KLEINFELDER
An employee owned company

September 19, 2005
File No.: 56130

Mr. Don Mellott
Director of Civil Engineering
BCRA
2106 Pacific Avenue, Suite 300
Tacoma, WA 98402

**SUBJECT: Reliance Letter**
**Supplemental Phase II Environmental Site Assessment Report**
**Proposed Retail Site (No. 4265-00)**
**2119 Mildred Street West**
**Fircrest, Washington**

Dear Mr. Mellott:

Per your request, Kleinfelder, Inc. (Kleinfelder) is pleased to provide this reliance letter to Wal-Mart Stores, Inc. (Wal-Mart) for the September 16, 2005 Supplemental Phase II Environmental Site Assessment (ESA) report prepared by Kleinfelder, Inc. for the above-referenced project. The report was prepared under contract between BCRA and Kleinfelder.

The following report may be relied upon by Wal-Mart, however, by accepting, Wal-Mart agrees that any use or reliance it places on the report shall be limited to the qualifications and limitations stated within the report and to the Terms and Conditions of the applicable project specific subconsultant agreement between Kleinfelder and BCRA:

- Supplemental Phase II Environmental Site Assessment, Proposed Retail Site (No. 4265-00), 2119 Mildred Street West, Fircrest, Washington. Kleinfelder Project No. 56130, dated September 16, 2005.

Wal-Mart shall also acknowledge that actual site conditions may change with time; that hidden conditions, not discoverable within the scope of the project, may exist at the site; and that the scope of the investigation was limited by time, budget and other constraints outlined in the report. Regardless of the findings of Kleinfelder's assessment, Kleinfelder makes no warranty that the site is free from existing or threatened pollution



KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

and Kleinfelder is not responsible for consequences or conditions arising from facts that were concealed, withheld or not fully disclosed at the time the project was conducted. In the preparation of the report and in the assembling of data and information related thereto, Kleinfelder represents to Wal-Mart that it has used the degree of care and skill ordinarily exercised by geotechnical and environmental consultants. No other warranties, expressed or implied, are made.

Kleinfelder appreciates the opportunity to be of service to you in this matter. Please do not hesitate to contact us at (425) 562-4200 or John Mancini, Kleinfelder's Client Service Manager for BCRA at (801) 261-3336, if you have any questions or require further information.

Sincerely,

**KLEINFELDER, INC.**

Kevin G. Lakey, PE LHG
Environmental Services Manager

cc: John Mancini, Kleinfelder, Salt Lake City, UT



KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

KLEINFELDER
An employee owned company

September 16, 2005
Kleinfelder Project No.: 56130

Mr. Don Mellott, P.E.
Director of Civil Engineering
BCRA
2106 Pacific Avenue, Suite 300
Tacoma, WA 98402

**Subject:** **Supplemental Phase II Environmental Site Assessment**
**Proposed Retail Site (No. 4265-00)**
**2119 Mildred Street West**
**Fircrest, Washington**

Dear Mr. Mellott:

This letter presents the results of our Supplemental Phase II Environmental Site Assessment (ESA) performed at the above-referenced property located in Fircrest, Washington (see Figure 1 in Attachment A). This investigation was performed to further assess the extent of tetrachloroethene (PCE), total petroleum hydrocarbons (TPH as heavy oil), and arsenic concentrations in the site's soil and perched groundwater previously identified in our June 24, 2005 Limited Phase II ESA report completed for the subject site.

This Supplemental Phase II ESA included collecting 14 discreet soil samples from 7 borings advanced along the central portion of the property (see Figure 2 in Attachment A for boring locations). Additionally, one groundwater monitoring well (MW-78) was installed along the eastern portion of the property, adjacent to five other groundwater monitoring wells (MW-66 through MW-70) which were previously installed during our June 2005 Limited Phase II ESA investigation (see Figure 2 in Attachment A).

As part of the scope of services conducted during this assessment, five perched water samples were collected at the site; one from the newly installed well (MW-78) and four from water bearing wells installed during our previous Limited Phase II ESA investigation.

Soil samples collected during this assessment were analyzed at a State Certified laboratory for the presence of PCE, TPH (as diesel and heavy oil), and total arsenic. The perched water sample collected from MW-78 was analyzed for PCE, TPH (as diesel and heavy oil), and dissolved arsenic concentrations. The remaining water




KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

samples collected from water bearing wells at the site (MW-66, MW-68, MW-69, and MW-70) were also analyzed for the presence of PCE and TPH (as diesel and heavy oil). However, there was an insufficient quantity of water in wells MW-66, MW-68, MW-69, and MW-70 to submit water samples for dissolved arsenic analysis. Additionally, a water sample could not be collected from well MW-67 since it was dry at the time of sampling.

In summary, the analytical results of the soil samples collected during this assessment indicate that the concentrations of TPH (as heavy oil) reported in one of the soil samples collected at the site (Sample No. B81-5) exceeded the Washington Department of Ecology's Model Toxics Control Act (MTCA) Method A soil cleanup level. TPH (as diesel and heavy oil) and PCE were also detected in four other soil samples collected at the site, but not at concentrations exceeding MTCA Method A soil cleanup levels. The TPH (as heavy oil) impacted soil areas were observed to be limited in size (generally not exceeding six inches in thickness) and seem to be randomly distributed around the central-undeveloped portion of the property. Due to the apparent random distribution of heavy oil impacts in soil, the total volume of heavy oil impacted soil could not be accurately estimated.

The PCE impacted soil area identified during our previous Limited Phase II ESA investigation appeared to be associated with a sink drainage outfall located at the center of the property, east of where a Material Preparation Shed once existed. The boundaries of the PCE impacted soil area were identified during this assessment. The volume of PCE contaminated soil is estimated to range between 2,000 to 3,000 cubic yards.

Analytical results of the perched groundwater sample collected from MW-78 were similar to perched groundwater samples collected during our previous Limited Phase II ESA conducted at the site. The concentrations of TPH (as diesel and heavy oil) and PCE did not exceed MTCA Method A groundwater cleanup levels or the laboratory's analytical method reporting limits. However, consistent with dissolved arsenic levels identified in the site's perched water during our previous Limited Phase II ESA, dissolved arsenic was detected during this assessment at a concentration of 14.6 micrograms per liter (µg/L), which exceeds the MTCA Method A groundwater cleanup level for arsenic (5 µg/L). None of the soil samples collected at the site reportedly contained detectable concentrations of arsenic.




KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

Details regarding our findings during this Supplemental Phase II ESA are summarized in the following sections of this report.

## PREVIOUS SITE INVESTIGATIONS

Below are brief descriptions of the following previous environmental investigations performed at the subject property by Kleinfelder:

1. *Phase I Environmental Site Assessment*, Proposed Retail Site (No. 4265-00), 2119 Mildred Street West, Fircrest, Washington. Dated May 25, 2005.

2. *Limited Phase II Environmental Site Assessment*, Proposed Retail Site (No. 4265-00), 2119 Mildred Street West, Fircrest, Washington. Dated June 24, 2005.

Copies of the above-listed reports were previously submitted to BCRA.

### *Phase I Environmental Site Assessment:*

A Phase I Environmental Site Assessment (ESA) report completed for the subject site (Kleinfelder, May 25, 2005) indicated that the northwest portion of the property is developed with a large industrial building and two smaller detached structures (a spray painting shed and a paint storage shed). The remainder of the property is undeveloped and was previously used as a depository for fill material. The industrial building and sheds are unoccupied and were observed storing the site owner's personal property, as well as an assortment of equipment, tools, machinery, and supplies that were formerly used in conjunction with the manufacturing of marine automatic pilots when the site was occupied by Metal Marine Pilot, Inc. Reportedly, Metal Marine Pilot had occupied the site from 1959 and ceased operations sometime during 2000. Hazardous materials used by Metal Marine Pilot in conjunction with their site operations included detergents, kerosene, paints, thinners, varnishes, stains, acids, glues, alcohols, aluminum coatings, hydraulic oil, and an assortment of cleaning solvents (PCE, methyl ethyl ketone, etc.).

Hazardous wastes formerly generated at the site included spent solvents, scrap metal, and sludge mixtures derived from washing and cleaning marine automatic pilot parts. During the course of Metal Marine Pilot's use at the site (1959 to 2000), there were several instances where hazardous materials were reportedly discharged or buried along the central and eastern portions of the site. There were also records indicating that four underground storage tanks (USTs) were removed and PCE impacted soil located in the central portion of the site was remediated during the late 1990s.




KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

Kleinfelder's Phase I ESA report concluded that a recognized environmental condition was found to exist at the subject property. The site has had a long history of industrial use, which included the reported disposal of hazardous materials on the property. Previous environmental investigation and remediation reports completed for the site indicated that some of the past environmental issues were successfully addressed at the site. However, some areas were not adequately addressed (see Section 6.2 in the Phase I ESA report for details).

Recommendations contained in the Phase I ESA report included performing a limited subsurface investigation at the site to address the potential presence of shallow soil and groundwater contamination from Metal Marine Pilot's use of the property. Analytical results generated during the limited subsurface investigation could then be evaluated as to whether (or not) a more extensive investigation (i.e. the collection of additional soil and/or groundwater samples) should be performed at the site.

***Limited Phase II Environmental Site Assessment:***

During the course of Kleinfelder's June 2005 Limited Phase II ESA investigation of the site, twenty-nine discreet soil samples were collected form 20 borings (B-58 through B-76) advanced along the northwest, central, and eastern portions of the property. Five of the 20 borings (B-72 through B-76) were completed inside the main industrial building located along the northwest end of the site. The remaining borings were completed along the undeveloped central and eastern portions of the property. See Figure 2 for boring locations in Kleinfelder's June 24, 2005 Limited Phase II ESA report completed for the site.

Soil borings advanced along the undeveloped central and eastern portions of the property (outside of the industrial building) ranged in depths of approximately 6 to 24 feet below the ground surface (bgs). Soil borings advanced within the industrial building ranged in depths of approximately 1.5 to 6 feet bgs. Up to two soil samples per boring were selected for laboratory analysis based on visual evidence of chemical staining or on elevated screening results using a photoionization detector (PID). Water samples were also collected from perched groundwater encountered at the bottom of borings B-59, B-63, and B-65.

After completing the borings and collecting the soil and perched water samples, five temporary groundwater monitoring wells (MW-66 through MW-70) were installed along the central-eastern portion of the site, immediately adjacent to boreholes B-66, B-67, B-

68, B-69, and B-70. After developing and purging the wells, Kleinfelder collected perched groundwater samples from monitoring wells MW-66, MW-68, MW-69, and MW-70. MW-67 was dry at the time of sampling.

All soil and perched groundwater samples collected during the Limited Phase II ESA investigation were submitted to ESN Northwest laboratory to be analyzed for one or more of the following:

- Volatile organic compounds (VOCs), using procedures based on U.S. Environmental Protection Agency's (EPA's) Method 8260.
- TPH (as gasoline), by Ecology Method NWTPH-Gx.
- TPH (as diesel and heavy oil), by Ecology Method NWTPH-Dx.
- Total (soil) and dissolved (water) metals (eight priority pollutant metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), by EPA 6000 and 7000 Series Methods.

