

SITE SUMMARY AND CLOSURE PLAN

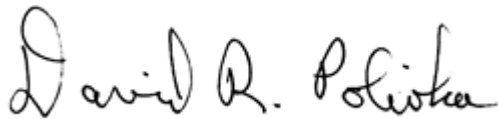
Former Metal Marine Pilot Inc. (a.k.a. Freeman Property)

2119 Mildred Street West
Tacoma, Washington 98466
Facility/Site Identification #: 84252573
Cleanup Site Identification #: 3615

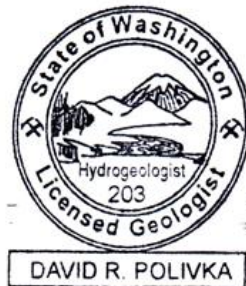
June 13, 2019

Prepared for:

Mr. Troy Eaton
Eaton Family LLC
4724 Steilacoom Blvd SW
Lakewood, WA 98499



David R. Polivka L.G. / L.Hg.
Senior Hydrogeologist



Prepared by:

ECI | Environmental Services
PO Box 153
Fox Island, Washington 98333
Office: (253) 238-9270
ECI Project No.: 0422-05

Table of Contents

1.0 INTRODUCTION1

1.1 Purpose of the Site Summary and Closure Plan 1

1.2 Property Description 1

1.3 “Site” Description..... 2

2.0 REGULATORY COMPLIANCE.....2

3.0 BACKGROUND2

3.1 Underground Storage Tank Removal/Remediation – Don Golden Company Inc., April 8, 1994 . 2

3.2 Site Characterization and Contaminated Soil Remediation: Pace Industries Oil Release April 26, 1999 - Creative Environmental Technologies, Inc (CETI), May 5, 1999 3

3.3 Level 1 Environmental Site Assessment - Creative Environmental Technologies, Inc., May 7, 1999 3

3.4 Phase 2 Site Assessment - Creative Environmental Technologies, Inc., March 28, 2000..... 3

3.5 Addendum to the Phase 2 Site Assessment - Creative Environmental Technologies, Inc., November 2000 4

3.6 PCE Contaminated Soil Remediation Report - Creative Environmental Technologies, Inc., January 2001 4

3.7 No Further Action (NFA) Letter – Washington State Department of Ecology March 6, 2001..... 5

3.8 Testing of Surface Soils near Eastern Swale of the Property at 2119 Mildred Street, Fircrest, Washington - Sound Environmental Strategies, Corp (SES), October 8, 2001 5

3.9 Underground Storage Tank Decommissioning and Soil Remediation - Sound Environmental Strategies, Corp (SES), May 24, 2002..... 5

3.10 Final Geotechnical Report: Proposed Retail Development (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., August 22, 2005..... 6

3.11 Phase I Environmental Site Assessment: Proposed Retail Site (#4265-00) 2119 Mildred Street, Fircrest, Washington; – Kleinfelder Inc., August 22, 2005 6

3.12 Phase II Environmental Site Assessment: Proposed Retail Site Report (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., May 25, 2005 7

3.13 Supplemental Phase II Environmental Site Assessment: Proposed Retail Site Report (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., September 16, 2005 7

3.14 Phase I Environmental Site Assessment - Proposed Fircrest Winco - 2119 Mildred Street West, Fircrest, Pierce County, Washington - Terracon Consultants, Inc., June 30, 2008..... 8

3.15	Focused Subsurface Investigation (FSI) – EcoCon Inc, September 27, 2011 and October 3, 2011	9
3.16	Remedial Excavation Soil Sampling – EcoCon Inc, August 2012	10
3.17	Focused Subsurface Investigation – EcoCon Inc, August 2012	11
3.18	Limited Feasibility Study / Disproportionate Cost Analysis – EcoCon Inc, May 5, 2015	11
3.19	Partial Sufficiency and Further Action Letter – Washington State Department of Ecology, July 28, 2015	12
3.20	Proposal – Focused Groundwater Assessment – EcoCon Inc, August 21, 2015	13
3.21	Site Summary and Recommendations – EcoCon Inc, October 29, 2015	13
4.0	PHYSICAL SETTING	13
4.1	Regional Geology	13
4.2	Regional Hydrogeology	14
4.3	Site Geology	14
4.4	Site Hydrogeology	14
5.0	CONTAMINANTS OF CONCERN AND CLEANUP LEVELS.....	15
6.0	PROPOSED POINTS OF COMPLIANCE	15
6.1	Point of Compliance for Soil.....	15
6.2	Point of Compliance for Groundwater.....	16
6.3	Conditional Point of Compliance for Groundwater	16
6.4	Point of Compliance used for the Site	16
7.0	CLOSURE PLAN.....	16
7.1	Closure Plan Activities.....	17
7.2	Monitoring Well Installation Workplan	17
7.2.1	Monitoring well Installation.....	18
7.2.2	Sample Collection and Handling Procedures	19
7.2.3	Field Documentation.....	19
7.3	Sample Analysis.....	21
7.4	Reporting.....	21
8.0	SUMMARY	21

List of Tables

Table 1: Contaminant of Concern 15
Table 2: Summary of Soil Analytical Results..... Appendix B
Table 3: Summary of Groundwater Analytical Results..... Appendix B

List of Appendices

Appendix A - Project Figures

- Figure 1: Site Location Map
- Figure 2: Site Topographic Map
- Figure 3: Site Historical Overview Map
- Figure 4: CETI 1999 Paraffin Oil Remedial Excavation
- Figure 5: CETI 2000 Phase II Boring Locations
- Figure 6: CETI 2000 PCE Remediation Sample Locations
- Figure 7: SES 2002 UST Removal & Remedial Sample Locations
- Figure 8: PCE Boring Location Map
- Figure 9: Arsenic Boring Location Map
- Figure 10: ECI 2012 PCE Remediation Sample Locations
- Figure 11: Arsenic Soil Sample Location Map
- Figure 12: Proposed Well Location Map

Appendix B – Project Tables

- Table 2: Summary of Soil Analytical Results
- Table 3: Summary of Groundwater Analytical Results

1.0 INTRODUCTION

EcoCon, Inc (ECI) has prepared this Site Summary and Closure Plan (plan) for the property located at 2119 Mildred Street West in Tacoma, Washington (Property/Subject Property) (Figures 1 and 2, Appendix A). This plan was developed in accordance with the investigation and reporting requirements for Independent Remedial Actions put forth in the Washington State Model Toxics Control Act (MTCA) (Washington Administrative Code [WAC] 173-340-515 and WAC 173-340-350) to summarize the previous investigations and remedial activities at the Property and to address the Washington State Department of Ecology (Ecology) “*Partial Sufficiency and Further Action*” letter dated July 28, 2015.

As established in WAC 173-340-200, the “Site” is defined as:

“...any area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed or otherwise come to be located...”

