

December 22, 2011

**RECEIVED**  
*2:06 pm, Dec 28, 2011*  
Alameda County  
Environmental Health

Rita and Tony Sullins  
Don Sul Inc.  
187 North L Street  
Livermore, CA 94550

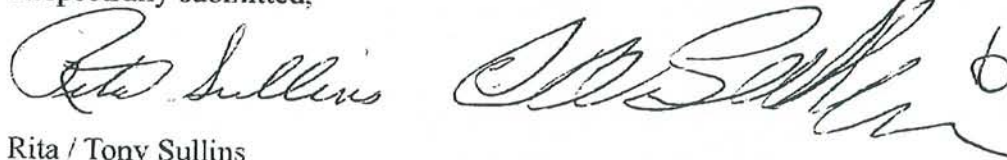
Re: Transmittal Letter  
Site Location: Arrow Rentals  
187 North L Street, Livermore, CA 94550

Dear Mr. Wickham:

On behalf of Rita and Tony Sullins, Don Sul Inc., Geological Technics Inc. (GTI) prepared the 2<sup>nd</sup> Semi-Annual Groundwater Monitoring, October 2011, dated December 23, 2011 that was sent to your office via electronic delivery per Alameda County's guidelines.

I declare under penalty of law that the information and/or recommendations contained in the above referenced document or report is true and correct to the best of my knowledge.

Respectfully submitted,



Rita / Tony Sullins  
Property Owner  
Don Sul Inc.  
187 North L Street  
Livermore, CA 94550

*Geological Technics Inc.* \_\_\_\_\_

## **REPORT**

**2<sup>nd</sup> Semi-Annual Groundwater Monitoring  
4<sup>th</sup> Quarter: October 2011**

**Arrow Rentals Service  
187 North L St.  
Livermore, CA 94550**

**Project No. 1262.2  
December 23, 2011**

**Prepared for:  
Tony & Rita Sullins  
Arrow Rentals Service  
187 North L St.  
Livermore, CA 94550**

**Prepared by:  
*Geological Technics Inc.*  
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# Geological Technics Inc.

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December 23, 2011

Project No.: 1262.2  
Project Name: Sullins (L St.)

Tony & Rita Sullins  
Arrow Rentals Service  
187 North L Street  
Livermore, CA 94550

RE: Report: 2<sup>nd</sup> Semi-Annual Groundwater Monitoring, 4<sup>th</sup> Quarter, October 2011  
Location: 187 North L Street, Livermore, CA 94550.  
(ACEH Fuel Leak Case No. RO0000394)

Dear Mr. & Ms. Sullins:

Geological Technics Inc. has prepared the following Report for the 2<sup>nd</sup> Semi-Annual 2011 groundwater monitoring event performed on October 25<sup>th</sup> and 26<sup>th</sup>, 2011, at the 187 North L Street property in Livermore, CA. An elevated core of gasoline contamination persists in the location of and down-gradient (northwest) of the former USTs/piping.

GTI is currently implementing the Corrective Action Plan (CAP) and the Dual Phase Extraction (DPE) system was started on November 15<sup>th</sup>, 2011. An installation report detailing the installation and start-up of the DPE system will be submitted by December 31<sup>st</sup>, 2011.

If you have any questions, please do not hesitate to call me at (209) 522-4119.

Respectfully submitted,



Raynold I. Kablanow II, PhD  
PG, CHG, REAI

cc: Jerry Wickham - ACEH  
USTCUF  
Chris Davidson - City of Livermore  
Jennifer Sedlecheck - Exxon Mobile Corp.

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**C**

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## **REPORT**

### **2<sup>nd</sup> Semi-Annual Groundwater Monitoring October 2011**

**Arrow Rentals Services  
187 North L St.  
Livermore, CA**

Project No. 1262.2  
December 23, 2011

#### **1.0 EXECUTIVE SUMMARY**

This report summarizes the results of the 2<sup>nd</sup> Semi-Annual 2011 groundwater monitoring and sampling event that took place on October 25<sup>th</sup> and 26<sup>th</sup>, of 2011.

The average shallow groundwater elevation at the site was 445.26 feet above mean sea level (msl) and the average depth to water was 35.41 feet below ground surface (bgs). This represents a decrease of 8.11 feet since the April 2011 monitoring event. The shallow groundwater flow was southwest (S68°W) at a slope of 0.0129 ft/ft for this event.

The analytical results of groundwater samples show that detectable concentrations of gasoline range petroleum hydrocarbons were present in all eighteen of the site's groundwater monitoring wells sampled for this event. A persistent core remains in the vicinity of well W-1 (76,000 µg/l TPH-g) which is located adjacent to former USTs/piping trenches and is down gradient of the former UST system.

GTI is currently implementing the Corrective Action Plan (CAP) that includes operating a Dual Phase Extraction system to treat the residual contamination at the site, which was started on November 15<sup>th</sup>, 2011.

## **Recommendations**

1. Continue groundwater monitoring as directed by Alameda County Environmental Health in their most recent email dated October 6, 2011.
2. Continue implementation of the Corrective Action Plan (CAP) and operating the Dual Phase Extraction (DPE) system, as the initial months of operation have been effective at treating the sites groundwater and soil contamination. A report detailing the installation and start-up of the DPE system will be submitted by December 31, 2011.

### **1.1 Site History**

Gasoline range petroleum hydrocarbons associated with underground storage tank (UST) systems have been documented in soil and groundwater at 187 North L Street, Livermore, CA (see Figures 1 and 2 for vicinity and site maps).

The work performed to date is summarized below\*:

- 1972 – Three 1,500 gallon gasoline USTs removed.
- 1984 – A single 1,000 gallon gasoline UST installed.
- 1986 – Two gasoline USTs removed (4,000 & 6,000 gallon).
- June 1985 – Pitcock Petroleum dispenses ~600 gallons into a vapor monitoring well adjacent to the 1,000 gasoline UST (Pitcock Release).
- September 1988 – Three monitoring wells installed (W-1, W-2 and W-3).
- March 1989 – Five soil borings advanced (B-1 through B-5).
- May 1989 – Three monitoring wells installed (W-1, W-2 and W-3).
- July 1990 – Five monitoring wells installed (W-A through W-E), three soil borings advanced (B-7, B-8 and B-1A), and a soil gas survey was completed.
- March 1991 – A single soil boring advanced (B-F).
- January 1992 - UST pipeline soil excavation and sampling, two soil borings advanced (B-G and B-H).
- March 1994 – Dual Phase Extraction pilot test performed.
- March 1996 - Four monitoring wells installed (W-1s, W-Bs, W-3s and W-Es).
- 1998- Soil gas survey.
- November 2005 - Soil gas survey.
- October 2006 - five continuous tubing multi-Chambered wells installed (the MW-4/104/204/304/404 through MW-8/108/208/308 series).
- October 2006 - Dual Phase Extraction pilot test performed.
- August 2007 – Final Corrective Action Plan prepared.
- April 2011 – Begin implementation of Corrective Action Plan.
- November 2011 – Start-up of Dual Phase Extraction (DPE) system.
- 1988 to present – intermittent monitoring/sampling of select monitoring wells.

\* Data from Woodward Clyde Consultants, GTI, & ACEH documentation.

## **1.2 Site Setting and Geology**

The site is in central portion in the City of Livermore, California, which is located in the Livermore Valley. The shallow sediments (<100 feet below grade) investigated in the project are Pleistocene (recent) alluvial fan and flood plain deposits [source: Geologic Map of California, San Jose Sheet, Division of Mines and Geology, 1966 (truncated geologic map copy located in Appendix D)].

The subject property is at an elevation of approximately 480 feet above mean sea level based on an October 16, 2006 survey conducted by Keir & Wright Engineers Surveyors Inc. of Livermore, California. Regionally, the surrounding area slopes to the west [source: USGS, Livermore Quadrangle, 7.5 Minute Series Topographic Map, 1980 photo-revision (truncated topographic map copy located in Appendix D)].

The subjective field observations of various field geologists and associated boring logs documented during this investigation were included in GTI's December 18, 2006 SCM report. The subsurface lithology falls into two predominant categories- gravelly soils and clayey soils. The site exhibits little correlation between boreholes and this situation is exacerbated by the fact that different geologists logged the boreholes and a five foot sampling interval was utilized in the past. The Site's geology is summarized as consisting primarily of gravelly units from the surface to approximately 35 – 45 feet bgs. Below these depths are 15 to 20 feet of clayey units that seem to retard the vertical migration of contaminants. These fine grained units are underlain by more gravels and a second clay horizon at approximately 78 feet bgs. Silts and sand units are present in the soil profile but are thin (usually a few inches thick, but much less than 5 feet thick) and less frequent than the soils noted above.

## **2.0 GROUNDWATER MONITORING**

### **2.1 Groundwater Elevation and Flow Direction**

The average groundwater elevation in the site's shallow water table wells was 445.26 feet above mean sea level (msl) on October 25<sup>th</sup>, 2011. This corresponds to 35.41 feet below grade surface (bgs) and represents a decrease of 8.11 feet since the April 2011 monitoring event. The depth to groundwater observed in the site's wells has ranged from approximately 20 - 49 feet below grade surface from 1989 to 2011. Refer to Figures 1 through 3 for site details, well and borehole locations.

GTI grouped the five CMT™ well sets installed in October 2006 and existing wells according to the aquifer interval that the screened section intercepted (see Table 3 in Appendix A for well construction details, and Figure 4 for well screen intervals):



Shallow Wells (screened 20 – 45 feet bgs):

W-1s, W-Bs, W-3s, W-Es, and either {MW-4, MW-5, MW-6, MW-7, MW-8} or {MW-105, MW-106, MW-107, MW-108} depending on groundwater elevation

Intermediate Wells (screened 40 – 60 feet bgs):

W-A, W-B, W-C, W-D, W-E, W-1, W-3, MW-104, MW-205, MW-206, MW-207, MW-208.

Notes:

- Wells W-B, -C, -D, and -E were abandoned on April 14, 2008. W-1 and W-3 are considered intermediate and are monitored; however they are not utilized for groundwater gradient measurements.
- Monitoring well W-2 cannot be located following the construction of the housing complex to the south and southeast of the site.

Deep Wells (screened ~ 65 feet bgs):

MW-204, MW-305, MW-306, MW-307, MW-308

Deepest Wells (screened > 70 feet bgs):

MW-304, MW-404

The groundwater elevation data are summarized in Tables 1A, 1B and 1C of Appendix A, for the shallow, intermediate and deep aquifer levels, respectively.

Horizontal Groundwater Gradients:

The calculated gradients for the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 monitoring event are as follows:

<u>Aquifer Zone:</u>	<u>Gradient:</u>	<u>Bearing:</u>
Water table	0.0129	S68°W
Intermediate	0.025	N52°W
Deep	0.0114	N64°W

Figures 5A illustrates the shallow aquifer groundwater gradient map for the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 monitoring event. Figure 5B and 5C illustrate the intermediate and deep aquifer gradient maps, respectively.

Vertical Groundwater Gradients:

GTI calculated vertical gradients for well pairs MW-204/304, MW-205/305, and MW-206/306 for the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 monitoring event. The vertical gradient for well pair MW-207/307 was not calculated during this event since MW-307 was not monitored during the 4<sup>th</sup> Quarter of 2011.

The following procedure is used to calculate vertical groundwater gradients in wells with submerged screens:

- Determine the vertical distance between the two measuring devices (wells) by calculating the distance between the mid-point between the screen top and bottom in the deep well (MW-305) and the mid-point between the screen top and bottom in the shallower well (MW-205).
- Measure the head in both wells used in the calculations.
- If the lateral distance between the well pair is greater than a few feet, then calculations must be made to correct the down-gradient piezometric head to account for the sloping water table between the wells. This is not necessary in this case because the wells are adjacent to each other in the CMT™ well sets.
- Divide the difference in head by the difference in vertical distance in the measuring devices to obtain the vertical gradient.

Figure 3 shows the location of the well pairs used for calculating vertical groundwater gradient in this report: MW-204/304, MW-205/305 MW-206/306, and MW-207/307. Table 2 in Appendix A shows the calculated vertical gradients.

For the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 event:

- The vertical gradient for the MW-204/304 pair was negative (or downward) at -0.01 ft/ft.
- The vertical gradient for the MW-205/305 pair was positive (or upward) at 0.10 ft/ft.
- The vertical gradient for the MW-206/306 pair was positive (or upward) at 0.13 ft/ft

In their January 16, 2007 letter correspondence Alameda County Environmental Health (ACEH) staff directed that groundwater elevation data for deep wells MW-304 & MW-404 be included in future reports. This data has been added in two columns on the far right of Table 1C, Appendix A.

## **2.2 Groundwater Sampling Procedure**

On October 25<sup>th</sup> and 26<sup>th</sup>, 2011, Geological Technics Inc. (GTI) staff mobilized to the site to conduct depth-to-water measurements and purging & sampling of the site's monitoring wells. Before sampling was attempted, the wells were sounded for depth to water and groundwater levels recorded with exceptions as noted. The CMT™ wells were purged of at least three well volumes of stagnant water by hand. The non-CMT™ wells were purged of at least three well volumes of stagnant water using a dedicated Waterra check-ball. Purging continued until the temperature, conductivity, and pH of the groundwater stabilized (<10% variation in three consecutive readings), indicating that formation water representative of aquifer conditions was entering the wells.

Once purging was complete, water samples were collected from the Waterra tube. Care was taken to minimize sample agitation. Once a sample container was filled and capped, the

bottle was inverted, tapped and checked for headspace bubbles. The sample container was identified and labeled with a unique designation, inserted into a foam holder and placed into an ice chest cooled to 4°C for transport to the laboratory. Disposable gloves were used by the technician to collect all samples and were changed with each sample collection.

*The following deviations from the sampling protocol are noted:*

- *Several CMT™ wells did not contain enough water to purge and collect samples. Samples were not collected from the following wells: MW-4, MW-5, MW-6, MW-7, MW-8, MW-105 and MW-108.*

A chain of custody document, listing all samples collected, accompanied the samples from field to laboratory, thereby providing a means to track the movement of and ensure the integrity of the samples.

All well purge water was placed in a 55 gallon DOT approved container. These drums were properly labeled and will be stored on site until their proper disposition can be arranged.

Groundwater monitoring field logs are included in Appendix C.

### **2.3 Laboratory Analyses**

The groundwater samples collected on October 25<sup>th</sup> and 26<sup>th</sup>, 2011, were delivered to BC Laboratories of Bakersfield, California (certification #1186) for analyses.

The groundwater samples were analyzed for:

- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX) by EPA method 8021B
- Total Petroleum Hydrocarbons as Gasoline (TPH-G) by EPA method 8015M

Note: The samples were not analyzed for MTBE for the 4<sup>th</sup> Quarter, 2011 monitoring event per an email directive from Jerry Wickham of Alameda County Environmental Health dated October 6<sup>th</sup>, 2011.

The results and detection limits for the above analyses are listed in Table 4 of Appendix A while the lab analytical results are presented in Appendix B.

As required under AB2886, the depth to groundwater data for the 2<sup>nd</sup> Semiannual 2011 was submitted to GeoTracker on December 27, 2011 – confirmation number 1240370988. Laboratory data was submitted to GeoTracker on December 27, 2011 – confirmation number 6582917213.

### 3.0 FINDINGS AND DISCUSSION

#### 3.1 Field Parameters

For the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 event:

- Dissolved Oxygen (DO) ranged from 0.15 (W-A) to 0.52 (W-3s).
- Electrical Conductivity (EC) ranged from 722 (W-Bs) to 1073 (W-1), which is above historical ranges.
- Oxygen Reduction Potential (ORP) ranged from -121.5 (W-1s) to -57.6 (W-3s).
- pH ranged from 6.45 (W-1) to 6.70 (W-A).
- Temperature ranged from 17.6 °C (W-Bs) to 18.1 °C (W-1s).

Field parameters were collected while purging all monitoring wells except the five CMT™ wells. The field parameter results are shown in Table 5 of Appendix A.

#### 3.2 Laboratory Analytical Data

For the October 25<sup>th</sup> and 26<sup>th</sup>, 2011 event:

##### Shallow Aquifer:

- CMT™ monitoring well MW-107 reported the highest concentrations of TPH-g (16,000 µg/l) and benzene (6,400 µg/l) in the shallow aquifer. Contaminant concentrations in MW-107 appear to be increasing over time; however concentrations decreased since the April 2011 event.
- The shallow aquifer TPH-g plume appears to be moving down-gradient, as suggested by the movement of the core of the plume, from being centered around W-1s and CMT™ -4 during the April 2007 monitoring event to centered around CMT™ -7, which is about 40 feet down-gradient. However, down-gradient well W-3s reported contaminant concentrations within the lower end of historical ranges, suggesting the boundary of the plume is not increasing. However, the data is incomplete and further groundwater monitoring events will allow for a better evaluation of seasonal fluctuations. The shallow aquifer TPH-g plume is shown in Figure 6.
- Well W-1s contained: 12,000 µg/l TPH-g, 2,900 µg/l benzene, 280 µg/l toluene, 520 µg/l ethyl benzene, and 530 µg/l xylene.
- Well W-Bs contained: 4,900 µg/l TPH-g, 250 µg/l benzene, 23.0 µg/l toluene, 230 µg/l ethyl benzene, and 38 µg/l xylene.
- Well W-3s contained: 190 µg/l TPH-g, 5.2 µg/l benzene, 0.76 µg/l toluene, 1.3 µg/l ethyl benzene and 2.1 µg/l xylene.
- CMT™ Well MW-106 contained 190 µg/l TPH-g and 1.7 µg/l benzene. MW-106 was non-detect below laboratory reporting limits for toluene, ethyl benzene and xylene.
- CMT™ Well MW-107 contained 16,000 µg/l TPH-g, 6,400 µg/l benzene, 28.0 µg/l toluene, 140 µg/l ethyl benzene and 200 µg/l xylene.

- CMT™ wells MW-4, MW-5, MW-6, MW-7, MW-8, MW-105 and MW-108 could not be sampled due to a lack of water in the well casing.
- Figure 6 contains a contour map indicating GTI's interpretation of the shallow TPH-g plume in October 2011. The groundwater plume is localized in the down gradient vicinity of the former USTs/piping trenches and appears to be centered on CMT™ cluster 7 (MW-107), which reported a TPH-g concentration of 16,000 µg/l during the October 2011 event.

