390, Santa Rosa, CA 95405 (by US mail)
Phone: (707) 869-0650
Phone: (707) 869-0864 [Call before Faxing]

7419

CHAIN OF CUSTODY RECORD

Laboratory Analysis P.O. No._____

Laboratory Please Call Accounts Payable for P.O. No.

Date: 10/31/02 Sheet 1 of 1

Project Name Chun

Project Number

Address 2301 Santa Clara Ave
Alameda, CA

Sampler's Name:
Frank Goldman

Sampler's Signature:
Franklin J. Goldman

Sample Number	Location	Date	Time	TPH as Gasoline 8015	TPH as Diesel 8015	TPH-g/BTEX 8015/8020	BTEX & EPA 8020	Oil and Grease 5520	Volatile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neu/Acids (Organic)	Pesticides 8140/8141	Method 8260b for 5 oxygenates & 2 lead scavengers	Bulk density, moisture, porosity fraction of organic carbon	SOIL SAMPLE	WATER SAMPLE
EW-12		10/31/02	5:35 AM			X								X			
EW-13		10/31/02	6:15 AM			X								X			
EW-14		10/31/02	7:05 AM			X								X			

Parameters

Laboratory Delivery Location
Delta Environmental Laboratory
685 Stone Road, #11
Benicia, CA 94553
Phone: (707) 747-6081
FAX: (707) XXX-XXX

Phone

Turnaround Time
☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day

Repeat to: Frank

Comments

Don't run until you receive payment from Chun, contact Wayne Chun @ 925 439-2302

FAX lab results to (818)908-9365

Relinquished By	Date	Time	Received By	Date	Time
Franklin J. Goldman	11/05/02	10:45 AM	Franklin J. Goldman	11-5-02	10:45 AM
Franklin J. Goldman	11-5-02	5:03	[illegible]	11/6/02	
Dispatched By	Date	Time	Received In Lab By	Date	Time

Total Number of Containers this Sheet:

Method of Shipment:

Special Shipment/Handling or Storage Requirements:
Keep on ice

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA
ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Attention: Franklin J. Goldman

Ref.: R386_400 s
Method: 5030 GCFID/ 8020/8015M
Sampled: 10/24/02
Received: 10/25/02
Matrix: Water
Analyzed: 11/1/02
Reported: 11/4/02
Units: mg/L

Laboratory Results for TPH-G + BTEX Analysis

Analyte	Detection Limit mg/L	Results
		Sample ID
		MW-11
		7386-6
BTEX		
Benzene	0.0005	5.14
Toluene	0.0005	5.94
Etnylbenzen	0.0005	1.64
total-Xylene	0.001	9.23
TPH-Gas	0.05	59

ND:Not Detected

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Ref	R7386_oxyw
Method	8260B
Sampled	10/24/02
Received	10/25/02
Matrix	Water
Analyzed	10/29/02
Reported	11/8/02
Units	ug/L
QC Batch	

Attention:Franklin J. Goldman

Laboratory Results for Oxygenates & lead Excavengers Analysis

Analyte	Detection Limit ug/L	Results
		Sample ID
		MW-11
ter-Butyl alcohol(t-Butanol)	20	ND
Methyl ter-butyl ether(MTBE)	0.5	2.5
Di-isopropyl ether	0.5	ND
ter-Butyl ethyl ether	0.5	ND
ter-Amyl methyl ether	0.5	ND
Lead Excavengers		
1,2-Dibromoethane (EDB)	0.5	5.8
1,2-Dichloethane (1,2-DCA)	0.5	10.7
Surrogate	**Conc**	**% Recovery**
Toluene-d8	20.0	107

ND:Not Detected

Delta Environmental Laboratories
Hossein Khosh Khoo, Ph D

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA
ENVIRONMENTAL LABORATORIES, Ltd

Quality Control Report

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Ref.	Q7386_oxy
Sampled:	10/24/02
Received	10/25/02
Matrix	Water
Analyzed:	10/29/02
Reported:	11/8/02
Units:	ug/L

Surrogate Standard Recovery Summary
Method : EPA 8260B

Date Analyzed	Lab Id.	Percent Recovery Toluene d8
	Blank	104
	Blank	105
QC limit:		81-117

Date Analyzed:
Sample Spiked:Blank

Analyte	Spike Added ug/L	Matrix Spike Recovery: Matrix Spike %Recovery	Matrix Spike Dup % Recovery	Relative % Difference RPD
Methyl ter-butyl ether(MTBE)	20	107	110	2.8
Diisopropyl ether	20	110	107	2.8
ter-Butyl ethyl ether	20	117	110	6.2
ter-Amyl methyl ether	20	113	114	0.9

H Khosh Khoo, PhD
Laboratory Director/President

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Attention:Franklin J. Goldman

Ref.: R7386_400 s
Method 5030 GCFID/ 8020/8015M
Sampled: 10/24/2002
Received: 10/25/2002
Matrix: Soil
Analyzed: 10/24-11/5/02
Reported: 11/6/2002
Units: mg/kg

Laboratory Results for TPH-G + BTEX Analysis

Analyte	Detection Limit mg/kg	Results				
		Sample ID				
		EW-12	EW-12	EW-12	EW-12	EW-12
		5-5.5	10-10.5	15-15.5	20-20.5	24.5-25
		7386-1	7386-2	7386-3	7386-4	7386-5
BTEX						
Benzene	0.005	ND	ND	ND	ND	ND
Toluene	0.005	ND	0.050	ND	ND	ND
Ethylbenzene	0.005	ND	ND	ND	ND	ND
total-Xylene	0.005	0.009	0.10	ND	ND	0.009
TPH-Gas	0.05	0.06	0.616	ND	0.05	0.05

ND:Not Detected

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Attention:Franklin J. Goldman

Ref.:	R7386_400 s
Method	5030 GCFID/ 8020/8015M
Sampled:	10/24/2002
Received:	10/25/2002
Matrix:	Soil
Analyzed:	10/24-11/6/02
Reported:	11/6/2002
Units:	mg/kg

Laboratory Results for TPH-G + BTEX Analysis

Analyte	Detection Limit mg/kg	Results				
		Sample ID				
		EW-13	EW-13	EW-13	EW-13	EW-13
		4.5-5	10-10.5	15-15.5	19.5-20	24.5-25
		7386-7	7386-8	7386-10	7386-12	7386-13
BTEX						
Benzene	0.005	ND	45.9	0.047	0.02	ND
Toluene	0.005	0.65	271	0.248	0.06	0.01
Ethylbenzene	0.005	0.178	72.3	0.053	0.015	ND
total-Xylene	0.005	0.994	375	0.029	0.094	0.016
TPH-Gas	0.05	8.7	2760	11.4	0.065	0.10

ND:Not Detected

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

WATER • WASTE WATER • HAZARDOUS WASTE • FUEL • AIR • SOIL

DELTA
ENVIRONMENTAL LABORATORIES, Ltd

Client:
Franklin J. Goldman
PO Box 9390
Santa Rosa, CA95405

Client Project ID:
Chun

Ref.: R7386_400 s
Method 5030 GCFID/ 8020/8015M
Sampled: 10/24/2002
Received: 10/25/2002
Matrix: Soil
Analyzed: 10/24-11/6/02
Reported: 11/6/2002
Units: mg/kg

Attention:Franklin J. Goldman

Laboratory Results for TPH-G + BTEX Analysis

Analyte	Detection Limit mg/kg	Results				
		Sample ID				
		EW-14	EW-14	EW-14	EW-14	EW-14
		4.5-5	9-9.5	14.5-15	19-19.5	24.5-25
		7386-14	7386-16	7386-18	7386-19	7386-21
BTEX						
Benzene	0.005	ND	0.045	0.007	ND	ND
Toluene	0.005	0.008	0.245	0.012	ND	ND
Ethylbenzene	0.005	ND	0.053	ND	ND	ND
total-Xylene	0.005	0.017	0.284	0.017	0.007	ND
TPH-Gas	0.05	0.09	7.19	0.16	ND	ND

ND:Not Detected

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

Franklin J. Goldman
PO BOX 9390, Santa Rosa, CA 95405 (by US mail)
Phone: (707) 869-0850
Phone: (707) 869-0864 [Call before Faxing]

CHAIN OF CUSTODY RECORD

7386 1/3

Laboratory Analysis P.O. No._____

Laboratory Please Call Accounts Payable for P.O. No.

