Agency Review Work Plan For Ground Water Monitoring Well Assessment

Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

June 29, 2015
Terracon Project No. B2157002

Prepared for:
Boeing Field Chevron
Tukwila, Washington

Prepared by:
Terracon Consultants, Inc.
Lakewood, Washington

June 29, 2015

Boeing Field Chevron
% Mr. Kurt Peterson
Cascadia Law Group PLLC
1201 Third Avenue, Suite 320
Seattle, WA 98101

Attn: Mr. Rajbir Sandhu

Re: Agency Review Work Plan for Ground Water Monitoring Well Assessment
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington
Terracon Project No. B2157002

Dear Mr. Sandhu:

Terracon Consultants, Inc. (Terracon) is pleased to submit our work plan for a proposed ground water monitoring well assessment at the site referenced above. The work plan outlines a comprehensive effort to assess the integrity of the existing wells and to collect and analyze samples from all accessible wells at the site, during both high and low tidal phases. The results will be used to refine the remedial investigation work plan, which will subsequently be provided under separate cover. Terracon has prepared this document, which is associated with Agreed Order No. DE 10947, at the request of the Washington State Department of Ecology.

Terracon appreciates this opportunity to provide environmental consulting services to Boeing Field Chevron. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
Terracon Consultants, Inc.

Elizabeth Rachman, L.G., L.Hg.
Senior Project Manager

Matt Wheaton, E.I.T, L.G.
Principal

Terracon Consultants, Inc. 3006 South 96th Street, Lakewood, WA 98499
P (253) 573 9939 F (253) 573 9959 terracon.com

Terracon

TABLE OF CONTENTS

AGENCY REVIEW
WORK PLAN FOR GROUND WATER MONITORING WELL ASSESSMENT
BOEING FIELD CHEVRON
10805 EAST MARGINAL WAY SOUTH
TUKWILA, WASHINGTON

Terracon Project No. B2157002
June 29, 2015

1.0 Introduction

Rajbir and Pradeep Sandhu, RPNP Corporation, and Chevron Environmental Management Company (Chevron) are signatories to an Agreed Order (No. DE 10947) with the Washington State Department of Ecology (Ecology) under the Model Toxics Control Act (MTCA) requiring a ground water monitoring well assessment, a Remedial Investigation (RI), and possibly an interim action for the Boeing Field Chevron site (site).

The site is defined by the extent of contamination caused by the release of petroleum compounds originating at the Boeing Field Chevron property, 10805 East Marginal Way South in Tukwila, Washington (see Figure 1).

Several USTs were removed in the 1990s, during which releases of gasoline to the soil and ground water at the site were identified and reported to Ecology. Excavation and off-site disposal of at least 2,500 cubic yards of petroleum-contaminated soil (PCS) were performed by Chevron, as was quarterly ground water monitoring for several years. As of 2003, ground water concentrations were reportedly decreasing but were still not in compliance with MTCA.

During a ground water sampling event performed for Chevron in 2003, approximately four feet of light non-aqueous phase liquid (LNAPL, or free product) was encountered in one of the wells (MW-11) that had no previous history of the presence of LNAPL. A piping leak was found at the west pump island. Based on this new release, Chevron ceased all ground water monitoring activities at the site. PCS was again reportedly excavated and removed from the site for off-site disposal by the property owner in 2004, and free product removal activities were performed on a number of occasions. However, no documentation pertaining to this excavation can be located at this time. In addition, several subsurface soil and ground water investigations have been performed to characterize the release. Despite these efforts, impacted soil and ground water, and LNAPL, remain at the subject site, the extent of which remains largely unknown. Based on the information available to date, the site may be underlain by two distinct aquifers.

The investigation work under the Agreed Order is intended to provide additional data and analysis to assess the potential risks posed by the site, to determine if active cleanup of the site is necessary and, if so, to facilitate the selection of a cleanup remedy. More specifically, the ground water monitoring well assessment will supply current data on the contaminants of potential concern (COPCs) in the ground water at the site, which will be used to refine the scope of work (SOW) for the RI Work Plan.

1.1 Objectives of the Ground Water Monitoring Well Assessment

The purpose of the ground water monitoring well assessment is to collect, develop, and evaluate sufficient information regarding the COPCs and the ground water flow direction at the site. The work will be done in advance of the RI, and the results will be used to refine its scope. The assessment will focus on the following:

- Sampling 25 of the existing 28 ground water wells during two separate events: one during typical high tide conditions and one during typical low tide conditions forecasted for the Duwamish Waterway. Three of the existing wells, EX-N, EX-S and IP-6, will not be sampled as part of this assessment. Well IP-6 is reportedly inaccessible due to a broken skimmer pump. Wells EX-N and EX-S are reportedly screened from the surface to the bottom of the wells. Based on their construction, they are not considered to be suitable for sampling. Therefore, they have been omitted from this assessment and will be decommissioned in the near future.