### **Intermediate Aquifer:**

- Monitoring well W-1 reported the highest concentrations of TPH-g (76,000 µg/l) and benzene (15,000 µg/l) in the intermediate aquifer. Contaminant concentrations in W-1 appear to be on an overall decreasing trend and are within historical ranges for the October 2011 monitoring event. However, both TPH-g and benzene concentrations increased from the April 2011 event.
- The intermediate aquifer TPH-g plume appears to be stationary, as suggested by the fluctuation of the core of the plume between W-1, W-A, MW-104 and MW-205, with contaminant concentrations increasing and decreasing. In addition, down-gradient well W-3 reported the lowest contaminant concentrations to date during the April 2011 event, suggesting the boundary of the plume is not increasing. W-3 was not sampled during the October 2011 event due to the lack of an access agreement. However, the data is incomplete and further groundwater monitoring events will allow for a better evaluation of seasonal fluctuations. The intermediate aquifer TPH-g plume is shown in Figure 7.
- Well W-A contained: 18,000 µg/l TPH-g, 3,500 µg/l benzene, 410 µg/l toluene, 970 µg/l ethyl benzene, and 870 µg/l xylene.
- Well W-1 contained: 76,000 µg/l TPH-g, 15,000 µg/l benzene, 6,100 µg/l toluene, 910 µg/l ethyl benzene, and 11,000 µg/l xylene.
- CMT™ Well MW-104 contained: 25,000 µg/l TPH-g, 8,400 µg/l benzene, 120 µg/l toluene, 490 µg/l ethyl benzene, and 740 µg/l xylene.
- CMT™ Well MW-205 contained: 26,000 µg/l TPH-g, 11,000 µg/l benzene, 130 µg/l toluene, 240 µg/l ethyl benzene, and 300 µg/l xylene.
- CMT™ Well MW-206 contained 160 µg/l TPH-g and 5.7 µg/l benzene, 0.4 µg/l toluene, 0.25 µg/l ethyl benzene. MW-206 was non-detect below laboratory reporting limits for total xylenes.
- CMT™ Well MW-207 contained 18,000 µg/l TPH-g, 7,600 µg/l benzene, 38 µg/l toluene, 160 µg/l ethyl benzene, and 280 µg/l xylene.
- CMT™ Well MW-208 contained: 7,400 µg/l TPH-g, 1,600 µg/l benzene, 97 µg/l toluene, 60 µg/l ethyl benzene, and 210 µg/l xylene.
- Figure 7 contains a contour map indicating GTI's interpretation of the intermediate TPH-g plume in October 2011. The groundwater plume is localized in the vicinity of the former USTs/piping trenches and appears to be centered on monitoring well W-1, which reported a TPH-g concentration of 76,000 µg/l during the October 2011 event.

### **Deep Aquifer:**

- CMT™ monitoring well MW-204 reported the highest concentrations of TPH-g (7,400 µg/l) and benzene (1,900 µg/l) in the deep aquifer. Contaminant concentrations in MW-204 appear to be fluctuating and have increased since the April 2011 monitoring event.
- Concentrations reported in the deep wells during the October 2011 event suggest the deep groundwater plume is stationary or moving down gradient slowly. However, the data is incomplete and further groundwater monitoring events will allow for a better evaluation of seasonal fluctuations. Previously, the deep aquifer TPH-g plume has appeared to be moving down-gradient, as suggested by the movement of the core of the plume from centered around CMT™ well MW-204 during the April 2007 monitoring event to split cores centered around MW-204 and further down-gradient (50 feet) MW-308 in April 2011. Until the October 2011 event, MW-308 had been reporting increasing contaminant concentrations, suggesting the boundary of the plume appears to be increasing.
- CMT™ Well MW-204 contained: 7,400 µg/l TPH-g, 1,900 µg/l benzene, 38 µg/l toluene, 250 µg/l ethyl benzene, and 400 µg/l xylene.
- CMT™ Well MW-305 contained: 1,300 µg/l TPH-g, 280 µg/l benzene, 37 µg/l toluene, 20 µg/l ethyl benzene, and 49 µg/l xylene.
- CMT™ Well MW-306 contained: 75 µg/l TPH-g, 0.5 µg/l benzene and was non-detect below laboratory reporting limits for toluene, ethyl benzene and xylene.
- CMT™ Well MW-307 was not sampled during the 4<sup>th</sup> quarter of 2011.
- CMT™ Well MW-308 contained: 2,900 µg/l TPH-g, 610 µg/l benzene, 9.2 µg/l toluene, 73 µg/l ethyl benzene, and 53 µg/l xylene.
- Figure 8 contains a contour map indicating GTI's interpretation of the deep TPH-g plume in October 2011. The groundwater plume is localized in the vicinity of the former USTs/piping trenches and appears to be centered around CMT™ -4, which reported a TPH-g concentration of 7,400 µg/l, respectively, during the October 2011 event. The plume appears to attenuate around MW-306 (75 µg/l) to the northeast.

### **Deepest Aquifer**

- CMT™ Well MW-304 contained: 6,500 µg/l TPH-g, 1,600 µg/l benzene, 45 µg/l toluene, 190 µg/l ethyl benzene, and 350 µg/l xylene.
- CMT™ Well MW-404 contained: 1,500 µg/l TPH-g, 400 µg/l benzene, 9.1 µg/l toluene, 46 µg/l ethyl benzene, and 65 µg/l xylene.

### **Figures**

- Figure 9 illustrates TPH-g concentration versus time in well W-1s (located in the vicinity of the core of the contaminant plume). With the exception of events in 1995, 1997 and 2001 the contaminant concentrations exhibit a fairly stable trend. The three peaks evident correspond with low stands of groundwater and suggest that significant

contaminant mass is present although decades have past since the original USTs were removed. The October 2011 monitoring event represents the lowest concentrations of TPH-g in this well since April of 1998.

- Figure 10 illustrates TPH-g concentration versus time in well W-3s (located down/cross gradient of the core of the plume). The contaminant concentrations show an overall declining trend, despite several elevated spikes in concentrations in 1996, 1997, 1998 and 2003. These events of elevated concentration do not show a correlation with low groundwater elevations, as was observed in W-1s.
- Figure 11 illustrates TPH-g concentration versus time in well W-Bs (located down gradient of the core of the plume). The contaminant concentrations showed a rapid declining trend from 1995 – 2003 but appear to be fairly stabilized since.

#### 4.0 CONCLUSIONS & RECOMMENDATIONS

##### Conclusions

1. The dominant groundwater flow direction is to the southwest, with the average flow bearing being S68°W at a slope of 0.0129 ft/ft.
2. For the October 2011 event, the average groundwater elevation and depth is 445.26 feet below mean sea level and 35.41 feet below ground surface, respectively.
3. Elevated concentrations of BTEX and TPH-g are present in a laterally limited (probably less than 150 foot radius) groundwater plume that is centered between the vicinity CMT™ Cluster 7 and wells W-1/W-1s. The plume appears to attenuate to the northeast at CMT™ Cluster 6, to the northwest at W-3s and W-3 and unknown to the north and south.
4. The highest level of benzene detected, 15,000 µg/l, was present in intermediate depth well W-1.
5. The highest level of TPH-g detected, 76,000 µg/l, was present in intermediate depth well W-1.
6. The data shows that the core of the plume is fairly stable, with concentrations decreasing very slowly by either natural biodegradation causes or by dilution effects.
7. Overall the contaminant concentrations at the site are following a decreasing trend, as shown in Figures 9, 10 and 11. It appears that there is a direct relationship between groundwater elevation and contaminant concentrations. It is hypothesized that groundwater levels during the October 2011 groundwater monitoring event may be related to low concentrations reported in some wells. Continued sampling will allow for further evaluation of this relationship.

##### Recommendations

1. Continue groundwater monitoring as directed by Alameda County Environmental Health in their most recent email dated October 6, 2011.
2. Continue implementation of the Corrective Action Plan (CAP) and operating the Dual Phase Extraction (DPE) system, as the initial months of operation have been effective at

treating the sites groundwater and soil contamination. A report detailing the installation and start-up of the DPE system will be submitted by December 31, 2011.

## 5.0 LIMITATIONS

This report was prepared in accordance with the generally accepted standard of care and practice in effect at the time Services were rendered. It should be recognized that definition and evaluation of environmental conditions is an inexact science and that the state or practice of environmental geology/hydrology is changing and evolving and that standards existing at the present time may change as knowledge increases and the state of the practice continues to improve. Further, that differing subsurface soil characteristics can be experienced within a small distance and therefore cannot be known in an absolute sense. All conclusions and recommendations are based on the available data and information.

The tasks proposed and completed during this project were reviewed and approved by the local regulatory agency for compliance with the law. No warranty, expressed or implied, is made.

## 6.0 SIGNATURES & CERTIFICATION

This report was prepared by:



Andrew Dorn, B.Sc. Geology

This report was prepared under the direction of:

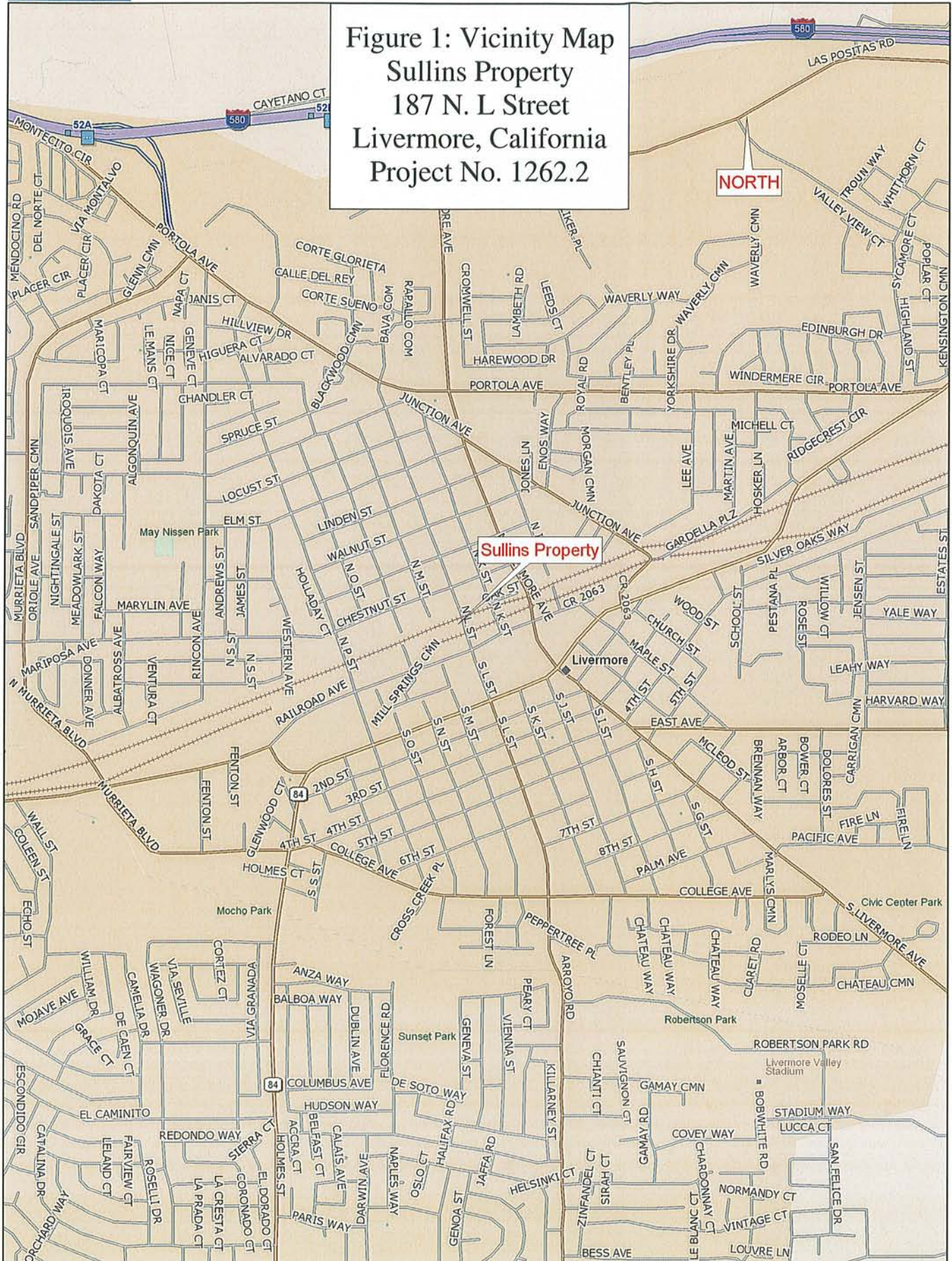


Raynold I. Kablanow II, PhD  
PG, CHG, REAII





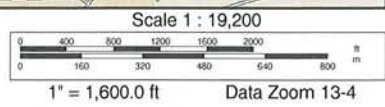
Figure 1: Vicinity Map  
Sullins Property  
187 N. L Street  
Livermore, California  
Project No. 1262.2



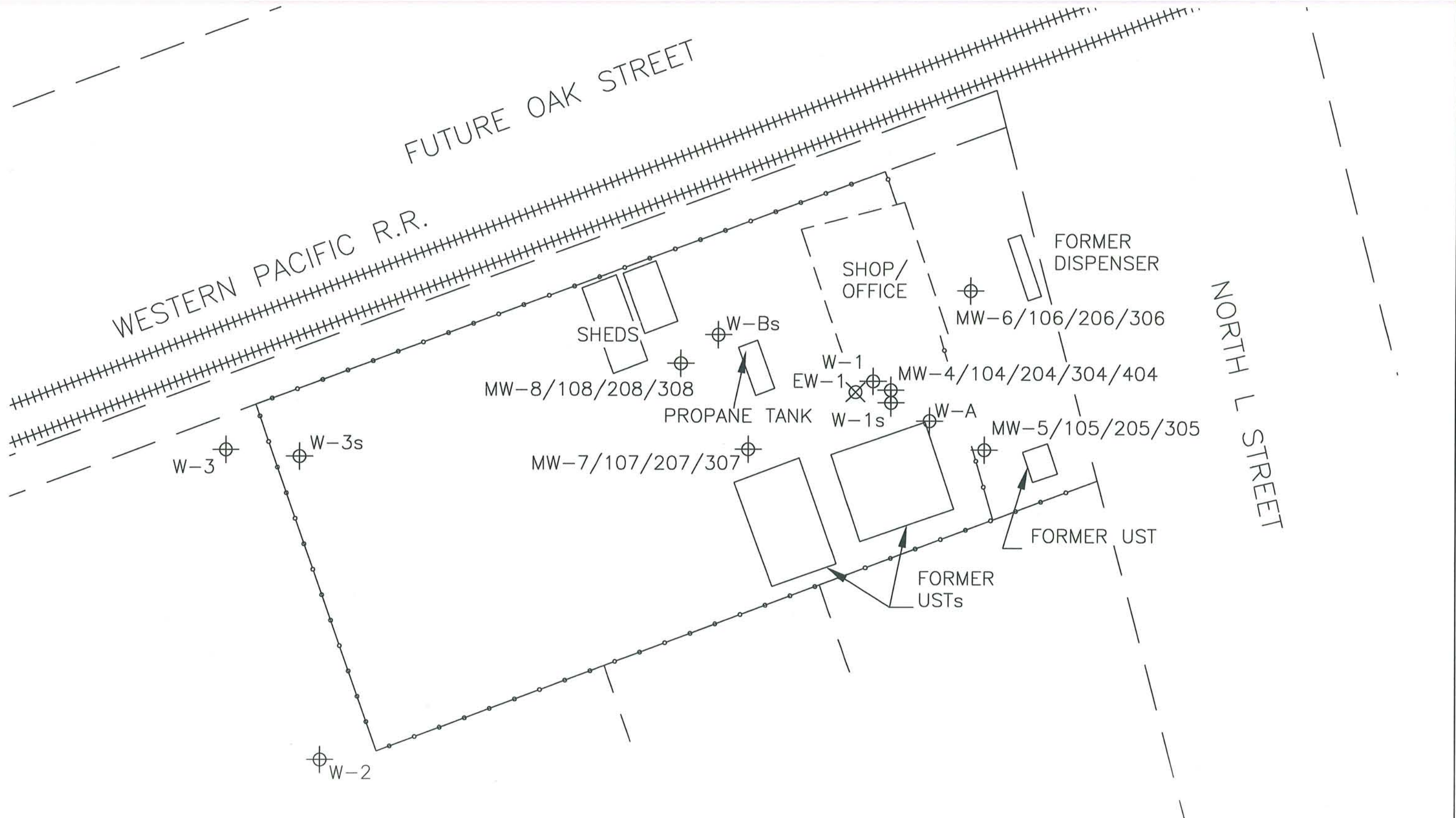
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**LEGEND**