Date: 10/24/02 Sheet 1 Of 3

Project Name Chun

Project Number

Address 2301 Santa Clara Ave Alameda, CA

Sampler's Name: Frank Goldman

Sampler's Signature: Franklin J Goldman

Sample Number	Location	Date	Time	TPH as Gasoline 8015	TPH as Diesel 8015	TPH-g/BTEX 8015/8020 ~~Ba/TPH~~	BTEX & EPA 8020	Oil and Grease 5520	Volitile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neu/Acids (Organic)	Pesticides 8140/8141	Method 8260b for 5 oxygenates & 2 lead scavengers	RBCA Risk-based Corrective Action	Bulk density, moisture, porosity fraction of organic carbon	SOIL SAMPLE	WATER SAMPLE
EW-12	5-5½	10/24/02	10:20 AM			X											X	
EW-12	10-10½		10:45 AM			X											X	
EW-12	15-15½		11:15			X											X	
EW-12	20-20½		11:30			X											X	
EW-12	24½-25		11:45 AM			X											X	
MW-11			1:40 PM											X				X
EW-13	4½-5		2:00			X											X	
EW-13	10-10½		2:20			X											X	
EW-13	10½-11		2:25			X										X	X	
EW-13	15-15½		2:50			X											X	

Laboratory Delivery Location
Delta Environmental Laboratory
685 Stone Road, #11
Benicia, CA 94553
Phone: (707) 747-6081
FAX: (707) XXX-XXX

Phone

Turnaround Time

☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day

Repeat to: Frank

Comments

Don't run until receive payment by Chun (925 439-2302

3 VOAs

Relinquished By	Date	Time
Franklin J Goldman		
Dispatched By	Date	Time

Received By	Date	Time
Dina Sa	10/25/02	
Received in Lab By	Date	Time

Total Number of Containers this Sheet:

Method of Shipment:

Special Shipment/Handling or Storage Requirements:

Keep on Ice

Franklin J. Goldman
PO BOX 9390, Santa Rosa, CA 95405 (by US mail)
Phone: (707) 869-0850
Phone: (707) 869-0864 [Call before Faxing]

7386 2/3

CHAIN OF CUSTODY RECORD

Laboratory Analysis P.O. No.________

Laboratory Please Call Accounts Payable for P.O. No.

Date: 10-24/25/02 Sheet 2 of 3

Project Name: Chun
Project Number:
Address: 2301 Santa Clara Ave, Alameda, CA
Sampler's Name: Frank Goldman
Sampler's Signature: Franklin J. Goldman

Laboratory Delivery Location
Delta Environmental Laboratory
685 Stone Road, #11
Benicia, CA 94553
Phone: (707) 747-6081
FAX: (707) XXX-XXX

Phone

Turnaround Time: ☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day

Repeat to: Frank

Sample Number	Location	Date	Time	TPH as Gasoline 8015	TPH as Diesel 8015	TPH-g/BTEX 8015/8020 & [illegible]	BTEX & EPA 8020	Oil and Grease 5520	Volitile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neu/Acids (Organic)	Pesticides 8140/8141	Method 8260b for 5 oxygenates & 2 lead scavengers	~~[illegible]~~	Bulk density, moisture, porosity fraction of organic carbon	SOIL SAMPLE	WATER SAMPLE	Comments
EW-13	15½-16	10/24/02	2:55													X	X		
EW-13	19½-20	10/24/02	3:30 PM			X											X		Don't run until receive payment by Chun 925 439-2308
EW-13	24½-25	10/24/02	3:40 PM			X											X		
EW-14	4½-5	10/25/02	9:20 AM			X											X		
EW-14	5-5½	↓	9:25												(scribbled out)	X	X		
EW-14	9-9½	↓	9:30			X											X		
EW-14	9½-10	↓	9:35														X		
EW-14	14½-15	↓	9:45			X											X		
EW-14	19-19½	↓	10:10			X									(scribbled out)	X	X		
EW-14	19½-20	↓	10:15														X		

Relinquished By	Date	Time	Received By	Date	Time
Franklin J. Goldman			Dina S[illegible]	10/25/02	

Dispatched By	Date	Time	Received in Lab By	Date	Time

Total Number of Containers this Sheet:

Method of Shipment:

Special Shipment/Handling or Storage Requirements: Keep on Ice

Franklin J. Goldman
PO BOX 9390, Santa Rosa, CA 95405 (by US mail)
Phone: (707) 869-0850
Phone: (707) 869-0864 [Call before Faxing]

7386 3/3

CHAIN OF CUSTODY RECORD

Laboratory Analysis P.O. No._____

Laboratory Please Call Accounts Payable for P.O. No.

Date: 10/25/02 Sheet 3 of 3

Project Name Chun

Project Number

Address 2301 Santa Clara Ave
Alameda, CA

Sampler's Name:
Frank Goldman

Sampler's Signature:
Franklin J Goldman

Sample Number	Location	Date	Time
EW-14	27½-25	10/25/02	10:30 AM

Parameters

TPH as Gasoline 8015	TPH as Diesel 8015	TPH-g/BTEX 8015/8020 ~~8260B~~	BTEX & EPA 8020	Oil and Grease 5520	Volitile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neu/Acids (Organic)	Pesticides 8140/8141	Method 8260b for 5 oxygenates & 2 lead scavengers		Bulk density, moisture, porosity fraction of organic carbon	SOIL SAMPLE	WATER SAMPLE
		X											X	

Laboratory Delivery Location
Delta Environmental Laboratory
685 Stone Road, #11
Benicia, CA 94553
Phone: (707) 747-6081
FAX: (707) XXX-XXX

Phone

Turnaround Time
☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day

Repeat to: Frank

Comments

Don't run until receive payment by chun
925 439-2302

Relinquished By	Date	Time	Received By	Date	Time
Franklin J Goldman			Dina Savi	10/25/02	

Dispatched By	Date	Time	Received In Lab By	Date	Time

Total Number of Containers this Sheet:

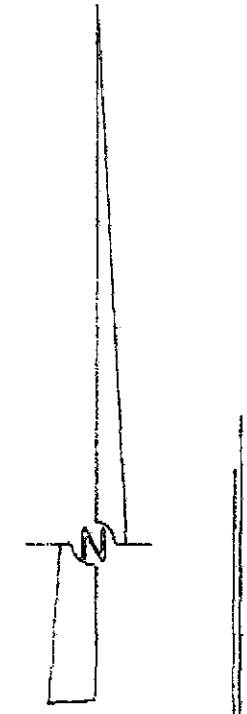
Method of Shipment:

Special Shipment/Handling or Storage Requirements:

Keep on Ice

Appendix C
Land Survey

	NO	X	Y	CASING	LID
EW	1	170.23	109.24	24.838	25.36
EW	2	131.65	136.86	25.798	25.96
EW	3	162.12	138.91	25.223	25.59
WELL		AT LONGS DRUGS		24.931	
BM				25.045	



SCALE 1"=20'

OAK STREET

B.M. 25.045

X = 240.00
Y = 100.00

41.92

X = 240.00
Y = 141.92

140.00

140.00

EW-3

EW-1

EW-2

X = 100
Y = 100

41.92

X = 100
Y = 141.92

SANTA CLARA AVENUE

MONITORING WELLS, 2301 SANTA CLARA AVENUE ALAMEDA

CLIENT: MR WAYNE CHUN

ANDREAS DEAK
LICENSED LAND SURVEYOR
2116 BUENA VISTA AVENUE ALAMEDA CA 94501
PHONE: 865-4289

DATE 11-09-2002
SCALE 1"=20'
SURVEY DEAK
PLAT DEAK
APN 71-202-27
JOB NO.