Analytical results of the soil and perched water samples collected at the site during our June 2005 Limited Phase II ESA investigation indicated that the concentrations of TPH (as heavy oil) in three soil samples (samples B59-2, B63-6, and B67-6) and one VOC constituent (tetrachloroethene (PCE)) in two soil samples (samples B61-2 and B62-2) exceeded the MTCA Method A soil cleanup levels for TPH (as heavy oil) and PCE. Isopropyltoluene, lead, chromium, and arsenic were also detected in several soil samples collected at the site, but not at concentrations exceeding MTCA Method A soil cleanup levels. Dissolved metals (arsenic, barium, chromium, and selenium) and one VOC constituent (acetone) were detected in some or all of the perched groundwater samples collected at the site, but only the arsenic concentrations from two groundwater samples (B-63 and MW-70) exceeded the MTCA Method A groundwater cleanup level for arsenic. No other VOCs or TPH (as gasoline, diesel, and heavy oil) were detected above the laboratory reporting limits in perched groundwater samples collected from the site.

The Limited Phase II ESA report indicated that visual signs of stained soil where elevated levels of TPH (as heavy oil) were identified in soil samples collected at the site occurred intermittently and varied in depths ranging between 5 to 15 feet bgs. The source of the TPH (as heavy oil) identified at the site was reportedly unknown, but potentially originated from historic spills and/or possibly from the fill material which was imported onto the property during the past. In either case, the source of the TPH (as

heavy oil) did not seem to originate from a localized source, such as an aboveground or underground storage tank.

The likely source of the PCE soil contamination was attributed to Metal Marine Pilot's historic waste water discharge activities from a sink drain located within the Material Preparation Shed formerly existing on the property. PCE impacted soil was identified in soil samples collected within the sink's drain field located in the undeveloped central portion of the property. Reportedly, PCE (as well as other solvents) were used by Metal Marine Pilot to clean navigational parts and other equipment. This cleaning process also included rinsing the parts with water (after cleaning them with solvents) in the sink located within the Material Preparation Shed. Between 1960 and 1992, waste water accumulated during this cleaning process was routinely discharged onto the undeveloped central portion of the site via a concrete drain pipe connected to the sink drain located within the Material Preparation Shed. This practice stopped after 1992 when Metal Marine Pilot began transferring the waste water into an evaporator.

The Limited Phase II ESA report concluded that the extent of TPH (as heavy oil) and PCE in soil had not been fully characterized. Additionally, the source and distribution of arsenic identified in perched groundwater at the site was not fully characterized. Recommendations contained in the report included collecting additional soil and groundwater samples at the site to further assess the extent of TPH (as heavy oil), PCE, and dissolved arsenic contamination.

## SOIL LITHOLOGY AND DEPTH TO GROUNDWATER

The near surface geology at the site consists of glacial till, which includes medium dense to very dense silty sand with some fine to coarse gravel. The glacial till extends to at least 40 feet below ground surface (bgs).

Fill material overlies the glacial till on most of the property east of the buildings. The depth of fill ranges between 1 to 25 feet bgs and consists of loose to medium dense silty sand, concrete rubble, and vegetation debris.

Perched water encountered within MW-78 during this investigation was at a depth of approximately 19.0 feet bgs. Perched water encountered at the site during our previous Limited Phase II ESA investigation ranged in depths from approximately 16.6 to 19.6 feet bgs. Based on the subsurface drilling performed during the site during both investigations, it appears that perched water at the site occurs intermittently. The thickness and quantity of perched water is also variable and appeared to have

decreased between our previous Limited Phase II ESA investigation and this assessment. In general, the perched groundwater flow direction at the site is estimated to be towards the east and southeast, generally following surface topography.

Of the six total wells installed at the site during the course of both investigations, one well (MW-67) did not contain a measurable quantity of water. Wells MW-66, MW-68, MW-69, and MW-70 sampled during this assessment had just enough water to fill two 40-milliliter VOA vials each, a quantity deemed sufficient by the laboratory (ESN Northwest) to analyze for the presence of PCE and TPH (as diesel and heavy oil), but not enough to analyze for the presence of dissolved arsenic. MW-78 (installed during this investigation), however, had a sufficient quantity of water to be analyzed for the presence of PCE, TPH (as diesel and heavy oil), as well as dissolved arsenic.

## FIELD ACTIVITIES

Field activities involved with completing this Supplemental Phase II ESA investigation were performed during August 2005. The field activities included collecting soil samples from 7 borings advanced along the central portion of the site and installing one new monitoring well (MW-78) along the eastern portion of the site. Field activities also included collecting a soil sample from the bottom of the sink drain located where the former Material Preparation Shed once existed. Furthermore, field activities included collecting perched water samples from MW-78 and from the four water-bearing wells installed during our previous Limited Phase II ESA investigation.

### *Drilling and Soil Sampling Activities*

On August 17$^{th}$ and 18$^{th}$, 2005, seven soil borings (B-80 through B-85) were completed along the central portion of the site using a hollow-stem auger truck-mounted drill rig supplied and operated by Boart Longyear/Holt Drilling, Inc of Fife, Washington. The boring locations are depicted on Figure 2 (Attachment A).

Soil borings were advanced to a maximum depth of approximately 21.5 feet bgs. Soil samples for logging purposes were collected from each boring at a minimum depth interval of every 2.5 feet using standard split spoon samplers driven by a 140-pound hammer through a hollow stem auger. The samplers were decontaminated with soapy water and double rinsed after collecting each soil sample. Soil samples collected during this investigation were visually inspected for signs of chemical staining and field screened using a PID meter. Soil samples were described using the Unified Soil



KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

Classification System (USCS). Prior to arrival at the site and between boring locations, the drilling equipment was cleaned using a steam cleaner.

Two soil samples per boring were selected for laboratory analysis based on field screening results. Additionally, one shallow soil sample was collected from the bottom of the sink drain located in the area where the former Material Preparation Shed once existed. Perched groundwater was not encountered in any of the soil borings, excluding the area where MW-78 was installed (see details below). Table 1 (see Attachment B) lists the soil samples collected during this investigation.

Nitrile type gloves were worn during sampling activities at each boring location. All soil samples selected for TPH and total metals analysis were transferred in the field from the split spoon samplers into four-ounce glass jars supplied by the laboratory. Soil samples selected to be analyzed for PCE content were collected directly from the split spoon samplers using plastic syringes in accordance with EPA's soil sampling method 5035A. A new syringe was used for every soil sample collected.

The jars containing the soil samples were sealed, labeled, and stored on ice in a cooler (and in a refrigerator) until delivery to the laboratory. The samples were delivered to ESN Northwest, a State Certified laboratory in Bellevue, Washington, to be analyzed for the following:

- PCE by EPA Method 8260.
- TPH (as diesel and heavy oil), by Ecology Method NWTPH-Dx.
- Total arsenic by EPA Method 7061.

***Monitoring Well Installation***

After completing the borings and collecting the soil samples at the site, one groundwater monitoring well (MW-78) was installed in a borehole completed along the eastern portion of the property by Boart Longyear/Holt Drilling on August 17th, 2005 (Figure 2). Using a hollow-stem auger, the well boring was advanced to a depth of approximately 25 feet bgs and the monitoring well was installed within the borehole in accordance with Washington Administrative Code (WAC) 173-160 Minimum Standards for Construction and Maintenance of Wells.

The monitoring well was constructed of 2-inch diameter, flush-thread Schedule 40 PVC casing and 15 feet of 0.020-inch slot manufactured well screen, the bottom of which was placed at approximately 22 feet below ground surface (bgs). The base of the well



KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

screen was sealed with a flush PVC bottom screw cap. A filter pack consisting of #10-20 Colorado Silica Sand was placed around the well casing, as well as roughly one foot above and three feet below the well screen. The annular space above the filter pack was sealed with approximately five feet of 3/8-inch bentonite chips. A expandable well cap was placed on top of the PVC well casing and a protective flush-mount steel well cover was installed and sealed over the well at ground surface.

The boring logs and well completion details are included as Attachment C to this report.

***Monitoring Well Development***

On August 17, 2005, monitoring well MW-78 was developed by Kleinfelder by purging water from the well using a disposable bailer. Purged water obtained from the well was contained in a 55-gallon drum staged on-site pending laboratory analytical results.

***Groundwater Sampling***

On August 18, 2005, Kleinfelder collected a groundwater sample from monitoring well MW-78. Groundwater samples were also collected from four monitoring wells (MW-66, MW-68, MW-69 and MW-70) installed during our previous Limited Phase II ESA investigation. As previously noted, a groundwater sample could not be collected from monitoring well MW-67 since it was dry during the time of sampling.

Accurate documentation of field activities and measurements was recorded on Field Sampling Data Sheets (FSDS). Recorded data included sample collection information, as well as field measurements of pH and temperature.

Nitrile gloves were worn during sampling activities at each well location. All samples were transferred into containers previously prepared by the laboratory. The sample containers were sealed, labeled, and stored on ice in a cooler (and in a refrigerator) until delivery to the analytical laboratory.

The groundwater samples were submitted to ESN Northwest for two or more of the following analysis:

- PCE by EPA Method 8260.
- TPH (as diesel and heavy oil), by Ecology Method NWTPH-Dx.
- Dissolved arsenic by EPA Method 6020.

## RESULTS

### *Applicable Regulatory Standards – Soil and Groundwater*

The rules that guide the cleanup process at sites within Washington are incorporated into the Model Toxics Control Act (MTCA) administered by Ecology, as defined in WAC 173-340. For this report, PCE, TPH (as diesel and heavy oil), and arsenic analytical laboratory results are compared to MTCA Method A cleanup levels for soil and groundwater. The Method A cleanup levels are conservative and are for sites with relatively few hazardous substances, which may be inappropriate for all sites. The regulations state that Method A should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage, or similar purposes. Additionally, exceedances of Method A cleanup levels do not necessarily mandate a cleanup action for a site. The applicable MTCA Method A soil and groundwater cleanup levels are presented in Tables 1 and 2 (Attachment B), alongside the soil and perched water sample analytical results, for comparison. Copies of the laboratory analytical reports are included as Attachment D of this report.

The detected constituents that were reported by the laboratory as exceeding MTCA Method A soil and groundwater cleanup levels (PCE, TPH (as heavy oil), and dissolved arsenic) are discussed in detail below.

### *Soil Sample Analytical Results—PCE*

PCE was detected in three soil samples (B80-4, B80-7, and B85-2) collected from borings B-80 and B-85. In borehole B-80, PCE was detected in a soil sample collected at 10.0 feet bgs (0.04 mg/kg) and again in a sample collected at 17.5 feet bgs (0.02 mg/kg). In borehole B-85, PCE was detected in a soil sample collected at 5.0 feet bgs (0.04 mg/kg).