For this workplan, the “Site” is defined by the full lateral and vertical extent of contamination that has originating from releases from historical activities on the Property and from fill material that was used to fill the eastern portion of the property.

1.1 Purpose of the Site Summary and Closure Plan

The purpose of this plan is to summarize the work that has been performed at Site and to address the issues identified by Ecology that need to be addressed before they can issue a closure determination. As will be described in the background section of this plan, in a letter dated July 28, 2015, Ecology accepted a portion of the work previously performed at the Site as being acceptable for closure but identified a couple of other issues that needed to be addressed. Those issues revolved around the presence of arsenic in the soil and groundwater in portions of the Property. Ecology indicated that an “Environmental Covenant” would be needed and that the “Environmental Covenant” would need to identify the areas where residual arsenic in both the soil and groundwater are present.

1.2 Property Description

According to the Pierce County Assessor, the Property (Pierce County Tax Parcel number 0220112005) consists of a single commercial lot, 9.49 acres in size, and is currently improved with an approximately 25,000 square foot main building, an approximately 600 square foot painting building, and an approximately 80 square foot paint storage shed. Concrete building pads for two approximately 700 square foot former buildings were historically present as well. (Figure 3, Appendix A). The Pierce County Assessor, records show that the Property is currently owned by Eaton Family LLC.

The site was formerly utilized by Metal Marine Pilot for the design, manufacture, repair, and design of auto pilot devices for boats. Office space, bathrooms, a break room, and a sales room were also located in the main building. The painting building was used to paint and dry parts during production of the auto pilot devices. The paint storage building was used to store paint and other flammable liquids. The former materials building was used to clean parts and equipment used in the Metal Marine Pilot operations. The former cardboard building was used to store cardboard.

1.3 “Site” Description

The “Site” as defined by Ecology is defined by the nature and extent of contamination associated with the following releases:

- Tetrachloroethylene (PCE) in Soil.
- Total Petroleum hydrocarbons as heavy oil (TPH-O) gasoline (TPH-G) and volatile organic compounds as benzene, ethyl benzene, toluene and xylenes (BTEX) in the Soil.
- Metals (Arsenic) in the Soil and Groundwater.

The contamination is found in 250-foot by 240-foot area (1.3 acres) near the central portion of the Subject Property (Figure 3, Appendix A). It is our understanding that the Property owner would like to subdivide the 9.49-acre Property into several parcels so that only one parcel is considered the be a “Cleanup Site” and the rest of the parcels can be sold or leased separately.

2.0 REGULATORY COMPLIANCE

Regulatory compliance for this project is based on the Washington Administrative Code (WAC) 173-340 – Model Toxic Control Act (MTCA) - RCW Chapter 70.105D, implemented by the Washington State Department of Ecology (Ecology). Pursuant to Chapter 70.105D RCW, Ecology has established procedures for developing cleanup levels and requirements for cleanup actions. The rules establishing these levels and requirements were developed by Ecology in consultation with a Science Advisory Board (established under the Act) and with representatives from local government, citizen, environmental, and business groups. The rules were first published in February 1991, with amendments in January 1996, February 2001, and October 2007.

3.0 BACKGROUND

3.1 Underground Storage Tank Removal/Remediation – Don Golden Company Inc., April 8, 1994

This report describes the decommissioning of one 1,000-gallon UST used to store diesel and one 1,000-gallon UST used to store solvent. The approximate former location of these USTs is indicated on Figure 3, Appendix A. According to the report, both USTs were installed in 1982. The diesel UST was listed as a stainless-steel tank and the solvent UST was listed as a single-walled steel tank. Both USTs were removed from the site during the decommissioning process. Groundwater was not encountered in the UST cavity and signs of impaired soil were not observed. Nine confirmation samples were obtained from the UST cavity and analyzed for gasoline, diesel, and oil range Total Petroleum Hydrocarbons (TPH) and BTEX (benzene, toluene, ethylbenzene, and total xylenes).

Concentrations of the above listed compounds were reported to be not detectable above laboratory reporting limits. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site

3.2 Site Characterization and Contaminated Soil Remediation: Pace Industries Oil Release April 26, 1999 - Creative Environmental Technologies, Inc (CETI), May 5, 1999

This report describes the Pace Industries oil release of April 26, 1999 and subsequent remedial action. Pace Industries, located on the adjacent property to the north, suffered equipment failure that caused a pressure release of a large quantity of heavy-oil range petroleum fluids on the Property). The point of impact was located northeast of the main building, to the east of the telephone poles along the northern Property boundary and flowed toward the southeast, channeling the 200-foot long storm water drainage ditch along the eastern side of the Property (Figures 3 and 4, Appendix A).

A total of 31 soil samples (performance and confirmation) were analyzed. At the conclusion of remedial activities, the highest concentration of oil-range organics (ORO) was under the release point S29 at 5,800 milligrams per kilogram (mg/kg). An estimated eighty cubic tons of impacted soil was removed from the Site. All confirmation samples reported ORO concentrations below laboratory reporting limits except those collected on the northern Property boundary. The CETI report concluded the Property to be free of release related petroleum impacts but the northern property remained impacted with high concentrations of ORO. This was confirmed again in February of 2000, when CETI collected four additional soil samples along the northern Property boundary where previous samples indicated ORO concentrations above the MTCA Method A Cleanup Level. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site. This release is not considered part of the Site, as the point source origin was from the neighboring property to the north, and the contamination that migrated onto the Property was removed.

3.3 Level 1 Environmental Site Assessment - Creative Environmental Technologies, Inc., May 7, 1999

In May of 1999, Creative Environmental Technologies, Inc. (CETI) completed a "Level 1 Environmental Site Assessment which identified several areas in need of further investigation, including:

- Area A – Located immediately east of the painting shed, paint storage shed, and materials preparation shed where solvents may have been spilled.
- Area B – Located east of the paint storage shed, within the undeveloped portion of the Property which acted as the facility drain field. Contaminants of concern in this area were SVOCs and metals which may have been transported via the floor drain located in the materials preparation shed.
- Area C – Located east of the rear gravel driveway. This area had pits that were excavated and lined with lime for neutralization and disposal of acid. The acid was used in etching metal, so the contaminants of concern in this area was metals.
- Area D – Located south of the cardboard box storage shed, where a diesel UST formerly existed.

These areas are shown on Figure 3 in Appendix A.

3.4 Phase 2 Site Assessment - Creative Environmental Technologies, Inc., March 28, 2000

This investigation was completed on the subject site based on information obtained during the Level I Environmental Site Assessment completed May 7, 1999. The investigation included analysis of 15 soil samples collected from 24 borings (Figure 5, Appendix A). The samples were analyzed for volatile organic

compounds (VOCs), semi-volatile organic compounds (semi-VOCs), and/or metals including antimony, arsenic, beryllium, cadmium, chromium, copper, lead mercury, nickel, selenium, silver, thallium, and zinc.