⊕ MONITORING WELL  
 ⊗ EXTRACTION WELL

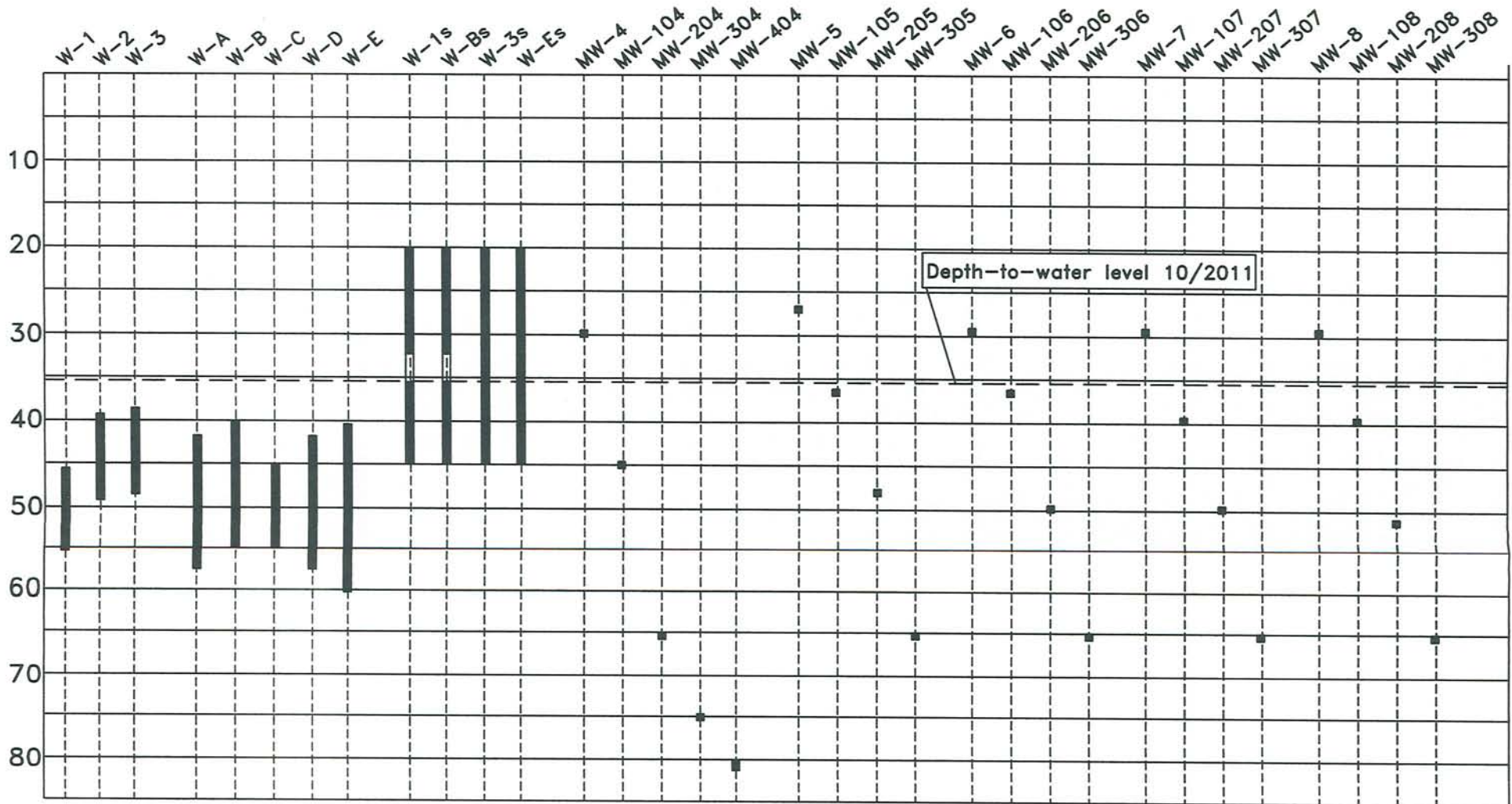
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Scale:	NTS
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**FIGURE 3: SITE DETAIL MAP**  
 ARROW RENTALS  
 187 NORTH L STREET  
 LIVERMORE, CA

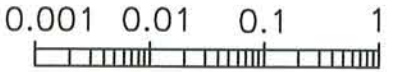
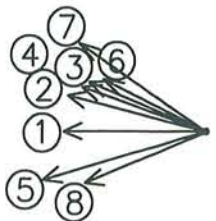
Figure 4:  
Well Screened  
Interval Diagram



Sullins  
187 North L Street  
Livermore, CA

	DATE	BEARING	GRADIENT
1	04/29/04	WEST	0.019
2	07/07/06	N76°W	0.019
3	10/16/06	N68°W	0.014
4	04/17/07	N71°W	0.016
5	12/19/07	S74°W	0.033
6	04/07/08	N64°W	0.012
7	04/08/11	N56°W	0.0221
8	10/25/11	S68°W	0.0129

ROSE DIAGRAM

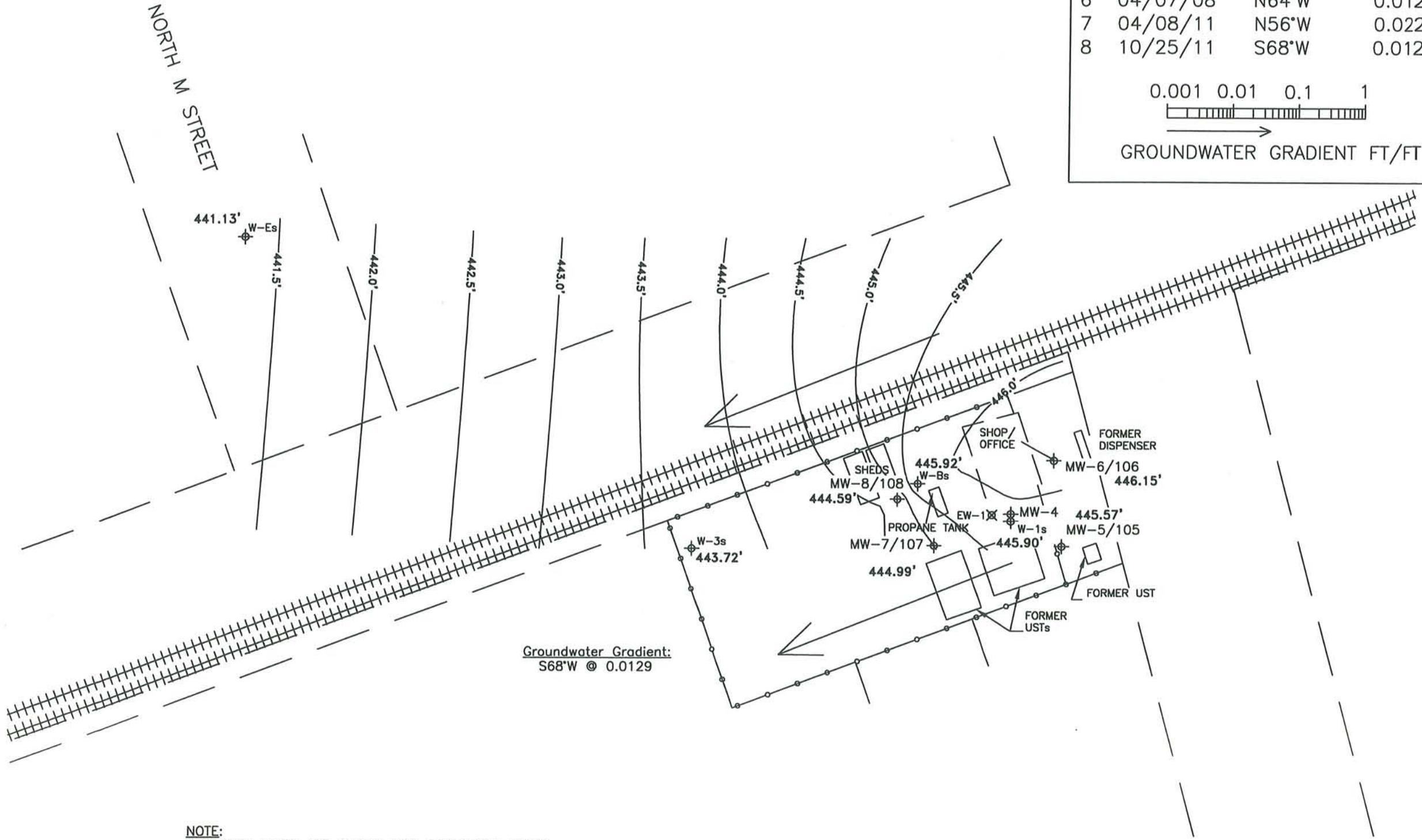


GROUNDWATER GRADIENT FT/FT



**LEGEND**

- MONITORING WELL
- ⊕ EXTRACTION WELL
- ⊕ DATA NOT AVAILABLE
- ⊗ GRADIENT CALCULATED BY COMPUTER GENERATED CONTOURS
- GROUNDWATER ELEV. -33.66'
- CONTOUR INTERVAL = 0.5 FOOT
- GW BEARING DETERMINED USING W-Es, W-3s and W-Bs.



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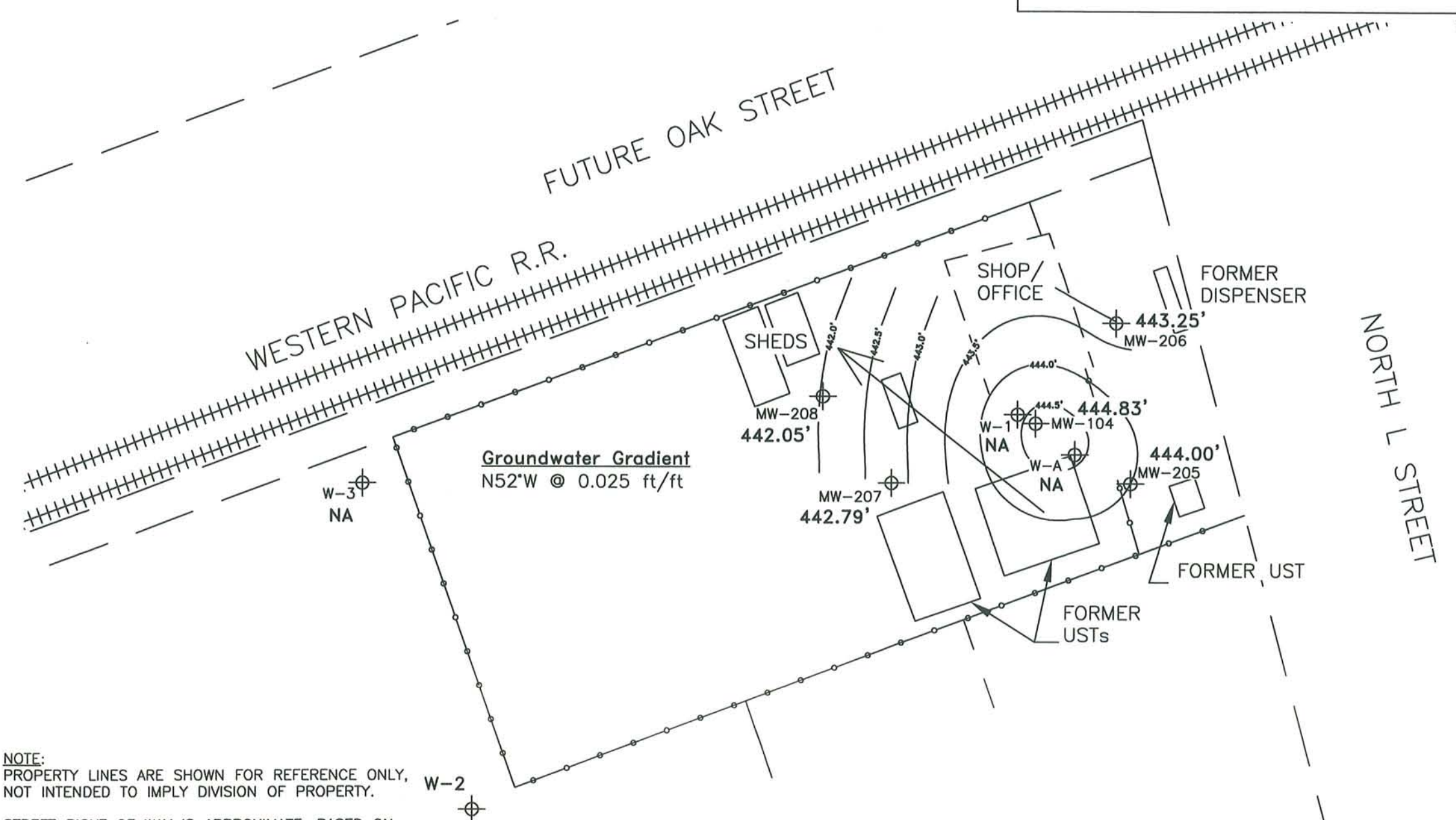
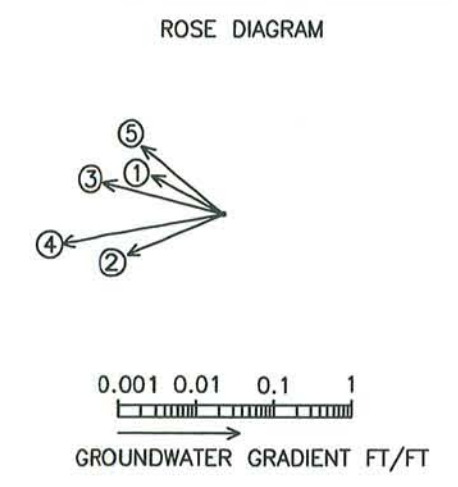
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**FIGURE 5A: GROUNDWATER GRADIENT MAP  
SHALLOW WELLS**  
**ARROW RENTALS**  
 187 NORTH L STREET  
 LIVERMORE, CA

DATE	BEARING	GRADIENT
1 10/16/06	N63°W	0.012
2 04/17/07	S68°W	0.022
3 12/19/07	N76°W	0.04
4 04/07/08	NORTHWEST	VARIABLE
5 10/25/11	N53°W	0.025



**LEGEND**

- ⊕ MONITORING WELL
- ⊗ EXTRACTION WELL
- NA DATA NOT AVAILABLE

GRADIENT CALCULATED BY  
COMPUTER GENERATED CONTOURS

GROUNDWATER ELEV. -33.66'

CONTOUR INTERVAL = 0.1 FEET

GW BEARING DETERMINED USING  
CMT WELLS MW-205, MW-206  
and MW-208.

NOTE:  
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WELLS W-A and W-1 WERE LEFT OUT OF GRADIENT CALCULATIONS  
DUE TO ANOMALOUS VALUES AND MODIFICATION TO WELL TOP

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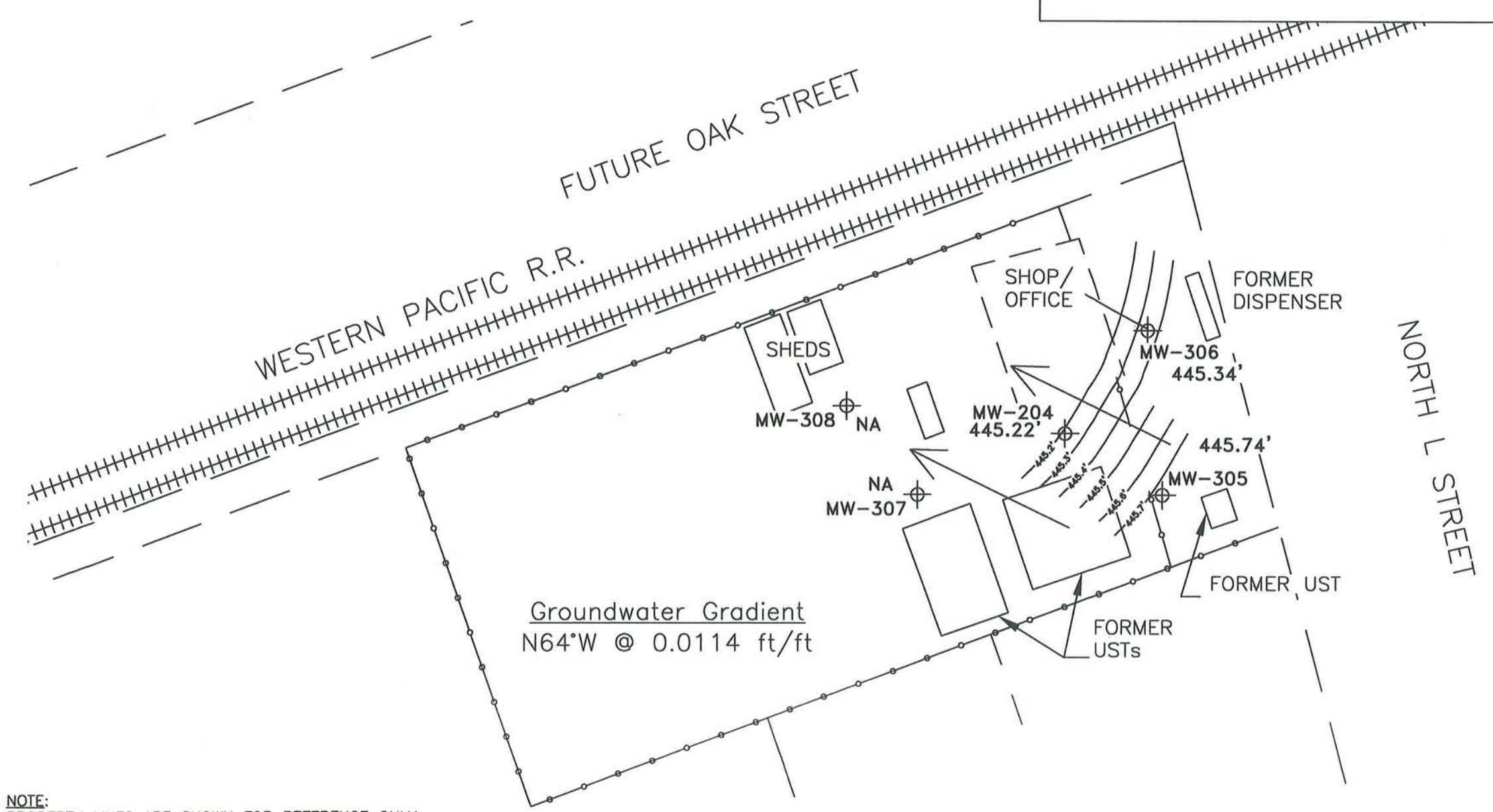
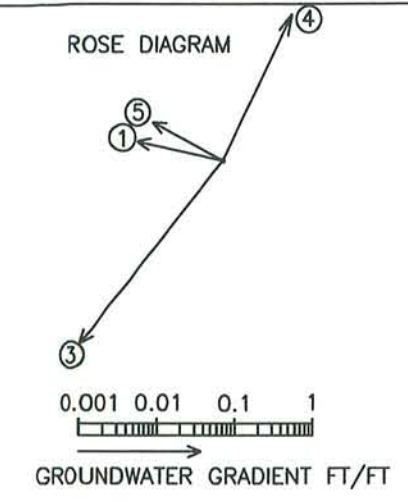
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FIGURE 5B: GROUNDWATER GRADIENT MAP  
INTERMEDIATE WELLS

ARROW RENTALS  
187 NORTH L STREET  
LIVERMORE, CA

	DATE	BEARING	GRADIENT
1	10/16/06	N78°W	0.014
2	04/17/07	UNDETERMINED	
3	12/19/07	S39°W	0.18
4	04/07/08	N26°E	0.10
5	10/25/11	N64°W	0.0114



**LEGEND**

- ⊕ MONITORING WELL
- ⊗ EXTRACTION WELL
- NA DATA NOT AVAILABLE

GRADIENT CALCULATED BY  
COMPUTER GENERATED CONTOURS

GROUNDWATER ELEV. -33.66'

CONTOUR INTERVAL = 0.1 FEET

GW BEARING DETERMINED USING  
CMT WELLS MW-204, MW-305  
and MW-306.