PCE concentrations in soil samples collected from boring B-80 suggest that PCE contamination extends to at least 17.5 feet bgs, but does not exceed the PCE MTCA Method A soil cleanup level of 0.05 mg/kg at a depth of greater than approximately ten feet bgs. Boring B-85 was advanced immediately down gradient of the sink drain field, east of the former Material Preparation Shed. The PCE concentrations detected at boring B-85 (0.04 mg/kg) are also below the MTCA Method A soil cleanup level for PCE.

None of the soil samples collected from borings B-79, B-81, B-82, B-83, B-84, and from the bottom of the sink drain reportedly contained PCE at concentrations greater than

the laboratory's analytical method reporting limit. Soil samples collected from borings B-79, B-81, B-82, B-83, and B-84 were used to define the horizontal extent of the PCE contamination around the sink drain outfall. The non-detections in these boreholes roughly defined the boundaries of the PCE soil contamination (Figure 2). The estimated surface area of the contamination is approximately 6,400 square feet. Assuming 10 vertical feet of contamination (PCE levels exceeding MTCA Method A soil cleanup levels), the estimated volume of PCE impacted soil is roughly between 2,000 to 3,000 cubic yards.

***Soil Sample Analytical Results—Heavy Oil***

TPH (as heavy oil) was detected in the following three soil samples: B80-4 collected at 10 feet bgs (54 mg/kg), B81-5 collected at 12.5 feet bgs (3,700 mg/kg), and in a soil sample collected from the bottom of the sink drain located within the former Material Preparation Shed (1,700 mg/kg). The MTCA Method A soil cleanup level for TPH (as heavy oil) is 2,000 mg/kg (see Table 1). Therefore, TPH (as heavy oil) concentrations in sample B81-5 collected at 12.5 feet bgs (see above) exceeds the MTCA Method A soil cleanup level for TPH (as heavy oil).

The soil samples impacted with heavy oil were either stained or had a distinct petroleum odor. Visual signs of stained soil where elevated levels of TPH (as heavy oil) were identified occurred intermittently and varied in depths ranging between one foot bgs (within the sink drain) to 12.5 feet bgs (within boring B-81). The occurrences of heavy oil staining did not generally exceed six inches in thickness. The horizontal extent of each stained area appeared limited in that heavy oil occurrences in one borehole were not observed in neighboring boreholes. Due to the apparent random distribution of heavy oil impacts in soil, the total volume of heavy oil impacted soil could not be accurately estimated.

***Groundwater Sample Analytical Results--Arsenic***

Dissolved arsenic was detected in a perched groundwater sample collected from monitoring well MW-78 at 14.6 µg/L, which exceeds the 5.0 µg/L MTCA Method A groundwater cleanup level for arsenic (see Table 2 in Attachment B). The source(s) of the arsenic identified in the perched groundwater at the site is currently unknown, however, its presence may not have originated from a surface release or another localized source. None of the soil samples collected at the site reportedly contained arsenic at levels greater that the laboratory's analytical method reporting limit.

Additionally, according to the site owner (Mr. Michael Freeman), Metal Marine Pilot, Inc. did not use arsenic in conjunction with their industrial operations at the site.

## REGULATORY REVIEW

### *Department of Ecology's Input*

On September 12, 2005 Kleinfelder contacted Mr. Charles San Juan (Hydrogeologist with Ecology's Toxic Cleanup Program in Olympia, Washington) to discuss Ecology's opinion concerning the dissolved arsenic levels in the site's perched groundwater. According to Mr. San Juan, arsenic has been found throughout the Puget Sound Area (as well as throughout the Western U.S.) to occur naturally in groundwater at concentrations of 15 to 50 µg/L, which exceeds the MTCA Method A groundwater cleanup level of 5 µg/L. Additionally, according to Mr. San Juan, the site is located within the footprint of the Tacoma Smelter Plume and that the arsenic levels detected in the site's perched groundwater may be naturally occurring and not related to any anthropogenic activities at the site. Mr. San Juan stated that based on the arsenic concentrations in the site's perched groundwater, Ecology will likely not require additional activities regarding this issue. Mr. San Juan summarized his comments in an e-mail that was forwarded to Kleinfelder on September 12, 2005. A copy of Mr. San Juan's e-mail is included as Attachment E to this report.

## SUMMARY AND CONCLUSIONS

Consistent with BCRA's request, Kleinfelder completed a Supplementary Limited Phase II ESA at the subject site. This investigation included (1) collecting 14 discreet soil samples from 7 borings advanced along the central portion of the site; (2) installing one groundwater monitoring well along the eastern portion of the site; (3) collecting groundwater samples from the new and previously installed monitoring wells; and (4) submitting the soil and groundwater samples to a State Certified laboratory to be analyzed for the presence of PCE, TPH (diesel and heavy oil), and arsenic.

Analytical results of soil samples collected at the site indicate elevated levels of PCE and TPH (as heavy oil) in soil located along the central portion of the site. Additionally, elevated levels of dissolved arsenic were also identified in a perched water sample collected from the site. The extent of PCE impacted soil is estimated to range between 2,000 to 3,000 cubic yards around the sink drain outfall area of the site. Visual signs of stained soil where elevated levels of TPH (as heavy oil) were identified occurred intermittently and varied in depths ranging between one foot bgs (within the sink drain) to 12.5 feet bgs (within boring B-81). The thickness of the heavy oil staining did not

appear to exceed six inches. The horizontal extent of each stained area encountered appeared limited in that heavy oil occurrences in one borehole were not observed in neighboring boreholes. Due to the apparent random distribution of heavy oil impacts in soil, the total volume of heavy oil impacted soil could not be accurately estimated.

Elevated levels of dissolved arsenic were identified in a perched groundwater sample collected at the site. The arsenic concentrations appeared to be consistent with the previous groundwater arsenic results identified in our June 2005 Limited Phase II ESA report and, according to Mr. Charles San Juan of Ecology, may be naturally occurring.

**RECOMMENDATIONS**

Based on the findings of this assessment, as well as the findings obtained during our previous Limited Phase II ESA investigation, further site characterization is not recommended at this time. However, prior to site development, Kleinfelder recommends that the site be enrolled into Ecology's Voluntary Cleanup Program (VCP) and that a remediation work plan be submitted to Ecology for their review and concurrence. Items to be addressed in the work plan should include the following:

1. The removal of PCE impacted soil and the removal of the two sealed recovery tanks (see the May 2005 Phase I ESA report) at the site prior to development activities.
2. The removal of the randomly distributed TPH (as heavy oil) impacted soil areas during site development.
3. The removal of paraffin oil impacted soil areas (northern property boundary) and the removal of the buried limed-lined hazardous waste disposal pits (identified in the Phase I ESA report) that may be encountered during site development activities.
4. Confirmatory soil sampling following excavation activities.
5. Mr. San Juan's comments indicating that the arsenic levels identified at the site may be naturally occurring.

Once approved by Ecology, the work plan will be used to guide site cleanup and to achieve a No Further Action (NFA) determination from Ecology.

Additional recommendations concerning the subject site (prior to redevelopment) are as follows:



KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

1. All drums, aboveground storage tanks, and other smaller containers storing oil, cleaning solvents, and other hazardous materials identified in the May 2005 Phase I ESA report should be removed from the site and properly disposed or recycled.

2. All hydraulic oil residues, hazardous materials stained areas, and metal shavings located on the concrete floor within the Metal Marine Pilot industrial building should be cleaned up and properly disposed or recycled.

3. Existing septic tanks at the site should be cleaned out by a septic tank service contractor and removed prior to site development.

4. Sections of the buried inactive transite water pipe identified in the May 2005 Phase I ESA report that become exposed or disturbed during site development should be removed and disposed of by a State Certified asbestos abatement contractor.

5. Asbestos-containing materials identified within the Metal Marine Pilot industrial building during the May 2005 Phase I ESA should be removed by a State licensed and registered asbestos abatement contractor prior to demolishing the building.

6. Disturbance of lead-based paints identified at the site should be performed as outlined in Section 5.2 of the May 2005 Phase I ESA report. Removing loose paint from the on-site structures prior to demolition activities (if present) should reduce worker exposure to airborne lead dust particles and reduce the possibility of paint chips and lead dust from mixing-in with the soil on-site and from migrating onto neighboring properties during demolition activities. Based upon laboratory analysis results of the paint applications, loose paint debris and associated dust must be handled and disposed of as hazardous waste.

   The disposal facility receiving building demolition debris coated with lead paint(s) that are not flaking or peeling may request a Toxicity Characteristic Leaching Procedure (TCLP) test on a representative sample of the debris material to evaluate whether the debris must be handled and disposed of as hazardous waste under Ecology's regulations.




KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax

7. Should underground storage tanks and/or groundwater wells be encountered on the property during site development, they should be decommissioned in accordance with Federal, State, and local requirements. Additionally, if any buried hazardous materials, visibly impacted soil areas, and/or septic tanks are encountered at the site during development activities, they should be removed and properly disposed of.

**LIMITATIONS**

The work described herein was performed to address the recommendations expressed in Kleinfelder's June 24, 2005 Limited Phase II ESA report concerning the subject site. The findings and recommendations in this report are made based upon the analytical results, field observations, and our best professional judgment. It is possible that unforeseen events could occur that may limit the effectiveness of the assessment. Although risk can never be eliminated, more detailed and extensive sampling and testing would yield better management of site risks. Since such extensive services involve greater expense, we ask our clients to participate in identifying the level of service that will provide them with an acceptable level of risk. Please contact the signatories of this report if you would like to discuss this issue of risk further.

The scope of work on this project was presented in our Contract Modification No. 2 (dated July 7, 2005) and subsequently approved by BCRA as out client. Please be aware our scope of work was limited to those items specifically identified in the proposal. Other activities not specifically included in the presented scope of work (in the Contract Modification, correspondence, or this report) are excluded and should not be considered to be a part of our scope of services.

Land use, site conditions (both on-site and off-site) and other factors will change over time. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings and opinions can be considered valid only as of the date of the site visit.

This report may be used by BCRA and their client (The Client) and only for the purposes stated within a reasonable time from its issuance, but in no event later than one year from the date of this report.

Any party other than BCRA and The Client who would like to use this report shall notify Kleinfelder of such intended use (see "Third Party Reliance Letter" template in

Attachment F). Based on the intended use of this report, Kleinfelder may require that additional work be performed and that a revised report be issued. Non-compliance with any of these requirements by BCRA, The Client, or anyone else will release Kleinfelder from any liability resulting from the use of this letter report by any unauthorized party. No warranty, either express, or implied is made.

**CLOSING**

We trust this report meets your needs at this time and appreciate the opportunity to provide our consulting services to BCRA. Please contact the undersigned at (425) 562-4200 or John Mancini (Kleinfelder's Senior Client Service Manager to BCRA) at (801) 261-3336 if you have questions or require additional information.

Sincerely,
KLEINFELDER, INC.

