

April 9, 2012

ECI Project No. 0422-02

Linn Larson  
C/o Ron Eaton  
Eaton Family LLC  
1201 Pacific Avenue, Suite 1400  
Tacoma, WA 98402

Re: Environmental Activities Review Letter  
2119 Mildred Street  
Fircrest, Washington

Mr. Eaton:

EconCon, Inc., (ECI), per your request, completed a Focused Subsurface Investigation project at 2119 Mildred Street, Fircrest, Washington (the "Subject Property / Property"; Figures 1) in October 2011. During the course of our investigation we confirmed and refuted the finding of previous investigation (Kleinfelder 2005). The contaminants of concern identified were perchloroethylene (PCE) and arsenic (As).

PCE was identified in soil at depths below ground surface (bgs) of 4 to 10 feet in an irregular dispersion approximately 50 to 75 feet east-west and 75 to 100 feet north-south, located southeast of the southeast corner of the building (Figure 2 – Attached). Should better delineation of the impacted soil be required, further sampling and analysis to delineate the lateral extent of impacted soil would be necessary.

Remediation of the impacted soil is limited to the following methodologies. Due to the intermittent PCE concentrations identified by both ECI and Kleinfelder (Figure 3), calculating total quantities is an estimate only. Remediation options are limited to:

- 1.) Natural Attenuation: Leaving the impacted soil in place and monitoring through intermittent sampling of natural degradation. This process will take an indefinite period of time and may not adequately reduce the concentration of contaminants to acceptable levels to meet Ecology cleanup requirements.
- 2.) In-situ<sup>1</sup> Remediation: This is the process of "treating" the soil in place. As with Natural Attenuation, the in-situ process will take an undetermined amount of time and may not meet the Ecology cleanup requirements.
- 3.) Ex-situ<sup>2</sup> Remediation / Off Site Disposal: This is the process of excavating the impacted soil and testing the soil following excavation activities for contaminants concentrations exceeding applicable cleanup levels (CULs). Also involved is confirming the excavation limits (confirmation sampling) are

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<sup>1</sup> In-situ ("in place") remediation refers to the cleanup of contaminated soils and groundwater without removing contaminated media from the subsurface, typically through the use of physical and/or chemical processes.

<sup>2</sup> Ex-situ remediation involves the removal of contaminated media, for on-site treatment and subsequent return to the subsurface.

below applicable CUL's. If post excavation sampling of excavated soil is reported below CUL's the material may be used as backfill on the property. If the soil is reported exceeding applicable CUL's, off site disposal at a licensed disposal facility will be required. The total quantity of material where off-site disposal will be required post stockpile activities can not be quantified. However, it is expected that a minimum of 20% of the stockpiled soil, following post stockpile sampling, will be below applicable CUL's.

Our estimate of PCE impacted soil, using the investigation derived data from both ECI and Kleinfelder and the irregular shape of the PCE distribution, is 500 to 1500 cubic yards (CY). The remediation option best suited for this site is ex-situ excavation, staging (stockpiling), and re-sampling then off-site disposal of confirmed impacted soil. Although a remediation work plan (cleanup action plan) would need to be completed, this recommendation would include the following.

- Excavation and Stockpiling of PCE Impacted Soil;
- Collection and Analysis from Excavation (Confirmation Sampling);
- Stockpile Performance Sampling (Concentration of PCE in Stockpile Soil);
- Off-Site Disposal of PCE Impacted Soil as Necessary.

We anticipate, based on the very low concentration (0.087 mg/kg to 0.23 mg/kg), that through the act of excavation, stockpile perpetration and short term (1 month) soil management, PCE concentrations will reduce through volatilization (evaporation) to levels where a substantial amount of the soil can remain on the property. Off site disposal of soil with any concentration of PCE is regulated and will require consent from the Washington State Department of Ecology. This consent is provided through a "Contained In Determination" as part of the required Cleanup Action Plan.

Arsenic contaminated soil identified during the 2011 ECI investigation (ECI samples B4:15', B7:10', B10:15', B16:20', B18:15' and B19:15') is assumed to be related to the Asarco Area Wide Contamination Plume and was most likely imported onto the site during historic infilling. ECI recommends completing additional sampling activities to delineate the extent of arsenic contaminated soil. A minimum of 10 sample locations with soil samples collected at two elevations will be necessary.

Once delineated, remediation options are limited to:

- 1.) Excavation and on-site treatment using experimental treatment technologies;
- 2.) Off site disposal at a licensed disposal facility.
- 3.) In-situ alternative or management of arsenic impacted soil using institutional controls.