**NOTE:**  
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Scale:	NTS
File:	12622 Graphics 10-25-11

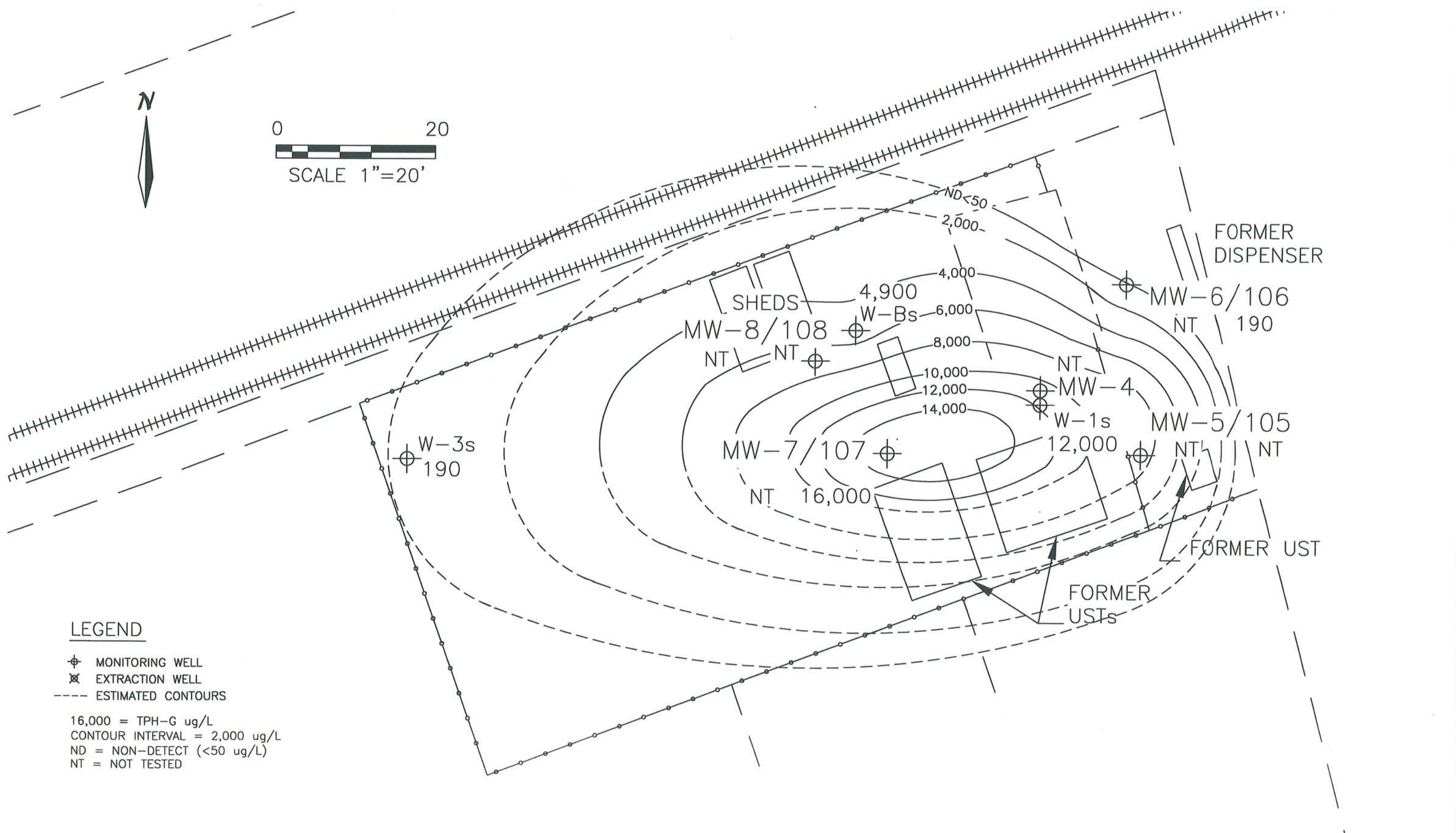
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**FIGURE 5C: GROUNDWATER GRADIENT MAP  
DEEP WELLS**

ARROW RENTALS  
187 NORTH L STREET  
LIVERMORE, CA

Page 1 of 1



**LEGEND**

- ⊕ MONITORING WELL
- ⊗ EXTRACTION WELL
- ESTIMATED CONTOURS

16,000 = TPH-G ug/L  
 CONTOUR INTERVAL = 2,000 ug/L  
 ND = NON-DETECT (<50 ug/L)  
 NT = NOT TESTED

**NOTE:**  
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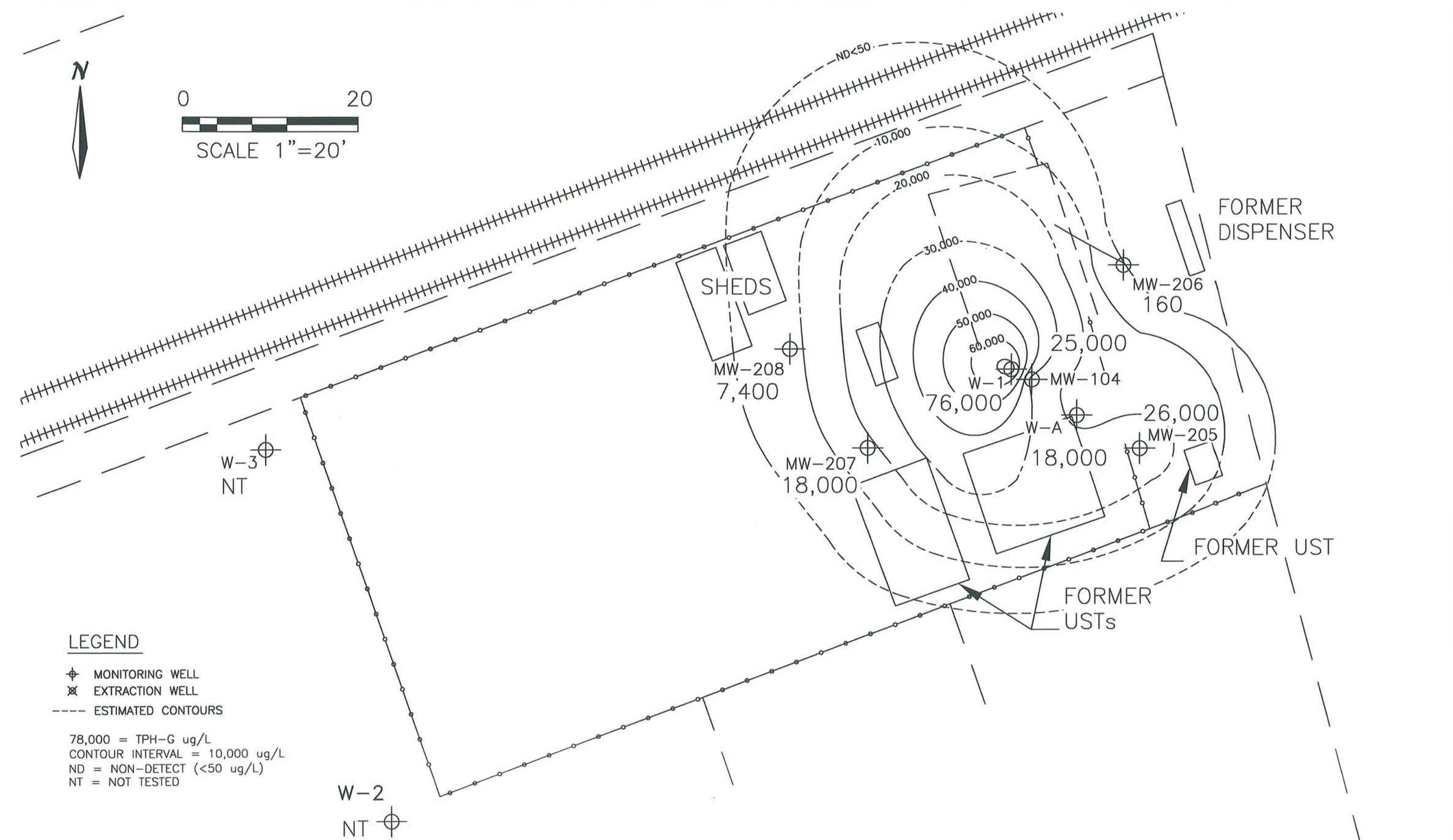
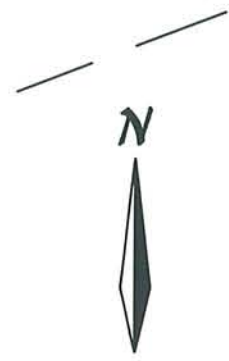
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**FIGURE 6: SHALLOW WELL TPH-G CONCENTRATIONS**  
 ARROW RENTALS  
 187 NORTH L STREET  
 LIVERMORE, CA





**LEGEND**

- ⊕ MONITORING WELL
- ⊗ EXTRACTION WELL
- ESTIMATED CONTOURS
  
- 78,000 = TPH-G ug/L
- CONTOUR INTERVAL = 10,000 ug/L
- ND = NON-DETECT (<50 ug/L)
- NT = NOT TESTED

**NOTE:**  
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By:	AD
Job No:	1262.2 Date: 11-04-11
Scale:	1" = 50 feet
File:	12622 Graphics 10-25-11

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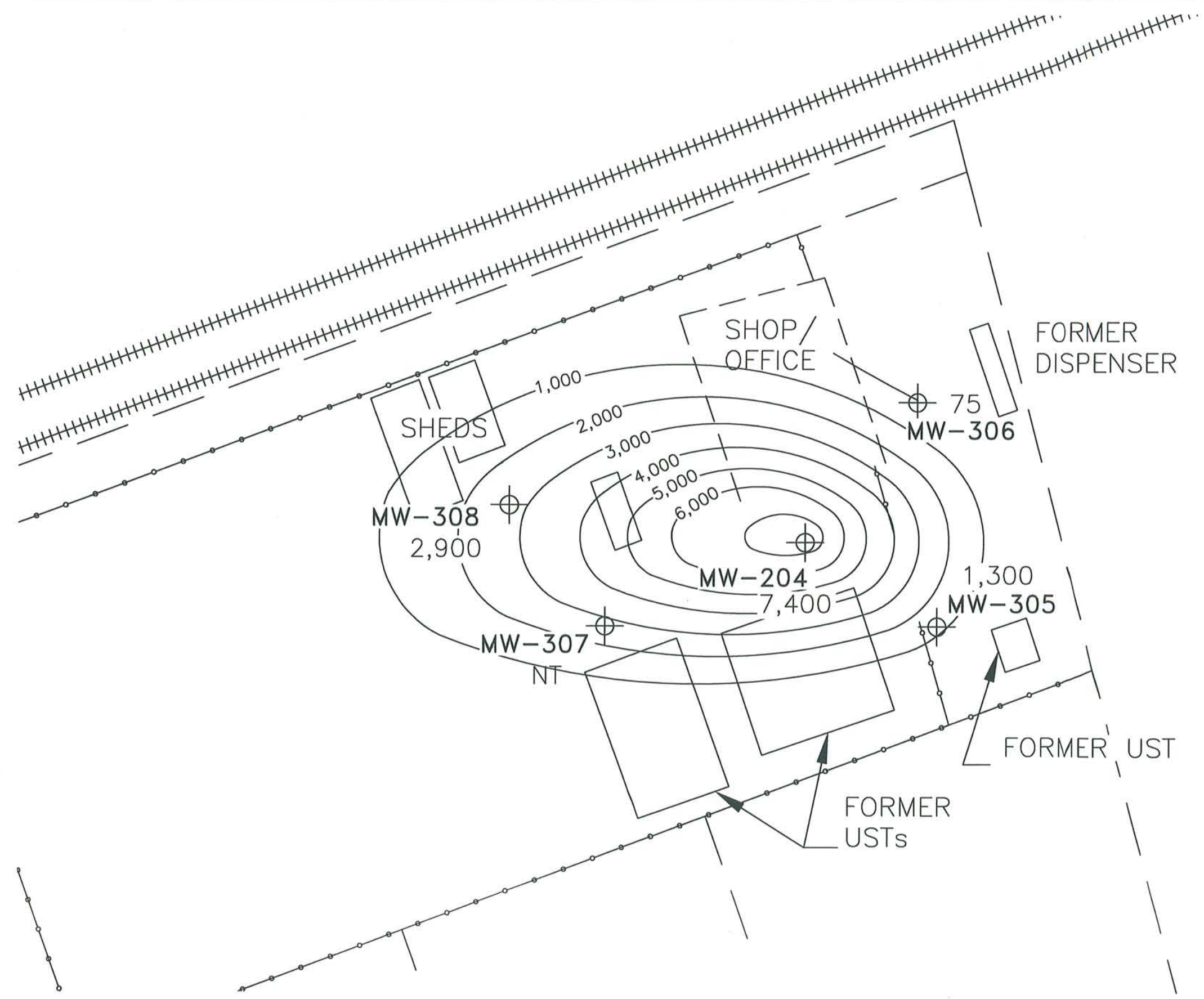
**FIGURE 7: INTERM. WELL TPH-G CONCENTRATIONS**  
**ARROW RENTALS**  
 187 NORTH L STREET  
 LIVERMORE, CA



**LEGEND**

- ⊕ MONITORING WELL
- ⊗ EXTRACTION WELL

7,400 = TPH-G ug/L  
 CONTOUR INTERVAL = 1,000 ug/L  
 ND = NON-DETECT (<50 ug/L)  
 NT = NOT TESTED



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By: AD
Job No: 1262.2 Date: 11-04-11
Scale: 1" = 50 feet
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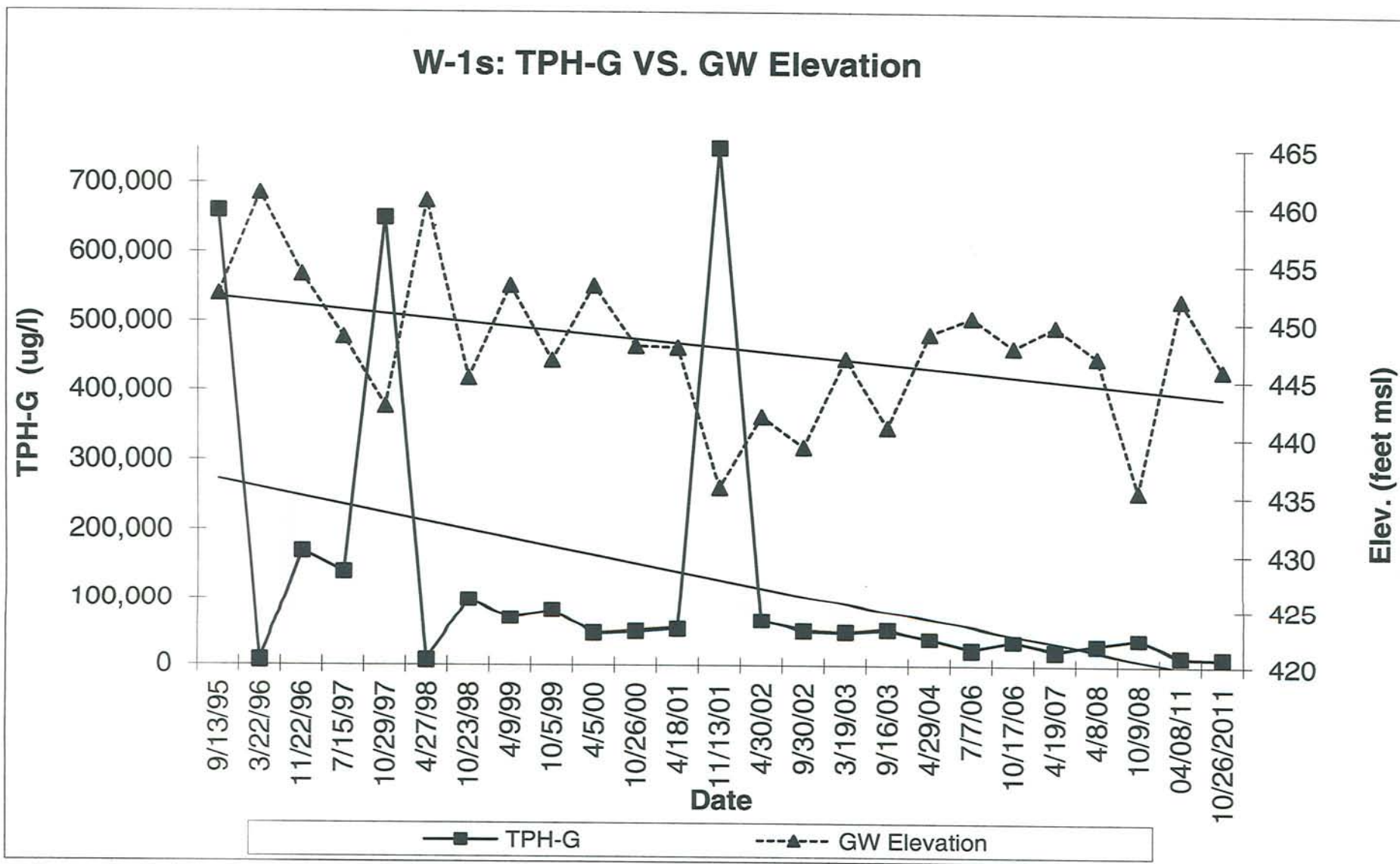
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**FIGURE 8: DEEP WELL TPH-G CONCENTRATIONS**  
 ARROW RENTALS  
 187 NORTH L STREET  
 LIVERMORE, CA