Antimony, arsenic, copper, lead, mercury, nickel, and zinc were identified in some soil samples; however, concentrations were below MTCA Method A cleanup levels (if available). Total chromium was identified at concentrations ranging from 16 mg/kg to 62 mg/kg, which is below the MTCA Method A cleanup level of 2,000 mg/kg for trivalent chromium; however, some of the samples were above the MTCA Method A cleanup level for hexavalent chromium (19 mg/kg).

The samples collected near the former loading dock were reported to contain concentrations of PCE ranging from 0.64 mg/kg to 2.22 mg/kg, which is above the current MTCA Method A cleanup level of 0.05 mg/kg. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site. Based on these findings CETI recommended all PCE contaminated soil be removed from the site.

3.5 Addendum to the Phase 2 Site Assessment - Creative Environmental Technologies, Inc., November 2000

This investigation consisted of the collection of three surface soil samples and a sample collected from a soil boring, all along the northern site boundary near the Pace Industries facility. Two of the surface samples were collected in areas exhibiting an oily appearance, one of which was analyzed for pH and DRO and ORO. The other surface sample was collected in an area that contained black sooty material and was analyzed for arsenic, cadmium, chromium, lead, mercury, and zinc.

The soil boring sample was analyzed for the above listed metals as well as antimony, beryllium, copper, nickel, selenium, silver, and thallium. Detectable concentrations of zinc, nickel, lead, copper, chromium, arsenic, and antimony were identified at concentrations below MTCA Method A and/or Method B cleanup levels. ORO was identified at a concentration of 35,000 mg/kg in one of the surface soil samples, which is well above the MTCA Method A cleanup level of 2,000 mg/kg. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site. CETI concluded that the ORO was related to a spill of paraffin oil that occurred on the Pace Industries property in 1999.

3.6 PCE Contaminated Soil Remediation Report - Creative Environmental Technologies, Inc., January 2001

In January 2001, CETI reported on the cleanup of PCE contaminated soil located near the former loading dock as identified in CETI's March 28, 2000 Phase II Investigation. An approximately 25-foot by 40-foot area was excavated to a depth ranging between 6 feet to 11 feet below the ground surface (bgs) (Figure 6, Appendix A). The top 4 feet of material was stockpiled separately based on depth to contamination results from borings previously advanced in the area. One of the 6 characterization samples of the stockpile indicated a detectable concentration of PCE; however, the concentration of 0.34 mg/kg was below the MTCA Method A cleanup level used at that time (0.5 mg/kg). Note that the current cleanup level for PCE is 0.05 mg/kg. This material was eventually used as backfill in the excavation. All other soils were stockpiled on September 12, 2000 and were removed on November 28, 2000. All stockpiled soils were placed on a plastic-lined bermed area and covered with plastic sheeting.

Nine confirmation samples were collected from the excavation cavity. With the exception of one sample, which was reported to contain a concentration of PCE at 0.39 mg/kg, analytical results of all confirmation samples reported PCE concentrations as not detectable above laboratory reporting limits. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

3.7 No Further Action (NFA) Letter – Washington State Department of Ecology March 6, 2001

On March 6, 2001, Ecology issued as No Further Action letter regarding the Metal Marine Pilot, Inc. aka Freeman Property (Subject Property) addressed to Creative Environmental Technologies, Inc. This letter was in response to a review of the January 2000 PCE Contaminated Soil Remediation Report, the March 28, 2000 Phase II Site Assessment, and the May 7, 1999 Level I Environmental Site Assessment. The letter indicated that Ecology was issuing a No Further Action (NFA) designation for the remediated PCE soil contamination as indicated in the January 2000 report.

3.8 Testing of Surface Soils near Eastern Swale of the Property at 2119 Mildred Street, Fircrest, Washington - Sound Environmental Strategies, Corp (SES), October 8, 2001

In August of 2000, Sound Environmental Strategies (SES) collected a surface soil sample along the east end of the Property where a red-colored stain was observed by the Property owner. The soil sample was analyzed for PCE and total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The soil sample contained concentrations of arsenic and cadmium above their respective MTCA Method A Cleanup Levels.

Based on these results SES collected eight additional samples in the same general vicinity to evaluate if the contamination was a wide spread issue, or limited to the stained area. All eight soil samples were analyzed for PCE, total petroleum hydrocarbons, and/or total metals. One sample contained a concentration of arsenic slightly above the MTCA Method A Cleanup Level. All other soil samples reported concentrations of COCs below their respective cleanup level and/or laboratory reporting limit. SES concluded that there was not a direct correlation between the red stained soil and the metals contamination on the Site. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

3.9 Underground Storage Tank Decommissioning and Soil Remediation - Sound Environmental Strategies, Corp (SES), May 24, 2002

This report describes the decommissioning of two steel double-walled water heaters which were buried underground and used to store kerosene. Both USTs were located outside the western portion of the main building near the HVAC intake (Figures 3 and 7, Appendix A). The USTs, located approximately 6 feet to 8 feet bgs, reportedly were installed in the late 1960s to early 1970s and were used to store kerosene used for parts cleaning.

The report indicated that the USTs showed no signs of corrosion or leakage and field staff reported no sign of soil impairment. However, soil samples indicated the presence of diesel range DRO above MTCA Method A cleanup levels. Subsequent remedial excavation removed 6.7 tons of soil from the area.

Confirmation soil samples collected after the soil cleanup did not indicated the presence of DRO above laboratory reporting limits. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

3.10 Final Geotechnical Report: Proposed Retail Development (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., August 22, 2005

This report was completed by Kleinfelder for design considerations regarding a retail building and an underground parking garage. The report acknowledged that the site has historically undergone fill and grading activities which was reported to have been completed between 1972 and 2000. According to the report, the fill material was imported from nearby commercial construction projects and roadway projects. Sections of fill material up to approximately 37 feet thick were encountered in some of the 56 borings completed for this report. Field staff reported the presence of wood debris, roots, concrete, asphaltic concrete, plastic, and garbage within fill material encountered during drilling operations. Perched groundwater was observed at varying depths within sandy sections of the fill and native glacial till material.

3.11 Phase I Environmental Site Assessment: Proposed Retail Site (#4265-00) 2119 Mildred Street, Fircrest, Washington; – Kleinfelder Inc., August 22, 2005

This report was completed as part of a predevelopment investigation for a proposed retail development. At the time of the report, the site was developed with the existing main building, two detached structures, paved parking area, and the stormwater system consisting of a ditch and two ponds. The site was used as a storage facility containing Metal Marine Pilot equipment and personal property of the Freeman family.

The Phase I included an Asbestos Survey of the main building and two smaller detached structures. Asbestos -containing building materials were found in various places within the main building.

