

Final Feasibility Study

**Whitney's Chevrolet, Inc.
123 Pioneer Avenue
Montesano, Washington 98563**

Agreed Order No. 2951

Prepared For:

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TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 BACKGROUND.....	2
2.1 Site Description	2
2.2 Site History and Prior Actions.....	2
2.3 Interim Actions and Data Gap Investigation	3
2.4 Quarterly Ground Water Monitoring	3
2.4.1 Ground Water Measurements	3
2.4.2 Ground Water Sampling and Analyses.....	4
2.4.3 Ground Water Sample Analytical Results.....	5
3.0 NATURAL CONDITIONS	6
3.1 Physiographic Setting/Topography	6
3.2 Geology	6
3.3 Surface Water	6
3.4 Ground Water.....	6
3.5 Natural Resources and Ecological Receptors.....	7
4.0 NATURE AND EXTENT OF CONTAMINANTS	7
4.1 Sources and Affected Media	7
4.2 LNAPL and Dissolved-Phase Plume	8
4.3 Residual Soil Impacts.....	8
4.4 Indoor Air Quality.....	9
5.0 CLEANUP STANDARDS	10
5.1 Applicable Regulations	10
5.2 Development of Cleanup Levels	11
5.3 Points of Compliance	11
6.0 FINAL CONTAMINANTS OF CONCERN	12
7.0 REMEDIAL ACTION OBJECTIVES.....	13

8.0	IDENTIFICATION AND SCREENING OF REMEDIATION TECHNOLOGIES	13
8.1	General Response Actions.....	13
8.2	Identification and Screening of Applicable Technologies	14
8.2.1	Institutional Controls	14
8.2.2	Containment (Capping, Vertical Barriers, Hydraulic Containment).....	14
8.2.3	Removal (LNAPL Recovery).....	15
8.2.4	Removal (Ground Water Extraction).....	15
8.2.5	Ex-Situ Treatment of Ground Water	15
8.2.6	In-Situ Treatment	16
9.0	SELECTION AND DESCRIPTION OF REMEDIAL ALTERNATIVES.....	18
9.1	MTCA Threshold Requirements.....	18
9.2	Description of Remedial Alternatives	19
9.2.1	Alternative 1 – Multi-Phase Extraction and Ex-Situ Treatment.....	20
9.2.2	Alternative 2 – LNAPL Recovery and SVE	21
9.2.3	Alternative 3 – LNAPL Recovery and AS/SVE	23
9.2.4	Alternative 4 – LNAPL Recovery, ISCO and Localized SVE	24
9.2.5	Alternative 5 – GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE	25
10.0	EVALUATION OF REMEDIAL ALTERNATIVES	26
10.1	Protectiveness	27
10.2	Permanence	27
10.3	Effectiveness Over the Long Term	28
10.4	Management of Short-Term Risks	28
10.5	Technical and Administrative Implementability	29
10.6	Consideration of Public Concerns	29
10.7	Restoration Time Frame.....	30
10.8	Cost.....	30
10.9	Disproportionate Cost Analysis (DCA)	31
11.0	RECOMMENDED REMEDIAL ALTERNATIVE	33
12.0	LIMITATIONS	33
13.0	REFERENCES.....	34

Tables

- Table 1: Summary of Depth to Water and Ground Water Elevation Data
- Table 2: Summary of Ground Water Sample Analytical Results
- Table 3: Summary of Residual Concentrations in Soil
- Table 4: Site Contaminants of Concern (COCs) and Cleanup Levels (CULs)
- Table 5: Identification and Screening of General Response Actions and Remediation Technologies
- Table 6: Remedial Alternatives Evaluation
- Table 7: Order-of-Magnitude Cost Estimate, Alternative 1 – Multi-Phase Extraction and Ex-Situ Treatment
- Table 8: Order-of-Magnitude Cost Estimate, Alternative 2 – LNAPL Recovery and SVE
- Table 9: Order-of-Magnitude Cost Estimate, Alternative 3 – LNAPL Recovery and AS/SVE
- Table 10: Order-of-Magnitude Cost Estimate, Alternative 4 – LNAPL Recovery, ISCO and Localized SVE
- Table 11: Order-of-Magnitude Cost Estimate, Alternative 5 – GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE

Figures

- Figure 1: General Vicinity Map
- Figure 2: Site Representation with Site Boundary and Monitoring Well Location
- Figure 3: Site Representation with Water Table Piezometric Contours for August 2012
- Figure 4: Site Representation with Summary of Ground Water Analytical Data
- Figure 5: GRPH Isoconcentration Contours for August 2012
- Figure 6: Benzene Isoconcentration Contours for August 2012
- Figure 7: PCE Isoconcentration Contours for August 2012
- Figure 8: Site Representation with Soil Sampling Locations
- Figure 9: Conceptual Layout for Alternative 1, Multi-Phase Extraction and Ex-Situ Treatment
- Figure 10: Conceptual Layout for Alternative 2, LNAPL Recovery and Soil Vapor Extraction
- Figure 11: Conceptual Layout for Alternative 3, LNAPL Recovery and AS/SVE
- Figure 12: Conceptual Layout for Alternative 4, LNAPL Recovery, ISCO and Localized SVE
- Figure 13: Conceptual Layout for Alternative 5, GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE

Attachments

- Attachment A: August 2012 Purge Water Disposal Documentation
- Attachment B: Copy of Ground Water Analytical Laboratory Reports (August 2012)

1.0 INTRODUCTION

Environmental Partners, Inc. (EPI) has prepared this *Feasibility Study* (FS) for the Whitney's Chevrolet facility located at 123 West Pioneer Avenue in Montesano, Washington (Property). For the purpose of this report, the term "Site" includes the Whitney's Chevrolet Property and the impacted areas on and off the Property. The general location of the Property is indicated on Figure 1. The Whitney's Chevrolet Site is shown on Figure 2.

This FS was conducted under Agreed Order No. DE 2951 (Order) dated May 30, 2007 and as amended on April 25, 2011. The Order is between the Washington State Department of Ecology (Ecology) and Whitney's Chevrolet, Inc.; Caldwell Family Holdings, LLC; and Wynoochee Lodge #43 F&AM of Washington (collectively, the potentially liable persons [PLPs]). The Order was issued pursuant to the authority of the Model Toxics Control Act (MTCA), Revised Code of Washington (RCW), Chapter 70.105D.050(1). The original Order required that the PLPs perform a Remedial Investigation (RI) and prepare a draft and final Remedial Investigation/Feasibility Study (RI/FS) report for the Site. The Order was amended by agreement of the parties to include: (1) performance of interim actions at the Site, including removal of underground storage tanks (USTs) and contaminated soils; (2) implementation of the data gaps work plan to complete the RI; (3) performance of a year of performance groundwater monitoring; (4) preparation of this FS; and (5) preparation of a draft Cleanup Action Plan (dCAP).

On behalf of the PLPs and in conformance with the amended Order, EPI conducted the interim action and data gap investigation (IADG) activities during 2011. Details and results of the IADG activities were documented in the *Interim Action and Data Gap Investigation Report* (IADG Report) dated February 23, 2012 (EPI 2012a), which was presented to Ecology for review. Ecology provided comments on the IADG Report to EPI during a telephone call on February 28, 2012. Subsequently, EPI prepared a letter to Ecology, dated March 23, 2012, providing the PLPs' responses to Ecology's comments on the IADG Report (EPI 2012b). The response to comments letter also included replacement pages for the IADG Report, which contained modified text that incorporated Ecology's comments and the PLPs' responses. The IADG Report is considered final with inclusion of the replacement pages.

Following submittal of EPI's March 23 letter, Ecology issued a letter on April 13, 2012 (Ecology 2012) acknowledging that the RI requirements of the Order have been satisfied and requesting preparation of the FS as stipulated under the Order.

2.0 BACKGROUND

A brief site description and summary of previous actions are described in the following sections.

2.1 Site Description

The Site is located in downtown Montesano, Washington, as presented on Figure 1 – General Vicinity Map. Figure 2 depicts the current property features and structures.

The entire Site is covered with buildings, asphalt, or concrete. Only marginal areas of landscaping exist. The Site is generally flat with slopes of less than 2 percent. Apparent storm water flow is from north to south. There are a total of four properties that are either fully or partially encompassed by the Site; these are:

- Whitney's Chevrolet;
- Sterling Savings Bank
- Charlie's Bar/Veterans of Foreign Wars (VFW) Post #2455; and
- Tony's Short Stop.

The entire northern portion of the Whitney's Chevrolet facility is under roof and currently houses an automobile dealership, repair facility, and vehicle parts sales office. Repair activities include mechanical and auto body repairs. The Whitney's Chevrolet facility was built in stages, with the oldest portion of the building (i.e., northwestern corner) being built in the early 1900s.

The Tony's Short Stop property is subject to its own agreed order (Agreed Order DE-2954) for a pre-existing release of petroleum hydrocarbon fuels in the southeastern corner of that property.

Current and future land use at the Site will be limited to commercial uses and there is no realistic potential for ground floor residential development in the area of the Site. Such land uses are currently not allowed under current City of Montesano zoning or within the Master Plan for the downtown core.

2.2 Site History and Prior Actions

Information pertaining to the Site's history has previously been described in detail in the *Draft Remedial Investigation Report*, dated March 24, 2010 (EPI 2010). The reader is directed to this document for additional information.

Several previous investigations and environmental activities that are relevant to the Property have been conducted since 1995. Summaries of the investigations and activities conducted through 2010 were presented in the *Interim Action Work Plan and Data Gap Investigation (IAWP)*, dated January 12, 2011 (EPI 2011). The activities included the following:

- Underground storage tank (UST) decommissioning activities and a limited environmental site assessment conducted by Fitt Environmental, Inc. during 1995 (Fitt 1995).

- Area-wide ground water investigations in Montesano conducted by Ecology, with assistance from GeoEngineers, Inc., during 2004 and 2005 (GeoEngineers 2005). Ecology continued to monitor ground water quality throughout Montesano on a routine basis through 2009 (Ecology 2006, 2009).
- A Phase I environmental site assessment conducted by EPI during 2007 (EPI 2007).
- Remedial investigation activities conducted by EPI during 2008 through 2010 (EPI 2010).

The reviewer is directed to the source documents for additional detail.

2.3 Interim Actions and Data Gap Investigation

During 2011, EPI conducted interim actions and a data gaps investigation to complete the remedial investigation activities. The interim actions included removal of USTs and excavation of impacted soil. The data gaps investigation included installation of additional ground water monitoring wells, collection and analysis of soil and ground water samples, and assessment of indoor air quality. Details and results of the activities were presented in the IADG Report (EPI 2012a). The reader is directed to this document for additional information.

2.4 Quarterly Ground Water Monitoring

Ground water at the Site is monitored on a quarterly basis, in accordance with the Order. Following completion of the 2011 interim actions and data gaps investigation quarterly ground water monitoring was conducted at the Site during November 2011 and February, May, and August of 2012. The results of the November 2011 monitoring event were included in the IADG Report (EPI 2012a); and the results of the February 2012 and May 2012 monitoring events were presented in subsequent letter reports, which were submitted to Ecology (EPI 2012c, EPI 2012d). Ground water data for August 2012 were received in early September and the results are first presented below.

2.4.1 Ground Water Measurements

On August 20, 2012, EPI personnel measured ground water elevations in 23 monitoring wells at the Site and in three additional wells associated with the Tony's Short Stop UST release located to the southeast of the Site. Due to inaccessibility on August 20, two additional wells (KBMW-10 and TSSMW-9) were measured on August 21, 2012. Water level elevations and measurements of light non-aqueous phase liquid (LNAPL) are summarized in Table 1.

A product/water interface probe was utilized to assess the potential presence of LNAPL and if present, to measure the thickness of accumulated LNAPL. No wells with LNAPL were sampled for dissolved-phase constituents. The depth to water was measured relative to the northernmost point on the well casing. This measurement was subtracted from the surveyed elevation to establish a piezometric elevation.

Monitoring wells WCMW-2, KBMW-2, and KBMW-9 contained LNAPL at thicknesses of 0.03 foot (0.36 inch), 0.21 foot (2.52 inches), and 0.69 foot (8.28 inches), respectively. LNAPL was not observed in wells WCMW-2 and KBMW-2 during the previous two events in February and May 2012, but was present in the two wells during the monitoring event conducted in November 2011. The LNAPL measurements recorded for August 2012 indicate an increase in LNAPL in KBMW-2 and KBMW-9 from previous measurements, and a decrease in LNAPL in WCMW-2 from the previous measurement. Due to the presence of LNAPL, no ground water samples were collected from the three wells during the August 2012 event.

The piezometric elevation data indicate that the direction of ground water migration is southeasterly with an average slope of about 0.0112 foot/foot as measured between wells WCMW-9 and KBMW-12. These piezometric conditions are consistent with previous findings. In August 2012 the ground water elevation was an average of 1.42 feet lower than the ground water elevation in May 2012. This condition is expected throughout the summer months. A Site Representation map with ground water elevation contours is included as Figure 3.

2.4.2 Ground Water Sampling and Analyses

Ground water sampling was conducted between August 20 and August 22, 2012. A total of 28 monitoring wells were scheduled for sampling; five of the wells are located on the Tony's Short Stop Property (KBMW-11, KBMW-12, TSSMW-7, TSSMW-8, and TSSMW-12). As noted, the three wells with LNAPL were not sampled and, therefore, a total of 25 wells were sampled during the August sampling event. Three duplicate ground water samples and one trip blank were collected and submitted to the laboratory for quality control purposes for a total of 29 samples submitted for analysis.

After collection of water level data, each well where LNAPL was not encountered was either purged of three wetted casing volumes or purged until field measurements of pH, temperature and conductivity stabilized to within 10 percent. Purging was performed using a peristaltic pump and dedicated tubing. Purge water was temporarily stored on-site in properly labeled 55-gallon drums. The drums were removed from the Site on August 28, 2012 by Kleen Environmental Technologies, Inc. of Seattle, Washington, and transported to the Chemical Waste Management facility located in Arlington, Oregon for hazardous disposal. A copy of the waste manifest is included in Attachment A.

Ground water monitoring wells were sampled using the same tubing and peristaltic pump that were used for purging. Sampling was conducted using low-flow purging and sampling techniques to minimize sample volatilization and silt uptake. The ground water samples were pumped directly into appropriate pre-labeled sample containers supplied by the laboratory at a flow rate of less than 100 milliliters/minute.

All ground water samples were submitted for the following analyses:

- Gasoline-range petroleum hydrocarbons (GRPH) using the Northwest Total Petroleum Hydrocarbons as Gasoline (NWTPH-Gx) Method; and

- Volatile organic compounds (VOCs) including the aromatic fuel hydrocarbons benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and the chlorinated solvent tetrachloroethene (PCE) using Environmental Protection Agency (EPA) Method 8260C.

Immediately upon collection, each ground water sample container was appropriately labeled and placed in an iced cooler pending submittal to the analytical laboratory. All samples were transported under standard Chain-of-Custody protocols to Libby Environmental, Inc., in Olympia, Washington.

2.4.3 Ground Water Sample Analytical Results

A summary of analytical data is presented in Table 2. Final laboratory analytical reports are included as Attachment B. For the purposes of this report it is assumed that GRPH, benzene, and PCE in ground water are the primary contaminants of concern for monitoring purposes. For that reason, only those compounds are discussed below and graphical representations for only those compounds are prepared. Table 2 summarizes all analytical results for the quarterly ground water monitoring events.

During August 2012, GRPH concentrations ranged from 209 micrograms/liter ($\mu\text{g/L}$) to 68,900 $\mu\text{g/L}$ for the Whitney's Site. A sample collected from KBMW-12 on the Tony's Short Stop property contained a GRPH concentration of 68,400 $\mu\text{g/L}$. The well immediately upgradient of KBMW-12, TSSMW-7, contained a GRPH concentration of 557 $\mu\text{g/L}$ and additional upgradient wells exhibited a similar pattern of lesser concentrations than KBMW-12. Figure 5 illustrates the distribution of dissolved-phase GRPH at the Site. Based upon the distribution of GRPH impacts and the proximity of KBMW-12 to the prior releases on the Tony's Short Stop Site, the impacts at KBMW-12 are interpreted as most likely associated with releases on the Tony's Short Stop Site.

Benzene concentrations in August 2012 ranged from 2.0 $\mu\text{g/L}$ to 778 $\mu\text{g/L}$ for the Whitney's Site. As with GRPH concentrations, the benzene concentration detected at KBMW-12 contained an elevated benzene concentration of 932 $\mu\text{g/L}$. For the reasons described above the impacts observed at KBMW-12 are interpreted as being associated with releases on the Tony's Short Stop Site. Figure 6 depicts the benzene concentration contours for the August 2012 quarterly sampling event.

The distribution of hydrocarbon impacts to ground water, as represented by GRPH and benzene concentrations, indicate a separation between the maximum downgradient extent of the dissolved-phase plume originating from the Whitney Chevrolet property and the upgradient extent of impacts originating from releases at the Tony's Short Stop Site. Since at least January 2010, the maximum downgradient extent of benzene at the MTCA Method A Ground Water Cleanup Level (i.e., 5 $\mu\text{g/L}$) from the Whitney Site has not been co-located with similar concentrations from the Tony's Short Stop Site.

The analytical results for the ground water samples indicate that detectable concentrations of PCE at the Site ranged from 1.2 $\mu\text{g/L}$ to 50.7 $\mu\text{g/L}$. The concentrations of PCE found at the Site during August 2012 are generally consistent with previously observed concentrations. Figure 7 depicts the PCE concentration contours for the August 2012 quarterly sampling event.

3.0 NATURAL CONDITIONS

3.1 Physiographic Setting/Topography

The subject property is located in downtown Montesano in an area of commercial development and major thoroughfares. The area of the Site is fully paved with asphalt or concrete or is otherwise covered with buildings. The subject property is at approximately 40 feet above mean sea level (MSL) and is located on the north slope of the Chehalis River valley, near the confluence of the Wynoochee River and Chehalis River. The ground surface at the subject property slopes slightly toward the southeast.

3.2 Geology

Immediately beneath the surface paving and subgrade materials the shallow soil consists of Silty Sand to about 6 feet below grade. The silt and clay content of the soil increases to a depth of about 12 feet with intermittent and laterally discontinuous zones of soil with varying degrees of apparent permeability. Poorly-Graded Sand is consistently present from about 12 feet below grade to the maximum depth of exploration of 20 feet below grade.

3.3 Surface Water

The closest surface water body to the subject property is the Chehalis River, which is approximately 0.5 miles to the south-southeast at its closest point and Lake Sylvia is approximately 1 mile to the north-northeast. Storm water is routed to catch basins around the perimeter of the subject property, which route storm water to the local storm sewer system. The storm sewer reportedly discharges to the Chehalis River through a permitted outfall managed by the City of Montesano. The subject property is located upland of the 100-year flood plain for the Chehalis River and is in an area that receives minimal flooding according to the October 1981 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Montesano, Washington.

3.4 Ground Water

Depth to ground water at the Site ranges from approximately 9 feet to 17.5 feet below grade. Based on quarterly monitoring data. Over the annual cycle of ground water monitoring for this project the hydraulic gradient has consistently been southeasterly with a magnitude ranging from 0.0112 ft/ft to 0.013 ft/ft. Over the current period of monitoring the maximum fluctuation in water table elevations was observed at well KBMW-8 with a minimum elevation of 19.03 feet MSL (i.e., 16.78 feet below grade) to a maximum elevation of 22.37 feet MSL (i.e., 13.44 feet below grade).

Ground water at the Site is not used for drinking water. The City of Montesano is served by municipal drinking water and current City codes restrict the installation of drinking water wells in the area of the Site. The potential for the on-Site ground water to be used for potable purposes appears to be very limited.

Based on the characterization of the dissolved-phase contaminant plume associated with the Whitney Site, the plume does not extend to surface water and surface water exposures are not a completed exposure pathway.

3.5 Natural Resources and Ecological Receptors

As documented in the RI Report (EPI 2010), a terrestrial ecological evaluation (TEE) was performed for the Site, in accordance with WAC 173-340-7490, to determine if the Site poses a threat to the terrestrial environment. The Site is fully capped and located within the urban core of Montesano. Based on the TEE performed, the subject facility qualifies for a TEE exclusion based upon WAC 173-340-7491(1)(b), which states:

“All soil contamination with hazardous substances is, or will be, covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed to the soil contamination....”

Therefore, terrestrial ecological exposures are not considered. Surface water and sediment impacts are also not considered since surface water bodies are a substantial distance from the Site and a pathway of migration to surface water does not exist. Data from the RI and IA activities confirm that impacted ground water from the Site does not discharge to surface water and that the storm sewer piping is well above the water table even during the highest water table time of the year.

4.0 NATURE AND EXTENT OF CONTAMINANTS

4.1 Sources and Affected Media

Impacts at the Site are present as a result of historic releases from former petroleum fuel USTs and potentially from vehicle maintenance and service activities. The previously completed interim action has remediated the primary sources of release of contaminants of concern at the Site and has removed, to the extent practicable, impacted soils associated with those releases.

A portion of the Site is impacted with LNAPL and Site soil and ground water are impacted with petroleum hydrocarbons, volatile fuel components and PCE. Indoor air is also affected by the volatile constituents of hydrocarbon fuels and other volatile organic compounds. Specific constituents of concern for each media are discussed in greater detail in the following sections.

There are no impacts to surface water or sediment. The limits of the Site have been well characterized, as reflected in the final RI, and do not extend to any surface water bodies. The potential for preferential pathways (i.e., sewer lines) has been explored during the RI and has been ruled out as a contributing factor.

The probable transport mechanisms for the migration of contaminants include sorption to soil, desorption from soil to ground water, dissolution of LNAPL to the aqueous phase in ground water, migration with dispersion of dissolved-phase constituents in ground water, naturally occurring

attenuation processes (i.e., dilution, chemical diffusion, biological degradation) of the dissolved-phase in ground water, and volatilization from soil and ground water to soil gas and migration to indoor air.

4.2 LNAPL and Dissolved-Phase Plume

The extents of the LNAPL and dissolved-phase plumes are well characterized. The LNAPL consists of a gasoline-type fuel. GRPH and aromatic fuel compounds are present in the dissolved-phase. An area of PCE in ground water is also present, but is wholly co-located with the dissolved-phase GRPH and benzene. Figures 5, 6 and 7 depict the current extent of the Site, as defined by GRPH, benzene and PCE in ground water at concentrations exceeding MTCA Method A Ground Water Cleanup Levels (CULs). The presence of LNAPL and the dissolution of petroleum hydrocarbons from smear zone soils represents a continuing source of dissolved-phase contaminants to ground water.

The distribution of LNAPL and the extent of dissolved-phase petroleum impacts suggest that these impacts result primarily from historic releases from the former USTs. LNAPL and the core of the dissolved-phase plume have migrated downgradient to the southeast from a source area(s) in the northwestern portion of the Site and the maximum LNAPL thickness is downgradient from the identifiable sources of release.

Measurable LNAPL was present in ground water at the core of the dissolved-phase plume with the thickest accumulations consistently observed at monitoring well KBMW-9. Lesser LNAPL thicknesses are observed in wells WCMW-2 and KBMW-2. A summary of ground water table elevations and LNAPL measurements for the Site is presented in Table 1.

The presence of LNAPL within some of the wells appears to be intermittent and is likely related to specific hydrogeologic conditions that allow the accumulation of LNAPL. This finding indicates that an unknown mass of gasoline hydrocarbons is present within the core of the plume at concentrations in soil and ground water near residual saturation. Depending upon the elevation of the seasonally fluctuating water table, some of these residual hydrocarbons may be exposed and drain, forming localized pockets of LNAPL during low water table conditions.

There no longer appears to be extensive commingling between the contaminants originating on the Whitney Chevrolet Site with those originating on the Tony's Short Stop Site at concentrations exceeding a MTCA CUL. It is acknowledged that some detectable concentrations of contaminants originating from the Site may have migrated beyond the western, upgradient boundary of the Tony's Short Stop Site, but these impacts do not appear to have exceeded applicable cleanup levels as of August 2012, and are well below levels observed to be originating from Tony's Short Stop Site sources. Any commingling of contaminants appears to be minor, and remediation of the Whitney Chevrolet Site sources will address any potential impacts to the Tony's Short Stop Site that originate from the Whitney Chevrolet Site.

4.3 Residual Soil Impacts

Following completion of the interim actions in the source area, only limited areas of the Site still contain residual concentrations of contaminants in soil at concentrations slightly exceeding a MTCA CUL. These impacts could not be removed because of access limitations. The remedial actions are

presented in detail in the IADG Report (EPI 2012a). Table 3 presents a summary of residual concentrations remaining in Site soil at the terminal limits of the remedial excavations. Soil sampling locations associated with the data are shown on Figure 8. The areas containing residual soil impacts are primarily located within the northwest portion of the Site in the vicinity of former USTs, which is the primary source area of the ground water plume. These impacts are located in a limited depth horizon from about 10 to 14 feet below grade.

Constituents remaining in soil above the water table include GRPH, BTEX, ORPH, and naphthalene. Residual oil-range petroleum hydrocarbon (ORPH) impacts also remain in soil at shallower depths between approximately 5 and 10.5 feet below grade beneath the central portion of the Whitney Chevrolet building. Impacted soil in this area also contains minor concentrations of GRPH and BTEX constituents.

The majority of impacts in soil are at and below the water table and include GRPH and BTEX compounds. Residual PCE is also present in isolated areas at the approximate depth of the water table (i.e., 16 feet below grade). Soil impacts at the water table are relatively thin (i.e., less than 5 feet) and likely represent a historic smear zone and are within the historic range of water table elevations. The residual impacts in soil below the water table represent a source of contaminant dissolution to ground water.

The remaining soil impacts at the Site are inaccessible and are fully covered with buildings, concrete, or asphalt pavement. All known USTs at the Site and all accessible impacted soils have been removed.

4.4 Indoor Air Quality

Indoor air has been evaluated using direct indoor air sampling, background air quality sampling, and using an analytical model to assess the potential for vapor intrusion. The results of that evaluation were presented in the RI Report (EPI 2010), along with tables summarizing analytical data for soil gas samples and indoor air samples collected from the Whitney's Chevrolet building, Sterling Savings Bank building, and the VFW/Charlie's Bar building. Minor exceedences of MTCA Method B Indoor Air Cleanup Levels were identified for fuel-related compounds benzene and ethylene dichloride (EDC) within the buildings located at the Site. It should be noted that MTCA Method B Indoor Air Cleanup Levels incorporate residential exposures to children and include an exposure frequency of 1 (i.e., 24 hours/day, 365 days/year). The Site is zoned commercial within the downtown commercial core of Montesano and such exposure assumptions are not appropriate for, nor applicable to, the Site.

Benzene and EDC were both detected in indoor air within the Whitney's Chevrolet building, along with other fuel-related constituents and chlorinated compounds. However, vapor intrusion at the Whitney's Chevrolet facility is difficult to assess based upon interior background levels attributable to the current facility uses (i.e., vehicle sales and service) and the ventilation within the building (i.e., open service bays and breezeways). Many of the compounds that were detected remain in current use within the facility. The benzene and EDC data suggest that although some vapor intrusion of these compounds may be occurring, it is not possible to assess to what extent.

Indoor air at the Sterling Savings Bank building appears to be primarily affected by EDC concentrations that exceed the cleanup level. Benzene was also detected in indoor air samples from the building, but does not exceed the cleanup level when adjusted for background concentrations. Based on detections of benzene and EDC concentrations in indoor air, vapor intrusion appears to be occurring to a limited extent at the Sterling Savings Bank building. The building appears to provide at least a 0.1 attenuation factor between indoor air and soil gas if one assumes there are no interior background levels.

As indicated in the RI Report, the source of the EDC in indoor air samples is unclear given that it has never been detected in ground water and is present in only one soil gas sample located on the east side of the Whitney's Chevrolet facility.

Some minor vapor intrusion for benzene may be occurring at the VFW/Charlie's Bar building. While five different fuel-related compounds were present in soil gas from samples near the building at concentrations exceeding the corresponding compound-specific soil gas screening level, only benzene was detected in indoor air at a concentration exceeding the MTCA Method B Indoor Air Cleanup Level. This may be attributable to indoor anthropogenic sources such as smoking. Other compounds detected in the indoor air samples at the VFW/Charlie's Bar building are most likely the result of some on-property use of the detected compound. Given the current building use and, therefore, lack of juvenile exposure or residential exposure frequency, MTCA Method B indoor air cleanup levels for this structure are not appropriate.

The potential for the identified indoor air impacts to adversely affect human receptors appears highly limited. The cleanup levels provided within the guidance are based upon residential exposures and include juvenile exposures, neither of which are present at the Site and are not reasonably expected at the Site in the future. Vapor intrusion risks at the Site will be best addressed through remediation of the LNAPL and dissolved-phase contaminant plumes. Action levels (ALs), based on a reasonable maximum exposure (RME), and exceedences of ground water cleanup levels protective of indoor air at the AL can be incorporated into the dCAP.

5.0 CLEANUP STANDARDS

Cleanup standards include cleanup levels, remediation levels (RELs), and ALs that are adequately protective of human health and the environment, and the point of compliance at which those levels must be met. The cleanup standards are used as the basis for developing media-specific remedial action objectives for the cleanup action. In addition to the cleanup standards identified for soil, groundwater, and indoor air, the free product detected in the subsurface should be removed to the maximum extent practicable.

5.1 Applicable Regulations

The work documented herein is intended to comply with the laws and regulations of Washington State. The work to be performed during implementation of the selected remedy will be performed under the Agreed Order and must comply with MTCA (70.105D RCW) and its implementing regulations (WAC 173-340). Applicable or Relevant and Appropriate Regulations (ARARs) for the selected remedy will be

MTCA and all potential exposure pathways will be addressed. Moreover, this FS contains a fully MTCA-compliant CUL development. Therefore, further consideration of ARARs is not warranted and MTCA has been selected as the regulation with primacy for this project.

5.2 Development of Cleanup Levels

CULs for soil, groundwater, and indoor air were evaluated in accordance with MTCA requirements and take into consideration exposure pathways and receptors based on current and likely future uses of the Site. Final CULs and the potential use of RELs and ALs will be considered and developed in the dCAP and may be applied to various portions of the Site. The discussions of CULs below are for the purposes of evaluating the potential effectiveness of remedial alternatives and the likely ability of those options to attain a cleanup standard.

Because the Site and surrounding area are currently developed for commercial use and will likely remain so into the foreseeable future, only exposure pathways for human receptors were taken into consideration. Under the current and future land uses, the potential pathways for exposure to on-Site contaminants include direct contact (i.e., dermal, ingestion, and inhalation exposures) with soil and ground water by construction workers and indoor air inhalation (from vapor intrusion pathway) for a commercial worker exposure. Residual soil impacts are deeper than 6 feet below grade and are capped with asphalt and concrete within an urban setting which precludes the potential for terrestrial ecological exposures. As noted above, the ground water-to-surface water exposure pathway is not completed and surface water exposures are therefore not considered.

Although the Site is zoned and used as a commercial property, the Site can still utilize MTCA Method A CULs for soil and ground water as prescribed in WAC 173-340-704. Soil CULs for unrestricted land use and ground water CULs for protection of drinking water use were developed in accordance with WAC-173-340-740, using the exposure pathways identified above. Based on the exposure pathway identified for indoor air, CULs for indoor air were developed using MTCA Method B in accordance with WAC 173-340-750.

A summary of the potentially applicable CULs used for this FS is presented in Table 4. It should be noted that MTCA Method A soil and ground water CULs are lower than those necessary to be protective of the known exposure pathways at the Site. It is reiterated that final CULs, RELs, and ALs, and the use of engineering controls, institutional controls, and environmental covenants will be evaluated and presented in the dCAP. The dCAP can first be prepared once Ecology has indicated its agreement with this FS and the recommended remedy and, as recommended below, pilot testing is performed to confirm the applicability and likely effectiveness of the selected remedy.

5.3 Points of Compliance

A point of compliance is that point or location on a property where the CULs are attained. The standard point of compliance within MTCA is all media throughout a Site. If a conditional point of compliance is appropriate it must be established as close to the source of the release as practicable.

For the purposes of this FS each remedial alternative will be evaluated based upon its likely ability to achieve the standard point of compliance. The alternatives will also be evaluated based upon their ability to be protective of human health and the environment during implementation of the remedy, regardless of the point of compliance.

Final points of compliance, including conditional points of compliance for soil, ground water and air, if applicable, will be established in the dCAP.