Appendix D
Well Development Logs

IWM
Integrated Waste Management

WELL DEVELOPMENT DATA SHEET

Project #: 02-1028-MN1	Client: Clear Heart Drilling
Developer: MDN	Date Developed: 10/28/02
Well I.D. EW-2	Well Diameter: (circle one) 2 3 (4) 6 ___
Total Well Depth: Before 24.22 After 25.03	Depth to Water: Before 9.61 After 22.91
Reason not developed:	If Free Product, thickness:
Additional Notations: Surged well for 15 min prior to purge	

Volume Conversion Factor (VCF):	Well dia.		VCF
{12 x (d^2/4) x π} /231	2"	=	0.16
where	3"	=	0.37
12 = in / foot	4"	=	0.65
d = diameter (in.)	6"	=	1.47
π = 3.1416	10"	=	4.08
231 = in 3/gal	12"	=	6.87

9.5	X	10	=	95.0
1 Case Volume		Specified Volumes		gallons

Purging Device: Bailer ☐ Electric Submersible ☒ @ 5 gpm
Middleburg ☒ @ 1 gpm Suction Pump ☐

Type of Installed Pump ___
Other equipment used 4" Surge block

TIME	TEMP (F)	pH	Cond. (mS or µS)	TURBIDITY (NTUs)	VOLUME REMOVED:	NOTATIONS:	TDS
1337	67.0	7.2	2056	>200	9.5	Dark Silty Brown, (Fine), Middleburg Pump, Strong HC odor	1487
1347	66.6	7.2	1897	>200	19.0	Brown, Slightly Less Silty, Strong odor	1370
1357	66.7	7.1	1600	>200	28.5	Light Brown, Cloudy, Strong odor ~~Dropping Pump to bottom~~	1135
1407	66.7	7.1	1581	>200	38.0	Dropping Pump to bottom, Dark Brown, Sandy, odor	1120
1417	66.6	7.0	1486	>200	47.5	Light Brown, Cloudy, Hard odor to bottom, DTW=13.96	1027
1427	66.6	7.0	1467	>200	57.0	" " odor Switching to ES	1015
1430	68.3	6.9	1518	>200	66.5	Light Brown, Increased cloudiness, odor	1076
1433	67.9	6.9	1398	>200	76.0	" " "	979
1436	67.4	6.9	1824	>200	85.5	Brown, Cloudy, odor, Very Fine Silt	1298
1438	67.5	7.0	1634	>200	95.0	light brown, cloudy, clearing, odor	1160
						DTW = 22.91	

Did Well Dewater? NO If yes, note above. Gallons Actually Evacuated: 95.0

WELL DEVELOPMENT DATA SHEET

Project #: 021028-MN1	Client: Clear Heart Drilling
Developer: MW	Date Developed: 10/28/02
Well I.D. EW-3	Well Diameter: (circle one) 2 3 (4) 6
Total Well Depth: Before 23.80 After 24.54	Depth to Water: Before 9.09 After 21.05
Reason not developed:	If Free Product, thickness:
Additional Notations: Surged well for 15 min prior to purge	

Volume Conversion Factor (VCF):
{12 x (d^2/4) x π} /231
where
12 = in / foot
d = diameter (in.)
π = 3.1416
231 = in 3/gal

Well dia.		VCF
2"	=	0.16
3"	=	0.37
4"	=	0.65
6"	=	1.47
10"	=	4.08
12"	=	6.87

9.7	X	10	=	97.0
1 Case Volume		Specified Volumes		gallons

Purging Device: Bailer ☐ Electric Submersible ☐ ⊗ 5gpm
Middleburg ☒ ⊗ 1gpm Suction Pump ☐

Type of Installed Pump _____
Other equipment used 4" Surge block

TIME	TEMP (F)	pH	Cond. (mS or µS)	TURBIDITY (NTUs)	VOLUME REMOVED:	NOTATIONS:	TDS
1142	66.7	7.0	1831	>200	9.7	Dark Silty Brown, (Fine), Middleburg HC pump, odor	1303
1152	66.8	6.8	1470	>200	19.4	Brown, less Silty, HC odor, clearing Slightly	1052
1202	66.8	6.7	1149	>200	29.1	" " " " Dropping Pump to bottom	804
1212	66.7	6.7	1275	>200	38.8	Dark Brown, Sandy, HC odor, Thick	894
1222	66.6	6.7	1016	>200	48.5	Brown, less Sandy, HC odor, clearing, DTW = 12.39	705
1232	66.8	6.6	866	>200	58.2	Light Brown, Cloudy, HC odor, Heard Sand on bottom, ES pump	59
1239	67.9	6.6	761	>200	64.9	" " " ES pump	526
1247	68.2	6.6	949	>200	74.6	Brown, Increased Cloudiness, HC odor	659
1245	68.0	6.7	1479	>200	84.3	" " "	1039
1248	68.0	6.8	1102	>200	97.0	Light Brown, cloudy, HC odor	766
						DTW = 21.05	
						- Fast Recharge -	
Did Well Dewater? NO		If yes, note above.		Gallons Actually Evacuated:		97.0	

WELL GAUGING DATA

Project # 021028-MN1 Date 10/28/02 Client Clear Heart Drilling

Site 2301 Santa Clara Ave., Alameda

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	
EW-1	4					8.50	23.20		
EW-2	4					9.61	24.22		
EW-3	4					9.09	23.80	T	

WELL DEVELOPMENT DATA SHEET

Project #: 021028-MN1	Client: Clear Heart Drilling
Developer: MDN	Date Developed: 10/28/02
Well I.D. EW-1	Well Diameter: (circle one) 2 3 (4) 6 __
Total Well Depth: Before 23.20 After 24.60	Depth to Water: Before 8.50 After 21.80
Reason not developed:	If Free Product, thickness:
Additional Notations: Surged well for 15 min prior to purge	

Volume Conversion Factor (VCF):
$\{12 \times (d^2/4) \times \pi\} / 231$
where
12 = in / foot
d = diameter (in.)
π = 3.1416
231 = in 3/gal

Well dia.		VCF
2"	=	0.16
3"	=	0.37
4"	=	0.65
6"	=	1.47
10"	=	4.08
12"	=	6.87

9.6 X 10 = 96.0
1 Case Volume X Specified Volumes = gallons

Purging Device: Bailer ☐ Electric Submersible ☒ @ 5 gpm
Middleburg ☒ @ 1 gpm Suction Pump ☐