The Phase I also included lead sampling which consisted of collection of 12 paint chip samples. Of the 12 samples, 11 were identified to contain concentrations of lead above laboratory reporting limits. Concentrations of lead ranged from 55 mg/kg to 5,100 mg/kg. One sample was identified above 5,000 mg/kg (5,100 mg/kg), which was from light gray paint located on the metal walls of the paint storage shed.

Kleinfelder indicated that the previous on-site investigations and remedial work did not sufficiently address impacts to site soil and groundwater. Kleinfelder recommended that addition investigation be completed to address potential contamination due to the Pace facility paraffin oil spill, on-site hazardous material and waste storage, floor staining within the main building, use of the two sealed recovery USTs, onsite disposal of acids in lime-lined pits, onsite disposal of fluorescent light bulbs, and the onsite discharge of waste water mixed with oil and solvents. Kleinfelder also recommended the removal of all hazardous material and hazardous material storage containers, the septic tanks, the transite pipe, if exposed, and the asbestos containing material, as identified by Kleinfelder.

3.12 Phase II Environmental Site Assessment: Proposed Retail Site Report (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., May 25, 2005

This investigation was performed based off the findings of Kleinfelder’s 2005 Phase I ESA (discussed above). The investigation consisted of 5 borings that were advanced inside the main building to depths between 1.5 feet and 6 feet bgs and 15 borings that were advanced in the north half of the site to depths between 6 and 24 feet bgs (Figures 8 and 9, Appendix A).

Twenty-nine soil samples and three perched water samples were collected from the 20 borings and submitted for analysis. Five of the exterior borings were completed as monitoring wells and groundwater samples from four of the wells (one well was dry) were collected and submitted for analysis. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

Analytical results indicated the following:

- eight soil samples contained detectable concentrations of ORO, three of which were the above MTCA Method A cleanup level;
- three soil samples contained detectable levels of perchloroethylene (PCE), two of which were above the MTCA Method A cleanup level;
- one soil sample contained a detectable concentration of isopropyltoluene;
- 11 soil samples contained detectable concentrations of lead;
- seven soil samples contained detectable concentrations of chromium;
- one soil sample contained a detectable concentration of arsenic;
- one groundwater sample contained a detectable concentration of acetone;
- four groundwater sampled contained detectable concentrations of arsenic, two of which were above the MTCA Method A cleanup level;
- six groundwater samples contained detectable concentrations of barium;
- two groundwater samples contained detectable concentrations of chromium; and
- two groundwater samples contained detectable concentrations of selenium.

Based on these findings further investigation was recommended.

3.13 Supplemental Phase II Environmental Site Assessment: Proposed Retail Site Report (#4265-00) 2119 Mildred Street, Fircrest, Washington – Kleinfelder Inc., September 16, 2005

This investigation was based off the findings of Kleinfelder’s 2005 Phase II report (discussed above). The investigation included collection of 14 soil samples from seven borings located in the central portion of the site. An eighth boring, which was completed with a monitoring well, was also advanced in the eastern portion of the site (Figures 8 and 9, Appendix A). Five groundwater samples were collected for this investigation, one from the new monitoring well and four from the previously sampled monitoring wells. A soil sample was also collected from the bottom of a drain located in the former material shed. All soil

samples and the groundwater sample collected from the new monitoring well were analyzed for PCE, diesel and heavy oil range TPH, and arsenic. The groundwater samples from the old monitoring wells were analyzed for PCE and diesel and heavy oil range TPH. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

Analytical results indicated the following:

- three soil samples contained detectable concentrations of ORO, one of which was above the MTCA Method A cleanup level;
- two soil samples contained detectable concentrations of DRO;
- three soil samples contained detectable concentrations of PCE; and
- one groundwater sample contained a detectable concentration of arsenic.

Kleinfelder discussed the arsenic levels identified during their two Phase II investigations with Charles San Juan, who was a hydrogeologist with Ecology's Toxic Cleanup Program. Mr. San Juan believed the depth of the contamination eliminated the Tacoma Smelter plume as a source of the arsenic and explained that the arsenic may be naturally occurring. He believed that Ecology would likely not require additional investigation in regards to arsenic on-site.

Based on information gathered during their Phase I ESA, Phase II investigation, and Supplemental Phase II investigation, Kleinfelder concluded that 2,000 to 3,000 yards of PCE contaminated soil remained on-site. ORO contamination remained on site as well; however, impacted soil observed in exploratory borings appeared to be limited to 6 inches thick. Also, there appeared to be no correlations between borings as to the depth of contaminated soil, thus Kleinfelder concluded that ORO contaminated soil was discontinuous and sporadically located throughout the site. Kleinfelder recommended that the site be enrolled in Ecology's VCP program and all PCE, ORO, and paraffin oil contaminated soil be removed prior to development. Also, Kleinfelder recommended that the sealed recovery USTs and the lime-lined pit be removed.

3.14 Phase I Environmental Site Assessment - Proposed Fircrest Winco - 2119 Mildred Street West, Fircrest, Pierce County, Washington - Terracon Consultants, Inc., June 30, 2008

In June, 2008, Terracon Consultants, Inc. (Terracon) completed a Phase I ESA which included a review of the above-mentioned events, an extensive interview with Michael Freeman (representative for owner), and a database review and historical research summaries. Terracon reported the following locations as recognized environmental conditions (RECs) identified during their site walk: the two disposal USTs, drains, and the catch basin due to former storage of solvents, degreasers and paints. Terracon reported the following historical RECs from their review of previous reports and the personal interview:

- *Previous reported impact by environmental assessment appears to remain on-site*
- *Reported asbestos pipe*
- *Former sink drain outlet/drainfield for waste fluids prior to 1992 (solvents, metals)*

- *Fluorescent light bulbs (mercury containing) reported disposed into east field*
- *Former lime-lined pits historically utilized for disposal of processed acids, (metals, pH)*
- *Former drum storage area, drums contained solvents, petroleum products, degreasers*
- *Area of former impact from north adjacent property (petroleum hydrocarbons)*
- *Imported fill material may have unknown contaminants*
- *Lacquer and spray paint process area west of loading dock prior to installation of paint process building*
- *Three reported septic tanks*

Terracon also reported RECs from the database review at surrounding properties including:

- *Pace Industries*
- *Leland McArthur former fueling station*

The recommendation Terracon provided was to conduct additional subsurface investigation.

3.15 Focused Subsurface Investigation (FSI) – EcoCon Inc, September 27, 2011 and October 3, 2011

In September and October, 2011, EcoCon Inc. (ECI) completed a Focused Subsurface Investigation (FSI) at the Site to supplement previous subsurface investigation completed by others. The primary goal of the FSI was to better quantify the extent of PCE contaminated soil, and substantiate the ORO concentrations reported by Kleinfelder in 2005, which appeared discontinuous in nature. It was speculated, that due to organic matter in the underlying soil, these concentrations may have been biased high and not representative.