Dana P. Divine
Staff Hydrogeologist

Ted W. Sykes
Project Manager

Kevin Lakey, PE, LHG
Environmental Services Manager

Cc: John Mancini, Senior Client Service Manager

| | |
|---|---|
| Attachment A: | Figure 1 – Site Vicinity Map<br>Figure 2 – Soil Borings/Monitoring Well Locations Map |
| Attachment B: | Table 1 – Soil Sample Analytical Results<br>Table 2 – Water Sample Analytical Results |
| Attachment C: | Boring Logs/Monitoring Well Installation Details |
| Attachment D: | Analytical Laboratory Reports and Chain-of-Custody |
| Attachment E: | Copy of Ecology's September 12, 2005 E-Mail Concerning the Subject Site |
| Attachment F: | Third Party Reliance Letter Template |




KLEINFELDER 2405 140th Avenue NE, Suite A101, Bellevue, WA 98005 (425) 562-4200 (425) 562-4201 fax




N

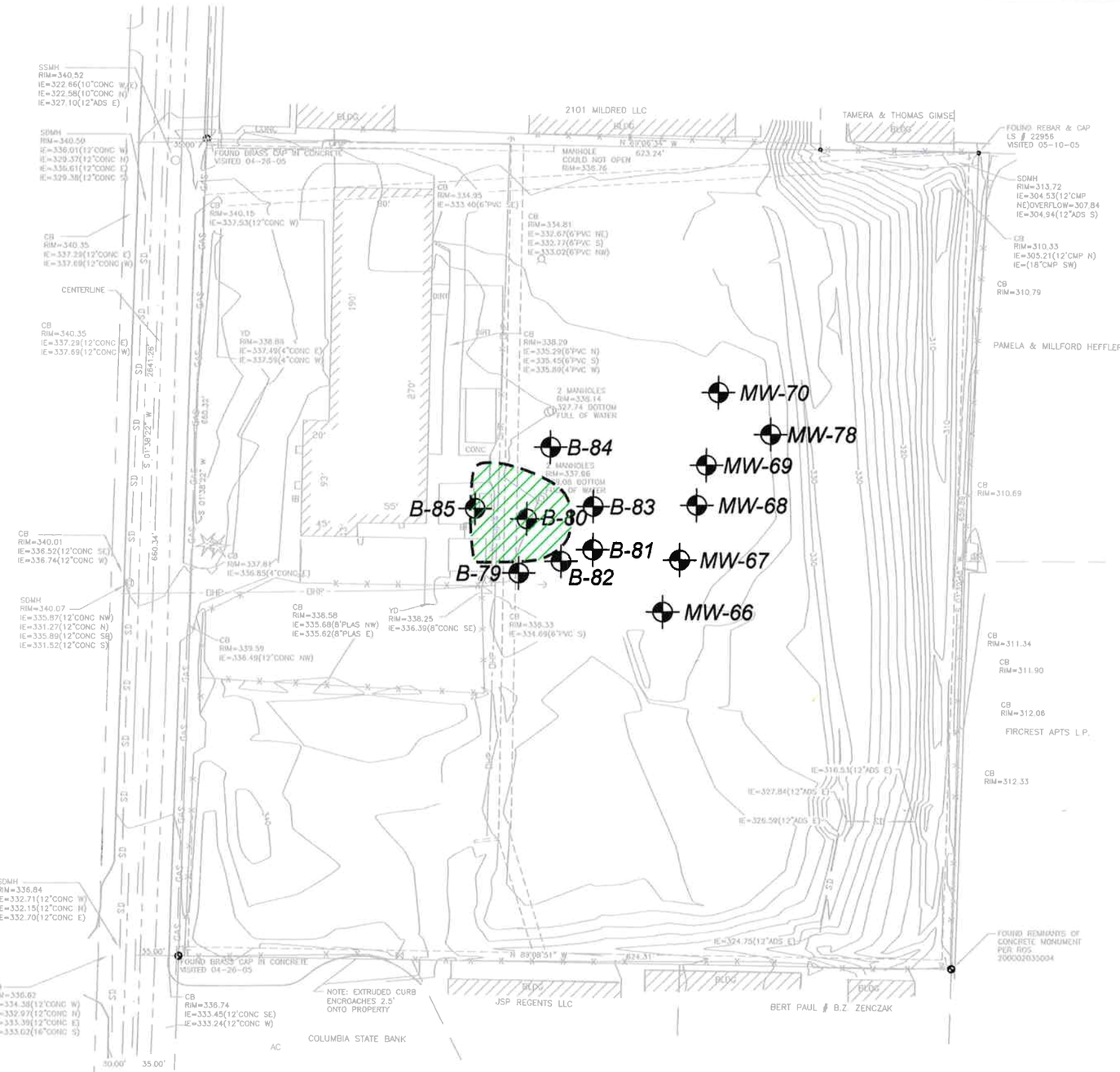
Not to Scale

KLEINFELDER

PROJECT NO. 56130 September 2005

**Vicinity Map**
Proposed Retail Site (No.95984)
2119 Mildred Street West
Fircrest, Washington

**FIGURE 1**




## Legend

- Approximate Limits of PCE Impacted Soil
- B-79 Boring Location
- MW-66 Monitoring Well Location

KLEINFELDER

Proposed Retail Site (No.95984)
2119 Mildred Street West
Fircrest, Washington

Project: 56130 September 2005

Boring/Monitoring Well Locations Plan

FIGURE 2

# ATTACHMENT B

# TABLES 1 AND 2

KLEINFELDER

# Table 1
## Soil Sample Analytical Results
## Proposed Retail Site (No. 4265-00)
## 2119 Mildred Street West
## Fircrest, Washington

| Soil Sample Number | Diesel/Fuel Oil (mg/kg) | Heavy Oil (mg/kg) | Arsenic (mg/kg) | PCE (mg/kg) |
|---|---|---|---|---|
| MTCA A | 2,000 | 2,000 | 20 | 0.05 |
| B79-2@5' | <20 | <50 | <5 | <0.02 |
| B79-4@10' | <20 | <50 | <5 | <0.02 |
| B80-4@10' | <20 | **54** | <5 | **0.04** |
| B80-7@17.5' | <20 | <50 | <5 | 0.02 |
| B81-4@10' | <20 | <50 | <5 | <0.02 |
| B81-5@12.5' | **410** | 3,700 | <5 | <0.02 |
| B82-2@5' | <20 | <50 | <5 | <0.02 |
| B82-5@12.5' | <20 | <50 | <5 | <0.02 |
| B83-3@7.5' | <20 | <50 | <5 | <0.02 |
| B83-6@15' | <20 | <50 | <5 | <0.02 |
| B84-3@7.5' | <20 | <50 | <5 | <0.02 |
| B84-7@17.5' | <20 | <50 | <5 | <0.02 |
| Drain | **420** | **1,700** | <5 | <0.02 |
| B85-2@5' | <20 | <50 | <5 | **0.04** |

Notes:
mg/kg = milligrams per kilogram.
Bold values indicate detection above laboratory analytical method reporting limit.
Shaded values indicate analytical result exceeds MTCA A soil cleanup level.

# Table 2
## Water Sample Analytical Results
## Proposed Retail Site (No. 4265-00)
## 2119 Mildred Street West
## Fircrest, Washington

| Water Sample Number | Diesel/Fuel Oil (ug/L) | Heavy Oil (ug/L) | Arsenic (ug/L) | PCE (ug/L) |
|---|---|---|---|---|
| MTCA A | 500 | 500 | 5 | 5 |
| MW-66 | <0.20 | <0.50 | NA | <1.0 |
| MW-68 | <0.20 | <0.50 | NA | <1.0 |
| MW-69 | <0.20 | <0.50 | NA | <1.0 |
| MW-70 | <0.20 | <0.50 | NA | <1.0 |
| MW-78 | <0.20 | <0.50 | **14.6** | <1.0 |

Notes:
ug/L = micrograms per liter.
Bold values indicate detection above laboratory analytical method reporting limit.
Shaded values indicate analytical result exceeds MTCA A groundwater cleanup level.
NA = Not Analyzed due to insufficient quantity of water in the well.

# ATTACHMENT C

# BORING LOGS/MONITORING WELL INSTALLATION DETAILS

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | **Surface conditions: grass** |
| 0 | | | | | | | | | | | | | SM | |
| | | | | | | | | | 8<br>14<br>18 | | 1 | | | SILTY SAND (SM): light gray, dry, dense, fine- to medium-grained sand with fine- to coarse-grained gravel. |
| 5 | | | | | | | | | 1<br>7<br>20 | | 2 | | | as above, except medium dense |
| | | | | | | | | | 6<br>7<br>6 | | 3 | | | SILTY SAND (SM): light gray to olive gray, moist, medium dense, fine- to medium-grained sand, trace fine gravel. |
| 10 | | | | | | | | | 2<br>2<br>3 | | 4 | | | SILTY SAND (SM): olive gray to greenish-gray, moist, loose, fine- to medium-grained sand, trace fine gravel. |
| | | | | | | | | | 3<br>9<br>8 | | 5 | | | SILTY SAND (SM): olive gray, moist, medium dense, fine- to medium-grained sand, some fine- to coarse-grained gravel. |
| 15 | | | | | | | | | 1<br>1<br>1 | | 6 | | | SILTY SAND (SM): olive gray, moist to wet, very loose, fine- to medium-grained sand, some fine- to coarse-grained gravel, trace fine organics (rootlets). |
| | | ▽ | | | | | | | 1<br>1<br>1 | | 7 | | | SILTY SAND (SM): dark brown to dark gray, moist to wet, very loose, fine- to medium-grained sand, trace fine- to coarse-grained gravel, trace fine organics, shoe contains wood fiber. |
| 20 | | | | | | | | | | | | | | |

**DATE DRILLED:** 8-17-05
**LOGGED BY:** D. Divine
**REVIEWED BY:** T. Sykes

**SURFACE ELEVATION (feet):**
**TOTAL DEPTH (feet):** 25.0
**DIAMETER OF BORING (in):** 8

**DRILLING METHOD:** HSA
**DRILLER:** Boart
**CASING SIZE:** N/A

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

**PROJECT NUMBER:** 56130

**Proposed Retail Development**
**Fircrest, WA**

**BORING LOG**
**MW-78**

**Appendix**
**A - a**
**PAGE 1 of 2**

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 8<br>3<br>7 | | 8 | | | NR |
| | | | | | | | | | 5<br>9<br>8 | | 9 | | | SILTY SAND (SM): gray to brown, wet, medium dense, fine- to medium-grained sand, trace fine gravel. Less silt in this sample than previous samples in this hole. |
| 25 | | | | | | | | | | | | | | Total Depth = 25 feet |

COMPLETION DETAILS:

0-7 feet: 2-inch diameter, flush-threaded Schedule 40 PVC blank riser pipe.

7-22 feet: 2-inch diameter, flush-threaded Schedule 40 PVC well screen with 0.020-inch machine slots.