Type of Installed Pump ______
Other equipment used 4" Surge block

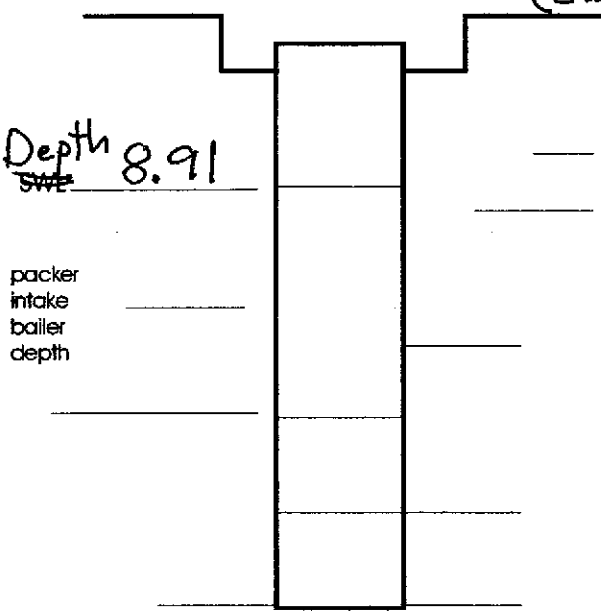
TIME	TEMP (F)	pH	Cond. (mS or µS)	TURBIDITY (NTUs)	VOLUME REMOVED:	NOTATIONS:	TDS
953	68.3	6.8	1692	>200	9.6	Dark Brown, Silty (Fine), Middleburg, odor	
1003	69.0	7.0	1607	>200	19.2	" " , odor	
1013	69.3	7.0	1203	>200	28.8	Brown, Slightly less Silty, odor	
1023	69.5	7.0	1047	>200	38.4	Pump @ Bottom, Silty (Sandy), Brown, odor	TDS = 734
1033	69.3	6.9	971	>200	48.0	Light Brown, Less Silty, Clearing Slightly, hard bottom	= 673
1043	69.1	6.9	809	>200	57.6	" , " , clearing, DTW = 11.90, Switch TO 5" ES	= 553
1050	69.9	6.8	811	>200	67.2	Light Brown, cloudy, odor	= 554
1053	71.4	6.9	827	>200	76.8	Brown, increased cloudiness, odor	= 566
1056	70.8	6.8	1061	>200	86.4	Brown, cloudy (very fine silt), odor	= 735
1059	70.2	6.9	941	>200	96.0	Brown, " " , clearing Slightly	= 650
						DTW = 21.80	
						- Fast recharge -	

Did Well Dewater? NO	If yes, note above.	Gallons Actually Evacuated:	96.0

PROJECT: Chun EVENT: _____ SAMPLER: FG DATE: Oct 31 02

WELL/HYDROLOGIC STATISTICS

EW-12
(EW-1)



Action	Time	Pump Rate	IWL (low yield)
Stop			
Sampled			
(Final IWL)			

Purge Calculator

_____ gal/ft. _____ ft. _____ gals. X 3 = _____ gals.

SWL to BOP or packer to BOP | one volume | purge volume-3 casings

Head Purge Calculation (Airlift Only)

_____ gal/ft. _____ ft. _____ gals

packer to SWL

Equipment Used/Sampling method/Description of Event:

Electronic water level indicator, weighted plastic disposable bailor, Hydac kit

Actual Gallons Purged: _____

Actual Volumes Purged: _____

Well Yield: ⊕ _____
(See Below)

COC #: _____

Sample I.D.	Analysis	Lab

Additional Comments:

Gallons purged	TEMP C/F (Circle One)	EC (us/cm)	PH	TURBIDITY (NTU)	HEAD (FT)	TIME
1. 1.5	70.3	931	6.8			4 50
2. 1.5	70.1	942	6.9			5 05
3. 1.0	70.3	940	6.9			5 15
4. 2.0	70.5	947	7.0			5 30
5.						

*Take measurement at approximately each casing volume purged

⊕ HY-Minimal W.L. drop

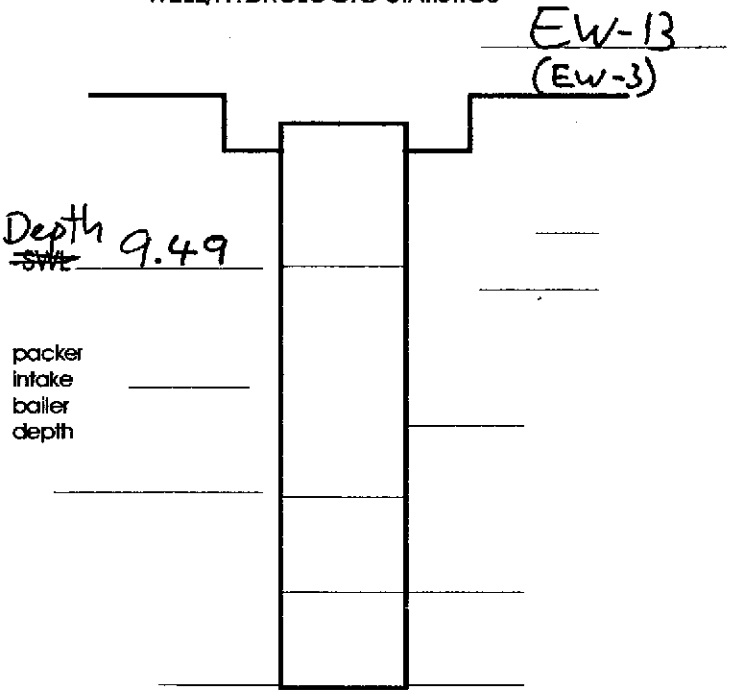
MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge unable to purge 3 volumes.

PROJECT: Chun EVENT: _____ SAMPLER: FG DATE: Oct 31 02

WELL/HYDROLOGIC STATISTICS



Action	Time	Pump Rate	WL (low yield)
Stop			
Sampled			
(Final WL)			

Purge Calculator

_____ gal/ft. _____ ft. _____ gals. X 3 = _____ gals.

SWL to BOP or packer to BOP | one volume | purge volume-3 casings.

Head Purge Calculation (Airlift Only)

_____ gal/ft. _____ ft. _____ gals

packer to SWL

Equipment Used/Sampling method/Description of Event:

Electronic water level indicator, weighted plastic disposable bailor, Hydac kit

Actual Gallons Purged: _____

Actual Volumes Purged: _____

Well Yield: ⊕ _____
(See Below)

COC #: _____

Sample I.D.	Analysis	Lab

Additional Comments:

Gallons purged	TEMP C/F (Circle One)	EC (us/cm)	PH	TURBIDITY (NTU)	HEAD (FT)	TIME
1. 1.5	66.3	1324	7.2			5^45
2. 1.0	66.9	1361	7.2			5^55
3. 1.0	67.5	1369	7.1			6^05
4. 1.5	67.0	1378	7.2			6^10
5.						