ECI completed two sampling events, September 27, 2011 and October 3, 2011. Soil sample locations were selected using Kleinfelder's previous investigation derived data. Boring locations were placed at areas adjacent to Kleinfelder's 2005 boring locations and other areas of concern following a review of previous environmental reports (Figures 8 and 9, Appendix A).

During ECI's September 27, 2011 sampling event, twelve borings were advanced on the Site, ranging in depth from 5 to 25 feet bgs. Thirty-six soil samples were collected and analyzed. Sample analysis included twenty samples for diesel range organics DRO and ORO using EPA Method 3630C (Silica Gel Cleanup) to remove organic interference, seven samples for GRO, two samples for polycyclic aromatic hydrocarbons (PAHs), four samples for VOCs and twenty samples for total metals arsenic (As), chromium (Cr) and hexavalent chromium (Cr VI).

During ECI's October 3, 2011 sampling event, eight borings were advanced on the Site, ranging in depth from 5 to 25 feet bgs. Fifteen soil samples were collected and analyzed. Sample analysis included two samples for DRO/ORO, five samples for GRO, five samples for VOCs and eight samples for As.

Four soil samples were reported with PCE concentrations exceeding the MTCA Method A Cleanup Level. One sample from a depth of 10 feet bgs was reported containing a concentration of benzene exceeding the MTCA Method A Cleanup Level and concentrations of toluene, ethylbenzene xylene and naphthalene exceeding the laboratory reporting limit. The remaining five soil samples were reported below the laboratory reporting limit or “non-detect”. The concentration of benzene (0.032mg/kg) was slightly above the MTCA Method A Cleanup Level (0.03mg/kg) and appeared unusual with respect to known COCs in this area. The benzene concentration was recommended to be further evaluated during subsequent remedial activities.

Ten soil samples reported concentrations of ORO concentrations exceeding the laboratory reporting limit but below the MTCA-A CUL. The remaining twelve soil samples were reported below the laboratory reporting limit or “non-detect”.

All seven soil samples analyzed for GRO contained concentrations below the laboratory reporting limit or “non-detect”.

Six soil samples contained concentrations of arsenic exceeding the MTCA Method A Cleanup Level. Fourteen samples were reported with arsenic concentration exceeding the laboratory reporting limit, but below the MTCA Method A Cleanup Level. The remaining samples reported arsenic concentrations below the laboratory reporting limit. Thirteen soil samples were reported containing chromium exceeding the laboratory reporting limit but below the MTCA Method A Cleanup Level. The remaining samples reported concentrations of chromium below the laboratory reporting limit or “non-detect”. ECI also analyzed each of the twenty chromium samples for hexavalent chromium (CrVI); one sample reported a concentration exceeding the laboratory reporting limit but below the MTCA Method A Cleanup Level. The remaining samples reported concentrations of CrVI below the laboratory MRL or “non-detect”. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

3.16 Remedial Excavation Soil Sampling – EcoCon Inc, August 2012

Based on the results of the 2011 FSI, ECI recommended excavation and removal of the PCE contaminated soil as the preferred remedial alternative. The extent of impact was properly delineated using a combination of data obtained by Kleinfelder in 2005 and ECI in 2011. The area appeared to be approximately 25-50 feet by 50-100 feet in dimension.

Excavation activities were performed on August 7th and 8th, 2012, and involved the removal of approximately 250 cubic yards of soil (Figure 10, Appendix A). Nine confirmation soil samples were collected from the sidewalls of the excavation and six from the excavation floor. All 15 soil samples reported concentrations of PCE and associated degradation compounds below their respective laboratory reporting limits and/or MTCA Method A Cleanup Levels. Based on these results, it appeared that no further remedial action was warranted with respect to PCE contamination in soil. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

Performance samples were collected from the excavated soil stockpile for the purposes of profiling and disposal. Ten composite soil samples were collected from the stockpile, with four of the ten reporting concentrations of PCE above the MTCA Method A Cleanup Level.

3.17 Focused Subsurface Investigation – EcoCon Inc, August 2012

In August of 2012, ECI completed an FSI to further evaluate the extent of arsenic contaminated soil on the Site previously identified by ECI and others.

ECI advanced a total of 10 borings, during two separate field mobilizations, across the eastern half of the Property (Figure 11, Appendix A). This area had previously been identified as the location where fill material was imported onto the Property. Soil samples were collected from both the fill material, generally encountered between the surface and 20 feet bgs, and the native material, identified below 20 feet bgs. Twenty-nine soil samples were collected from the fill, while 3 were collected from the underlying native material.

Three soil samples collected from the fill material contained concentrations of arsenic above the MTCA Method A Cleanup Level; eleven soil samples contained concentrations of arsenic above the laboratory reporting limit, but below the MTCA Method A Cleanup Level; and fifteen soil samples reported concentrations of arsenic below the laboratory reporting limit. The soil samples containing concentrations of arsenic above the MTCA Method A Cleanup Level were collected from borings AB2 and AB5, from depths between 12 and 20 feet bgs.

One soil sample collected from the native material contained a concentration of arsenic above the MTCA Method A Cleanup Level. The remaining two soil samples reported concentrations of arsenic below the laboratory reporting limit. Table 2 in Appendix B Presents the Summary of Soil Analytical Results for the Site.

3.18 Limited Feasibility Study / Disproportionate Cost Analysis – EcoCon Inc, May 5, 2015

In May of 2015, EcoCon Inc. (ECI) completed a Limited Feasibility Study / Disproportionate Cost Analysis (LFS/DCA) for the Subject Site. The purpose of the LFS/DCA was to develop and evaluate remedial alternatives for the “Site” and to select the most appropriate alternative based the criteria set forth in MTCA.

Based on ECI’s understanding of the conceptual site model, the proposed remedial alternative was the implementation of engineering controls (impervious [asphalt/concrete] cap of contaminated areas) to prevent human direct contact with the soil and prevent rainwater infiltration from contacting the soil and leaching into groundwater. Additionally, the remedial alternative stipulated institutional controls such as an environmental covenant (deed restriction) be placed on the Property to prevent disturbance of the cap and outline monitoring requirements for the perched groundwater conditions.