6.0 FINAL CONTAMINANTS OF CONCERN

Contaminants of potential concern (COPCs) were identified during RI and interim action activities. COPCs that were identified for soil were compounds that had been detected at concentrations exceeding respective soil screening levels, which were based on MTCA Method A or Method B Soil Cleanup Levels for Unrestricted Land Uses. As with soil COPCs, the COPCs that were identified for ground water were compounds that had been detected at concentrations exceeding respective ground water screening levels, which were based on the MTCA Method A cleanup levels for ground water as a source of drinking water. For indoor air, COPCs were identified as those compounds that had been measured in soil or ground water during the RI at concentrations that could result in vapor intrusion at concentrations potentially exceeding MTCA Method B indoor air cleanup levels, which are conservatively based upon a residential exposure scenario. The COPCs identified for affected media at the Site were specified in the RI report (EPI 2010) and subsequent IADG report (EPI 2012a).

Final contaminants of concern (COCs) for this FS were selected based upon the COPCs that remain in Site soil, ground water, and indoor air at concentrations exceeding the potentially applicable CULs presented in Section 5.2. The final COCs for affected media at the Site include the following:

Summary of COCs by Media

Compound	Media			
	Soil	Ground Water	Surface Water	Indoor Air
ORPH	X			
GRPH	X	X		
Benzene	X	X		X
Toluene	X	X		
Ethylbenzene	X	X		
Total Xylenes	X	X		
Naphthalenes	X	X		
EDC				X
PCE		X		

The final COCs and potentially applicable CULs are presented in Table 4. As stated above, final media specific CULs which incorporate the use of an RME, RELs, ALs, institutional controls, engineering controls and environmental covenants will be developed in the dCAP.

7.0 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) have been established for the Site to provide remedial alternatives that protect human health and the environment under the MTCA cleanup process (WAC 173-340-350). Based on the assessment of conditions at the site and the potentially applicable CULs presented in Section 5.2, the RAOs for the Site have been established as follows:

- Remove free product to the maximum extent practicable.
- Reduce concentrations of COCs in soil to levels protective of human health and the environment and which are protective of ground water quality.
- Actively remediate ground water to the extent practicable such that ground water CULs will be achieved in a reasonable time frame.
- Reduce concentrations of COCs in ground water to levels protective of human health and the environment.
- Protect indoor air quality in structures at the Site to levels protective of the reasonable maximum exposure.

The RAOs are of primary importance to the evaluation of the general response actions, technologies, process options, and cleanup action alternatives presented in this FS.

8.0 IDENTIFICATION AND SCREENING OF REMEDIATION TECHNOLOGIES

This section identifies general response actions and screens remediation technologies for use in assembling remediation alternatives.

8.1 General Response Actions

General response actions are broad categories of remedial actions that can be combined to meet the RAOs for a site. The following are typical general response actions that are applicable to most impacted sites:

- No action
- Institutional controls
- Monitored natural attenuation
- Containment
- Removal
- Ex-situ treatment
- In-situ treatment

Potentially applicable technologies associated with these general response actions have been identified and screened based on the Site COCs and affected media, and take into consideration the current and future use of the property. An overview of those technologies is provided in the following section.

8.2 Identification and Screening of Applicable Technologies

Applicable technologies associated with the general response actions have been identified and screened for potential inclusion in the remediation alternatives for the Site. Each identified technology was screened based on applicability to site conditions, overall effectiveness, implementability, and relative cost. The potentially applicable technologies considered for the Site are presented in Table 5, which provides a summary of the screening results. The technologies that were retained for further consideration include institutional controls, containment options, removal of LNAPL and ground water, ex-situ ground water treatment options, and in-situ treatment options for soil and ground water. Details of each technology are summarized below. The technologies determined to be appropriate for the Site are incorporated into potentially applicable remediation alternatives presented in Section 9.0.

8.2.1 Institutional Controls

Institutional controls involve implementation of legal and/or physical restrictions on land use and on ground water use to limit exposure potential. Such restrictions may be implemented as a component of a remedial action or they may be pre-existing restrictions. Given the location of the Site and local zoning and land use there is a *de facto* institutional control at the Site that prohibits its use for residential or public uses. Land use restrictions might prohibit uses of a Site that would compromise the integrity of the existing surface cap of asphalt and concrete and could require that the cap is maintained as long as COCs remain above cleanup levels in soil beneath the cap. Ground water use restrictions would prohibit the use of Site ground water as a source of potable water to prevent contact with or ingestion of dissolved contaminants. Implementation of institutional controls would be appropriate as a component of a remedial alternative to limit exposures during active remediation of the Site. Institutional controls would not be an appropriate solution on its own without first removing LNAPL beneath the Site. Land use and ground water use restrictions would remain in force until COC concentrations decrease to below the CULs.

8.2.2 Containment (Capping, Vertical Barriers, Hydraulic Containment)

Technology options that are applicable for containment of impacts at the Site include capping with an impervious surface, installing a vertical barrier, and hydraulic containment through ground water pumping. Capping is applicable, as the Site is currently paved with asphalt and concrete; this minimizes direct contact exposure and reduces infiltration of storm water through impacted soil to ground water. Containment technologies do not mitigate the potential vapor migration pathway and additional technologies would be required to address that exposure pathway. Implementing a physical vertical barrier or hydraulic containment will minimize or prevent migration of contaminants in the subsurface. A vertical barrier may include installation of a slurry wall or other impermeable wall around subsurface impacts. Hydraulic containment would include installation of extraction wells and ground water pumping equipment. Containment alone would not achieve full compliance with cleanup standards; therefore, if

implemented, additional remediation technologies would also be required to reduce contaminant concentrations in the subsurface to meet the CULs.

8.2.3 Removal (LNAPL Recovery)

LNAPL will need to be removed from the subsurface in order to achieve the RAOs and comply with cleanup standards. LNAPL recovery can be accomplished through active or passive methods. LNAPL recovery alone would help to mitigate the vapor exposure pathway by removing source material but additional technologies would be required to fully mitigate potential vapor migration. Active methods of LNAPL recovery include the use of submersible or aboveground pumping equipment and oil-water separation technology. Passive methods include the use of in-well product skimmers and periodic bailing. LNAPL recovery will likely require installation of recovery wells and/or recovery trenches within the core of the plume for implementation of active or passive recovery technology. Recovered LNAPL will collect in a designated recovery tank or drum and will require period disposal at an off-site facility. LNAPL recovery should be included with other treatment technologies as part of the selected cleanup action for the Site.

8.2.4 Removal (Ground Water Extraction)

Ground water extraction (GWE) can be effective for reducing dissolved impacts at the Site, establishing hydraulic control of the plume, and may also facilitate LNAPL recovery; however, the cleanup process can take several years to complete if not coupled with additional in-situ treatment. GWE alone would also not mitigate the potential vapor exposure pathway. The GWE process consists of utilizing submersible and/or aboveground pumping equipment to extract impacted ground water through recovery wells and/or recovery trenches. Implementation of this technology would require installation of several recovery wells and/or recovery trenches within the core of the plume and at other areas across the Site. If implemented, GWE should be combined with ex-situ treatment. Treated water can either be discharged to the sanitary sewer or re-injected at the Site as part of an in-situ treatment component. Disposal of untreated ground water to an off-site facility would be cost-prohibitive.

8.2.5 Ex-Situ Treatment of Ground Water

Ex-situ treatment would be required as a component of GWE. Applicable treatment options for extracted ground water include granular activated carbon (GAC) adsorption, aeration technology, air stripping, and chemical oxidation. These technologies, which have been proven to be effective for reducing dissolved concentrations of petroleum hydrocarbons and PCE, are described below.

8.2.5.1 GAC Adsorption

This technology involves the use of liquid-phase GAC adsorption equipment to physically remove contaminants from extracted ground water. As water passes through the GAC, the dissolved contaminant compounds adsorb to the surface of the carbon material. If implemented, the GAC equipment will require periodic change-out of the spent carbon material. Use of GAC may not be practical during the initial phase of remediation while LNAPL is still present and contaminant concentrations are significantly elevated. During such conditions, GAC will be used up quickly and the potential for breakthrough of contaminants will be high. Frequent change-out of the GAC would be

necessary and cost-prohibitive; therefore, this technology should be considered for use in the later stages of remediation when contaminant concentrations have been significantly reduced.

8.2.5.2 Aeration

Aeration technology utilizes injection of air into extracted ground water to volatilize dissolved contaminants and enhance aerobic biodegradation. The process is typically conducted within an aeration tank equipped with air injection tubing or slotted piping connected to an external blower. Aeration of impacted ground water will produce off-gas vapors that will require additional treatment through adsorption or oxidation equipment. Iron-fouling can be problematic for aeration treatment at sites containing high iron concentrations in the subsurface; therefore, testing for iron content at the Site would be recommended prior to full consideration of this technology.

8.2.5.3 Air Stripping

Air stripping technology also volatilizes dissolved contaminants from extracted ground water. The impacted water is routed through an air stripper, which typically consists of a tank or tower containing packing material or a series of perforated trays. Water is pumped into the stripper and sprayed over the packing material/trays while air is blown up through the bottom. Contaminants are volatilized while water moves toward the bottom of the stripper. As with aeration, air stripping will also produce off-gas vapors that will require additional treatment through adsorption or oxidation equipment. Iron-fouling can also be problematic for air stripper equipment, so testing for iron at the Site would be recommended prior to full consideration of this technology.

As with aeration, air stripping would also require treatment of the air effluent stream resulting from the water treatment. Potentially applicable air effluent technologies are discussed below in Section 8.2.6.1.

8.2.5.4 Chemical Oxidation

Chemical oxidation destroys contaminants through chemical reactions. Oxidant compounds such as hydrogen peroxide solution or ozone gas are injected into the impacted water and mixed in a reaction tank. When mixed in the tank, the oxidizing compounds break down the dissolved contaminants into carbon dioxide, water, and salts. This technology may not be as cost-effective as other ex-situ treatment technologies during the initial phase of remediation when contaminant concentrations are significantly elevated; such conditions would require the use of large amounts of oxidizing agents.

8.2.5.5 Other Technologies

Additional technologies exist for the ex situ treatment of extracted ground water. Those technologies include bioreactors, ultraviolet/photoxidation (UV/Photox), and thermal treatment technologies. Based on prior experience and best professional judgment, those classes of technologies are not retained for further consideration in this FS on the basis of technical impracticality at the Site.

8.2.6 In-Situ Treatment

In-situ treatment can be implemented at the Site as an alternative to or in conjunction with other treatment technologies. In-situ treatment technologies are directly applied to subsurface soil and ground water for removal or destruction of COCs. Applicable in-situ treatment options include air sparging, soil

vapor extraction, and chemical oxidation. These technologies, which have been proven to be effective for reducing petroleum hydrocarbons and PCE in subsurface soil and ground water, are described below.

8.2.6.1 Air Sparging (AS)

AS consists of injecting air into ground water below the water table. Volatile contaminants are transferred from the dissolved-phase to the vapor-phase for recovery. AS has the additional benefit of increasing the dissolved oxygen content of ground water and facilitating aerobic biological degradation of petroleum hydrocarbons and the cometabolic biodegradation of co-located chlorinated VOCs.

Implementation of AS would require installation of several injection wells (screened within the saturated zone) across the Site, and delivering air to the wells using a blower or compressor. AS wells can be either vertical wells or horizontal wells. Vapor recovery will also need to be implemented to capture volatilized compounds generated from the AS process. Therefore, AS systems are typically installed in conjunction with a soil vapor extraction (SVE) system. SVE wells can also be installed as either vertical or horizontal wells. The selection of vertical or horizontal wells and the spacing and construction of such wells would require the performance of Site-specific pilot testing in order to facilitate property system design and operation.

As with aeration and air stripping treatment technologies, fouling by iron and manganese can be problematic; therefore, testing for dissolved-iron and manganese at the Site would be recommended prior to implementing this technology. If selected for the cleanup action, remedial pilot testing should be conducted at the Site to evaluate the effective radius of influence of injected air and determine the appropriate spacing for AS injection wells.

8.2.6.2 Soil Vapor Extraction (SVE)

SVE technology can be implemented alone or coupled with other technologies such as GWE or AS. This technology would require installation of extraction wells (or trenches) screened within the vadose zone where impacts are present in soil. SVE technology may also utilize appropriately constructed monitoring wells for either vapor and vacuum monitoring or for active extraction. Using vacuum blower equipment, a vacuum is applied to the SVE wells to extract volatile contaminants from the subsurface. Those volatile compounds are present in soil gas either through normal volatilization or as the result of AS.

The extracted vapors require treatment prior to atmospheric discharge. Vapor effluent treatment technologies include GAC, thermal oxidation (therm-ox), or catalytic oxidation (cat-ox). GAC is typically applicable to lower air effluent discharges while therm-ox and cat-ox are more applicable to higher mass loadings. Assuming that vapor concentrations would be significantly elevated during the initial phase of remediation, a therm-ox or cat-ox would be more suitable and more cost-effective than using GAC adsorption equipment for vapor treatment. However, GAC could be more practical for vapor treatment once concentrations are significantly reduced. If selected for the cleanup action, remedial pilot testing should be conducted for this technology to evaluate the effective radius of influence for extraction and determine the appropriate well spacing.

It is important to note that AS with SVE has been used effectively at other remedial actions in the vicinity of the Site. This demonstrated effectiveness of the AS and SVE technologies factors into this FS.

8.2.6.3 In-Situ Chemical Oxidation (ISCO)

Application of ISCO technology mineralizes contaminants within subsurface soil and ground water through chemical reactions. A mixture of oxidant and buffering compounds are typically injected into impacted soil and ground water and upon contact with contaminants the oxidizer(s) break down the dissolved contaminants into carbon dioxide, water, and salts. Delivery of oxidants to the subsurface can be conducted using direct-push probes or injection wells installed across the Site. Typical chemical oxidants used for ISCO of petroleum hydrocarbons include Fenton's reagent and ozone, both of which have been proven to effectively destroy petroleum hydrocarbons and chlorinated solvents. Fenton's reagent consists of hydrogen peroxide combined with an iron catalyst. The injection mixture also typically includes the addition of acid, as Fenton's reagent is more effective at acidic pH. When ozone is used for ISCO, it is applied through sparging technology. For ozone sparging, ozone is generated on-site from air and then injected as a gas into the subsurface. Regardless of the oxidant that is used, the destruction efficiency of contaminants can be greatly affected by the organic content of the soil and other subsurface characteristics that can be readily oxidized. Therefore, testing should be conducted at the Site to analyze the overall soil and water oxygen demand and determine the appropriate oxidant dose to be applied. The use of an ozone sparging technology would also require performance of a pilot study and addition of an SVE system. While LNAPL is present at the Site, this technology may not be as cost-effective as other in-situ treatment methods due to the large quantity of oxidizing agents that would be required for contaminant destruction.

9.0 SELECTION AND DESCRIPTION OF REMEDIAL ALTERNATIVES

Potential remedial alternatives for the Site are based on the response actions and technologies described in Section 8 and screened in Table 5. At a minimum, the alternatives must meet the MTCA Threshold requirements specified in WAC 173-340-360(2)(a) before being considered for further evaluation.

9.1 MTCA Threshold Requirements

The MTCA Threshold Requirements [WAC 173-340-360 (2)(a)] specify that cleanup actions shall:

- Protect human health and the environment.
- Comply with cleanup standards.
- Comply with applicable state and federal laws.
- Provide for compliance monitoring.

MTCA [WAC 173-340-360 92)(b)] also indicate Other Requirements that must be met by any cleanup alternative:

- Use permanent solutions to the maximum extent practicable.
- Provide for a reasonable restoration time frame.
- Consider public concerns.

Based on preliminary screening of the general response actions identified in Section 8, the following actions if implemented without the use of other technologies, do not meet the threshold requirements and, therefore, will not be further considered as stand-alone remedial alternatives:

- **No Action** – This will not address the impacts at the Site and will result in leaving contaminants in soil and ground water and LNAPL in its current state, which would not be protective of human health or the environment.
- **Monitored Natural Attenuation (MNA)** – Although MNA provides for monitoring and complies with applicable state and federal laws as a remediation alternative, it is not practical when LNAPL is present and would not achieve compliance with cleanup standards in a reasonable time frame, nor would it be protective of human health and the environment.
- **Containment (Capping and Vertical Barrier)** – Although somewhat protective with respect to soil and ground water exposure risks, containment would not address LNAPL nor mitigate potential vapor intrusion exposure risks. Containment alone would not comply with the cleanup standards.

9.2 Description of Remedial Alternatives

Based on the screening evaluation and MTCA threshold and other requirements, the following remedial alternatives are proposed for the Site:

- Alternative 1 – Multi-Phase Extraction and Ex-Situ Treatment
- Alternative 2 – LNAPL Recovery and SVE
- Alternative 3 – LNAPL Recovery and AS/SVE
- Alternative 4 – LNAPL Recovery and ISCO
- Alternative 5 – GWE with Ex-Situ Treatment and Re-Infiltration

Conceptual descriptions of these alternatives are provided below.

In evaluating the alternatives presented below it is important to consider that the entire Site is currently capped with asphalt and concrete resulting in a significant component of containment. The land uses of the Site, in the downtown Montesano urban core also serves as a *de facto* deed restriction and institutional control on current and future land uses.

Lastly, access at the Site is significantly limited by the current land uses and structures. As such, it is possible and likely, that most remedial technologies will not be capable of treating every portion of the

dissolved-phase or LNAPL plume as it is currently situated. Therefore, each of the technologies presented below will necessarily include a component of MNA as contaminant mass is removed from the subsurface and the contaminant load on natural biological processes is decreased and allows those processes to become more prevalent. While not expressly stated as a component of each of the alternatives below it is expected that MNA will play a role in each of the evaluated alternatives.

9.2.1 Alternative 1 – Multi-Phase Extraction and Ex-Situ Treatment

This remedial alternative consists of active LNAPL recovery with extraction and treatment of impacted ground water and soil vapors. The ground water extraction component of this alternative also provides a degree of hydraulic containment as a secondary benefit. Multi-phase extraction includes a component of SVE which would also be protective of the potential vapor intrusion pathway. Institutional controls would be included in this alternative for maintaining the existing impervious surface cap until Site conditions comply with the cleanup standards. The multi-phase extraction and treatment system would be operated until LNAPL is no longer observable at the Site, system influent concentrations are consistently non-detectable, and concentrations of COCs in Site ground water achieve the CULs; therefore, performance and compliance monitoring are also included in this alternative. A conceptual layout for Alternative 1 is presented in Figure 9 and details are provided below.

Multi-Phase Extraction

For this alternative, a high vacuum pump would be used to extract total fluids from recovery wells. A network of 4-inch diameter PVC multi-phase recovery wells, with a screened interval extending above and below the water table, would be installed in the vicinity of the source area and throughout the core of the plume. A 30-foot radius of influence for total fluids extraction is assumed for this alternative; however, pilot testing would be necessary to confirm the actual radius of influence for design and implementation.

Similarly, general chemistry testing of ground water would be required to assess whether iron or manganese fouling are likely to be an issue with well performance and efficiency and whether pH adjustments to the system would be required to limit such fouling.

LNAPL Recovery and Water Treatment

Extracted fluids from the recovery well network would be routed to aboveground treatment equipment for separation and recovery of LNAPL, and treatment and discharge of impacted water and vapors. LNAPL and ground water would be separated in an oil/water separator located in the treatment compound. Recovered LNAPL from the separator would be collected in a storage drum for offsite disposal. It is assumed that an air stripper would initially be used for water treatment when dissolved concentrations are significantly elevated. The air stripper could be replaced in the future with liquid-phase GAC units when concentrations have reduced to levels appropriate for adsorption treatment. The treated water would be discharged to the sanitary sewer under a discharge permit.

Vapor Treatment

Offgas vapors from the air stripper would combine with extracted soil vapors for treatment prior to discharge to the atmosphere. It is assumed that a thermal or catalytic oxidizer would initially be used for vapor treatment when concentrations are significantly elevated. The oxidizer would likely be replaced

after a period of time with vapor-phase GAC units once concentrations decrease to appropriate levels. It is anticipated that an air operating permit and notice of construction would be required for discharging treated vapors to the atmosphere through the Olympic Region Clean Air Agency (ORCAA).

Performance and Compliance Monitoring

Performance monitoring would be conducted to assess remedial progress, hydraulic control, and permit compliance. Performance monitoring would consist of the following: monthly sampling and analysis of system influent and effluent (water and vapors); monthly measurement of recovered LNAPL; and quarterly ground water and hydraulic monitoring during active remediation. Quarterly ground water monitoring would include in-well measurements of LNAPL and collection of ground water samples for analysis of COCs.

Compliance monitoring would be conducted for indoor air, ground water, and soil. For indoor air, compliance monitoring would be conducted periodically during and after the active remediation phase to assess soil gas quality beneath the floor slabs of the existing structures and would consist of collection of sub-slab vapor samples for analysis of the indoor air COCs. The resulting concentrations would be compared to Site-specific soil gas screening levels based upon the current site uses and RME developed in the dCAP. It may be necessary to implement a vapor mitigation system if the results exceed the ALs or RME. That is, if ALs in ground water or soil gas are exceeded and additional actions indicate that vapor intrusion is occurring at unacceptable levels, vapor mitigation systems may be appropriate. The process for the use of ALs and contingent actions will be included in the dCAP. Compliance monitoring for ground water would be incorporated into ground water performance monitoring and would be conducted following completion of active remediation (i.e., following shut down of the remediation system). Compliance monitoring for soil may also be conducted following completion of active remediation. This would consist of sampling and analysis of Site ground water and soil for assessing concentrations of COCs and confirming compliance with the final CULs and points of compliance established within the dCAP.

9.2.2 Alternative 2 – LNAPL Recovery and SVE

This remedial alternative consists of removal and disposal of LNAPL and extraction and treatment of impacted soil vapors. Removal of LNAPL and impacted soil vapors will mitigate vapor intrusion issues at Site buildings and will minimize dissolution of COCs into Site ground water. SVE will also function to remove contaminant mass from the vadose zone with deeper portions of the smear zone accessible during periods of low water table elevations. Dissolved-phase constituents would be addressed primarily through MNA. MNA will be facilitated by the removal of contaminant mass as LNAPL and the sorbed phase in soil. The use of MNA will require additional testing to demonstrate, in accordance with current Ecology protocols, the occurrence and effectiveness of biological processes.

Institutional controls would be included in this alternative for maintaining the existing impervious surface until Site conditions comply with the cleanup standards. This alternative would be implemented until LNAPL is no longer observable at the Site, SVE system influent concentrations are consistently non-detectable, and concentrations of COCs in Site ground water achieve the CULs; therefore, performance and compliance monitoring are also included in this alternative. A conceptual layout for Alternative 2 is presented in Figure 10 and details are provided below.

LNAPL Recovery

In-well skimming and pumping equipment is assumed for this alternative for recovery of LNAPL. This will also include areas of focused ground water pumping and total fluids recovery to facilitate LNAPL recovery within the core of the plume. Based on ground water monitoring data for the Site, measurable LNAPL appears to be greatest when the ground water table is at a depth ranging between 15 and 17 feet below grade. Therefore, focused ground water pumping will be implemented to draw down the water table to such depths for maintaining optimum conditions for LNAPL recovery.

For recovery of LNAPL, skimmer pumps would be placed in existing monitoring wells WCMW-2, KBMW-2, KBMW-4, and KBMW-9. Additional LNAPL recovery wells would be installed near the four wells and skimmer pumps would be placed in the additional wells. A submersible ground water pump would also be placed below the skimmer pump in each of the wells, and/or placed in other wells surrounding the recovery wells, to maintain a localized depression in the water table for maximizing LNAPL recovery. Recovered LNAPL would be pumped directly to a storage drum for offsite disposal. Ground water would be pumped to an aboveground tank for subsequent treatment through an air stripper prior to discharge to the sanitary sewer. LNAPL recovery and ground water extraction and treatment would be discontinued once LNAPL is no longer observable at the Site.

Soil Vapor Extraction (SVE)

This alternative includes SVE implemented concurrently with LNAPL recovery and after the LNAPL recovery component is shut down. Regenerative blower equipment would be used to apply vacuum to a network of SVE wells to extract soil vapors. SVE would serve to remove impacted soil gas, facilitate mass removal from the vadose zone, and be protective of the indoor air pathway.

The SVE wells would be constructed of 4-inch diameter PVC, installed to an approximate depth of 16 feet below grade, with a 10-foot length of slotted screen (i.e., 6 to 16 feet below grade). A 30-foot radius of influence for SVE is assumed for this alternative; however, pilot testing would be necessary to confirm the actual radius of influence for design and implementation. If necessary, horizontal SVE wells may also be installed beneath the Whitney's Chevrolet facility using directed drilling technology. As with Alternative 1, extracted soil vapors would initially be treated through therm-ox or cat-ox, and later using vapor-phase GAC adsorption, prior to discharge to the atmosphere under an air permit. The SVE system would be operated until influent vapor concentrations are consistently non-detectable.

Performance and Compliance Monitoring

Dissolved-phase ground water impacts would be addressed primarily through MNA. As demonstrated by current ground water quality, the dissolved-phase plume is stable, even with the presence of LNAPL. This finding provides an empirical demonstration that MNA processes provide substantial benefit at the Site. In the absence of LNAPL and with the removal of residual sorbed-phase contaminant mass in soil, MNA would be further facilitated and would therefore be still more capable of addressing the dissolved-phase contaminant plume.

A component of performance sampling will be a qualitative and quantitative demonstration of MNA and biological natural attenuation processes using currently available Ecology guidance and protocols. Performance monitoring would be conducted to assess remedial progress and would consist of the following: monthly sampling and analysis of SVE system influent and effluent; monthly measurement of

recovered LNAPL; and quarterly ground water monitoring during active remediation. Quarterly ground water monitoring would include in-well measurements of LNAPL and collection of ground water samples for analysis of COCs.

Compliance monitoring would be conducted for indoor air, ground water, and soil. For indoor air, compliance monitoring would be conducted periodically by collection of sub-slab vapor samples and comparison of those results to the site-specific CUL, REL, or AL and would incorporate the appropriate attenuation factor for subslab vapor to indoor air. Compliance monitoring for ground water and soil would be conducted following completion of active remediation and would consist of sampling and analysis of Site ground water and soil for assessing concentrations of COCs and confirming compliance with the CULs.

9.2.3 Alternative 3 – LNAPL Recovery and AS/SVE

This remedial alternative consists of removal and disposal of LNAPL, injection of air (air sparging) into Site ground water, and extraction and treatment of impacted soil vapors and volatilized contaminants generated from air sparging. Alternative 3 includes all of the elements of Alternative 2, with the addition of injecting air into the subsurface. Injecting air increases the rate of volatilization of COCs in ground water and saturated soil and enhances removal of impacts from the subsurface. As with Alternatives 1 and 2, this alternative also includes institutional controls and provisions for performance and compliance monitoring. A conceptual layout for Alternative 3 is presented in Figure 11 and details are provided below.

LNAPL Recovery

LNAPL extraction and recovery would be implemented as described in Alternative 2.

AS/SVE

The AS component of this alternative would be implemented concurrently with SVE. As with Alternative 2, the AS/SVE system would operate during LNAPL recovery and after LNAPL recovery is complete. A compressor would be used to supply air to a network of AS wells. The AS wells would be constructed of 1-inch diameter PVC, installed to an approximate depth of 25 feet below grade, with a 2-foot length of slotted screen at the bottom of the well. A 15-foot radius of influence for injection is assumed for this alternative; however, pilot testing would be necessary to confirm the actual radius of influence for design and implementation. The SVE component of this alternative, and associated vapor treatment, would be implemented as described in Alternative 2; however, the SVE flow rate would be increased for accommodating the additional vapors generated from the AS component. The AS/SVE system would be operated until influent vapor concentrations are consistently non-detectable and concentrations of COCs in Site ground water achieve the CULs.

As contemplated herein, the AS/SVE system would be operated using vertical wells. However, it must be acknowledged that access for the installation and operation of vertical wells may be challenging given the various land uses and ownership within the Site. During any pilot testing phase it would be possible to assess the applicability of horizontal AS and SVE wells in order to limit disruption to the Site and to provide better coverage of the dissolved-phase plume.

Performance and Compliance Monitoring

This alternative includes the performance monitoring and compliance monitoring described for Alternative 2.

9.2.4 Alternative 4 – LNAPL Recovery, ISCO and Localized SVE

This remedial alternative consists of removal and disposal of LNAPL and in-situ treatment of residual impacts using ISCO technology. For this alternative, LNAPL recovery would be implemented as described for Alternative 2, using in-well skimming and pumping equipment with focused ground water extraction to enhance recovery. Once LNAPL is fully removed from the Site, ISCO technology would then be implemented to destroy remaining impacts in subsurface soil and ground water to achieve compliance with the CULs. As with Alternatives 1, 2, and 3, this alternative also includes institutional controls and provisions for performance and compliance monitoring. A conceptual layout for Alternative 4 is presented in Figure 12 and details are provided below.

LNAPL Recovery

LNAPL extraction and recovery would be implemented as described in Alternative 2.

ISCO

It is assumed that the ISCO component of this alternative would utilize a combination of ozone sparging and injection of hydrogen peroxide. Ozone would serve to both oxidize COCs and to increase the dissolved oxygen content of ground water and facilitate the natural biodegradation of dissolved-phase contaminants. Hydrogen peroxide would serve primarily to address sorbed-phase mass within the smear zone.

ISCO equipment would be stationed in an on-Site treatment enclosure. Ozone would be generated on-Site and injected through Teflon tubing to a network of sparging wells located in the vicinity of the source area and throughout the plume. The ozone sparge wells would be constructed of stainless steel (0.5-inch to 1-inch diameter), installed to a depth just below the smear zone (approximately 18 to 20 feet below grade), with a 1-foot length of ozone diffusion screen at the bottom of the well. In conjunction with ozone sparging, a solution of hydrogen peroxide would be injected through a network of injection wells located in close proximity to the ozone sparge wells. The wells would be constructed of 2-inch diameter Schedule 80 PVC, installed to the top of the smear zone (approximately 15 to 16 feet below grade), with a 5-foot length of slotted screen at the bottom of the well. A 15-foot radius of influence for ozone and hydrogen peroxide injection is assumed for this alternative; however, pilot testing would be necessary to confirm the actual radius of influence for design and implementation. Hydrogen peroxide would also be injected through the previously-installed infiltration piping located within the former UST excavations beneath the Whitney's Chevrolet facility. Injections would be applied at timed intervals to maximize in-situ destruction effectiveness.

SVE

Localized SVE would also be implemented beneath the Whitney Chevrolet facility and the VFW/Charlie's Bar building. SVE would be implemented as described above. The SVE system would be used to control excess ozone and sparged vapors resulting from the ozone sparging process and to provide protection of the indoor air pathway during implementation of the remedial actions.

Performance and Compliance Monitoring

Performance monitoring would be conducted to assess remedial progress and would consist of monthly and quarterly monitoring activities. During operation of the LNAPL recovery system, performance monitoring would include monthly measurement of recovered LNAPL, monthly sampling and analysis of influent and effluent from the associated ground water treatment system, and quarterly ground water monitoring. Quarterly ground water monitoring would include in-well measurements of LNAPL and collection of ground water samples for analysis of COCs. During operation of the ISCO system, performance monitoring would include monthly system readings to assess oxidant usage rates and quarterly ground water monitoring for sampling and analysis of dissolved COCs.

Compliance monitoring would be conducted for indoor air, ground water, and soil as described for Alternatives 1 through 3.

9.2.5 Alternative 5 – GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE

This remedial alternative consists of pumping for removal of impacted ground water and LNAPL and applying ex-situ treatment technologies. This alternative also provides hydraulic containment of contaminants. Another component of this alternative includes focused re-injection of treated ground water into soil within the source area to provide additional treatment for residual impacts above the water table. The pump and treat system would be operated until LNAPL is no longer observable at the Site, system influent concentrations are consistently non-detectable, and concentrations of COCs in Site ground water achieve the CULs. As with Alternatives 1 through 4, this alternative also includes institutional controls and provisions for performance and compliance monitoring. A conceptual layout for Alternative 5 is presented in Figure 13 and details are provided below.

GWE and LNAPL Extraction

Submersible pumping equipment is assumed for this alternative for combined extraction of LNAPL and ground water. Electric or pneumatic submersible pumps would be placed in existing monitoring wells WCMW-1R, WCMW-2, WCMW-3, KBMW-2, KBMW-4, and KBMW-9. Additional extraction wells would be installed near the six wells and submersible pumps placed in the wells to increase recovery of ground water and LNAPL. The pumps would be placed such that the inlet is at an extraction depth between approximately 16 and 18 feet below grade, to achieve maximum recovery of LNAPL and dissolved COCs.

Extracted fluids from the recovery well network would be routed to aboveground treatment equipment for separation and recovery of LNAPL, and ex-situ treatment of impacted water. LNAPL and ground water would be separated in an oil/water separator located in the treatment compound. Recovered LNAPL from the separator would be collected in a storage tank or drum for offsite disposal. It is assumed that an air stripper would initially be used for water treatment when dissolved concentrations are significantly elevated. Offgas vapors from the air stripper would be treated through thermal oxidation technology prior to discharge to the atmosphere. The air stripper would be replaced with liquid-phase GAC units or a chemical oxidation treatment tank when concentrations have reduced to levels appropriate for those technologies. Some of the treated water would be discharged to the

sanitary sewer under a discharge permit, while the rest would be re-injected into the subsurface on-Site.

