

# **PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT**

**GARDEN OAKS & SHEPHERD PARK (CENTRAL) DRAINAGE AND PAVING  
HOUSTON, HARRIS COUNTY, TEXAS**

**WBS NO. M-000285-0001-3**



***PREPARED FOR:***  
**PGAL, INC.**  
**HOUSTON, TEXAS**

***BY:***  
**ASSOCIATED TESTING LABORATORIES, INC.**  
**HOUSTON, TEXAS**

**REPORT NO: E14-111**  
**March 2015**

March 19, 2015

PGAL, INC.  
3131 BRIARPARK DRIVE  
HOUSTON, TEXAS 77042

**RE: PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT**  
GARDEN OAKS & SHEPHERD PARK (CENTRAL) DRAINAGE AND PAVING  
HOUSTON, TEXAS  
WBS No. M-000285-0001-3

ATL REPORT NO.: E14-111

**Associated Testing Laboratories (ATL)** is pleased to submit the following Phase II ESA report for the above-mentioned project.

Thank you for considering ATL for this project. We appreciate the opportunity to conduct environmental service for this project and are looking forward to serving you again on future projects. The following provides a brief summary of the Phase II ESA results:

#### **EXECUTIVE SUMMARY**

**ATL** performed a Limited Phase II Environmental Site Assessment (ESA) for the Garden Oaks & Shepherd Park (Central) Drainage and Paving project in Houston, Texas. Please refer to Figures Section for the location and site details. The following is reported:

- Ten (10) environmental soil borings were completed at four (4) sites of Recognized Environmental Conditions (RECs). Soil samples were screened utilizing a MiniRAE Photo Ionization Detector (PID) instrument in the field. PID readings and visual inspection directed the submittal of soil samples and the sample with the greatest PID reading was submitted from each soil boring, and one soil sample was selected from each of the boring. In the event of no significant PID readings, default soil samples were collected from various representative depths and submitted for laboratory analyses. Soil samples were analyzed for total petroleum hydrocarbons (TPH) and methyl tert-butyl ether/benzene, toluene, ethyl-benzene and total xylenes (MTBE/BTEX).
- Groundwater was encountered in soil borings SB-1 through SB-10 at depths ranging from 9 to 16 feet below ground surface. Groundwater samples were

collected and submitted for laboratory analyses from soil borings SB-2 (TWP-2), SB-4 (TWP-4) and SB-9 (TWP-9).

The following provides a summary of the soil laboratory analytical results for the REC locations:

- Individual MTBE/BTEX constituents and TPH concentrations were below the sample detection limit at the four investigated REC locations.

The following provides a summary of the groundwater laboratory analytical results for the REC locations:

- Individual BTEX constituents were below the sample detection limit at the four investigated REC locations. Minor detections of MTBE were reported in temporary well points, TWP-4 (0.011 mg/L) and TWP-9 (0.02 mg/L). However, the lab results are below the sample detection limit and considered non-detect. The REC locations with environmental conditions are as follows:
  - 939 Fisher Street: The REC location was reported to have a detection of 1.1 mg/L for TPH carbon range >C<sub>12</sub>-C<sub>28</sub> and 1.03 mg/L for TPH carbon range >C<sub>28</sub>-C<sub>35</sub> in groundwater of SB-2/TWP-2. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).
  - 4730 & 4728 Brinkman Street at Martin Street: The REC location was reported to have a MTBE concentration 0.011 mg/L. The lab results reported a detection of 1.21 mg/L for TPH carbon range >C<sub>12</sub>-C<sub>28</sub> and 1.05 mg/L for TPH carbon range >C<sub>28</sub>-C<sub>35</sub> in groundwater of SB-4/TWP-4. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).
  - 4710 Brinkman Street: The REC location was reported to have a MTBE concentration 0.02 mg/L. The lab results reported a detection of 1.18 mg/L for TPH carbon range >C<sub>12</sub>-C<sub>28</sub> and 1.03 mg/L for TPH carbon range >C<sub>28</sub>-C<sub>35</sub> in groundwater of SB-9/TWP-9. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).

## RECOMMENDATIONS

**ATL** performed a Limited Phase II Environmental Site Assessment (ESA) for the project in Houston, Texas. Based on field observations and soil laboratory analytical results, the following is noted:

- Based on the soil laboratory analytical data and PID readings at soil borings SB-1 through SB-10, special handling practices of the soil are not required. Additionally, air monitoring is not required at the REC locations. Based on the Phase II ESA results, additional environmental investigation work is not warranted.
- Based on the groundwater analytical data, the following is reported for the REC locations:

#### 939 Fisher Street

- Groundwater is hydrocarbon-affected at the REC location. Based on the groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 10+00 to 15+00 (Fisher Street).

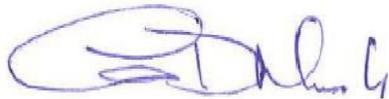
#### 4730 & 4728 Brinkman Street at Martin Street

- Groundwater is hydrocarbon-affected at the REC location. Based on the groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 20+00 to 25+00 (Brinkman Street).

#### 4710 Brinkman Street at Woodcreek Drive

- Groundwater is hydrocarbon-affected at the REC location. Based on the groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 15+00 to 20+00 (Brinkman Street).

Regards,



Tom Murphy  
Environmental Project Manager  
Attachment

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## 1.0 INTRODUCTION

Drainage improvements are proposed for select streets in the Garden Oaks and Shepherd Park (Central) in Houston, Texas. Phase II ESA activities occurred at three locations along the proposed drainage alignment and included a location on Fisher Street and two locations on Brinkman Street. Location maps (Key Map©© and United States Geological Survey Topographic Map), FIGURE 1A and 1B identify the investigated areas (RECs) and are presented in Figures Section of this report.

## 2.0 SCOPE-OF-WORK

Associated Testing Laboratories (ATL) was retained by PGAL, Inc. to evaluate whether the project alignment has been affected by one leaking petroleum storage tank (LPST) facility, one out-of-use gas station, one possible historical dry cleaner and an historical vehicle repair facility at the project alignment and are as follows (REC locations):

1. Manning Electric LPST facility/site (939 Fisher Street)
2. Luck 7 Food Store/Out-of-Use PST facility/site (4730 Brinkman Street) and Possible Historical Dry Cleaner (4728 Brinkman Street)
3. High Speed Transmissions & historical vehicle repair facility (4710 Brinkman Street)

Sampling and analyses were conducted to determine whether petroleum contamination is present at the REC locations. The following Phase II Assessment activities were performed:

- Conducted an investigation of facilities with the potential for environmental conditions as identified in a previously conducted Phase I ESA for the project alignment.
- Completed Texas Excavation Safety (Texas 811) notification.
- Soil sampling locations placed at equidistant locations to provide adequate coverage of the REC locations. Submitted soil samples for laboratory analytical testing based upon field observations (visual and olfactory) and field screening.
- Conducted continuous field screening of soil cores at 2.0-foot intervals utilizing a photo-ionization detector (PID) calibrated to 100 ppm isobutylene standard.
- Completed 10 soil borings at the project alignment.
- Submitted soil samples for laboratory analyses of methyl tert-butyl ether/benzene, toluene, ethyl-benzene and total xylenes (MTBE/BTEX) and total petroleum hydrocarbons (TPH).

- Converted the soil borings, SB-2, SB-4 and SB-9 into temporary well points for the collection of groundwater. Submitted groundwater samples, TWP-2, TWP-4, TWP-9 for laboratory analyses of methyl tert-butyl ether/benzene, toluene, ethyl-benzene and total xylenes (MTBE/BTEX) and total petroleum hydrocarbons (TPH).
- Detailed site assessment activities, reviewed laboratory analytical results and presented the results and conclusions in a Limited Phase II ESA investigation report.

### **3.0 PHASE II ASSESSMENT ACTIVITIES**

On July 11<sup>th</sup>, 2014, ATL completed ten soil borings, SB-1 through SB-10 at select locations along the project alignment. The soil borings were completed to 20 feet below ground surface (bgs).

Soil borings were advanced utilizing a truck-mounted hydraulically-driven drilling rig with 4-foot stainless sleeves. Soil samples were continuously collected at 1-foot intervals and field screened utilizing a photo-ionization detector (PID). PID field screening ranged from non-detect (0.0 ppm) to 0.7 ppm. Geologic stratigraphy (lithology) and subsurface characteristics were recorded by the field environmental professional. FIGURES 2 through 4 provide investigated site details and soil boring locations. Soil boring logs are presented in APPENDIX A.

Prior to the initial soil boring and between each 4-foot advancement, all sampling devices were thoroughly cleaned and decontaminated using a hospital grade detergent, water and distilled water. Soil samples were obtained by the environmental professional utilizing appropriate sampling tools and wearing clean, disposable gloves. Disposable nitrile gloves were changed between each sample collection. Two discrete (grab) samples were collected from each 2-foot interval of the soil borings. One sample was placed in a disposable bag for headspace screening. The second soil sample was placed in a separate 4-ounce sterile glass container equipped with a Teflon-lined lid furnished by the testing laboratory. Each container was filled to capacity with soil to limit the amount of headspace present. All samples were labeled in the field and stored at approximately 4°C prior to submission to A & B Laboratories in Houston, Texas for laboratory analyses. Chain-of-custody documentation accompanied the samples in accordance with standard quality assurance and quality control measures.

#### **3.1 SOIL SAMPLING (939 Fisher Street)**

Three soil borings, SB-1, SB-2 and SB-3 were advanced in the eastbound lane or south side of Fisher Street at 939 to 929 Fisher Street. PID readings were non-detect (0.0 ppm) for the soil borings and default soil samples were collected and submitted for laboratory analyses.

Groundwater was encountered at 9 feet bgs at this REC location. FIGURE 2 provides site details and soil boring locations.

Sampling was conducted due to an adjoining facility at this REC location. The property is currently vacant and structures had been recently demolished/removed. Other occupants have been present at the facility in recent years. A former occupant, Manning Electric (939 Fisher Street) had an LPST event. The LPST event was reported to have had groundwater impact (LPST ID No. 106064). One 1,000 gallon single wall steel UST has been permanently removed from the ground at the facility. The property to the east of the REC location was formerly a community swimming pool (933 Fisher Street) that also has been removed and the property is vacant.

### **3.2 SOIL SAMPLING (4730 and 4728 Brinkman Street)**

Four soil borings, SB-4, SB-5, SB-6 and SB-7 were advanced in the northbound lane (east side) of Brinkman Street, south of Martin Street. Minor PID readings were encountered in soil boring SB-4 commencing at 12 feet bgs and the greatest PID reading was collected and submitted for laboratory analytical testing. The PID readings for soil borings SB-5, SB-6 and SB-7 were non-detect (0.0 ppm) for the soil boring. Default soil samples were collected and submitted for laboratory analyses. Groundwater was not encountered at this REC location. FIGURE 3 provides site details and soil boring locations.

A gasoline service station/convenience store, Lucky 7 Food Mart (4730 Brinkman Street) adjoins the project alignment at this REC location. The facility was formerly a Stop-N-Go. Three 12,000 gallon gasoline fiberglass reinforced plastic (FRP) USTs were reported to be out-of-use at the facility (Facility ID No. 97500). This is only a temporary measure for USTs and the USTs will be required to be put back in-service or removed from the ground. The facility appears to have had the status since October 2010. Based on the status of the facility, sampling was considered warranted. Additionally, a potential historical dry cleaner, Lang's Alterations and Cleaners (4728 Brinkman Street) is present at the location. The facility is currently a drop-off/pick-up station only, but may have conducted dry cleaning in the past.

### **3.3 SOIL SAMPLING (4710 Brinkman Street)**

Three soil borings, SB-8, SB-9 and SB-10 were advanced in the northbound lane (east side) of Brinkman Street, south of Woodcreek Drive. PID readings were non-detect (0.0 ppm) for the soil boring soil cores. Default soil samples were collected from each soil boring and submitted for laboratory analytical testing. Groundwater was encountered

at 12.5 to 13 feet bgs at this REC location. FIGURE 4 provides site details and soil boring locations.

The REC location is the location of High Speed Transmissions (4710 Brinkman Street). Historical vehicle repair activities appear to have occurred at the location.

### **3.4 GROUNDWATER SAMPLING**

Three of the ten soil borings were converted to temporary well points SB-2/TWP-2, SB-4/TWP-4 and SB-9/TWP-9. After the completion of select soil borings, a ¾-inch PVC temporary well point was placed in the boring. The temporary well point was developed by slowly purging the well with a peristaltic pump and purge water was co-mingled with drummed soil cuttings. After purging and recharge, groundwater samples were collected utilizing a dedicated plastic bailer. Groundwater was transferred from the bailer into glass 40 ml vials equipped with Teflon-lined lids furnished by the testing laboratory. Each container was filled to capacity with groundwater to an inverted meniscus. All samples were labeled in the field and stored at approximately 4°C prior to submission to A & B Laboratories of Houston, Texas. Chain-of-custody documentation accompanied the samples in accordance with standard quality assurance and quality control measures. FIGURES 2, 3 and 4 provide site details and temporary well point location. Soil boring logs for temporary well point and other soil borings are presented in APPENDIX A.

## **4.0 REGULATORY FRAMEWORK**

The Texas Commission on Environmental Quality (TCEQ) administers the Environmental Protection Agency (EPA) regulations and enforcement in Texas. It has additionally established its own standards for environmental compliance. The Texas Risk Reduction Program (TRRP) administered by TCEQ, as provided for in 30 TAC Chapter 350, addresses levels of regulated compounds and allowable levels of such contaminants to protect human health, safety, and the environment. The TCEQ TRRP applies to closures, corrective actions, and remediation efforts subject to the jurisdiction of the TCEQ. The TRRP, whether residential or commercial, contains provisions for Remedy Standard A (no physical controls required) or Remedy Standard B (physical controls required). Implementation of Remedy Standard A or Remedy Standard B is a tiered process, as described in general terms below:

- Tier 1 is a risk-based analysis to derive non site-specific protective concentration limits (PCLs) for complete or reasonably anticipated to be complete exposure pathways. Tier 1 is based on default exposure factors and affected property parameters, and assumes exposure occurs at,

above, or below the source area (i.e., no lateral transport) (TCEQ Subchapter D Section 350.75 (b)).

- Tier 2 is a risk-based analysis to derive site-specific PCLs for complete or reasonably anticipated to be completed exposure pathways utilizing site-specific exposure factors, as allowable, and/or affected property parameters and Tier 1 equations. Tier 2 PCLs may also include lateral transport considerations (TCEQ, Subchapter D Section 350.75 (c)).
- Tier 3 is a risk-based analysis to derive site-specific PCLs for complete or reasonably anticipated to be completed exposure pathways. Tier 3 PCLs are based on measured natural attenuation factors and/or natural attenuation factor models/equations other than those provided for Tier 1 or 2; and may also include site-specific exposure factors, as allowable, and/or affected property parameters (TCEQ, Subchapter D Section 350.75 (d)).