**Figure 9: Sullins**

187 N.L Street

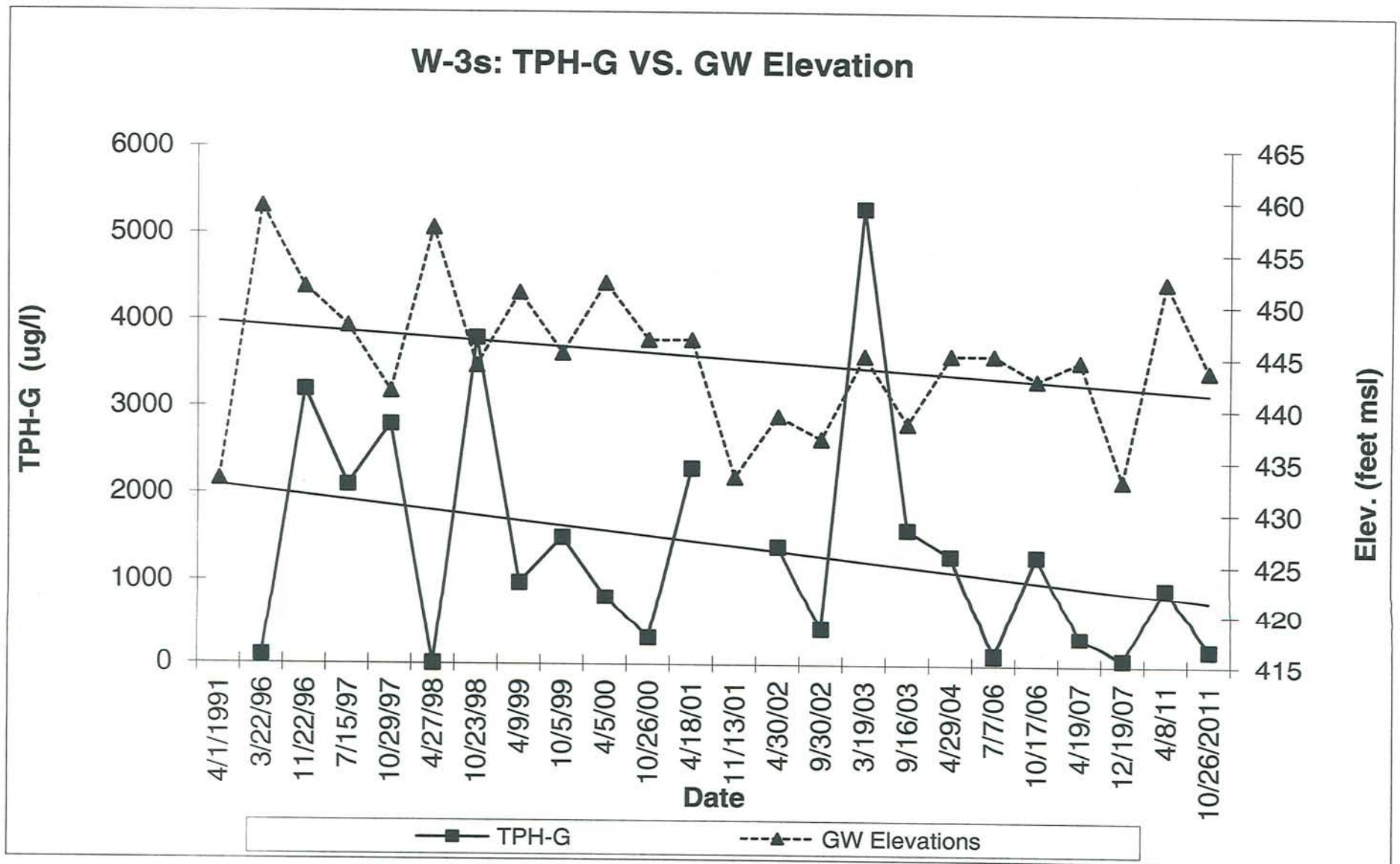
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**Figure 10: Sullins**

187 N.L Street

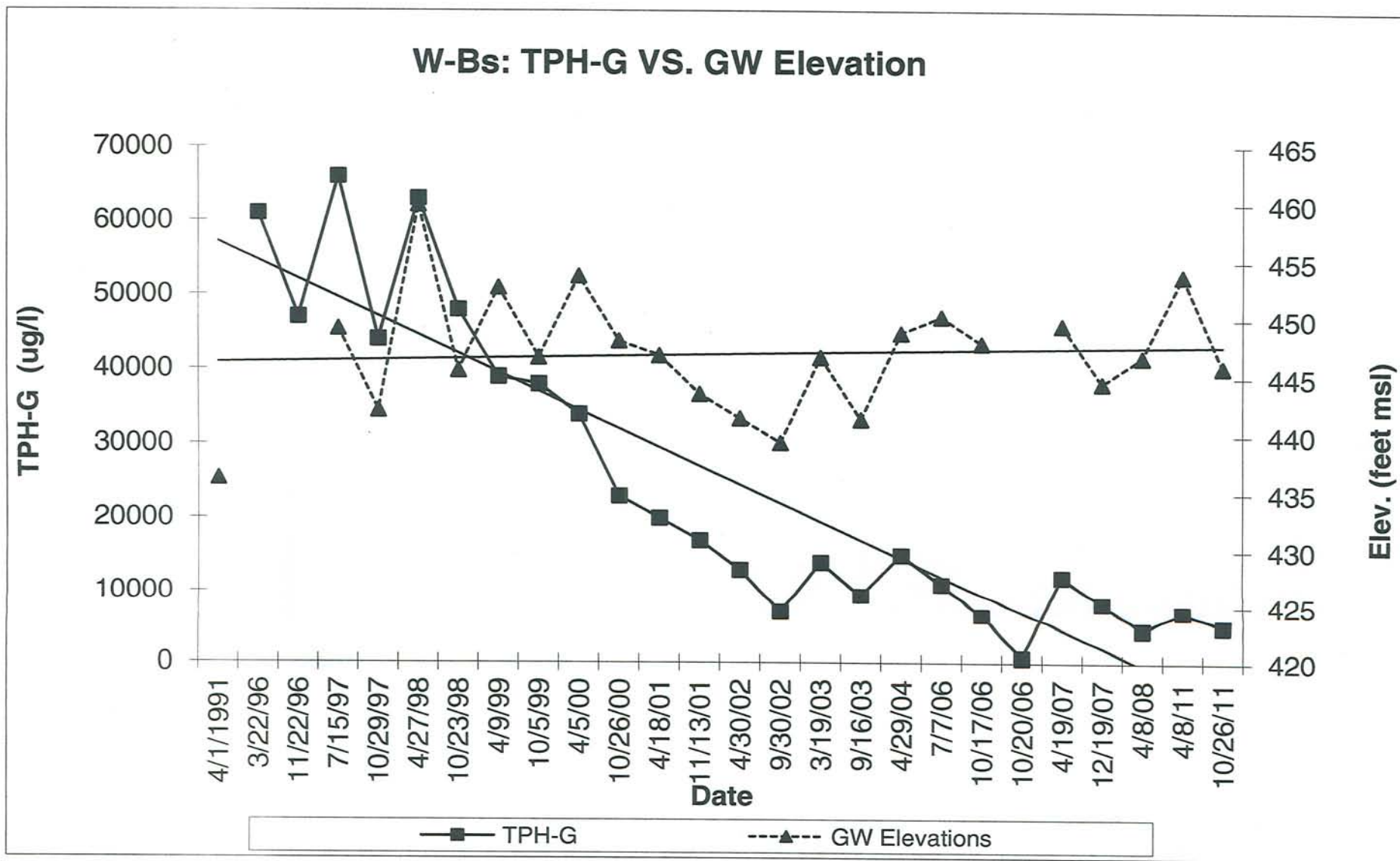
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**Figure 11: Sullins**

187 N.L Street

Livermore, CA



**Appendix A**  
**Summary Tables**



Table 1B: Summary of Groundwater Elevation and Gradient - Intermediate Wells

Arrow Rentals  
 187 North L. Street  
 Livermore, CA  
 Project No. 1262.2

Date	Elevation of Groundwater - Wells Surveyed October 16, 2006 in accordance with SWRCB Geotracker Requirements																								Avg. Elv. (feet)	Avg. DTW (feet)	Gradient (ft/ft)	Bearing
	W-1	DTW-W-1	W-A	DTW-W-A	W-B	DTW-W-B	W-C	DTW-W-C	W-D	DTW-W-D	W-E	DTW-W-E	MW-104	DTW-MW-104	MW-205	DTW-MW-205	MW-206	DTW-MW-206	MW-207	DTW-MW-207	MW-208	DTW-MW-208						
top of casing	480.77		481.04		480.74		481.61		477.03		476.56		480.84		481.12		480.79		480.91		480.64							
top of screen	435.27	45.5	439.04	42	440.74	40	436.61	45	435.03	42	436.06	40.5	431.34	49.5	434.12	47	431.79	49	431.91	49	429.64	51						
bottom of screen	425.27	55.5	423.54	57.5	425.74	55	426.61	55	419.53	57.5	416.26	60.3	430.34	50.5	433.12	48	430.79	50	430.91	50	428.64	52						
10/16/2006	-	-	-	-	-	-	-	-	-	-	442.63	33.93	444.85	35.99	446.75	34.37	447.03	33.76	446.27	34.64	445.12	35.52	445.44	34.70	0.012	N63°W		
4/17/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	448.57	32.22	447.13	33.78	447.05	33.59	447.58	33.20	0.022	S68°W		
12/19/2007	-	-	438.36	42.68	-	-	-	-	-	-	-	-	435.98	44.86	-	-	436.10	44.69	434.33	46.58	433.92	46.72	435.74	45.11	0.04	N76°W		
4/7/2008	-	-	446.72	34.32	-	-	-	-	-	-	-	-	443.10	37.74	444.84	36.28	446.38	34.41	444.84	36.07	443.66	36.98	444.92	35.97	northwest	variable		
10/8-9/2008	-	-	-	-	Wells Destroyed on 4/18/2008										431.08	49.76	434.51	46.61	431.32	49.47	-	-	430.68	49.96	431.90	48.95	0.12	N20°W
4/8/2011	-	-	453.38	27.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	453.38	27.66	N/A	N/A		
10/26/2011	445.28	35.49	445.60	35.44	-	-	-	-	-	-	-	-	444.83	36.01	444.00	37.12	443.25	37.54	442.79	38.12	442.05	38.59	443.75	37.14	0.025	N52°W		

"-" = well dry or depth to water measurement could not be obtained  
 Starting 10/26/11 - Gradient calculated using a 3-point problem with CMT wells 205, 206 & 208



Table 1C: Summary of Groundwater Elevation and Gradient - Deep Wells

Arrow Rentals  
 187 North L Street  
 Livermore, CA  
 Project No. 1262.2

Date	Elevation of Groundwater - Wells Surveyed October 16, 2006 in accordance with SWRCB Geotracker Requirements																		
	DEEP WELLS										GROUNDWATER				DEEPEST WELLS				
	MW-204	DTW-MW-204	MW-305	DTW-MW-305	MW-306	DTW-MW-306	MW-307	DTW-MW-307	MW-308	DTW-MW-308	Avg. Elv.	Avg. DTW	Gradient	Bearing	MW-304	DTW-MW-304	MW-404	DTW-MW-404	
	<i>top of casing</i>	480.84		481.12		480.79		480.91		480.64		(feet)	(feet)	(ft/ft)		480.84		480.84	
	<i>top of screen</i>	415.34	65.5	416.12	65	415.79	65	415.91	65	415.64	65					406.34	74.5	400.84	80.0
	<i>bottom of screen</i>	414.34	66.5	415.12	66	414.79	66	414.91	66	414.64	66					405.34	75.5	399.34	81.5
10/16/2006		447.09	33.75	447.44	33.68	447.29	33.50	446.63	34.28	446.37	34.27	446.96	33.90	0.014	N78°W	442.76	38.08	444.37	36.47
4/17/2007		-	-	448.49	32.63	449.08	31.71	-	-	-	-	448.79	32.17	-	-	-	-	448.82	32.02
12/19/2007		435.73	45.11	-	-	443.19	37.60	435.20	45.71	434.93	45.71	437.26	43.53	0.18	S39°W	435.45	45.39	435.51	45.33
4/7/2008		446.42	34.42	446.56	34.56	442.68	38.11	446.86	34.05	445.59	35.05	445.62	35.24	0.1	N26°E	441.42	39.42	446.18	34.66
10/8-9/2008		429.90	50.94	444.51	36.61	432.28	48.51	-	-	442.09	38.55	437.20	43.65	-	-	-	-	432.20	48.64
4/8/2011		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/26/2011		445.22	35.62	445.74	35.38	445.34	35.45	-	-	445.55	35.09	445.46	35.39	<b>0.0114</b>	<b>N64°W</b>	445.14	35.70	445.07	35.77

"-" = well dry or depth to water measurement could not be obtained

Starting 10/26/11 - Gradient calculated using a 3-point problem with CMT wells 204, 305 & 306

**Table 2**

Arrow Rentals  
 187 North L Street  
 Livermore CA  
 Project No. 1262.2

Date	Well Pair	Mid Points (TS-BS & TS-BS)	gw/ts	bs/bb	GW Elev. (Head)	Vert Head diff.	Vert Dist diff.	Vertical Gradient
16-Oct-06	MW-104	430.84	431.34	430.34	444.85	2.240	16.00	0.14
	MW-204	414.84	415.34	414.34	447.09			
16-Oct-06	MW-205	433.62	434.12	433.12	446.75	0.690	18.00	0.04
	MW-305	415.62	416.12	415.12	447.44			
19-Apr-07	MW-107	441.41	441.91	440.91	448.92	-1.790	10.00	-0.18
	MW-207	431.41	431.91	430.91	447.13			
19-Apr-07	MW-206	431.29	431.79	430.79	446.75	0.510	16.00	0.03
	MW-306	415.29	415.79	414.79	447.44			
19-Dec-07	MW-204	414.84	415.34	414.34	435.73	-0.280	9.00	-0.03
	MW-304	405.84	406.34	405.34	435.45			
19-Dec-07	MW-304	405.84	406.34	405.34	435.45	0.060	5.75	0.01
	MW-404	400.09	400.84	399.34	435.51			
19-Dec-07	MW-207	431.41	431.91	430.91	434.33	0.870	16.00	0.05
	MW-307	415.41	415.91	414.91	435.20			
7-Apr-08	MW-204	414.84	415.34	414.34	446.42	-5.000	9.00	-0.56
	MW-304	405.84	406.34	405.34	441.42			
7-Apr-08	MW-205	433.62	434.12	433.12	446.75	1.720	18.00	0.10
	MW-305	415.62	416.12	415.12	447.44			
7-Apr-08	MW-206	431.29	431.79	430.79	446.75	-3.700	16.00	-0.23
	MW-306	415.29	415.79	414.79	447.44			
7-Apr-08	MW-207	431.41	431.91	430.91	444.84	2.020	16.00	0.13
	MW-307	415.41	415.91	414.91	446.86			
8-Oct-08	MW-204	414.84	415.34	414.34	429.90	-	9.00	N/A
	MW-304	405.84	406.34	405.34	-			
8-Oct-08	MW-205	433.62	434.12	433.12	434.51	10.000	18.00	0.56
	MW-305	415.62	416.12	415.12	444.51			
8-Oct-08	MW-206	431.29	431.79	430.79	431.32	0.960	16.00	0.06
	MW-306	415.29	415.79	414.79	432.28			
8-Oct-08	MW-207	431.41	431.91	430.91	-	-	16.00	N/A
	MW-307	415.41	415.91	414.91	-			
25-Oct-11	MW-204	414.84	415.34	414.34	445.22	-0.080	9.00	-0.01
	MW-304	405.84	406.34	405.34	445.14			
25-Oct-11	MW-205	433.62	434.12	433.12	444.00	1.740	18.00	0.10
	MW-305	415.62	416.12	415.12	445.74			
25-Oct-11	MW-206	431.29	431.79	430.79	443.25	2.090	16.00	0.13
	MW-306	415.29	415.79	414.79	445.34			
25-Oct-11	MW-207	431.41	431.91	430.91	442.79	-	16.00	N/A
	MW-307	415.41	415.91	414.91	-			

**Table 3: Summary of Well Construction**

**Arrow Rentals  
187 North L Street  
Livermore, CA  
Project No. 1262.2**

Well/Boring Type	Well/Boring Number	Status	Date Drilled	Total Depth (ft)	Boring Diameter (in)	Well Casing Diameter (in)	Casing Type	Slot Size (in)	Sand Type	Well Screen		Filter Pack		Annular Seal		Grout Seal	
										From	To	From	To	From	To	From	To
Monitoring	W-1	Active	5/25/1989	56.5	8	2	PVC	0.010	#2/12	55.5	45.5	55.5	41.5	41.5	39	39	S
Monitoring	W-2	Active	5/26/1989	51.5	8	2	PVC	0.010	#2/12	49	39	49	36	36	22.5	22.5	S
Monitoring	W-3	Active	5/26/1989	51.5	8	2	PVC	0.010	#2/12	48	38	48	34.5	34.5	32.5	32.5	S
Monitoring	W-A	Active	7/12/1990	63	12	4	PVC	0.010	#2/12	57.5	42	63	40	40	36.5	36.5	S
Monitoring	W-B	Active	7/13/1990	55	12	4	PVC	0.010	#2/12	55	40	55	32	32	30	30	S
Monitoring	W-C	Active	7/11/1990	55	8	2	PVC	0.010	#2	55	45	55	37.5	37.5	35	35	S
Monitoring	W-D	Active	7/12/1990	57.5	12	4	PVC	0.010	#2/12	57.5	42	57.5	39.5	34	32	32	S
Monitoring	W-E	Active	7/10/1990	61	8	2	PVC	0.010	#2/12	60.3	40.5	61	37	30	29	29	S
Monitoring	MW-1s	Active	3/11/1996	45	?	6	PVC	0.010	#2/12	45	20	45	17	17	15	15	S
Monitoring	MW-Bs	Active	3/12/1996	45	?	6	PVC	0.010	#2/12	45	20	45	18	18	16	16	S
Monitoring	MW-3s	Active	3/12/1996	45	?	4	PVC	0.010	#2/12	45	20	45	18	18	16	16	S
Monitoring	MW-Es	Active	3/13/1996	45	?	2	PVC	0.010	#2/12	45	20	45	18	18	16	16	S
Monitoring	MW-4	Active	10/04/06	82	8	-	MCT	-	#2/12	30	29	30	20	16	14	14	S
Monitoring	MW-104	Active	-	-	-	-	MCT	-	#2/12	50.5	49.5	52	48	-	-	-	-
Monitoring	MW-204	Active	-	-	-	-	MCT	-	#2/12	66.5	65.5	68	64	-	-	-	-
Monitoring	MW-304	Active	-	-	-	-	MCT	-	#2/12	75.5	74.5	76	73	-	-	-	-
Monitoring	MW-404	Active	-	-	-	-	MCT	-	#2/12	81.5	80	81.5	79.5	-	-	-	-
Monitoring	MW-5	Active	10/09/06	68	8	-	MCT	-	#2/12	27	26	29	24	24	21.5	21.5	S
Monitoring	MW-105	Active	-	-	-	-	MCT	-	#2/12	37	36	39	34	-	-	-	-
Monitoring	MW-205	Active	-	-	-	-	MCT	-	#2/12	48	47	50	45	-	-	-	-
Monitoring	MW-305	Active	-	-	-	-	MCT	-	#2/12	66	65	68	63	-	-	-	-
Monitoring	MW-6	Active	10/10/06	68	8	-	MCT	-	#2/12	30	29	31	27	27	24	24	S
Monitoring	MW-106	Active	-	-	-	-	MCT	-	#2/12	37	36	39	35	-	-	-	-
Monitoring	MW-206	Active	-	-	-	-	MCT	-	#2/12	50	49	52	47	-	-	-	-
Monitoring	MW-306	Active	-	-	-	-	MCT	-	#2/12	66	65	68	63	-	-	-	-
Monitoring	MW-7	Active	10/05/06	69.5	8	-	MCT	-	#2/12	30	29	30	20	-	-	6	S
Monitoring	MW-107	Active	-	-	-	-	MCT	-	#2/12	40	39	42	37	-	-	-	-
Monitoring	MW-207	Active	-	-	-	-	MCT	-	#2/12	50	49	52	47	-	-	-	-
Monitoring	MW-307	Active	-	-	-	-	MCT	-	#2/12	66	65	68	63	-	-	-	-
Monitoring	MW-8	Active	10/06/06	66.5	8	-	MCT	-	#2/12	30	29	30	30	20	18	18	S
Monitoring	MW-108	Active	-	-	-	-	MCT	-	#2/12	40	39	42	37	-	-	-	-
Monitoring	MW-208	Active	-	-	-	-	MCT	-	#2/12	52	51	54	49	-	-	-	-
Monitoring	MW-308	Active	-	-	-	-	MCT	-	#2/12	66	65	66	63	-	-	-	-
Vapor Extraction	EW-1	Active	10/3/2006	25	10	4	PVC	0.010	#2/12	25	10	25	9.5	9.5	7.5	7.5	S