0-1 feet: concrete flush mount monument
1-6 feet: 3/8-inch bentonite chips, hydrated
6-25 feet: 10x20 Colorado Silica Sand

* SAMPLER TYPE: Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
MW-78

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | | | | | SM | |
| | | | | | | | | | 11<br>15<br>9 | | 1 | | | SILTY SAND (SM): olive gray, moist, medium dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| 5 | | | | | | | | | 4<br>4<br>9 | | 2 | | | As above. Old wire insulation and blue-green copper staining in soil (FILL). |
| | | | | | | | | | 14<br>37<br>47 | | 3 | | SM | SILTY SAND (SM): light gray with yellow-orange oxidation streaks, moist, very dense, fine- to medium-grained sand, trace fine gravel (TILL). |
| 10 | | | | | | | | | 50/2" | | 4 | | | As above |
| | | | | | | | | | 22<br>32<br>30 | | 5 | | SW | SAND (SW): light gray, moist, very dense, fine- to coarse-grained sand, with silt and fine- to coarse-grained gravel. |
| | | | | | | | | | | | | | ML | SANDY SILT (ML): light gray, moist, hard, fine sand, laminations. |
| 15 | | | | | | | | | 27<br>50/5" | | 6 | | SM | SILTY SAND (SM): light gray, moist, very dense, fine- to medium-grained sand, with fine- to coarse-grained gravel.<br><br>slow drilling, but not rough |
| | | | | | | | | | 15<br>50/6" | | 7 | | | as above |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-17-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart
CASING SIZE: N/A

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-79

Appendix
A - a



THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 37<br>50/4" | | 8 | SW | | SAND (SW): greenish-gray, moist, very dense, fine- to coarse-grained sand, with silt and fine- to coarse-grained gravel. |
| 21.5 | | | | | | | | | | | | | | Total Depth = 21.5 feet |

* SAMPLER TYPE — Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT — 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-79

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | 6<br>7<br>5 | | 1 | SM | | SILTY SAND (SM): light brown to gray, dry, medium dense, fine- to medium-grained sand, some fine- to coarse-grained gravel. (FILL) |
| 5 | | | | | | | | | 20<br>9<br>12 | | 2 | | | SILTY SAND (SM): light brown grading to dark brown, dry to moist, medium dense, fine- to medium-grained sand, some fine- to coarse-grained gravel. |
| | | | | | | | | | 5<br>9<br>26 | | 3 | | | SILTY SAND (SM): light brown, moist, dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. Two-inches of dark staining on top of gravel piece. |
| 10 | | | | | | | | | 50/2" | | 4 | SM | | SILTY SAND (SM): light gray, moist, very dense, fine- to coarse-grained sand, trace fine gravel. (TILL) |
| | | | | | | | | | 20<br>50/5" | | 5 | | | SILTY SAND (SM): olive gray to green-gray, moist, very dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| 15 | | | | | | | | | 50/6" | | 6 | | | As above |
| | | | | | | | | | 30<br>50/5" | | 7 | SW | | SAND (SW): yellow-orange grading to light gray, moist, fine- to coarse-grained sand, with silt and fine- to coarse-grained gravel. |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-17-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-80

Appendix
A - a



2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 12<br>26<br>27 | | 8 | ML | | SANDY SILT (ML): light gray, moist, hard, fine sand, trace fine- to coarse-grained gravel, laminations. |
| 21.5 | | | | | | | | | | | | | | Total Depth = 21.5 feet |

* SAMPLER TYPE — Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT — 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-80

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | 50/6" | | 1 | SM | | SILTY SAND (SM): light gray, dry, very dense, fine- to medium-grained sand. |
| 5 | | | | | | | | | 6<br>4<br>4 | | 2 | | | SILTY SAND (SM): olive gray, moist, loose, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| | | | | | | | | | 50/1" | | 3 | | | NR |
| 10 | | | | | | | | | 15<br>19<br>10 | | 4 | | | SILTY SAND (SM): olive gray to light brown, moist, medium dense, fine- to medium-grained sand, with fine- to coarse-grained gravel. One-inch dark staining in shoe. |
| | | | | | | | | | 3<br>3<br>15 | | 5 | | | SILTY SAND (SM): dark brown mixed with greenish-gray, moist, medium dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel, trace fine organics (rootlets). Shoe has petroleum odor. (FILL). |
| 15 | | | | | | | | | 14<br>26<br>10 | | 6 | | | As above. Staining and petroleum odor. |
| | | | | | | | | | 26<br>14<br>9 | | 7 | | | SILTY SAND (SM): brown, moist, medium dense, fine- to medium-grained sand, organic material in bottom 4-inches of sample (loam/wood). |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-17-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-81

Appendix
A - a



2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 3<br>9<br>19 | | 8 | | | |
| 21.5 | | | | | | | | | | | | | ML | SANDY SILT (ML): light gray, moist, very stiff, fine sand, fine laminations (2mm) that break on planes.<br>Total depth = 21.5 feet |

* SAMPLER TYPE — Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT — 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-81

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY — MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD — PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | | | | | SM | |
| | | | | | | | | | 10<br>9<br>4 | | 1 | | | SILTY SAND (SM): light gray to light brown, moist, medium dense, fine- to coarse-grained sand, some fine- to coarse-grained gravel. |
| 5 | | | | | | | | | 5<br>10<br>8 | | 2 | | | As above |
| | | | | | | | | | 16<br>41<br>19 | | 3 | | | SILTY SAND (SM): brown to light gray, moist, very dense, fine- to medium-grained sand, with fine- to coarse-grained gravel. The gray portion has stained material that looks and smells like tar. |
| 10 | | | | | | | | | 9<br>6<br>6 | | 4 | | | NR |
| | | | | | | | | | 16<br>40<br>50/6" | | 5 | | | SILTY SAND (SM): light gray, moist, very dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| 15 | | | | | | | | | 20<br>22<br>25 | | 6 | | | As above, except dense. |
| | | | | | | | | | 2<br>17<br>40 | | 7 | | | SILTY SAND (SM): olive gray, moist to wet, very dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-18-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-82

Appendix
A - a



2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 7<br>22<br>19 | | 8 | | | SILTY SAND (SM): light gray, moist, dense, 2-inch lens of SAND (SW) followed by 4-inch lens of SILT (ML) with laminations, then more SILTY SAND (SM). |
| 21.5 | | | | | | | | | | | | | | Total Depth = 21.5 feet |

* SAMPLER TYPE: Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-82

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | 14<br>9<br>6 | | 1 | SM | | SILTY SAND (SM): light gray, moist, medium dense, fine- to coarse-grained sand, some fine gravel. |
| 5 | | | | | | | | | 2<br>9<br>6 | | 2 | | | SILTY SAND (SM): olive gray, moist, medium dense, fine- to medium-grained sand, sone fine gravel, trace fine organics (grass). |
| | | | | | | | | | 15<br>17<br>17 | | 3 | | | SILTY SAND (SM): olive gray to light gray, moist, dense, fine- to medium-grained sand, trace fine gravel. |
| 10 | | | | | | | | | 8<br>12<br>6 | | 4 | | | SILTY SAND (SM): olive gray, moist to wet, medium dense, fine- to medium-grained sand, with fine- to coarse-grained gravel. |
| | | | | | | | | | 5<br>4<br>4 | | 5 | | | As above, except loose |
| 15 | | | | | | | | | 4<br>4<br>4 | | 6 | | | As above, trace organic material (twigs) and one piece of mangled black plastic. (FILL) |
| | | | | | | | | | 10<br>7<br>9 | | 7 | | | SILTY SAND (sM): olive gray, moist, medium dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel, trace organics (twigs and rootlets). (FILL) |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-18-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-83

Appendix
A - a

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 17<br>30<br>50/5" | X | 8 | SM | | SILTY SAND (SM): light gray, moist, very dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. (TILL) |
| 21.5 | | | | | | | | | | | | | | Total Depth = 21.5 feet |

* SAMPLER TYPE: Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-83

Appendix
A - b



2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: grass |
| 0 | | | | | | | | | 7<br>14<br>16 | | 1 | | SM | SILTY SAND (SM): light brown, moist, medium dense, fine- to medium-grained sand, trace fine- to coarse-grained gravel. |
| 5 | | | | | | | | | 9<br>10<br>9 | | 2 | | | As above |
| | | | | | | | | | 36<br>12<br>17 | | 3 | | | SILTY SAND (SM): olive gray, moist, dense, fine- to medium-grained sand, some fine gravel. |
| 10 | | | | | | | | | 3<br>3<br>10 | | 4 | | | SILTY SAND (SM): dark brown, moist, loose, fine- to medium-grained sand, with coarse wood pieces. |
| | | | | | | | | | | | | | ML | SANDY SILT (ML): green-gray, moist, stiff, fine sand, trace fine- to coarse-gravel. |
| | | | | | | | | | 2<br>8<br>14 | | 5 | | SM | SILTY SAND (SM): dark brown, moist, medium dense, fine- to coarse-grained sand with one large piece of wood above shoe. Possible staining above wood. Trace brick fragements. |
| 15 | | | | | | | | | 20<br>16<br>26 | | 6 | | | NR |
| | | | | | | | | | 12<br>24<br>28 | | 7 | | SP | SAND (SP): light gray, moist to dry, very dense, fine- to medium-grained sand. Four-inch SANDY SILT (ML) interbed. |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-18-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING
PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-84

Appendix
A - a
PAGE 1 of 2

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 25<br>50/4" | | 8 | SM | | SILTY SAND (SM): light gray, moist, very dense, fine- to medium-grained sand, trace fine gravel. |
| 21.5 | | | | | | | | | | | | | | Total Depth = 21.5 feet |

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROVED: _____

* SAMPLER TYPE: Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop); 140 lbs (30" Drop)

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-84

Appendix
A - b

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S. NAME | U.S.C.S. SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Surface conditions: concrete |
| 0 | | | | | | | | | 2<br>3<br>2 | | 1 | SM | | SILTY SAND (SM): brown, dry to moist, loose, fine- to medium-grained sand, trace fine gravel. |
| 5 | | | | | | | | | 8<br>17<br>28 | | 2 | | | SILTY SAND (SM): light brown to yellow-organge, dry to moist, dense, fine- to medium-grained sand, some fine- to coarse-grained gravel. |
| | | | | | | | | | 37<br>50/4" | | 3 | | | SILTY SAND (SM): light gray, moist to dry, very dense, fine- to medium-grained sand, trace fine gravel. (TILL) |
| 10 | | | | | | | | | 28<br>50/5" | | 4 | | | As above |
| | | | | | | | | | 50/5" | | 5 | | | As above |
| 15 | | | | | | | | | 50/6" | | 6 | | | As above |
| | | | | | | | | | 50/6" | | 7 | | | As above |
| 20 | | | | | | | | | | | | | | |

DATE DRILLED: 8-18-05
LOGGED BY: D. Divine
REVIEWED BY: T. Sykes

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 21.5
DIAMETER OF BORING (in): 8