The below provided soil PCLs are concentrations which are protective of human health and the environment:

- |   |                     |   |   |
|---|---------------------|---|---|
| * | $^{GW}Soil_{Ing}$   | * | Groundwater Soil Ingestion ( $^{GW}Soil_{Ing}$ ) is the groundwater protection standard for either residential or commercial use. Concentration in soil is assumed protective of groundwater considering cross-medial contamination of groundwater from contaminated soil. This is the critical PCL for special handling practices of the soil for the project. |
| * | $^{Tot}Soil_{Comb}$ | * | The Total Soil Combined ( $^{Tot}Soil_{Comb}$ ) PCLs are a combined exposure standard for residential use. The PCL considers cross-media contamination of human ingestion, inhalation and dermal pathways. This is the critical PCL for construction worker exposure concentrations.  |

The following details groundwater PCLs:

- |   |                 |   |   |
|---|-----------------|---|---|
| * | $^{GW}GW_{Ing}$ | * | Groundwater Ingestion ( $^{GW}GW_{Ing}$ ) is the groundwater protection standard for either residential or commercial use. The $^{GW}GW_{Ing}$ PCLs are the same as the Federal Drinking Water Standards Maximum Concentration Limits (MCLs). This will be utilized to determine whether the groundwater is acceptable for surface discharge. |
|---|-----------------|---|---|

*MTBE/BTEX concentrations, if any, will be the predominant environmental and exposure consideration of this project. TPH concentrations, if any, also will be evaluated, but typically involves special handling practices of the soil and not necessarily human exposure considerations. The  $^{Tot}Soil_{Comb}$  and  $^{GW}GW_{Ing}$  PCLs are the action levels for this project. TABLE I provide the PCLs, soil laboratory analytical and is presented in the attachments of the report. The  $^{GW}GW_{Ing}$  PCLs may also be a consideration for the Phase II ESA (TABLE II). Groundwater conditions also will be discussed.*

## **5.0 SOIL/GROUNDWATER LABORATORY ANALYTICAL RESULTS**

A total of ten soil samples were collected from the ten soil borings were submitted to a certified laboratory for analyses. The soil samples were analyzed for methyl tert-butyl ether/benzene, toluene, ethyl-benzene and total xylenes (MTBE/BTEX) by EPA Method SW846-8021B and total petroleum hydrocarbons (TPH) by Texas Commission on Environmental Quality (TCEQ) Texas Method 1005. Four groundwater samples were collected from temporary well points, TWP-2, TWP-4 and TWP-9 and submitted for MTBE/BTEX and TPH analyses. The following details the laboratory methodology:

### **5.1 LABORATORY ANALYTICAL METHODS**

**Methyl tert-butyl ether/benzene, toluene, ethyl-benzene, and xylene (MTBE/BTEX) by SW-846 EPA Method 8021B:** This laboratory analysis employs a gas chromatograph (GC) equipped with a photoionization detector and/or electrolytic conductivity detectors to detect and quantify certain regulated, volatile organic compounds in a soil or water sample. Compounds on this list include certain chlorinated solvents used in dry cleaning and printing processes, refined petroleum products such as gasoline and diesel, and others. This method can also be used to test for MTBE/BTEX compounds, which are a portion of the entire VOA list. These compounds are common components of most formulated gasolines, and their presence is a reliable indicator that a gasoline release has occurred.

**Total Petroleum Hydrocarbons (TPH) by TCEQ Method 1005:** This laboratory analysis utilizes a GC equipped with a flame ionization detector (FID) to quantify levels of petroleum compounds or derivatives in the range from C6 to C28, in a soil or groundwater medium. Results are reported in two to three distinct ranges, from C6 to C12, >C12 to C28 and >C28 to C35. This allows some interpretation as to the possible source of the release, based upon the indicated carbon range. Petroleum hydrocarbons are not necessarily hazardous or toxic. The analysis is designed to determine if TPH is present, and to quantify the level of petroleum hydrocarbons. This analysis is especially useful as a broad category procedure, and may indicate additional testing for the specific hazardous or toxic constituents that may be present and contribute to the

TPH levels assessed. Some constituents of petroleum hydrocarbons may be hazardous or toxic, high levels of TPH require additional testing of the sample area.

## 5.2 SOIL LABORATORY ANALYTICAL RESULTS

Soil samples, SB-1 at 4-6 feet, SB-2 at 8-10 feet, SB-3 at 14-16 feet; SB-4 at 12-14 feet, SB-5 at 4-6 feet, SB-6 at 8-10 feet; SB-7 at 2-4 feet, SB-8 at 8-10 feet, SB-9 at 12-14 feet and SB-10 at 2-4 feet were submitted for TPH and MTBE/BTEX analyses from the soil borings. The resulting laboratory analytical data was compared to the TCEQ TRRP Total Soil Combined (<sup>Tot</sup>Soil<sub>Comb</sub>) Protective Concentration Limits (PCLs) and Groundwater Soil Ingestion (<sup>GW</sup>Soil<sub>Ing</sub>) PCLs.

### 5.2.1 LAB ANALYTICAL RESULTS (939 Fisher Street)

Three soil samples, SB-1 at 4-6 feet bgs, SB-2 at 8-10 feet bgs and SB-3 at 14-16 feet bgs, were collected, submitted and analyzed for this location. The following was reported for individual MTBE/BTEX constituents for the soil samples:

- MTBE concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Benzene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Toluene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Ethyl-benzene concentrations were determined to be below the sample detection limit (<0.005 mg/kg to <0.006 mg/kg).
- Total xylene concentrations were determined to be below the sample detection limit (<0.002 mg/kg).

The following was reported in the designated carbon ranges for the soil samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> were determined to be below the sample detection limit and ranged from <26.5 mg/kg to <27.5 mg/kg.
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> were determined to be below the sample detection limit and ranged from <22.7 mg/kg to <23.5 mg/kg.
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> were determined to be below the sample detection limit and ranged from <19.8 mg/kg to <20.5 mg/kg.

TABLE I located in the Table section summarizes the laboratory analytical results. Individual MTBE/BTEX and TPH constituents were

determined to be below the sample detection limit at is location. None of the soil laboratory analytical concentrations exceed the TCEQ <sup>Tot</sup>Soil<sub>Comb</sub> and/or are not a health concern to construction workers. Additionally, the soil laboratory analytical indicates that the soil does not require special handling practices. A copy of the laboratory analytical results is presented in APPENDIX B. Photographs of some of the field activities are presented in APPENDIX C.

### **5.2.2 LAB ANALYTICAL RESULTS (4730/4728 Brinkman St.)**

Three soil samples, SB-4 at 12-14 feet bgs, SB-5 at 4-6 feet bgs, SB-6 at 8-10 feet bgs and SB-7 at 2-4 feet bgs were collected, submitted and analyzed for this location. The following was reported for individual MTBE/BTEX constituents for the soil samples:

- MTBE concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Benzene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Toluene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Ethyl-benzene concentrations were determined to be below the sample detection limit (<0.005 mg/kg to <0.006 mg/kg).
- Total xylene concentrations were determined to be below the sample detection limit (<0.002 mg/kg).

The following was reported in the designated carbon ranges for the soil samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> were determined to be below the sample detection limit and ranged from <25.7 mg/kg to <28.3 mg/kg.
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> were determined to be below the sample detection limit and ranged from <22.1 mg/kg to <24.2 mg/kg.
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> were determined to be below the sample detection limit and ranged from <19.2 mg/kg to <21.1 mg/kg.

Individual MTBE/BTEX and TPH constituents were determined to be below the sample detection limit at is location. None of the soil laboratory analytical concentrations exceed the TCEQ <sup>Tot</sup>Soil<sub>Comb</sub> and/or are not a health concern to construction workers. Additionally, the soil laboratory analytical indicates that the soil does not require special handling practices.

### 5.2.3 LAB ANALYTICAL RESULTS (4710 Brinkman St.)

Three soil samples, SB-8 at 4-6 feet bgs, SB-9 at 14-16 feet bgs and SB-10 at 6-8 feet bgs, were collected, submitted and analyzed for this location. The following was reported for individual MTBE/BTEX constituents for the soil samples:

- MTBE concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Benzene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Toluene concentrations were determined to be below the sample detection limit (<0.001 mg/kg).
- Ethyl-benzene concentrations were determined to be below the sample detection limit (<0.005 mg/kg to <0.006 mg/kg).
- Total xylene concentrations were determined to be below the sample detection limit (<0.002 mg/kg).

The following was reported in the designated carbon ranges for the soil samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> were determined to be below the sample detection limit and ranged from <26.7 mg/kg to <27.3 mg/kg.
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> were determined to be below the sample detection limit and ranged from <22.9 mg/kg to <23.4 mg/kg.
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> below the sample detection limit and ranged from <20.0 mg/kg to <20.4 mg/kg.

Individual MTBE/BTEX and TPH constituents were determined to be below the sample detection limit at is location. None of the soil laboratory analytical concentrations exceed the TCEQ <sup>TotSoilComb</sup> and/or are not a health concern to construction workers. Additionally, the soil laboratory analytical indicates that the soil does not require special handling practices.

## 5.3 GROUNDWATER LABORATORY ANALYTICAL RESULTS

Groundwater samples were collected from soil boring (SB-2, SB-4, & SB-9) that were converted to temporary well points (TWP-2; TWP-4 & TWP-9) and groundwater was analyzed for MTBE/BTEX by EPA Method SW846-8021 and TPH by Texas Method 1005.

### 5.3.1 GW LAB ANALYTICAL RESULTS (939 Fisher Street)

Groundwater sample, TWP-2 was collected from the above-noted location (Figure 2). The following was reported for individual MTBE/BTEX

constituents for the groundwater sample:

- The MTBE concentration was determined to be below the sample detection limit (<0.001 mg/L).
- The benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).
- The toluene concentration was determined to be below the sample detection limit (<0.001 mg/L).
- The ethyl-benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).
- The total xylene concentration was determined to be below the sample detection limit (<0.003 mg/L).

The following was reported in the designated carbon ranges for the groundwater samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> was determined to be non-detect (<0.907 mg/L).
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> was determined to be non-detect (<1.18 mg/L).
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> was determined to be non-detect (<1.03 mg/L).

MTBE/BTEX concentrations were determined to be non-detect at this location. No MTBE/BTEX concentrations were detected above TCEQ <sup>GW</sup>GW<sub>ing</sub> PCL and Federal Drinking Water Standard Maximum Concentration Limits (MCLs). TPH concentrations were non-detect and ranged from <0.907 mg/L to <1.18 mg/L. The TPH laboratory results are considered below the sample detection limit. Due to the fact the TPH detection limit is above the PCL (<0.98 mg/L) for select carbon ranges, dewatering special management practices should be implemented. Groundwater cannot be discharged to the surface without special handling practices of the generated water.

A copy of the laboratory analytical results is presented in APPENDIX B.

### **5.3.2 GW LAB ANALYTICAL RESULTS (4730/4728 Brinkman St.)**

Groundwater sample, TWP-4 was collected from the above-noted location (Figure 2). The following was reported for individual MTBE/BTEX constituents for the groundwater sample:

- The MTBE concentration was determined to be 0.011 mg/L.
- The benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).

- The toluene concentration was determined to be below the sample detection limit (<0.001 mg/L).
- The ethyl-benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).
- The total xylene concentration was determined to be below the sample detection limit (<0.003 mg/L).

The following was reported in the designated carbon ranges for the groundwater samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> was determined to be non-detect (<0.928 mg/L).
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> was determined to be <1.21 mg/L.
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> was determined to be <1.05 mg/L.

A MTBE concentration of 0.011 mg/L was reported in the groundwater laboratory analytical results at this REC location. The concentration is below the TCEQ <sup>GW</sup>GW<sub>Ing</sub> PCL and Federal Drinking Water Standard Maximum Concentration Limits (MCLs) of 0.244 mg/L for MTBE. BTEX concentrations were determined to be non-detect at this location. TPH concentrations were non-detect and ranged from <0.928 mg/L to <1.21 mg/L. The TPH laboratory results are considered below the sample detection limit. Due to the fact the TPH detection limit is above the PCL (<0.98 mg/L) for select carbon ranges, dewatering special management practices should be implemented. Groundwater cannot be discharged to the surface without special handling practices of the generated water.

### 5.3.3 GW LAB ANALYTICAL RESULTS (4710 Brinkman St.)

Groundwater sample, TWP-9 was collected from the above-noted location (Figure 2). The following was reported for individual MTBE/BTEX constituents for the groundwater sample:

- The MTBE concentration was determined to be 0.02 mg/L.
- The benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).
- The toluene concentration was determined to be below the sample detection limit (<0.001 mg/L).
- The ethyl-benzene concentration was determined to be below the sample detection limit (<0.0008 mg/L).
- The total xylene concentration was determined to be below the sample detection limit (<0.003 mg/L).

The following was reported in the designated carbon ranges for the groundwater samples:

- TPH carbon ranges C<sub>6</sub>-C<sub>12</sub> was determined to be non-detect (<0.906 mg/L).
- TPH carbon ranges >C<sub>12</sub>-C<sub>28</sub> was determined to be <1.18 mg/L.
- TPH carbon ranges >C<sub>28</sub>-C<sub>35</sub> was determined to be <1.03 mg/L.

A MTBE concentration of 0.02 mg/L was reported in the groundwater laboratory analytical results at this REC location. The concentration is below the TCEQ <sup>GW</sup>GW<sub>Ing</sub> PCL and Federal Drinking Water Standard Maximum Concentration Limits (MCLs) of 0.244 mg/L for MTBE. BTEX concentrations were determined to be non-detect at this location. TPH concentrations were non-detect and ranged from <0.906 mg/L to <1.18 mg/L. The TPH laboratory results are considered below the sample detection limit. Due to the fact the TPH detection limit is above the PCL (<0.98 mg/L) for select carbon ranges, dewatering special management practices should be implemented. Groundwater cannot be discharged to the surface without special handling practices of the generated water.

## 6.0 AIR MONITORING/WASTE MANAGEMENT PRACTICES

Based on the PID readings of the Phase II ESA, air monitoring is not warranted. Confined space protocol may still apply depending on construction activities.

Based on the soil laboratory analytical results, “special handling practices” of the soil is not required. However, it should be noted that very low level PID readings and hydrocarbon odors were noted commencing at 12 feet bgs in soil boring SB-4. The soil is saturated (wet) at this depth and may be related to minor groundwater impact indicated in the groundwater lab results.