Treated Water Injection

Treated water from the ex-situ treatment system would be injected within the upgradient portion of the plume, and in the vicinity of the source area. The water would be transferred from the treatment compound to a network of infiltration trenches for gravity feed into the subsurface. The trench network would include previously installed infiltration galleries located within the former UST excavations beneath the Whitney's Chevrolet building and additional infiltration trenches that would be installed west of the building within South First Street, and north of the building along the north side of West Pioneer Avenue. The depth of infiltration would be at an approximate depth between 8 and 10 feet below grade to provide contact with and flushing of impacts trapped in soil above the water table. Infiltrated water will reach the ground water table and will be captured through the extraction system for subsequent treatment.

SVE

Localized SVE would also be implemented beneath the Whitney Chevrolet facility and the VFW/Charlie's Bar building. SVE would be implemented as described above.

Performance and Compliance Monitoring

Performance monitoring would be conducted to assess remedial progress and would consist of the following: monthly sampling and analysis of system influent and effluent; monthly measurement of recovered LNAPL; and quarterly ground water monitoring during active remediation. Quarterly ground water monitoring would include in-well measurements of LNAPL and collection of ground water samples for analysis of COCs.

Compliance monitoring would be conducted for indoor air, ground water, and soil as described for Alternatives 1 through 4.

10.0 EVALUATION OF REMEDIAL ALTERNATIVES

This section presents an evaluation and comparison of the proposed remedial alternatives for selecting the preferred cleanup action for the Site. In accordance with MTCA, the alternatives are evaluated relative to the criteria specified in WAC 173-340-360(3)(f) and WAC 173-340-360(4), which include the following:

- Protectiveness
- Permanence
- Effectiveness over the long term
- Management of short-term risks
- Technical and administrative implementability
- Consideration of public concerns
- Restoration time frame
- Cost

A summary of the evaluation of the proposed alternatives is provided in Table 6 and summarized in Sections 10.1 through 10.8 for each of the criteria. The overall evaluation is then used to determine the relative benefit of each alternative.

Based upon EPI's experience, best professional judgment, and the application of scientific principles, each alternative has been assigned a score for each criterion ranging from 5 (best) to 1 (worst); each score is based on the perceived benefit associated with the criterion and is included in Table 6. Several of the criteria are comprised of subcriteria. In such cases, each subcriterion is scored and the average of those scores is used as the criterion score. Alternatives deemed equally beneficial for a criterion or subcriterion are given the same score. The highest score is the preferred alternative for the non-cost criteria.

For the disproportionate cost analysis (DCA), the non-cost criteria are weighted based on using weighting factors established by Ecology and then summed. That summed score is then compared to the conceptual cost of each alternative. The results of the DCA are presented in Section 10.9.

10.1 Protectiveness

Protectiveness is defined in WAC 173-340-360(3)(f)(i) as:

Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.

All of the remedial alternatives are protective of human health and the environment. Each of the alternatives removes LNAPL and remediates soil and ground water beneath the Site, but at different time frames. Each of the alternatives also includes provisions for protection of the indoor air/vapor intrusion pathway. Potential for on-Site or off-Site risks during the cleanup process will vary depending on the remedial action. Alternatives 1 and 5 both include a higher degree of ground water extraction and, therefore, better hydraulic containment than the other alternatives, which would result in lower potential for off-Site migration of contaminants during remediation. Alternative 3 provides for air sparging and therefore enhances mass transport to the vapor phase and should be more protective in the long-term. Alternatives 4 and 5 include localized SVE but do not provide the same level of protectiveness of indoor air as the other alternatives. Overall, implementation of any of the alternatives will improve environmental quality at the Site, reduce risk, and attain cleanup standards. Alternative 3 received the highest score followed, in order, by Alternatives 1, 2, 4, and 5.

10.2 Permanence

Permanence is defined in WAC 173-340-360(3)(f)(ii) as:

The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases

and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and improvement of the overall environmental quality.

At the completion of remedial activities, all of the alternatives would result in a solution that is equally permanent. Permanence includes the subcriteria of reduction in toxicity, degree of irreversibility, and the type and character of the waste streams generated during treatment. While all of the technologies, if successfully implemented would be permanent, due to the nature of the technologies, the degree of certainty in the success of the technology varies. Alternative 3 received the highest score followed, in order, by Alternatives 1, 2 and 4 (tied), and Alternative 5.

10.3 Effectiveness Over the Long Term

Effectiveness over the long term is defined in WAC 173-340-360(3)(f)(iv) as:

Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.

All of the alternatives have the intent of meeting cleanup standards and protecting human health and the environment after completion of the remedial action. However, there are varying levels of uncertainty and reliability associated with each technology throughout the process. Long-term effectiveness includes the subcriteria of certainty, reliability, residual risk, and utilization of preferred remedies. Alternative 3 is most highly ranked based primarily upon a high degree of certainty and general reliability of the technology and associated equipment. Alternative 1 was ranked second followed by Alternatives 2 and 5 (tied) and Alternative 4.

10.4 Management of Short-Term Risks

Management of short-term risks is defined in WAC 173-340-360(3)(f)(v):

The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.

Each of the alternatives has manageable short-term risks and effective measures for mitigating those risks. Technologies such as AS and SVE are simple and robust with very little risk associated with system operation. Multi-phase extraction uses more componentry and has some risk of failure due to complexity. Technologies such as ISCO using ozone have physical hazards (corrosivity, explosion risk)

and extraction of contaminated ground water has the potential for system failure and leakage or spread of contamination. Based on these considerations Alternative 3 was ranked most highly followed, in order, by Alternatives 2, 1 and 4 and 5 (tied).

10.5 Technical and Administrative Implementability

Technical and administrative implementability is defined in WAC 173-340-360(3)(f)(vi):

Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.

This criterion includes the concepts of technical possibility, access, necessary resources, monitoring requirements and integration into existing facility features. The primary determining subcriterion is technical possibility.

Alternatives 2 and 3 are considered to be the most technically possible given their proven effectiveness at similar sites and in the area of downtown Montesano. The equipment necessary is relatively simple and robust and remedial systems are flexible in their modes of operation (i.e., flows, vacuum, operations cycles). Alternative 3 is somewhat more highly ranked because of the addition of AS and the likely higher mass removal rates associated with the combination of AS and SVE.

Issues of access, availability of resources, and integration into existing facility features are generally equal across the technologies with minor variation. Monitoring requirements do vary between the alternatives with Alternatives 4 and 5 having the highest monitoring requirements.

Alternative 3 received the highest score followed, in order, by Alternatives 2, 1, 4, and 5.

10.6 Consideration of Public Concerns

Consideration of public concerns is defined in WAC 173-340-360(3)(f)(vii):

Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.

The primary public concerns are assumed to be issues related to vapor control and vapor mitigation and issues of nuisance for the public and adjacent property owners during installation and operation of any remediation system. Alternatives with strong SVE components (Alternatives 1, 2, and 3) are likely to best address public concerns related to vapor intrusion. Alternatives with significant construction components (Alternative 5) are assumed to have the most impact to the public during implementation. Each of the alternatives will require significant drilling for well installation and trenching for piping.

Based on a subjective evaluation of likely and perceived public concerns Alternative 3 was ranked highest based on the aggressiveness of the remedial action followed by Alternatives 1 and 2 (tied), 4, and 5.

10.7 Restoration Time Frame

Restoration Time Frame (RTF) is evaluated using the following factors described in WAC 173-340-360(4)(b)(i through ix):

- *Potential risks posed by the site to human health and the environment*
- *Practicability of achieving a shorter restoration timeframe*
- *Current use of the site*
- *Potential future use of the site*
- *Availability of alternative water supplies*
- *Likely effectiveness and reliability of institutional controls*
- *Ability to monitor and control migration of hazardous substances from the site*
- *Toxicity of hazardous substances at the site*
- *Natural processes that reduce concentrations of hazardous substances at the site.*

Estimates of RTF are necessarily subjective. Each of the alternatives is assumed to provide a reasonable RTF, but actual estimates of system operation and effectiveness are premature without data regarding actual system effectiveness and the environmental response to the system.

RTF was ranked based upon the general aggressiveness of each of the technologies and perceived certainty associated with the technology. Alternative 3 is judged to be the most aggressive based on the combination of AS and SVE for addressing soil impacts within the smear zone and the use of LNAPL recovery, AS, and increasing dissolved oxygen content within the dissolved-phase plume. Alternatives 4 and 5 were judged to be the least aggressive since the technologies may be more difficult to manage and control and because they are based on natural rates of ground water migration which are typically relatively slow.

Based on these considerations, Alternative 3 was ranked highest, followed by Alternatives 1 and 2 (tied) and 4 and 5 (tied).

10.8 Cost

Cost is defined in WAC 173-340-360(3)(f)(iii) as:

The cost to implement the alternative, including the cost of construction, the net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long-term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.

Order-of-magnitude remediation costs (i.e., -30% to +50%) have been estimated for each of the remedial alternatives based on the descriptions and associated assumptions presented in Section 9, and without engineering design or contractor bidding. The order-of-magnitude remedial costs are based on typical costs for Washington State and the current knowledge of the Site. All costs are assumed to be for newly purchased equipment and not refurbished or used. Estimated capital costs are based on current dollar values. Estimated recurring costs and periodic costs associated with system operation and maintenance, performance and compliance monitoring, and site closure activities are adjusted to reflect the net present value. A discount rate of 7% was used to determine the net present value, based on federal guidance for developing feasibility study cost estimates (USACE/USEPA 2000). The following table summarizes these estimated costs, and a more detailed analysis of costs is provided in Tables 7 through 11. These costs are for comparison purposes only and actual implementation costs will vary from those provided below. These estimated costs incorporate a variety of necessary assumptions and the validity of those assumptions cannot be fully known at this time.

Remedial Alternatives Cost Summary

Remedial Alternative	Order-of-Magnitude Remediation Cost Estimate ^a
1. Multi-Phase Extraction and Ex-Situ Treatment	\$ 1,531,000
2. LNAPL Recovery and Soil Vapor Extraction	\$ 1,562,000
3. LNAPL Recovery and Air Sparging/Soil Vapor Extraction	\$ 1,672,000
4. LNAPL Recovery, ISCO and Localized SVE	\$ 1,976,000
5. GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE	\$ 1,987,000

^a Estimates include net present value (7% discount rate) of recurring and future costs.

10.9 Disproportionate Cost Analysis (DCA)

Under WAC 173-340-360(3)(e), a cleanup action shall not be considered practicable "if the incremental cost of the alternative over that of a lower cost alternative exceeds the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative". The determination of practicability is made using an analysis of benefit versus cost. The DCA can be performed quantitatively using the judged scoring of the non-cost criteria as the net benefit.

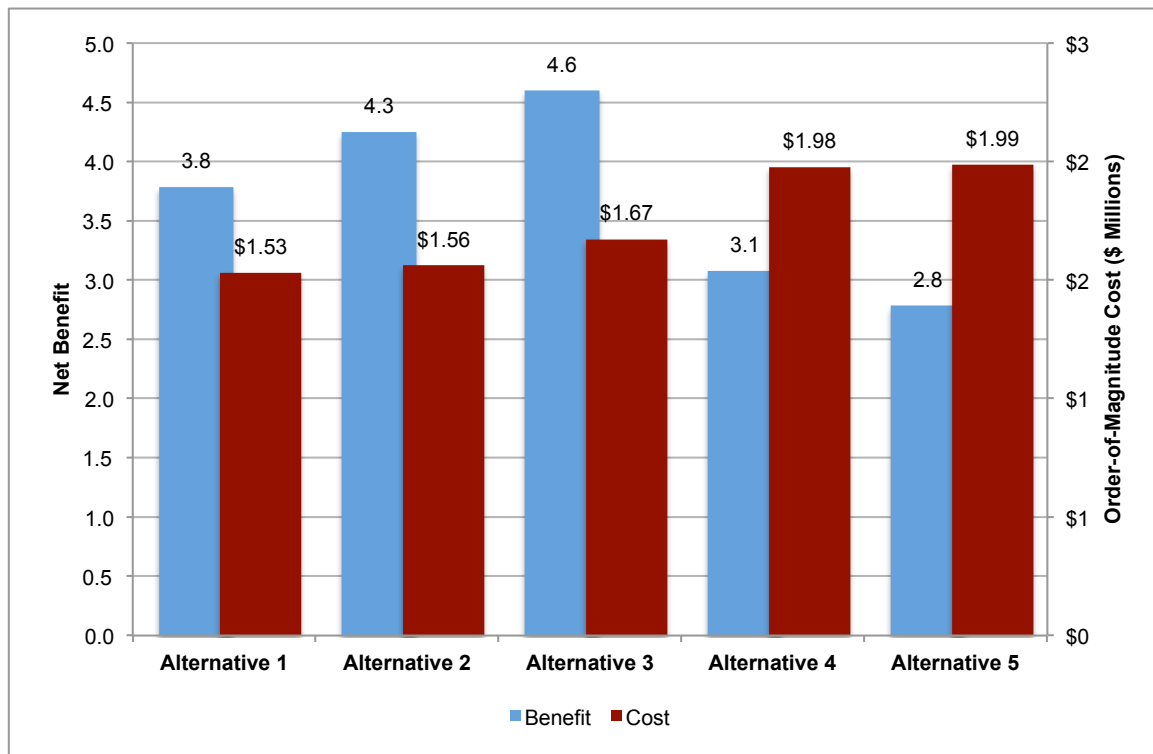
As previously discussed, each alternative was assigned a score for each of the non-cost evaluation criteria, with a score of 5 representing the highest overall perceived benefit and a score of 1 representing the lowest overall perceived benefit. The raw scores that were assigned in Table 6 are summarized below and are weighted for each criterion according to weighting factors established by Ecology, based on the DCA template provided by Ecology. The sum of the individual weighted scores for each alternative represents a value of the overall benefit of the alternative.

The charts below present the DCA using the estimated order-of-magnitude costs and quantitative net benefit values presented above.

Remedial Alternatives Scoring Summary

Criteria (Weighting Factor)	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Protectiveness (0.3)	4.0	1.2	3.5	1.1	4.7	1.4	3.0	0.9	2.8	0.9
Permanence (0.2)	4.3	0.9	5.0	1.0	5.0	1.0	4.3	0.9	3.7	0.7
Long-Term Effectiveness (0.2)	3.8	0.8	4.3	0.9	4.3	0.9	2.8	0.6	3.0	0.6
Short-Term Risk (0.1)	3.5	0.4	4.5	0.5	4.5	0.5	3.0	0.3	3.0	0.3
Implementability (0.1)	3.2	0.3	4.0	0.4	4.0	0.4	2.6	0.3	2.0	0.2
Public Concerns (0.1)	3.0	0.3	5.0	0.5	5.0	0.5	2.0	0.2	1.0	0.1
BENEFIT VALUE	3.8		4.3		4.6		3.1		2.8	

Cost-to-Benefit Analysis



11.0 RECOMMENDED REMEDIAL ALTERNATIVE

Based upon this FS, Alternative 3, LNAPL Recovery and AS/SVE, best meets the MTCA criteria for selection of a remedial action. This approach complies with applicable regulations, is protective of human health and the environment, is reasonably practicable and can be readily implemented at the Site. Based on the DCA, Alternative 3 also provides the best cost-to-benefit ratio of the available alternatives. Alternative 2 may also be applicable to the Site and provides only a marginally lower cost-to-benefit ratio. The addition of AS to Alternative 3 compared to Alternative 2 results in more aggressive treatment and therefore likely ultimately provides a shorter restoration time frame. For these reasons, Alternative 3 is recommended over Alternative 2.

The actual cost of implementation of these technologies is highly dependent upon the intrinsic soil properties at the Site such as vacuum permeability, radius of influence of AS and SVE, hydraulic permeability, and contaminant mass recovery rates. The cost of implementing either technology will depend upon these design factors. Field scale pilot testing would resolve these uncertainties and would allow for a more detailed understanding of the costs and logistics of implementing the technologies.

EPI recommends that, prior to development of the dCAP, a series of pilot tests be performed and evaluated. Based upon those pilot tests a 60 percent design for a remedial system can be prepared which evaluates practicability and includes an evaluation of such issues as vertical versus horizontal wells for AS/SVE, the use of recovery trenches for SVE within the Whitney Chevrolet facility and the types of vapor treatment technology to be used.

A component of that evaluation would also be discussion with adjacent property owners regarding access and an understanding of how different technologies will affect their properties. The requirements of the downgradient property owners also has a potential effect on the final recommended remedy and will help to inform the 60 percent design, which can then be incorporated into the dCAP.

12.0 LIMITATIONS

To the extent that preparation of this FS report has required the application of best professional judgment and the application of scientific principles, certain results of this work have been based on subjective interpretation. We make no warranties express or implied, including and without limitation, warranties as to merchantability or fitness for a particular purpose. The information provided in this FS report is not to be construed as legal advice.

This FS report has been prepared on behalf of Whitney's Chevrolet, Inc., Caldwell Family Holdings, LLC, and Wynoochee Lodge #43 F&AM of Washington, in ongoing fulfillment of the requirements of Agreed Order No. 2951.

13.0 REFERENCES

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Tables

Table 1
Depth to Water and Ground Water Elevation Data
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

Well ID	PVC Casing Elevation ^(a) (feet)	Date	Depth to Water ^(b) (feet)	LNAPL Thickness ^(c) (feet)	Water Table Elevation ^(d) (feet)
Monitoring Wells Associated With Whitney's Chevrolet Site					
WCMW-1	39.84	7/1/08	15.11	0.00	24.73
		12/14/09	14.13	0.00	25.71
		1/18/10	12.98	0.00	26.86
WCMW-1R	40.07	10/31/11	15.62	0.00	24.45
		1/31/12	13.23	0.00	26.84
		5/7/12	13.51	0.00	26.56
		8/20/12	15.48	0.00	24.59
WCMW-2	40.42	7/1/08	16.42	0.00	24.00
		12/14/09	15.42	0.00	25.00
		1/18/10	14.46	0.00	25.96
		10/31/11	16.78	0.10	23.72
		1/31/12	14.55	0.00	25.87
		5/7/12	14.79	0.00	25.63
		8/20/12	15.53	0.03	24.91
WCMW-3	39.93	7/1/08	16.26	0.00	23.67
		12/14/09	15.27	0.00	24.66
		1/18/10	14.36	0.00	25.57
		10/31/11	16.53	0.00	23.40
		1/31/12	14.47	0.00	25.46
		5/7/12	14.68	0.00	25.25
		8/20/12	16.34	0.00	23.59
WCMW-4	38.95	7/1/08	16.18	0.00	22.77
		12/14/09	15.62	0.00	23.33
		1/18/10	15.98	0.00	22.97
		10/31/11	16.08	0.00	22.87
		1/31/12	13.52	0.00	25.43
		5/7/12	13.96	0.00	24.99
		8/20/12	15.84	0.00	23.11
WCMW-5	37.73	7/1/08	15.18	0.00	22.55
		12/14/09	13.90	0.00	23.83
		1/18/10	13.01	0.00	24.72
		10/31/11	14.98	0.00	22.75
		1/31/12	12.98	0.00	24.75
		5/7/12	13.16	0.00	24.57
		8/20/12	14.93	0.00	22.80

Table 1
Depth to Water and Ground Water Elevation Data
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

Well ID	PVC Casing Elevation ^(a) (feet)	Date	Depth to Water ^(b) (feet)	LNAPL Thickness ^(c) (feet)	Water Table Elevation ^(d) (feet)
WCMW-6	38.80	7/1/08	15.73	0.00	23.07
		12/14/09	14.76	0.00	24.04
		1/18/10	13.88	0.00	24.92
		10/31/11	15.91	0.00	22.89
		1/31/12	13.94	0.00	24.86
		5/7/12	14.17	0.00	24.63
		8/20/12	15.85	0.00	22.95
WCMW-7	39.85	10/31/11	15.21	0.00	24.64
		1/31/12	12.83	0.00	27.02
		5/7/12	13.14	0.00	26.71
		8/20/12	15.93	0.00	23.92
WCMW-8	40.70	10/31/11	15.91	0.00	24.79
		1/31/12	13.51	0.00	27.19
		5/7/12	13.83	0.00	26.87
		8/20/12	15.77	0.00	24.93
WCMW-9	40.86	10/31/11	15.66	0.00	25.20
		1/31/12	13.17	0.00	27.69
		5/7/12	13.47	0.00	27.39
		8/20/12	15.37	0.00	25.49
WCMW-10	40.82	10/31/11	15.90	0.00	24.92
		1/31/12	14.35	0.00	26.47
		5/7/12	14.57	0.00	26.25
		8/20/12	15.72	0.00	25.10
KBMW-1	39.31	12/14/09	15.89	0.00	23.42
		1/18/10	14.76	0.00	24.55
		10/31/11	17.08	0.00	22.23
		1/31/12	15.03	0.00	24.28
		5/7/12	14.92	0.00	24.39
		8/20/12	16.93	0.00	22.38
KBMW-2	38.17	12/14/09	14.31	0.00	23.86
		1/18/10	13.45	0.00	24.72
		10/31/11	15.49	0.04	22.71
		2/2/12	13.56	0.00	24.61
		5/7/12	13.68	0.00	24.49
		8/20/12	15.45	0.21	22.89

Table 1
Depth to Water and Ground Water Elevation Data
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

Well ID	PVC Casing Elevation ^(a) (feet)	Date	Depth to Water ^(b) (feet)	LNAPL Thickness ^(c) (feet)	Water Table Elevation ^(d) (feet)
KBMW-3	37.21	12/14/09	14.53	0.00	22.68
		1/18/10	13.93	0.00	23.28
		10/31/11	15.61	0.00	21.60
		1/31/12	13.91	0.00	23.30
		5/7/12	14.02	0.00	23.19
		8/20/12	15.28	0.00	21.93
KBMW-4	36.76	12/14/09	15.09	0.00	21.67
		1/18/10	14.53	0.00	22.23
		10/31/11	15.72	Sheen	21.04
		1/31/12	13.73	0.00	23.03
		5/7/12	13.79	0.00	22.97
		8/20/12	15.08	0.00	21.68
KBMW-5	37.81	12/14/09	15.97	0.00	21.84
		1/18/10	15.42	0.00	22.39
		10/31/11	16.79	0.00	21.02
		1/31/12	15.42	0.00	22.39
		5/7/12	15.61	0.00	22.20
		8/20/12	16.68	0.00	21.13
KBMW-6	40.15	12/14/09	16.73	0.00	23.42
		1/18/10	16.17	0.00	23.98
		10/31/11	17.50	0.00	22.65
		1/31/12	16.23	0.00	23.92
		5/7/12	16.38	0.00	23.77
		8/20/12	17.43	0.00	22.72
KBMW-7	36.17	12/14/09	13.28	0.00	22.89
		1/18/10	12.53	0.00	23.64
		10/31/11	15.21	0.00	20.96
		1/31/12	12.42	0.00	23.75
		5/7/12	12.62	0.00	23.55
		8/20/12	14.08	0.00	22.09
KBMW-8	35.81	12/14/09	13.98	0.00	21.83
		1/18/10	13.39	0.00	22.42
		10/31/11	16.78	0.00	19.03
		1/31/12	13.44	0.00	22.37
		5/7/12	13.60	0.00	22.21
		8/20/12	14.75	0.00	21.06

Table 1
Depth to Water and Ground Water Elevation Data
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

Well ID	PVC Casing Elevation ^(a) (feet)	Date	Depth to Water ^(b) (feet)	LNAPL Thickness ^(c) (feet)	Water Table Elevation ^(d) (feet)
KBMW-9	35.84	12/14/09	14.38	0.00	21.46
		1/18/10	13.82	0.00	22.02
		11/1/11	15.60	0.55	20.68
		2/1/12	14.06	0.21	21.95
		5/8/12	14.22	0.23	21.80
		8/21/12	15.68	0.69	20.71
KBMW-10	34.96	12/14/09	13.55	0.00	21.41
		1/18/10	13.00	0.00	21.96
		11/1/11	14.34	0.00	20.62
		2/1/12	12.13	0.00	22.83
		5/8/12	13.27	0.00	21.69
		8/21/12	14.33	0.00	20.63
KBMW-11	35.01	10/31/11	14.72	0.00	20.29
		11/31/12	13.46	0.00	21.55
		5/7/12	13.65	0.00	21.36
		8/20/12	14.70	0.00	20.31
KBMW-12	34.16	10/31/11	13.94	0.00	20.22
		2/1/12	12.73	0.00	21.43
		5/7/12	12.88	0.00	21.28
		8/20/12	13.94	0.00	20.22
ESMW-1	40.82	12/14/09	15.03	0.00	25.79
		1/18/10	13.96	0.00	26.86
		10/31/11	16.30	0.00	24.52
		1/31/12	13.94	0.00	26.88
		5/7/12	14.22	0.00	26.60
		8/20/12	16.10	0.00	24.72
ESMW-7	35.59	12/14/09	14.07	0.00	21.52
		1/18/10	13.54	0.00	22.05
		10/31/11	14.86	0.00	20.73
		1/31/12	13.63	0.00	21.96
		5/7/12	13.77	0.00	21.82
		8/20/12	14.85	0.00	20.74
Monitoring Wells Associated With Tony's Short Stop Site (315 South Main Street, Montesano, WA)					
TSSMW-1	32.33	1/18/10	10.62	0.00	21.71
TSSMW-2	31.94	1/18/10	10.56	0.00	21.38
TSSMW-3	32.87	1/18/10	11.40	0.00	21.47
TSSMW-4	31.07	1/18/10	--	0.08	--
TSSMW-5	32.63	1/18/10	11.16	0.00	21.47
TSSMW-6	33.97	1/18/10	12.31	0.00	21.66

Table 1
Depth to Water and Ground Water Elevation Data
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

Well ID	PVC Casing Elevation ^(a) (feet)	Date	Depth to Water ^(b) (feet)	LNAPL Thickness ^(c) (feet)	Water Table Elevation ^(d) (feet)
TSSMW-7	35.04	1/18/10	13.23	0.00	21.81
		10/31/11	15.57	0.00	18.40
		2/1/12	13.34	0.00	21.70
		5/7/12	13.45	0.00	21.59
		8/20/12	14.50	0.00	20.54
TSSMW-8	34.52	1/18/10	13.02	0.00	21.50
		10/31/11	14.31	0.00	20.21
		2/1/12	13.07	0.00	21.45
		5/7/12	13.22	0.00	21.30
		8/20/12	14.29	0.00	20.23
TSSMW-9	35.36	1/18/10	13.38	0.00	21.98
		11/1/11	14.75	0.00	20.61
		2/1/12	13.54	0.00	21.82
		5/7/12	13.66	0.00	21.70
		8/21/12	14.72	0.00	20.64
TSSMW-10	--	1/18/10	--	--	--
TSSMW-11	30.03	1/18/10	9.07	0.00	20.96
TSSMW-12	32.98	1/18/10	11.55	0.00	21.43
		10/31/11	13.94	0.00	19.04
		2/1/12	11.61	0.00	21.37
		5/7/12	11.78	0.00	21.20
		8/20/12	12.81	0.00	20.17
TSSMW-13	34.80	1/18/10	13.34	0.00	21.46

Notes:

(a) Top of casing elevation measurement collected from the north side of the well casing.

Survey of WCMW-1 through WCMW-6 completed July 3, 2008 by Duane Hartman & Associates (DHA).

Survey of KBMW-1 through KBMW-10, ESMW-1 and ESMW-7 completed December 14, 2009 by DHA.

Survey of TSSMW-1 through TSSMW-13 completed January 18, 2010 by DHA.

Survey of WCMW-1R, WCMW-7 through WCMW-10, KBMW-11, and KBMW-12 completed on November 14, 2011 by DHA.

TSSMW-10 was not accessible at the time of the survey. Therefore, vertical data was not obtained.

Coordinate System and Zone: Washington State Plane, North Zone coordinates

Horizontal Datum: NAD 83(91) US feet (horizontal accuracy: 0.1'); Vertical Datum: NAVD'88 (vertical accuracy 0.01')

(b) Depth to ground water measured from top of well casing.

(c) Light Non-Aqueous Phase Liquid (LNAPL) thickness = [Depth to LNAPL] - [Depth to Water]; measured from top of well casing using an electronic oil-water interface probe.