- Characterizing site COPCs.

- Evaluating the potential impacts of site COPCs.

The overall objectives of the assessment are to:

- Obtain data of sufficient quality and quantity to describe the physical and chemical properties (including contaminants) of site ground water.

- Use the results of the monitoring event to develop the RI Work Plan.

The objectives of this monitoring event and associated documents are to:

- Provide ground water data to refine the RI Work Plan to address data gaps and complete characterization.

- Provide a schedule for the RI activities in accordance with the Agreed Order.

1.2 Ground Water Monitoring Well Assessment Work Plan Organization

This Work Plan consists of the following sections:

- Section 2 provides a summary of historical site uses, previous investigations and site COPCs.
- Section 3 describes the tasks to be completed as part of the monitoring event activities.
- Section 4 describes the project schedule and deliverables.
- Section 5 presents the Sampling and Analysis Plan (SAP).
- A list of references is presented after Section 5.
- Appendix A provides relevant figures, and Appendix B provides Table 2, "Historical Ground Water Elevations and COPC Concentrations."
- Appendix C provides a Quality Assurance Project Plan (QAPP) for the site.

2.0 Background

This section provides a general summary of current and historical site uses, previous site investigations, suspected contaminant source areas, and COPCs. Additional information is available in cited references and site maps and historical data tables prepared by others (maps included for reference in Appendix A and data tables included for reference in Appendix B).

2.1 Setting

2.1.1 Location

The Boeing Field Chevron property is located at 10805 East Marginal Way South, Tukwila, Washington (see Figure 1). The property is located in an industrial area of Tukwila and is bound to the west by Tukwila International Boulevard (aka Pacific Highway South) and to the east by East Marginal Way South, which intersect just north of the site. Adjacent properties include Blue Star Gas to the east; Gene Juarez Distribution Center, Paramount Supply, Custom Gear, Inc., Gourmet Innovations, and Business Interiors Northwest to the southeast; Mighty-O Donuts and The Trust Center to the south; and Roto-Rooter and Seattle Mitsubishi Fuso (truck sales, parts, and service) to the west.

The property is one tax parcel (King County tax parcel number 0323049064) totaling approximately 0.61 acre of land. Rajbir and Pradeep Sandhu are listed as the current owners of the property.

2.1.2 Surface Features

The site consists of a retail gasoline station, convenience store, and carwash. The 3,255-square-foot convenience store and the 1,049-square-foot carwash were constructed in 1996. The existing gasoline USTs were installed in 1996. The convenience store is located on the southern portion of the site, the carwash is located on the eastern portion of the site, and the pump islands are located on the central portion of the site. Two access driveways to the site are located along Tukwila International Boulevard and one access driveway to the site is located along East Marginal Way South (see Figure 1). The site is currently occupied by a Chevron-branded gasoline station.

Currently three underground storage tanks (USTs) are operational at the site, including a 10,000-gallon unleaded gasoline UST, a 15,000-gallon unleaded gasoline UST, and another 15,000-gallon UST divided into a 7,500-gallon unleaded gasoline compartment and a 7,500-gallon diesel compartment. No aboveground storage tanks (ASTs) are present at the site. Historical USTs were removed from the site in 1990, 1992 and 1996. Locations and removal of the other tanks are discussed below in Section 2.2.

Stormwater drainage systems are present on the site and were installed in 1996. Six stormwater catch basins are present, including one south of the canopy, one at either end of the canopy, one on the southeast corner of the site, one north of the carwash and one between the carwash and the fuel USTs. The catch basins on either end of the canopy appear to convey stormwater to municipal utilities in the Tukwila International Boulevard right-of-way. The remaining catch basins convey stormwater to an oil-water separator on the east-central portion of the site, which then discharges to municipal utilities within the East Marginal Way South right-of-way.

Table 1: Summary of Site Structures

Parcel	Structure	Currently Used?	Date Constructed	Notes
323049064	Retail gasoline station	Yes	1996	Located on the central portion of the site.
323049064	Convenience store	Yes	1996	Located on the southern portion of the site.
323049064	Carwash	Yes	1996	Located on the eastern portion of the site.

2.1.3 Geology

The Boeing Field Chevron site is located in the Duwamish River Valley. The surficial geology beneath the Boeing Field Chevron property generally consists of 10 to 12 feet of brown silt sand and sandy silt overlying a layer of fine-grained silt at 12 to 14 feet. On the west portion of the site, a one to four-foot thick layer of organic-rich clay and silt has been identified at 14 to 18 feet below ground surface (bgs). The clay and silt layer was underlain by wet coarse black sand; however, this portion of the site has undergone significant excavation of PCS and backfilling with imported materials. On the northern portion of the site, cobbly, gravelly sand fill has been encountered to a depth of 15 feet bgs (G-Logics, 2008).