If dewatering is utilized at these REC locations, “special handling practices” of groundwater will be required at the three REC locations (939 Fisher Street, 4730/4728 Brinkman and 4710 Brinkman Street). Figures 2, 3 and 4 delineates the PPCA.

## 7.0 CONCLUSIONS

The purpose of the assessment was to determine the absence or presence and concentration levels of petroleum hydrocarbons in soil and/or groundwater. Phase II ESA activities were conducted in accordance with ATL, Inc.’s proposal/workplan dated May 27, 2014. Phase II ESA activities also were conducted in accordance with the ASTM 1903 Standard Practice and the City of Houston Department of Public Works & Engineering Infrastructure Design Manual, Chapter 11. The following was indicated by the laboratory analytical results:

### Soil Laboratory Analytical Results

Individual MTBE/BTEX constituents and TPH concentrations were below the sample detection limit at the three investigated REC locations.

### Groundwater Laboratory Analytical Results

Individual BTEX constituents were below the sample detection limit at the three investigated REC locations. Minor detections of MTBE were reported in temporary well points, TWP-4 (0.011 mg/L) and TWP-9 (0.02 mg/L). The TPH detection limit for carbon ranges  $>C_{12}-C_{28}$  and  $>C_{28}-C_{35}$  of 0.98 mg/L was not obtained. However, the lab results are below the sample detection limit and considered non-detect. The REC locations with environmental conditions are as follows:

- 939 Fisher Street: The REC location was reported to have a detection of 1.1 mg/L for TPH carbon range  $>C_{12}-C_{28}$  and 1.03 mg/L for TPH carbon range  $>C_{28}-C_{35}$  in groundwater of SB-2/TWP-2. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).
- 4730 & 4728 Brinkman Steet at Martin Street: The REC location was reported to have a MTBE concentration 0.011 mg/L. The lab results reported a detection of 1.21 mg/L for TPH carbon range  $>C_{12}-C_{28}$  and 1.05 mg/L for TPH carbon range  $>C_{28}-C_{35}$  in groundwater of SB-4/TWP-4. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).
- 4710 Brinkman Street.: The REC location was reported to have a MTBE concentration 0.02 mg/L. The lab results reported a detection of 1.18 mg/L for TPH carbon range  $>C_{12}-C_{28}$  and 1.03 mg/L for TPH carbon range  $>C_{28}-C_{35}$  in groundwater of SB-9/TWP-9. Groundwater is affected at the location. The area is a potentially petroleum contaminated area (PPCA).

## **8.0 RECOMMENDATIONS**

Based on the laboratory analytical results and field observations of the Limited Phase II Environmental Site Assessment for the Garden Oaks & Shepherd Park (Central) Drainage and Paving: in Houston, Harris County, Texas, the following is noted:

- Based on the soil laboratory analytical data and PID readings at soil borings SB-1 through SB-10, special handling practices of the soil are not required. Additionally, air monitoring is not required at the REC locations. Based on the Phase II ESA results, additional environmental investigation work is not warranted.

- Based on the groundwater analytical data, the following is reported for the REC locations:

939 Fisher Street

- Groundwater is hydrocarbon-affected at the REC location. Based on the groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 10+00 to 15+00 (Fisher Street).

4730 & 4728 Brinkman Street at Martin Street

- Groundwater is hydrocarbon-affected at the REC location. Based on the and groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 20+00 to 25+00 (Brinkman Street).

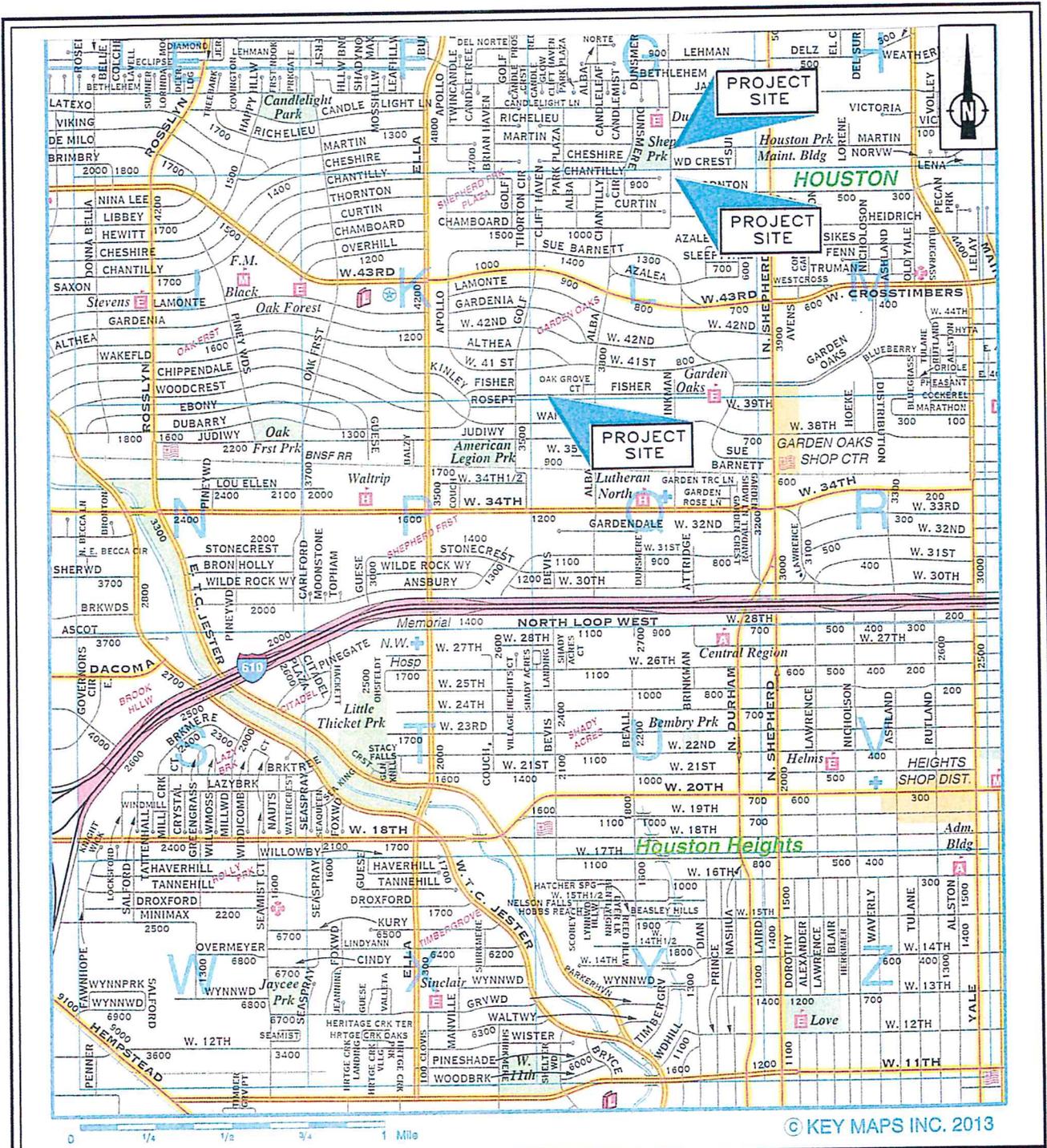
4710 Brinkman Street at Woodcreek Drive

- Groundwater is hydrocarbon-affected at the REC location. Based on the and groundwater laboratory analytical results, the area shall be defined as a Potentially Petroleum Contaminated Area (PPCA). Groundwater shall be contained, sampled, discharged or disposed as appropriate. Specifications 02105 and 02120 shall be utilized to direct environmental work at the construction project.
  - The Station Nos. are from 15+00 to 20+00 (Brinkman Street).

The excess soil cuttings and waste generated during the assessment were stored in a tightly fitted steel containers. ATL will have the materials disposed of within the completion of this Phase II ESA.

Waste shall be transported by signed manifests. Vehicles transporting contaminated materials shall be approved and properly covered with waterproof tarpaulins to prevent material from escaping. Containers shall be properly labeled. The contents of the container were reported on the labels as well as emergency contact information. Containers were sealed and lidded and properly stored

## FIGURES

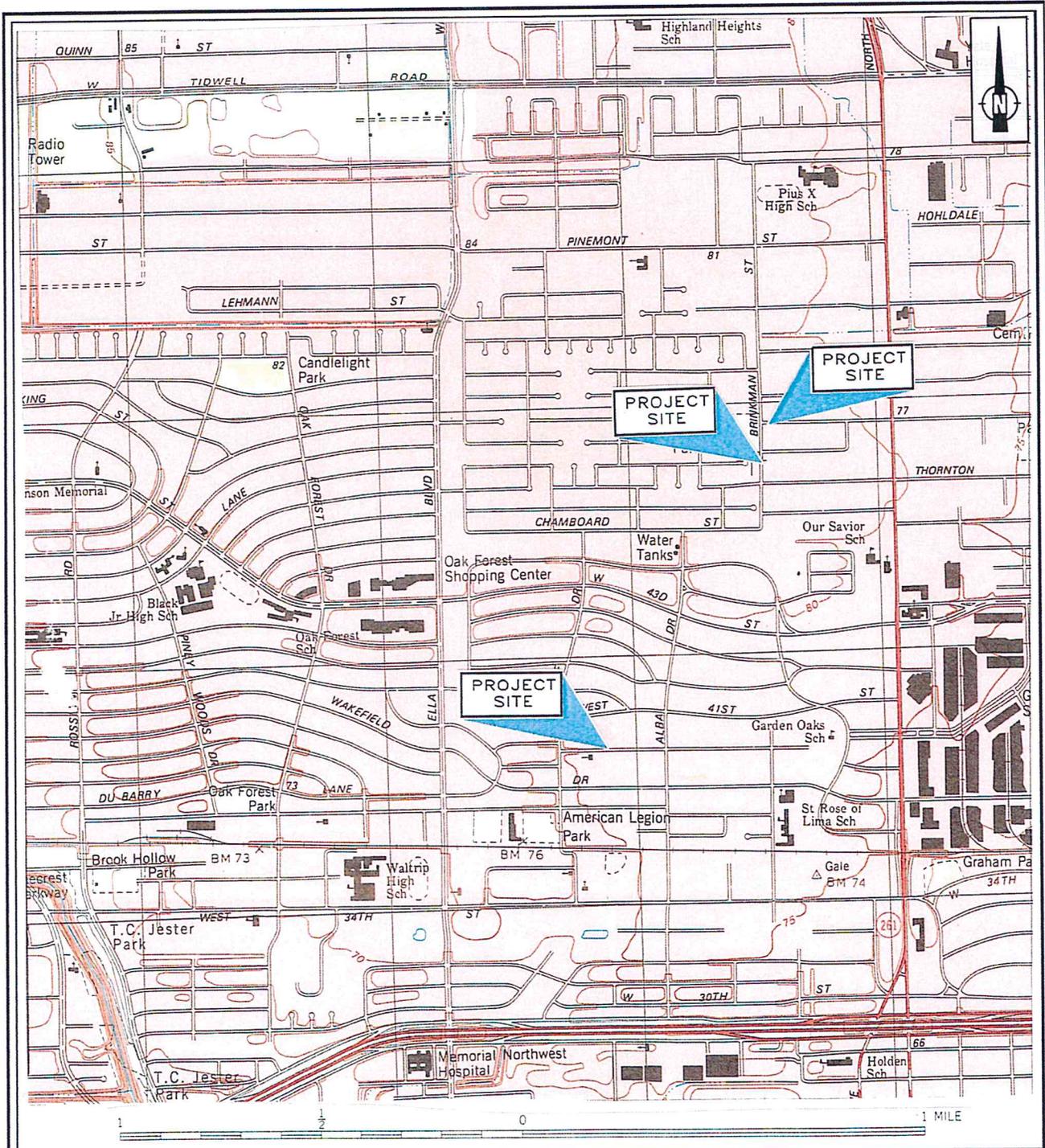


**FIGURE 1A**

Garden Oaks & Shepherd Park (Central) Drainage  
and Paving  
Houston, Harris County, Texas  
WBS No. M-000285-001-4

**Source:**  
Key Maps, Inc. ©  
**Scale:**  
1 Inch = 2,640 feet / 0.5-Mile  
Page 452, Sections G & L





**FIGURE 1B**

Garden Oaks & Shepherd Park (Central) Drainage and Paving  
 Houston, Harris County, Texas  
 WBS No. M-000285-0001-4

**Source:**  
 US Department of Interior  
 Geological Survey  
 USGS Topographic Map  
 7.5 Minute 1995 Houston Heights  
 Quad.  
**Scale:**  
 See Above



**ATL** ASSOCIATED TESTING LABORATORIES, INC.



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**FIGURE 2**  
**Limited Phase II Environmental Site Assessment**  
Garden Oaks & Shepherd Park (Central) Drainage & Paving  
Soil Boring Location Map - Manning Electric LPST Facility  
(939 Fisher Street)  
Houston, Harris County, Texas  
ATL Project No. E14-111

Approximate Scale:  
1" = ~75'

**LEGEND**

- SB-4 - Soil Boring Location
- - - Potentially Petroleum Contaminated Area (GW)

ATL

ASSOCIATED TESTING  
LABORATORIES, INC.