*Take measurement at approximately each casing volume purged

⊕ HY-Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

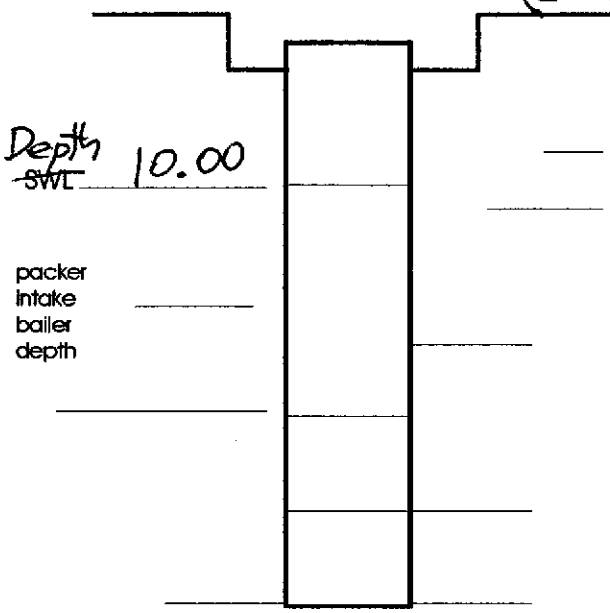
LY - able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge unable to purge 3 volumes.

PROJECT: Chun EVENT: _____ SAMPLER: FG DATE: Oct 31 02

WELL/HYDROLOGIC STATISTICS

EW-14
(EW-2)



Action	Time	Pump Rate	IWL (low yield)
Stop			
Sampled			
(Final IWL)			

Purge Calculator

_____ gal/ft. _____ ft. (SWL to BOP or packer to BOP) _____ gals. (one volume) X 3 = _____ gals. (purge volume-3 casings)

Head Purge Calculation (Airlift Only)

_____ gal/ft. _____ ft. (packer to SWL) _____ gals

Equipment Used/Sampling method/Description of Event:

Electronic water level indicator, weighted plastic disposable bailor, Hydac kit

Actual Gallons Purged: _____

Actual Volumes Purged: _____

Well Yield: ⊕ _____
(See Below)

COC #: _____

Sample I.D.	Analysis	Lab

Additional Comments:

Gallons purged	TEMP C/F (Circle One)	EC (us/cm)	PH	TURBIDITY (NTU)	HEAD (FT)	TIME
1. 1.5	67.6	1428	7.1			6^25
2. 2.0	67.9	1461	7.2			6^40
3. 1.0	68.3	1452	7.2			6^50
4. 1.0	68.3	1433	7.3			7^00
5.						

*Take measurement at approximately each casing volume purged

⊕ HY-Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge unable to purge 3 volumes.

Attachment 1

Revised Groundwater Monitoring Data for the

09-17-00 & 07-04-02 SAMPLING EVENTS

TABLE 1 - Revised Analytical for Gasoline in Groundwater (ppb) Chun

Well No	TPHg	Benzene
MW-1 (07-04-02)	43,000 DECREASE	7,200 DECREASE
MW-1 (09-17-00)	*65,000*	*15,000*
MW-2 (07-04-02)	41,000 DECREASE	5,600 DECREASE
MW-2 (09-17-00)	*140,000*	*21,000*
MW-3 (07-04-02)	10,000 INCREASE	2,300 DECREASE
MW-3 (09-17-00)	*9,300*	*3,000*
MW-4 (07-04-02)	ND	ND
MW-4 (09-17-00)	*ND*	*ND*
MW-5 (07-04-02)	16,000 DECREASE	89 DECREASE
MW-5 (09-17-00)	*44,000*	*490*
MW-6 (07-04-02)	3,900 DECREASE	29 DECREASE
MW-6 (09-17-00)	*10,000*	*110*
MW-7 (07-04-02)	140,000 DECREASE	15,000 DECREASE
MW-7 (09-17-00)	*220,000*	*32,000*
MW-8 (07-03-02)	ND	1.1 DECREASE
MW-8 (09-17-00)	*ND*	*1.4*
MW-9 (07-03-02)	ND	ND
MW-9 (09-17-00)	*ND*	*ND*
MW-10 (07-03-02)	ND	ND
MW-10 (09-17-00)	*ND*	*ND*
MW-11 (10-31-02)	59,000	5,140
MW-11 (07-03-02)		
MW-11 (09-17-00)		
SV-1 (07-04-02)	210,000 DECREASE	7,900 DECREASE
SV-1 (09-17-00)	*560,000*	*10,000*