The third option (above), to leave the impacted soil in place and manage the site using institutional controls would be the least expensive, using the future development of the site, specifically the capping of the site (asphalt, concrete, buildings, etc.) with new construction. This institutional control / capping alternative, should regulatory closure be the ultimate goal, will require Ecology authorization and a study of groundwater conditions underlying the site to confirm that arsenic has not or will not impact groundwater. Costs associated with this alternative will include Environmental Consulting (Estimated 16 to 24 hours @ \$95/hr [Ecology & Legal Collaboration], Voluntary Cleanup Program fees (10 to 20 hours @ \$120.00 / hr) and legal representation to review and file the Restrictive Covenant. To receive a No Further Action (NFA) determination, Ecology will require a restrictive covenant on the property stating

that the soil underlying the property is impacted with arsenic exceeding the Model Toxic Control Act Method A Cleanup Levels for Unrestricted land uses. The restrictive covenant will be filed with the county and affixed to the property's title.

ECI also completed sampling and analysis for total petroleum hydrocarbons (TPH) as gasoline (GRO), diesel (DRO) and oil (ORO/HRO). This sampling and analysis was completed due to the 2005 Kleinfelder analysis reporting ORO concentration exceeding applicable (TPH) cleanup levels. Soil samples collected by ECI were placed immediately adjacent to Kleinfelder sample locations and analyzed for GRO, DRO and ORO. All ECI samples were reported below the applicable CUL. It is speculated that, due to the organic matter in the underlying soil, the Kleinfelder sample analysis may have had organic interferences, giving false positives. ECI used EPA Method 3630C, Silica Gel Cleanup, removing the organic matter that may have contributed to the Kleinfelder reported ORO concentration. Although ten samples were reported exceeding the laboratory MRL oil range organics, further investigation is not warranted at this time. It is unclear why the Kleinfelder samples were reported at such elevated concentration.

Overall, the primary environmental issue identified by ECI is the remediation of PCE impacted soil. Excavation, stockpiling and final disposition following post stockpile sampling activities is our recommended strategy. As stated earlier, the PCE concentrations should be substantially reduced, possibly to levels where off-site disposal of some of the soil may not be necessary.

## Conclusions

### Perchloroethylene (PCE) Contaminated Soil

ECI suggests on-site remediation by excavation. It is expected up to 1500 CY of PCE contaminated soil is impacted at concentration exceeding applicable CUL's and will need to be excavated. The PCE contaminated soil should be stockpiled approximately 3' deep on an impermeable liner (6 mill plastic sheeting) for a minimum of one month, covered during rain events. The excavation and stockpile activities provide the PCE contaminate the opportunity volatilize<sup>3</sup>. Soil stockpile sampling using Ecology's stockpile sampling guidelines completed following the stockpile activity will determine the remaining concentration of PCE in the soil. Ecology's stockpile guidelines require 10 samples be collected on stockpiles greater than per 1000 yards and less than 2000 yards.

PCE volatilizes (evaporates) quickly, so the one month sampling event will provide guidance whether the soil is cleaning itself and to what extent, or whether it or a portion of it requires removal to land fill. This process will define the remaining work.

Excavation and placement of the 1500 CY should be able to be accomplished within two to three days at a cost of \$5,000 to \$7,500 for equipment and labor and \$500 to \$1,000 for materials (plastic sheeting, hay bails, etc.). Monitoring and sampling by ECI will cost \$2,750. Following PCE excavation up to 15 samples will be collected from the excavation to determine any further contamination beyond what is anticipated from the sampling already conducted. Contaminated soil excavation oversight, progress sample collection (collection of sample to guide excavation activities) and analysis, confirmation sample

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<sup>3</sup> Henry's law constant of  $1.8 \times 10^{-2}$  atm·m<sup>3</sup>/mol (ATSDR 1993; U.S. Air Force 1989)

collection (post excavation sample collection) and analysis, summary report preparation and application to Ecology to receive a "Contained In Determination" is expected to cost \$5,500.00.

Based on our experience, we anticipate approximately 20% to 40% of the total, or 300 to 600 CY, will require removal to landfill: Typical costs for disposal of 300 to 600 CY is presented below.