Durham  
Elementary  
School &  
Park

Brinkman Street

Residential



UST Tank Pit

Martin Street

UST Canopy &  
Dispensers

SB-4

SB-5

4730

4728

SB-6

Residential

Approximate Scale:  
1" = ~50'

**LEGEND**

- SB-4 - Soil Boring Location
- - - Potentially Petroleum Contaminated Area (GW)

SB-7

**FIGURE 3**  
**Limited Phase II Environmental Site Assessment**  
 Garden Oaks & Shepherd Park (Central) Drainage and Paving  
 Soil Boring Location Map - Out-of-Use PST Facility & Cleaners  
 (4730 & 4728 Brinkman Street)  
 Houston, Harris County, Texas  
 ATL Project No. E14-111



**FIGURE 4**  
**Limited Phase II Environmental Site Assessment**  
 Garden Oaks and Shepherd Park (Central) Drainage and Paving  
 Soil Boring Location Map - High Speed Transmissions & historic repair  
 (4710 Brinkman Street)  
 Houston, Harris County, Texas  
 ATL Project No. E14-111

Approximate Scale:  
 1" = ~50'

**LEGEND**

- SB-8 - Soil Boring Location
- - - Potentially Petroleum Contaminated Area (GW)

<b>TABLE</b>
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TABLE I

**SUMMARY OF SOIL LABORATORY ANALYTICAL RESULTS - BTEX-MTBE/TPH  
GARDEN OAKS & SHEPHERD PARK (CENTRAL) AREA DRAINAGE AND PAVING  
HOUSTON, HARRIS COUNTY, TEXAS**

Sample ID	Date	Depth (feet)	MTBE (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	BTEX (mg/kg)	TPH C6-C12 (mg/kg)	TPH >C12-C28 (mg/kg)	TPH >C28-C35 (mg/kg)	Total TPH (mg/kg)
<b>TRRP Tier 1 PCLs (<sup>Tot</sup>Soil<sub>Comb</sub>)</b>			<b>804</b>	<b>32.0</b>	<b>4,500</b>	<b>5,300</b>	<b>6,400</b>	<b>NA</b>	<b>1,600</b>	<b>2,300</b>	<b>NA</b>	<b>NA</b>
<b>*TRRP Tier 1 PCLs (<sup>GW</sup>Soil<sub>Ing</sub>)</b>			<b>0.621</b>	<b>0.026</b>	<b>8.20</b>	<b>7.80</b>	<b>120</b>	<b>NA</b>	<b>65</b>	<b>200</b>	<b>NA</b>	<b>NA</b>
<b>SOIL BORING SOIL SAMPLES</b>												
<i>Vacant/former Manning Electric/LPST Facility (939 Fisher Street)</i>												
SB-1	07/11/14	4-6	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<26.5	<22.7	<19.8	<SDL
SB-2	07/11/14	8-10	<0.001	<0.001	<0.001	<0.005	<0.002	<SDL	<26.9	<23.0	<20.1	<SDL
SB-3	07/11/14	14-16	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<27.5	<23.5	<20.5	<SDL
<i>Lucky 7 Food Store/Out-of-Use PST Facility &amp; Lang's Alterations &amp; Clenaers (4730 Brinkman Street &amp; 4728 Brinkman Street)</i>												
SB-4	07/11/14	12-14	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<28.3	<24.2	<21.1	<SDL
SB-5	07/11/14	4-6	<0.001	<0.001	<0.001	<0.005	<0.002	<SDL	<26.7	<22.9	<19.9	<SDL
SB-6	07/11/14	8-10	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<26.8	<23.0	<20.0	<SDL
SB-7	07/11/14	2-4	<0.001	<0.001	<0.001	<0.005	<0.002	<SDL	<25.7	<22.1	<19.2	<SDL
<i>High Speed Transmissions &amp; historical vehicle service facilities (4710 Brinkman Street)</i>												
SB-8	07/11/14	8-10	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<26.9	<23.1	<20.1	<SDL
SB-9	07/11/14	12-14	<0.001	<0.001	<0.001	<0.006	<0.002	<SDL	<27.3	<23.4	<20.4	<SDL
SB-10	07/11/14	2-4	<0.001	<0.001	<0.001	<0.005	<0.002	<SDL	<26.7	<22.9	<20.0	<SDL
<b>Notes:</b>												
1. PCLs indicates TRRP Tier 1 Tables protective concentration limits.												
2. TRRP Tier 1 PCLs ( <sup>Tot</sup> Soil <sub>Comb</sub> ) indicates the PCLs for the combined soil exposure pathways (Residential, 0.5-acre site).												
3. TRRP Tier 1 PCLs ( <sup>GW</sup> Soil <sub>Ing</sub> ) indicates the PCLs for the leaching of soil concentrations into groundwater (Residential, 0.5-acre site).												
4. Analyses by the following methods: BTEX - EPA Method SW846-8021B; TPH - Texas Method 1005.												
5. Detections are provided in bold font.												
6. NA indicates Not Applicable, or Not Available.												
7. <SDL indicates less than or below sample detection limit (SDL).												

TABLE II

SUMMARY OF GROUNDWATER ANALYTICAL DATA - BTEX/TPH  
GARDEN OAKS & SHEPHERD PARK (CENTRAL) AREA DRAINAGE AND PAVING  
HOUSTON, HARRIS COUNTY, TEXAS

Sample ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethyl-Benzene (mg/L)	Xylenes (mg/L)	BTEX (mg/L)	MTBE (mg/L)	TPH C6-C12 (mg/L)	TPH >C12-C28 (mg/L)	TPH >C28-C35 (mg/L)	Total TPH (mg/L)
TRRP Tier 1 PCLs ( <sup>GW</sup> GW <sub>ing</sub> )		0.005	1.0	0.7	10.0	NA	0.244	0.98	0.98	0.98	NA
TRRP Tier 1 PCLs ( <sup>GW</sup> GW <sub>Class 3</sub> )		0.5	100	70	1,000	NA	24.4	97	97	97	NA
TRRP Tier 1 PCLs ( <sup>Air</sup> GW <sub>Inh-v</sub> )		50	6,203	15,648	1,676	NA	4,038	4,250	7,497	NA	NA
<b>SOIL BORINGS/TEMPORARY WELL POINTS</b>											
<i>Vacant/former Manning Electric/LPST Facility (939 Fisher Street)</i>											
SB-2/TWP-2	07/11/14	<0.0008	<0.001	<0.0008	<0.003	<SDL	<0.001	<0.907	<1.18	<1.03	<1.18
<i>Lucky 7 Food Store/Out-of-Use PST Facility &amp; Lang's Alterations &amp; Clenaers (4730 Brinkman Street &amp; 4728 Brinkman Street)</i>											
SB-4/TWP-4	07/11/14	<0.0008	<0.001	<0.0008	<0.003	<SDL	<b>0.011</b>	<0.928	<1.21	<1.05	<1.21
<i>High Speed Transmissions &amp; historical vehicle service facilities (4710 Brinkman Street)</i>											
SB-9/TWP-9	07/11/14	<0.0008	<0.001	<0.0008	<0.003	<SDL	<b>0.02</b>	<0.906	<1.18	<1.03	<1.18
<b>Notes:</b>											
1. PCLs indicates TRRP Tier 1 Tables protective concentration limits.											
2. TRRP Tier 1 PCLs ( <sup>GW</sup> GW <sub>ing</sub> ) indicates the PCLs for groundwater ingestion and is the same as MCLs under Federal Drinking Water Standards.											
3. TRRP Tier 1 PCLs ( <sup>GW</sup> GW <sub>Class 3</sub> ) indicates the PCLs for Class 3 groundwater conditions.											
4. TRRP Tier 1 PCLs ( <sup>Air</sup> GW <sub>Inh-v</sub> ) indicates the PCLs for the inhalation of water vapor.											
5. Analyses by the following methods: BTEX/MTBE - EPA Method SW846-8021; TPH - Texas Method 1005											
6. Detections are provided in bold font.											
7. NA indicates Not Applicable, or Not Available											
8. <SDL indicates below Sample Detection Limit											
9. Shaded cell indicates PCL exceedence, if applicable											
10. <i>Italics</i> indicates detection limit exceeded the PCL.											

# APPENDIX A

## Soil Boring Logs

**PROJECT NO:** E14-111  
**SITE NAME:** Garden Oaks & Shepherd Park (Central) Drainage and Paving  
**FACILITY ADDRESS:** Former Manning Electric LPST facility/site (939 Fisher Street)  
**DRILLING COMPANY / METHOD / RIG:** Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
**DRILLER:** Clay **DATE: (START / FINISH)** 07/11/2014 @ 10:40-10:58.  
**LOGGED BY:** T. Murphy **TOP OF CASING ELEVATION:** N/Apl.

BOREHOLE     MONITOR WELL  
 BORING NUMBER : SB-1    TEMP. WELL NUMBER :

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Aphalt/Concrete (4")	
0.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (surface to 7 feet)	SB-1 @ 4-6'; 10:45, 1-4 oz
5.0				SM	Sand and silty sand; Very light gray sand and silty sand, medium-grained, wet (7-19 feet)	
10.0				CL	Sandy clay; Light gray clay, fines, moist with Fe staining (19-20 feet)	
15.0						
20.0						
25.0						
30.0						
35.0						
40.0						
45.0						

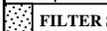
FILTER SAND     BENTONITE SEAL     GROUT / CONCRETE SURFACE     WATER ENCOUNTERED

**A T L Associated Testing Laboratories, Inc.**  
 TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE     RISER W/CONCRETE    SHEET 1 OF 1

**PROJECT NO:** E14-111  
**SITE NAME:** Garden Oaks & Shepherd Park (Central) Drainage and Paving  
**FACILITY ADDRESS:** Former Manning Electric LPST facility/site (939 Fisher Street)  
**DRILLING COMPANY / METHOD / RIG:** Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
**DRILLER:** Clay **DATE: (START / FINISH)** 07/11/2014 @ 9:38-10:04.  
**LOGGED BY:** T. Murphy **TOP OF CASING ELEVATION:** N/Apl.

BOREHOLE     MONITOR WELL  
**BORING NUMBER :** SB-2    **TEMP. WELL NUMBER :** TWP-2

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Concrete (4")	
0.0				CL	Sandy clay; Brown and reddish-orange sandy clay, fines, moist (surface to 3 feet)	
0.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (3-7 feet)	
5.0				SM	Sand and silty clay; Very light gray sand and silty sand, medium-grained, wet (7-19 feet)	
10.0				CL	Sandy clay; Light gray clay, fines, moist with Fe staining (19-20 feet)	SB-2 @ 8-10'; 9:47, 1-4 oz
15.0						
20.0						
25.0						
30.0						
35.0						
40.0						
45.0						

 FILTER SAND   
  BENTONITE SEAL   
  GROUT / CONCRETE SURFACE   
 ▼ WATER ENCOUNTERED

**A T L Associated Testing Laboratories, Inc.**

TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE     RISER W/CONCRETE    SHEET 1 OF 1

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER: SB-3 TEMP. WELL NUMBER: \_\_\_\_\_  
 FACILITY ADDRESS: Former Manning Electric LPST facility/site (939 Fisher Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 11:12-11:31.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Asphalt/Concrete (4")	
0.0				Fill	Fill, Gravel and sand (surface to 1-foot)	
0.0				CL	Sandy clay; Brown and reddish-orange sandy clay, fines, moist (1-foot to 4 feet)	
5.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (4-7 feet)	
10.0				SM	Sand and silty sand; Yellowish-brown and reddish-orange sand and silty sand, medium-grained, wet (7-15 feet)	
15.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (15-20 feet)	SB-3 @ 14-16'; 11:25, 1-4 oz
20.0						
25.0						
30.0						
35.0						
40.0						
45.0						

FILTER SAND   
  BENTONITE SEAL   
  GROUT / CONCRETE SURFACE   
  WATER ENCOUNTERED

TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE  RISER W/CONCRETE    SHEET 1 OF 1

**A** *Associated Testing*  
**TL** *Laboratories, Inc.*

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER: SB-4 TEMP. WELL NUMBER: TWP-4  
 FACILITY ADDRESS: Lucky 7 Food Store & cleaners (4730 & 4728 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 12:22-12:42.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Appl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Asphalt (4")	
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
5.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-8 feet)	
10.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (8-10 feet)	
15.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (10-20 feet)	SB-4 @ 12-14'; 12:31, 1-4 oz
20.0						
25.0						
30.0						
35.0						
40.0						
45.0						

FILTER SAND    
  BENTONITE SEAL    
  GROUT / CONCRETE SURFACE    
  WATER ENCOUNTERED

TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE  RISER W/CONCRETE     SHEET 1 OF 1

**A** *Associated Testing*  
**TL** *Laboratories, Inc.*

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER : SB-5 TEMP. WELL NUMBER : \_\_\_\_\_  
 FACILITY ADDRESS: Lucky 7 Food Store & cleaners (4730 & 4728 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 13:17-13:37.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
			Ground Surface			
0					Asphalt (4")	
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
0.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-6 feet)	SB-5 @ 4-6'; 13:25, 1-4 oz
5.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (6-13 feet)	
10.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (13-20 feet)	
15.0						
20.0						
25.0					Total Depth = 20 ft	
30.0					Note: Asphalt drilled at 13:13. Subsurface clearance at 13:16. No odor.	
35.0						
40.0						
45.0						

TOTAL DEPTH: <u>20'</u>			
SEAL MATERIAL: (TYPE/INTERVAL) <u>Bentonite to surface</u>			
SURFACE COMPLETION: <input type="checkbox"/> FLUSH W/CONCRETE <input type="checkbox"/> RISER W/CONCRETE			
<b>A</b> <b>TL</b>		<b>Associated Testing Laboratories, Inc.</b>	
SHEET <u>1</u> OF <u>1</u>			

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER : SB-6 TEMP. WELL NUMBER : \_\_\_\_\_  
 FACILITY ADDRESS: Lucky 7 Food Store & cleaners (4730 & 4728 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 13:52-14:10.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Asphalt (4")	
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
0.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-5 feet)	
5.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (5-11 feet)	SB-6 @ 8-10'; 14:00, 1-4 oz
10.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (11-20 feet)	
15.0						
20.0						
25.0						
30.0						
35.0						
40.0						
45.0						

FILTER SAND   
  BENTONITE SEAL   
  GROUT / CONCRETE SURFACE   
  WATER ENCOUNTERED

TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE  RISER W/CONCRETE    SHEET 1 OF 1

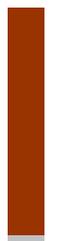
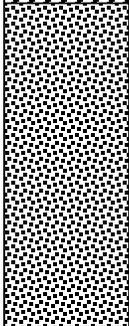
**A** Associated Testing  
**TL** Laboratories, Inc.