(d) Water table elevations adjusted for the presence of LNAPL using the following formula and assumed LNAPL specific gravity of 0.8:

$$[\text{Water Table Elevation}] = [\text{PVC Casing Elevation}] - [\text{Depth to Water}] + [\text{LNAPL Thickness} \times 0.80]$$

"--" = not recorded

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
Monitoring Wells Associated With Whitney's Chevrolet Site								
WCMW-1	12/13/09	9,600	7.9	84.4	58.6	816	121	24.6
	1/19/10 and/Dup3	5,040/4,910	98.3/117	125/98.5	134/120	900/1,330	70.5/87.7	34.1/35
WCMW-1R	11/02/11	750	<1.0	1.2	2.6	30.2	6.3	1.5
	1/31/12	4,740	2.8	23.8	51.7	508	130	16
	5/7/2012 and/WC-Dup1	6,200/5,770	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	31.2/25.1	125	20.6/14.7
	8/20/12	267	<1.0	<1.0	<1.0	31.2	<5.0	6.8
WCMW-2	12/12/09	52,000	1,020	4,350	1,970	10,000	322	23.7
	1/19/10	41,400	2,490	14,700	6,490	29,500	340	41.9
	10/31/11	LNAPL - 0.10 foot (1.2 inches)						
	2/01/12	43,600	584	1,100	1,100	2,700	364	21.8
	5/8/12	49,600	454	2,290	1,140	4,630	1,170	17.7
	8/20/12	LNAPL - 0.03 foot (0.36 inch)						
WCMW-3	12/12/09	41,000	575	2,190	118	6,450	171	27.1
	1/19/10	26,300	2,370	11,000	4,710	23,400	554	25.5
	11/02/11	37,800	394	2,980	1,760	8,810	534	14.9
	2/02/12	38,600	473	694	941	1,590	749	14.2
	5/9/12	52,500	709	2,950	1,350	6,030	1,280	11.0
	8/22/12	68,900	630	3,660	1,690	8,430	795	14.4
WCMW-4	12/13/09	26,000	115	2,040	266	5,460	12.6	24
	1/19/10	16,900	167	3,330	1,660	8,150	324	27.5
	11/01/11	7,950	13.1	236	385	1,730	192	21.1
	2/01/12	683	<1.0	<1.0	<1.0	32	30.6	<1.0
	5/8/12 and/WC-Dup2	<100/<100	<1.0/<1.0	<1.0/<1.0	1.1<1.0	<2.0/<2.0	<5.0/<5.0	1.4/1.4
	8/21/12	10,100	50.6	453	132	2,030	221	50.7

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
WCMW-5	12/13/09	7,900	267	274	39.7	1,440	57.3	13.7
	1/19/10	6,890	593	1,290	1,070	4,960	174	14.4
	11/01/11	4,350	51.4	176	278	830	77.7	4.7
	2/01/12	4,280	71.1	192	223	801	137	3.1
	5/8/12	9,050	140	125	93.6	1,060	376	3.3
	8/22/12	8,000	164	307	93.6	1,690	232	4.9
WCMW-6	12/13/09	<100	<1	<1	<1	<2	<5.0	4.7
	1/19/10 and/Dup2	<100/<100	<1/<1	<1/<1	<1/<1	<2/<2	<5.0/<5.0	3.5/4
	10/31/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	1/31/12 and WC-Dup1	<100/<100	<1/<1	<1/<1	<1/<1	<2/<2	<5.0/<5.0	1.1/<1.0
	5/7/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/20/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.2
WCMW-7	10/31/11 and/WC-Dup1	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0	1.3/<1.0
	1/31/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	2.8
	5/7/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.2
	8/20/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.2
WCMW-8	10/31/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	2.1
	1/31/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	5.3
	5/7/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.8
	8/20/12/and WC- Dup1	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	6.6/6.1
WCMW-9	10/31/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.5
	1/31/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	5/7/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/20/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
WCMW-10	10/31/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	1/31/12	1,230	<1.0	<1.0	2.3	<2.0	43.0	<1.0
	5/7/12	2,060	<1.0	<1.0	<1.0	<2.0	28.8	<1.0
	8/20/12	2,690	<1.0	<1.0	<1.0	<2.0	37.4	<1.0
KBMW-1	12/13/09	<100	<1	<1	<1	<2	<5.0	9.3
	1/18/10	<100	9.8	<1	<1	<2	<5.0	9.8
	11/01/11	<100	<1.0	<1	<1.0	<2	<5.0	<1.0
	2/02/12	211	<1.0	<1.0	<1.0	<2.0	<5.0	3.3
	5/9/12	236	1.7	<1.0	<1.0	<2.0	<5.0	6.3
	8/22/12 and WC-Dup3	245/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	<1.0/<1.0
KBMW-2	12/13/09	38,000	553	5,750	<1	8,110	228	9.2
	1/18/10	27,500	709	8,310	2,200	10,300	282	<1
	10/31/11	LNAPL - 0.04 foot (0.48 inch)						
	2/02/12	38,300	190	2,170	864	3,280	302	<1.0
	5/9/12	43,600	261	2,790	714	3,430	582	<1.0
	8/20/12	LNAPL - 0.21 foot (2.52 inches)						
KBMW-3	12/13/09	200	10	3.5	<1	3.8	<5.0	<1
	1/18/10	160	10.9	9.1	<1	4.2	5.3	<1
	11/02/11	657	6.3	1.2	12.3	15.2	12.9	<1.0
	2/02/12	191	4.3	<1.0	<1.0	<2.0	<5.0	<1.0
	5/9/12	346	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/22/12	787	7.1	3.1	14.7	55.7	14.8	<1.0
KBMW-4	12/13/09	24,000	279	431	1,390	4,340	195	4.2
	1/19/10	25,400	565	1,140	1,800	6,300	200	<1
	10/31/11	LNAPL - sheen						
	2/01/12	8,960	16	7.6	116	276	62.3	<1.0
	5/8/12	22,600	71.8	46.5	565	1,250	517	<1.0
	8/21/12	20,600	69.2	67	598	1,270	298	<1.0

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
KBMW-5	12/13/09	<100	<1	<1	<1	<2	<5.0	<1
	1/18/10	<100	<1	<1	<1	<2	<5.0	<1
	11/02/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	2/02/12	<100	<1.0	<1.0	<1.0	<2.0	6.1	<1.0
	5/9/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/22/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
KBMW-6	12/13/09	<100	<1	<1	<1	<2	<5.0	<1
	1/18/10	<100	<1	<1	<1	<2	<5.0	<1
	11/02/11 and/WC-Dup3	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	<1.0/<1.0
	2/02/12 and/WC-Dup3	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	<1.0/<1.0
	5/9/12 and/WC-Dup3	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	<1.0/<1.0
	8/21/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
KBMW-7	12/13/09	800	11.6	4.1	<1	13.1	16	9.1
	1/19/10	1,090	8.5	13	146	352	39.5	6.8
	11/01/11	1,090	20.6	20.3	98.6	287	84.7	4.7
	1/31/12	1,460	4.2	1.4	31.6	114	43.6	2
	5/7/12	1,170	1.7	1.7	2.3	42.4	11.0	<1.0
	8/21/12	1,750	14.7	6.1	<1.0	92.6	21.3	1.4
KBMW-8	12/13/09 and/Dup2	2,700/4,000	54.4/64.5	8.9/20.8	<1/6.8	147/262	<5.0/<5.0	4.5/3.7
	1/19/10	223	21.8	48.4	19.5	76.2	38.7	3.9
	11/01/11	1,990	19.9	5.0	108	66.3	45.4	<1.0
	2/01/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/21/12	209	3.4	<1.0	6.7	<2.0	<5.0	<1.0

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
KBMW-9	12/14/09	37,000	516	3,850	1,900	9,100	479	1.8
	1/18/10	24,900	778	6,290	3,760	17,000	370	2
	11/01/11	LNAPL - 0.55 foot (6.6 inches)						
	2/01/12	LNAPL - 0.21 foot (2.52 inches)						
	5/8/12	LNAPL - 0.23 foot (2.76 inches)						
	8/21/12	LNAPL - 0.69 foot (8.28 inches)						
KBMW-10	12/14/09	<100	<1	<1	<1	<2	<5.0	5.9
	1/18/10	<100	<1	<1	<1	<2	<5.0	4.2
	11/01/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	2.4
	2/01/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	2.5
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.6
	8/21/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	1.7
KBMW-11	11/01/11	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	2/01/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/21/12	<100	2.0	<1.0	<1.0	<2.0	<5.0	<1.0
KBMW-12	11/01/11	49,000	1,470	3,780	2,290	9,210	376	<1.0
	2/01/12	51,600	4,440	12,600	2,330	10,500	212	<1.0
	5/8/12	83,000	2,090	8,370	3,000	11,100	310	<1.0
	8/21/12	68,400	932	5,500	2,010	8,130	297	<1.0
ESMW-1	12/13/09 and/Dup1	800/650	11.3/8.8	8.2/<1	1.1/<1	29.6/12.1	<5.0/<5.0	<1/<1
	1/19/10 and/Dup1	658/695	10.9/10.9	10.2/10.4	3.5/3.2	32.2/29.5	28.2/29.1	<1/<1
	10/31/11	1,300	6.2	4.3	28.2	37.1	12.4	<1.0
	1/31/12	2,060	7.5	6.3	46.2	47.5	57.6	<1.0
	5/7/12	4,180	5.8	4.2	38.7	13.5	20.4	<1.0
	8/20/12	1,430	2.0	<1.0	2.1	7.4	<5.0	<1.0

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
ESMW-7	12/13/09	3,600	76.5	30.2	5.1	680	<5.0	6.4
	1/19/10	1,990	127	39.5	292	649	32.1	<1
	11/01/12	5,800	135	31.4	520	645	133	<1.0
	2/01/12 and/WC-Dup2	1,180/804	56.6/29.1	7.7/3.9	91/20.1	127/67.4	38.9	<1.0/<1.0
	5/8/12	5,350	94.8	41.8	207	427	106	<1.0
	8/21/12/ and WC- Dup2	10,200/16,000	312/349	45.1/46.7	612/789	1,400/1,700	409/420	<1.0/<1.0
Monitoring Wells Associated With Tony's Short Stop Site (315 South Main Street, Montesano, WA)								
TSSMW-2	1/18/10	92,100	22,300	66,700	10,700	47,600	99	<4
TSSMW-4	1/18/10	LNAPL - 0.8 foot (0.96 inch)						
TSSMW-5	1/18/10	<100	<1	<1	<1	<2	<5	<1
TSSMW-6	1/18/10	<100	<1	<1	<1	<2	<5	4.4
TSSMW-7	1/18/10	107	2.3	<1	1.4	17	<5	2
	11/01/11	315	4.1	<1.0	3.2	3.3	14.2	1.2
	2/01/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/21/12	557	<1.0	<1.0	<1.0	45.7	12.7	1.0
TSSMW-8	1/18/10	125	1.4	<1	9.3	<2	<5	<1
	11/01/11	150	4.9	<1.0	2.1	<2.0	<5.0	<1.0
	2/01/12	<100	1.0	<1.0	<1.0	<2.0	5.5	<1.0
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/21/12	<100	2.6	<1.0	<1.0	<2.0	<5.0	<1.0
TSSMW-9	1/18/10	1,700	173	82	97.5	1,190	96.9	<1
	11/01/11	1,310	69.8	45.4	244	616	116	<1.0
	2/01/12	1,130	25	8.7	34.2	173	27.3	<1.0
	5/8/12	930	11.9	2.7	7.4	43.2	40.7	<1.0
	8/21/12	7,000	59.3	22.7	91.9	306	65.1	<1.0

Table 2
Summary of Ground Water Analytical Data (µg/L)
Whitney's Chevrolet
123 Pioneer Ave.
Montesano, Washington

WELL ID.	Date Collected	GRPH ^(a)	Benzene ^(b)	Toluene ^(b)	Ethylbenzene ^(b)	Total Xylenes ^(b)	Naphthalene ^(b)	PCE ^(b)
TSSMW-12	11/01/11 and/WC-Dup2	<100/<100	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<5.0/<5.0	<1.0/<1.0
	2/01/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	5/8/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
	8/21/12	<100	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0
MTCA Method A Ground Water Cleanup Level		800 / 1,000^(c)	5	1,000	700	1,000	160	5

Notes:

µg/L = micrograms per liter

GRPH - Gasoline-range petroleum hydrocarbons

PCE - Tetrachlorethene

LNAPL- Light non-aqueous phase liquid

MTCA - Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, October 12, 2007

"<" indicates the analyte was not detected at the laboratory method reporting limit shown

Bold indicates the analyte was detected above the compound-specific laboratory detection limit**Bold and Shaded** indicates the detected concentration exceeds the MTCA Method A Ground Water Cleanup Level

(a) Analyzed using Ecology Method NWTPH-Gx

(b) Analyzed using EPA Method 8260B

(c) Ground water cleanup level for GRPH is 800 µg/L when benzene is present in the sample; 1,000 µg/L when benzene is not detected.

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
Initial Remedial Investigation Soil Samples										
DPT-5	4	4/23/08	43	NA	0.15	1.5	0.76	4.2	0.16	NA
	12	4/23/08	16,000	190	6.6	110	42.0	240	29.0	<1.0
	14.5	4/23/08	200	<71	5.7	18.0	4.6	23.1	2.3	<0.12
DPT-6	12	4/23/08	<28	210	<0.00075	<0.0037	<0.00075	<0.00225	2.1	0.0011
	16	4/23/08	<4.5	<61	0.056	0.21	0.13	0.41	0.11	<0.00065
DPT-7	8	4/22/08	<7.2	<72	0.027	0.13	0.025	0.101	0.0037	0.0015
	14	4/22/08	250	730	<0.093*	<0.46	3.0	13.3	4.5	<0.093
DPT-8	14	4/23/08	<4.3	<57	0.014	0.023	0.0096	0.035	0.0091	<0.00072
DPT-9	13	4/22/08	64	2,500	<0.053*	<0.26	0.33	1.43	0.47	<0.053
DPT-10	10	4/22/08	<8.9	7,100	<0.0010	<0.0052	0.0025	0.1099	0.02	0.0025
	14.5	4/22/08	<4.3	<54	0.0041	0.0088	0.011	0.079	0.0099	<0.00071
DPT-11	10	4/22/08	<10.0	9,500	<0.0015	<0.0074	<0.0015	<0.0045	<0.0015	<0.0015
	14.5	4/22/08	<5.2	<63	<0.0025	<0.013	<0.0025	<0.0075	<0.0025	<0.0025
DPT-12	7	4/22/08	<8.1	<82	<0.0011	<0.0056	<0.0011	<0.0033	<0.0011	<0.0011
	15	4/22/08	<4.8	<64	0.028	<0.0032	0.0056	0.0046	0.012	0.0047
DPT-13	4	4/23/08	NA	<76	NA	NA	NA	NA	NA	NA
	9	4/23/08	<7.0	7,300	<0.00085	<0.0043	<0.00085	<0.00255	<0.00085	<0.00085
	13	4/23/08	<3.3	<54	<0.00060	<0.0030	<0.00060	<0.0018	<0.0006	<0.00060
DPT-14	3	4/21/08	<7.3	<77	<0.0031	<0.015	<0.0031	<0.0093	<0.0031	<0.0031
	10	4/21/08	<5.4	<69	<0.00071	<0.0036	<0.00071	<0.00211	<0.00071	<0.00071
DPT-15	3.5	4/21/08	<7.0	<75	<0.00090	<0.0045	<0.00090	<0.0027	<0.00090	<0.00090
	9	4/21/08	<6.2	<72	<0.00075	<0.0038	<0.00075	<0.00225	<0.00075	<0.00075
DPT-16	3.5	4/21/08	<6.8	<74	<0.0029	<0.015	<0.0029	<0.0088	<0.0029	<0.0029
	8.5	4/21/08	<5.3	<68	<0.00069	<0.0035	<0.00069	<0.00209	<0.00069	<0.00069

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
DPT-17	6.5	4/21/08	<6.6	<75	<0.00088	<0.0044	<0.00088	<0.00268	<0.00088	<0.00088
	12.5	4/21/08	<4.3	<58	<0.00077	<0.0038	<0.00077	<0.00227	<0.00077	<0.00077
DPT-18	7	4/21/08	<6.8	<76	<0.00085	<0.0042	<0.00085	<0.00255	<0.00085	<0.00085
	14	4/21/08	<3.8	<57	<0.00065	<0.0032	<0.00065	<0.00195	<0.00065	<0.00065
DPT-19	5	4/23/08	<7.5	<83	<0.0012	<0.0060	<0.0012	<0.0036	0.002	<0.0012
	14	4/23/08	<5.2	<65	<0.00069	<0.0034	<0.00069	<0.00209	<0.00069	<0.00069
DPT-20	11	4/24/08	<5.7	<34	<0.02	<0.0038	<0.00077	<0.00227	<0.00069	<0.00069
	15	4/24/08	<5.9	<68	<0.02	<0.0038	<0.00077	<0.00227	<0.00077	0.00085
DPT-21	9	4/24/08	<6.7	<76	<0.00081	<0.0041	<0.00081	<0.00241	<0.00081	<0.00081
	14	4/24/08	<6.2	<71	<0.00076	<0.0038	<0.00076	<0.00226	<0.00076	<0.00076
Supplemental RI Soil Samples										
DPT-22	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-23	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-24	4	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	8	11/14/09	<20	<100	0.06	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-25	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-26	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-27	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
DPT-28	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
DPT-29	8	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-30	8	11/15/09	<20	<100	<0.028	0.079	<0.04	<0.08	NA	NA
	12	11/15/09	<20	<100	<0.028	0.11	0.083	0.24	0.18	NA
	15	11/15/09	<20	<100	<0.028	0.12	0.07	0.28	0.32	NA
DPT-31	8	11/15/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/15/09	<20	<100	0.12	0.099	0.25	0.33	0.28	NA
	15	11/15/09	<20	<100	<0.028	0.12	<0.04	<0.08	0.35	NA
DPT-32	8	11/14/09	<20	<100	<0.028	<0.04	0.06	<0.08	NA	NA
	12	11/14/09	<20	<100	0.074	<0.04	<0.04	<0.08	<0.05	NA
	15	11/14/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-33	4	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	8	11/13/09	<20	<100	0.92	0.067	<0.04	0.16	<0.05	NA
	12	11/13/09	<20	<100	0.17	<0.04	0.074	0.18	0.05	NA
	15	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-34	8	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
DPT-35	8	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
DPT-36	8	11/15/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/15/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-37	8	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/12/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
DPT-38	8	11/15/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/15/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-44	8	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
DPT-45	8	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
DPT-46	8	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-47	8	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
DPT-48	8	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
	12	11/13/09	<20	<100	<0.028	<0.04	<0.04	<0.08	NA	NA
Monitoring Well Installations - Soil Samples										
WCMW-1R	16.5	10/24/11	344	NA	0.93	0.26	0.97	5.65	NA	0.18
	20	10/24/11	<10	NA	<0.02	0.05	<0.03	0.20	NA	<0.02
WCMW-2	7	5/27/08	<15.0	2,600	0.0095	0.015	0.017	0.086	0.0460	0.0047
	15	5/27/08	<10.0	<63	0.19	1.4	2.2	8.4	2.0	<0.051
WCMW-3	6	5/28/08	<6.4	<69	<0.00088	<0.0044	0.0017	0.0087	<0.00088	<0.00088
	15	5/28/08	<4.6	<60	0.023	0.016	0.012	0.065	0.0310	<0.00072
WCMW-4	5.5	6/30/08	<5.8	<67	<0.00081	<0.0041	<0.00081	<0.00162	<0.00081	<0.00081
	14.5	6/30/08	<4.1	<55	0.0014	0.0071	0.0029	<0.0149	0.0017	<0.00075
WCMW-5	5	6/30/08	<8.3	<76	<0.00093	<0.0047	<0.00093	<0.00283	<0.00093	<0.00093
	14.5	6/30/08	<8.9	<57	0.0018	<0.0037	0.0038	0.0094	0.0062	<0.00073

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
WCMW-6	6	5/28/08	<7.8	<78	<0.0011	<0.0054	0.0017	0.0087	<0.0011	<0.0011
	11.5	5/28/08	<5.5	<67	<0.00080	<0.0040	<0.00080	0.0041	<0.00080	<0.00080
WCMW-7	9	10/25/11	195	NA	<0.02	0.041	<0.03	0.11	NA	<0.02
	14	10/25/11	<10	NA	<0.02	<0.02	<0.03	0.11	NA	<0.02
WCMW-8	9	10/24/11	300	NA	0.052	0.17	0.052	0.26	NA	<0.02
	14	10/24/11	<10	NA	<0.02	0.084	0.032	0.15	NA	<0.02
WCMW-9	9	10/26/11	<10	NA	<0.02	<0.02	<0.03	<0.03	NA	<0.02
	14	10/26/11	14	NA	<0.02	<0.02	0.06	0.25	NA	<0.02
WCMW-10	9	10/26/11	36	NA	0.059	0.40	1.85	7.74	NA	<0.02
	14	10/26/11	11	NA	<0.02	<0.02	0.10	0.60	NA	<0.02
KBMW-4	5	12/11/09	<20	<100	NA	NA	NA	NA	NA	NA
	13	12/11/09	NA	NA	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	14.5	12/11/09	NA	NA	<0.028	<0.04	<0.04	<0.08	<0.05	NA
KBMW-6	10	12/10/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	15	12/10/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
KBMW-9	5	12/11/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	10	12/11/09	<20	<100	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	13	12/11/09	36	NA	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	14.5	12/11/09	NA	NA	<0.028	0.16	0.78	4.17	0.41	NA
KBMW-10	10	12/11/09	NA	NA	<0.028	<0.04	<0.04	<0.08	<0.05	NA
	13	12/11/09	NA	NA	<0.028	<0.04	<0.04	<0.08	<0.05	NA
KBMW-11	9	10/25/11	<10	NA	<0.02	<0.02	<0.03	<0.03	NA	<0.02
	14	10/25/11	<10	NA	<0.02	<0.02	<0.03	<0.03	NA	<0.02
KBMW-12	10	10/25/11	4,220	NA	8.58	488	284	1,320	NA	<0.02
	15	10/25/11	3,400	NA	1.75	13.6	96.8	331	NA	<0.02

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
Interim Action Work Area 1 - Final Performance Samples										
WA1-SW1	9	9/12/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-SW2	14	9/12/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA1-SW3	5	9/12/11	23	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-SW4	10	9/13/11	<10	<40	<0.02	<0.15	<0.10	<0.15	NA	<0.02
WA1-SW5	14	9/13/11	<10	<40	<0.02	<0.15	<0.10	<0.15	NA	NA
WA1-SW8	5	9/13/11	11	<40	<0.02	<0.15	<0.10	<0.15	NA	NA
WA1-SW10	12	9/13/11	395	<40	<0.02	<0.15	0.18	0.64	NA	<0.02
WA1-SW11	12	9/13/11	<10	<40	<0.02	<0.15	<0.10	<0.15	NA	NA
WA1-SW12	5	9/13/11	<10	<40	<0.02	<0.15	<0.10	<0.15	NA	NA
WA1-SW13	10	9/13/11	1,350	<40	<0.02	<0.15	0.51	1.40	NA	0.029
WA1-SW14	14	9/14/11	951	<40	0.5	2.8	3.9	22	NA	NA
WA1-SW15	5	9/14/11	27	<40	<0.02	0.11	<0.10	0.20	NA	NA
WA1-SW17	10	9/19/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-SW18	12	9/19/11	1,450	<40	<0.02	0.17	0.8	4.9	NA	NA
WA1-SW19	14	9/19/11	230	<40	0.028	0.19	0.82	3.9	NA	<0.02
WA1-SW20	6	9/19/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA1-SW21	11	9/20/11	2,750	<40	<0.02	0.17	8.5	27.2	NA	NA
WA1-SW22	12	9/22/11	292	<40	0.044	0.44	0.71	3.91	NA	<0.02
WA1-SW23	10	9/22/11	18	<40	<0.02	<0.03	0.11	0.60	NA	NA
WA1-SW28	11	9/22/11	250	<40	<0.02	<0.03	0.12	0.91	NA	<0.02
WA1-SW29	11	9/22/11	790	<40	<0.02	0.4	2.7	12.6	NA	NA
WA1-SW31	5	9/23/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA1-SW38	14	9/27/11	<10	NA	0.02	0.12	0.098	0.58	NA	<0.02

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
WA1-SW39	12	9/27/11	28	NA	0.026	0.31	0.35	1.9	NA	<0.02
WA1-SW40	10	9/27/11	628	NA	<0.02	0.08	2	10	NA	NA
WA1-SW41	5	9/27/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-SW42	13	9/28/11	<10	NA	0.026	<0.03	0.17	1.1	NA	<0.02
WA1-SW43	11	9/28/11	14	NA	<0.02	<0.03	0.44	3	NA	<0.02
WA1-SW46	11	9/28/11	14	<40	<0.02	0.5	0.23	1.3	NA	<0.02
WA1-SW47	5	9/28/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-B1	16	9/12/11	12,500	<40	0.93	8.76	101	540	NA	NA
WA1-B2	16	9/12/11	11,900	<40	0.84	24.2	8.8	84.4	NA	0.53
WA1-B3	16	9/12/11	11,420	<40	0.26	3.54	11.6	57.7	NA	NA
WA1-B4	16	9/12/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA1-B5	16	9/13/11	6,220	<40	<0.02	<0.15	0.24	0.74	NA	NA
WA1-B6	16	9/13/11	25,000	<40	0.15	0.62	4.27	16.5	NA	NA
WA1-B7	16	9/14/11	6,300	<40	0.10	0.62	1.53	5.1	NA	NA
WA1-B8	16	9/19/11	8,130	<40	0.25	26.7	76.6	335	NA	NA
WA1-B9	16	9/19/11	1,110	<40	<0.02	0.28	1.18	10.6	NA	0.14
WA1-B10	16	9/20/11	1,640	<40	<0.02	<0.03	0.62	2.4	NA	NA
WA1-B11	16	9/22/11	1,950	<40	<0.02	0.16	1.5	7.6	NA	0.34
WA1-B12	16	9/22/11	936	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA1-B13	16	9/22/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-B14	16	9/27/11	<10	NA	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-B15	16	9/27/11	18	<40	<0.02	<0.03	0.06	0.32	NA	<0.02
WA1-B16	16	9/28/11	<10	NA	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA1-B17	16	9/28/11	<10	NA	<0.02	<0.03	<0.03	<0.03	NA	<0.02

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
Interim Action Work Area 2 - Final Performance Samples										
WA2-SW1	4	10/4/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	NA
WA2-SW2	9	10/4/11	<10	<40	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02
WA2-SW3	10	10/4/11	10	<40	<0.02	<0.03	<0.03	0.25	<0.03	<0.02
WA2-SW4	9	10/4/11	<10	<40	<0.02	<0.03	<0.03	<0.03	<0.03	NA
WA2-SW5	9	10/4/11	<10	<40	<0.02	<0.03	<0.03	<0.03	<0.03	NA
WA2-B1	12	10/4/11	13	<40	<0.02	0.095	0.14	1.2	<0.03	<0.02
Interim Action Work Area 3 - Final Performance Samples										
WA3-SW1	4	10/11/11	<10	<40	<0.02	<0.15	<0.10	<0.15	NA	NA
WA3-SW2	9	10/11/11	<10	240	<0.02	<0.15	<0.10	<0.15	<0.15	<0.02
WA3-SW3	9.5	10/11/11	<10	1,010	<0.02	<0.15	<0.10	<0.15	<0.15	<0.02
WA3-SW4	9	10/11/11	<10	490	<0.02	<0.15	<0.10	<0.15	NA	NA
WA3-SW5	8	10/11/11	<10	530	<0.02	<0.15	<0.10	<0.15	<0.15	<0.02
WA3-SW6	5	10/11/11	<10	3,970	<0.02	<0.15	<0.10	<0.15	NA	NA
WA3-SW7	5	10/11/11	<10	12,800	<0.02	<0.15	<0.10	<0.15	NA	NA
WA3-SW8	5	10/11/11	975	96,000	0.17	6.74	3.98	22.6	NA	NA
WA3-SW9	8.5	10/11/11	25	3,360	<0.02	<0.15	<0.10	0.17	<0.15	0.038
WA3-B1	10.5	10/11/11	81	2,520	0.067	0.12	0.38	1.86	1.03	<0.02
WA3-B2	9.5	10/11/11	104	4,660	<0.02	<0.15	0.2	0.98	1.00	<0.02
WA3-B3	10.5	10/11/11	73	3,680	0.068	<0.15	0.53	2.56	NA	NA
Interim Action Work Area 4 - Final Performance Samples										
WA4-SW1	6.5	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02
WA4-SW2	6.5	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA4-SW3	6.5	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02

Table 3
Summary of Residual Concentrations in Soil (mg/kg)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Sample Location ^(a)	Sample Depth (feet bgs)	Sample Date	GRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Naphthalenes	PCE
WA4-SW4	7	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA4-SW5	4	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	NA	<0.02
WA4-B1	8	10/17/11	<10	<40	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02
MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses			30 / 100^(b)	2,000	0.03	7	6	9	5	0.05

Notes:

mg/kg = milligrams per kilogram

feet bgs = feet below ground surface

GRPH - Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-Gx

ORPH - Oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx extended

Benzene, toluene, ethylbenzene, xylenes, and naphthalenes by EPA Methods 8260B and 8260C

PCE - tetrachloroethene by EPA Method 8260C

MTCA - Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, October 12, 2007

NA = Not analyzed

* = Method Detection Limit raised above the applicable MTCA Cleanup Level due to interference by another analyte

"<" indicates the analyte was not detected at the laboratory method reporting limit shown

Bold indicates the analyte was detected above the compound-specific laboratory detection limit**Bold and Shaded** indicates the detected concentration exceeds the MTCA Method A Soil Cleanup Level

(a) Sample locations are shown on Figure 8 of this document.

(b) Soil cleanup level for GRPH is 30 mg/kg when benzene is present; otherwise the cleanup level is 100 mg/kg when benzene is not detectable and the total of ethylbenzene, toluene, and xylenes is less than 1% of the gasoline mixture.

Table 4
Site Contaminants of Concern (COCs) and Cleanup Levels (CULs)
Whitney's Chevrolet
123 Pioneer Ave
Montesano, Washington

Finalized June 25, 2015

COC	Media	MTCA Method	CUL	Units
ORPH	Soil	A	2,000	mg/kg
GRPH	Soil	A	30 ^(a)	mg/kg
	Ground Water	A	800 ^(b)	µg/L
Benzene	Soil	A	0.03	mg/kg
	Ground Water	A	5	µg/L
	Indoor Air	B	0.32	µg/m ³
Toluene	Soil	A	7	mg/kg
	Ground Water	A	1,000	µg/L
Ethylbenzene	Soil	A	6	mg/kg
	Ground Water	A	700	µg/L
Total Xylenes	Soil	A	9	mg/kg
	Ground Water	A	1,000	µg/L
Naphthalenes	Soil	A	5	mg/kg
	Ground Water	A	160	µg/L
EDC	Indoor Air	B	0.096	µg/m ³
PCE	Ground Water	A	5	µg/L

Notes:

MTCA - Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, October 12, 2007

ORPH - Heavy oil-range petroleum hydrocarbons

GRPH - Gasoline-range petroleum hydrocarbons

EDC - Ethylene dichloride

PCE - Tetrachlorethene

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

µg/m³ = micrograms per cubic meter

(a) GRPH cleanup level when benzene is present; otherwise the cleanup level is 100 mg/kg when benzene is not detectable and the total of ethylbenzene, toluene, and xylenes is less than 1% of the gasoline mixture.

(b) GRPH cleanup level with benzene present in ground water; otherwise the cleanup level is 1,000 µg/l when benzene is not detectable in ground water.

**Table 5
Identification and Screening of
General Response Actions and Remediation Technologies
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington**

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
No Action	None	--	Not applicable - Impacts exceed CULs in all media at the Site	Not effective for achieving RAOs	--	--	No	RAOs cannot be achieved
Institutional Controls	Site access restrictions; site use restrictions	Legal or physical restrictions to limit exposure potential - may include deed restrictions to maintain surface cap and impose restrictions on ground water use	Potentially applicable for Site soil and ground water, once LNAPL is removed and indoor air concentrations meet CULs; may be applicable during remediation phase before soil and ground water CULs are achieved	Not effective for eliminating LNAPL or reducing COC concentrations, but may be effective for minimizing potential exposures during cleanup process	Implementable	Low	No	RAOs cannot be achieved
Monitored Natural Attenuation	Monitored natural attenuation	Allow natural physical and biological processes to gradually reduce contaminant concentrations	Not applicable to current site conditions due to presence of LNAPL; may be applicable in the future if residual contaminant concentrations remain above CULs following completion of active remediation	Effective on petroleum hydrocarbons where natural conditions are conducive to microbial activity; however, process is slow.	Implementable	Low, but costs for long-term monitoring should be taken into consideration	No	RAOs cannot be achieved in a reasonable time-frame
Containment	Capping	Impervious surface (asphalt, concrete)	Potentially applicable for Site soil and ground water, once LNAPL is removed and indoor air concentrations meet CULs; extraction of LNAPL and impacted ground water would be required in conjunction with capping	Effective at preventing direct contact with impacted soil and reducing infiltration through impacted soil into ground water	Implementable	(Existing)	Yes	Reduces potential risks due to direct contact exposures
	Vertical barriers	Slurry wall or other impermeable wall around impacted soil and ground water to prevent migration of COCs	Applicable to Site soil and ground water, but would require extraction of LNAPL and mitigation of indoor air concentrations in conjunction with barrier	Effective for preventing lateral migration of dissolved contaminants, but not effective for eliminating LNAPL or reducing COC concentrations	Implementable	High	Yes	A vertical barrier installed at the down-gradient edge of the plume would prevent migration of LNAPL onto adjacent property
	Hydraulic containment	Ground water pumping	Applicable	Effective for minimizing migration of contaminants, removing impacted ground water, and enhancing removal and recovery of LNAPL; however, cleanup process can be slow if not coupled with additional in-situ treatment	Implementable	Moderate	Yes	Consider for enhancement of LNAPL recovery and for ground water treatment option
Removal	Soil excavation	Physical removal of impacted soil using standard excavation equipment and hauling offsite for disposal	Not applicable - all accessible impacted soil has been removed; remaining impacted soil is inaccessible due to presence of Site buildings and/or proximity to utilities	Somewhat effective for reducing impacts that leach to ground water	Not practical due to inaccessibility issues	High	No	In-situ treatment will be easier to achieve and more cost effective
	LNAPL recovery	Removal of floating LNAPL from ground water table through active pumping and oil-water separation technology or passive product skimmers	Applicable	Effective for reducing LNAPL from subsurface	Implementable	Low to Moderate	Yes	LNAPL will need to be removed to meet RAOs; should be included with other treatment technologies as part of the cleanup action
	Ground water extraction	Ground water pumping through extraction wells and/or extraction trenches installed at the Site, using submersible and/or aboveground pumping equipment; extracted ground water can be routed through ex-situ treatment equipment prior to discharge or re-injection at the Site	Applicable	Effective for removing dissolved impacts from the subsurface; however, cleanup process can be slow if not coupled with additional in-situ treatment	Implementable	Moderate; however, cost would be significantly high if disposing of untreated ground water to an off-site facility	Yes	Consider for inclusion with ex-situ ground water treatment option

**Table 5
Identification and Screening of
General Response Actions and Remediation Technologies
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington**

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
Ex-Situ Treatment - Soil	Various treatment methods for excavated soil	On-site treatment of impacted soil that is excavated from the subsurface; treated soil may be re-used at the Site	Not applicable - all accessible impacted soil has been removed; remaining impacted soil is inaccessible due to presence of Site buildings and/or proximity to utilities	Somewhat effective for reducing impacts that leach to ground water	Not practical due to inaccessibility issues	Low to High, depending on technology used	No	In-situ treatment will be easier to achieve and more cost effective
Ex-Situ Treatment - Ground Water	Activated carbon adsorption	Route extracted ground water through liquid-phase granular activated carbon (GAC) filters to adsorb contaminants; treated water may be discharged to sanitary sewer or re-injected at the Site	Applicable	Effective for reducing petroleum constituents and PCE in ground water	Implementable	Moderate to High; disposal of spent GAC would not be cost-effective during initial remediation phase due to elevated concentrations of impacts	Yes	Consider for potential future ground water treatment option after concentrations are reduced by other methods
	Aeration	Inject air into extracted ground water to volatilize impacts and enhance aerobic biodegradation; treated water may be discharged to sanitary sewer or re-injected at the Site	Applicable	Effective for reducing petroleum constituents and PCE in ground water; however, off-gasses produced from volatilization would need to be mitigated	Implementable	Low	Yes	Consider for ground water treatment option
	Air stripping	Route extracted ground water through an air stripper to volatilize impacts; treated water may be discharged to sanitary sewer or re-injected at the Site	Applicable	Effective for reducing petroleum constituents and PCE in ground water; however, off-gasses from air stripper would need to be mitigated	Implementable	Moderate	Yes	Consider for ground water treatment option
	Chemical oxidation	Inject chemical oxidants (e.g., hydrogen peroxide, ozone, etc.) into extracted ground water to destroy organic constituents; treated water may be discharged to sanitary sewer or re-injected at the Site	Applicable	Effective for reducing petroleum constituents and PCE in ground water	Implementable	Moderate to High; may not be cost-effective for initial remediation phase due to elevated concentrations of impacts requiring the use of large amounts of oxidizing agent	Yes	Consider for potential future ground water treatment option following removal of LNAPL and reduction in ground water concentrations
In-Situ Treatment	Air sparging	Inject air into subsurface ground water to volatilize impacts and enhance aerobic biodegradation	Applicable	Effective	Implementable	Moderate	Yes	Consider for ground water treatment option
	Soil vapor extraction (SVE)	Applying vacuum to subsurface to extract volatilized impacts from soil; extracted vapors will require treatment (e.g., vapor-phase GAC, thermal oxidation, etc.) prior to discharge to the atmosphere	Applicable	Effective	Implementable	Moderate	Yes	Consider for ground water treatment option
	In-situ chemical oxidation (ISCO)	Inject chemical oxidants (e.g., hydrogen peroxide, ozone, etc.) into subsurface soil and ground water to destroy organic constituents	Potentially applicable - Not suitable when LNAPL is present, but may be applicable in the future once LNAPL is fully removed	Effective with sufficient chemical oxidant	Implementable	Moderate to High	Yes	Consider for potential future treatment option for soil and ground water following removal of LNAPL; would not be cost-effective as an initial treatment option
	In-situ thermal desorption	Apply heat to subsurface (e.g., via electrical resistance or heated water injection) to volatilize impacts; will require LNAPL recovery and SVE to capture vapors	Applicable	Effective	Potentially implementable, but difficult due to large electrical demand	Very High	No	Not cost-effective compared to other treatment options