Table 4: Summary of Groundwater Analytical Data

Arrow Rentals  
187 North L Street  
Livermore CA  
Project No. 1262.2

Wells	Date	TPH Gallons up/L	TPH Disinfectant up/L	Benzene up/L	Toluene up/L	Ethyl Benzene up/L	Xylenes up/L	Total Xylenes up/L	MTBE up/L	ETBE up/L	DPE up/L	TAME up/L	TBA up/L	1,3 DCA up/L	EDB up/L
MW-3	10/16/2006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4/17/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/19/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-104	10/19/2006	960	-	250	170	20	83	DRY	-	-	-	-	-	-	-
	4/8/2008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/29/2007	1,300	-	210	82	110	380	DRY	<5	-	-	-	-	-	-
MW-106	10/16/2006	13,000	-	4,300	980	490	1,600	DRY	<250	-	-	-	-	-	-
	4/19/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/19/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-107	10/19/2006	320	-	430	290	33	140	DRY	<200	-	-	-	-	-	-
	4/19/2007	7,400	-	3,400	150	140	140	DRY	<200	-	-	-	-	-	-
	12/19/2007	18,000	-	6,100	700	380	490	DRY	<200	-	-	-	-	-	-
MW-108	10/16/2006	3,400	-	780	46	420	220	55	-	-	-	-	-	-	-
	4/19/2007	<20,000	-	5,800	<200	400	220	14	<400	-	-	-	-	-	-
	12/19/2007	310	-	55	32	10	14	19	<100	-	-	-	-	-	-
MW-204	10/19/2006	5,800	-	2,700	650	210	580	DRY	<200	-	-	-	-	-	-
	4/18/2007	<10,000	-	18	9.9	11	34	<1	-	-	-	-	-	-	-
	12/20/2007	22,000	-	4,700	1,100	490	1,400	<800	-	-	-	-	-	-	-
MW-205	10/16/2006	<200	-	880	63	<20	54	DRY	<800	-	-	-	-	-	-
	4/18/2007	<40,000	-	14,000	590	<400	220	DRY	<250	-	-	-	-	-	-
	12/19/2007	31,000	-	20,000	640	510	1,400	DRY	<250	-	-	-	-	-	-
MW-206	10/16/2006	<50	-	0.72	<0.5	<0.5	<0.5	<1	-	-	-	-	-	-	-
	4/8/2008	60	-	1.8	<0.5	<0.5	<1	<2	-	-	-	-	-	-	-
	12/19/2007	84	-	0.71	<0.5	<0.5	<1	<2	-	-	-	-	-	-	-
MW-207	10/19/2006	1,000	-	170	52	18	67	DRY	<500	-	-	-	-	-	-
	4/19/2007	<25,000	-	9,700	480	<250	250	DRY	<500	-	-	-	-	-	-
	12/19/2007	32,000	-	12,000	360	580	790	DRY	<250	-	-	-	-	-	-
MW-208	10/17/2006	1,500	-	520	39	<10	100	DRY	<200	-	-	-	-	-	-
	4/8/2008	19,000	-	3,900	230	550	1,200	DRY	<200	-	-	-	-	-	-
	12/19/2007	<10,000	-	2,500	<100	<100	<100	DRY	<200	-	-	-	-	-	-
MW-304	10/19/2006	3,300	-	290	240	55	530	DRY	<200	-	-	-	-	-	-
	4/19/2007	<10,000	-	3,100	450	<100	420	DRY	<200	-	-	-	-	-	-
	12/20/2007	1,590	-	380	43	32	110	<40	-	-	-	-	-	-	-
MW-305	10/16/2006	<50	-	1.8	<0.5	<0.5	0.57	DRY	<400	-	-	-	-	-	-
	4/19/2007	<20,000	-	3,600	<200	<200	<200	DRY	<400	-	-	-	-	-	-
	12/19/2007	290	-	42	14	8.1	28	DRY	<5	-	-	-	-	-	-
MW-306	10/16/2006	<50	-	<0.5	<0.5	<0.5	<0.5	<1	-	-	-	-	-	-	-
	4/18/2007	<50	-	0.54	<0.5	<0.5	<1	<2	-	-	-	-	-	-	-
	12/20/2007	<50	-	0.5	<0.5	<0.5	<1	<2	-	-	-	-	-	-	-
MW-307	10/19/2006	<50	-	2.3	1.5	<0.5	4.7	DRY	<80	-	-	-	-	-	-
	4/19/2007	<400	-	1,300	290	78	310	DRY	<80	-	-	-	-	-	-
	12/19/2007	1,590	-	2,000	50	59	140	DRY	<25	-	-	-	-	-	-
MW-308	10/16/2006	<50	-	<0.5	<0.5	<0.5	<0.5	<100	-	-	-	-	-	-	-
	4/19/2007	<10,000	-	1,600	<100	<100	<100	DRY	<200	-	-	-	-	-	-
	12/19/2007	770	-	25	1.5	7.2	8.4	DRY	<4	-	-	-	-	-	-
MW-404	10/19/2006	1,700	-	120	73	27	280	DRY	<0.5	-	-	-	-	-	-
	4/18/2007	<10,000	-	1,400	440	130	550	DRY	<200	-	-	-	-	-	-
	12/19/2007	2,200	-	160	63	92	300	DRY	<40	-	-	-	-	-	-

pre-2006 data adapted from Environmental Sampling Services 527/04 Groundwater Monitoring Report  
- = not analyzed

Table 5: Summary of Field Parameters

**Arrow Rentals**  
**187 North L Street**  
**Livermore, California**  
**Project No. 1262.2**

Monitoring Well	W-1s					W-3s					W-Bs					W-Es				
	pH	E.C.	Temp °C	ORP	DO	pH	E.C.	Temp °C	ORP	DO	pH	E.C.	Temp °C	ORP	DO	pH	E.C.	Temp °C	ORP	DO
Date																				
7/7/2006	-	-	-	-128.5	0.13	-	-	-	-	0.07	-	-	-	-107.3	0.09	7.05	339	20.9	32.9	0.06
12/29/2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4/8/2008	6.76	514	24.8	-95.5	-	-	-	-	-	-	-	-	-	-	0.28	7.07	503	25.1	121.4	6.85
10/8-9/2008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4/7-8/2011	6.17	967	19.1	-221.5	0.37	6.63	964	18.1	40.7	0.72	6.61	780	18.5	-198.2	0.02	7.03	790	19.5	141.3	1.06
10/26/2011	6.65	1012	18.1	-121.5	0.16	6.65	914	17.9	-57.6	0.52	6.51	722	17.6	-115.8	0.38	-	-	-	-	-

Monitoring Well	W-1					W-3					W-A				
	pH	E.C.	Temp °C	ORP	DO	pH	E.C.	Temp °C	ORP	DO	pH	E.C.	Temp °C	ORP	DO
Date															
4/7-8/2011	6.30	917	19.0	-164.3	0.40	6.94	928	18.3	-185.7	0.10	6.85	907	18.9	-254.5	0.04
10/26/2011	6.45	1073	17.8	-60.9	0.20	-	-	-	-	-	6.70	1019	18.0	-120.2	0.15

" - " = insufficient data no result reported

## **Appendix B**

### **Laboratory Analytical Data Sheets**



Date of Report: 11/04/2011

Andrew Dorn

Geological Technics  
1172 Kansas Avenue  
Modesto, CA 95354

Project: Water Samples  
BC Work Order: 1117830  
Invoice ID: B110692

Enclosed are the results of analyses for samples received by the laboratory on 10/27/2011. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Christina Herndon  
Client Service Rep

Authorized Signature

Certifications: CA ELAP #1186; NV #CA00014





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**Geological Technics Inc.**

1172 Kansas Avenue  
Modesto, CA  
(209) 522-4119 Fax 522-4227  
E-mail: gti@gtienv.com

# 11-17830



**Chain of Custody**

Project #: 1262.2		Client/Project Name: SULLINS		No. of Containers	Matrix (Soil, Water, Gas, Other)	Preservation Type	TPH-G & BTEX (Boily Bozi)	Analysis Requested										Laboratory: BC LABS										
Site Address: 187 NORTH L ST., LIVERMORE, CA								6	W	HCL	X											Temp. @ Shipping: C°						
Global ID No.: T06001 00116												6	W	HCL	X											Temp. @ Lab Receipt: C°		
Sampled By: (print and sign name) ANDREW DORN <i>Andrew Dorn</i>																6	W	HCL	X									
Date	Time	Field I.D.	Sample I.D.																	EDF Report: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								
10-25-11	1340	-1	W-3s	6	W	HCL	X											Turnaround Time: <input checked="" type="checkbox"/> S = Standard										
10-25-11	1645	-2	W-Bs	6														1 day 2 day 5 day										
<del>10-26-11</del>			<del>W-3</del>															Remarks										
10-26-11	1010	-3	W-A	6														THE REPORTING LIMITS ARE AS FOLLOWS:										
	1245	-4	W-1s	6														TPH-G	50 ug/L									
	1200	-5	W-1	6														BENZENE	0.5 ug/L									
	1455	-6	MW-404	6														TOLUENE	0.5 ug/L									
	1540	-7	MW-308	6														ETHYLBENZENE	0.5 ug/L									
	1320	-8	MW-306	6														XYLENE	0.5 ug/L									
	1350	-9	MW-305	6														CHK BY: DISTRIBUTION										
	1500	-10	MW-304	6														<i>AD</i>	<input type="checkbox"/> SUB-OUT									
	1600	-11	MW-208	5																								
	1415	-12	MW-207	6																								
	1400	-13	MW-206	6																								
Relinquished by: (signature) <i>Andrew Dorn</i>			Date: 10-27-11	Time: 0830	Received by: (signature) <i>Elizabeth Emmons</i>			Date: 10/27/11	Time: 830																			
Relinquished by: (signature) <i>Elizabeth Emmons</i>			Date: 10-27-11	Time: 11:08	Received by: (signature) <i>Nancy Bogen</i>			Date: 10-27-11	Time: 1108																			
Relinquished by: (signature) <i>Karen W. Bogen</i>			Date: 10-27-11	Time: 1550	Received by: (signature) <i>Nancy Bogen</i>			Date: 10-27-11	Time: 1630																			

Please return cooler/ice chest to Geological Technics Inc.  
REL - Nancy Bogen 10-27-11 20:30 REC - Julie P. 10-27-11 20:30 Rel - Elizabeth 10-27-11 23:50 Rev. 2/2009  
REL - Nancy Bogen 10-27-11 20:30 REC - Julie P. 10-27-11 20:30 Rel - Elizabeth 10-27-11 23:50





BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 1 of 2

Submission #: 11-17830

SHIPPING INFORMATION Federal Express UPS Hand Delivery BC Lab Field Service Other

SHIPPING CONTAINER Ice Chest Box None Other

Refrigerant: Ice Blue Ice None Other Comments:

Custody Seals Ice Chest Containers None Intact? Yes No

All samples received? Yes No All samples containers intact? Yes No Description(s) match COC? Yes No

COC Received YES NO

Emissivity: 0.98 Container: Pipe Thermometer ID: 177 Temperature: A 0.6 C / C 0.9 C

Date/Time: 10/28/11 0120 Analyst Int: MA

Table with columns for Sample Containers and Sample Numbers (1-10). Rows include various sample types like QT GENERAL MINERAL, PT PE UNPRESERVED, etc.

Comments: Sample Numbering Completed By: BLT Date/Time: 10-28-11 @ 1730

[H:\DOCS\WP80\LAB\_DOCS\FORMS\SAMREC2.WPD]



BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 2 of 2

Submission #: 11-17830

SHIPPING INFORMATION: Federal Express  UPS  Hand Delivery  BC Lab Field Service  Other  (Specify) \_\_\_\_\_

SHIPPING CONTAINER: Ice Chest  None  Box  Other  (Specify) \_\_\_\_\_

Refrigerant: Ice  Blue Ice  None  Other  Comments: \_\_\_\_\_

Custody Seals: Ice Chest  Containers  None  Intact? Yes  No  Intact? Yes  No  Comments: \_\_\_\_\_

All samples received? Yes  No  All samples containers intact? Yes  No  Description(s) match COC? Yes  No

COC Received: YES  NO  Emissivity: 0.98 Container: Pipe Thermometer ID: 177 Date/Time: 10/28/10 0120

Temperature: A 0.6 °C / C 0.9 °C Analyst Init: MA

SAMPLE CONTAINERS	SAMPLE NUMBERS									
	11	12	13	14	15	16	17	18	19	20
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE /NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL	A 5	A (6)	A (6)	A (6)	A (6)	A (6)	A (4)	A (6)		
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments: \_\_\_\_\_  
 Sample Numbering Completed By: BLT Date/Time: 10-28-10 @ 1730  
 A = Actual / C = Corrected

[H:\DOCS\WP10\LAB\_DOCS\FORMS\SAMREC2.WPD]



Geological Technics  
1172 Kansas Avenue  
Modesto, CA 95354

**Reported:** 11/04/2011 13:12  
**Project:** Water Samples  
**Project Number:** Sullins  
**Project Manager:** Andrew Dorn

### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information
------------	---------------------------

<b>1117830-01</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> W-3S <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/25/2011 13:40 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): W-3S Matrix: W Sample QC Type (SACode): CS Cooler ID:
-------------------	--	--

<b>1117830-02</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> W-BS <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/25/2011 15:45 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): W-BS Matrix: W Sample QC Type (SACode): CS Cooler ID:
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<b>1117830-03</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> W-A <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 10:10 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): W-A Matrix: W Sample QC Type (SACode): CS Cooler ID:
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Project: Water Samples  
Project Number: Sullins  
Project Manager: Andrew Dorn

### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information		
1117830-04	COC Number:	---	Receive Date: 10/27/2011 23:50
	Project Number:	Sullins	Sampling Date: 10/26/2011 12:45
	Sampling Location:	---	Sample Depth: ---
	Sampling Point:	W-1S	Lab Matrix: Water
	Sampled By:	Andrew Dorn of GTIM	Sample Type: Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): W-1S
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
1117830-05	COC Number:	---	Receive Date: 10/27/2011 23:50
	Project Number:	Sullins	Sampling Date: 10/26/2011 12:00
	Sampling Location:	---	Sample Depth: ---
	Sampling Point:	W-1	Lab Matrix: Water
	Sampled By:	Andrew Dorn of GTIM	Sample Type: Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): W-1
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
1117830-06	COC Number:	---	Receive Date: 10/27/2011 23:50
	Project Number:	Sullins	Sampling Date: 10/26/2011 14:55
	Sampling Location:	---	Sample Depth: ---
	Sampling Point:	MW-404	Lab Matrix: Water
	Sampled By:	Andrew Dorn of GTIM	Sample Type: Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): MW-404
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:

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**Project:** Water Samples  
**Project Number:** Sullins  
**Project Manager:** Andrew Dorn

### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information		
1117830-07	<b>COC Number:</b>	---	<b>Receive Date:</b> 10/27/2011 23:50
	<b>Project Number:</b>	Sullins	<b>Sampling Date:</b> 10/26/2011 15:40
	<b>Sampling Location:</b>	---	<b>Sample Depth:</b> ---
	<b>Sampling Point:</b>	MW-308	<b>Lab Matrix:</b> Water
	<b>Sampled By:</b>	Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): MW-308
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
	1117830-08	<b>COC Number:</b>	---
<b>Project Number:</b>		Sullins	<b>Sampling Date:</b> 10/26/2011 13:20
<b>Sampling Location:</b>		---	<b>Sample Depth:</b> ---
<b>Sampling Point:</b>		MW-306	<b>Lab Matrix:</b> Water
<b>Sampled By:</b>		Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): MW-306
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:
1117830-09		<b>COC Number:</b>	---
	<b>Project Number:</b>	Sullins	<b>Sampling Date:</b> 10/26/2011 13:50
	<b>Sampling Location:</b>	---	<b>Sample Depth:</b> ---
	<b>Sampling Point:</b>	MW-305	<b>Lab Matrix:</b> Water
	<b>Sampled By:</b>	Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater
			Delivery Work Order:
			Global ID: T0609900342
			Location ID (FieldPoint): MW-305
			Matrix: W
			Sample QC Type (SACode): CS
			Cooler ID:





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### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1117830-10	<b>COC Number:</b>	---	<b>Receive Date:</b> 10/27/2011 23:50	
	<b>Project Number:</b>	Sullins	<b>Sampling Date:</b> 10/26/2011 15:00	
	<b>Sampling Location:</b>	---	<b>Sample Depth:</b> ---	
	<b>Sampling Point:</b>	MW-304	<b>Lab Matrix:</b> Water	
	<b>Sampled By:</b>	Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater	
			Delivery Work Order:	
			Global ID: T0609900342	
			Location ID (FieldPoint): MW-304	
			Matrix: W	
			Sample QC Type (SACode): CS	
			Cooler ID:	
	<hr/>			
	1117830-11	<b>COC Number:</b>	---	<b>Receive Date:</b> 10/27/2011 23:50
<b>Project Number:</b>		Sullins	<b>Sampling Date:</b> 10/26/2011 16:00	
<b>Sampling Location:</b>		---	<b>Sample Depth:</b> ---	
<b>Sampling Point:</b>		MW-208	<b>Lab Matrix:</b> Water	
<b>Sampled By:</b>		Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater	
			Delivery Work Order:	
			Global ID: T0609900342	
			Location ID (FieldPoint): MW-208	
			Matrix: W	
			Sample QC Type (SACode): CS	
			Cooler ID:	
<hr/>				
1117830-12		<b>COC Number:</b>	---	<b>Receive Date:</b> 10/27/2011 23:50
	<b>Project Number:</b>	Sullins	<b>Sampling Date:</b> 10/26/2011 14:15	
	<b>Sampling Location:</b>	---	<b>Sample Depth:</b> ---	
	<b>Sampling Point:</b>	MW-207	<b>Lab Matrix:</b> Water	
	<b>Sampled By:</b>	Andrew Dorn of GTIM	<b>Sample Type:</b> Groundwater	
			Delivery Work Order:	
			Global ID: T0609900342	
			Location ID (FieldPoint): MW-207	
			Matrix: W	
			Sample QC Type (SACode): CS	
			Cooler ID:	

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### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information
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<b>1117830-13</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-206 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 14:00 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-206 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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<b>1117830-14</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-205 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 14:00 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-205 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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<b>1117830-15</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-204 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 15:05 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-204 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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**Project Manager:** Andrew Dorn

### Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information
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<b>1117830-16</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-107 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 14:30 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-107 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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<b>1117830-17</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-106 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 13:45 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-106 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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<b>1117830-18</b>	<b>COC Number:</b> --- <b>Project Number:</b> Sullins <b>Sampling Location:</b> --- <b>Sampling Point:</b> MW-104 <b>Sampled By:</b> Andrew Dorn of GTIM	<b>Receive Date:</b> 10/27/2011 23:50 <b>Sampling Date:</b> 10/26/2011 15:15 <b>Sample Depth:</b> --- <b>Lab Matrix:</b> Water <b>Sample Type:</b> Groundwater Delivery Work Order: Global ID: T0609900342 Location ID (FieldPoint): MW-104 Matrix: W Sample QC Type (SACode): CS Cooler ID:
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**Project:** Water Samples  
**Project Number:** Sullins  
**Project Manager:** Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

**BCL Sample ID:** 1117830-01      **Client Sample Name:** Sullins, W-3S, 10/25/2011 1:40:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	5.2	ug/L	0.30	0.040	EPA-8021	ND		1
Toluene	0.76	ug/L	0.30	0.046	EPA-8021	ND		1
Ethylbenzene	1.3	ug/L	0.30	0.042	EPA-8021	ND		1
Total Xylenes	2.1	ug/L	0.60	0.14	EPA-8021	ND		1
Gasoline Range Organics (C4 - C12)	190	ug/L	50	5.0	Luft	ND		2
a,a,a-Trifluorotoluene (PID Surrogate)	108	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	108	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 17:54	jjh	GC-V4	1	BUJ2124
2	Luft	10/31/11	11/02/11 17:54	jjh	GC-V4	1	BUJ2124



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Project: Water Samples  
Project Number: Sullins  
Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-02	<b>Client Sample Name:</b> Sullins, W-BS, 10/25/2011 3:45:00PM, Andrew Dorn							
Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	250	ug/L	6.0	0.80	EPA-8021	ND	A01	1
Toluene	23	ug/L	6.0	0.92	EPA-8021	ND	A01	1
Ethylbenzene	230	ug/L	6.0	0.84	EPA-8021	ND	A01	1
Total Xylenes	38	ug/L	12	2.8	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	4900	ug/L	1000	100	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	106	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	106	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/03/11 08:16	jjh	GC-V4	20	BUJ2124
2	Luft	10/31/11	11/03/11 08:16	jjh	GC-V4	20	BUJ2124



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Project Number: Sullins  
Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-03	<b>Client Sample Name:</b> Sullins, W-A, 10/26/2011 10:10:00AM, Andrew Dorn							
Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	3500	ug/L	15	2.0	EPA-8021	ND	A01	1
Toluene	410	ug/L	15	2.3	EPA-8021	ND	A01	1
Ethylbenzene	970	ug/L	15	2.1	EPA-8021	ND	A01	1
Total Xylenes	870	ug/L	30	7.0	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	18000	ug/L	2500	250	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	114	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	111	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 18:38	jjh	GC-V4	50	BUJ2124
2	Luft	10/31/11	11/02/11 18:38	jjh	GC-V4	50	BUJ2124

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### Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1117830-04 Client Sample Name: Sullins, W-1S, 10/26/2011 12:45:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	2900	ug/L	15	2.0	EPA-8021	ND	A01	1
Toluene	280	ug/L	15	2.3	EPA-8021	ND	A01	1
Ethylbenzene	520	ug/L	15	2.1	EPA-8021	ND	A01	1
Total Xylenes	530	ug/L	30	7.0	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	12000	ug/L	2500	250	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	112	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	107	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 18:59	jjh	GC-V4	50	BUJ2124
2	Luft	10/31/11	11/02/11 18:59	jjh	GC-V4	50	BUJ2124



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-05	<b>Client Sample Name:</b> Sullins, W-1, 10/26/2011 12:00:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	15000	ug/L	60	8.0	EPA-8021	ND	A01	1
Toluene	6100	ug/L	30	4.6	EPA-8021	ND	A01	2
Ethylbenzene	910	ug/L	30	4.2	EPA-8021	ND	A01	2
Total Xylenes	11000	ug/L	60	14	EPA-8021	ND	A01	2
Gasoline Range Organics (C4 - C12)	76000	ug/L	5000	500	Luft	ND	A01	3
a,a,a-Trifluorotoluene (PID Surrogate)	118	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (PID Surrogate)	123	%	70 - 130 (LCL - UCL)		EPA-8021			2
a,a,a-Trifluorotoluene (FID Surrogate)	120	%	70 - 130 (LCL - UCL)		Luft			3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/04/11 05:17	jjh	GC-V4	200	BUJ2124
2	EPA-8021	10/31/11	11/02/11 19:21	jjh	GC-V4	100	BUJ2124
3	Luft	10/31/11	11/02/11 19:21	jjh	GC-V4	100	BUJ2124

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Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-06	<b>Client Sample Name:</b> Sullins, MW-404, 10/26/2011 2:55:00PM, Andrew Dorn							
Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	400	ug/L	3.0	0.40	EPA-8021	ND	A01	1
Toluene	9.1	ug/L	3.0	0.46	EPA-8021	ND	A01	1
Ethylbenzene	46	ug/L	3.0	0.42	EPA-8021	ND	A01	1
Total Xylenes	65	ug/L	6.0	1.4	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	1500	ug/L	500	50	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	106	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	102	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run		Analyst	Instrument	Dilution	QC
			Date/Time					Batch ID
1	EPA-8021	10/31/11	11/02/11	19:43	jjh	GC-V4	10	BUJ2124
2	Luft	10/31/11	11/02/11	19:43	jjh	GC-V4	10	BUJ2124

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Project Number: Sullins  
Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID:	1117830-07	Client Sample Name:	Sullins, MW-308, 10/26/2011 3:40:00PM, Andrew Dorn						
Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #	
Benzene	610	ug/L	3.0	0.40	EPA-8021	ND	A01	1	
Toluene	9.7	ug/L	3.0	0.46	EPA-8021	ND	A01	1	
Ethylbenzene	73	ug/L	3.0	0.42	EPA-8021	ND	A01	1	
Total Xylenes	53	ug/L	6.0	1.4	EPA-8021	ND	A01	1	
Gasoline Range Organics (C4 - C12)	2900	ug/L	500	50	Luft	ND	A01	2	
a,a,a-Trifluorotoluene (PID Surrogate)	112	%	70 - 130 (LCL - UCL)		EPA-8021			1	
a,a,a-Trifluorotoluene (FID Surrogate)	113	%	70 - 130 (LCL - UCL)		Luft			2	

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 20:05	jjh	GC-V4	10	BUJ2124
2	Luft	10/31/11	11/02/11 20:05	jjh	GC-V4	10	BUJ2124



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Project Number: Sullins

Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-08	<b>Client Sample Name:</b> Sullins, MW-306, 10/26/2011 1:20:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	0.50	ug/L	0.30	0.040	EPA-8021	ND		1
Toluene	ND	ug/L	0.30	0.046	EPA-8021	ND		1
Ethylbenzene	ND	ug/L	0.30	0.042	EPA-8021	ND		1
Total Xylenes	ND	ug/L	0.60	0.14	EPA-8021	ND		1
Gasoline Range Organics (C4 - C12)	75	ug/L	50	5.0	Luft	ND		2
a,a,a-Trifluorotoluene (PID Surrogate)	106	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	98.0	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 22:17	jjh	GC-V4	1	BUJ2124
2	Luft	10/31/11	11/02/11 22:17	jjh	GC-V4	1	BUJ2124



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Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-09	<b>Client Sample Name:</b> Sullins, MW-305, 10/26/2011 1:50:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	280	ug/L	3.0	0.40	EPA-8021	ND	A01	1
Toluene	37	ug/L	3.0	0.46	EPA-8021	ND	A01	1
Ethylbenzene	20	ug/L	3.0	0.42	EPA-8021	ND	A01	1
Total Xylenes	49	ug/L	6.0	1.4	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	1300	ug/L	500	50	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	98.1	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	102	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 22:38	jjh	GC-V4	10	BUJ2124
2	Luft	10/31/11	11/02/11 22:38	jjh	GC-V4	10	BUJ2124



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Project Number: Sullins  
Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1117830-10 Client Sample Name: Sullins, MW-304, 10/26/2011 3:00:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	1600	ug/L	15	2.0	EPA-8021	ND	A01	1
Toluene	45	ug/L	15	2.3	EPA-8021	ND	A01	1
Ethylbenzene	190	ug/L	15	2.1	EPA-8021	ND	A01	1
Total Xylenes	350	ug/L	30	7.0	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	6500	ug/L	2500	250	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	107	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	103	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/02/11 23:00	jjh	GC-V4	50	BUJ2124
2	Luft	10/31/11	11/02/11 23:00	jjh	GC-V4	50	BUJ2124



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-11	<b>Client Sample Name:</b> Sullins, MW-208, 10/26/2011 4:00:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	1600	ug/L	15	2.0	EPA-8021	ND	A01	1
Toluene	97	ug/L	15	2.3	EPA-8021	ND	A01	1
Ethylbenzene	60	ug/L	15	2.1	EPA-8021	ND	A01	1
Total Xylenes	210	ug/L	30	7.0	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	7400	ug/L	2500	250	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	106	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	107	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run		Analyst	Instrument	Dilution	QC
			Date/Time					Batch ID
1	EPA-8021	10/31/11	11/02/11	23:22	jjh	GC-V4	50	BUJ2124
2	Luft	10/31/11	11/02/11	23:22	jjh	GC-V4	50	BUJ2124



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

**BCL Sample ID:** 1117830-12      **Client Sample Name:** Sullins, MW-207, 10/26/2011 2:15:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	7600	ug/L	30	4.0	EPA-8021	ND	A01	1
Toluene	38	ug/L	15	2.3	EPA-8021	ND	A01	2
Ethylbenzene	160	ug/L	15	2.1	EPA-8021	ND	A01	2
Total Xylenes	280	ug/L	30	7.0	EPA-8021	ND	A01	2
Gasoline Range Organics (C4 - C12)	18000	ug/L	2500	250	Luft	ND	A01	3
a,a,a-Trifluorotoluene (PID Surrogate)	105	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (PID Surrogate)	114	%	70 - 130 (LCL - UCL)		EPA-8021			2
a,a,a-Trifluorotoluene (FID Surrogate)	113	%	70 - 130 (LCL - UCL)		Luft			3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/04/11 05:38	jjh	GC-V4	100	BUJ2124
2	EPA-8021	10/31/11	11/02/11 23:43	jjh	GC-V4	50	BUJ2124
3	Luft	10/31/11	11/02/11 23:43	jjh	GC-V4	50	BUJ2124

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### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-13	<b>Client Sample Name:</b> Sullins, MW-206, 10/26/2011 2:00:00PM, Andrew Dorn
----------------------------------	---

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	5.7	ug/L	0.30	0.040	EPA-8021	ND		1
Toluene	0.40	ug/L	0.30	0.046	EPA-8021	ND		1
Ethylbenzene	0.25	ug/L	0.30	0.042	EPA-8021	ND	J	1
Total Xylenes	ND	ug/L	0.60	0.14	EPA-8021	ND		1
Gasoline Range Organics (C4 - C12)	160	ug/L	50	5.0	Luft	ND		2
a,a,a-Trifluorotoluene (PID Surrogate)	105	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	102	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run		Instrument	Dilution	QC
			Date/Time	Analyst			Batch ID
1	EPA-8021	10/31/11	11/03/11 00:05	jjh	GC-V4	1	BUJ2124
2	Luft	10/31/11	11/03/11 00:05	jjh	GC-V4	1	BUJ2124

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### Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1117830-14 Client Sample Name: Sullins, MW-205, 10/26/2011 2:00:00PM, Andrew Dorn

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	11000	ug/L	60	8.0	EPA-8021	ND	A01	1
Toluene	130	ug/L	15	2.3	EPA-8021	ND	A01	2
Ethylbenzene	240	ug/L	15	2.1	EPA-8021	ND	A01	2
Total Xylenes	300	ug/L	30	7.0	EPA-8021	ND	A01	2
Gasoline Range Organics (C4 - C12)	26000	ug/L	2500	250	Luft	ND	A01	3
a,a,a-Trifluorotoluene (PID Surrogate)	100	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (PID Surrogate)	112	%	70 - 130 (LCL - UCL)		EPA-8021			2
a,a,a-Trifluorotoluene (FID Surrogate)	115	%	70 - 130 (LCL - UCL)		Luft			3

Run #	Method	Prep Date	Run		Instrument	Dilution	QC
			Date/Time	Analyst			Batch ID
1	EPA-8021	10/31/11	11/04/11 09:06	jjh	GC-V4	200	BUJ2124
2	EPA-8021	10/31/11	11/03/11 00:27	jjh	GC-V4	50	BUJ2124
3	Luft	10/31/11	11/03/11 00:27	jjh	GC-V4	50	BUJ2124

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### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-15	<b>Client Sample Name:</b> Sullins, MW-204, 10/26/2011 3:05:00PM, Andrew Dorn
----------------------------------	---

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	1900	ug/L	15	2.0	EPA-8021	ND	A01	1
Toluene	38	ug/L	15	2.3	EPA-8021	ND	A01	1
Ethylbenzene	250	ug/L	15	2.1	EPA-8021	ND	A01	1
Total Xylenes	400	ug/L	30	7.0	EPA-8021	ND	A01	1
Gasoline Range Organics (C4 - C12)	7400	ug/L	2500	250	Luft	ND	A01	2
a,a,a-Trifluorotoluene (PID Surrogate)	105	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	104	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/03/11 00:49	jjh	GC-V4	50	BUJ2124
2	Luft	10/31/11	11/03/11 00:49	jjh	GC-V4	50	BUJ2124



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1117830-16	Client Sample Name: Sullins, MW-107, 10/26/2011 2:30:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	6400	ug/L	30	4.0	EPA-8021	ND	A01	1
Toluene	28	ug/L	15	2.3	EPA-8021	ND	A01	2
Ethylbenzene	140	ug/L	15	2.1	EPA-8021	ND	A01	2
Total Xylenes	200	ug/L	30	7.0	EPA-8021	ND	A01	2
Gasoline Range Organics (C4 - C12)	16000	ug/L	2500	250	Luft	ND	A01	3
a,a,a-Trifluorotoluene (PID Surrogate)	103	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (PID Surrogate)	107	%	70 - 130 (LCL - UCL)		EPA-8021			2
a,a,a-Trifluorotoluene (FID Surrogate)	111	%	70 - 130 (LCL - UCL)		Luft			3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/04/11 06:22	jjh	GC-V4	100	BUJ2124
2	EPA-8021	10/31/11	11/03/11 01:11	jjh	GC-V4	50	BUJ2124
3	Luft	10/31/11	11/03/11 01:11	jjh	GC-V4	50	BUJ2124



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Project Number: Sullins

Project Manager: Andrew Dorn

### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b>	1117830-17	<b>Client Sample Name:</b>	Sullins, MW-106, 10/26/2011 1:45:00PM, Andrew Dorn					
Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	1.7	ug/L	0.30	0.040	EPA-8021	ND		1
Toluene	ND	ug/L	0.30	0.046	EPA-8021	ND		1
Ethylbenzene	ND	ug/L	0.30	0.042	EPA-8021	ND		1
Total Xylenes	ND	ug/L	0.60	0.14	EPA-8021	ND		1
Gasoline Range Organics (C4 - C12)	190	ug/L	50	5.0	Luft	ND		2
a,a,a-Trifluorotoluene (PID Surrogate)	109	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (FID Surrogate)	106	%	70 - 130 (LCL - UCL)		Luft			2

Run #	Method	Prep Date	Run		Instrument	Dilution	QC
			Date/Time	Analyst			Batch ID
1	EPA-8021	10/31/11	11/03/11 01:33	jjh	GC-V4	1	BUJ2124
2	Luft	10/31/11	11/03/11 01:33	jjh	GC-V4	1	BUJ2124



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

<b>BCL Sample ID:</b> 1117830-18	<b>Client Sample Name:</b> Sullins, MW-104, 10/26/2011 3:15:00PM, Andrew Dorn
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Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	8400	ug/L	30	4.0	EPA-8021	ND	A01	1
Toluene	120	ug/L	15	2.3	EPA-8021	ND	A01	2
Ethylbenzene	490	ug/L	15	2.1	EPA-8021	ND	A01	2
Total Xylenes	740	ug/L	30	7.0	EPA-8021	ND	A01	2
Gasoline Range Organics (C4 - C12)	25000	ug/L	2500	250	Luft	ND	A01	3
a,a,a-Trifluorotoluene (PID Surrogate)	102	%	70 - 130 (LCL - UCL)		EPA-8021			1
a,a,a-Trifluorotoluene (PID Surrogate)	108	%	70 - 130 (LCL - UCL)		EPA-8021			2
a,a,a-Trifluorotoluene (FID Surrogate)	116	%	70 - 130 (LCL - UCL)		Luft			3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8021	10/31/11	11/04/11 06:44	jjh	GC-V4	100	BUJ2124
2	EPA-8021	10/31/11	11/03/11 01:55	jjh	GC-V4	50	BUJ2124
3	Luft	10/31/11	11/03/11 01:55	jjh	GC-V4	50	BUJ2124