3.19 Partial Sufficiency and Further Action Letter – Washington State Department of Ecology, July 28, 2015

On July 28, 2015 Ecology issued a letter based on review of the above discussed Site investigations and the LFS/DCA. Ecology indicated that Further Action was needed on the Subject Property based on arsenic contamination observed in those investigations. The letter replaced the NFA letter issued on March 1, 2001. The letter also indicated the cleanup standards were met for:

- *“Tetrachloroethylene (PCE) in Soil.”*
- *“Total Petroleum hydrocarbons as heavy oil (TPH-O), gasoline (TPH-g), and volatile organic compounds as benzene, ethyl benzene, toluene and xylenes (BTEX) in Soil”*

The letter indicated that further action was needed to address arsenic in the soil and groundwater. Ecology stated that:

“...Arsenic soil contamination appears to be fairly widespread throughout the Site, and does not appear to be associated with any specific point release. The source of the arsenic is likely attributable to the former operation of the Tacoma Asarco Smelter Plant, and the fill material that was imported to the property as part of historical grading activities. On the eastern half of the Site, soil with concentrations of arsenic above MTCA Method A CIJL of 20 mg/kg were identified from ground surface to approximately 26 feet bgs. Arsenic concentrations in soil samples collected during sub-surface investigations completed between 2011 and 2012, range from a low of 5.1 mg/kg in boring AB7 at a depth of 8 to 9 feet bgs, to a high of 49 mg/kg in boring AB11 at a depth of 11 to 12 feet bgs.”

Ecology reviewed the LFS/DCA which proposed the implementation of engineering controls (impervious [asphalt/concrete] cap of contaminated areas) along with an environmental covenant and determined that the cleanup action proposed for the Site meets the substantive requirements of MTCA and concurred with the selection of institutional controls.

Within the opinion letter, Ecology indicated the next steps at the Site included the need to draft an environmental covenant (EC) for Ecology to review and provided instructions for completing the EC.

The various instructions associated with completing the draft EC were:

- Identify areas of the Site where residual soil and groundwater contamination are present.
- Summarize the institutional controls to be placed on the Site, including restrictions on intrusive activities of capped areas, groundwater usage (monitored as appropriate), and building of structures without proper ventilation protection.
- Conduct a title search to identify all persons holding interest in the real property subject to the covenant. Generally, Ecology will not sign the EC unless all interest holders are willing to sign on as grantors or subordinate their interests.
- Submit the draft EC for review and comment to the appropriate land use planning authority in your jurisdiction.
- Submit the draft EC to Ecology for review and approval.

Within the LFS/DCA, ECI presented an argument that groundwater was not a media of concern for the Property. The argument was based on data presented in previous investigations and contended that water encountered by previous consultants was perched within the fill material and was not representative of the static groundwater condition, which exists at approximately 50 feet below ground surface. Ecology dismissed this argument and requested that monitoring of this perched condition be included within the EC.

3.20 Proposal – Focused Groundwater Assessment – EcoCon Inc, August 21, 2015

On August 21, 2015, ECI prepared a proposal for the completion of a Focused Groundwater Assessment at the Subject Property to address the groundwater monitoring issues identified in Ecology's July 2015 Further Action Letter. ECI proposed the installation and sampling of three groundwater monitoring wells at the Site to serve as confirmational monitoring points. This work has yet to be approved and performed based on the Site Summary and Recommendations letter discussed below.

3.21 Site Summary and Recommendations – EcoCon Inc, October 29, 2015

On October 20, 2015 ECI prepared a letter report that summarized Ecology's July 2015 Further Action Letter and provided recommendations for the additional actions to be taken regarding the Subject Property prior to the installation of additional groundwater monitoring wells at the Site. ECI felt that the following tasks be performed before the installation of the monitoring wells.

- Prepare a workplan and figure which detail the general layout/configuration of the potential development. The plan will be labeled as draft, with the understanding that certain site features may move, but the means and methods such as how the contaminated area is going to be capped should be consistent.
- Prepare a groundwater sampling and analysis plan which identifies our proposed well locations, monitoring frequency, and analytical means and methods.
- Prepare a draft EC for submittal to Ecology, along with the above-mentioned items.

4.0 PHYSICAL SETTING

Geological and hydrogeological conditions can often affect, to some extent, the environmental integrity of property. Underlying soil and bedrock formations may facilitate or impede the migration of chemical contaminants in groundwater and may even be the source of contaminants such as radon and metals. This section of the report summarizes geologic factors that may affect the Subject Property with regard to environmental concerns.

4.1 Regional Geology

The Site is located in the Puget Lowland geologic region. The Puget Sound Lowland is an elongated topographic and structural depression filled with complex sequences of glacial and non-glacial sediments that overlie bedrock. Continental ice sheets up to 3,000 feet thick covered portions of the Puget Lowland several times during the Quaternary period. Retreating ice carved new landscapes, rechanneled rivers, drained or formed lakes, and deposited glacial drift including till and outwash (WA DNR, 2002).

According to the Washington State Department of Natural Resources (DNR) Geologic Portal, the area is mapped as Pleistocene till and outwash clay, silt, sand, gravel, cobbles, and boulders deposited by or originating from continental glaciers. Locally it includes peat, nonglacial sediments, modified land, and artificial fill.

4.2 Regional Hydrogeology

The primary aquifers in the Puget Sound region are typically in glacial sands and gravels overlain by relatively impermeable glacial till deposits, that are present at or near the ground surface. Within these till deposits are localized areas or lenses of water-bearing sands and gravels that may result in a shallow, localized, perched water table. Lateral and vertical migration of shallow groundwater may be impeded by the relatively impermeable nature of the till and by the sometimes-discontinuous nature of the perched water-bearing sands and gravel. In some areas the hydrogeology is controlled by large gravel deposits that are the result of advance and recessional glacial outwash or non-glacial alluvium deposited by rivers in the region.

4.3 Site Geology

The Natural Resources Conservation Service (NRCS) Web Soil Survey describes the soils at the Subject Property as Alderwood gravelly sandy loam. This material is considered to be Glacial drift and/or glacial outwash over dense glaciomarine deposits. Based on the investigations at the Subject Site artificial fill ranging in thickness up to approximately 37 feet thick is located in the eastern portion of the Subject Property. The fill consists of loose to medium dense silty sand, concrete rubble and vegetation debris. The Site is at an elevation of approximately 340 feet above mean sea level (NAD83/WGS84) The Site is relatively flat with a slight slope to the east and a sharp drop off of approximately 20 feet into a drainage ditch along the eastern property boundary. (Figure 2, Appendix A). Originally the Site sloped to the east but was filled.

4.4 Site Hydrogeology

According to the initial investigation conducted at the Site, the regional groundwater in the vicinity of the Subject Property is located at a depth of approximately 50 bgs. Ecology well logs for the vicinity report groundwater is encountered at depths of 40 to 50 feet or greater bgs. Perched water was encountered during the investigations conducted by Kleinfelder. The perched water was found at depths ranging from 16 to 20 feet bgs. It appears that the perched water is discontinuous and is associated with the base of the fill material.

Because the perched water is associated with the base of the fill material it may represent infiltrating surface water that is seasonally present. Shallow groundwater flow directions fluctuate and tend to follow topographic gradient but are also affected by seasonal high-water tables and variable soil characteristics. The shallow perched groundwater beneath the Subject Property is anticipated to flow to the east and towards the drainage ditch along the eastern margin of the Property.