**Table 6
Remedial Alternatives Evaluation
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington**

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Criteria	Multi-Phase Extraction and Ex-Situ Treatment	Score	LNAPL Recovery and SVE	Score	LNAPL Recovery and AS/SVE	Score	LNAPL Recovery, ISCO and Localized SVE	Score	GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE	Score
Description/Issues	Combines total fluids extraction with SVE. Effectiveness is limited to SVE radius of influence and ability to extract ground water and localized ground water drawdown		Combines mechanical LNAPL recovery with SVE component. Effectiveness limited to SVE radius of influence and seasonal LNAPL recovery.		Combines mechanical LNAPL recovery and AS/SVE. AS used to enhance mass removal and improve DO of ground water for additional biological NA.		Combines LNAPL recovery for source removal, ISCO for dissolved-phase recovery and localized SVE for VI mitigation. Technically complex and ISCO is challenging at sites with high mass loadings in soil and ground water		Combines active ground water extraction with ex situ treatment and reinfiltration and localized SVE for VI mitigation. Technically complex and hydraulic control can be challenging.	
Protectiveness	Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.									
Overall protectiveness	Protective when complete	4	Protective when complete	4	Protective when complete	4	Protective when complete	4	Protective when complete	4
Reduces existing risks	Reduces risks when implemented	4	Reduces risks when implemented	4	Reduces risks when implemented	4	Reduces risks when implemented	4	Reduces risks when implemented	4
Time required to reduce risk	Longer duration required	4	Longer duration required with less certainty	3	Shortest duration to reduce risks	5	Longer duration to reduce risks and less certainty	3	Longest duration to reduce risks and least certainty	2
On-Site risks	Reduces risk with higher level of certainty	4	Reduces risks with lower level of certainty	3	Reduces risks with highest level of certainty	5	Reduces risks with low level of certainty	2	Reduces risks with low level of certainty	2
Off-Site risks	Reduces risk with higher level of certainty	4	Reduces risks with lower level of certainty	4	Reduces risks with highest level of certainty	5	Reduces risks with low level of certainty	2	Reduces risks with low level of certainty	2
Improvement in environmental quality	Higher level of improvement	4	Moderate level of improvement	3	Highest level of improvement	5	Moderate level of improvement	3	Moderate level of improvement	3
Criterion Score		4.0		3.5		4.7		3.0		2.8
Permanence	The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and improvement of the overall environmental quality.									
Reduces toxicity, mobility, and volume	Reduces toxicity, mobility and volume rapidly	5	Reduces toxicity, mobility, and volume moderately	3	Reduces toxicity, mobility and volume rapidly	5	Reduces toxicity, mobility, and volume moderately	3	Reduces toxicity, mobility, and volume moderately	3
Degree of irreversibility	Irreversible	5	Irreversible	5	Irreversible	5	Irreversible	5	Irreversible	5
Waste characteristics	Generates air, water and total fluids waste stream	3	Generates LNAPL and air waste stream	5	Generates LNAPL and air waste stream	5	Generates LNAPL and air waste stream	5	Generates LNAPL waste stream and reinjection of treated water, generates process wastes	3
Criterion Score		4.3		4.3		5.0		4.3		3.7
Long-Term Effectiveness	Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.									
Degree of Certainty	Relatively certain	4	Moderately certain	3	Highly certain	5	Moderately certain	3	Moderately certain	3
Reliability	Moderately reliable	3	Moderately reliable	3	Highly reliable and proven	5	Somewhat reliable	2	Somewhat reliable	2
Residual Risk	Low	4	Moderate	3	Low	4	Moderate	3	Moderate	3
Technology hierarchy	Somewhat highly ranked	4	Somewhat highly ranked	3	Somewhat highly ranked	3	Somewhat highly ranked	3	Higher rank due to reinfiltration	4
Criterion Score		3.8		3.0		4.3		2.8		3.0
Short-Term Risk Management	The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.									
During construction	Moderate risks associated with system complexity and spillage	2	Moderate risks	3	Low to moderate risk	4	Moderate to high based on ozone	2	Moderate to high risks associated with establishing hydraulic control and spillage	2
Effectiveness of risk management	Effective	5	Effective	5	Effective	5	Somewhat effective	4	Somewhat effective	4
Criterion Score		3.5		4.0		4.5		3.0		3.0
Implementability	Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.									
Technically possible	Somewhat possible, dependent upon pilot testing	3	Possible, SVE demonstrated at similar sites	4	Possible, AS/SVE demonstrated, AS enhances mass removal of LNAPL	5	Somewhat possible	2	Somewhat possible, technically complicated hydraulic controls	1
Access	Challenged based on site conditions and equipment needs	2	Less access required, fewer wells	3	Access challenging, may incorporate horizontal wells	4	Challenged access and risks to equipment during operation	2	Challenged access to need for infiltration gallery and long-term access agreement	1
Availability of necessary resources	Readily available	5	Readily available	5	Readily available	5	Available	4	Available	4
Monitoring requirements	High	3	High	3	High	3	Very high	2	Extremely high	1
Integration with existing features	Moderate	3	Moderate	3	Moderate	3	Moderate	3	Moderate	3
Criterion Score		3.2		3.6		4.0		2.6		2.0

**Table 6
Remedial Alternatives Evaluation
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington**

Finalized June 25, 2015

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Criteria	Multi-Phase Extraction and Ex-Situ Treatment	Score	LNAPL Recovery and SVE	Score	LNAPL Recovery and AS/SVE	Score	LNAPL Recovery, ISCO and Localized SVE	Score	GWE with Ex-Situ Treatment, Re-Infiltration and Localized SVE	Score
Public Concerns	Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.									
Criterion Score	<i>Some potential concerns regarding VI pathway, residual soil impacts, and lateral coverage of system. Potential noise concerns</i>	3.0	<i>Significant concerns regarding VI and residual soil impacts</i>	3.0	<i>Fewest VI concerns, addresses off-property impacts</i>	5.0	<i>Potential significant concerns regarding effectiveness</i>	2.0	<i>Potential significant concerns regarding hydraulic control and effectiveness</i>	1.0
Restoration Time Frame	Determination of whether a cleanup action provides for a reasonable restoration time frame based on criteria in WAC 173-340-360(4)(b)									
Score	<i>Moderate timeframe</i>	3.0	<i>Moderate to long time frame</i>	3.0	<i>Moderate to shorter time frame</i>	4.0	<i>Moderate to uncertain time frame</i>	2.0	<i>Moderate to uncertain time frame</i>	2.0
Total Score	24.8		24.4		31.4		19.7		17.5	
Conceptual Level Cost	\$1,531,000		\$1,562,000		\$1,672,000		\$1,976,000		\$1,987,000	

Table 7
Order-of-Magnitude Cost Estimate
Alternative 1 - Multi-Phase Extraction and Ex-Situ Treatment
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Pre-Remedial Activities								
	Pilot Testing							
	High Vacuum Extraction Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 5,000	\$ 10,000	
	Hydraulic Permeability/Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Treatment System Design	1	LS			\$ 40,000	\$ 40,000	
	Air Permit Treated Vapor Discharges	1	LS			\$ 5,000	\$ 5,000	
	Waste Water Discharge Permit	1	LS			\$ 5,000	\$ 5,000	
	Bid Solicitation	3	each			\$ 2,500	\$ 7,500	
	Contracting	1	each			\$ 5,000	\$ 5,000	\$ 85,500
Treatment System (Capital Cost)								
	MPE Well Installation (4" PVC to 20 ft bgs)	15	each	\$ 2,500	\$ 37,500	\$ 3,000	\$ 40,500	
	Wellhead Connections/Drop Tubes/Vaults	15	each	\$ 1,000	\$ 15,000	\$ 2,000	\$ 17,000	
	Trenching & Installation of MPE Conveyance Piping	750	LF	\$ 60	\$ 45,000	\$ 5,000	\$ 50,000	
	Road Disturbance/Permitting/Repair	1	each	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	Drill Cuttings Disposal	25	drum	\$ 200	\$ 5,000	\$ 1,000	\$ 6,000	
	Waste Disposal Profiling and Sampling	1	LS	\$ 1,500	\$ 1,500	\$ 1,000	\$ 2,500	
	Vacuum Extraction Pump and Sound Enclosure	1	LS	\$ 15,000	\$ 15,000		\$ 15,000	
	Liquid-Vapor Separator Tank	1	each	\$ 4,000	\$ 4,000		\$ 4,000	
	Oil-Water Separator Tank	1	each	\$ 10,000	\$ 10,000		\$ 10,000	
	Ancillary Equipment and Piping for Separator Tanks	1	LS	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	LNAPL Recovery Tank and Ancillary Equipment	1	LS	\$ 5,000	\$ 5,000	\$ 1,500	\$ 6,500	
	Water Treatment Batch Tank	1	each	\$ 4,000	\$ 4,000		\$ 4,000	
	Air Stripper and Ancillary Equipment	1	LS	\$ 25,000	\$ 25,000	\$ 1,500	\$ 26,500	
	Vapor Treatment Equipment:							
	Heat Exchanger	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Thermal/Catalytic Oxidizer	1	each	\$ 30,000	\$ 30,000		\$ 30,000	
	Propane AST for alternative fuel source	1	each	\$ 15,000	\$ 15,000		\$ 15,000	
	Vapor Phase Carbon	2	each	\$ 5,000	\$ 10,000		\$ 10,000	
	Misc. Plumbing/Piping	200	LF	\$ 25	\$ 5,000	\$ 5,000	\$ 10,000	
	Instrumentation	1	LS	\$ 3,000	\$ 3,000	\$ 2,000	\$ 5,000	
	Control System	1	LS	\$ 5,000	\$ 5,000	\$ 3,000	\$ 8,000	
	Telemetry	1	each	\$ 4,000	\$ 4,000	\$ 1,500	\$ 5,500	
	Electrical Service	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	Treatment System Compound	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	System Startup/Initial Monitoring	1	LS	\$ 30,000		\$ 30,000	\$ 30,000	
	Treatment System Installation Report	1	LS	\$ 20,000		\$ 20,000	\$ 20,000	
	<i>Category Subtotals</i>				\$ 282,000	\$ 83,500	\$ 365,500	
	Tax on Contractor Services/Capital Equipment (9.5%)				\$ 26,800		\$ 26,800	\$ 392,300
System Operation and Maintenance								
	Annual System O&M (8 Years)							
	Electrical Usage	12	months	\$ 1,200	\$ 14,400		\$ 14,400	
	Air Influent and Effluent Sampling	12	months	\$ 200	\$ 2,400		\$ 2,400	
	Water Influent and Effluent Sampling	12	months	\$ 600	\$ 7,200		\$ 7,200	
	Site Visits (monthly)	12	visits	\$ 2,000		\$ 24,000	\$ 24,000	
	Annual O&M Subtotal						\$ 48,000	
	<i>Net Present Value O&M Subtotal (8 years, 7% discount)*</i>						\$ 286,600	
	Periodic O&M Costs							
	Propane Usage (Years 1 and 2)	12	months	\$ 300	\$ 3,600		\$ 3,600	
	<i>Net Present Value (years 1-2, 7% discount)*</i>						\$ 6,500	
	LNAPL Disposal (Year 2)	1	LS	\$ 1,500	\$ 1,500	\$ 500	\$ 2,000	
	<i>Net Present Value (year 2, 7% discount)*</i>						\$ 1,700	
	Carbon Replacement (Years 3, 4, and 6)	2,000	pounds	\$ 1.80	\$ 3,600	\$ 1,000	\$ 4,600	
	<i>Net Present Value (years 3, 4, and 6, 7% discount)*</i>						\$ 10,300	
	Contingency for Equipment Replacement							
	10% of Capital Equipment Subtotal				\$ 28,200		\$ 28,200	
	<i>Net Present Value (year 5, 7% discount)*</i>						\$ 20,100	\$ 325,200
Performance and Compliance Monitoring/Sampling								
	Annual Ground Water Monitoring (10 Years)							
	Sampling Labor and Equipment	4	quarters	\$ 11,000		\$ 44,000	\$ 44,000	
	Ground Water Analytical Costs (4 quarters)	120	well	\$ 300	\$ 36,000		\$ 36,000	
	Reporting	4	each	\$ 3,000		\$ 12,000	\$ 12,000	
	Annual Ground Water Monitoring Subtotal						\$ 92,000	
	<i>Net Present Value (10 years, 7% discount)*</i>						\$ 646,200	
	Indoor Air Quality Monitoring (10 Years)							
	Sampling Labor and Equipment	1	event	\$ 1,500		\$ 1,500	\$ 1,500	
	Air Analytical Cost	5	samples	\$ 300	\$ 1,500		\$ 1,500	
	Annual Air Quality Monitoring Subtotal						\$ 3,000	
	<i>Net Present Value (10 years, 7% discount)*</i>						\$ 21,100	
	Compliance Soil Sampling (Year 10)							
	Contractor Drilling (Soil Sampling, Push-Probe)	2	day	\$ 4,000	\$ 8,000	\$ 3,000	\$ 11,000	
	Soil Analytical Cost	20	each	\$ 300	\$ 6,000		\$ 6,000	
	Compliance Soil Sampling Subtotal						\$ 17,000	
	<i>Net Present Value (year 10, 7% discount)*</i>						\$ 8,600	\$ 675,900

Table 7
Order-of-Magnitude Cost Estimate
Alternative 1 - Multi-Phase Extraction and Ex-Situ Treatment
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Site Restoration and Closure								
	Well Closure	35	well	\$ 1,500	\$ 52,500	\$ 17,500	\$ 70,000	
	Equipment/Enclosure Decommissioning	1	LS	\$ 5,000	\$ 5,000	\$ 12,000	\$ 17,000	
	Final Closure Report	1	LS	\$ 15,000		\$ 15,000	\$ 15,000	
	Site Restoration and Closure Subtotal						\$ 102,000	
	Net Present Value (year 10, 7% discount) ^a						\$ 51,800	\$ 51,800
PROJECT TOTAL								\$ 1,531,000

^aNet Present Value based on Annual or Multi-Year Discount Factors published in *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USACE/USEPA, July 2000); discount factors are calculated using the following formulas:

- Annual Discount Factor at 7% = $1+1.07^t$, where t = year that future cost is incurred.
- Multi-Year Discount Factor at 7% = $[1.07^n - 1] / [0.7(1.07)^n]$, where n = number of years that future costs are incurred.

Table 8
Order-of-Magnitude Cost Estimate
Alternative 2 - LNAPL Recovery and SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Pre-Remedial Activities								
	Pilot Testing							
	SVE Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Hydraulic Permeability/Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Treatment System Design	1	LS			\$ 40,000	\$ 40,000	
	Air Permit Treated Vapor Discharges	1	LS			\$ 5,000	\$ 5,000	
	Waste Water Discharge Permit	1	LS			\$ 5,000	\$ 5,000	
	Bid Solicitation	3	each			\$ 2,500	\$ 7,500	
	Contracting	1	each			\$ 5,000	\$ 5,000	\$ 88,500
Treatment System (Capital Cost)								
	LNAPL Recovery Well Installation (6" PVC to 20 ft bgs)	2	each	\$ 4,500	\$ 9,000	\$ 2,000	\$ 11,000	
	LNAPL Skimmers and Submersible GWE Pumps (2")	4	each	\$ 3,000	\$ 12,000		\$ 12,000	
	LNAPL Skimmers and Submersible GWE Pumps (4")	2	each	\$ 4,000	\$ 8,000		\$ 8,000	
	LNAPL Wellhead Connections/Vaults	6	each	\$ 1,000	\$ 6,000	\$ 1,500	\$ 7,500	
	SVE Well Installation (4" PVC to 15 ft bgs)	17	each	\$ 2,000	\$ 34,000	\$ 3,000	\$ 37,000	
	SVE Wellhead Connections/Vaults	17	each	\$ 800	\$ 13,600	\$ 2,000	\$ 15,600	
	Trenching & Installation of SVE Conveyance Piping	1,050	LF	\$ 60	\$ 63,000	\$ 5,000	\$ 68,000	
	Installation of LNAPL and GWE Recovery Piping	450	LF	\$ 20	\$ 9,000	\$ 1,500	\$ 10,500	
	Road Disturbance/Permitting/Repair	1	each	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	Drill Cuttings Disposal	30	drum	\$ 200	\$ 6,000	\$ 1,000	\$ 7,000	
	Waste Disposal Profiling and Sampling	1	LS	\$ 1,500	\$ 1,500	\$ 1,000	\$ 2,500	
	Compressor for LNAPL Skimmers	1	each	\$ 3,500	\$ 3,500		\$ 3,500	
	LNAPL Recovery Tank and Ancillary Equipment	1	LS	\$ 5,000	\$ 5,000	\$ 1,500	\$ 6,500	
	Water Treatment Batch Tank	1	each	\$ 4,000	\$ 4,000		\$ 4,000	
	Air Stripper and Ancillary Equipment	1	LS	\$ 25,000	\$ 25,000	\$ 1,500	\$ 26,500	
	SVE Blower and Sound Enclosure	1	LS	\$ 7,500	\$ 7,500		\$ 7,500	
	Moisture Knockout Tank	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Ancillary Equipment and Piping for Knockout Tank	1	LS	\$ 5,000	\$ 5,000	\$ 1,000	\$ 6,000	
	Vapor Treatment Equipment:							
	Heat Exchanger	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Thermal/Catalytic Oxidizer	1	each	\$ 30,000	\$ 30,000		\$ 30,000	
	Propane AST for alternative fuel source	1	each	\$ 15,000	\$ 15,000		\$ 15,000	
	Vapor Phase Carbon	2	each	\$ 5,000	\$ 10,000		\$ 10,000	
	Misc. Plumbing/Piping	200	LF	\$ 25	\$ 5,000	\$ 5,000	\$ 10,000	
	Instrumentation	1	LS	\$ 3,000	\$ 3,000	\$ 2,000	\$ 5,000	
	Control System	1	LS	\$ 5,000	\$ 5,000	\$ 3,000	\$ 8,000	
	Telemetry	1	each	\$ 4,000	\$ 4,000	\$ 1,500	\$ 5,500	
	Electrical Service	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	Treatment System Compound	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	System Startup/Initial Monitoring	1	LS	\$ 30,000	\$ 30,000		\$ 30,000	
	Treatment System Installation Report	1	LS	\$ 20,000	\$ 20,000		\$ 20,000	
	Category Subtotals				\$ 325,100	\$ 87,500	\$ 412,600	
	Tax on Contractor Services/Capital Equipment (9.5%)				\$ 30,900		\$ 30,900	\$ 443,500
System Operation and Maintenance								
	Annual System O&M (8 Years)							
	Electrical Usage	12	months	\$ 1,200	\$ 14,400		\$ 14,400	
	Air Influent and Effluent Sampling	12	months	\$ 200	\$ 2,400		\$ 2,400	
	Site Visits (monthly)	12	visits	\$ 2,000		\$ 24,000	\$ 24,000	
	Annual O&M Subtotal						\$ 40,800	
	Net Present Value O&M Subtotal (8 years, 7% discount)*						\$ 243,600	
	Periodic O&M Costs							
	Water Influent and Effluent Sampling (Years 1 and 2)	12	months	\$ 600	\$ 7,200		\$ 7,200	
	Net Present Value (years 1-2, 7% discount)*						\$ 13,000	
	Propane Usage (Years 1 and 2)	12	months	\$ 300	\$ 3,600		\$ 3,600	
	Net Present Value (years 1-2, 7% discount)*						\$ 6,500	
	LNAPL Disposal (Year 2)	1	LS	\$ 1,500	\$ 1,500	\$ 500	\$ 2,000	
	Net Present Value (year 2, 7% discount)*						\$ 1,700	
	Carbon Replacement (Years 3, 4, and 6)	2,000	pounds	\$ 1.80	\$ 3,600	\$ 1,000	\$ 4,600	
	Net Present Value (years 3, 4, and 6, 7% discount)*						\$ 10,300	
	Contingency for Equipment Replacement							
	10% of Capital Equipment Subtotal				\$ 32,500		\$ 32,500	
	Net Present Value (year 5, 7% discount)*						\$ 23,200	\$ 298,300
Performance and Compliance Monitoring/Sampling								
	Annual Ground Water Monitoring (10 Years)							
	Sampling Labor and Equipment	4	quarters	\$ 11,000		\$ 44,000	\$ 44,000	
	Ground Water Analytical Costs (4 quarters)	120	well	\$ 300	\$ 36,000		\$ 36,000	
	Reporting	4	each	\$ 3,000		\$ 12,000	\$ 12,000	
	Annual Ground Water Monitoring Subtotal						\$ 92,000	
	Net Present Value (10 years, 7% discount)*						\$ 646,200	
	Indoor Air Quality Monitoring (10 Years)							
	Sampling Labor and Equipment	1	event	\$ 1,500		\$ 1,500	\$ 1,500	
	Air Analytical Cost	5	samples	\$ 300	\$ 1,500		\$ 1,500	
	Annual Air Quality Monitoring Subtotal						\$ 3,000	
	Net Present Value (10 years, 7% discount)*						\$ 21,100	

Table 8
Order-of-Magnitude Cost Estimate
Alternative 2 - LNAPL Recovery and SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
	Compliance Soil Sampling (Year 10)							
	Contractor Drilling (Soil Sampling, Push-Probe)	2	day	\$ 4,000	\$ 8,000	\$ 3,000	\$ 11,000	
	Soil Analytical Cost	20	each	\$ 300	\$ 6,000		\$ 6,000	
	Compliance Soil Sampling Subtotal						\$ 17,000	
	<i>Net Present Value (year 10, 7% discount)^a</i>						\$ 8,600	\$ 675,900
	Site Restoration and Closure							
	Well Closure	39	well	\$ 1,500	\$ 58,500	\$ 19,500	\$ 78,000	
	Equipment/Enclosure Decommissioning	1	LS	\$ 5,000	\$ 5,000	\$ 12,000	\$ 17,000	
	Final Closure Report	1	LS	\$ 15,000		\$ 15,000	\$ 15,000	
	Site Restoration and Closure Subtotal						\$ 110,000	
	<i>Net Present Value (year 10, 7% discount)^a</i>						\$ 55,900	\$ 55,900
PROJECT TOTAL								\$ 1,562,000

^aNet Present Value based on Annual or Multi-Year Discount Factors published in *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USACE/USEPA, July 2000). discount factors are calculated using the following formulas:

- Annual Discount Factor at 7% = $1 + 1.07^t$, where t = year that future cost is incurred.
- Multi-Year Discount Factor at 7% = $[1.07^n - 1] / [0.7(1.07)^n]$, where n = number of years that future costs are incurred.

Table 9
Order-of-Magnitude Cost Estimate
Alternative 3 - LNAPL Recovery and AS/SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Pre-Remedial Activities								
	Pilot Testing							
	AS Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 5,000	\$ 10,000	
	SVE Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Hydraulic Permeability/Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Treatment System Design	1	LS			\$ 45,000	\$ 45,000	
	Air Permit Treated Vapor Discharges	1	LS			\$ 5,000	\$ 5,000	
	Waste Water Discharge Permit	1	LS			\$ 5,000	\$ 5,000	
	Bid Solicitation	3	each			\$ 2,500	\$ 7,500	
	Contracting	1	each			\$ 5,000	\$ 5,000	\$ 103,500
Treatment System (Capital Cost)								
	LNAPL Recovery Well Installation (6" PVC to 20 ft bgs)	2	each	\$ 4,500	\$ 9,000	\$ 2,000	\$ 11,000	
	LNAPL Skimmers and Submersible GWE Pumps (2")	4	each	\$ 3,000	\$ 12,000		\$ 12,000	
	LNAPL Skimmers and Submersible GWE Pumps (4")	2	each	\$ 4,000	\$ 8,000		\$ 8,000	
	LNAPL Wellhead Connections/Vaults	6	each	\$ 1,000	\$ 6,000	\$ 1,500	\$ 7,500	
	AS Well Installation (1" PVC to 25 ft bgs)	25	each	\$ 2,500	\$ 62,500	\$ 5,000	\$ 67,500	
	AS Wellhead Connections/Vaults	25	each	\$ 800	\$ 20,000	\$ 3,000	\$ 23,000	
	SVE Well Installation (4" PVC to 15 ft bgs)	20	each	\$ 2,000	\$ 40,000	\$ 3,000	\$ 43,000	
	SVE Wellhead Connections/Vaults	20	each	\$ 800	\$ 16,000	\$ 2,000	\$ 18,000	
	Trenching & Installation of SVE Conveyance Piping	1,100	LF	\$ 60	\$ 66,000	\$ 5,000	\$ 71,000	
	Installation of AS Conveyance Lines	1,100	LF	\$ 25	\$ 27,500	\$ 3,000	\$ 30,500	
	Installation of LNAPL and GWE Recovery Piping	450	LF	\$ 20	\$ 9,000	\$ 1,500	\$ 10,500	
	Road Disturbance/Permitting/Repair	1	each	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	Drill Cuttings Disposal	50	drum	\$ 200	\$ 10,000	\$ 1,000	\$ 11,000	
	Waste Disposal Profiling and Sampling	1	LS	\$ 2,000	\$ 2,000	\$ 1,000	\$ 3,000	
	Compressor for LNAPL Skimmers	1	each	\$ 3,500	\$ 3,500		\$ 3,500	
	LNAPL Recovery Tank and Ancillary Equipment	1	LS	\$ 5,000	\$ 5,000	\$ 1,500	\$ 6,500	
	Water Treatment Batch Tank	1	each	\$ 4,000	\$ 4,000		\$ 4,000	
	Air Stripper and Ancillary Equipment	1	LS	\$ 25,000	\$ 25,000	\$ 1,500	\$ 26,500	
	AS Compressor and Ancillary Equipment	2	LS	\$ 15,000	\$ 30,000		\$ 30,000	
	SVE Blower and Sound Enclosure	1	LS	\$ 10,000	\$ 10,000		\$ 10,000	
	Moisture Knockout Tank	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Ancillary Equipment and Piping for Knockout Tank	1	LS	\$ 5,000	\$ 5,000	\$ 1,000	\$ 6,000	
	Vapor Treatment Equipment:							
	Heat Exchanger	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Thermal/Catalytic Oxidizer	1	each	\$ 30,000	\$ 30,000		\$ 30,000	
	Propane AST for alternative fuel source	1	each	\$ 15,000	\$ 15,000		\$ 15,000	
	Vapor Phase Carbon	2	each	\$ 5,000	\$ 10,000		\$ 10,000	
	Misc. Plumbing/Piping	200	LF	\$ 25	\$ 5,000	\$ 5,000	\$ 10,000	
	Instrumentation	1	LS	\$ 5,000	\$ 5,000	\$ 3,000	\$ 8,000	
	Control System	1	LS	\$ 6,000	\$ 6,000	\$ 3,000	\$ 9,000	
	Telemetry	1	each	\$ 4,000	\$ 4,000	\$ 1,500	\$ 5,500	
	Electrical Service	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	Treatment System Compound	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	System Startup/Initial Monitoring Period	1	LS	\$ 30,000		\$ 30,000	\$ 30,000	
	Treatment System Installation Report	1	LS	\$ 20,000		\$ 20,000	\$ 20,000	
	<i>Category Subtotals</i>				\$ 486,500	\$ 99,500	\$ 586,000	
	Tax on Contractor Services/Capital Equipment (9.5%)				\$ 46,200		\$ 46,200	\$ 632,200
System Operation and Maintenance								
	Annual System O&M (6 Years)							
	Electrical Usage	12	months	\$ 1,200	\$ 14,400		\$ 14,400	
	Air Influent and Effluent Sampling	12	months	\$ 200	\$ 2,400		\$ 2,400	
	Site Visits (monthly)	12	visits	\$ 2,000		\$ 24,000	\$ 24,000	
	<i>Annual O&M Subtotal</i>						\$ 40,800	
	<i>Net Present Value O&M Subtotal (6 years, 7% discount)*</i>						\$ 194,500	
	Periodic O&M Costs							
	Water Influent and Effluent Sampling (Years 1 and 2)	12	months	\$ 600	\$ 7,200		\$ 7,200	
	<i>Net Present Value (years 1-2, 7% discount)*</i>						\$ 13,000	
	Propane Usage (Years 1 through 3)	12	months	\$ 300	\$ 3,600		\$ 3,600	
	<i>Net Present Value (years 1-3, 7% discount)*</i>						\$ 9,400	
	LNAPL Disposal (Year 2)	1	LS	\$ 1,500	\$ 1,500	\$ 500	\$ 2,000	
	<i>Net Present Value (year 2, 7% discount)*</i>						\$ 1,700	
	Carbon Replacement (Years 4 and 5)	2,000	pounds	\$ 1.80	\$ 3,600	\$ 1,000	\$ 4,600	
	<i>Net Present Value (years 4 and 5, 7% discount)*</i>						\$ 6,800	
	Contingency for Equipment Replacement							
	10% of Capital Equipment Subtotal				\$ 48,700		\$ 48,700	
	<i>Net Present Value (year 4, 7% discount)*</i>						\$ 37,200	\$ 262,600
Performance and Compliance Monitoring/Sampling								
	Annual Ground Water Monitoring (8 Years)							
	Sampling Labor and Equipment	4	quarters	\$ 11,000		\$ 44,000	\$ 44,000	
	Ground Water Analytical Costs (4 quarters)	120	well	\$ 300	\$ 36,000		\$ 36,000	
	Reporting	4	each	\$ 3,000		\$ 12,000	\$ 12,000	
	<i>Annual Ground Water Monitoring Subtotal</i>						\$ 92,000	
	<i>Net Present Value (8 years, 7% discount)*</i>						\$ 549,300	

Table 9
Order-of-Magnitude Cost Estimate
Alternative 3 - LNAPL Recovery and AS/SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
	Indoor Air Quality Monitoring (8 Years)							
	Sampling Labor and Equipment	1	event	\$ 1,500		\$ 1,500	\$ 1,500	
	Air Analytical Cost	5	samples	\$ 300	\$ 1,500		\$ 1,500	
	Annual Air Quality Monitoring Subtotal						\$ 3,000	
	<i>Net Present Value (8 years, 7% discount)^a</i>						\$ 17,900	
	Compliance Soil Sampling (Year 8)							
	Contractor Drilling (Soil Sampling, Push-Probe)	2	day	\$ 4,000	\$ 8,000	\$ 3,000	\$ 11,000	
	Soil Analytical Cost	20	each	\$ 300	\$ 6,000		\$ 6,000	
	Compliance Soil Sampling Subtotal						\$ 17,000	
	<i>Net Present Value (year 8, 7% discount)^a</i>						\$ 9,900	\$ 577,100
Site Restoration and Closure								
Well Closure	67	well	\$ 1,500	\$ 100,500	\$ 33,500	\$ 134,000		
Equipment/Enclosure Decommissioning	1	LS	\$ 5,000	\$ 5,000	\$ 12,000	\$ 17,000		
Final Closure Report	1	LS	\$ 15,000		\$ 15,000	\$ 15,000		
Site Restoration and Closure Subtotal						\$ 166,000		
<i>Net Present Value (year 8, 7% discount)^a</i>						\$ 96,600	\$ 96,600	
PROJECT TOTAL								\$ 1,672,000

^aNet Present Value based on Annual or Multi-Year Discount Factors published in *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USACE/USEPA, July 2000). discount factors are calculated using the following formulas:

- Annual Discount Factor at 7% = $1 + 1.07^t$, where t = year that future cost is incurred.
- Multi-Year Discount Factor at 7% = $[1.07^n - 1] / [0.7(1.07)^n]$, where n = number of years that future costs are incurred.