DRILLING METHOD: HSA
DRILLER: Boart Longyear
CASING SIZE: N/A

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-85

Appendix
A - a



2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

| DEPTH (feet) | WELL/PIEZO CONSTRUCTION | WATER LEVEL | TESTING PROGRAM: LABORATORY: MOISTURE CONTENT(%) | PLASTIC LIMIT(%) | LIQUID LIMIT(%) | % PASSING No. 200 SIEVE | OTHER TESTS | FIELD: PID (ppm) | BLOWS/6 in** (uncorrected) | SAMPLER * | SAMPLE NUMBER | U.S.C.S.: NAME | SYMBOL | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | 50/4" | ⊠ | 8 | | | As above, except moist to wet. |
| 21.5 | | | | | | | | | | | | | | Total depth = 21.5 feet |

* SAMPLER TYPE: Cal. (3"OD) Split Spoon; SPT (2" OD) Split Spoon; Core Sample; Shelby Tube; Grab; No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop); 140 lbs (30" Drop)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

2000 STANDARD IN/OUT 56130.GPJ 2000REV.GDT 8/22/05

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 56130

Proposed Retail Development
Fircrest, WA

BORING LOG
B-85

Appendix
A - b

# ATTACHMENT D

## ANALYTICAL LABORATORY REPORTS AND CHAIN-OF-CUSTODY

ESN NORTHWEST
Environmental Services Network

September 3, 2005

Ted Sykes
Kleinfelder
2405 140th Avenue NE
Suite A101
Bellevue, WA 98005-1877

Dear Mr. Sykes:

Please find enclosed the analytical data report from the Fircrest Retail Project site in Fircrest, Washington. Soil and waterater samples were analyzed for Diesel and Oil by NWTPH-Dx/Dx Extended, PCE by Method 8260, and As by Methods 7061 and 6020 on August 23 – 25, 2005.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this analytical work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services to Kleinfelder for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A. Korosec
*President*

1210 Eastside Street SE, Suite 200 ▪ Olympia, Washington 98501 ▪ 360.459.4670 ▪ FAX 360.459.3432
Web site: *www.esnnw.com* E-Mail: *info@esnnw.com*

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

| | |
|---|---|
| ESN Job Number: | S50819-1 |
| Client: | KLEINFELDER |
| Client Job Name: | FIRCREST RETAIL |
| Client Job Number: | 56130 |

Analytical Results

| NWTPH-Dx, mg/kg | | MTH BLK | B79-2@5' | B79-4@10' | B80-4@10' | B80-7@17.5' | B81-4@10' | B81-5@12.5' | B82-2@5' |
|---|---|---|---|---|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil |
| Date extracted | Reporting | | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 |
| Date analyzed | Limits | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 |
| Moisture, % | | | 15% | 9% | 7% | 7% | 9% | 5% | 11% |
| Kerosene/Jet fuel | 20 | nd | nd | nd | nd | nd | nd | nd | nd |
| Diesel/Fuel oil | 20 | nd | nd | nd | nd | nd | nd | **410** | nd |
| Heavy oil | 50 | nd | nd | nd | **54** | nd | nd | **3,700** | nd |
| Surrogate recoveries: | | | | | | | | | |
| Fluorobiphenyl | | 102% | 97% | 96% | 97% | 91% | 91% | 111% | 94% |
| o-Terphenyl | | 105% | 105% | 104% | 103% | 100% | 102% | 117% | 103% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S50819-1
Client: KLEINFELDER
Client Job Name: FIRCREST RETAIL
Client Job Number: 56130

Analytical Results

| NWTPH-Dx, mg/kg | | B82-5@12.5' | B83-3@7.5' | B83-6@15' | B84-3@7.5' | B84-7@17.5' | DRAIN | B85-2@5' | DUP B85-2@5' |
|---|---|---|---|---|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil |
| Date extracted | Reporting | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 |
| Date analyzed | Limits | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 |
| Moisture, % | | 10% | 11% | 12% | 11% | 10% | 42% | 8% | 8% |
| Kerosene/Jet fuel | 20 | nd | nd | nd | nd | nd | nd | nd | nd |
| Diesel/Fuel oil | 20 | nd | nd | nd | nd | nd | **420** | nd | nd |
| Heavy oil | 50 | nd | nd | nd | nd | nd | **1,700** | nd | nd |
| Surrogate recoveries: | | | | | | | | | |
| Fluorobiphenyl | | 93% | 92% | 95% | 96% | 94% | 131% | 97% | 91% |
| o-Terphenyl | | 101% | 101% | 114% | 104% | 103% | 133% | 102% | 100% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S50819-1
Client: KLEINFELDER
Client Job Name: FIRCREST RETAIL
Client Job Number: 56130

Analytical Results

| NWTPH-Dx, mg/l | | MTH BLK | MW-66 | MW-68 | MW-69 | MW-70 | MW-78 | DUP MW-78 |
|---|---|---|---|---|---|---|---|---|
| Matrix | Water | Water | Water | Water | Water | Water | Water | Water |
| Date extracted | Reporting | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 |
| Date analyzed | Limits | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 |
| Kerosene/Jet fuel | 0.20 | nd | nd | nd | nd | nd | nd | nd |
| Diesel/Fuel oil | 0.20 | nd | nd | nd | nd | nd | nd | nd |
| Heavy oil | 0.50 | nd | nd | nd | nd | nd | nd | nd |
| Surrogate recoveries: | | | | | | | | |
| Fluorobiphenyl | | 99% | 95% | 94% | 94% | 92% | 102% | 104% |
| o-Terphenyl | | 108% | 105% | 106% | 105% | 103% | 105% | 112% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S50819-1
Client: KLEINFELDER
Client Job Name: FIRCREST RETAIL
Client Job Number: 56130

| 8260, mg/kg | | MTH BLK | B79-2@5' | B79-4@10' | B80-4@10' | B80-7@17.5' | B81-4@10' | B81-5@12.5' | B82-2@5' |
|---|---|---|---|---|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil |
| Date extracted | Reporting | | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 |
| Date analyzed | Limits | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 | 08/23/05 |
| Moisture, % | | | 15% | 9% | 7% | 7% | 9% | 5% | 11% |
| Tetrachloroethene (PCE) | 0.02 | nd | nd | nd | **0.04** | **0.02** | nd | nd | nd |
| Surrogate recoveries: | | | | | | | | | |
| Dibromofluoromethane | | 106% | 103% | 104% | 101% | 104% | 105% | 98% | 99% |
| Toluene-d8 | | 103% | 104% | 101% | 103% | 106% | 102% | 102% | 103% |
| 4-Bromofluorobenzene | | 103% | 107% | 104% | 105% | 104% | 103% | 105% | 106% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

| | |
|---|---|
| ESN Job Number: | S50819-1 |
| Client: | KLEINFELDER |
| Client Job Name: | FIRCREST RETAIL |
| Client Job Number: | 56130 |

| 8260, mg/kg | | B82-5@12.5' | B83-3@7.5' | B83-6@15' | B84-3@7.5' | B84-7@17.5' | DRAIN | B85-2@5' |
|---|---|---|---|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil | Soil | Soil | Soil | Soil |
| Date extracted | Reporting | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 | 08/19/05 |
| Date analyzed | Limits | 08/24/05 | 08/24/05 | 08/24/05 | 08/24/05 | 08/24/05 | 08/24/05 | 08/24/05 |
| Moisture, % | | 10% | 11% | 12% | 11% | 10% | 42% | 8% |
| Tetrachloroethene (PCE) | 0.02 | nd | nd | nd | nd | nd | nd | **0.04** |
| Surrogate recoveries: | | | | | | | | |
| Dibromofluoromethane | | 103% | 105% | 102% | 104% | 101% | 97% | 95% |
| Toluene-d8 | | 104% | 102% | 104% | 102% | 103% | 102% | 105% |
| 4-Bromofluorobenzene | | 103% | 103% | 104% | 105% | 107% | 108% | 104% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

| | |
|---|---|
| ESN Job Number: | S50819-1 |
| Client: | KLEINFELDER |
| Client Job Name: | FIRCREST RETAIL |
| Client Job Number: | 56130 |

Analytical Results

| 8260, µg/l | | MTH BLK | MW-66 | MW-68 | MW-69 | MW-70 | MW-78 |
|---|---|---|---|---|---|---|---|
| Matrix | Water | Water | Water | Water | Water | Water | Water |
| | Reporting | | | | | | |
| Date analyzed | Limits | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 |
| Tetrachloroethene (PCE) | 1.0 | nd | nd | nd | nd | nd | nd |
| Surrogate recoveries: | | | | | | | |
| Dibromofluoromethane | | 102% | 106% | 105% | 107% | 106% | 107% |
| Toluene-d8 | | 105% | 115% | 114% | 114% | 116% | 113% |
| 4-Bromofluorobenzene | | 104% | 104% | 106% | 106% | 107% | 104% |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

| | |
|---|---|
| ESN Job Number: | S50819-1 |
| Client: | KLEINFELDER |
| Client Job Name: | FIRCREST RETAIL |
| Client Job Number: | 56130 |

Analytical Results

| 8260, mg/kg | | MTH BLK | LCS | MS | MSD | RPD |
|---|---|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil | Soil | |
| | Reporting | | | | | |
| Date analyzed | Limits | 08/23/05 | 08/25/05 | 08/24/05 | 08/24/05 | |
| 1,1-Dichloroethene | 0.05 | nd | 94% | 88% | 93% | 6% |
| Benzene | 0.02 | nd | 114% | 116% | 122% | 5% |
| Trichloroethene (TCE) | 0.02 | nd | 103% | 105% | 110% | 5% |
| Toluene | 0.05 | nd | 113% | 114% | 121% | 6% |
| Chlorobenzene | 0.05 | nd | 110% | 113% | 118% | 4% |
| Surrogate recoveries: | | | | | | |
| Dibromofluoromethane | | 106% | 106% | 102% | 105% | |
| Toluene-d8 | | 103% | 104% | 101% | 102% | |
| 4-Bromofluorobenzene | | 103% | 105% | 103% | 104% | |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

| | |
|---|---|
| ESN Job Number: | S50819-1 |
| Client: | KLEINFELDER |
| Client Job Name: | FIRCREST RETAIL |
| Client Job Number: | 56130 |

Analytical Results

| 8260, µg/l | | MTH BLK | LCS | MS | MSD | RPD |
|---|---|---|---|---|---|---|
| Matrix | Water | Water | Water | Water | Water | |
| | Reporting | | | | | |
| Date analyzed | Limits | 08/22/05 | 08/22/05 | 08/22/05 | 08/22/05 | |
| 1,1-Dichloroethene | 1.0 | nd | 84% | 80% | 84% | 5% |
| Benzene | 1.0 | nd | 106% | 101% | 107% | 6% |
| Trichloroethene (TCE) | 1.0 | nd | 97% | 91% | 96% | 5% |
| Toluene | 1.0 | nd | 116% | 114% | 119% | 4% |
| Chlorobenzene | 1.0 | nd | 117% | 113% | 120% | 6% |
| Surrogate recoveries: | | | | | | |
| Dibromofluoromethane | | 106% | 108% | 104% | 104% | |
| Toluene-d8 | | 108% | 112% | 116% | 116% | |
| 4-Bromofluorobenzene | | 105% | 105% | 105% | 106% | |

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

# ESN NORTHWEST CHEMISTRY LABORATORY

FIRCREST RETAIL PROJECT
Fircrest, Washington
Kleinfelder

## Heavy Metals in Soil by EPA-7000 Series

| Sample Number | Date Analyzed | Arsenic (As) EPA 7061 (mg/kg) |
|---|---|---|
| Method Blank | 8/25/05 | nd |
| B79-2@5' | 8/25/05 | nd |
| B79-4@10' | 8/25/05 | nd |
| B80-4@10' | 8/25/05 | nd |
| B80-7@17.5 | 8/25/05 | nd |
| B81-4@10' | 8/25/05 | nd |
| B81-5@12.5 | 8/25/05 | nd |
| B82-2@5' | 8/25/05 | nd |
| B82-5@12.5 | 8/25/05 | nd |
| B83-3@7.5 | 8/25/05 | nd |
| B83-6@15' | 8/25/05 | nd |
| B84-3@7.5 | 8/25/05 | nd |
| B84-7@17.5 | 8/25/05 | nd |
| Drain | 8/25/05 | nd |
| Drain Dup. | 8/25/05 | nd |
| B85-2@5' | 8/25/05 | nd |
| B85-2@5' Dup. | 8/25/05 | nd |
| Method Detection Limits | | 5 |

"nd" Indicates not detected at listed detection limits.