2.1.4 Hydrogeology

The hydrogeology at the site is complicated and requires additional investigation. Shallow ground water beneath the Boeing Field Chevron property ranges from approximately nine to 18 feet bgs (G-Logics, 2008). It is suspected that two aquifers are present beneath the site; however, it is also possible that differences in measured ground water elevations in various locations are due to the proximity of previous remedial and construction excavations.

Ground water beneath the site appears to be hydraulically connected to the Duwamish Waterway, which is tidally influenced by Puget Sound. Shallow ground water elevations at the site fluctuate with the tide, and depth to water measurements can vary by three or more feet during tide cycles (G-Logics, 2008).

Ground water flow varies beneath the site, due to tidal influences as well as the effect of numerous on-site excavations, existing and abandoned wells, and subgrade utilities. Historical ground water elevation measurements have shown predominant flow directions to the west and north. Table 2, provided in Appendix B, provides a summary of historical ground water elevations and COPC concentrations.

2.2 Site History

The following discussion of site history is limited to information provided in previous subsurface investigation, limited remedial action and ground water monitoring reports, discussed further below. Based on a review of this information, a gasoline station appears to have been in operation on the site from at least 1940 until the 1980s. The former structures were removed from the site in the 1980s, but the associated USTs remained onsite until the 1990s. The current Boeing Field Chevron station was constructed in 1996.

2.2.1 Land Ownership, Use, and Prior Operations

Standard Oil and Chevron operated on the site from at least 1968 to 1982. The current owner, Rajbir Sandhu, purchased the property from Phillip and Susan Usher in 1995. Ownership history from the early 1980s to 1995 was not reported in the records reviewed to date.

2.2.2 Previous Investigations and Remedial Actions

Previous investigation and remedial activities performed at the site are summarized below. Figure 2 illustrates previous remedial excavation locations on the site. Figure 3 shows the existing monitoring wells and product recovery wells on the site. Historical analytical data are included in Appendix B.

2.2.2.1 Site Soils and Ground Water

Several investigations and cleanup actions have been conducted at the site to address releases from current and former USTs and to identify and assess potential source areas.

- 1990 – Three USTs were removed and releases of gasoline to soil and ground water were identified at the site and reported to Ecology (RZA, 1990).
- 1992 – Two additional USTs were removed from the site (Hart Crowser, 1992).
- 1996 – One additional UST was removed and releases of gasoline to soil and ground water were identified at the site and reported to Ecology (PEG, 1997).
- 1990 to 2003 – Excavation and off-site disposal of PCS were performed, along with quarterly ground water monitoring (Various; see References).
- 2003 to the present – Approximately four feet of LNAPL (free product) was encountered in 2003 in one of the on-site wells during a ground water sampling event (Gettler-Ryan, Inc., 2003). A piping leak was found at the west pump island. PCS was reportedly excavated and removed from the site and free product removal activities were performed on a number of occasions. However, no documentation pertaining to this excavation can be located at this time. In addition, several subsurface soil and ground water investigations have been performed in an attempt to characterize the release (Various; see References).

2.3 Potential Source Areas and Contaminants of Potential Concern

Figures 4 and 5 illustrate the most recent distributions of gasoline-range organic hydrocarbons (GRO) and benzene in soil and ground water beneath the Boeing Field Chevron site. These figures depict prior sampling locations and analytical results from past investigations where contaminants of interest were detected, and compares the results to MTCA Method A cleanup levels. Final site-specific cleanup levels will be established as part of the RI process.

Table 3 below summarizes the potential source area and its COPCs, based on past sampling results as well as historical site operations.

Table 3: Summary of Potential Source Area

Potential Source Area	Rationale	Contaminants of Potential Concern
Areas southwest to north of the middle dispenser of the existing western pump island	Previously-identified release to soil and ground water	DRO, GRO, HO, BTEX, MTBE, EDC, EDB, naphthalenes, n-hexane, Pb

DRO = diesel-range organic hydrocarbon
GRO = gasoline-range organic hydrocarbon
HO = heavy oil range hydrocarbon
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
EDC = 1,2-dichloroethane
EDB = 1,2-dibromoethane
Pb = lead

3.0 Ground Water Monitoring Well Assessment Tasks

This section provides a discussion of the proposed ground water monitoring SOW and the rationale for those activities. The ground water monitoring work will address some of the existing data needs for the site (Section 3.1) with an emphasis of collection of sufficient data to further characterize site conditions.