Table 10
Order-of-Magnitude Cost Estimate
Alternative 4 - LNAPL Recovery, ISCO and Localized SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Pre-Remedial Activities								
	Pilot Testing							
	Sparge Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 5,000	\$ 10,000	
	Hydraulic Permeability/Radius of Influence	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Treatment System Design	1	LS			\$ 45,000	\$ 45,000	
	Air Permit Treated Vapor Discharges	1	LS			\$ 5,000	\$ 5,000	
	Waste Water Discharge Permit	1	LS			\$ 5,000	\$ 5,000	
	Bid Solicitation	3	each			\$ 2,500	\$ 7,500	
	Contracting	1	each			\$ 5,000	\$ 5,000	\$ 90,500
Treatment System (Capital Cost)								
	LNAPL Recovery Well Installation (6" PVC to 20 ft bgs)	2	each	\$ 4,500	\$ 9,000	\$ 2,000	\$ 11,000	
	LNAPL Skimmers and Submersible GWE Pumps (2")	4	each	\$ 3,000	\$ 12,000		\$ 12,000	
	LNAPL Skimmers and Submersible GWE Pumps (4")	2	each	\$ 4,000	\$ 8,000		\$ 8,000	
	LNAPL Wellhead Connections/Vaults	6	each	\$ 1,000	\$ 6,000	\$ 1,500	\$ 7,500	
	Ozone Well Installation (1" stainless steel to 20 ft bgs)	25	each	\$ 5,500	\$ 137,500	\$ 5,000	\$ 142,500	
	Ozone Wellhead Connections/Vaults	25	each	\$ 1,000	\$ 25,000	\$ 3,000	\$ 28,000	
	Peroxide Well Installation (2" PVC to 15 ft bgs)	19	each	\$ 2,000	\$ 38,000	\$ 3,000	\$ 41,000	
	Peroxide Wellhead Connections/Vaults	21	each	\$ 800	\$ 16,800	\$ 2,000	\$ 18,800	
	Trenching & Installation of Peroxide Injection Piping	1,100	LF	\$ 60	\$ 66,000	\$ 5,000	\$ 71,000	
	Installation of Ozone Lines (Teflon tubing)	5,900	LF	\$ 5	\$ 29,500	\$ 3,000	\$ 32,500	
	Installation of PVC Conduit for Ozone Lines	1,100	LF	\$ 10	\$ 11,000	\$ 3,000	\$ 14,000	
	Installation of LNAPL and GWE Recovery Piping	450	LF	\$ 20	\$ 9,000	\$ 1,500	\$ 10,500	
	SVE Well Installation (4" PVC to 15 ft bgs)	16	each	\$ 2,000	\$ 32,000	\$ 3,000	\$ 35,000	
	SVE Wellhead Connections/Vaults	16	each	\$ 800	\$ 12,800	\$ 2,000	\$ 14,800	
	Installation of SVE Conveyance Piping	1,000	LF	\$ 25	\$ 25,000	\$ 3,000	\$ 28,000	
	Road Disturbance/Permitting/Repair	1	each	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	Drill Cuttings Disposal	50	drum	\$ 200	\$ 10,000	\$ 1,000	\$ 11,000	
	Waste Disposal Profiling and Sampling	1	LS	\$ 2,000	\$ 2,000	\$ 1,000	\$ 3,000	
	Compressor for LNAPL Skimmers	1	each	\$ 3,500	\$ 3,500		\$ 3,500	
	LNAPL Recovery Tank and Ancillary Equipment	1	LS	\$ 5,000	\$ 5,000	\$ 1,500	\$ 6,500	
	Water Treatment Batch Tank	1	each	\$ 4,000	\$ 4,000		\$ 4,000	
	SVE Blower and Sound Enclosure	1	LS	\$ 7,500	\$ 7,500		\$ 7,500	
	Moisture Knockout Tank	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Ancillary Equipment and Piping for Knockout Tank	1	LS	\$ 5,000	\$ 5,000	\$ 1,000	\$ 6,000	
	Air Stripper and Ancillary Equipment	1	LS	\$ 25,000	\$ 25,000	\$ 1,500	\$ 26,500	
	Vapor Treatment Equipment:							
	Heat Exchanger	1	each	\$ 3,000	\$ 3,000		\$ 3,000	
	Thermal/Catalytic Oxidizer	1	each	\$ 30,000	\$ 30,000		\$ 30,000	
	Propane AST for alternative fuel source	1	each	\$ 15,000	\$ 15,000		\$ 15,000	
	Vapor Phase Carbon	2	each	\$ 3,000	\$ 6,000		\$ 6,000	
	Ozone-Peroxide System Package/Trailer	1	LS	\$ 150,000	\$ 150,000		\$ 150,000	
	Misc. Plumbing/Piping/Instrumentation/Controls	1	LS	\$ 5,000	\$ 5,000	\$ 5,000	\$ 10,000	
	Treatment System Enclosure	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	Telemetry	1	each	\$ 4,000	\$ 4,000	\$ 1,500	\$ 5,500	
	Electrical Service	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	System Startup/Initial Monitoring Period	1	LS	\$ 30,000		\$ 30,000	\$ 30,000	
	Treatment System Installation Report	1	LS	\$ 20,000		\$ 20,000	\$ 20,000	
	<i>Category Subtotals</i>				\$ 750,600	\$ 104,500	\$ 855,100	
	Tax on Contractor Services/Capital Equipment (9.5%)				\$ 71,300		\$ 71,300	\$ 926,400
System Operation and Maintenance								
	Annual System O&M (4 Years)							
	Electrical Usage	12	months	\$ 1,200	\$ 14,400		\$ 14,400	
	Peroxide Usage (50% solution, to be diluted to 10%)	3,800	gallons	\$ 10	\$ 38,000		\$ 38,000	
	Air Influent and Effluent Sampling	12	months	\$ 200	\$ 2,400		\$ 2,400	
	Water Influent and Effluent Sampling	12	months	\$ 600	\$ 7,200		\$ 7,200	
	Site Visits (monthly)	12	visits	\$ 2,000		\$ 24,000	\$ 24,000	
	Annual O&M Subtotal						\$ 86,000	
	<i>Net Present Value O&M Subtotal (4 years, 7% discount)*</i>						\$ 291,300	
	Periodic O&M Costs							
	Propane Usage (Years 1 and 2)	12	months	\$ 300	\$ 3,600		\$ 3,600	
	<i>Net Present Value (years 1-2, 7% discount)*</i>						\$ 6,500	
	LNAPL Disposal (Year 2)	1	LS	\$ 1,500	\$ 1,500	\$ 500	\$ 2,000	
	<i>Net Present Value (year 2, 7% discount)*</i>						\$ 1,700	
	Carbon Replacement (Year 4)	2,000	pounds	\$ 1.80	\$ 3,600	\$ 1,000	\$ 4,600	
	<i>Net Present Value (year 4, 7% discount)*</i>						\$ 3,500	
	Contingency for Equipment Replacement							
	10% of Capital Equipment Subtotal				\$ 75,100		\$ 75,100	
	<i>Net Present Value (year 3, 7% discount)*</i>						\$ 61,300	\$ 364,300
Performance and Compliance Monitoring/Sampling								
	Annual Ground Water Monitoring (6 Years)							
	Sampling Labor and Equipment	4	quarters	\$ 11,000		\$ 44,000	\$ 44,000	
	Ground Water Analytical Costs (4 quarters)	120	well	\$ 300	\$ 36,000		\$ 36,000	
	Reporting	4	each	\$ 3,000		\$ 12,000	\$ 12,000	
	Annual Ground Water Monitoring Subtotal						\$ 92,000	
	<i>Net Present Value (6 years, 7% discount)*</i>						\$ 438,600	

Table 10
Order-of-Magnitude Cost Estimate
Alternative 4 - LNAPL Recovery, ISCO and Localized SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Indoor Air Quality Monitoring (6 Years)	Sampling Labor and Equipment	1	event	\$ 1,500		\$ 1,500	\$ 1,500	
	Air Analytical Cost	5	samples	\$ 300	\$ 1,500		\$ 1,500	
	Annual Air Quality Monitoring Subtotal						\$ 3,000	
	Net Present Value (6 years, 7% discount) ^a						\$ 14,300	
	Compliance Soil Sampling (Year 6)							
	Contractor Drilling (Soil Sampling, Push-Probe)	2	day	\$ 4,000	\$ 8,000	\$ 3,000	\$ 11,000	
Compliance Soil Sampling (Year 6)	Soil Analytical Cost	20	each	\$ 300	\$ 6,000		\$ 6,000	
	Compliance Soil Sampling Subtotal						\$ 17,000	
	Net Present Value (year 6, 7% discount) ^a						\$ 11,300	
	Task Subtotal							\$ 464,200
Site Restoration and Closure								
Well Closure	82	well	\$ 1,500	\$ 123,000	\$ 41,000	\$ 164,000		
Equipment/Enclosure Decommissioning	1	LS	\$ 5,000	\$ 5,000	\$ 12,000	\$ 17,000		
Final Closure Report	1	LS	\$ 15,000		\$ 15,000	\$ 15,000		
Site Restoration and Closure Subtotal						\$ 196,000		
Net Present Value (year 6, 7% discount) ^a						\$ 130,500		
PROJECT TOTAL								\$ 1,976,000

^aNet Present Value based on Annual or Multi-Year Discount Factors published in *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USACE/USEPA, July 2000). discount factors are calculated using the following formulas:

- Annual Discount Factor at 7% = $1 + 1.07^t$, where t = year that future cost is incurred.
- Multi-Year Discount Factor at 7% = $[1.07^n - 1] / [0.7(1.07)^n]$, where n = number of years that future costs are incurred.

Table 11
Order-of-Magnitude Cost Estimate
Alternative 5 - GWE with Ex-Situ Treatment, Re-infiltration and Localized SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
Pre-Remedial Activities								
	Pilot Testing							
	Hydraulic Permeability/Radius of Influence, Slug	1	LS	\$ 5,000	\$ 5,000	\$ 8,000	\$ 13,000	
	Treatment System Design	1	LS			\$ 35,000	\$ 35,000	
	Air Permit for Treated Vapor Discharge	1	LS			\$ 5,000	\$ 5,000	
	Bid Solicitation	3	each			\$ 2,500	\$ 7,500	
	Contracting	1	each			\$ 5,000	\$ 5,000	\$ 65,500
Treatment System (Capital Cost)								
	GW Extraction Well Installation (6" PVC to 20 ft bgs)	13	each	\$ 4,500	\$ 58,500	\$ 5,000	\$ 63,500	
	GW Extraction Pumps (4")	13	each	\$ 3,000	\$ 39,000	\$ -	\$ 39,000	
	GW Extraction Wellhead Connections/Vaults	13	each	\$ 800	\$ 10,400	\$ 2,000	\$ 12,400	
	Reinfiltration Trenches	100	LF	\$ 100	\$ 10,000	\$ 4,000	\$ 14,000	
	Trenching & Installation of Conveyance Piping	950	LF	\$ 70	\$ 66,500	\$ 5,000	\$ 71,500	
	SVE Well Installation (4" PVC to 15 ft bgs)	12	each	\$ 2,000	\$ 24,000	\$ 3,000	\$ 27,000	
	SVE Wellhead Connections/Vaults	12	each	\$ 800	\$ 9,600	\$ 2,000	\$ 11,600	
	Installation of SVE Conveyance Piping	900	LF	\$ 20	\$ 18,000	\$ 3,000	\$ 21,000	
	Road Disturbance/Permitting/Repair	1	each	\$ 6,000	\$ 6,000	\$ 3,000	\$ 9,000	
	Drill Cuttings Disposal	48	drum	\$ 200	\$ 9,600	\$ -	\$ 9,600	
	Waste Disposal Profiling and Sampling	1	LS	\$ 2,500	\$ 2,500	\$ -	\$ 2,500	
	Oil-Water Separator Tank	1	each	\$ 10,000	\$ 10,000	\$ -	\$ 10,000	
	Ancillary Equipment and Piping for Separator Tank	1	LS	\$ 5,000	\$ 5,000	\$ 2,000	\$ 7,000	
	LNAPL Recovery Tank and Ancillary Equipment	1	LS	\$ 5,000	\$ 5,000	\$ 1,500	\$ 6,500	
	Water Batch Tanks	2	each	\$ 4,000	\$ 8,000	\$ -	\$ 8,000	
	Ancillary Equipment and Piping for Water Tanks	1	LS	\$ 5,000	\$ 5,000	\$ 1,000	\$ 6,000	
	SVE Blower and Sound Enclosure	1	LS	\$ 7,500	\$ 7,500	\$ -	\$ 7,500	
	Moisture Knockout Tank	1	each	\$ 3,000	\$ 3,000	\$ -	\$ 3,000	
	Ancillary Equipment and Piping for Knockout Tank	1	LS	\$ 5,000	\$ 5,000	\$ 1,000	\$ 6,000	
	Air Stripper and Ancillary Equipment	1	LS	\$ 25,000	\$ 25,000	\$ 1,500	\$ 26,500	
	Vapor Treatment Equipment:							
	Heat Exchanger	1	each	\$ 3,000	\$ 3,000	\$ -	\$ 3,000	
	Thermal/Catalytic Oxidizer	1	each	\$ 30,000	\$ 30,000	\$ -	\$ 30,000	
	Propane AST for alternative fuel source	1	each	\$ 15,000	\$ 15,000	\$ -	\$ 15,000	
	Vapor Phase Carbon	2	each	\$ 3,000	\$ 6,000	\$ -	\$ 6,000	
	Liquid Phase Carbon	2	each	\$ 5,000	\$ 10,000	\$ -	\$ 10,000	
	Misc. Plumbing/Piping	500	LF	\$ 25	\$ 12,500	\$ 5,000	\$ 17,500	
	Instrumentation	1	LS	\$ 4,000	\$ 4,000	\$ 2,000	\$ 6,000	
	Control System	1	LS	\$ 6,000	\$ 6,000	\$ 3,000	\$ 9,000	
	Telemetry	1	each	\$ 4,000	\$ 4,000	\$ 1,500	\$ 5,500	
	Electrical Service	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	Treatment System Compound	1	each	\$ 15,000	\$ 15,000	\$ 1,500	\$ 16,500	
	System Startup/Initial Monitoring Period	1	LS	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	
	Treatment System Installation Report	1	LS	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	
	<i>Category Subtotals</i>				\$ 448,100	\$ 98,500	\$ 546,600	
	Tax on Contractor Services/Capital Equipment (9.5%)				\$ 42,600		\$ 42,600	\$ 589,200
System Operation and Maintenance								
	Annual System O&M (13 Years)							
	Electrical Usage	12	months	\$ 1,500	\$ 18,000		\$ 18,000	
	Water Influent and Effluent Sampling	12	months	\$ 600	\$ 7,200		\$ 7,200	
	Site Visits (monthly)	12	visits	\$ 2,000		\$ 24,000	\$ 24,000	
	Annual O&M Subtotal						\$ 49,200	
	<i>Net Present Value O&M Subtotal (13 years, 7% discount)^g</i>						\$ 411,200	
	Periodic O&M Costs							
	Air Influent and Effluent Sampling (Years 1 through 6)	12	months	\$ 200	\$ 2,400		\$ 2,400	
	<i>Net Present Value (6 years, 7% discount)^g</i>						\$ 11,400	
	Propane Usage (Years 1 through 4)	12	months	\$ 300	\$ 3,600		\$ 3,600	
	<i>Net Present Value (years 1-4, 7% discount)^g</i>						\$ 12,200	
	LNAPL Disposal (Year 2)	1	LS	\$ 1,500	\$ 1,500	\$ 500	\$ 2,000	
	<i>Net Present Value (year 2, 7% discount)^g</i>						\$ 1,700	
	Vapor-Phase Carbon Replacement (Years 5 and 6)	1,000	pounds	\$ 1.80	\$ 1,800	\$ 1,000	\$ 2,800	
	<i>Net Present Value (years 5 and 6, 7% discount)^g</i>						\$ 3,900	
	Liquid-Phase Carbon Replacement (Years 5, 7, 9, and 11)	4,000	pounds	\$ 1.80	\$ 7,200	\$ 1,000	\$ 8,200	
	<i>Net Present Value (years 5, 7, 9, and 11, 7% discount)^g</i>						\$ 19,300	
	Contingency for Equipment Replacement							
	10% of Capital Equipment Subtotal				\$ 44,800		\$ 44,800	
	<i>Net Present Value (year 5, 7% discount)^g</i>						\$ 31,900	\$ 491,600
Performance and Compliance Monitoring/Sampling								
	Annual Ground Water Monitoring (15 Years)							
	Sampling Labor and Equipment	4	quarters	\$ 11,000		\$ 44,000	\$ 44,000	
	Ground Water Analytical Costs (4 quarters)	120	well	\$ 300	\$ 36,000		\$ 36,000	
	Reporting	4	each	\$ 3,000		\$ 12,000	\$ 12,000	
	Annual Ground Water Monitoring Subtotal						\$ 92,000	
	<i>Net Present Value (13 years, 7% discount)^g</i>						\$ 768,900	
	Indoor Air Quality Monitoring (10 Years)							
	Sampling Labor and Equipment	1	event	\$ 1,500		\$ 1,500	\$ 1,500	
	Air Analytical Cost	5	samples	\$ 300	\$ 1,500		\$ 1,500	
	Annual Air Quality Monitoring Subtotal						\$ 3,000	
	<i>Net Present Value (10 years, 7% discount)^g</i>						\$ 21,100	

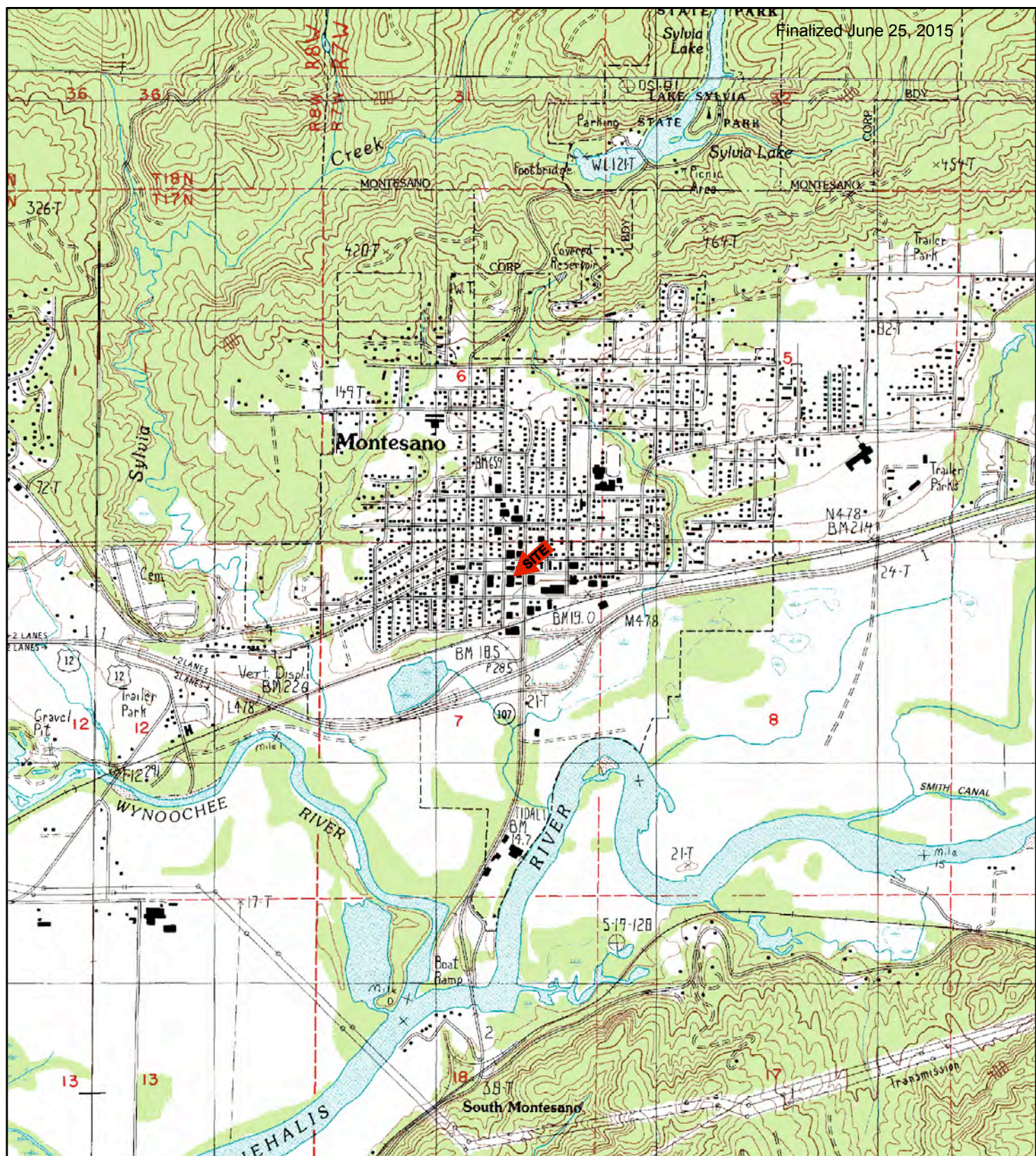
Table 11 Finalized June 25, 2015
Order-of-Magnitude Cost Estimate
Alternative 5 - GWE with Ex-Situ Treatment, Re-infiltration and Localized SVE
Whitney's Chevrolet
123 Pioneer Avenue
Montesano, Washington

Task	Component	Units	Basis	Unit Cost	Subtotal	Professional Labor	Component Subtotal	Task Subtotal
	Compliance Soil Sampling (Year 15)							
	Contractor Drilling (Soil Sampling, Push-Probe)	2	day	\$ 4,000	\$ 8,000	\$ 3,000	\$ 11,000	
	Soil Analytical Cost	20	each	\$ 300	\$ 6,000		\$ 6,000	
	Compliance Soil Sampling Subtotal						\$ 17,000	
	Net Present Value (year 15, 7% discount)*						\$ 6,200	\$ 796,200
	Site Restoration and Closure							
	Well Closure	45	well	\$ 1,500	\$ 67,500	\$ 22,500	\$ 90,000	
	Equipment/Enclosure Decommissioning	1	LS	\$ 5,000	\$ 5,000	\$ 12,000	\$ 17,000	
	Final Closure Report	1	LS	\$ 15,000		\$ 15,000	\$ 15,000	
	Site Restoration and Closure Subtotal						\$ 122,000	
	Net Present Value (year 15, 7% discount)*						\$ 44,200	\$ 44,200
PROJECT TOTAL								\$ 1,987,000

*Net Present Value based on Annual or Multi-Year Discount Factors published in *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USACE/USEPA, July 2000). discount factors are calculated using the following formulas:

- Annual Discount Factor at 7% = $1/(1+0.07)^t$, where t = year that future cost is incurred.
- Multi-Year Discount Factor at 7% = $[1 - (1.07)^{-n}] / [0.7(1.07)^n]$, where n = number of years that future costs are incurred.

Figures



KEY: SOURCE: USGS 7.5 MINUTE QUADRANGLE (TOPOGRAPHIC)

- MONTESANO, WASH. 1983; REVISED 1986
- CENTRAL PARK, WASH. 1983; REVISED 1986
- WYNOOCHEE VALLEY SW, WASH. 1987; REVISED 1990
- PRICES PEAK, WASHINGTON 1987; REVISED 1990

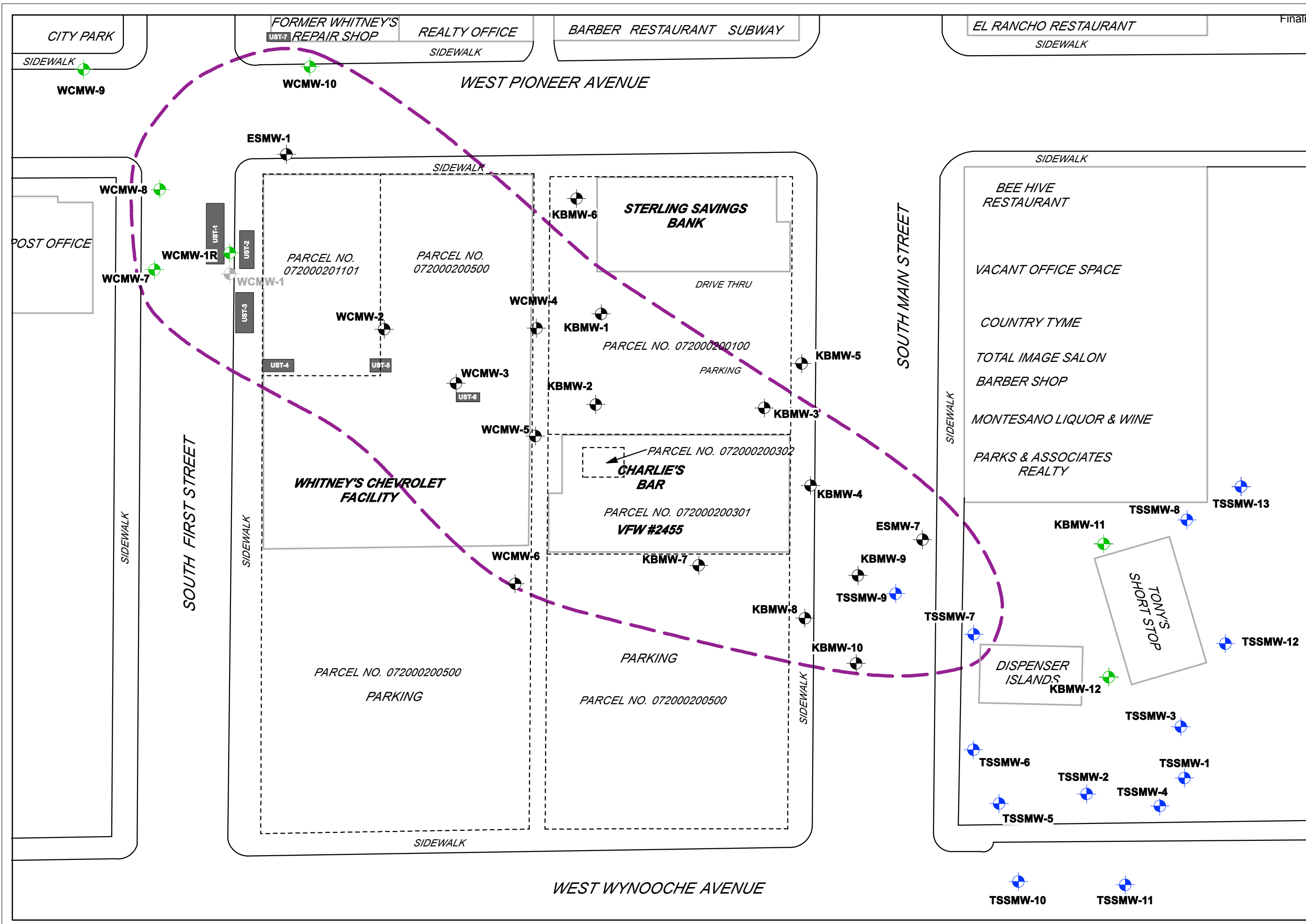


SCALE: 1" = 24,000'

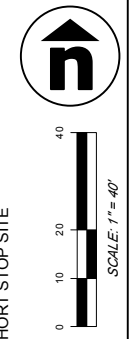
ept ENVIRONMENTAL PARTNERS INC
 295 NE Gilman Boulevard, Suite 201
 Issaquah, Washington 98027

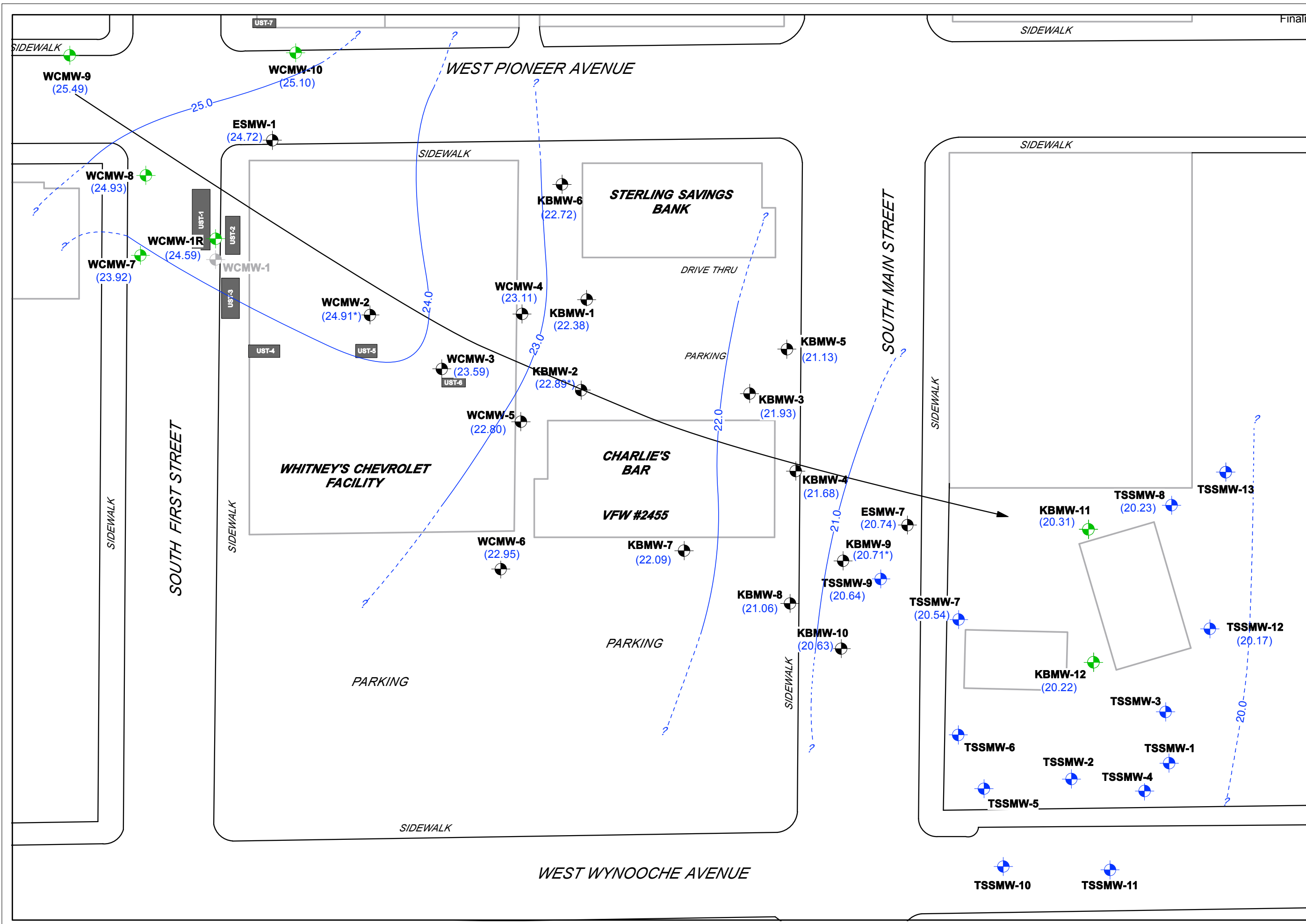
FIGURE 1
 GENERAL VICINITY MAP

PROJECT	51201.10		
PREPARED FOR	WHITNEY'S CHEVROLET, INC.		
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON		
SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TS	TM	10/17/12



<p>ENVIRONMENTAL PARTNERS INC. 295 NE Gilman Boulevard, Suite 201 Livingsport, Washington 98027</p>	PROJECT	51201.10	
	PREPARED FOR	WHITNEY'S CHEVROLET, INC.	
<p>FIGURE 2</p> <p>SITE REPRESENTATION WITH SITE BOUNDARY AND MONITORING WELL LOCATIONS</p>	LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON	
	SHEET	1 of 1	
<p>APPROXIMATE SITE BOUNDARY</p> <p>APPROXIMATE PARCEL BOUNDARY</p> <p>GROUND WATER MONITORING WELL ASSOCIATED WITH WHITNEY'S CHEVROLET SITE</p> <p>GROUND WATER MONITORING WELL ASSOCIATED WITH TONY'S SHORT STOP SITE</p> <p>GROUND WATER MONITORING WELL INSTALLED DURING 2011</p> <p>FORMER UNDERGROUND STORAGE TANK LOCATION</p>	DRAWN BY	ALW	
	REVIEWED BY	TSS	
		DATE	10/31/12





PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET, INC.
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DATE	10/31/12
DRAWN BY	ALW
REVIEWED BY	TSS