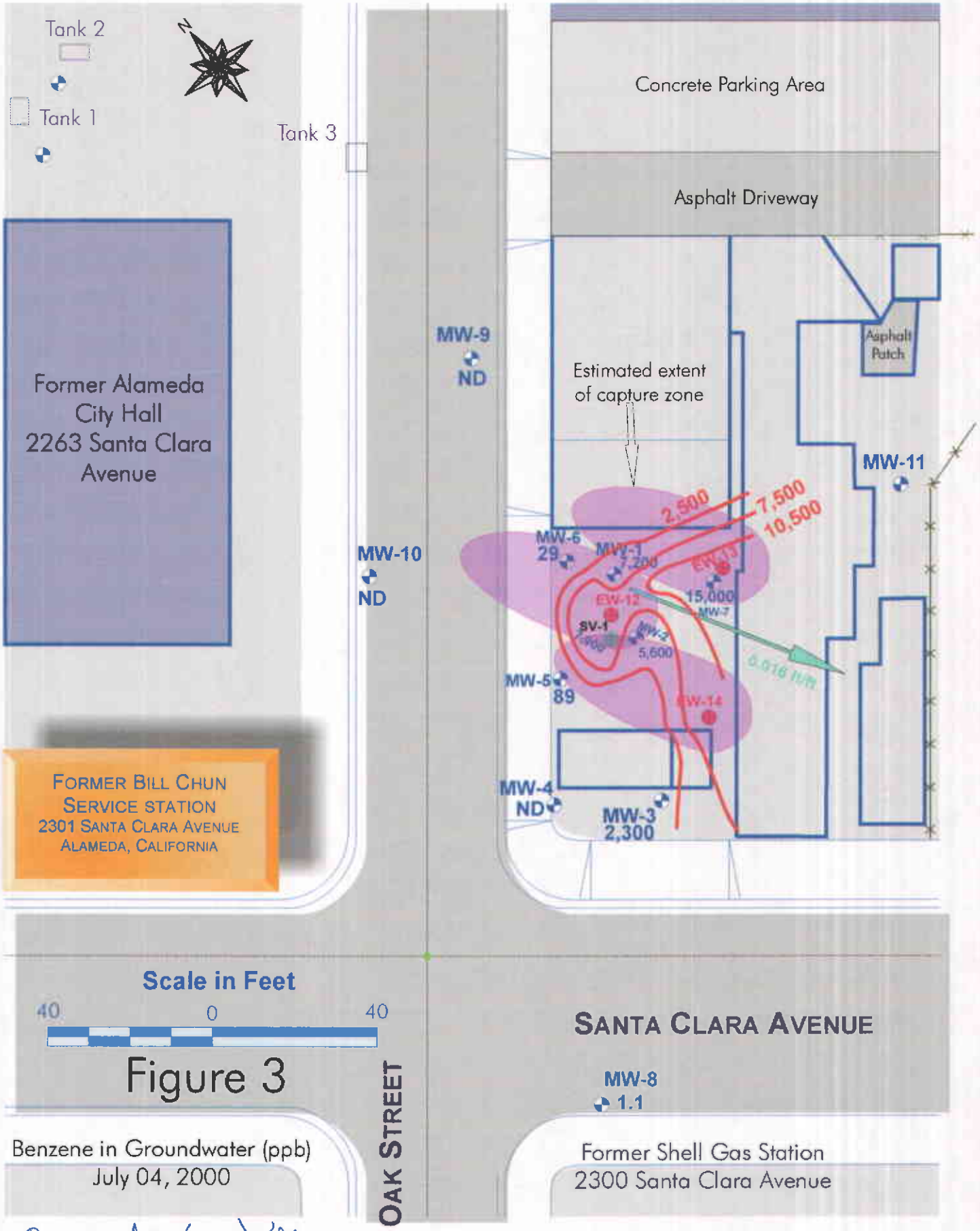
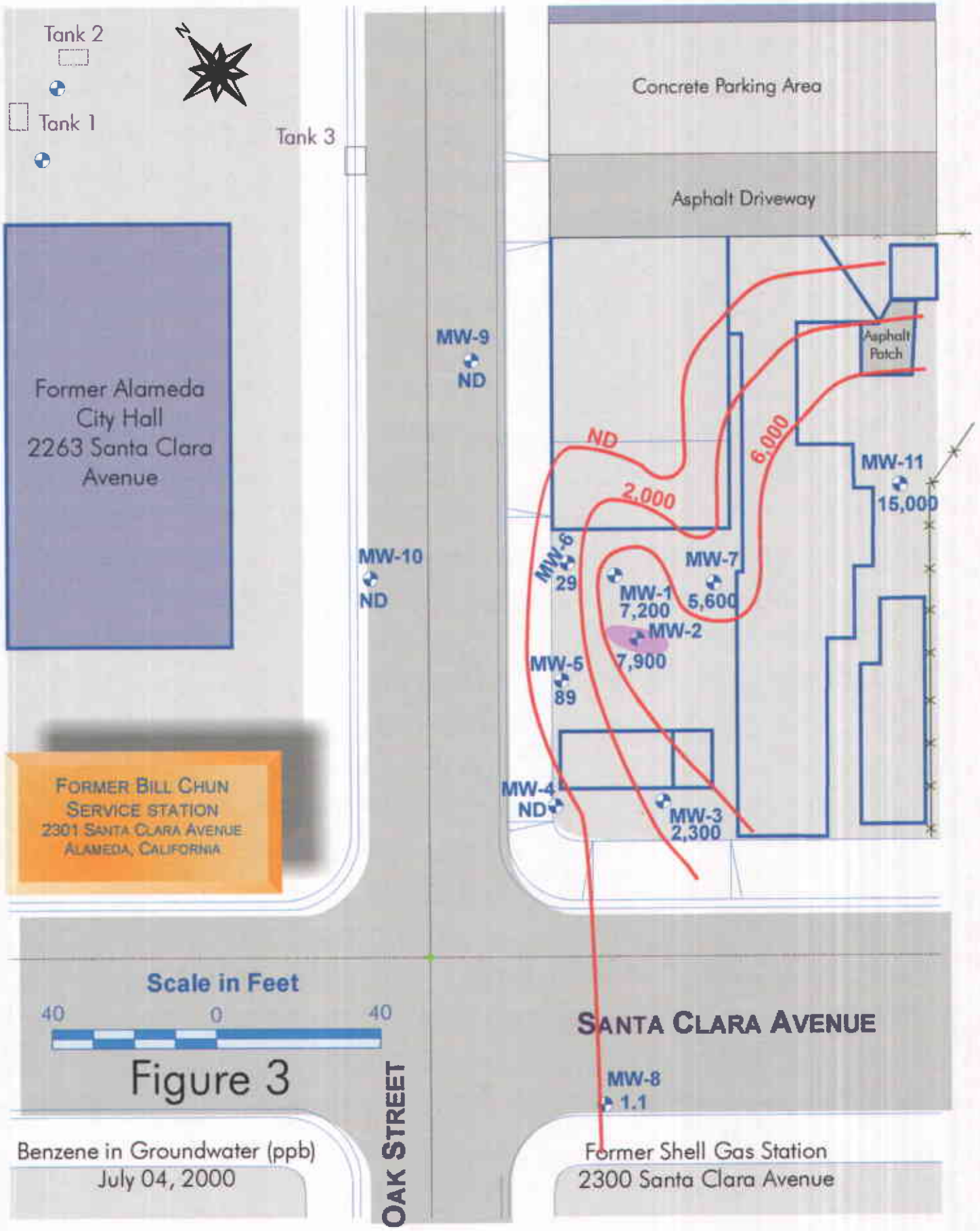


Figure 3

Revised 10/02 JJ


Tank 2
Tank 1
Tank 3
N
Concrete Parking Area
Asphalt Driveway
Asphalt Patch
Former Alameda City Hall 2263 Santa Clara Avenue
MW-9
ND
MW-10
ND
MW-11
15,000
MW-6
29
MW-7
5,600
MW-1
7,200
MW-2
7,900
MW-5
89
MW-4
ND
MW-3
2,300
ND
2,000
6,000
Former Bill Chun Service Station
2301 Santa Clara Avenue
Alameda, California
Scale in Feet
40
0
40
Figure 3
Santa Clara Avenue
Oak Street
MW-8
1.1
Benzene in Groundwater (ppb)
July 04, 2000
Former Shell Gas Station
2300 Santa Clara Avenue