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## Purgeable Aromatics and Total Petroleum Hydrocarbons

### Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
<b>QC Batch ID: BUJ2124</b>						
Benzene	BUJ2124-BLK1	ND	ug/L	0.30	0.040	
Toluene	BUJ2124-BLK1	ND	ug/L	0.30	0.046	
Ethylbenzene	BUJ2124-BLK1	ND	ug/L	0.30	0.042	
Total Xylenes	BUJ2124-BLK1	ND	ug/L	0.60	0.14	
Gasoline Range Organics (C4 - C12)	BUJ2124-BLK1	ND	ug/L	50	5.0	
a,a,a-Trifluorotoluene (PID Surrogate)	BUJ2124-BLK1	105	%	70 - 130 (LCL - UCL)		
a,a,a-Trifluorotoluene (FID Surrogate)	BUJ2124-BLK1	93.8	%	70 - 130 (LCL - UCL)		



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## Purgeable Aromatics and Total Petroleum Hydrocarbons

### Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits		Lab Quals
								Percent Recovery	RPD	
<b>QC Batch ID: BUJ2124</b>										
Benzene	BUJ2124-BS1	LCS	42.044	40.000	ug/L	105		85 - 115		
Toluene	BUJ2124-BS1	LCS	42.034	40.000	ug/L	105		85 - 115		
Ethylbenzene	BUJ2124-BS1	LCS	42.803	40.000	ug/L	107		85 - 115		
Total Xylenes	BUJ2124-BS1	LCS	124.78	120.00	ug/L	104		85 - 115		
Gasoline Range Organics (C4 - C12)	BUJ2124-BS1	LCS	905.56	1000.0	ug/L	90.6		85 - 115		
a,a,a-Trifluorotoluene (PID Surrogate)	BUJ2124-BS1	LCS	42.682	40.000	ug/L	107		70 - 130		
a,a,a-Trifluorotoluene (FID Surrogate)	BUJ2124-BS1	LCS	41.662	40.000	ug/L	104		70 - 130		



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### Purgeable Aromatics and Total Petroleum Hydrocarbons

#### Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Control Limits		Lab Quals
								Percent Recovery	Percent Recovery	
<b>QC Batch ID: BUJ2124</b>		Used client sample: N								
Benzene	MS	1115418-97	ND	40.792	40.000	ug/L		102		70 - 130
	MSD	1115418-97	ND	42.165	40.000	ug/L	3.3	105	20	70 - 130
Toluene	MS	1115418-97	ND	40.298	40.000	ug/L		101		70 - 130
	MSD	1115418-97	ND	42.309	40.000	ug/L	4.9	106	20	70 - 130
Ethylbenzene	MS	1115418-97	ND	40.765	40.000	ug/L		102		70 - 130
	MSD	1115418-97	ND	43.103	40.000	ug/L	5.6	108	20	70 - 130
Total Xylenes	MS	1115418-97	ND	119.33	120.00	ug/L		99.4		70 - 130
	MSD	1115418-97	ND	125.84	120.00	ug/L	5.3	105	20	70 - 130
Gasoline Range Organics (C4 - C12)	MS	1115418-97	ND	879.52	1000.0	ug/L		88.0		70 - 130
	MSD	1115418-97	ND	884.50	1000.0	ug/L	0.6	88.4	20	70 - 130
a,a,a-Trifluorotoluene (PID Surrogate)	MS	1115418-97	ND	41.859	40.000	ug/L		105		70 - 130
	MSD	1115418-97	ND	42.197	40.000	ug/L	0.8	105		70 - 130
a,a,a-Trifluorotoluene (FID Surrogate)	MS	1115418-97	ND	40.193	40.000	ug/L		100		70 - 130
	MSD	1115418-97	ND	40.242	40.000	ug/L	0.1	101		70 - 130

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Project Number: Sullins  
Project Manager: Andrew Dorn

**Notes And Definitions**

- J Estimated Value (CLP Flag)
- MDL Method Detection Limit
- ND Analyte Not Detected at or above the reporting limit
- PQL Practical Quantitation Limit
- RPD Relative Percent Difference
- A01 PQL's and MDL's are raised due to sample dilution.

# **Appendix C**

## **Groundwater Monitoring Field Notes**

## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: W-1

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
11:35	0	20.26	514	4.87	362.0	14.18	Brown, very strong odor, few sediments
11:40	3.5	18.02	1052	6.46	-69.5	18.75	Brown, very strong odor, few sediments
11:45	7.0	17.76	875	6.51	-49.9	0.20	Brown, very strong odor, few sediments
11:50	10.5	17.82	1073	6.45	-60.9	0.20	Brown, very strong odor, few sediments
12:00							Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.7 gal/min

Well Constructed TD (ft):	<u>56.50</u>
* Well TD (ft):	<u>55.53</u>
Silt Thickness (ft):	<u>0.97</u>
Initial DTW (ft):	<u>35.49</u>
Water column height (ft):	<u>20.04</u>
One casing volume (gal):	<u>3.41</u>
** Final DTW (ft):	<u>37.04</u>
Casing diameter (in):	<u>2"</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *Austin Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Project Name: Sullins (L St)

Well I.D.: MW-204

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
12:08	0							Greenish gray, strong odor, few sediments
12:12	0.34							Greenish gray, strong odor, few sediments
12:16	0.68							Greenish gray, strong odor, few sediments
12:20	1.02							Greenish gray, strong odor, few sediments
15:05								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	<u>66.50</u>
* Well TD (ft):	<u>66.00</u>
Silt Thickness (ft):	<u>0.50</u>
Initial DTW (ft):	<u>35.62</u>
Water column height (ft):	<u>30.38</u>
One casing volume (gal):	<u>0.34</u>
** Final DTW (ft):	_____
Casing diameter (in):	<u>CMT</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # VOAs \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_

Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: W-3s

Project No.: 1262.2

Date: 10/25/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:40	0.0	22.06	999	7.12	211.1	6.68	Dark gray, mild odor, very few sediments
13:55	5.25	17.40	907	6.62	-90.7	0.39	Gray/clear, no odor, no sediments
14:10	10.50	17.32	911	6.63	-85.9	0.58	Gray/clear, no odor, no sediments
14:25	15.75	17.85	914	6.65	-57.6	0.52	Gray/clear, no odor, no sediments
14:30							Collected Samples
						4.45	Took reading 5 minutes later w/no bubbles in flow cell

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.32 gal/min

Well Constructed TD (ft):	<u>45.00</u>
* Well TD (ft):	<u>43.29</u>
Silt Thickness (ft):	<u>1.71</u>
Initial DTW (ft):	<u>35.4</u>
Water column height (ft):	<u>7.89</u>
One casing volume (gal):	<u>5.13</u>
** Final DTW (ft):	<u>35.41</u>
Casing diameter (in):	<u>4"</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: DO levels remained low until ~ 15 gallons had been purged and then began to climb

w/bubbles-eliminated bubbles yet DO climbed & leveled off @ 4.45

Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

No. of Drums:

Project Name: Sullins (L St)

Well I.D.: W-Bs

Project No.: 1262.2

Date: 10/25/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
14:40	0.0	19.87	750	7.17	-37.0	4.31	Dark gray, strong odor, few sediments
14:45	14.0	17.60	707	6.55	-130.3	0.32	Gray/clear, strong odor, few sediments
15:12	28.0	18.04	711	6.56	-103.8	0.36	Gray/clear, strong odor, few sediments
15:30	42.0	17.64	722	6.51	-115.8	0.38	Gray/clear, strong odor, few sediments
15:45							Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.65 gal/min

Well Constructed TD (ft):	<u>45.00</u>
* Well TD (ft):	<u>44.38</u>
Silt Thickness (ft):	<u>0.62</u>
Initial DTW (ft):	<u>35.00</u>
Water column height (ft):	<u>9.38</u>
One casing volume (gal):	<u>13.88</u>
** Final DTW (ft):	<u>35.69</u>
Casing diameter (in):	<u>4"</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *Andrew Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: W-A

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
9:30	0	19.63	869	7.99	-44.7	4.85	Light gray, strong odor, lots of sediments
9:45	13.5	17.91	1033	6.62	-133.0	0.24	Dark green, strong odor, lots of sediments
9:55	27.0	17.95	1020	6.66	-144.5	0.13	Dark green, strong odor, lots of sediments
10:05	40.5	17.97	1019	6.70	-120.2	0.15	Dark green, strong odor, lots of sediments
10:10							Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 1 gal/min

Well Constructed TD (ft):	<u>63.00</u>
* Well TD (ft):	<u>56.00</u>
Silt Thickness (ft):	<u>7.00</u>
Initial DTW (ft):	<u>35.44</u>
Water column height (ft):	<u>20.56</u>
One casing volume (gal):	<u>13.36</u>
** Final DTW (ft):	<u>38.76</u>
Casing diameter (in):	<u>4"</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: Well recharges quickly; top of casing modified

Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums:

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: W-1s

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
10:30	0	18.42	1008	6.72	-66.5	5.32	Clear, strong odor, no sediments
10:45	13.75	17.90	1014	6.59	-103.2	0.47	Clear, strong odor, no sediments
11:00	27.5	18.12	1010	6.67	-122.2	0.15	Clear, strong odor, no sediments
11:20	41.25	18.13	1012	6.65	-121.5	0.16	Black, strong odor, lots of sediments
							Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.83 gal/min

Well Constructed TD (ft):	<u>45.00</u>
* Well TD (ft):	<u>44.42</u>
Silt Thickness (ft):	<u>0.58</u>
Initial DTW (ft):	<u>35.29</u>
Water column height (ft):	<u>9.13</u>
One casing volume (gal):	<u>13.51</u>
** Final DTW (ft):	<u>38.09</u>
Casing diameter (in):	<u>6"</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: Waterra tubing & flow cell became clogged w/sediments and bio-foul after purging 30 gallons. Slow recharge (6" in ~ 30 minutes)  
 Sampled By: A. Dorn *[Signature]*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



Project Name: Sullins (L St)

Well I.D.: MW-104

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
12:22	0.0							
12:24	0.16							
12:26	0.32							
12:30	0.48							
15:15								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	50.50
* Well TD (ft):	49.91
Silt Thickness (ft):	0.59
Initial DTW (ft):	36.01
Water column height (ft):	13.90
One casing volume (gal):	0.16
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Project Name: Sullins (L St)

Well I.D.: MW-304

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
11:51	0							
11:55	0.44							
12:01	0.88							
12:07	1.32							
15:00								Collected Samples

Purge Method:  Dedicated Watterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	75.50
* Well TD (ft):	75.07
Silt Thickness (ft):	0.43
Initial DTW (ft):	35.70
Water column height (ft):	39.37
One casing volume (gal):	0.44
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # amber liters \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Watterra  Bailer  Other

\* = measured \*\* = @ sampling

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: MW-404

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
11:30	0.0							Milky brown, no odor, very few sediments
11:36	0.5							Milky brown, no odor, very few sediments
11:43	1.0							Milky brown, no odor, very few sediments
11:50	1.5							Milky brown, no odor, very few sediments
14:55								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	81.50
* Well TD (ft):	80.87
Silt Thickness (ft):	0.63
Initial DTW (ft):	35.77
Water column height (ft):	45.10
One casing volume (gal):	0.50
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



Project Name: Sullins (L St)

Well I.D.: MW-105

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
	0.01							Could not purge 1 volume
	0.02							
	0.03							


Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	37.00
* Well TD (ft):	36.55
Silt Thickness (ft):	0.45
Initial DTW (ft):	35.55
Water column height (ft):	1.00
One casing volume (gal):	0.01
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: \_\_\_\_\_ # VOAs  preserved \_\_\_\_\_ non-preserved  
 \_\_\_\_\_ # amber liters \_\_\_\_\_ preserved \_\_\_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_\_\_ non-preserved

Notes: Dry

Sampled By: A. Dorn 

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Project Name: Sullins (L St)

Well I.D.: MW-205

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:21	0						Dark gray, strong odor, few sediments
13:25	0.12						Dark gray, strong odor, few sediments
13:30	0.24						Dark gray, strong odor, few sediments
13:35	0.36						Dark gray, strong odor, few sediments
14:00							Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.009 gal/min

Well Constructed TD (ft):	<u>48.00</u>
* Well TD (ft):	<u>47.77</u>
Silt Thickness (ft):	<u>0.23</u>
Initial DTW (ft):	<u>37.12</u>
Water column height (ft):	<u>10.65</u>
One casing volume (gal):	<u>0.12</u>
** Final DTW (ft):	
Casing diameter (in):	<u>CMT</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



Project Name: Sullins (L St)

Well I.D.: MW-305

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:05	0							Milky brown, no odor, few sediments
13:10	0.34							Milky brown, no odor, few sediments
13:15	0.68							Milky brown, no odor, few sediments
13:20	1.02							Milky brown, no odor, few sediments
13:50								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.02 gal/min

Well Constructed TD (ft):	<u>66.00</u>
* Well TD (ft):	<u>65.71</u>
Silt Thickness (ft):	<u>0.29</u>
Initial DTW (ft):	<u>35.38</u>
Water column height (ft):	<u>30.33</u>
One casing volume (gal):	<u>0.34</u>
** Final DTW (ft):	
Casing diameter (in):	<u>CMT</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing, 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



Project Name: Sullins (L St)

Well I.D.: MW-106

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
	0							
	0.04							
	0.08							
	0.12							
13:45								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	37.00
* Well TD (ft):	38.02
Silt Thickness (ft):	
Initial DTW (ft):	34.64
Water column height (ft):	3.38
One casing volume (gal):	0.04
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 4 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # VOAs \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: Well went dry, could only collect 4 voa's

Sampled By: A. Dorn *Austin Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: MW-206

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:50	0							clearish brown, no odor, no sediments
13:52	0.15							
13:53	0.30							
13:55	0.45							
14:00								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.045 gal/min

Well Constructed TD (ft):	<u>50.00</u>
* Well TD (ft):	<u>50.92</u>
Silt Thickness (ft):	
Initial DTW (ft):	<u>37.54</u>
Water column height (ft):	<u>13.38</u>
One casing volume (gal):	<u>0.15</u>
** Final DTW (ft):	
Casing diameter (in):	<u>CMT</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

No. of Drums:

## Groundwater Monitoring Field Log

Project Name: Sullins (L St)

Well I.D.: MW-306

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:36	0							Milky brown, no odor, lots of sediments
13:40	0.35							Milky brown, no odor, lots of sediments
13:44	0.70							Milky brown, no odor, lots of sediments
13:48	1.05							Milky brown, no odor, lots of sediments
13:20								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: 0.088 gal/min

Well Constructed TD (ft):	<u>66.00</u>
* Well TD (ft):	<u>66.61</u>
Silt Thickness (ft):	
Initial DTW (ft):	<u>35.45</u>
Water column height (ft):	<u>31.16</u>
One casing volume (gal):	<u>0.35</u>
** Final DTW (ft):	
Casing diameter (in):	<u>CMT</u>

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No

No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48



Project Name: Sullins (L St)

Well I.D.: MW-107

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (μS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
13:01	0							
13:02	0.04							
13:03	0.08							
13:04	0.12							
14:30								Collected Samples

Purge Method:  Dedicated Watterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	40.00
* Well TD (ft):	39.48
Silt Thickness (ft):	0.52
Initial DTW (ft):	35.92
Water column height (ft):	3.56
One casing volume (gal):	0.04
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: Collected samples from tubing  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *Andrew Dorn*

Sample Method: Watterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Project Name: Sullins (L St)

Well I.D.: MW-207

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
12:53	0							Clear, strong odor, no sediments
12:55	0.13							Clear, strong odor, no sediments
12:57	0.26							Clear, strong odor, no sediments
13:00	0.39							Clear, strong odor, no sediments
14:15								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	50.00
* Well TD (ft):	49.29
Silt Thickness (ft):	0.71
Initial DTW (ft):	38.12
Water column height (ft):	11.17
One casing volume (gal):	0.13
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_ # polys \_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing. 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48





Project Name: Sullins (L St)

Well I.D.: MW-208

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
14:16	0							
14:20	0.15							
14:24	0.30							
14:30	0.45							
16:00								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	52.00
* Well TD (ft):	51.98
Silt Thickness (ft):	0.02
Initial DTW (ft):	38.59
Water column height (ft):	13.39
One casing volume (gal):	0.15
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 5 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # amber liters \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *Andrew Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48

Project Name: Sullins (L St)

Well I.D.: MW-308

Project No.: 1262.2

Date: 10/26/2011

Project Location: 187 N. L Street

Livermore, CA

Samples sent to: BC Labs

Time	Cumulative Volume Purged (gal)	Temp	C°	EC (µS/cm)	pH	ORP (millivolts)	DO (mg/L)	Remarks
14:00	0							
14:05	0.31							
14:10	0.62							
14:15	0.93							
15:40								Collected Samples

Purge Method:  Dedicated Waterra  Centrifugal pump with dedicated tubing  Other

Pumping Rate: \_\_\_\_\_ gal/min

Well Constructed TD (ft):	66.00
* Well TD (ft):	63.03
Silt Thickness (ft):	2.97
Initial DTW (ft):	35.09
Water column height (ft):	27.94
One casing volume (gal):	0.31
** Final DTW (ft):	
Casing diameter (in):	CMT

Sample Containers used: 6 # VOAs X preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # amber liters \_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved  
 \_\_\_\_\_ # polys \_\_\_\_\_ preserved \_\_\_ non-preserved

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 Sampled By: A. Dorn *A. Dorn*

Sample Method: Waterra  Bailer  Other

\* = measured \*\* = @ sampling

Purged Water Drummed:  Yes  No  
 No. of Drums: \_\_\_\_\_

Gallons per foot of casing: 2" dia. = 0.17, 3" dia. = 0.38 4" dia. = 0.65, 5" dia. = 1.02, 6" dia. = 1.48