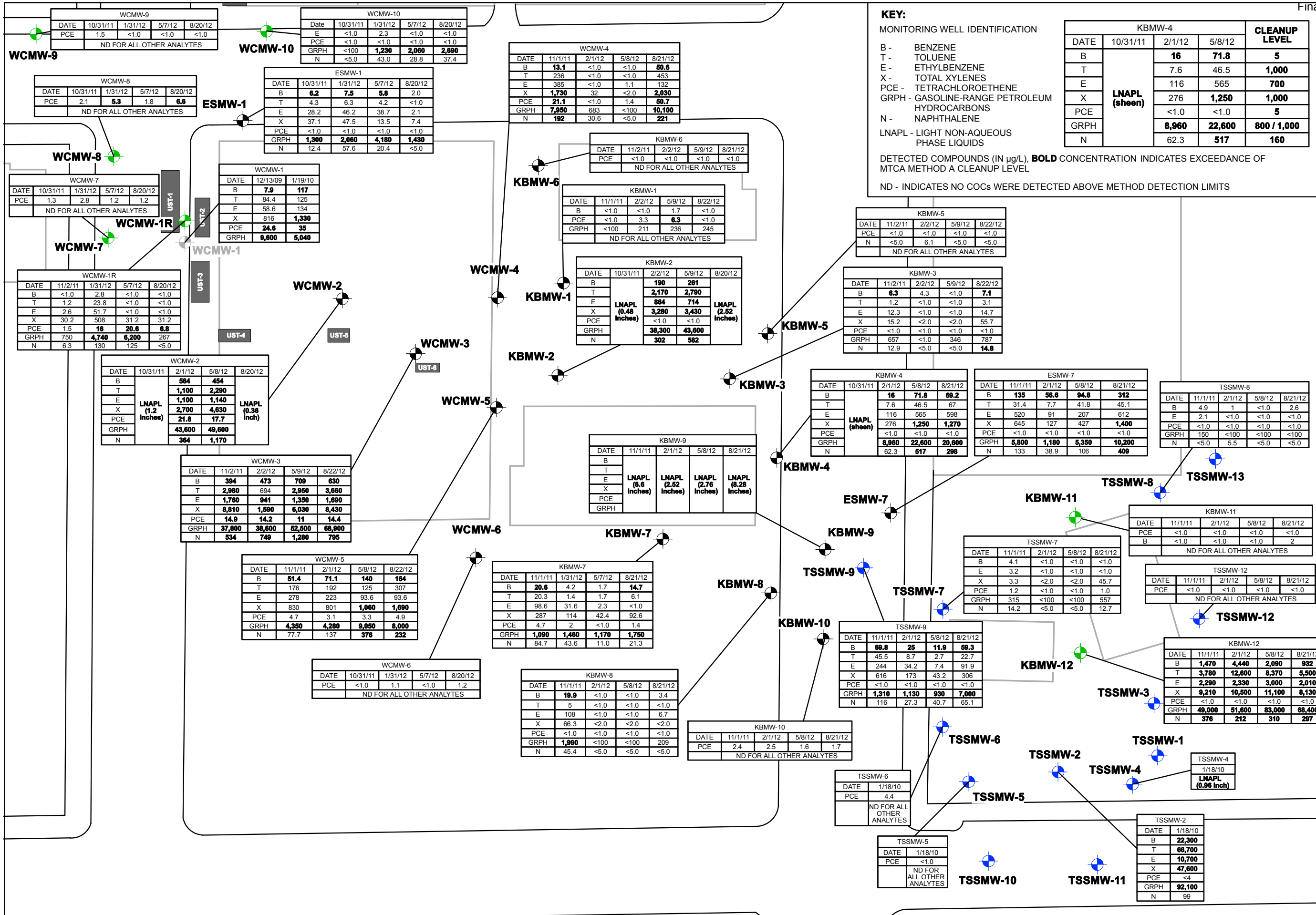
ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Issaquah, Washington 98027

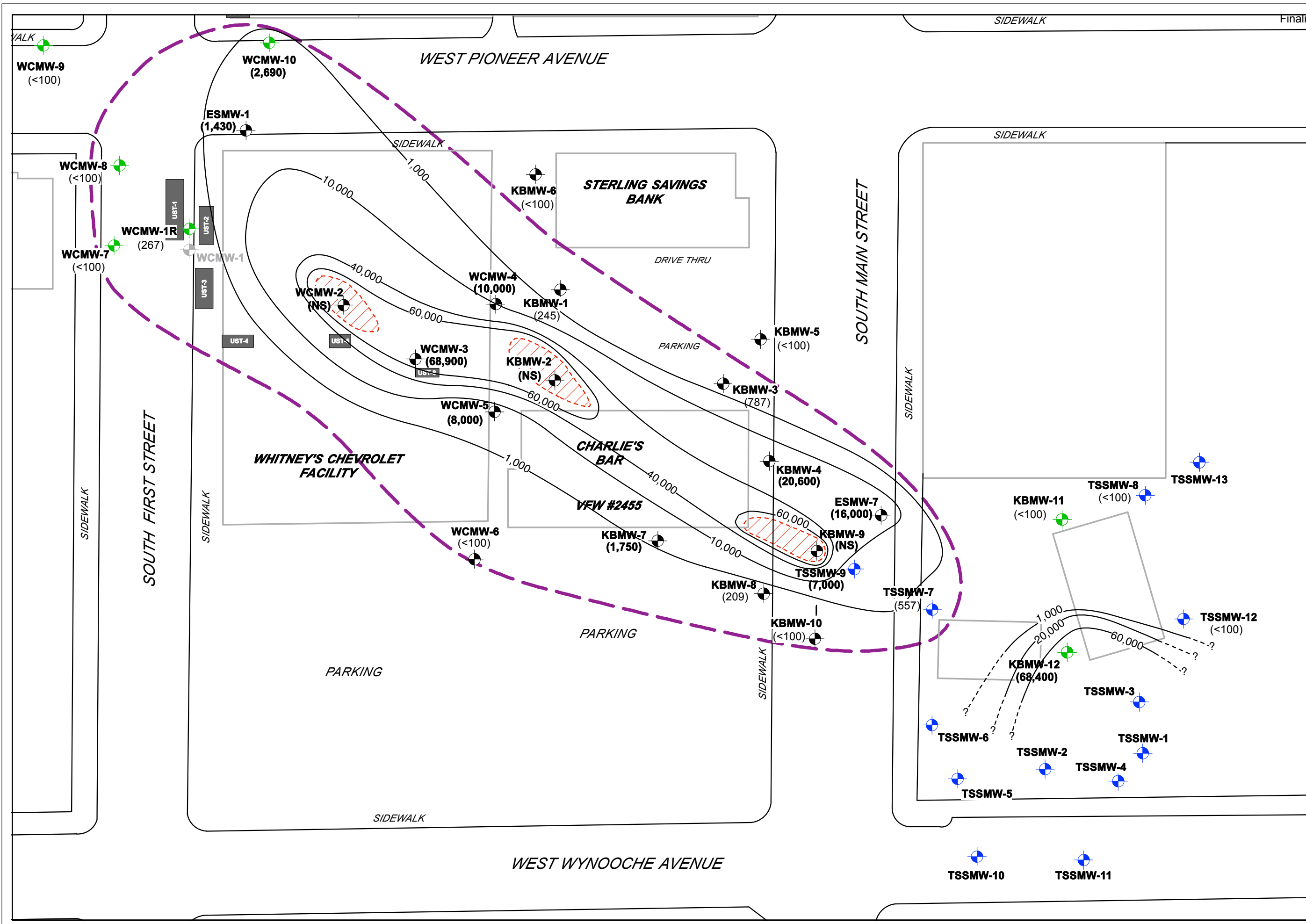
FIGURE 3
 SITE REPRESENTATION WITH WATER TABLE PIEZOMETRIC CONTOURS FOR AUGUST 2012

LEGEND:
 ● GROUND WATER MONITORING WELL ASSOCIATED WITH WHITNEY'S CHEVROLET SITE
 ● GROUND WATER MONITORING WELL ASSOCIATED WITH TONY'S SHORT STOP SITE
 ● FORMER UNDERGROUND STORAGE TANK LOCATION
 --- GROUND WATER ELEVATION CONTOUR, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN
 (20.22) GROUND WATER ELEVATION IN FEET
 (20.71*) GROUND WATER ELEVATION ADJUSTED FOR PRESENCE OF LNAPL
 → ESTIMATED GROUND WATER FLOW DIRECTION

SCALE: 1" = 40'

North Arrow





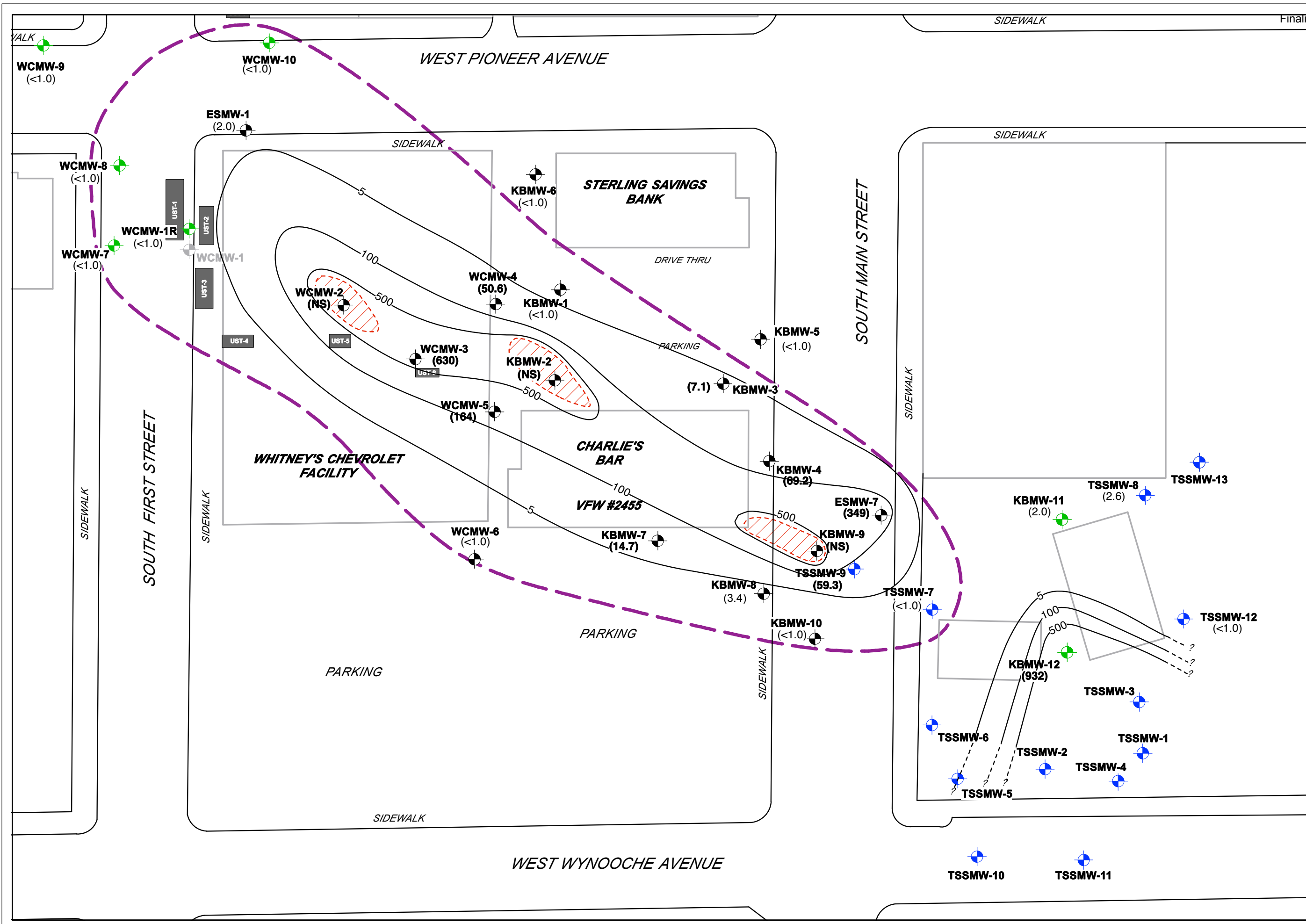
PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET, INC.
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	ALW
REVIEWED BY	TSS
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
295 NE Gilman Boulevard, Suite 201
Livestock, Washington 98027

FIGURE 5
GRPH ISOCENTRATION CONTOURS FOR AUGUST 2012 (IN µg/L)

APPROXIMATE SITE BOUNDARY
GROUND WATER MONITORING WELL ASSOCIATED WITH WHITNEY'S CHEVROLET SITE
GROUND WATER MONITORING WELL ASSOCIATED WITH TONY'S SHORT STOP SITE
GROUND WATER MONITORING WELL INSTALLED DURING 2011
INDICATES GRPH WAS NOT DETECTED ABOVE THE METHOD REPORTING LIMIT SHOWN
NS INDICATES SAMPLE WAS NOT COLLECTED DUE TO LNAPL IN MONITORING WELL
BOLD INDICATES CONCENTRATION OF GRPH WAS ABOVE MTCM METHOD A CLEANUP LEVEL (800 µg/L)
FORMER UNDERGROUND STORAGE TANK LOCATION
1,000 GRPH CONCENTRATION CONTOUR, DASHED WHERE INFERRED
HATCHED AREAS INDICATE PRESENCE OF MEASURED LNAPL IN WELL

SCALE: 1" = 40'



PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET, INC.
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	ALW
REVIEWED BY	ELC
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Everett, Washington 98207

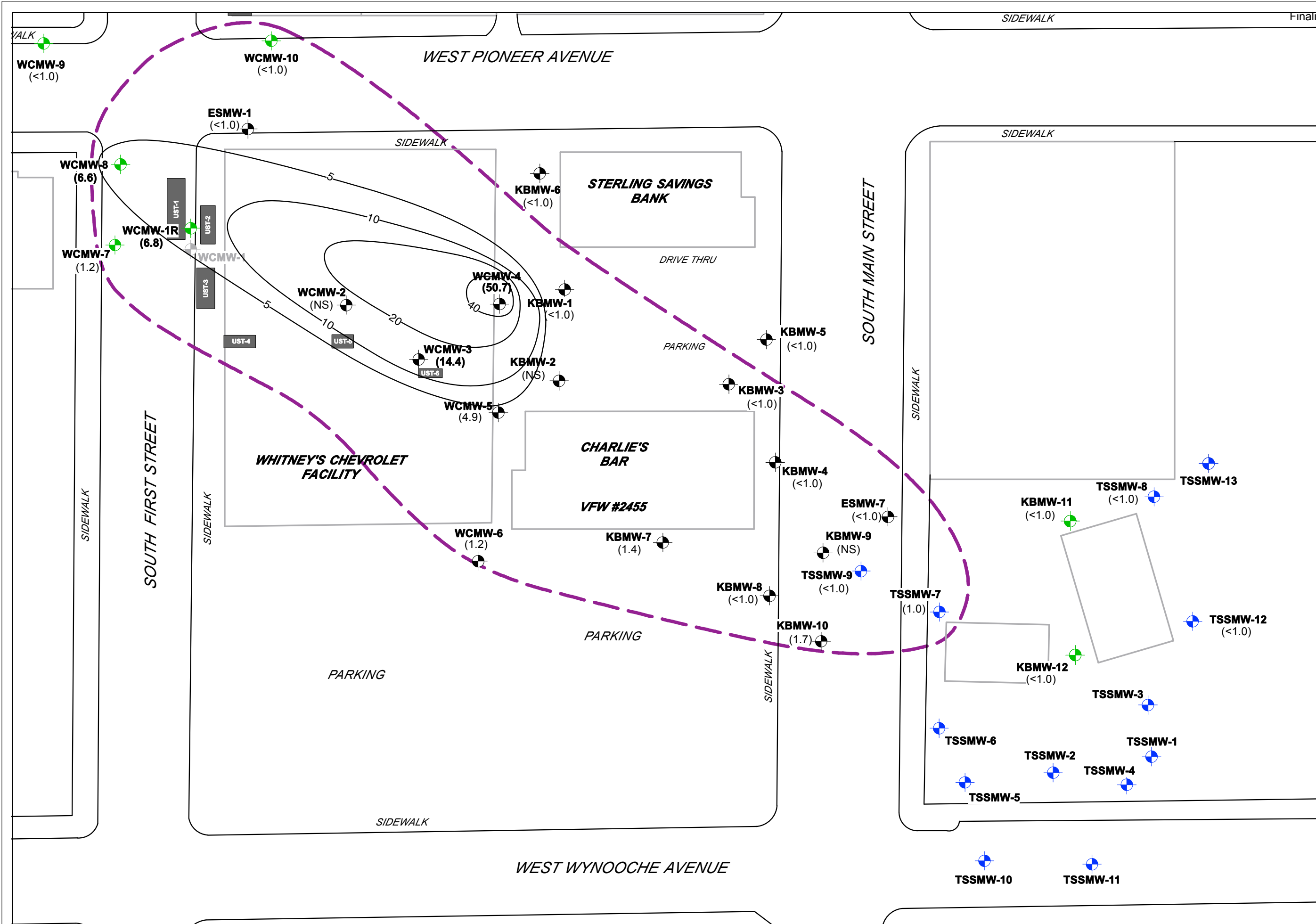
FIGURE 6
 BENZENE ISOCENTRATION CONTOURS
 FOR AUGUST 2012 (IN µg/L)

Legend:

- APPROXIMATE SITE BOUNDARY
- GROUND WATER MONITORING WELL ASSOCIATED WITH WHITNEY'S CHEVROLET SITE
- GROUND WATER MONITORING WELL ASSOCIATED WITH TONY'S SHORT STOP SITE
- INDICATES BENZENE WAS NOT DETECTED ABOVE THE METHOD REPORTING LIMIT SHOWN
- INDICATES SAMPLE WAS NOT COLLECTED DUE TO LNAPL IN MONITORING WELL
- INDICATES CONCENTRATION OF BENZENE WAS ABOVE MTCM METHOD A CLEANUP LEVEL (5 µg/L)
- FORMER UNDERGROUND STORAGE TANK LOCATION
- BENZENE CONCENTRATION CONTOUR, DASHED WHERE INFERRED
- HATCHED AREAS INDICATE PRESENCE OF MEASURED LNAPL IN WELL

Scale: 1" = 40'

North Arrow: ↑



PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET, INC.
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	ALW
REVIEWED BY	TSS
DATE	10/31/12

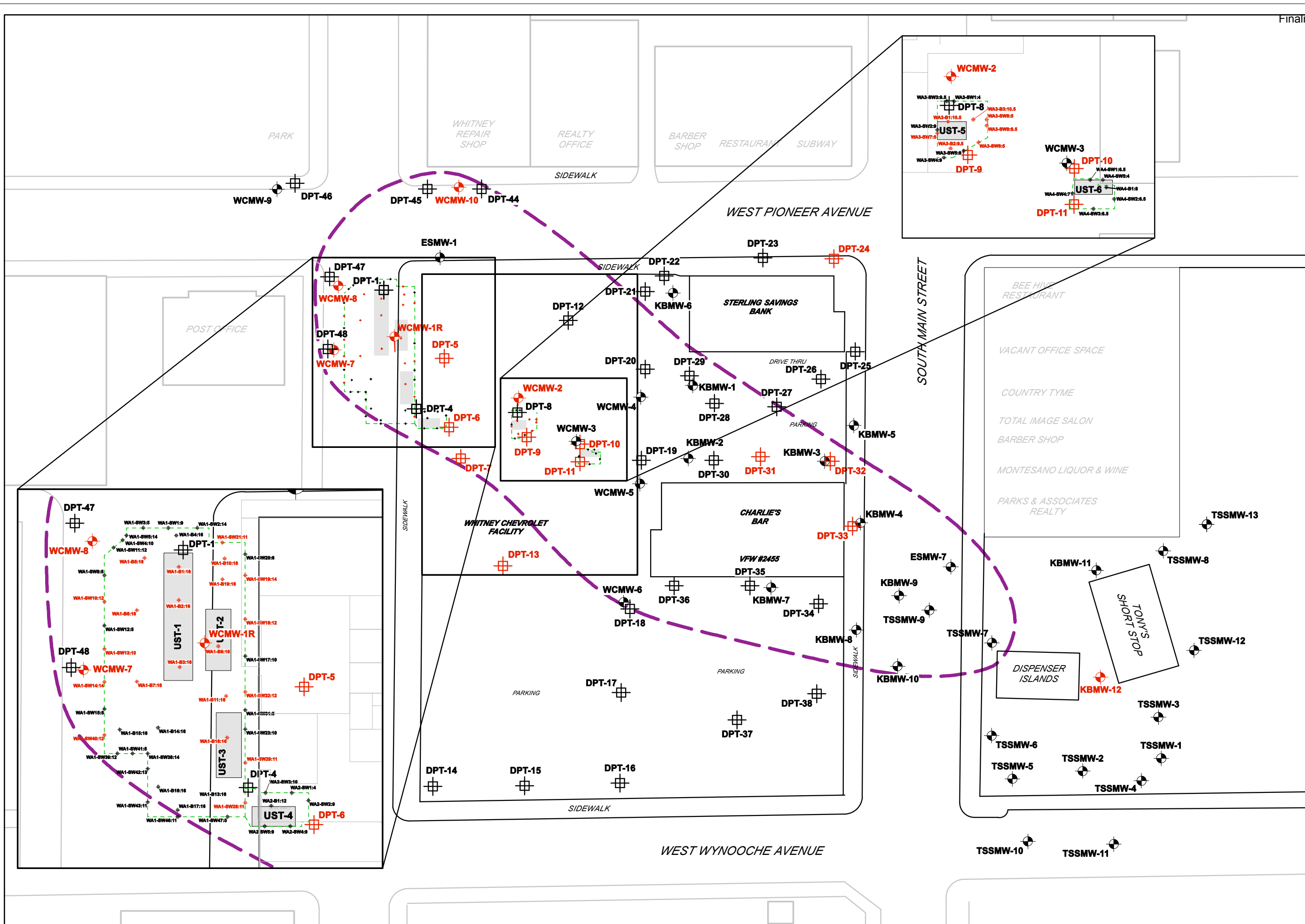
ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Longview, Washington 98027

FIGURE 7
 PCE ISOCONCENTRATION CONTOURS
 FOR AUGUST 2012 (IN µg/L)

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUND WATER MONITORING WELL ASSOCIATED WITH WHITNEY'S CHEVROLET SITE
- GROUND WATER MONITORING WELL ASSOCIATED WITH TONY'S SHORT STOP SITE
- GROUND WATER MONITORING WELL INSTALLED DURING 2011
- (<1.0) INDICATES PCE WAS NOT DETECTED ABOVE THE METHOD REPORTING LIMIT SHOWN
- NS INDICATES SAMPLE WAS NOT COLLECTED DUE TO LNAPL IN MONITORING WELL
- BOLD** INDICATES CONCENTRATION OF PCE WAS ABOVE MTCA METHOD A CLEANUP LEVEL (5 µg/L)
- FORMER UNDERGROUND STORAGE TANK LOCATION
- PCE CONCENTRATION CONTOUR

SCALE: 1" = 40'



PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	ALW
REVIEWED BY	TSS
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Longview, Washington 98027

FIGURE 8
 SITE REPRESENTATION WITH
 SOIL SAMPLING LOCATIONS

——— APPROXIMATE SITE BOUNDARY
 ⊕ SOIL SAMPLE LOCATION
 ● GROUND WATER MONITORING WELL
 ● RED LOCATIONS INDICATE RESIDUAL SOIL CONCENTRATIONS EXCEEDING MTCA METHOD A CLEANUP LEVELS
 ⊕ APPROXIMATE FINAL LIMITS OF INTERIM ACTION EXCAVATION AREA
 □ FORMER UNDERGROUND STORAGE TANK LOCATION

0 12.5 25 50
 SCALE: 1" = 50'



PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	TS
REVIEWED BY	TM
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Longview, Washington 98027

FIGURE 9
 CONCEPTUAL LAYOUT FOR ALTERNATIVE 1
 MULTI-PHASE EXTRACTION
 AND EX-SITU TREATMENT

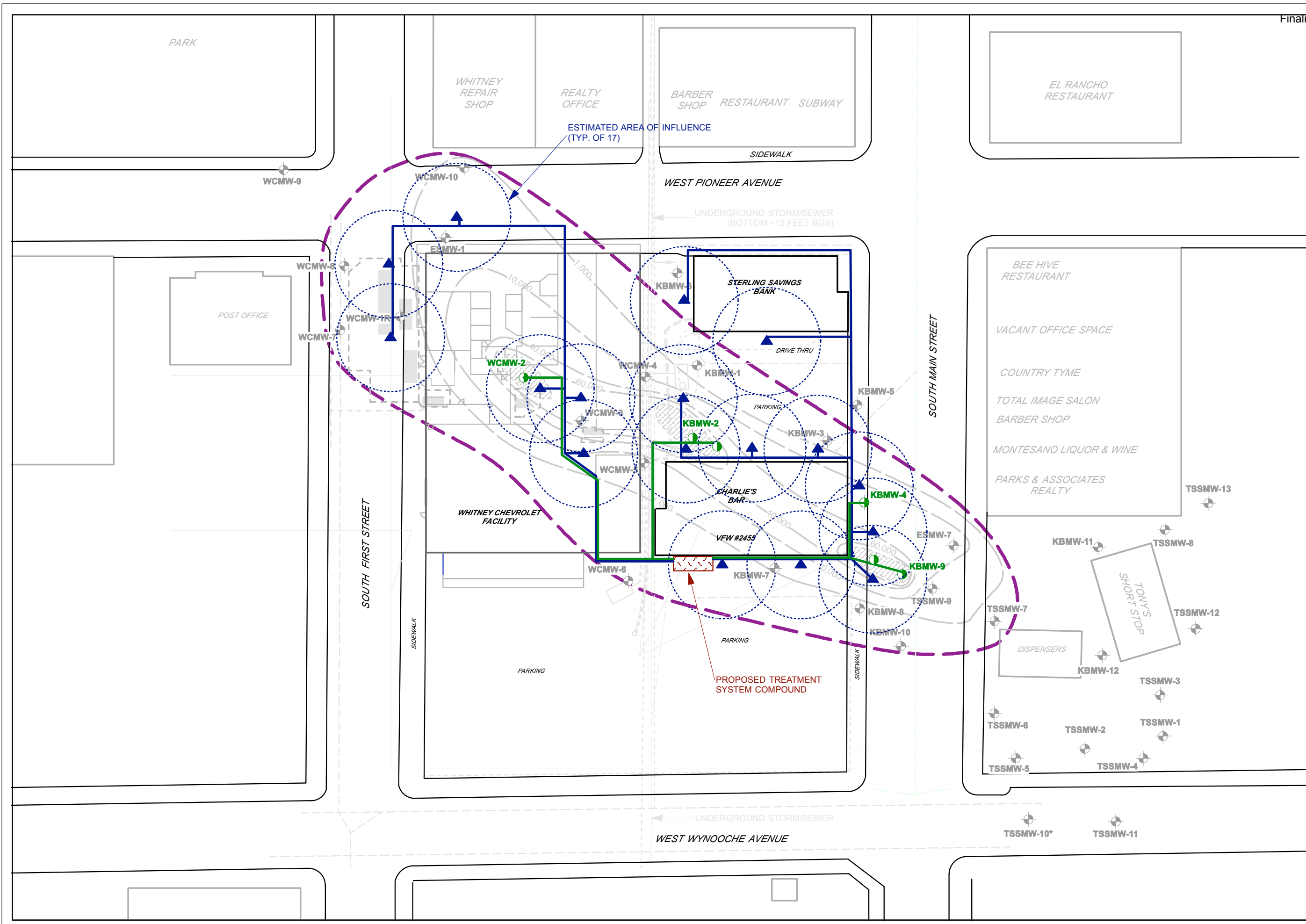
PROPOSED MULTI-PHASE EXTRACTION (MPE) WELL

PROPOSED MPE CONVEYANCE PIPING

ESTIMATED AREA OF INFLUENCE (TYP. OF 15)

PROPOSED TREATMENT SYSTEM COMPOUND

SCALE: 1" = 50'

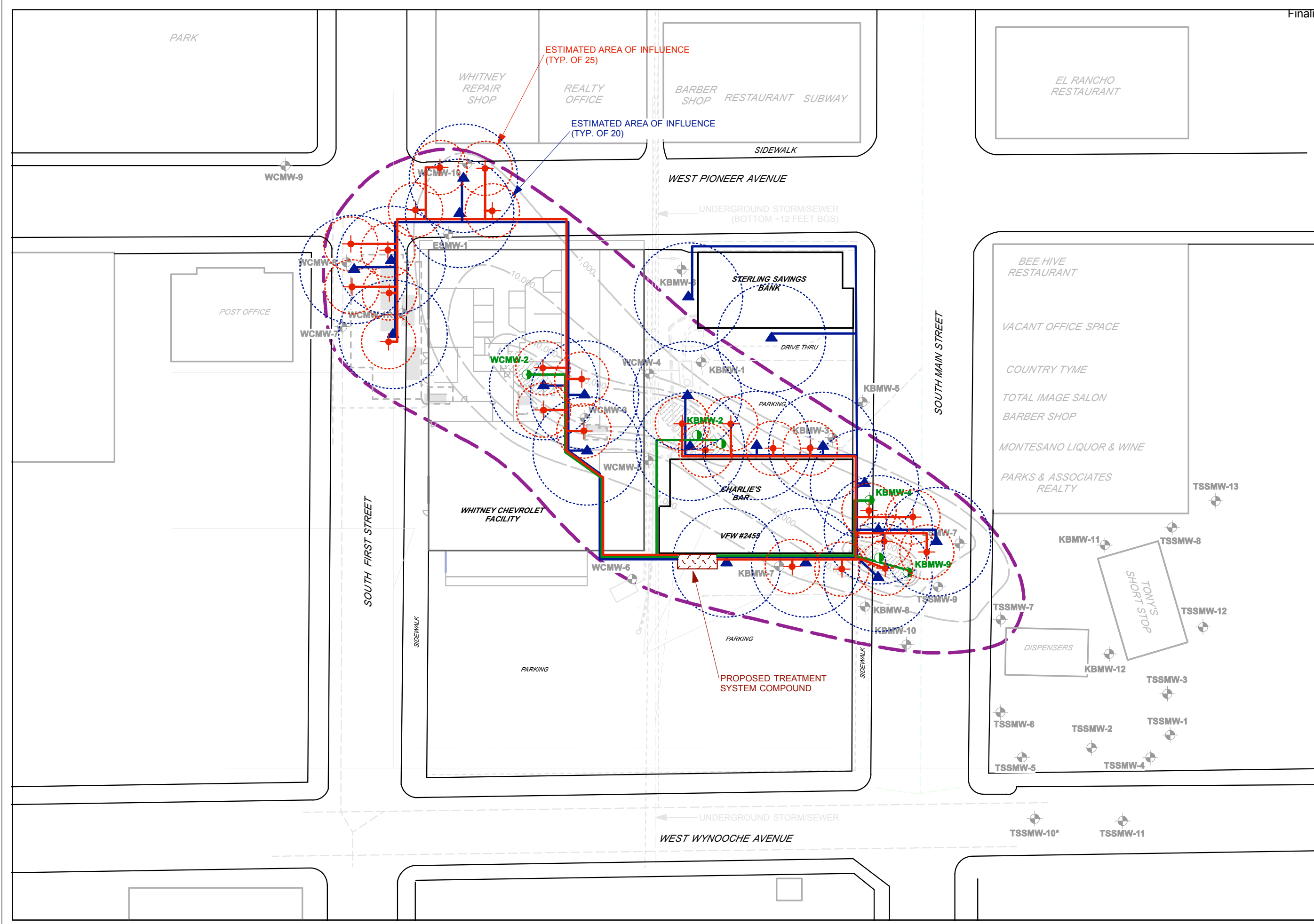


PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	TS
REVIEWED BY	TM
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Longview, Washington 98027

FIGURE 10
 CONCEPTUAL LAYOUT FOR ALTERNATIVE 2
 LNAPL RECOVERY AND SOIL VAPOR EXTRACTION

PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
 PROPOSED LNAPL RECOVERY WELL
 PROPOSED SVE CONVEYANCE PIPING
 PROPOSED LNAPL CONVEYANCE PIPING (INCLUDES SEPARATE GROUND WATER RECOVERY PIPING)