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER: SB-7 TEMP. WELL NUMBER: \_\_\_\_\_  
 FACILITY ADDRESS: Lucky 7 Food Store & cleaners (4730 & 4728 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 14:25-14:49.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface		Asphalt (5")	
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
0.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-5 feet)	SB-7 @ 2'-4"; 14:26, 1-4 oz
5.0			CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (5-11 feet)		
11.0			SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (11-20 feet)		
20.0			Total Depth = 20 ft			
25.0			Note: Concrete drilled at 14:19. Subsurface clearance at 14:21. No odor.			
30.0						
35.0						
40.0						
45.0						

FILTER SAND	BENTONITE SEAL	GROUT / CONCRETE SURFACE	WATER ENCOUNTERED
<b>A</b> <i>Associated Testing</i> <b>TL</b> <i>Laboratories, Inc.</i>		TOTAL DEPTH: <u>20'</u> SEAL MATERIAL: (TYPE/INTERVAL) <u>Bentonite to surface</u> SURFACE COMPLETION: <input type="checkbox"/> FLUSH W/CONCRETE <input type="checkbox"/> RISER W/CONCRETE	
		SHEET <u>1</u> OF <u>1</u>	

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER: SB-8 TEMP. WELL NUMBER: \_\_\_\_\_  
 FACILITY ADDRESS: High Speed Transmissions and historical car repair (4710 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 14:55-15:13.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

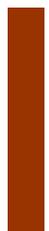
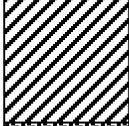
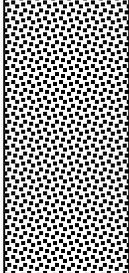
DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface			
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
2.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-7 feet)	
7.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (7-10 feet)	SB-8 @ 8-10'; 15:05, 1-4 oz
10.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (10-20 feet)	
20.0					Total Depth = 20 ft	
25.0					Note: Subsurface clearance at 14:21. No odor.	
30.0						
35.0						
40.0						
45.0						

FILTER SAND    
  BENTONITE SEAL    
  GROUT / CONCRETE SURFACE    
  WATER ENCOUNTERED

TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE  RISER W/CONCRETE     SHEET 1 OF 1

**A T L Associated Testing Laboratories, Inc.**

PROJECT NO: E14-111  BOREHOLE  MONITOR WELL  
 SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving BORING NUMBER: SB-9 TEMP. WELL NUMBER: TWP-9  
 FACILITY ADDRESS: High Speed Transmissions and historical car repair (4710 Brinkman Street)  
 DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve  
 DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 15:23-16:11.  
 LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
0			Ground Surface			
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
2.0				ML	Sandy loam; Brown sandy loam, fines, moist (2-7 feet)	
7.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (7-11 feet)	
11.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (11-20 feet)	SB-9 @ 12-14'; 15:42, 1-4 oz
20.0					Total Depth = 20 ft	
25.0					Note: Groundwater encountered at 13 feet. Subsurface clearance at 15:20.	
30.0					Groundwater sampled at 16:14.	
35.0						
40.0						
45.0						

FILTER SAND    
  BENTONITE SEAL    
  GROUT / CONCRETE SURFACE    
  WATER ENCOUNTERED

**A T L Associated Testing Laboratories, Inc.**    
 TOTAL DEPTH: 20'  
 SEAL MATERIAL: (TYPE/INTERVAL) Bentonite to surface  
 SURFACE COMPLETION:  FLUSH W/CONCRETE   
  RISER W/CONCRETE   
 SHEET 1 OF 1

PROJECT NO: E14-111

SITE NAME: Garden Oaks & Shepherd Park (Central) Drainage and Paving

FACILITY ADDRESS: Lucky 7 Food Store & cleaners (4730 & 4720 Brinkman Street)

DRILLING COMPANY / METHOD / RIG: Apline Services/Truck-mounted hydraulically-driven drill rig with sampling sleeve

DRILLER: Clay DATE: (START / FINISH) 07/11/2014 @ 16:34-16:51.

LOGGED BY: T. Murphy TOP OF CASING ELEVATION: N/Apl.

BOREHOLE     MONITOR WELL

BORING NUMBER : SB-10    TEMP. WELL NUMBER : \_\_\_\_\_

DEPTH (FEET)	PID	SAMPLE INTERVAL	STRATIGRAPHY	USCS	SOIL DESCRIPTION AND COMMENT (CLASSIFICATION, GRAIN SIZE, COLOR, MOISTURE, ODOR, OTHER)	NOTES
Ground Surface						
0					Asphalt (5")	
0.0				Fill	Fill, Gravel and sand (surface to 2 feet)	
0.0		X		ML	Sandy loam; Brown sandy loam, fines, moist (2-7 feet)	SB-10 @ 2-4'; 16:35, 1-4 oz
5.0				CL	Sandy clay; Light gray sandy clay, fines, moist with FE staining (7-11 feet)	
10.0				SM	Sand and silty sand; Light gray sand and silty sand, medium-grained, moist to wet (11-20 feet)	
20.0						
Total Depth = 20 ft						
Note: Asphalt drilled at 16:30. Subsurface clearance at 14:21. No odor.						

TOTAL DEPTH: <u>20'</u>			
SEAL MATERIAL: (TYPE/INTERVAL) <u>Bentonite to surface</u>			
SURFACE COMPLETION: <input type="checkbox"/> FLUSH W/CONCRETE <input type="checkbox"/> RISER W/CONCRETE    SHEET <u>1</u> OF <u>1</u>			

**A**    **Associated Testing**  
**TL**    **Laboratories, Inc.**

## **APPENDIX B**

### Laboratory Analytical Results

# Laboratory Analysis Report

Total Number of Pages: 46

Job ID : 14070601



10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, <http://www.ablabs.com>

## Client Project Name :

E14-111 / Garden Oaks + Shepherd Forest Area

Report To : Client Name: Associated Testing Lab  
Attn: Tom Murphy  
Client Address: 3143 Yellowstone Blvd.  
City, State, Zip: Houston, Texas, 77054

P.O.#.:  
Sample Collected By: Tom Murphy  
Date Collected: 07/11/14

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
SB-1 @ 4'-6'	Soil	14070601.01
SB-2 @ 8'-10'	Soil	14070601.02
SB-3 @ 14'-16'	Soil	14070601.03
SB-4 @ 12'-14'	Soil	14070601.04
SB-5 @ 4'-6'	Soil	14070601.05
SB-6 @ 8'-10'	Soil	14070601.06
SB-7 @ 2'-4'	Soil	14070601.07
SB-8 @ 8'-10'	Soil	14070601.08
SB-9 @ 12'-14'	Soil	14070601.09
SB-10 @ 2'-4'	Soil	14070601.10
SB-2 / TWP-2	Water	14070601.11
SB-4 / TWP-4	Water	14070601.12
SB-9 / TWP-9	Water	14070601.13

*Alisha Hughes*

Released By: Alisha Hughes  
Title: Project Manager  
Date: 7/21/2014



This Laboratory is NELAP (T104704213-14-11) accredited. Effective: 04/01/2014; Expires: 03/31/2015

Scope: Non-Potable Water, Drinking Water, Air, Solid, Hazardous Waste

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

Date Received : 07/14/2014 10:09



LABORATORY TEST RESULTS

Client Sample ID: SB-1 @ 4'-6'  
A&B Job Sample ID: 14070601.01

Date: 7/21/2014

Client Name: Associated Testing Lab  
Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
Analytical Method: SM 2540G  
QC Batch ID: Qb14071642  
Prep Method: SM 2540G  
Prepared By: MMaldonado  
Prep Batch ID: PB14071622  
Analyst Initial: MAM

Sample Matrix: Soil  
Date Collected: 07/11/2014 10:45  
Date Received: 07/14/2014 10:09  
Date Prepared: 07/16/2014 13:05

% Moisture: 10.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	10.6					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-1 @ 4'-6'  
 A&B Job Sample ID: 14070601.01

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 10:45  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 10.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.01	07/14/14 22:40
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.01	07/14/14 22:40
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.01	07/14/14 22:40
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	1.01	07/14/14 22:40
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.011	0.005	0.01	0.8	mg/Kg	1.01	07/14/14 22:40
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	1.01	07/14/14 22:40
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	1.01	07/14/14 22:40
98-08-8	Trifluorotoluene(surr)	96						81 111	%	1.005	07/14/14 22:40

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-1 @ 4'-6'  
 A&B Job Sample ID: 14070601.01

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 10:45  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 10.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.5	Q18,U	26.5	28	23.7	25	1000	mg/Kg	1	07/15/14 17:18
TPH-1005-2	>C12-C28 <sup>1</sup>	< 22.7	U	22.7	28	20.3	25	1000	mg/Kg	1	07/15/14 17:18
TPH-1005-4	>C28-C35 <sup>1</sup>	< 19.8	U	19.8	28	17.7	25	1000	mg/Kg	1	07/15/14 17:18
	Total C6-C35	<26.5					----	----	mg/Kg	1	07/15/14 17:18
111-85-3	1-Chlorooctane(surr)	112					60	143	%	1	07/15/14 17:18
3386-33-2	Chlorooctadecane(sur)	124					60	150	%	1	07/15/14 17:18

Soil results reported on dry weight basis



LABORATORY TEST RESULTS

Client Sample ID: SB-2 @ 8'-10'  
A&B Job Sample ID: 14070601.02

Date: 7/21/2014

Client Name: Associated Testing Lab  
Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
Analytical Method: SM 2540G  
QC Batch ID: Qb14071642  
Prep Method: SM 2540G  
Prepared By: MMaldonado  
Prep Batch ID: PB14071622  
Analyst Initial: MAM

Sample Matrix: Soil  
Date Collected: 07/11/2014 09:47  
Date Received: 07/14/2014 10:09  
Date Prepared: 07/16/2014 13:05

% Moisture: 11.8

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	11.8					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-2 @ 8'-10'  
 A&B Job Sample ID: 14070601.02

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 09:47  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 11.8

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/14/14 21:22
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/14/14 21:22
108-88-3	Toluene	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/14/14 21:22
100-41-4	Ethylbenzene	< 0.005	U	0.005	0.005	0.005	0.005	0.4	mg/Kg	0.93	07/14/14 21:22
108-38-3&106-4	m- & p-Xylenes	< 0.005	U	0.005	0.011	0.005	0.01	0.8	mg/Kg	0.93	07/14/14 21:22
95-47-6	o-Xylene	< 0.002	U	0.002	0.005	0.002	0.005	0.4	mg/Kg	0.93	07/14/14 21:22
1330-20-7	Xylenes	< 0.002	U	0.002	0.005	0.002	0.005	1.2	mg/Kg	0.93	07/14/14 21:22
98-08-8	Trifluorotoluene(surr)	90						81 111	%	0.934	07/14/14 21:22

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-2 @ 8'-10'  
 A&B Job Sample ID: 14070601.02

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 09:47  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 11.8

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.9	Q18,U	26.9	28.3	23.7	25	1000	mg/Kg	1	07/15/14 17:42
TPH-1005-2	>C12-C28 <sup>1</sup>	< 23	U	23	28.3	20.3	25	1000	mg/Kg	1	07/15/14 17:42
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20.1	U	20.1	28.3	17.7	25	1000	mg/Kg	1	07/15/14 17:42
	Total C6-C35	<26.9					----	----	mg/Kg	1	07/15/14 17:42
111-85-3	1-Chlorooctane(surr)	115					60	143	%	1	07/15/14 17:42
3386-33-2	Chlorooctadecane(sur	112					60	150	%	1	07/15/14 17:42

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-3 @ 14'-16'  
 A&B Job Sample ID: 14070601.03

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
 Analytical Method: SM 2540G  
 QC Batch ID: Qb14071642  
 Prep Method: SM 2540G  
 Prepared By: MMaldonado  
 Prep Batch ID: PB14071622  
 Analyst Initial: MAM

Sample Matrix: Soil  
 Date Collected: 07/11/2014 11:25  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/16/2014 13:05

% Moisture: 13.7

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	13.7					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-3 @ 14'-16'  
 A&B Job Sample ID: 14070601.03

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 11:25  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 13.7

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.00	07/14/14 20:57
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.00	07/14/14 20:57
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.00	07/14/14 20:57
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	1.00	07/14/14 20:57
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.012	0.005	0.01	0.8	mg/Kg	1.00	07/14/14 20:57
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	1.00	07/14/14 20:57
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	1.00	07/14/14 20:57
98-08-8	Trifluorotoluene(surr)	96.5						81 111	%	0.995	07/14/14 20:57

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-3 @ 14'-16'  
 A&B Job Sample ID: 14070601.03

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 11:25  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 13.7

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 27.5	Q18,U	27.5	29	23.7	25	1000	mg/Kg	1	07/15/14 18:06
TPH-1005-2	>C12-C28 <sup>1</sup>	< 23.5	U	23.5	29	20.3	25	1000	mg/Kg	1	07/15/14 18:06
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20.5	U	20.5	29	17.7	25	1000	mg/Kg	1	07/15/14 18:06
	Total C6-C35	<27.5					----	----	mg/Kg	1	07/15/14 18:06
111-85-3	1-Chlorooctane(surr)	112					60	143	%	1	07/15/14 18:06
3386-33-2	Chlorooctadecane(sur	131					60	150	%	1	07/15/14 18:06

Soil results reported on dry weight basis



LABORATORY TEST RESULTS

Client Sample ID: SB-4 @ 12'-14'  
A&B Job Sample ID: 14070601.04

Date: 7/21/2014

Client Name: Associated Testing Lab  
Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
Analytical Method: SM 2540G  
QC Batch ID: Qb14071642  
Prep Method: SM 2540G  
Prepared By: MMaldonado  
Prep Batch ID: PB14071622  
Analyst Initial: MAM

Sample Matrix: Soil  
Date Collected: 07/11/2014 12:31  
Date Received: 07/14/2014 10:09  
Date Prepared: 07/16/2014 13:05

% Moisture: 16.2

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	16.2					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-4 @ 12'-14'  
 A&B Job Sample ID: 14070601.04

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 12:31  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 16.2

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	0.98	07/14/14 20:31
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	0.98	07/14/14 20:31
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	0.98	07/14/14 20:31
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	0.98	07/14/14 20:31
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.012	0.005	0.01	0.8	mg/Kg	0.98	07/14/14 20:31
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	0.98	07/14/14 20:31
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	0.98	07/14/14 20:31
98-08-8	Trifluorotoluene(surr)	91.5						81 111	%	0.975	07/14/14 20:31

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-4 @ 12'-14'  
 A&B Job Sample ID: 14070601.04

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 12:31  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 16.2

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 28.3	Q18,U	28.3	29.8	23.7	25	1000	mg/Kg	1	07/15/14 18:30
TPH-1005-2	>C12-C28 <sup>1</sup>	< 24.2	U	24.2	29.8	20.3	25	1000	mg/Kg	1	07/15/14 18:30
TPH-1005-4	>C28-C35 <sup>1</sup>	< 21.1	U	21.1	29.8	17.7	25	1000	mg/Kg	1	07/15/14 18:30
	Total C6-C35	<28.3					----	----	mg/Kg	1	07/15/14 18:30
111-85-3	1-Chlorooctane(surr)	116					60	143	%	1	07/15/14 18:30
3386-33-2	Chlorooctadecane(sur)	113					60	150	%	1	07/15/14 18:30

Soil results reported on dry weight basis



LABORATORY TEST RESULTS

Client Sample ID: SB-5 @ 4'-6'
A&B Job Sample ID: 14070601.05

Date: 7/21/2014

Client Name: Associated Testing Lab
Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: % Moisture
Analytical Method: SM 2540G
QC Batch ID: Qb14071642
Prep Method: SM 2540G
Prepared By: MMaldonado
Prep Batch ID: PB14071622
Analyst Initial: MAM

Sample Matrix: Soil
Date Collected: 07/11/2014 13:25
Date Received: 07/14/2014 10:09
Date Prepared: 07/16/2014 13:05