- Excavation & Stockpile Preparation of PCE Impacted Soil \$ 4.00 / CY
- Disposal of PCE Contaminated Soil (With Contained In Authorization) \$ 37.50 / CY
- Transport of 600 CY (\$120/HR, 2HR-R/T, 20 CY/Truck,) \$ 11.00 / CY
- Excavator / Loader (\$120/HR@ 20Hrs) \$ 4.00 / CY

Note: These cost and quantities are estimates only.

The costs are set forth in the attached spreadsheet exhibit.

### **Arsenic (As) Contaminated Soil**

ECI recommends an additional twenty soil samples at ten locations ranging from 10 to 20 feet below ground surface (depth of imported soil) be completed on the site at locations previously identified as containing impacted soil be sampled for arsenic. The additional samples can be collected by drill rig or excavator. The cost for the drill rig to accomplish seven of the holes on the upper level of the site is expected to be \$1,700.00. The three lower/bank (eastern) sample locations will require an additional day (\$1,700). The estimated cost of sampling with an excavator capable of reaching 20 feet bgs is \$1,200 per day.

ECI will obtain two samples from each of the sample locations to characterize for Arsenic. The cost of this sampling activities and chemical analysis is expected to be \$2,750.00. If there is arsenic then alternatives for managing it will be reviewed in accordance with the alternatives stated above.

ECI will file the appropriate report with Ecology assuming PCE has been fully remediated and the Arsenic impacted soil has been fully delineated, apply for regulatory closure and (No Further Action [NFA] determination) for the site. It is likely that Ecology will require a groundwater investigation to confirm groundwater (not perched water) has not been impacted by the PCE and Arsenic contaminates. The depth to groundwater underlying the site is estimated to be between 50 and 200 feet bgs. The likely hood that groundwater has been impacted is very low. In the event it is required by Ecology, groundwater sampling will require at a minimum a large auger style drill rig that can reach depths of at least 50 feet bgs. All that will be required, assuming that the depth of PCE and Arsenic contamination is consistent with the previous ECI and Kleinfelder findings of 15 to 20 feet bgs, is confirmation that groundwater is 15 feet deeper than the lowest point of impacted soil. Costs associated with this type of drilling will include an Environmental Professional (16 to 24 hours @ \$95/hr) and a drill rig at and estimated \$1000 per boring. Two to four borings may be required. The time to complete the VCP process will take four to six months and be completely dependant on Ecology's response time.

The numbers and time lines stated above are estimates based on ECI experience, and will only be finitely defined upon receipts of contract estimates from qualified contractors and response from the Department of Ecology.

We appreciate the opportunity to provide environmental consulting services to you on this project. If you have any questions or comments regarding this submittal please do not hesitate to contact us at (253) 238-9270.