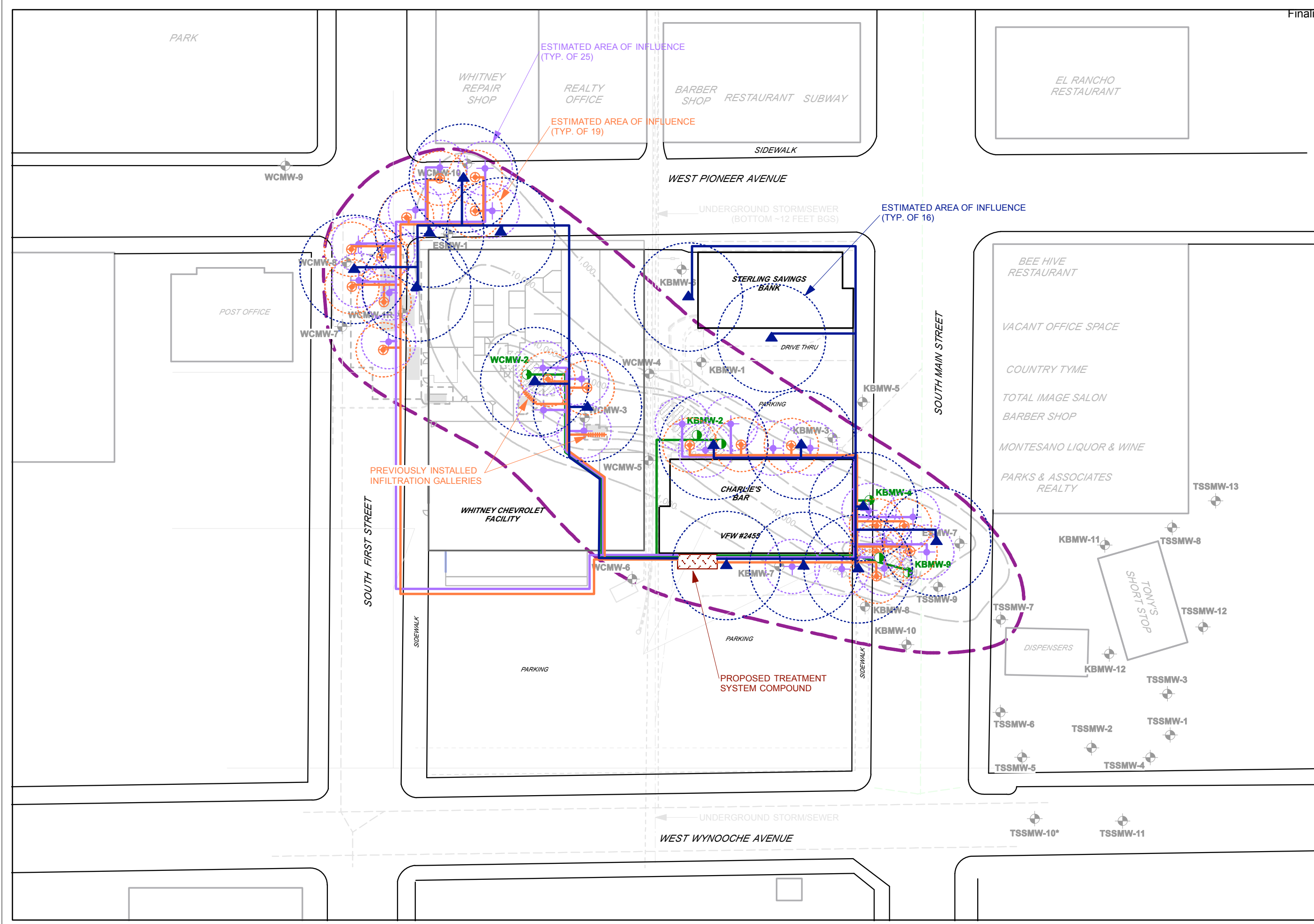
PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DRAWN BY	TS
REVIEWED BY	TM
DATE	10/31/12

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Issaquah, Washington 98027

FIGURE 11
 CONCEPTUAL LAYOUT FOR ALTERNATIVE 3
 LNAPL RECOVERY AND AS/SVE

- PROPOSED AIR SPARGE (AS) WELL
- PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
- PROPOSED LNAPL RECOVERY WELL
- PROPOSED AS CONVEYANCE PIPING
- PROPOSED SVE CONVEYANCE PIPING
- PROPOSED LNAPL CONVEYANCE PIPING (INCLUDES SEPARATE GROUND WATER RECOVERY PIPING)

SCALE: 1" = 60'



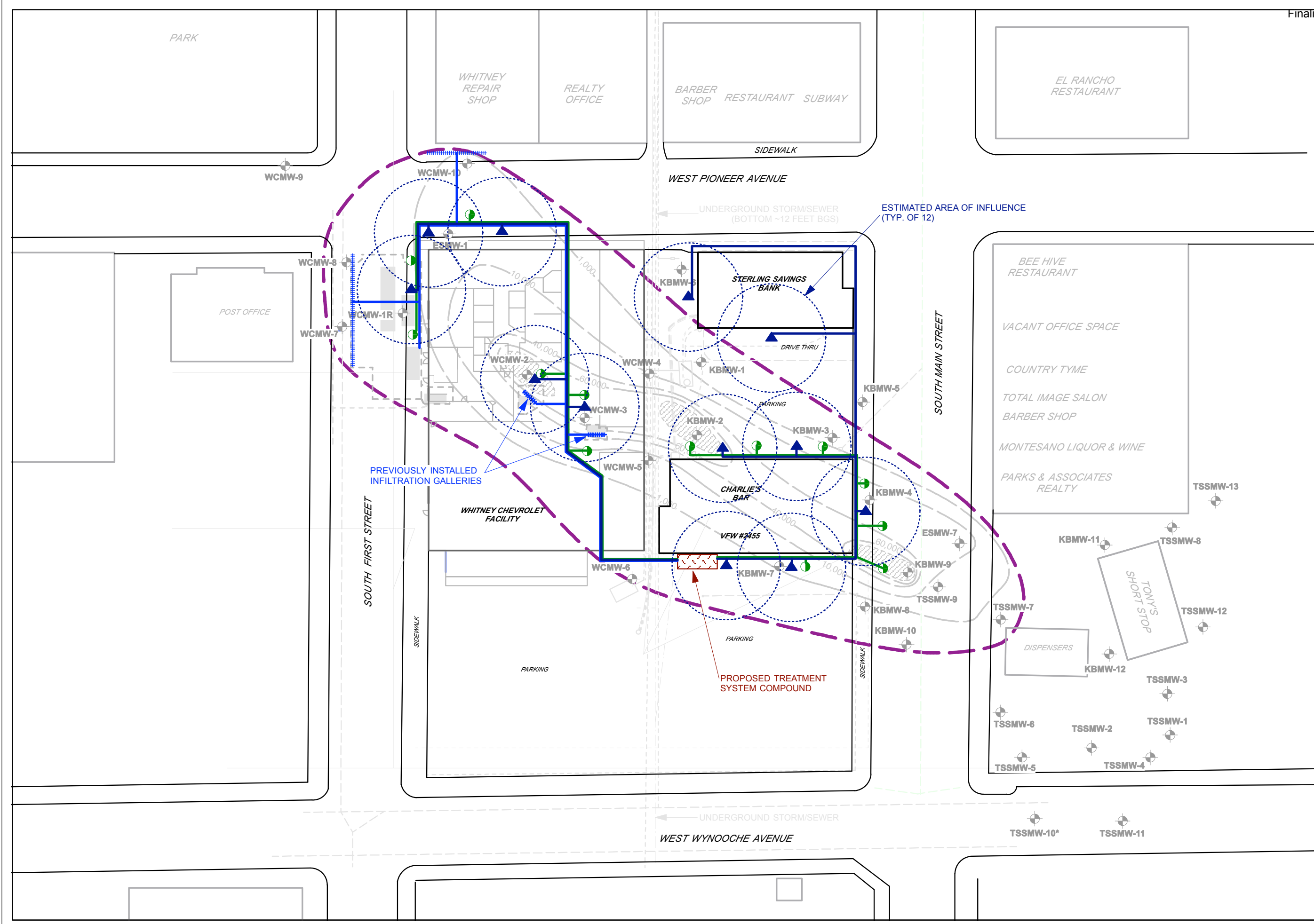
PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DATE	10/31/12
REVIEWED BY	TM
DRAWN BY	TS

ENVIRONMENTAL PARTNERS INC
 295 NE Gilman Boulevard, Suite 201
 Issaquah, Washington 98027

FIGURE 12
 CONCEPTUAL LAYOUT FOR ALTERNATIVE 4
 LNAPL RECOVERY, ISCO AND LOCALIZED SVE

PROPOSED OZONE SPARGE WELL
 PROPOSED HYDROGEN PEROXIDE INJECTION WELL
 PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
 PROPOSED LNAPL RECOVERY WELL
 PROPOSED OZONE INJECTION TUBING
 PROPOSED HYDROGEN PEROXIDE INJECTION PIPING
 PROPOSED SVE CONVEYANCE PIPING
 PROPOSED LNAPL CONVEYANCE PIPING
 (INCLUDES SEPARATE GROUND WATER RECOVERY PIPING)

SCALE: 1" = 50'



PROJECT	51201.10
PREPARED FOR	WHITNEY'S CHEVROLET
LOCATION	123 WEST PIONEER AVENUE MONTESANO, WASHINGTON
SHEET	1 of 1
DATE	10/31/12
REVIEWED BY	TM
DRAWN BY	TS

ENVIRONMENTAL PARTNERS INC.
 295 NE Gilman Boulevard, Suite 201
 Issaquah, Washington 98027

FIGURE 13

CONCEPTUAL LAYOUT FOR ALTERNATIVE 5
 GWE WITH EX-SITU TREATMENT,
 RE-INFILTRATION AND LOCALIZED SVE

- PROPOSED LNAPL/GROUND WATER EXTRACTION WELL
- PROPOSED GROUND WATER INJECTION TRENCH
- PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
- PROPOSED GROUND WATER EXTRACTION PIPING
- PROPOSED GROUND WATER INJECTION PIPING
- PROPOSED SVE CONVEYANCE PIPING

SCALE: 1" = 50'

Attachments

Attachment A
August 2012 Purge Water Disposal Documentation

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number WAD027357243	2. Page 1 of 1	3. Emergency Response Phone 206-285-8010	4. Manifest Tracking Number 008123837 JJK		
		5. Generator's Name and Mailing Address Whitneys Chevrolet 123 Florence Ave Montesano, WA 98563 Generator's Phone: 360 249-6629					
6. Transporter 1 Company Name Kleen Environmental Technologies, Inc.						U.S. EPA ID Number WAH000004457	
7. Transporter 2 Company Name						U.S. EPA ID Number	
8. Designated Facility Name and Site Address Chemical Waste Management of the NW 17629 Cedar Springs Lane Arlington, OR 97812 Facility's Phone: 541-454-2030						U.S. EPA ID Number ORD089452353	
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes	
		No.	Type				
X	UN3082, Waste Environmentally Hazardous Substance, Liquid, PG II, ERG # (171) (Trichloroethene, Tetrachloroethene)	4	DM	5075 220	P	F002	
14. Special Handling Instructions and Additional Information 9b.1) Profile OR306568, 4 ea x 55 gal LA2 Steel drums							
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.							
Generator's/Offerd's Printed/Typed Name D. SORNOV Glick				Signature Mary Ann		Month Day Year 8 28 12	
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____							
17. Transporter Acknowledgment of Receipt of Materials							
Transporter 1 Printed/Typed Name David Wukelic				Signature David Wukelic		Month Day Year 8 28 12	
Transporter 2 Printed/Typed Name				Signature		Month Day Year	
18. Discrepancy							
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection							
Manifest Reference Number: _____							
18b. Alternate Facility (or Generator)						U.S. EPA ID Number	
Facility's Phone: _____							
18c. Signature of Alternate Facility (or Generator)						Month Day Year	
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1.		2.		3.		4.	
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name				Signature		Month Day Year	

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY



LAND DISPOSAL RESTRICTION (LDR) NOTIFICATION AND CERTIFICATION FORM (PHASE IV)

Generator Name: Whitney's Chevrolet

Profile Number: OR 306568

Manifest Number: 008123837 JJIC

Ref. #	2. US EPA HAZARDOUS WASTE CODE(S)	3. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION (If not applicable, simply check NONE)		4. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
		DESCRIPTION	NONE	
1.	<u>F002</u>		<input checked="" type="checkbox"/>	<u>1</u>
2.				
3.				
4.				

- Is this waste a non-wastewater or wastewater? (See 40 CFR 268.2) Check ONE: Non-Wastewater Wastewater
For hazardous debris meeting the definition of debris and subject to the alternate treatment standards in 268.45, check here:
- In **column 2**, identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261.
• To list additional waste code(s) use Land Disposal Notification/Certification Supplemental Form (CWM-2005-D) and check here:
- In **column 3**, for each waste code, identify the subcategory if one applies, or check NONE if the waste code has no subcategory.
- In **column 4**, enter the letter from the list below (A. - D.) that describes how the waste must be managed to comply with the land disposal restriction regulations in 40 CFR 268. Please note that if you enter B.1, B.3, B.6 or D, you are certifying that the waste meets all the Land Disposal Restrictions and may be landfilled without further treatment. If you enter B.4, you are certifying that the waste has been decharacterized, but still requires treatment for UHCs. (States authorized by EPA to manage the LDR program may have regulatory citations different from the 40 CFR citations listed on this form. Where these regulatory citations differ, your form will be deemed to refer to those state citations as well as 40 CFR.)
- Constituents of concern for waste codes F001-F005 and F039 and underlying hazardous constituents (UHCs) for D001-D043, must be identified unless the treatment facility will monitor for all constituents. **If any of these codes apply, check appropriate box below:**
 - To identify constituents of concern for F001-F005, F039 and UHCs, use the Identification of Constituents of Concern Form (CWM-2007) and check here:
 - If UHCs are applicable, but none are present at the point of generation, check here:
 - If incineration facility will monitor for all constituents of concern (except dioxins), check here: UHC = NONE

MANAGEMENT METHODS

A RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR 268.40.

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I personally have examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process had been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40 without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the non-wastewater organic constituents have been treated by combustion units as specified in 268.42 Table 1. I have been unable to detect the non-wastewater organic constituents despite having used best faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.4 DECHARACTERIZED WASTE REQUIRES TREATMENT FOR UNDERLYING HAZARDOUS CONSTITUENTS

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49, to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.6 RESTRICTED DEBRIS TREATED TO ALTERNATE PERFORMANCE STANDARDS

"I certify under penalty of law that the debris has been treated in accordance with the requirements of 40CFR 268.45. I am aware that there are significant penalties for making a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column (4) above.

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I certify under penalty of law I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and LAC 33: V. 2223-2233. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

I hereby certify that all information submitted in this and all associated documents is complete and accurate to the best of my knowledge and information.

Name: (Print) Stephany Garcia

Title: Rep

Signature: [Handwritten Signature]

Date: 5-28-12

If the waste identified on the first page of this form is described by any of the following USEPA hazardous waste codes: F001, F002, F003, F004, F005, and all solvent constituents will not be monitored by the treator, then each constituent MUST be identified below by checking the appropriate box, and this page must accompany the shipment, along with the previous page of this form. If the waste code F039 describes this waste, then the corresponding list of constituents must be attached. If D001-D043 require treatment to 268.48 standards, then the underlying hazardous constituent(s) must also be attached.

SOLVENT WASTE TREATMENT STANDARDS

OR 306568

F001 through F005 spent solvent constituents and their associated USEPA hazardous waste code(s).	Treatment Standard ¹		F001 through F005 spent solvent constituents and their associated USEPA hazardous waste code(s).	Treatment Standard ¹	
	Wastewater	Nonwastewater		Wastewater	Nonwastewater
Acetone (F003)	0.28	160	Methylene chloride (F001, F002)	0.089	30
Benzene (F005) <i>VST Exempt</i>	0.14	1470 PPB	Methyl ethyl ketone (F005)	0.28	36
n-Butanol (n-butyl alcohol) (F003)	5.6	2.8	Methyl isobutyl ketone (F003)	0.14	33
Carbon disulfide (F005)	3.8	TCLP 4.8	Nitrobenzene (F004)	0.058	14
Carbon tetrachloride (F001)	0.057	6.0	2-Nitropropane (F005)	INCIN or (WETOX or CROXD) followed by CANN	INCIN
Chlorobenzene (F002)	0.057	6.0	Pyridine (F005)	0.014	16
o-Cresol (F004)	0.11	5.6	Tetrachloroethylene (F001, F002)	0.056	6.0
Cresol (m- and p- isomers) (F004)	0.77	5.6	Toluene (F005)	0.080	10
Cyclohexanone (F003)	0.36	TCLP 0.75	1,1,1-Trichloroethane (F001, F002)	0.054	6.0
o-Dichlorobenzene (F002)	0.088	6.0	1,1,2-Trichloroethane (F002)	0.054	6.0
2-Ethoxyethanol (F005) also called ethylene glycol monochethyl ether	INCIN or BIODC	INCIN	Trichloroethylene (F001, F002) ✓	0.054	3.9 PPB
Ethyl acetate (F003)	0.34	33	Trichloromonofluoromethane (F002)	0.020	30
Ethyl benzene (F003)	0.057	10	1,1,2-Trichloro-1,2,2-trifluoroethane (F002)	0.057	30
Ethyl ether (F003)	0.12	160	Xylenes (sum of o-, m-, and p- isomers) (F003)	0.32	30
Isobutanol (Isobutyl Alcohol) (F003)	5.6	170			
Methanol (F003)	5.6	TCLP 0.75			

¹ All spent solvent treatment standards are measured through a total waste analysis (TCA), unless otherwise noted. Wastewater units are mg/l, nonwastewater are mg/kg.

² For contaminated soils using the alternative soil treatment standards, the treatment standards for F001-F005 spent solvents must be a 90% reduction of constituents or less than 10 x the standards listed.

Attachment B
Copy of Ground Water Analytical Laboratory Reports
(August 2012)

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		Method Blank	WCMW-7	WCMW-8	WCMW-9	ESMW-1	WC-Dup-1
Date Sampled	Reporting	N/A	8/20/12	8/20/12	8/20/12	8/20/12	8/20/12
Date Analyzed	Limits	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	nd	nd	nd	nd	2.0	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd	nd
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	1.2	6.6	nd	nd	6.1
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	2.1	nd
Total Xylenes	2.0	nd	nd	nd	nd	7.4	nd
Styrene	1.0	nd	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description	Method Blank	WCMW-7	WCMW-8	WCMW-9	ESMW-1	WC-Dup-1
Date Sampled	Reporting	N/A	8/20/12	8/20/12	8/20/12	8/20/12
Date Analyzed	Limits	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	nd	nd	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	nd	nd	nd	nd
tert-Butylbenzene	1.0	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	nd	nd	5.5	nd
sec-Butylbenzene	1.0	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd
Surrogate Recovery						
Dibromofluoromethane		107	98	127	105	118
1,2-Dichloroethane-d4		122	97	119	94	113
Toluene-d8		88	85	83	85	91
4-Bromofluorobenzene		88	83	94	76	98

"nd" Indicates not detected at listed detection limit.

"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		WCMW-10	WCMW-10 Dup	WCMW-1R	WCMW-6	KBMW-10	TSSMW-9
Date Sampled	Reporting	8/20/12	8/20/12	8/20/12	8/20/12	8/20/12	8/21/12
Date Analyzed	Limits	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	2.0	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	nd	nd	nd	nd	nd	59.3
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd	22.7
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	6.8	1.2	1.7	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	91.9
Total Xylenes	2.0	nd	nd	31.2	nd	nd	306
Styrene	1.0	nd	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		WCMW-10	WCMW-1R Dup	WCMW-1R	WCMW-6	KBMW-10	TSSMW-9
Date Sampled	Reporting	8/20/12	8/20/12	8/20/12	8/20/12	8/20/12	8/21/12
Date Analyzed	Limits	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	nd	nd	nd	nd	4.9
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	nd	nd	nd	nd	8.2
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	1.6	1.2	10.8	nd	nd	26.6
tert-Butylbenzene	1.0	1.0	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	nd	nd	nd	nd	139
sec-Butylbenzene	1.0	3.5	2.0	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	4.1	3.1	nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	1.1	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	37.4	21.0	nd	nd	nd	65.1
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		118	97	126	103	106	99
1,2-Dichloroethane-d4		114	113	118	93	125	110
Toluene-d8		91	97	87	90	87	100
4-Bromofluorobenzene		102	94	98	80	85	90

"nd" Indicates not detected at listed detection limit.

"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

Finalized June 25, 2015

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WHITNEY'S CHEVROLET PROJECT

Environmental Partners, Inc.

Montaseno, Washington

Libby Project # L120821-1

Client Project # 51201.8

QA/QC Data - EPA 8260C Analyses

Sample Identification: WCMW-1R							
Matrix Spike			Matrix Spike Duplicate			RPD	
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
1,1-Dichloroethene	10	12.1	121	10	12.3	123	1.6
Benzene	10	12.5	125	10	11.9	119	4.9
Toluene	10	11.7	117	10	12.5	125	6.6
Chlorobenzene	10	11.2	112	10	12.3	123	9.4
Trichloroethene (TCE)	10	12.0	120	10	10.9	109	9.6
Surrogate Recovery							
Dibromofluoromethane			106			120	
1,2-Dichloroethane-d4			91			129	
Toluene-d8			91			92	
4-Bromofluorobenzene			89			98	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
1,1-Dichloroethene	20	14.0	70
Benzene	20	20.2	101
Toluene	20	20.4	102
Chlorobenzene	20	19.7	99
Trichloroethene (TCE)	20	19.4	97
Surrogate Recovery			
Dibromofluoromethane			128
1,2-Dichloroethane-d4			130
Toluene-d8			107
4-Bromofluorobenzene			88

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%

ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-11	ESMW-7	ESMW-7 Dup	WC-Dup-2	TSSMW-7	TSSMW-12
Date Sampled	Reporting	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12
Date Analyzed	Limits	8/28/12	8/28/12	8/28/12	8/28/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	2.0	262	312	349	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	40.0	45.1	46.7	nd	nd
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	nd	nd	1.0	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	524	612	789	nd	nd
Total Xylenes	2.0	nd	1170	1400	1700	45.7	nd
Styrene	1.0	nd	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-11	ESMW-7	ESMW-7 Dup	WC-Dup-2	TSSMW-7	TSSMW-12
Date Sampled	Reporting	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12
Date Analyzed	Limits	8/28/12	8/28/12	8/28/12	8/28/12	8/27/12	8/27/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	23.8	27.8	39.3	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	44.3	49.4	71.4	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	99.0	100	89.3	9.1	nd
tert-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	473	537	576	6.3	nd
sec-Butylbenzene	1.0	nd	nd	nd	4.4	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	nd	2.8	3.2	3.1	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	9.5	9.9	11.0	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	409	394	420	12.7	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		77	87	88	117	95	89
1,2-Dichloroethane-d4		70	94	95	117	108	92
Toluene-d8		94	100	98	95	93	92
4-Bromofluorobenzene		79	89	91	92	90	82

"nd" Indicates not detected at listed detection limit.
 "int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT
 ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-7	KBMW-7 Dup	KBMW-12	TSSMW-8	KBMW-8
Date Sampled	Reporting	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12
Date Analyzed	Limits	8/27/12	8/27/12	8/28/12	8/27/12	8/28/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	1.3	1.5	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd
Benzene	1.0	12.5	14.7	932	2.6	3.4
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	1.8	2.1	nd	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd
Toluene	1.0	5.2	6.1	5500	nd	nd
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	1.2	1.4	nd	nd	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	2010	nd	6.7
Total Xylenes	2.0	77.2	92.6	8130	nd	nd
Styrene	1.0	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120821-1
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-7	KBMW-7 Dup	KBMW-12	TSSMW-8	KBMW-8
Date Sampled	Reporting	8/21/12	8/21/12	8/21/12	8/21/12	8/21/12
Date Analyzed	Limits	8/27/12	8/27/12	8/28/12	8/27/12	8/28/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	nd	57	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	2.4	2.8	237	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	9.4	11.1	388	nd	nd
tert-Butylbenzene	1.0	nd	nd	175	nd	nd
1,2,4-Trimethylbenzene	1.0	39.0	47.1	1260	nd	nd
sec-Butylbenzene	1.0	nd	nd	9.5	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	nd	nd	1.2	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd
Naphthalene	5.0	21.3	20.2	297	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd
Surrogate Recovery						
Dibromofluoromethane		95	89	85	91	74
1,2-Dichloroethane-d4		106	98	89	94	76
Toluene-d8		96	94	96	94	96
4-Bromofluorobenzene		89	89	87	85	82

"nd" Indicates not detected at listed detection limit.
 "int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT
 ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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WHITNEY'S CHEVROLET PROJECT

Environmental Partners, Inc.

Montaseno, Washington

Libby Project # L120821-1

Client Project # 51201.8

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	8/27/12	88	nd
Method Blank	8/27/12	104	nd
Method Blank	8/28/12	95	nd
WCMW-7	8/27/12	85	nd
WCMW-8	8/27/12	84	nd
WCMW-9	8/27/12	85	nd
ESMW-1	8/27/12	91	1430
WC-Dup-1	8/27/12	77	nd
WCMW-10	8/27/12	96	2690
WCMW-10 Dup	8/27/12	95	2800
WCMW-1R	8/27/12	87	267
WCMW-6	8/27/12	90	nd
KBMW-10	8/27/12	87	nd
TSSMW-9	8/27/12	98	7000
KBMW-11	8/28/12	94	nd
KBMW-11 Dup	8/28/12	105	nd
ESMW-7	8/28/12	98	10200
WC-Dup-2	8/28/12	97	16000
TSSMW-7	8/27/12	93	557
TSSMW-12	8/27/12	92	nd
KBMW-7	8/27/12	96	1750
KBMW-7 Dup	8/27/12	94	1310
KBMW-12	8/28/12	96	68400
TSSMW-8	8/27/12	94	nd
KBMW-8	8/28/12	96	209
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

Libby Environmental, Inc.

Finalized June 25, 2015

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WHITNEY'S CHEVROLET PROJECT

Environmental Partners, Inc.

Montaseno, Washington

Libby Project # L120821-1

Client Project # 51201.8

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene -d8): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120822-2
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		Method Blank	KBMW-4	KBMW-6	WCMW-4	KBMW-5	KBMW-3
Date Sampled	Reporting	N/A	8/21/12	8/21/12	8/21/12	8/22/12	8/22/12
Date Analyzed	Limits	8/23/12	8/28/12	8/23/12	8/28/12	8/23/12	8/23/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	3.9
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	nd	69.2	nd	50.6	nd	7.1
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	7.5	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	67	nd	453	nd	3.1
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	nd	50.7	nd	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	598	nd	132	nd	14.7
Total Xylenes	2.0	nd	1270	nd	2030	nd	55.7
Styrene	1.0	nd	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120822-2
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		Method Blank	KBMW-4	KBMW-6	WCMW-4	KBMW-5	KBMW-3
Date Sampled	Reporting	N/A	8/21/12	8/21/12	8/21/12	8/22/12	8/22/12
Date Analyzed	Limits	8/23/12	8/28/12	8/23/12	8/28/12	8/23/12	8/23/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	34.9	nd	nd	nd	2.3
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	109	nd	29.7	nd	3.1
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	135	nd	125	nd	nd
tert-Butylbenzene	1.0	nd	117	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	890	nd	121	nd	25.1
sec-Butylbenzene	1.0	nd	6.2	nd	nd	nd	2.8
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	nd	5.7	nd	2.4	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	13.3	nd	nd	nd	2.0
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	298	nd	221	nd	14.8
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		96	93	98	91	93	94
1,2-Dichloroethane-d4		104	107	101	103	92	96
Toluene-d8		85	98	88	102	83	95
4-Bromofluorobenzene		84	92	81	88	82	86

"nd" Indicates not detected at listed detection limit.
 "int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT
 ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120822-2
 Client Project # 51201.8

QA/QC Data - EPA 8260C Analyses

Sample Identification: KBMW-6							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
1,1-Dichloroethene	10	6.6	66	10	6.8	68	3.0
Benzene	10	8.8	88	10	8.6	86	2.3
Toluene	10	8.0	80	10	7.9	79	1.3
Chlorobenzene	10	9.3	93	10	10.6	106	13.1
Trichloroethene (TCE)	10	8.0	80	10	8.4	84	4.9
Surrogate Recovery							
Dibromofluoromethane			104			95	
1,2-Dichloroethane-d4			107			108	
Toluene-d8			96			83	
4-Bromofluorobenzene			81			84	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
1,1-Dichloroethene	10	6.8	68
Benzene	10	8.9	89
Toluene	10	8.0	80
Chlorobenzene	10	9.8	98
Trichloroethene (TCE)	10	9.0	90
Surrogate Recovery			
Dibromofluoromethane			98
1,2-Dichloroethane-d4			99
Toluene-d8			91
4-Bromofluorobenzene			84

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

ANALYSES PERFORMED BY: Sherry Chilcutt

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120822-2
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-1	KBMW-1 Dup	WCMW-5	WCMW-3	WC-Dup3	Trip Blank
Date Sampled	Reporting	8/22/12	8/22/12	8/22/12	8/22/12	8/22/12	8/22/12
Date Analyzed	Limits	8/23/12	8/23/12	8/28/12	8/28/12	8/23/12	8/23/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Dichlorodifluoromethane	2.0	nd	nd	nd	nd	nd	nd
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd	nd
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	nd	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl <i>tert</i> -Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
<i>trans</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	nd	nd	164	630	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
<i>cis</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	307	3660	nd	nd
<i>Trans</i> -1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	4.9	14.4	nd	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	93.6	1690	nd	nd
Total Xylenes	2.0	nd	nd	1690	8430	nd	nd
Styrene	1.0	nd	nd	nd	nd	nd	nd

WHITNEY'S CHEVROLET PROJECT
 Environmental Partners, Inc.
 Montaseno, Washington
 Libby Project # L120822-2
 Client Project # 51201.8

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		KBMW-1	KBMW-1 Dup	WCMW-5	WCMW-3	WC-Dup3	Trip Blank
Date Sampled	Reporting	8/22/12	8/22/12	8/22/12	8/22/12	8/22/12	8/22/12
Date Analyzed	Limits	8/23/12	8/23/12	8/28/12	8/28/12	8/23/12	8/23/12
	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Bromoform	1.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	nd	20.1	56.0	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	nd	34.0	160	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	nd	122	395	nd	nd
tert-Butylbenzene	1.0	nd	nd	nd	219	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	nd	320	1560	nd	nd
sec-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
Isopropyltoluene	1.0	nd	nd	2.1	6.6	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	2.0	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	232	795	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		98	92	95	103	103	91
1,2-Dichloroethane-d4		103	97	104	119	97	95
Toluene-d8		96	92	93	96	105	85
4-Bromofluorobenzene		87	88	88	94	85	83

"nd" Indicates not detected at listed detection limit.

"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

Finalized June 25, 2015
4139 Libby Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@aol.com

WHITNEY'S CHEVROLET PROJECT
Environmental Partners, Inc.
Montaseno, Washington
Libby Project # L120822-2
Client Project # 51201.8

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline ($\mu\text{g/l}$)
Method Blank	8/23/12	85	nd
Method Blank	8/28/12	95	nd
KBMW-4	8/28/12	98	20600
KBMW-6	8/23/12	88	nd
WCMW-4	8/28/12	93	10100
KBMW-5	8/23/12	83	nd
KBMW-3	8/23/12	95	787
KBMW-1	8/23/12	96	245
KBMW-1 Dup	8/23/12	92	288
WCMW-5	8/28/12	120	8000
WCMW-3	8/28/12	96	68900
WC-Dup-3	8/23/12	105	nd
Trip Blank	8/23/12	85	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene -d8): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc. **Chain of Custody Record**

4139 Libby Road NE Ph: 360-352-2110
 Olympia, WA 98506 Fax: 360-352-4154

Date: 8/21/12 Page: 1 of 1

Client: Environmental Partners, Inc. Project Manager: Tena Seeds

Address: 295 NE Gilman Blvd, Ste 201, Forks, WA Project Name: Whitney's Chevrolet

Phone: 425-281-3629 Fax: 425-395-0011 Location: Mt Rainier, WA City:

Client Project # 51201.8 Collector: E. Cuddy & M. Bussell Date of Collection: 8/21/12 & 8/22/12

Sample Number	Date	Depth	Time	Sample Type	Container Type	Analytical Methods											Field Notes			
						VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEM VOL 8270	NWTPH-HOLD	NWTPH-GX	NWTPH-DX	PAH 8270	PCB's 8082	MTCA 5 Metals					
1	8/21/12		16:45	Water	VOA-7		X			X										
2			15:35				X			X										
3			16:46				X			X										
4	8/22/12		08:52				X			X										
5			09:09				X			X										
6			09:50				X			X										
7			10:03				X			X										
8			10:47				X			X										
9							X			X										
10							X			X										
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
Relinquished by: <u>[Signature]</u>		Date / Time: <u>8/22/12 14:15</u>		Received by: <u>[Signature]</u>		Date / Time: <u>8/22/12 17:25</u>		Sample Receipt:				Remarks: <u>Standard Turn</u>								
Relinquished by:		Date / Time:		Received by:		Date / Time:		Good Condition?												
Relinquished by:		Date / Time:		Received by:		Date / Time:		Cold?												
Relinquished by:		Date / Time:		Received by:		Date / Time:		Seals Intact?												
Relinquished by:		Date / Time:		Received by:		Date / Time:		Total Number of Containers												

Distribution: White - Lab, Yellow - File, Pink - Originator