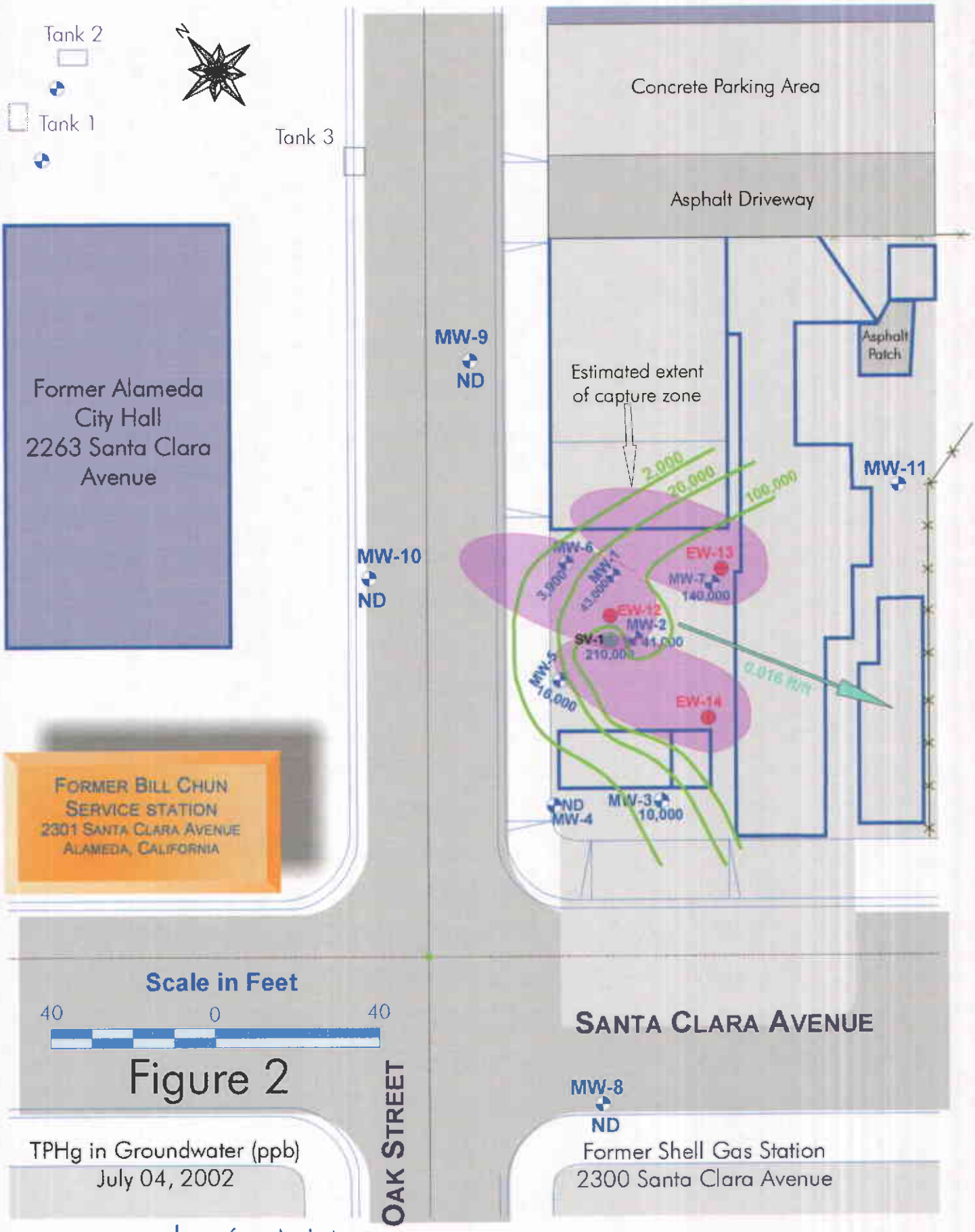


Figure 2

TPHg in Groundwater (ppb)
July 04, 2002

Revised 10/02 JJ

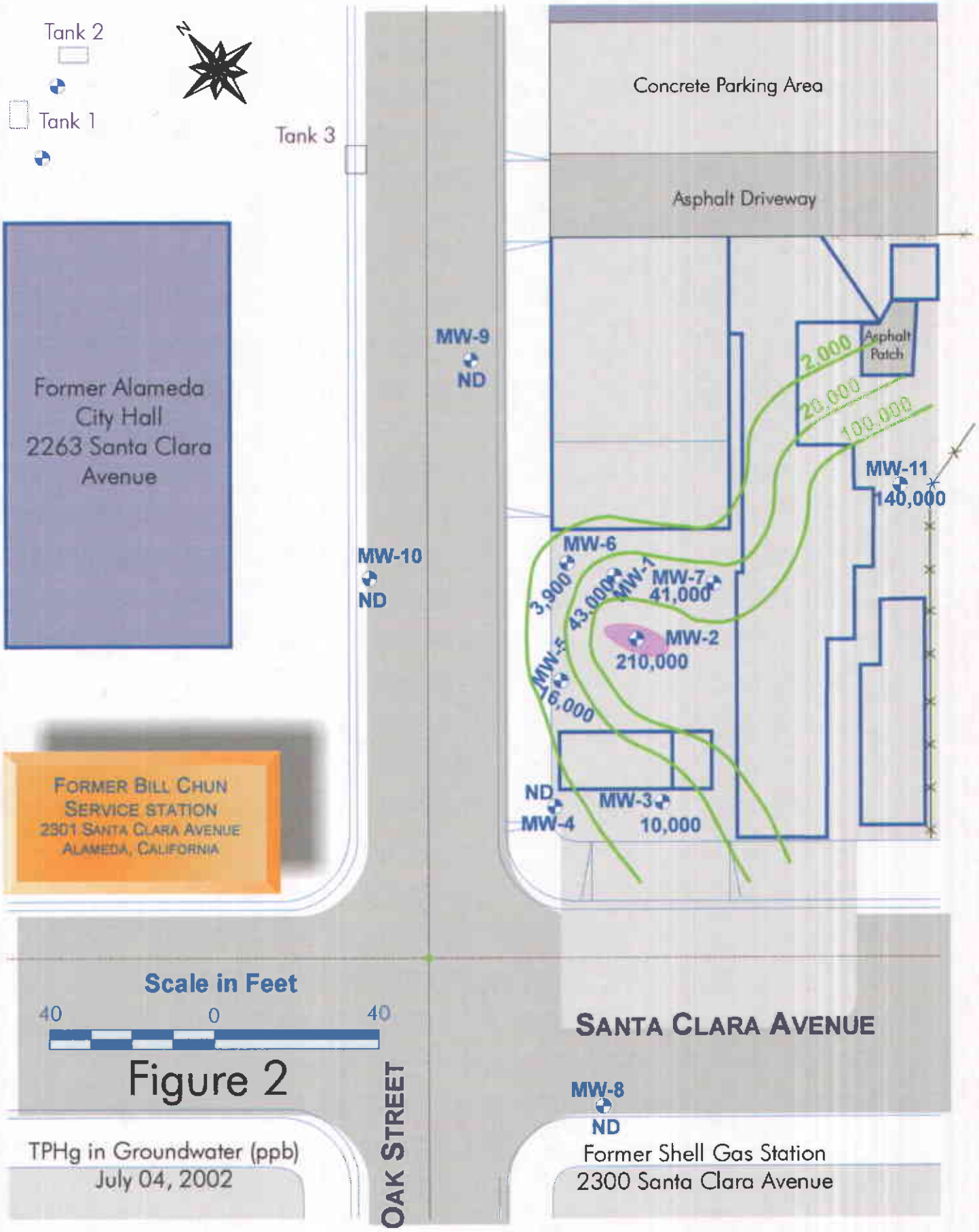

Tank 2
Tank 1
Tank 3
N
Concrete Parking Area
Asphalt Driveway
Former Alameda City Hall 2263 Santa Clara Avenue
MW-9
ND
MW-10
ND
Asphalt Patch
2,000
20,000
100,000
MW-11
140,000
MW-6
3,900
MW-1
43,000
MW-7
41,000
MW-2
210,000
MW-5
16,000
ND
MW-4
MW-3
10,000
Former Bill Chun Service Station
2301 Santa Clara Avenue
Alameda, California
Scale in Feet
40
0
40
Figure 2
TPHg in Groundwater (ppb)
July 04, 2002
Oak Street
Santa Clara Avenue
MW-8
ND
Former Shell Gas Station
2300 Santa Clara Avenue

TABLE 2
Depth to Groundwater Measurements
July 03, 2002

Well No	Depth to Groundwater from TOC (feet bgs)	TOC Elevation (feet)	Water Table Elevation (feet)
MW-1	8.25	28.49	20.24
MW-2	8.56	28.47	19.91
MW-3	8.78	28.78	20.00
MW-4	8.16	28.53	20.37
MW-5	7.90	28.33	20.43
MW-6	7.83	28.36	20.53
MW-7	8.27	28.44	20.17
MW-8	8.50	28.17	19.67
MW-9	6.32	27.45	21.13
MW-10	6.15	27.32	21.17
MW-11			
SV-1	7.98	28.42	20.44