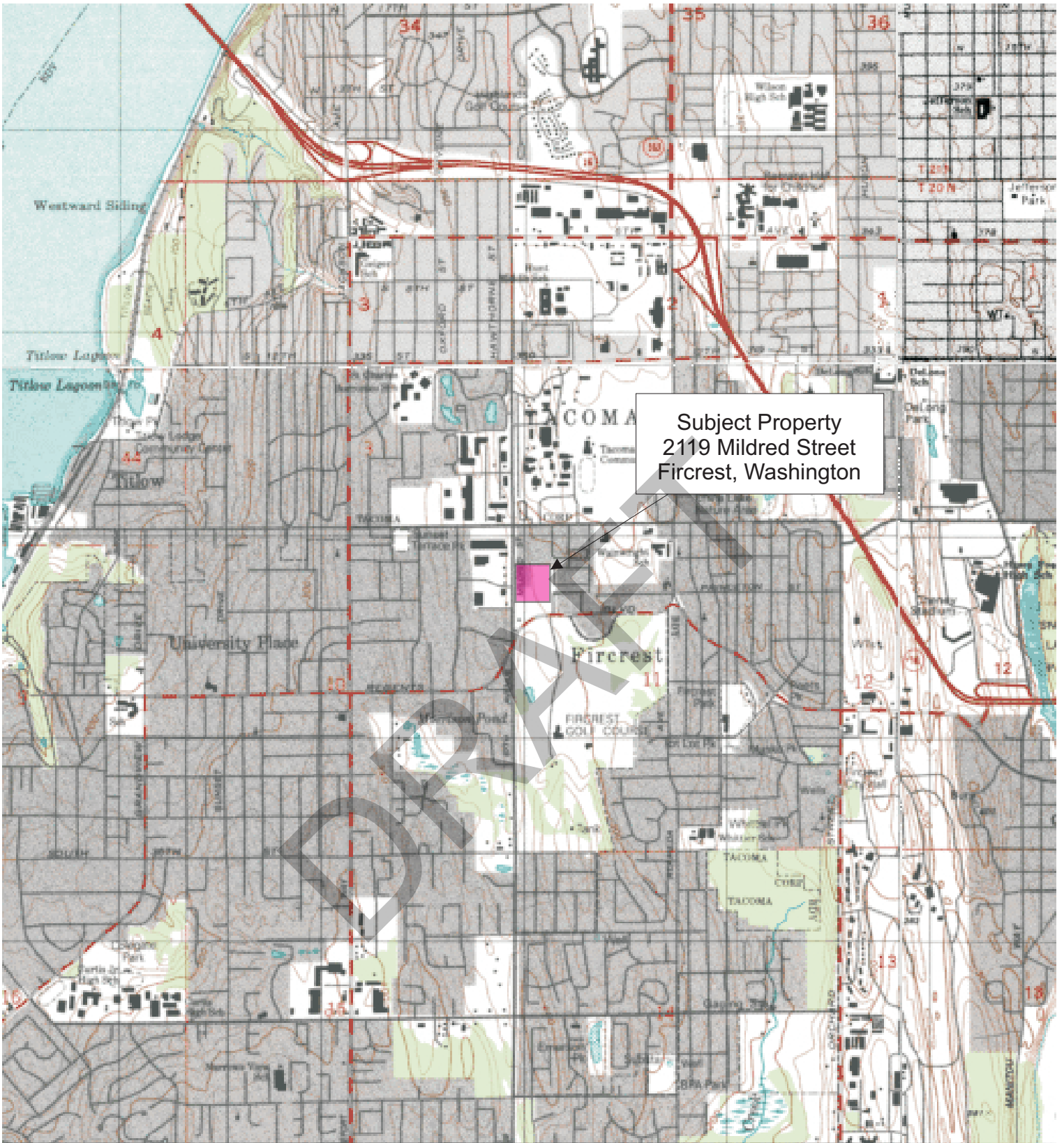
Respectively Submitted,

  
Stephen Spencer  
Principal

Enclosures

Attachment A

- Figure 1 – Site Representation With ECI & Kleinfelder Boring Locations
- Figure 2 – PCE Sample Location Map
- Figure 3 – Arsenic Sample Location Map



Site Location & Topographic Map  
 2119 Mildred Street  
 Fircrest, Washington

Date: April 2, 2012  
 Completed By: S. Spencer  
 Reviewed By.: S. Spencer  
 Version: ECI-001  
 Project No.: 0377-04

Figure No.:

**01**

Sheet 01 of 01

KB75  
PCE <0.02@1'

KB74  
PCE <0.02@1'

MW70  
PCE <0.02@5'  
PCE <0.02@22.5'

MW78

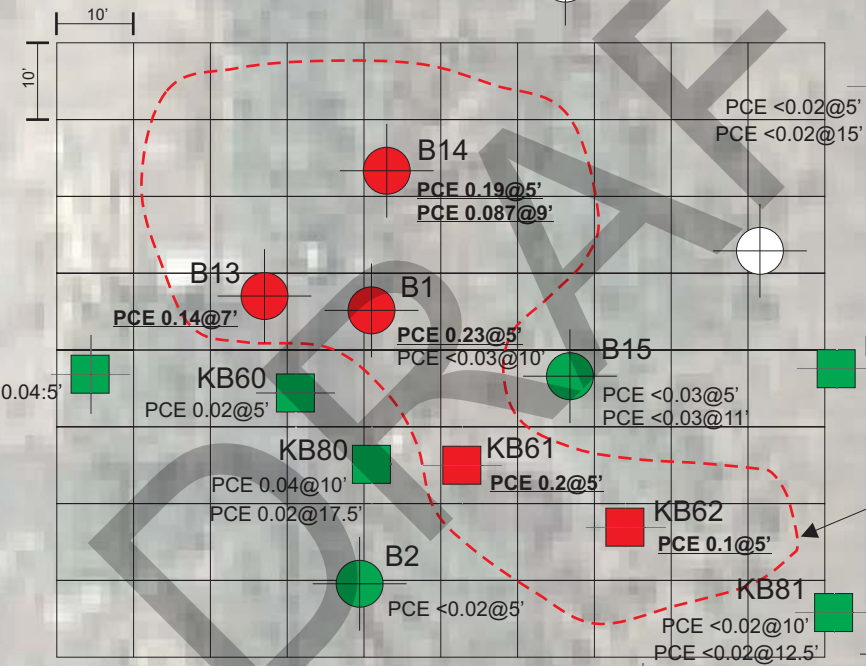
KB71  
PCE <0.02@5'