ANALYSES PERFORMED BY:Matthew Sebonia

ESN NORTHWEST CHEMISTRY LABORATORY

FIRCREST RETAIL PROJECT
Fircrest, Washington
Kleinfelder

## QA/QC Data - Total Metals EPA-7000 Series Analyses

| Sample Number: B-6-01 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Matrix Spike | | | Matrix Spike Duplicate | | | RPD |
| | Spiked Conc. (mg/kg) | Measured Conc. (mg/kg) | Spike Recovery (%) | Spiked Conc. (mg/kg) | Measured Conc. (mg/kg) | Spike Recovery (%) | (%) |
| Arsenic | 250 | 220 | 88 | 250 | 214 | 86 | 2.76 |

| Laboratory Control Sample | | | |
|---|---|---|---|
| | Spiked Conc. (mg/kg) | Measured Conc. (mg/kg) | Spike Recovery (%) |
| Arsenic | 250 | 245 | 98 |

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY:Matthew Sebonia

Sample Identification:

| Lab. No. | Client ID | Date/Time Sampled | Matrix |
|---|---|---|---|
| 129434-1 | MW-78 | | Liquid |

# STL Seattle

| | |
|---|---|
| Client Name | ESN Northwest, Inc. |
| Client ID: | MW-78 |
| Lab ID: | 129434-01 |
| Date Received: | 8/19/2005 |
| Date Prepared: | 8/23/2005 |
| Date Analyzed: | 8/24/2005 |
| Dilution Factor | 5 |

**Dissolved Metals by ICP-MS - USEPA Method 6020**

| Analyte | Result (mg/L) | RL | Flags |
|---|---|---|---|
| Arsenic | 0.0146 | 0.0025 | |

# STL Seattle

| | |
|---|---|
| Lab ID: | Method Blank - DP1495 |
| Date Received: | - |
| Date Prepared: | 8/23/2005 |
| Date Analyzed: | 8/24/2005 |
| Dilution Factor | 1 |

**Dissolved Metals by ICP-MS - USEPA Method 6020**

| Analyte | Result (mg/L) | RL | Flags |
|---|---|---|---|
| Arsenic | ND | 0.0005 | |

# STL Seattle

Matrix Spike Report

| | |
|---|---|
| Client Sample ID: | 1-H2O FOUNTAIN BY CAFE |
| Lab ID: | 129447-01 |
| Date Prepared: | 8/23/2005 |
| Date Analyzed: | 8/24/2005 |
| QC Batch ID: | DP1495 |

Dissolved Metals by ICP-MS - USEPA Method 6020

| Parameter Name | Sample Result (mg/L) | Spike Amount (mg/L) | MS Result (mg/L) | MS % Rec. | Flag |
|---|---|---|---|---|---|
| Arsenic | 0 | 4 | 4.02 | 100 | |

# STL Seattle

Duplicate Report

| | |
|---|---|
| Client Sample ID: | 1-H2O FOUNTAIN BY CAFE |
| Lab ID: | 129447-01 |
| Date Prepared: | 8/23/2005 |
| Date Analyzed: | 8/24/2005 |
| QC Batch ID: | DP1495 |

Dissolved Metals by ICP-MS - USEPA Method 6020

| Parameter Name | Sample Result (mg/L) | Duplicate Result (mg/L) | RPD % | Flag |
|---|---|---|---|---|
| Arsenic | 0 | 0 | NC | |

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

Tel: 253 922 2310
Fax: 253 922 5047
www.stl-inc.com

## DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be < 40%.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%. The higher result was reported unless anomalies were noted.

C3: Second analysis confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be ≤ 30%.

C4: Second analysis confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 30%. The presence of this analyte was not verified per WAC 246-290-010. The original analysis was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

MRL: Method Reporting Limit

N: See analytical narrative

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

ESN NORTHWEST Environmental Services Network

S50819-1

# CHAIN-OF-CUSTODY RECORD

CLIENT: Kleinfelder

ADDRESS: 2405 140th Ave NE Ste A101 Bellev

PHONE: 425 562 4200 FAX: 425 562 4201

CLIENT PROJECT #: 56130 PROJECT MANAGER: T. Sykes

DATE: 8/19/05 PAGE 1 OF 3

PROJECT NAME: Fircrest retail

LOCATION: 2119 Mildred

COLLECTOR: D. Divine DATE OF COLLECTION 8/17

| Sample Number | Depth | Time | Sample Type | Container Type | ANALYSES: WBA 8021B PCE | VOA 8021B BTEX Only | VOA 8260 | SEMI VOL 8270 | TPH - HCID | TPH 8015 (gasoline) | TPH 8015 (diesel) | TPH 8015 (d & o) | PAH 8100 | PAH 8270 | PCBs 8082 | Pesticides 8081 | EPH | VPH | Methamphetamine | Pb | Hex Chrome | Asbestos | | NOTES | Total Number of Containers | Laboratory Note Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. B79-2@5' | 5' | 1115 | S | 4oz VOA | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | 2 | |
| 2. B79-4@10' | 10' | 1120 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 3. B79-8@20' | 20' | 1215 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. B80-2@5' | 5' | 1245 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. B80-3@7.5' | 7.5' | 1250 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. B80-4@10' | 10' | 1300 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 7. B80-5@12.5 | 12.5' | 1310 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. B80-6@15' | 15' | 1320 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. B80-7@17.5 | 17.5' | 1330 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 10. B81-4@10' | 10' | 1445 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 11. B81-5@12.5 | 12.5' | 1500 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 12. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | | | | | | | | | | | | | | | | | | | | | | | | | | |

| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |
|---|---|---|---|
| Dana Divine | 8/19/05 | | 8/19/05 10:45 |
| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |
| | | | |

**SAMPLE DISPOSAL INSTRUCTIONS**

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

| SAMPLE RECEIPT | |
|---|---|
| TOTAL NUMBER OF CONTAINERS | |
| CHAIN OF CUSTODY SEALS Y/N/NA | |
| SEALS INTACT? Y/N/NA | |
| RECEIVED GOOD COND./COLD | |
| NOTES: | |

LABORATORY NOTES:

- PCE only, not all VOAs.

Turn Around Time: 24 HR 48 HR 5 DAY

ESN NORTHWEST | Environmental Services Network

530017 | [illegible]

# CHAIN-OF-CUSTODY RECORD

CLIENT: Kleinfelder

ADDRESS: 2405 140TH Ave NE Ste A101 Bellevue WA 98005

PHONE: 425 562 4201 FAX: 425 562 4200

CLIENT PROJECT #: 56130 PROJECT MANAGER: T. Sykes

DATE: 8/19/05 PAGE 2 OF 3

PROJECT NAME: Fircrest retail

LOCATION: Fircrest, WA 2119 Mildred

COLLECTOR: D DiVinc DATE OF COLLECTION 8/18

| Sample Number | Depth | Time | Sample Type | Container Type | VOA 8021B PCE | VOA 8021B BTEX Only | VOA 8260 | SEMI VOL 8270 | TPH - HCID | TPH 8015 (gasoline) | TPH 8015 (diesel) | TPH 8015 (d & o) | PAH 8100 | PAH 8270 | PCBs 8082 | Pesticides 8081 | EPH | VPH | Methamphetamine | Pb | Hex Chrome | Arsenic | | NOTES | Total Number of Containers | Laboratory Note Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. B82-2@5' | 5' | 715 | S | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | 2 | |
| 2. B82-3@7.5 | 7.5 | 745 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. B82-5@12.5 | 12.5 | 750 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 4. B83-2@5 | 5' | 845 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. B83-3@7.5 | 7.5 | 900 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 6. B83-5@12.5 | 12.5 | 930 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. B83-6@15' | 15 | 945 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 8. B84-3@7.5 | 7.5 | 1045 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 9. B84-5@12.5 | 12.5 | 1030 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. B84-7@17.5 | 17.5 | 1050 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 11. Drain | 0.5 | 1110 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 12. B85-2@5' | 5' | 1200 | | | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | | | | | |
| 13. B85-4@10' | 10' | 1215 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | | | | | | | | | | | | | | | | | | | | | | | | | | |

| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |
|---|---|---|---|
| Diana DiVinc | 8/19/05 | [signature] | 8/19/05 10AM |
| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |

**SAMPLE DISPOSAL INSTRUCTIONS**

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

| SAMPLE RECEIPT | |
|---|---|
| TOTAL NUMBER OF CONTAINERS | |
| CHAIN OF CUSTODY SEALS Y/N/NA | |
| SEALS INTACT? Y/N/NA | |
| RECEIVED GOOD COND./COLD | |
| NOTES: | |

LABORATORY NOTES:
- PCE only, not all VOAs.