% Moisture: 11.2

Table with 11 columns: CAS Number, Parameter, Result, Flag, SDL, SQL, MDL, MQL, UQL, Units, DF, Date/Time. Row 1: % Moisture^1, 11.2, ----, ----, %, 1, 07/16/14 13:06



**LABORATORY TEST RESULTS**

Client Sample ID: SB-5 @ 4'-6'  
 A&B Job Sample ID: 14070601.05

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 13:25  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 11.2

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 03:25
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 03:25
108-88-3	Toluene	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 03:25
100-41-4	Ethylbenzene	< 0.005	U	0.005	0.005	0.005	0.005	0.4	mg/Kg	0.97	07/15/14 03:25
108-38-3&106-4	m- & p-Xylenes	< 0.005	U	0.005	0.011	0.005	0.01	0.8	mg/Kg	0.97	07/15/14 03:25
95-47-6	o-Xylene	< 0.002	U	0.002	0.005	0.002	0.005	0.4	mg/Kg	0.97	07/15/14 03:25
1330-20-7	Xylenes	< 0.002	U	0.002	0.005	0.002	0.005	1.2	mg/Kg	0.97	07/15/14 03:25
98-08-8	Trifluorotoluene(surr)	91.5						81 111	%	0.966	07/15/14 03:25

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-5 @ 4'-6'  
 A&B Job Sample ID: 14070601.05

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 13:25  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 11.2

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.7	Q18,U	26.7	28.2	23.7	25	1000	mg/Kg	1	07/15/14 20:06
TPH-1005-2	>C12-C28 <sup>1</sup>	< 22.9	U	22.9	28.2	20.3	25	1000	mg/Kg	1	07/15/14 20:06
TPH-1005-4	>C28-C35 <sup>1</sup>	< 19.9	U	19.9	28.2	17.7	25	1000	mg/Kg	1	07/15/14 20:06
	Total C6-C35	<26.7					----	----	mg/Kg	1	07/15/14 20:06
111-85-3	1-Chlorooctane(surr)	109					60	143	%	1	07/15/14 20:06
3386-33-2	Chlorooctadecane(sur	123					60	150	%	1	07/15/14 20:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-6 @ 8'-10'  
 A&B Job Sample ID: 14070601.06

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
 Analytical Method: SM 2540G  
 QC Batch ID: Qb14071642  
 Prep Method: SM 2540G  
 Prepared By: MMaldonado  
 Prep Batch ID: PB14071622  
 Analyst Initial: MAM

Sample Matrix: Soil  
 Date Collected: 07/11/2014 14:00  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/16/2014 13:05

% Moisture: 11.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	11.6					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-6 @ 8'-10'  
 A&B Job Sample ID: 14070601.06

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 14:00  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 11.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.03	07/15/14 00:49
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.03	07/15/14 00:49
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.03	07/15/14 00:49
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	1.03	07/15/14 00:49
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.012	0.005	0.01	0.8	mg/Kg	1.03	07/15/14 00:49
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	1.03	07/15/14 00:49
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	1.03	07/15/14 00:49
98-08-8	Trifluorotoluene(surr)	99.5						81	111	%	1.025 07/15/14 00:49

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-6 @ 8'-10'  
 A&B Job Sample ID: 14070601.06

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 14:00  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 11.6

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.8	Q18,U	26.8	28.3	23.7	25	1000	mg/Kg	1	07/15/14 20:29
TPH-1005-2	>C12-C28 <sup>1</sup>	< 23	U	23	28.3	20.3	25	1000	mg/Kg	1	07/15/14 20:29
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20	U	20	28.3	17.7	25	1000	mg/Kg	1	07/15/14 20:29
	Total C6-C35	<26.8					----	----	mg/Kg	1	07/15/14 20:29
111-85-3	1-Chlorooctane(surr)	132					60	143	%	1	07/15/14 20:29
3386-33-2	Chlorooctadecane(sur)	126					60	150	%	1	07/15/14 20:29

Soil results reported on dry weight basis



LABORATORY TEST RESULTS

Client Sample ID: SB-7 @ 2'-4'  
A&B Job Sample ID: 14070601.07

Date: 7/21/2014

Client Name: Associated Testing Lab  
Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
Analytical Method: SM 2540G  
QC Batch ID: Qb14071642  
Prep Method: SM 2540G  
Prepared By: MMaldonado  
Prep Batch ID: PB14071622  
Analyst Initial: MAM

Sample Matrix: Soil  
Date Collected: 07/11/2014 14:26  
Date Received: 07/14/2014 10:09  
Date Prepared: 07/16/2014 13:05

% Moisture: 7.96

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	7.96					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-7 @ 2'-4'  
 A&B Job Sample ID: 14070601.07

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 14:26  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 7.96

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/15/14 00:23
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/15/14 00:23
108-88-3	Toluene	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.93	07/15/14 00:23
100-41-4	Ethylbenzene	< 0.005	U	0.005	0.005	0.005	0.005	0.4	mg/Kg	0.93	07/15/14 00:23
108-38-3&106-4	m- & p-Xylenes	< 0.005	U	0.005	0.01	0.005	0.01	0.8	mg/Kg	0.93	07/15/14 00:23
95-47-6	o-Xylene	< 0.002	U	0.002	0.005	0.002	0.005	0.4	mg/Kg	0.93	07/15/14 00:23
1330-20-7	Xylenes	< 0.002	U	0.002	0.005	0.002	0.005	1.2	mg/Kg	0.93	07/15/14 00:23
98-08-8	Trifluorotoluene(surr)	90.5						81 111	%	0.934	07/15/14 00:23

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-7 @ 2'-4'  
 A&B Job Sample ID: 14070601.07

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 14:26  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 7.96

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 25.7	Q18,U	25.7	27.2	23.7	25	1000	mg/Kg	1	07/15/14 20:53
TPH-1005-2	>C12-C28 <sup>1</sup>	< 22.1	U	22.1	27.2	20.3	25	1000	mg/Kg	1	07/15/14 20:53
TPH-1005-4	>C28-C35 <sup>1</sup>	< 19.2	U	19.2	27.2	17.7	25	1000	mg/Kg	1	07/15/14 20:53
	Total C6-C35	<25.7					----	----	mg/Kg	1	07/15/14 20:53
111-85-3	1-Chlorooctane(surr)	97.7					60	143	%	1	07/15/14 20:53
3386-33-2	Chlorooctadecane(sur	115					60	150	%	1	07/15/14 20:53

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-8 @ 8'-10'  
 A&B Job Sample ID: 14070601.08

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
 Analytical Method: SM 2540G  
 QC Batch ID: Qb14071642  
 Prep Method: SM 2540G  
 Prepared By: MMaldonado  
 Prep Batch ID: PB14071622  
 Analyst Initial: MAM

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:05  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/16/2014 13:05

% Moisture: 12.0

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	12					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-8 @ 8'-10'  
 A&B Job Sample ID: 14070601.08

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:05  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 12.0

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.02	07/14/14 23:58
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.02	07/14/14 23:58
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1.02	07/14/14 23:58
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	1.02	07/14/14 23:58
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.012	0.005	0.01	0.8	mg/Kg	1.02	07/14/14 23:58
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	1.02	07/14/14 23:58
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	1.02	07/14/14 23:58
98-08-8	Trifluorotoluene(surr)	96.5						81	111	%	1.015 07/14/14 23:58

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-8 @ 8'-10'  
 A&B Job Sample ID: 14070601.08

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:05  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 12.0

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.9	Q18,U	26.9	28.4	23.7	25	1000	mg/Kg	1	07/15/14 21:16
TPH-1005-2	>C12-C28 <sup>1</sup>	< 23.1	U	23.1	28.4	20.3	25	1000	mg/Kg	1	07/15/14 21:16
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20.1	U	20.1	28.4	17.7	25	1000	mg/Kg	1	07/15/14 21:16
	Total C6-C35	<26.9					----	----	mg/Kg	1	07/15/14 21:16
111-85-3	1-Chlorooctane(surr)	119					60	143	%	1	07/15/14 21:16
3386-33-2	Chlorooctadecane(sur	114					60	150	%	1	07/15/14 21:16

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-9 @ 12'-14'  
 A&B Job Sample ID: 14070601.09

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
 Analytical Method: SM 2540G  
 QC Batch ID: Qb14071642  
 Prep Method: SM 2540G  
 Prepared By: MMaldonado  
 Prep Batch ID: PB14071622  
 Analyst Initial: MAM

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:42  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/16/2014 13:05

% Moisture: 13.3

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	13.3					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-9 @ 12'-14'  
 A&B Job Sample ID: 14070601.09

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:42  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 13.3

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1	07/15/14 06:52
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1	07/15/14 06:52
108-88-3	Toluene	< 0.001	U	0.001	0.006	0.001	0.005	0.4	mg/Kg	1	07/15/14 06:52
100-41-4	Ethylbenzene	< 0.006	U	0.006	0.006	0.005	0.005	0.4	mg/Kg	1	07/15/14 06:52
108-38-3&106-4	m- & p-Xylenes	< 0.006	U	0.006	0.012	0.005	0.01	0.8	mg/Kg	1	07/15/14 06:52
95-47-6	o-Xylene	< 0.002	U	0.002	0.006	0.002	0.005	0.4	mg/Kg	1	07/15/14 06:52
1330-20-7	Xylenes	< 0.002	U	0.002	0.006	0.002	0.005	1.2	mg/Kg	1	07/15/14 06:52
98-08-8	Trifluorotoluene(surr)	99.5						81 111	%	1	07/15/14 06:52

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-9 @ 12'-14'  
 A&B Job Sample ID: 14070601.09

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 15:42  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 13.3

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 27.3	U	27.3	28.8	23.7	25	1000	mg/Kg	1	07/15/14 21:40
TPH-1005-2	>C12-C28 <sup>1</sup>	< 23.4	U	23.4	28.8	20.3	25	1000	mg/Kg	1	07/15/14 21:40
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20.4	U	20.4	28.8	17.7	25	1000	mg/Kg	1	07/15/14 21:40
	Total C6-C35	<27.3					----	----	mg/Kg	1	07/15/14 21:40
111-85-3	1-Chlorooctane(surr)	119					60	143	%	1	07/15/14 21:40
3386-33-2	Chlorooctadecane(sur)	113					60	150	%	1	07/15/14 21:40

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-10 @ 2'-4'  
 A&B Job Sample ID: 14070601.10

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **% Moisture**  
 Analytical Method: SM 2540G  
 QC Batch ID: Qb14071642  
 Prep Method: SM 2540G  
 Prepared By: MMaldonado  
 Prep Batch ID: PB14071622  
 Analyst Initial: MAM

Sample Matrix: Soil  
 Date Collected: 07/11/2014 16:35  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/16/2014 13:05

% Moisture: 11.4

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
	% Moisture <sup>1</sup>	11.4					----	----	%	1	07/16/14 13:06

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-10 @ 2'-4'  
 A&B Job Sample ID: 14070601.10

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071518  
 Prep Method: SW-846 5035A  
 Prepared By: Spabba  
 Prep Batch ID: PB14071508

Sample Matrix: Soil  
 Date Collected: 07/11/2014 16:35  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 15:00

Analyst Initial: SP

% Moisture: 11.4

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 06:26
71-43-2	Benzene	< 0.001	Q18,U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 06:26
108-88-3	Toluene	< 0.001	U	0.001	0.005	0.001	0.005	0.4	mg/Kg	0.97	07/15/14 06:26
100-41-4	Ethylbenzene	< 0.005	U	0.005	0.005	0.005	0.005	0.4	mg/Kg	0.97	07/15/14 06:26
108-38-3&106-4	m- & p-Xylenes	< 0.005	U	0.005	0.011	0.005	0.01	0.8	mg/Kg	0.97	07/15/14 06:26
95-47-6	o-Xylene	< 0.002	U	0.002	0.005	0.002	0.005	0.4	mg/Kg	0.97	07/15/14 06:26
1330-20-7	Xylenes	< 0.002	U	0.002	0.005	0.002	0.005	1.2	mg/Kg	0.97	07/15/14 06:26
98-08-8	Trifluorotoluene(surr)	91					81	111	%	0.966	07/15/14 06:26

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-10 @ 2'-4'  
 A&B Job Sample ID: 14070601.10

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: qb14071557  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071620

Sample Matrix: Soil  
 Date Collected: 07/11/2014 16:35  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 16:00

Analyst Initial: AVB

% Moisture: 11.4

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 26.7	Q18,U	26.7	28.2	23.7	25	1000	mg/Kg	1	07/15/14 22:04
TPH-1005-2	>C12-C28 <sup>1</sup>	< 22.9	U	22.9	28.2	20.3	25	1000	mg/Kg	1	07/15/14 22:04
TPH-1005-4	>C28-C35 <sup>1</sup>	< 20	U	20	28.2	17.7	25	1000	mg/Kg	1	07/15/14 22:04
	Total C6-C35	<26.7					----	----	mg/Kg	1	07/15/14 22:04
111-85-3	1-Chlorooctane(surr)	122					60	143	%	1	07/15/14 22:04
3386-33-2	Chlorooctadecane(sur)	110					60	150	%	1	07/15/14 22:04

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-2 / TWP-2  
 A&B Job Sample ID: 14070601.11

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071525  
 Prep Method: SW-846 5030C  
 Prepared By: Spabba  
 Prep Batch ID: PB14071510

Sample Matrix: Water  
 Date Collected: 07/11/2014 10:20  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 14:50

Analyst Initial: SP

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	< 0.001	U	0.001	0.002	.0014	0.002	0.16	mg/L	1	07/14/14 16:10
71-43-2	Benzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 16:10
108-88-3	Toluene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 16:10
100-41-4	Ethylbenzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 16:10
108-38-3&106-4	m- & p-Xylenes	< 0.002	U	0.002	0.004	.0016	0.004	0.32	mg/L	1	07/14/14 16:10
95-47-6	o-Xylene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 16:10
1330-20-7	Xylenes	< 0.003	U	0.003	0.002	.0025	0.002	0.48	mg/L	1	07/14/14 16:10
98-08-8	Trifluorotoluene(surr)	76.3						75 125	%	1	07/14/14 16:10

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-2 / TWP-2  
 A&B Job Sample ID: 14070601.11

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: Qb14071653  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071631

Sample Matrix: Water  
 Date Collected: 07/11/2014 10:20  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 13:00