KB84  
PCE <0.02@17.5'  
PCE <0.02@7.5'

KB64  
PCE <0.02@8.5'  
PCE <0.02@15'

MW69  
PCE <0.02@11.5'  
PCE <0.02@22.5'

KB73  
PCE <0.02@1'



KB65  
PCE <0.02@2.5'  
PCE <0.02@15'

MW68  
PCE <0.02@5'  
PCE <0.02@20'

KB72  
PCE <0.02@1'

KB83  
PCE <0.02@7.5'  
PCE <0.02@15'

PCE 0.04@5'

B13  
PCE 0.14@7'

B1  
PCE 0.23@5'  
PCE <0.03@10'

B15  
PCE <0.03@5'  
PCE <0.03@11'

KB60  
PCE 0.02@5'

KB80  
PCE 0.04@10'  
PCE 0.02@17.5'

KB61  
PCE 0.2@5'

KB62  
PCE 0.1@5'

Estimated limits of PCE impacted soil

B2  
PCE <0.02@5'

KB81  
PCE <0.02@10'  
PCE <0.02@12.5'

MW67  
PCE <0.02@12'  
PCE <0.02@15'

KB79  
PCE <0.02@5'  
PCE <0.02@10'

B17  
B4

MW66  
PCE <0.02@5'  
PCE <0.02@22.5'

B6

B12

- ECI 2011 Boring Locations
- ECI 2011 Boring Locations Exceeding MTCA-A CULs
- Kleinfelder 2005 Boring Locations
- Kleinfelder 2005 Boring Locations Exceeding MTCA-A CULs

PCE Soil Sample Location Map  
2119 Mildred Street  
Fircrest, Washington

Date: April 2, 2012  
 Completed By: S. Spencer  
 Reviewed By: S. Spencer  
 Version: ECI-001  
 Project No.: 0377-04

Figure No.:  
**02**  
 Sheet 01 of 01



KB75

KB74

KB71  
As: <5@5'

KB73

KB72

KB85  
As: <5@5'

B13

KB60  
As: <5@5'

KB80  
As: <5@10'  
As: <5@17.5'

B2

KB79  
As: <5@5'  
As: <5@10'

KB61  
As: <5@5'

B1

KB62  
As: <5@5'

KB82  
As: <5@5'  
As: <5@12.5'

B15

KB81  
As: <5@10'  
As: <5@12.5'

KB82  
As: <5@5'  
As: <5@12.5'

B16

KB83  
As: <5@7.5'  
As: <5@15'

B7

KB63  
As: <5@5'  
As: <5@15'

B8

KB64  
As: <5@8.5'  
As: <5@15'

KB65  
As: <5@2.5'  
As: <5@15'

B9

KB84  
As: <5@7.5'  
As: <5@17.5'

B10

KB59  
As: <5@5'

B11

B19  
As: 43@15'  
As: <5@20'

B20  
As: 6@20'

B18  
As: 47@15'  
As: <5@20'

B17  
As: <5@20'

B4  
As: <5@10'  
As: 29@15'

B3  
As: 6.5@12'  
As: 13@15'

B5  
As: 8.2@10'  
As: 8.8@15'

B6  
As: 6.7@10'  
As: 5.4@15'

B12  
As: <5@10'  
As: <5@15'

MW70  
As: <5@5'  
As: <5@22.5'


MW78




MW69  
As: <5@11.5'  
As: <5@22.5'

MW68  
As: <5@5'  
As: <5@20'

MW67  
As: <5@12'  
As: <5@15'

MW66  
As: <5@5'  
As: <5@22.5'

 N

-  ECI 2011 Boring Locations Less Than MTCA-A Arsenic CULs
-  ECI 2011 Boring Locations Exceeding MTCA-A Arsenic CULs
-  Kleinfelder 2005 Boring Locations Less Than MTCA-A Arsenic CULs

ECI Arsenic Soil Sample Location Map  
2119 Mildred Street  
Fircrest, Washington

Date: April 2, 2012  
Completed By: S. Spencer  
Reviewed By: S. Spencer  
Version: ECI-001  
Project No.: 0377-04

Figure No.:  
**03**  
Sheet 01 of 01