Turn Around Time: 24 HR 48 HR (5 DAY)

ESN NORTHWEST | Environmental Services Network

550811-1

# CHAIN-OF-CUSTODY RECORD

CLIENT: Kleinfelder

ADDRESS: 2405 140th Ave. NE Ste A101, Bellevue WA 98005

PHONE: 425 562 4200 FAX: 425 562 4201

CLIENT PROJECT #: 56130 PROJECT MANAGER: T. Sykes

DATE: 8/19/05 PAGE 3 OF 3

PROJECT NAME: Tircrest Retail

LOCATION: 219 Mildred

COLLECTOR: D. Divine DATE OF COLLECTION 8/18/05

| Sample Number | Depth | Time | Sample Type | Container Type | ANALYSES: VOA 8021B | VOA 8021B BTEX Only | VOA 8260 PCE | SEMI VOL 8270 | TPH - HCID | TPH 8015 (gasoline) | TPH 8015 (diesel) | TPH 8015 (G & D) | PAH 8100 | PAH 8270 | PCBs 8082 | Pesticides 8081 | EPH | VPH | Methamphetamine | Pb | Hex Chrome | Diss Arsenic | NOTES | Total Number of Containers | Laboratory Note Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. MW-66 | ~ | 1330 | W | | | | ✓ | | | | ✓ | | | | | | | | | | | | | 3 | |
| 2. MW-68 | — | 1340 | | | | | ✓ | | | | ✓ | | | | | | | | | | | | | 2 | |
| 3. MW-69 | ~ | 1350 | | | | | ✓ | | | | ✓ | | | | | | | | | | | | | 2 | |
| 4. MW-70 | ~ | 1400 | | | | | ✓ | | | | ✓ | | | | | | | | | | | | | DP * 2 | |
| 5. MW-78 | — | 1430 | ↓ | | | | ✓ | | | | ✓ | | | | | | | | | | ✓ | | | 4 | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | | | | | | | | | | | | | | | | | | | | | | | | | |

| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |
|---|---|---|---|
| Dana Divine | 8/19/05 | [signature] | 8/19/05 10AM |
| RELINQUISHED BY (Signature) | DATE/TIME | RECEIVED BY (Signature) | DATE/TIME |

**SAMPLE DISPOSAL INSTRUCTIONS**

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

| SAMPLE RECEIPT | |
|---|---|
| TOTAL NUMBER OF CONTAINERS | |
| CHAIN OF CUSTODY SEALS Y/N/NA | |
| SEALS INTACT? Y/N/NA | |
| RECEIVED GOOD COND./COLD | |
| NOTES: | |

LABORATORY NOTES:

- PCE only.
- Filter As sample please

Turn Around Time: 24 HR 48 HR (5 DAY)

# ATTACHMENT E

## COPY OF ECOLOGY'S SEPTEMBER 12, 2005 E-MAIL CONCERNING THE SUBJECT SITE

**Ted Sykes - Detection of Dissolved G.W. Arsenic (Fircrest Site)**

**From:** "San Juan, Charles" <csan461@ECY.WA.GOV>
**To:** "'tsykes@kleinfelder.com'" <tsykes@kleinfelder.com>
**Date:** 9/12/2005 9:53:43 AM
**Subject:** Detection of Dissolved G.W. Arsenic (Fircrest Site)

Ted -

Per our phone conversation about the site you are working on, it's my understanding that dissolved arsenic (9.47-17.9 ug/L) was detected in a shallow perched zone. It's my understanding that temporary wells were used to collect samples and that the wells were developed to the extent practicable.

Arsenic can occur naturally in excess of the MTCA Method A standard of 5 ppb. For example, Welch et al. (1988) found that arsenic in ground water (in the Western U.S.) can occur naturally (15-50 ug/L). In a subsequent publication, Welch et al. (2000) found that ~10% of 30,000 ground water samples (across the U.S.) contained arsenic concentrations > 10 ug/L. The USGS also found similar trends in a study of naturally occurring arsenic in Southeast Michigan (http://mi.water.usgs.gov/splan2/sp07800/dwiarsenic.php).

Thus, it's my opinion that the arsenic you detected may be naturally occurring and is therefore not related to any anthropogenic activities. This site is located within the footprint of the Tacoma Smelter Plume; however, my check of the soil data indicates that lead and arsenic concentrations tend to drop off significantly with the first 0-24 inches. In other words, it doesn't seem that there is any correlation between high concentrations of arsenic in surficial soils and shallow perched ground water 15-20 ft. below land surface.

References

Welch et al. (1988). Arsenic in Ground Water of the Western United States. GROUND WATER, Vol. 26. No. 3, pp. 333-347.
Welch et a. (2000). Arsenic in Ground Water of the Unites States: Occurrence and Geochemistry. GROUND WATER, Vol. 38, No. 4, pp. 589-604.

Charles San Juan
Hydrogeologist, LHG
Toxics Cleanup Program
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98054-7600
(360)407-7191
Fax: (360)407-7154
email: csan461@ecy.wa.gov

# ATTACHMENT F

# THIRD PARTY RELIANCE LETTER TEMPLATE

[Date]

[Name of Third-Party Representative]
[Third-Party's Full and Formal Name]
[Third-Party's Address]

Re: Agreement Concerning Release of Report
Report Number [Report Number]

Dear [Name of Third-Party Representative]:

The attached report was prepared pursuant to a specific scope of service and written contract between [Name of Kleinfelder's Client], (Client) and Kleinfelder, Inc., (Kleinfelder) dated [Date of Contract]. Client has given us permission to release the report to you. You may rely on this report as though it were addressed to you at the time of the issuance for a period of six months from the date of issuance, with the express understanding that Kleinfelder shall not be responsible for problems arising from events or changes that may have occurred subsequent to our preparation of said report.

This reliance letter is expressly contingent upon your acceptance of the General Terms and Conditions attached hereto and actual payment of $[Amount]. Your payment shall also indicate your acceptance of the attached General Terms and Conditions which include a provision limiting Kleinfelder's liability, whether such liability arises in breach of contract or warranty, tort (including negligence), strict or statutory liability, or any other cause of action, to the maximum extent permitted by law. This reliance letter shall be void in the event your acceptance and said consideration is not received within seven days of the above date.

Sincerely,

**Kleinfelder, Inc.**

[Name of Kleinfelder Representative]
[Representative's Title]

Attachments: Report
General Terms and Conditions

[Name of Third-Party Representative]
[Third-Party's Full and Formal Name]
[Third-Party's Address]

I acknowledge and accept the Letter Agreement Concerning Release of Report dated _____ regarding Report No. _____, including the attached General Terms and Conditions, and remit payment of the consideration in the amount of $_____.

_____ _____

[Name and Title] Date

# KLEINFELDER, INC. GENERAL CONDITIONS (PROFESSIONAL SERVICES)

**1. Services.** This Agreement is entered into between Third Party and Kleinfelder, Inc. ("Consultant") wherein Third Party engages Consultant to provide a reliance letter to support professional services ("Services") in connection with the project for Consultant's client (Client) described in the proposal ("Project") to which these General Conditions apply. Third party agrees that services not specifically described in the Scope of Services identified in Consultant's proposal to Client are not included in the Scope of Services described by Consultant. This Agreement, including the original or any revised proposal, these General Conditions, any Consultant Addenda and Fee Schedule, represents the entire Agreement between the parties and supercedes any and all agreements between the parties, either oral or in writing, including any purchase or work order issued by Client or Third Party.

**2. Work Product.** Services provided under this Agreement, including all reports, information, recommendations, or opinions ("Reports") prepared or issued by Consultant, are for the exclusive use and benefit of Client or Third Party in connection with the Project, are not intended to inform, guide or otherwise influence any other entities or persons with respect to any particular business transactions, and should not be relied upon by any entities or persons other than Client or Third Party for any purpose other than the Project. Third Party will not distribute or convey such Reports to any other persons or entities without Consultant's prior written consent which shall include a release of Consultant from liability and indemnification by such party. Consultant's Reports, boring logs, maps, field data, drawings, test results and other work products are part of Consultant's professional services, do not constitute goods or products and are copyrighted works of Consultant. Third Party understands that Third Party may rely upon the final report for a period not to exceed 180 days from the date the report was issued by Consultant to the Client.

**3. Standard of Care.** Consultant has performed the Services in a manner consistent with that level of care and skill ordinarily exercised by members of the Consultant's profession practicing in the same locality under similar circumstances at the time the services were performed. This Agreement creates no other representation, warranty or guarantee, express or implied.

**4. Limitation of Liability.** Consultant's potential liability to Third Party is grossly disproportionate to Consultant's fee. Therefore, unless Third Party and Consultant otherwise agree in writing in consideration for an increase in Consultant's fee, Third Party, including its directors, officers, partners, employees, agents, contractors and their respective assigns, agree to limit Consultant's liability (whether arising from contract, statutory violation or tort) to the greater of $5,000 or the amount of Consultant's fee. This limitation of liability shall apply to all phases of Services performed in connection with this Project, whether subsequent to or prior to the execution of this Agreement. In no event shall Consultant be liable for consequential, incidental or special damages.

**5. Indemnification.** To the fullest extent permitted by law, Third Party, including its directors, officers, partners, employees, agents, contractors and their respective assigns, waives any claim against and agrees to indemnify, defend, and hold harmless Consultant, its directors, officers, employees and subcontractors from and against all claims, liability, damages, or expenses ("Claims") arising out of, in connection with or relating to any alleged act, failure to act, or other conduct of Consultant, including but not limited to, Claims alleging the negligence or other fault of Consultant, but specifically excepting Claims arising out of Consultant's sole negligence or willful misconduct. Third Party shall indemnify Consultant even if Third Party is partially or wholly without fault for such Claims.

**6. Dispute Resolution.** The parties shall attempt resolution of any dispute arising under or related to this Agreement by mediation. Either party may demand mediation by serving a written notice on the other party stating the essential nature of the dispute. The mediation shall be conducted in accordance with, but not under the supervision of, the AAA Construction Industry Mediation Rules then in effect within forty-five (45) days from the service of notice. The parties shall share the fees equally. If mediation fails, either party may institute litigation in the state or federal court of the county in which Consultant's office issuing the proposal is located. The prevailing party shall be entitled to attorneys' fees, cost, including costs incurred in the mediation and costs of enforcement of any judgment. The parties expressly waive any statute of limitations for a longer period of time and agree that any action shall be brought within one year from the date of Consultant's final report. The parties expressly waive any and all rights to a trial by jury in any action, proceeding or counterclaim brought by either of the parties against the other with respect to any matter relating to, arising out of or in any way connected with this Agreement.

**7. Changed Conditions.** If during the course of performance of this Agreement conditions or circumstances were discovered which were not contemplated by Consultant at the commencement of the agreement, Consultant shall notify Third Party of the newly discovered conditions or circumstances, and Third Party and Consultant shall renegotiate, in good faith, the terms and conditions of this Agreement. If amended terms and conditions cannot be agreed upon within thirty (30) days after notice, Consultant may terminate this Agreement.

**8. Governing Law.** The laws of the State where the Agreement was entered into shall govern interpretation of this Agreement. If any term is deemed unenforceable, the remainder of the Agreement shall stay in full force and effect.

**9. Additional Provisions.** Neither party may assign its interest in this Agreement without the prior written consent of the other. Any modification to this Agreement will be effective only if it is in writing signed by the party to be bound, except that if Consultant has performed services in reliance on Third Party's verbal approval to proceed, Third Party shall be bound by such verbal approval. One or more waivers of any term, condition or covenant by either party shall not be construed as a waiver of any other term, condition or covenant. This Agreement may be signed in counterpart.