Analyst Initial: AVB

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 0.907	Q8,U	0.907	2.06	0.66	1.5	60	mg/L	1.374	07/14/14 15:45
TPH-1005-2	>C12-C28 <sup>1</sup>	< 1.18	U	1.18	2.06	0.86	1.5	60	mg/L	1.374	07/14/14 15:45
TPH-1005-4	>C28-C35 <sup>1</sup>	< 1.03	U	1.03	2.06	0.75	1.5	60	mg/L	1.374	07/14/14 15:45
	Total C6-C35	<1.18					----	----	mg/L	1.374	07/14/14 15:45
111-85-3	1-Chlorooctane(surr)	87.7					59	122	%	1.374	07/14/14 15:45
3386-33-2	Chlorooctadecane(sur	98.3					48	123	%	1.374	07/14/14 15:45



**LABORATORY TEST RESULTS**

Client Sample ID: SB-4 / TWP-4  
 A&B Job Sample ID: 14070601.12

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071525  
 Prep Method: SW-846 5030C  
 Prepared By: Spabba  
 Prep Batch ID: PB14071510

Sample Matrix: Water  
 Date Collected: 07/11/2014 12:54  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 14:50

Analyst Initial: SP

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	0.011		0.001	0.002	.0014	0.002	0.16	mg/L	1	07/14/14 17:30
71-43-2	Benzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 17:30
108-88-3	Toluene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 17:30
100-41-4	Ethylbenzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 17:30
108-38-3&106-4	m- & p-Xylenes	< 0.002	U	0.002	0.004	.0016	0.004	0.32	mg/L	1	07/14/14 17:30
95-47-6	o-Xylene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 17:30
1330-20-7	Xylenes	< 0.003	U	0.003	0.002	.0025	0.002	0.48	mg/L	1	07/14/14 17:30
98-08-8	Trifluorotoluene(surr)	92.5						75 125	%	1	07/14/14 17:30

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-4 / TWP-4  
 A&B Job Sample ID: 14070601.12

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: Qb14071653  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071631

Sample Matrix: Water  
 Date Collected: 07/11/2014 12:54  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 13:00

Analyst Initial: AVB

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 0.928	Q8,U	0.928	2.11	0.66	1.5	60	mg/L	1.406	07/14/14 16:09
TPH-1005-2	>C12-C28 <sup>1</sup>	< 1.21	U	1.21	2.11	0.86	1.5	60	mg/L	1.406	07/14/14 16:09
TPH-1005-4	>C28-C35 <sup>1</sup>	< 1.05	U	1.05	2.11	0.75	1.5	60	mg/L	1.406	07/14/14 16:09
	Total C6-C35	<1.21					----	----	mg/L	1.406	07/14/14 16:09
111-85-3	1-Chlorooctane(surr)	111					59	122	%	1.406	07/14/14 16:09
3386-33-2	Chlorooctadecane(sur)	108					48	123	%	1.406	07/14/14 16:09



**LABORATORY TEST RESULTS**

Client Sample ID: SB-9 / TWP-9  
 A&B Job Sample ID: 14070601.13

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Purgeable Aromatics**

Analytical Method: SW-846 8021B  
 QC Batch ID: Qb14071525  
 Prep Method: SW-846 5030C  
 Prepared By: Spabba  
 Prep Batch ID: PB14071510

Sample Matrix: Water  
 Date Collected: 07/11/2014 16:14  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 14:50

Analyst Initial: SP

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
1634-04-4	MTBE	0.02		0.001	0.002	.0014	0.002	0.16	mg/L	1	07/14/14 17:56
71-43-2	Benzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 17:56
108-88-3	Toluene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 17:56
100-41-4	Ethylbenzene	< 0.0008	U	0.0008	0.002	.0008	0.002	0.16	mg/L	1	07/14/14 17:56
108-38-3&106-4	m- & p-Xylenes	< 0.002	U	0.002	0.004	.0016	0.004	0.32	mg/L	1	07/14/14 17:56
95-47-6	o-Xylene	< 0.001	U	0.001	0.002	.0010	0.002	0.16	mg/L	1	07/14/14 17:56
1330-20-7	Xylenes	< 0.003	U	0.003	0.002	.0025	0.002	0.48	mg/L	1	07/14/14 17:56
98-08-8	Trifluorotoluene(surr)	93.8						75 125	%	1	07/14/14 17:56

Soil results reported on dry weight basis



**LABORATORY TEST RESULTS**

Client Sample ID: SB-9 / TWP-9  
 A&B Job Sample ID: 14070601.13

Date: 7/21/2014

Client Name: Associated Testing Lab  
 Project Name: E14-111 / Garden Oaks + Shepherd Forest Area

Attn: Tom Murphy

Test Description: **Total Petroleum Hydrocarbons**

Analytical Method: TX 1005  
 QC Batch ID: Qb14071653  
 Prep Method: TX 1005  
 Prepared By: AVBembde  
 Prep Batch ID: PB14071631

Sample Matrix: Water  
 Date Collected: 07/11/2014 16:14  
 Date Received: 07/14/2014 10:09  
 Date Prepared: 07/14/2014 13:00

Analyst Initial: AVB

% Moisture

CAS Number	Parameter	Result	Flag	SDL	SQL	MDL	MQL	UQL	Units	DF	Date/Time
TPH-1005-1	C6-C12 <sup>1</sup>	< 0.906	Q8,U	0.906	2.06	0.66	1.5	60	mg/L	1.373	07/14/14 16:33
TPH-1005-2	>C12-C28 <sup>1</sup>	< 1.18	U	1.18	2.06	0.86	1.5	60	mg/L	1.373	07/14/14 16:33
TPH-1005-4	>C28-C35 <sup>1</sup>	< 1.03	U	1.03	2.06	0.75	1.5	60	mg/L	1.373	07/14/14 16:33
	Total C6-C35	<1.18					----	----	mg/L	1.373	07/14/14 16:33
111-85-3	1-Chlorooctane(surr)	90.1					59	122	%	1.373	07/14/14 16:33
3386-33-2	Chlorooctadecane(sur	95.1					48	123	%	1.373	07/14/14 16:33

Soil results reported on dry weight basis  
<sup>1</sup>-Parameter not available for accreditation

**QUALITY CONTROL CERTIFICATE**



**Job ID :** 14070601

**Date :** 7/21/2014

**Analysis :** Purgeable Aromatics      **Method :** SW-846 8021B      **Reporting Units :** mg/Kg

**QC Batch ID :** Qb14071518      **Created Date :** 07/15/14      **Created By :** Spabba

**Samples in This QC Batch :** 14070601.01,02,03,04,05,06,07,08,09,10

**Sample Preparation :** PB14071508      **Prep Method :** SW-846 5035A      **Prep Date :** 07/14/14 15:00      **Prep By :** Spabba

<b>QC Type: Method Blank</b>								
Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
MTBE	1634-04-4	< MDL	mg/Kg	1	0.005	0.001		
Benzene	71-43-2	< MDL	mg/Kg	1	0.005	0.001		
Toluene	108-88-3	< MDL	mg/Kg	1	0.005	0.001		
Ethylbenzene	100-41-4	< MDL	mg/Kg	1	0.005	0.005		
m- & p-Xylenes	108-38-3&106-42-3	< MDL	mg/Kg	1	0.01	0.005		
o-Xylene	95-47-6	< MDL	mg/Kg	1	0.005	0.002		
Xylenes	1330-20-7	< MDL	mg/Kg	1	0.005	0.002		
Trifluorotoluene(surr)	98-08-8	92.5	%	1				

<b>QC Type: LCS and LCSD</b>										
Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
MTBE	0.05	0.047	94	0.05	0.045	90	4.3	20	67.2-132	
Benzene	0.05	0.043	86	0.05	0.044	88	2.3	20	76.2-128	
Toluene	0.05	0.046	92	0.05	0.047	94	2.2	20	74.2-126	
Ethylbenzene	0.05	0.049	98	0.05	0.05	100	2	20	79.4-125	
m- & p-Xylenes	0.1	0.096	96	0.1	0.098	98	2.1	20	76.3-126	
o-Xylene	0.05	0.049	98	0.05	0.049	98	0.0	20	77.1-123	
Xylenes	0.15	0.145	96.7	0.15	0.147	98	1.4	20	77.2-125	

<b>QC Type: MS and MSD</b>											
<b>QC Sample ID: 14070601.01</b>											
Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
MTBE	BRL	0.052	0.04	76.9	0.049	0.037	75.5	7.8	26	76-134	M2
Benzene	BRL	0.052	0.037	71.2	0.049	0.035	71.4	5.6	19	68-138	
Toluene	BRL	0.052	0.04	76.9	0.049	0.038	77.6	5.1	19	67-135	
Ethylbenzene	BRL	0.052	0.043	82.7	0.049	0.04	81.6	7.2	20	71-127	
m- & p-Xylenes	BRL	0.103	0.083	80.6	0.099	0.079	79.8	4.9	27	56-135	
o-Xylene	BRL	0.052	0.042	80.8	0.049	0.039	79.6	7.4	24	56-134	
Xylenes	BRL	0.155	0.125	80.6	0.148	0.118	79.7	5.8	25	59-134	

Refer to the Definition page for terms.

**QUALITY CONTROL CERTIFICATE**



**Job ID :** 14070601

**Date :** 7/21/2014

**Analysis :** Purgeable Aromatics

**Method :** SW-846 8021B

**Reporting Units :** mg/L

**QC Batch ID :** Qb14071525

**Created Date :** 07/15/14

**Created By :** Spabba

**Samples in This QC Batch :** 14070601.11,12,13

**Sample Preparation :** PB14071510

**Prep Method :** SW-846 5030C

**Prep Date :** 07/14/14 14:50

**Prep By :** Spabba

**QC Type: Method Blank**

Parameter	CAS #	Result	Units	D.F.	MQL	MDL	Qual
MTBE	1634-04-4	< MDL	mg/L	1	0.002	.0014	
Benzene	71-43-2	< MDL	mg/L	1	0.002	.0008	
Toluene	108-88-3	< MDL	mg/L	1	0.002	.0010	
Ethylbenzene	100-41-4	< MDL	mg/L	1	0.002	.0008	
m- & p-Xylenes	108-38-3&106-42-3	< MDL	mg/L	1	0.004	.0016	
o-Xylene	95-47-6	< MDL	mg/L	1	0.002	.0010	
Xylenes	1330-20-7	< MDL	mg/L	1	0.002	.0025	
Trifluorotoluene(surr)	98-08-8	95	%	1			

**QC Type: LCS and LCSD**

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
MTBE	0.02	0.018	90	0.02	0.017	85	5.7	30	69.4-124	
Benzene	0.02	0.017	85	0.02	0.017	85	0	30	79.1-123	
Toluene	0.02	0.018	90	0.02	0.018	90	0	30	72.3-117	
Ethylbenzene	0.02	0.019	95	0.02	0.02	100	5.1	30	77.4-119	
m- & p-Xylenes	0.04	0.038	95	0.04	0.038	95	0	30	77.2-127	
o-Xylene	0.02	0.019	95	0.02	0.019	95	0	30	71-114	
Xylenes	0.06	0.057	95	0.06	0.057	95	0	30	75.8-121	

**QC Type: MS and MSD**

**QC Sample ID: 14070601.11**

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
MTBE	BRL	0.02	0.019	95	0.02	0.019	95	0	21	68-117	
Benzene	BRL	0.02	0.017	85	0.02	0.016	80	6.1	17	65-143	
Toluene	BRL	0.02	0.018	90	0.02	0.018	90	0	29	67-136	
Ethylbenzene	BRL	0.02	0.019	95	0.02	0.018	90	5.4	30	80-134	
m- & p-Xylenes	BRL	0.04	0.037	92.5	0.04	0.037	92.5	0	22	81-131	
o-Xylene	BRL	0.02	0.02	100	0.02	0.019	95	5.1	21	74-134	
Xylenes	BRL	0.06	0.057	95	0.06	0.056	93.3	1.8	21	80-136	

Refer to the Definition page for terms.

**QUALITY CONTROL CERTIFICATE**



**Job ID :** 14070601

**Date :** 7/21/2014

**Analysis :** Total Petroleum Hydrocarbons      **Method :** TX 1005      **Reporting Units :** mg/Kg

**QC Batch ID :** qb14071557      **Created Date :** 07/15/14      **Created By :** AVBembde

**Samples in This QC Batch :** 14070601.01,02,03,04,05,06,07,08,09,10

**Sample Preparation :** PB14071620      **Prep Method :** TX 1005      **Prep Date :** 07/14/14 16:00      **Prep By :** AVBembde

**QC Type: Method Blank**

Parameter	CAS #	Result	Units	D.F.	MQL	MDL	Qual
C6-C12	TPH-1005-1	< MDL	mg/Kg	1	25	23.7	
>C12-C28	TPH-1005-2	< MDL	mg/Kg	1	25	20.3	
>C28-C35	TPH-1005-4	< MDL	mg/Kg	1	25	17.7	
Total C6-C35		< MDL	mg/Kg	1	----		
Chlorooctadecane(surr)	3386-33-2	124	%	1			
1-Chlorooctane(surr)	111-85-3	125	%	1			

**QC Type: LCS and LCSD**

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	500	459	91.8	500	445	89	3.1	20	75-125	
>C12-C28	500	448	89.6	500	449	89.8	0.2	20	75-125	
>C28-C35	500	510	102	500	477	95.4	6.7	20	75-125	

**QC Type: MS and MSD**

**QC Sample ID: 14070617.04**

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
C6-C12	BRL	500	466	92.9	500	464	92.5	0.4	20	75-125	
>C12-C28	BRL	500	462	89.9	500	443	86.1	4.3	20	75-125	
>C28-C35	18.1	500	513	99	500	489	94.2	5	20	75-125	

Refer to the Definition page for terms.



**QUALITY CONTROL CERTIFICATE**



**Job ID :** 14070601

**Date :** 7/21/2014

**Analysis :** Total Petroleum Hydrocarbons      **Method :** TX 1005      **Reporting Units :** mg/L

**QC Batch ID :** Qb14071653      **Created Date :** 07/16/14      **Created By :** AVBembde

**Samples in This QC Batch :** 14070601.11,12,13

**Sample Preparation :** PB14071631      **Prep Method :** TX 1005      **Prep Date :** 07/14/14 13:00      **Prep By :** AVBembde

**QC Type: Method Blank**

Parameter	CAS #	Result	Units	D.F.	MQL	MDL	Qual
C6-C12	TPH-1005-1	< MDL	mg/L	1	1.5	0.66	
>C12-C28	TPH-1005-2	< MDL	mg/L	1	1.5	0.86	
>C28-C35	TPH-1005-4	< MDL	mg/L	1	1.5	0.75	
Total C6-C35		< MDL	mg/L	1	---		
1-Chlorooctane(surr)	111-85-3	104	%	1			
Chlorooctadecane(surr)	3386-33-2	107	%	1			

**QC Type: LCS and LCSD**

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	30	29.1	97	30	35.1	117	18.7	20	75-125	
>C12-C28	30	27.4	91.3	30	32.7	109	17.6	20	75-125	
>C28-C35	30	25.7	85.7	30	30.8	103	18.1	20	75-125	

**QC Type: MS and MSD**

**QC Sample ID: 14070601.12**

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
C6-C12	BRL	42.2	35.8	84.8	42.2	45	107	22.8	20	75-125	R3
>C12-C28	BRL	42.2	33	77.9	42.2	41.6	98.2	23.1	20	75-125	R3
>C28-C35	BRL	42.2	36.4	86.3	42.2	42.9	102	16.4	20	75-125	

Refer to the Definition page for terms.