Groundwater migration pathways may also follow underground conduits. Land development and glacial till may allow any contaminants to migrate in different directions through utility corridors or other paths of least resistance. Surface water is anticipated to flow to the east toward the drainage ditch along the eastern margin of the Subject Property.

5.0 CONTAMINANTS OF CONCERN AND CLEANUP LEVELS

In their July 28, 2015 Further Action Letter Ecology, indicated that no further action was required regarding the PCE and ORO contamination that had been identified and remediated at the Site. However, Ecology indicated that arsenic in the soil and groundwater still needs to be addressed. Ecology also agreed that the arsenic on the Subject Property appeared to be heterogenous, widespread and not associated with a specific release point and was likely associated with the Tacoma Asarco Smelter Plant and the fill material used at the Site. Based on Ecology's July 28, 2015 letter, the remaining contaminant of concern (COC) for the Site is arsenic. The soil and groundwater cleanup levels for the COC are listed in the following table.

Table 1: Contaminant of Concern

Method-A Soil Cleanup Levels for Unrestricted Land Use and Method A Groundwater Cleanup Levels (MTCA Cleanup Regulation 173-340-900: Tables 740-1 and 720-1)		
Contaminant of Concern (COC)	Soil Cleanup Level (mg/kg)	Groundwater Cleanup Level (µg/L)
Arsenic	20	5

6.0 PROPOSED POINTS OF COMPLIANCE

WAC 173-340-740 indicates that the point of compliance is where the cleanup levels for each media of concern shall be attained.

6.1 Point of Compliance for Soil

The most conservative point of compliance for soil is for the protection of groundwater. WAC 173-340-740(6)(b) states:

“For soil cleanup levels based on the protection of groundwater, the point of compliance shall be established in the soils throughout the site.”

The point of compliance for soil protection human exposure is defined in WAC 173-340-740(6)(d). It states:

“For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities.”

6.2 Point of Compliance for Groundwater

For Groundwater, WAC173-340-720(8)(b) states that:

“The standard point of compliance shall be established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.”

6.3 Conditional Point of Compliance for Groundwater

For Groundwater, WAC 173-340-720(8)(c) states that:

“Where it can be demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level throughout the site within a reasonable restoration time frame, the department may approve a conditional point of compliance that shall be as close as practicable to the source of hazardous substances, and except as provided under (d) of this subsection, not to exceed the property boundary. Where a conditional point of compliance is proposed, the person responsible for undertaking the cleanup action shall demonstrate that all practicable methods of treatment are to be used in the site cleanup.”

6.4 Point of Compliance used for the Site

Because groundwater is at a shallow depth beneath the Subject Site, the point of compliance for soil would be the most conservative for the protection of groundwater. Therefore, the point of compliance for soil is proposed to be shall be established in the soils throughout the site.

Based on the previous investigations at the Subject Site, the proposed subdivision of the Subject Property to include the contaminated media on only one parcel, and the proposed remedy of paving or covering the Site with a building to provide a “cap” preventing water infiltration that would potentially leach soil contamination to groundwater, it is being proposed that a conditional point of compliance be established for the Subject Site.

It is being proposed that the “Conditional Point of Compliance” be at the downgradient property boundary of the newly subdivided Parcel. The “Conditional Point of Compliance” would be documented in an Environmental Covenant that would be filed with Pierce County and attached to the Property deed.

7.0 CLOSURE PLAN

Ecology agreed with ECI’s recommendation in the May 5, 2015 Limited Feasibility Study / Disproportionate Cost Analysis that leaving the arsenic contamination in place with institutional controls was the most reasonable cleanup option for the Site. The following closure plan contains activities that when completed, are intended to satisfy the requirements set forth by Ecology to achieve closure with institutional controls.

7.1 Closure Plan Activities

Activities associated with this closure plan include:

- Working with the Property owner on plans for subdividing the Subject Property so as to include the contaminated area subject to and Environmental Covenant in one parcel so that the remaining parcels can be sold or leased without restriction.
- Conducting a title search to identify all persons holding interest in the real property subject to the covenant and obtaining their willingness to sign on as grantors or subordinate their interests.
- Drafting an Environmental Covenant for Ecology review and approval that identifies the controls and monitoring requirements that will be placed on the parcel that will be considered the Site after subdivision of the current Property. The Environmental Covenant will include:
 - Identification of the areas of the Site where residual soil and groundwater contamination is present.
 - A description of the capping used for the areas of contamination (paving or buildings)
 - Restrictions on intrusive activities of capped areas,
 - Restrictions on the use of the perched groundwater beneath the Site.
 - The locations of monitoring wells used for compliance with groundwater protection and cleanup levels identified
 - A monitoring plan for the monitoring the concentrations of arsenic in the groundwater from the groundwater-monitoring wells. The wells will be sampled at least every 18 months after an initial one year of quarterly monitoring,
 - An inspection plan for inspecting the integrity of the cap at the Site at least yearly.

Ecology indicated that controls on the building of structures without proper ventilation protection would be needed as part of the Environmental Covenant. However, since the contaminant of concern in the Environmental Covenant (arsenic) is not volatile, controls on ventilation is not needed.

- Submittal the draft EC for review and comment to the City of Tacoma, and the Tacoma Pierce County Health Department.
- Recording the Environmental Covenant with Pierce County and attaching it to the Property deed.
- Installation and sampling of three groundwater-monitoring wells to be located near the former Kleinfelder wells MW- 78, MW-68 and MW-66 (Figure 12, Appendix A).

7.2 Monitoring Well Installation Workplan

This section:

- Identifies the proposed monitoring well locations
- The protocol by which samples will be obtained, and
- The analytical methods to be used

7.2.1 Monitoring well Installation

Three groundwater monitoring wells are planned to be installed on the Subject Site. The wells will be drilled and installed using a combination push-probe/ hollow-stemmed auger drill rig operated by a Washington State licensed driller. This will allow for the use of a hollow-stemmed auger should the push-probe reach refusal before the target depth of the boring is reached. The monitoring wells will be located in the vicinity of the former Kleinfelder monitoring wells MW-66, MW-68 and MW-78 and drilled to the base of the fill material and a minimum of 5 feet into the native material beneath the Site, anticipated to be at least 16 to 25 feet bgs. (Figure 12, Appendix A).

If a push-probe is able to be used, continuous samples from the surface to the maximum drilling extent will be collected for field screening and logging lithology. Samples will be collected using a two-inch diameter, four (4) foot long stainless-steel push-probe fitted with four-foot long single use (disposable) acetate liners that will be advanced as the boring drilled. If a push-probe is not able to obtain the depths needed to complete the monitoring wells, a hollow-stemmed auger will be used.

If a hollow-stemmed auger is used, samples will be collected every 5 feet for characterization of the lithology during drilling. This is because the wells will be located in an area that has been identified as not having soil contaminated with arsenic except at the soil/groundwater interface. At each five-foot increment a sample will be collected using a two-inch diameter split-spoon sampler advanced ahead of the auger with a standard 140-pound drop hammer.