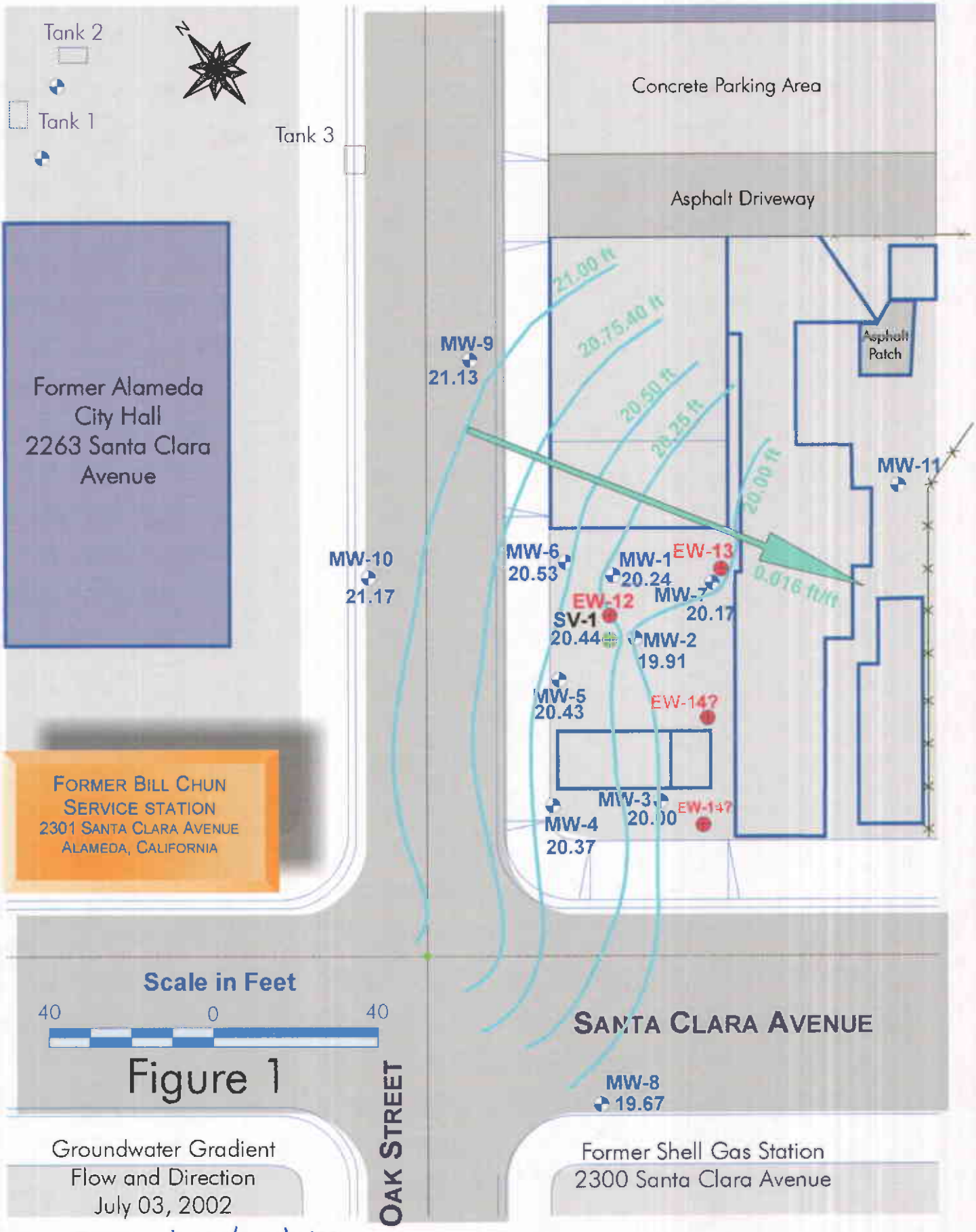
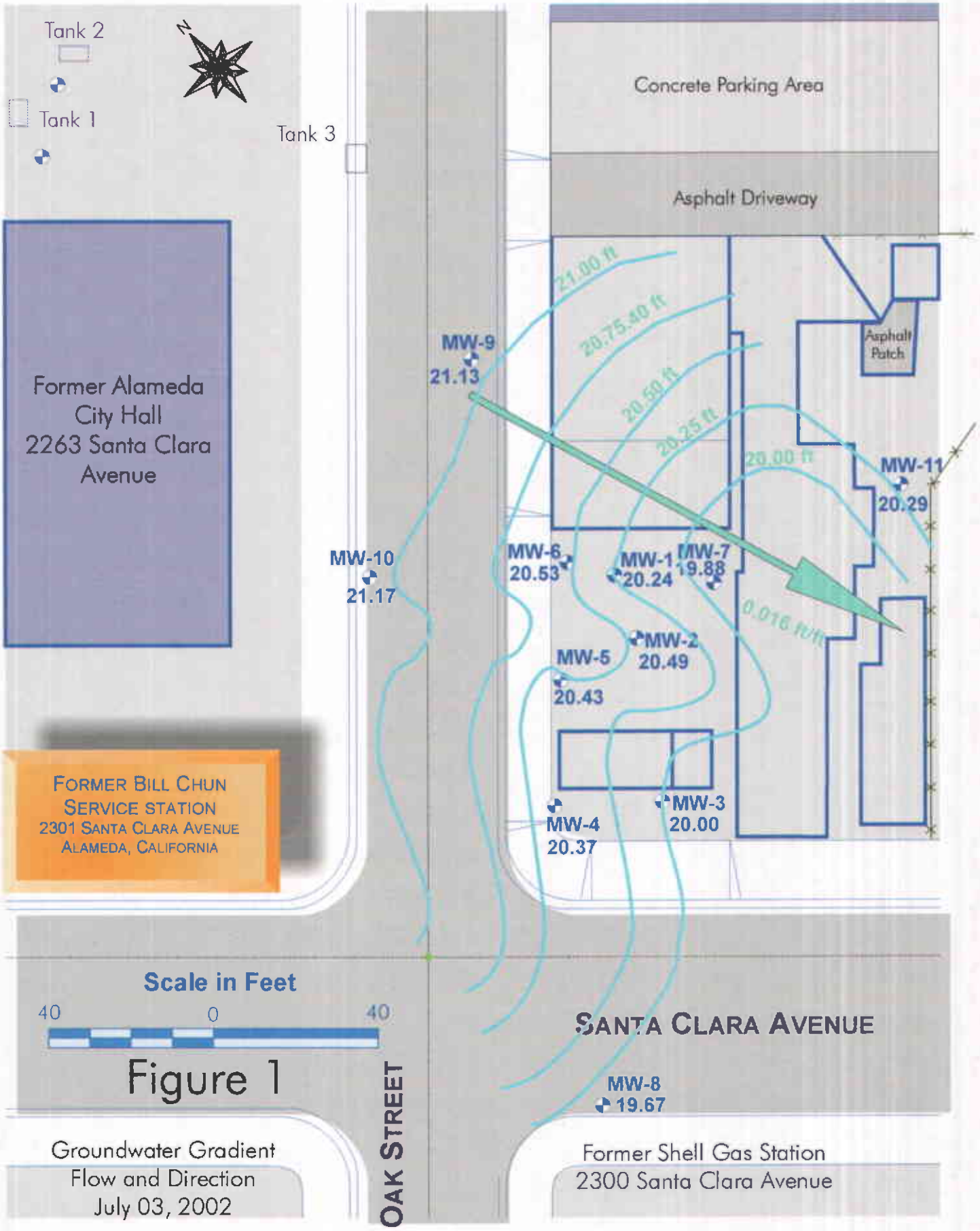


Figure 1

Groundwater Gradient
Flow and Direction
July 03, 2002

Revised 10/02 JJ


Tank 2
Tank 1
Tank 3
N
Concrete Parking Area
Asphalt Driveway
Asphalt Patch
Former Alameda City Hall 2263 Santa Clara Avenue
21.00 ft
20.75 ft
20.50 ft
20.25 ft
20.00 ft
MW-9
21.13
MW-11
20.29
MW-10
21.17
MW-6
20.53
MW-1
20.24
MW-7
19.88
0.016 ft/ft
MW-2
20.49
MW-5
20.43
MW-4
20.37
MW-3
20.00
FORMER BILL CHUN SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, CALIFORNIA
Scale in Feet
40
0
40
SANTA CLARA AVENUE
MW-8
19.67
OAK STREET
Figure 1
Groundwater Gradient
Flow and Direction
July 03, 2002
Former Shell Gas Station
2300 Santa Clara Avenue