**LABORATORY TERM AND QUALIFIER DEFINITION REPORT**



Job ID : 14070601

Date: 7/21/2014

**General Term Definition**

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	SDL	Sample Detection Limit
MS	Matrix Spike	surr	Surrogate
MSD	Matrix Spike Duplicate	T	Time
MW	Molecular Weight	TNTC	Too numerous to count

**Qualifier Definition**

M2	Matrix Spike and/or Matrix Spike Duplicate recovery is below laboratory control limits due to matrix interference.
Q18	Soils not collected in a hermetically sealed container may lose low-level VOCs.
Q8	Insufficient sample received to meet method requirements. Test was scaled down based on the amount of sample received.
R3	MS/MSD RPD exceeds control limit. Recovery meets acceptance criteria.
U	Undetected at SDL (Sample Detection Limit).



# Sample Condition Checklist

A&B JobID : <b>14070601</b>	Date Received : <b>07/14/2014</b>	Time Received : <b>10:09AM</b>																										
Client Name : <b>Associated Testing Lab</b>																												
Temperature : <b>1.9-0.9cf=1.0°C</b>	Sample pH : <b>n/a</b>																											
Thermometer ID : <b>102002320</b>	pH Paper ID : <b>n/a</b>																											
<b>Check Points</b>																												
<b>1.</b>	<b>Cooler seal present and signed.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
<b>2.</b>	<b>Sample(s) in a cooler.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>3.</b>	<b>If yes, ice in cooler.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>4.</b>	<b>Sample(s) received with chain-of-custody.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>5.</b>	<b>C-O-C signed and dated.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>6.</b>	<b>Sample(s) received with signed sample custody seal.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
<b>7.</b>	<b>Sample containers arrived intact. (If no comment).</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>8.</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"><b>Matrix</b></td> <td style="width: 10%;"><b>Water</b></td> <td style="width: 10%;"><b>Soil</b></td> <td style="width: 10%;"><b>Liquid</b></td> <td style="width: 10%;"><b>Sludge</b></td> <td style="width: 10%;"><b>Solid</b></td> <td style="width: 10%;"><b>Cassette</b></td> <td style="width: 10%;"><b>Tube</b></td> <td style="width: 10%;"><b>Bulk</b></td> <td style="width: 10%;"><b>Badge</b></td> <td style="width: 10%;"><b>Food</b></td> <td style="width: 10%;"><b>Other</b></td> </tr> <tr> <td>:</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	<b>Matrix</b>	<b>Water</b>	<b>Soil</b>	<b>Liquid</b>	<b>Sludge</b>	<b>Solid</b>	<b>Cassette</b>	<b>Tube</b>	<b>Bulk</b>	<b>Badge</b>	<b>Food</b>	<b>Other</b>	:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
<b>Matrix</b>	<b>Water</b>	<b>Soil</b>	<b>Liquid</b>	<b>Sludge</b>	<b>Solid</b>	<b>Cassette</b>	<b>Tube</b>	<b>Bulk</b>	<b>Badge</b>	<b>Food</b>	<b>Other</b>																	
:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																	
<b>9.</b>	<b>Sample(s) were received in appropriate container(s).</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
<b>10.</b>	<b>Sample(s) were received with proper preservative</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>11.</b>	<b>All samples were logged or labeled.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>12.</b>	<b>Sample ID labels match C-O-C ID's</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>13.</b>	<b>Bottle count on C-O-C matches bottles found.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>14.</b>	<b>Sample volume is sufficient for analyses requested.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>15.</b>	<b>Samples were received within the hold time.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>16.</b>	<b>VOA vials completely filled.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
<b>17.</b>	<b>Sample accepted.</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
<b>Comments : Include actions taken to resolve discrepancies/problem:</b>																												
TPH received in 40mL VOAs. Headspace in 13A-C.																												

Received by : AHall

Check in by/date : AHall / 07/14/2014

## **APPENDIX C**

### Photographs



View of push drilling activity at soil boring SB-2 (Fisher Street).



Close-up view of soil boring SB-2.



Typical view of soil cores generated during Phase II ESA activities.



View of temporary well point TWP-2.



View of push drilling activity at SB-1.



View of patching the concrete at SB-2.



View of push drilling activity at SB-3.



Close-up view at SB-3.



View of push drilling at SB-4 (Brinkman and Martin Streets).



View of asphalt patch.



View of the Lucky 7 Food Store.



View of push drilling activity at SB-5.



Typical view of pre clearance of soil boring location for subsurface conflicts.



View of soil boring SB-6 location.



View of SB-8.



View of push drilling activity at soil boring SB-9.



Close-up view of push drilling activity at SB-9.



Typical view of sampling equipment and supplies.



View of temporary well point TWP-9.



View of the SB-10 location.

## **APPENDIX D**

### Qualifications of Environmental Professional

**TOM MURPHY**  
**PROJECT MANAGER**  
**ENVIRONMENTAL ENGINEERING SERVICES**

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**EDUCATION**

Texas State (formerly Southwest Texas State University): B. S., Geography-Resource and Environmental Studies/Biology, 1993

**REGISTRATION/TRAINING**

40/8-Hour CFR 1910.120, OSHA Training and Refreshers (HazWop)  
40 CFR 265.16, Hazardous Waste Management Certification  
49 CFR 172 & 173, DOT Hazardous Materials Training  
29 CFR 1919.134, Respirator Fit Test/Training  
RRC Rule 36 & API-RP 49, Hydrogen Sulfide Training  
ExxonMobil LPS and OIMS Training  
Facility, Client or Site-Specific Safety Training and Protocols

**PROFESSIONAL EXPERIENCE**

Project Manager  
Project Geologist/Scientist/Manager  
Field Geologist  
Bioremedial Field Engineer

Specialization:

Spill response and assessment/remediation to closure  
Environmental site assessments  
Remediation systems installation and system design  
General construction experience  
Regulatory and data interpretation  
Surveying/mapping/site plans

**PROFESSIONAL HISTORY**

Associated Testing Laboratories, Inc., Contract Environmental Professional/Project Manager, Sept. 2013 to present  
Berg-Oliver Associates, Inc., Project Manager, November 2004 to present  
BNC Environmental Svs., Inc. (successor CRA), Project Geologist/Scientist/Manager, Oct. 2001 to Nov. 2004.  
Eco-Systems, Inc., Project Scientist, March 2001 to October 2001.  
Self-Employed, Environmental Consultant/Scientist, November 2000 to March 2001.  
Associated Environmental Consultants, Inc., Project Manager, August 1995 to November 2000.  
Self-Employed, Environmental Consultant, April 1995 to August 1995.  
Sybron Chemicals, Inc., Bioremedial Field Engineer, October 1993 to April 1995.

**REPRESENTATIVE EXPERIENCE**

Mr. Murphy is a mid to senior-level project manager with over 18 years of diverse environmental experience. Mr. Murphy's responsibilities include: project management activities, conducting surface and/or subsurface soil groundwater investigations, Phase II ESAs, Phase IIIs, Affected Property Assessment Reports (APARs), spill response and environmental management, conducting over twenty six hundred Phase I ESAs/due diligence, transaction screens, wetland projects (delineation, nationwide and individual permits), road (new and reconstruction) and infrastructure (waterlines, sanitary sewer and storm sewer) projects and other environmental-related tasks. Experience and preparation of cost proposals, project coordination, health and safety plans and supervisory duties of sub-contractors, bioremedial equipment project design/set-up, various remediation technology projects, equipment and design for treating petroleum-contaminated soil and groundwater, equipment set-up/construction, QA/QC, monitor well advancement, supervision of sampling discharge effluents and storm water, groundwater monitoring supervision, EPA/TCEQ & RRC protocol, expediting projects, treatability studies and contaminant plume mapping. He has project experience in field assessments and remediation projects for banks, developers, brokers, institutions, companies, corporations, engineering firms/government entities (city of Houston,

HCPID-AED and other cities) and the Texas Commission on Environmental Quality Leaking Petroleum Storage Tank (LPST) RPR Division. Mr. Murphy excels in the application of technical knowledge, site-specific factors, data analysis, report preparation to existing and potential clients. Knowledgeable in government environmental acts and regulations. Representative projects include:

- Performed numerous Subsurface Investigations and Phase II-Environmental Site Assessments for various clients to determine the presence or absence of adverse environmental conditions.
- Conducting spill response activities and delineations predominantly for pipeline-related enterprises and bulk storage facilities inclusive of: air monitoring, subcontractor supervision, excavation and over-excavation, sampling, waste disposal (waste profiling/characterization, transportation and disposal), reporting and closure under Railroad Commission of Texas or TCEQ. Representative clients:
  - ❑ ExxonMobil Pipeline Co. (EMPCo.)
  - ❑ BP Pipelines North America (NA), Inc.
  - ❑ Valero Logistics Operations, L.P.
  - ❑ Kinder Morgan
  - ❑ Shell Oil Products US, Equiva, Motiva and Equilon
  - ❑ TEPPCO
- Prepared a pilot project leading to a contracted waste water line build-up treatment plan, technical documents, cost proposal for the City of Houston (waste water line bioremediation).
- Conducted numerous new road, road reconstruction, waterline alignments, sanitary sewer alignments, storm sewer alignments and Limited Environmental Assessment projects for the City of Houston Public Works and Engineering Department, Harris County Public Infrastructure Department-Architecture and Engineering Division and Engineering Firms and other numerous linear projects (TxDOT (State CE, CE and support for LEAs).
- LPST remediation equipment set-up and design, petroleum contaminant reduction, TCEQ approved closure of several LPST sites and supervision of LPST sites.
- Experience in all phases of construction including bioremedial equipment installation, sampling protocol of water and/or soils, and closure of project site. Field Engineer for numerous site assessments throughout the Gulf Coast region. Construction of bioremediation systems to convert pump and treat contaminated ground water including recovery/treatment/microbe and nutrient injection systems. Projects:
  - ❑ Houston Lighting & Power-Spring Branch, Houston, bioreactor system; and
  - ❑ Wilburforce Road, Houston-First Interstate (successor Wells Fargo Bank), bioreactor.
- Field experience with soil injection, bioreactors, air strippers, and vacuum heaps and air sparging to treat soil/groundwater contaminants. Field Engineer for various remediation projects of oil and petroleum-contaminated soils. Field experience in soil vapor extraction equipment (SVE) including a specially designed bio-treated fluid separator. Constructed a vapor extraction system with a biological scrubber to extend carbon polishing efficiency and/or the potential for breakthrough or fugitive releases, and reduction of overall total emissions. System also included method to remove groundwater from vapor extraction wells, which tended to accumulate due to excessive rainfall and shallow groundwater effects. Constructed, maintained and operated landfarms for various clients. Provided technical and consulting services during the operation of the landfarm, including biological health analyses sampling, data interpretation, report presentation and closure. Other Environmental Projects:
  - ❑ Numerous due diligence assessments and affected property assessments for various clients.
  - ❑ Non-producing “old oilfield” asset assessments (Chevron Environmental Management Company and Chevron Business and Real Estate Services).

- ❑ Several States, Monitoring and assessments of natural gas compressor stations (El Paso Energy Corporation-Tennessee Gas Pipeline and Southern Natural Gas).
- ❑ Texas – Hydrostatic water treatment projects.
- ❑ Texas – Wastewater permitting and discharge analyses (Williams Energy-Williams Gas Pipeline and EMPCo.).
- ❑ Numerous crude oil and refined product spill delineations.
- ❑ Texas City, Texas – BP-Amoco pipeline release assessment affecting sanitary sewer system.
- ❑ Texas – Assessments of Shell Oil Products US and related enterprises-Equiva, Motiva and Equilon.
- ❑ Pasadena, Texas – Kinder Morgan Texas Pipeline, Assessment to evaluate off-site source of corrosion to pipeline.
- ❑ Remediation and landfarms (Chevron Environmental Management Co., First Interstate (successor Wells Fargo Bank), Kinder Morgan, Genesis Crude Oil, L.P., Valero Logistics Operations, L.P., TEPPCO, Specialty Lubricants and Commercial Metals).
- ❑ Angleton, Texas – First Interstate (successor Wells Fargo Bank), specialty soil vapor extraction system.
- ❑ Rockport and Marshall, Texas-First Interstate (successor Wells Fargo Bank), vacuum heap/augmented with automated microbial/nutrient additive system.
- Administrative duties, supervision, cost proposals, report preparation, regulatory document preparation, client project status reports. Supervision and field experience in soil boring/monitor well drilling advancement, logging, decommissioning and soil sampling criteria. Installation of numerous soil borings and groundwater monitoring wells at various sites.
- Field experience in groundwater monitoring, low flow sampling, flow interpretation, and contaminant plume mapping. Experience in a variety of mapping, site plan creation/surveying, geographic information systems, regulatory databases and land-use planning.
- Performed over twenty-six hundred Phase I Site Assessments, Categorical Exclusions and Limited Environmental Assessments for various clients including oil companies (Chevron Environmental Management Co., ChevronTexaco Business and Real Estate Services, Shell Oil Products US, Weatherford International, Inc., EMPCo., etc.) banks, lending agencies, private individuals and/or businesses and corporations, engineering firms, Texas Department of Transportation, City of Houston Department of Public Works and Engineering and Harris County Public Infrastructure Department-Architecture and Engineering Division. Performed site assessments on all types of properties and facilities including vacant and developing properties, office buildings, office/warehouses, machine shops, and industrial properties. Performed PCS PrimeCo., Sprint, NEXTEL, and American Tower Company pad site assessments. Project Budgets \$2,500-\$5,500: Locations: Texas, Louisiana, North Carolina, Ohio, Virginia, West Virginia.
- Performed and managed various site clean-ups (hazardous and non-hazardous materials/items). Sampling events of abandoned drums and containers with unidentified substances, laboratory supervision, obtaining waste codes, arranging pick-up by certified waste hauling enterprises and appropriate final disposal activities.

#### **ASSOCIATIONS AND ORGANIZATIONS**

The Society of Texas Environmental Professionals

National Association of Environmental Professionals