Each sample will be field-screened for potential additional contaminants utilizing visual and olfactory screening techniques. Specific additional soil sample locations and depths will be determined in the field by a qualified environmental professional based on field screening and other site observations. All soil samples will be collected in accordance with industry standard sampling techniques. One sample from each boring collected at the soil ground/water interface will be collected for chemical analysis for the contaminant of concern, arsenic.

The wells will be constructed pursuant to the Washington State Resource Protection Well Regulations (Chapter 173-160 WAC) with 10 to 15 feet of 1 or 2-inch diameter flush-threaded 0.010-inch slotted well screen starting at the base of the boring. The base of the boring will be a minimum of 5 feet below the static water level at the time of drilling and/or 5 feet into the native material beneath the Site. The bottom of each well will be fitted with a threaded PVC bottom cap, and the top of each well will be fitted with a locking compression-fit well cap. The annulus of the monitoring well will be filled with #10/20 silica sand to a minimum height of 1 foot above the top of the screened interval. A bentonite seal with a minimum thickness of 1 foot will be installed above the sand pack. The wells will be completed at the surface with a traffic-rated well box set in concrete.

After installation, the well will be developed to remove the effects that drilling may have had on the soils and assure that representative samples of the groundwater can be obtained. This will be accomplished by surging and pumping the water until the water is clear or as clear as reasonably possible.

7.2.2 Sample Collection and Handling Procedures

Following collection, each discrete soil samples will be placed in new, laboratory provided containers. If samples are collected for volatile organic constituents and GRO, they will be sampled using the Ecology-required Environmental Protection Agency (EPA) 5035 sampling collection method and assigned unique sample identification numbers. The samples will be identified by the boring number and the depth of the sample (e.g. B1-10 for the sample collected from boring B1 at 10 feet bgs). Samples will then be placed into a container maintained at 4° Celsius until delivered to an Ecology accredited laboratory for analysis under industry standard chain of custody protocols.

Groundwater sampling will occur a minimum of 72 hours after installation and development of the monitoring wells to allow for the groundwater conditions to equilibrate after drilling and well development. Groundwater samples will be collected in accordance with American Society of Testing and Materials (ASTM) *Guideline D6771-02 "Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations"*. This method uses the following procedures:

- The cap from the monitoring well will be removed and the groundwater level will be allowed to equilibrate to atmospheric pressure for a minimum of 20 minutes.
- The depth to groundwater in the monitoring well will be measured relative to the top of the well casing using an electronic water-level meter.
- Each monitoring well will be purged at a low-flow rate (100 to 500 milliliters per minute so as to limit drawdown within the well) using a peristaltic pump and dedicated polyethylene tubing. Temperature, pH, dissolved oxygen, turbidity and specific conductivity will be monitored during purging using a water quality meter to determine when these parameters stabilize.

7.2.3 Field Documentation

Field Logs

Field logs are intended to provide sufficient information to reconstruct events that occurred during field activities. The following are examples of information to be included by the sampler(s) in a field log:

- Project name and location;
- Name, date, and time of entry;
- Names and responsibilities of field crew members;
- Name and titles of any site visitors involved in or actively observing the sampling;
- Descriptions of deviations from the sampling procedures and any problems encountered;
- Weather information including air temperature and recent precipitation;
- Date and time of sample collection;
- General observations, including setting / features, sampling location, topography, etc.; and,
- Start and stop times of work.

Boring and Well Construction Logs.

During drilling and installation of the wells boring and well construction logs will be prepared by the environmental professional overseeing the drilling and well installation. These logs will contain but not be limited to: documenting:

- Project name, number, and location;
- Name of the person(s) logging the boring.
- The weather conditions
- The boring/well identification number
- The location of the boring/well
- Date and time the boring/well was drilled
- The drilling method, drilling contractor, and name of the driller
- The type of sampler used to obtain the soil samples
- The lithology of each boring/well described using the uniform soil classification system.
- For each sample the log will document:
 - The sample number and time it was obtained
 - The color of the soil,
 - the major soil type and the minor components of the soil
 - The moisture content of the soil
 - the relative density of the soil based on the ease of drilling and sampling (blow counts if using a split-spoon sampler) and any changes observed.
 - Any layering that occurs within the sample interval
 - Any staining in the soil such as iron staining or staining caused by contamination
 - PID readings if obtained. .
- Any unusual drilling observations
- The depth to water at the time of drilling and static water level after drilling.
- Any perched water or wet zones within the boring.
- The well construction details to include:
- Test
 - Type and diameter of the well casing materials
 - The well screen length and slot size
 - The depth and length of the well screen
 - The type and size of the sand pack used around the screen and the interval that it was placed within the boring
 - The length and type of well seal used (i.e. bentonite chips, bentonite slurry, cement grout etc.)
 - The type of well completion monument used.

The boring/well log will also contain

- notes of anything unusual and/or comments made by the driller
- The Department of Ecology well identification tag number provided by the driller.

Site Photographs

Photographs will be taken at each sampling location. These photographs will be taken to document field conditions, including the features and structures surrounding the sample locations. Photographs also will provide a record of the spatial relationships between the boring location and surrounding features and

structures. Photographs will also be taken of each sample removed from the boring to act as backup and corroboration of the soil descriptions in the boring logs.

7.3 Sample Analysis

Based on the results of previous investigations, the remaining contaminant of concern (COCs) for the Site as identified by Ecology is arsenic in soil and groundwater. Based on this all samples will be analyzed for arsenic by an Ecology accredited laboratory using EPA Method 200.8/6020A.

7.4 Reporting

At the conclusion of the field work, and receipt of analytical results, ECI will prepare a Well Installation and Groundwater Sampling Report that will include:

- A description of Site activities,
- Sampling observations,
- Laboratory analytical results,
- An interpretation of the Site Conceptual Model,
- A Terrestrial Ecological Evaluation in accordance with WAC 173-340-7490, and
- Recommendations for additional work, if any.

In addition to the Well Installation and Groundwater Sampling Report, ECI will also prepare progress reports that document the progress of the activities identified in this closure plan. ECI will also prepare and submit to Ecology along with this closure plan, an application to re-enter Ecology's Voluntary Cleanup Program (VCP) and request a formal opinion on this closure plan.

8.0 SUMMARY

ECI intends to implement the activities in this closure plan and will:

- Draft an Environmental Covenant for Ecology review
- Work with the Property owner on plans for subdividing the Subject Property so as to include the contaminated area subject to and Environmental Covenant in one parcel
- Install and sample three groundwater-monitoring wells
- Submit an application to re-enter the Ecology Voluntary Cleanup Program
- Submit this closure plan to Ecology for review under the Ecology VCP program.