Procedures for sampling and analysis and quality assurance/quality control (QA/QC) are described in in the Sampling and Analysis Plan (SAP) in Section 5 and the Quality Assurance Project Plan (QAPP) in Appendix C. A Health and Safety Plan (HASP) that pertains to the ground water monitoring well assessment will be prepared by the contractor prior to performing any work on site.

3.1 Additional Data Needs

Several additional investigations data needs (i.e., data gaps) have been identified based on the results of the previous investigation and remediation activities. The data gaps are primarily related to the following general data concerns for the site:

- The current ground water condition, including dissolved phase concentrations and non-aqueous phase thicknesses.
- The hydrogeology of the site, including how the site is tidally influenced and whether more than one aquifer is present and/or adversely affected by the releases at the site.

The ground water monitoring well assessment will provide additional information with regard to these data needs. Data Gaps will be discussed in greater detail in the Remedial Investigation Work Plan.

3.2 Ground Water Monitoring Well Assessment Scope of Work

As previously discussed, the primary focus of the ground water monitoring well assessment is to fill data gaps associated with site, including current contaminant levels in the ground water and the hydrogeology of the site. The SOW was developed to address each of the data needs previously described.

Four of the existing ground water monitoring wells (MW-18 through MW-21) are located on the west-adjoining property, across Tukwila International Boulevard from the Boeing Field Chevron property. An access agreement will be executed between Terracon and the west-adjoining property owner prior to performing the ground water monitoring activities. In addition, one of the existing ground water monitoring wells (MW-17) is located in the Tukwila International Boulevard right-of-way. A Street Use Permit will be obtained from the City of Tukwila to allow access to the monitoring well for sampling purposes.

This section provides a summary of each of the work tasks included in the ground water monitoring well assessment. Additional details regarding implementation of the related tasks (field sampling methodologies, chemical analyses, etc.) are presented in the SAP (Section 5).

3.2.1 Health and Safety Plan

Terracon is committed to the safety of all its employees. As such, and in accordance with our *Incident and Injury Free®* safety goals, Terracon will develop a safety plan to be used by our personnel during field services. At this time, we anticipate performing fieldwork in an OSHA Level D work uniform consisting of hard hats, safety glasses, protective gloves, and steel-toed boots. It may become necessary to upgrade this level of protection, at additional cost, during sampling activities in the event that we encounter petroleum or chemical constituents in soils or ground water that present an increased risk for personal exposure.

3.2.2 Conduct Ground Water Monitoring

Twenty-five of the existing 28 monitoring wells will be sampled twice as part of this assessment: once at typical low tide and once at typical high tide. Wells included in the monitoring event are shown on Figure 6. Monitoring wells in which free product is encountered will not be sampled. Ground water samples collected during each monitoring event will be submitted for laboratory analysis for the following analytes:

- Gasoline-range Total Petroleum Hydrocarbons (TPH)
- Diesel- and oil-range TPH
- Benzene, toluene, ethylbenzene and total xylenes (BTEX)
- Methyl tertiary butyl ether (MTBE)
- 1,2-dichloroethane (EDC)
- 1,2-dibromoethane (EDB)
- Naphthalenes

- n-Hexane
- Total and dissolved lead

In addition to the ground water monitoring activities described above, ground water elevation monitoring will be performed. A ground water elevation level will be taken before each well is purged and sampled.

3.2.3 Waste Disposal

The purge water generated by the ground water monitoring activities will be temporarily stored at the Boeing Field Chevron Property in properly labeled 55-gallon drums. Due to the anticipated presence of LNAPL, vented drums will be used to store the purge water generated at the site for safety purposes. Disposal of the drums is not specifically covered by this SOW, but will be addressed separately once the ground water analytical results are received.

3.3 Data Evaluation

The results of the ground water sampling and analysis conducted during the sampling event will be used to refine the scope of the RI.

4.0 Schedule and Deliverables

4.1 Ground Water Monitoring Well Assessment Deliverables

The ground water monitoring well assessment deliverables will include addenda to the work plan and SAP for additional data requirements identified during the assessment, if any, and the draft and final versions of a summary report.

A Draft Ground Water Monitoring Report will be prepared to summarize the procedures used to investigate the site, to present the field data and the validated sample analytical data, and to discuss the interpretations of the data. The Draft Ground Water Monitoring Report will be submitted to Ecology for review. A Final Ground Water Monitoring Report will be prepared that addresses the comments and required changes from Ecology.

In addition, tabulated raw data copies of original laboratory reports, and sample location maps will be submitted to Ecology within ten days of receipt of data from the analytical laboratory. All of the ground water monitoring data will be entered into Ecology's Environmental Information Management (EIM) database no later than the submittal of the draft ground water monitoring report.

4.2 Schedule

The schedule for the ground water monitoring well assessment activities and deliverables is in compliance with the Agreed Order SOW schedule, and is presented below.

Ground Water Monitoring Activities and Deliverables	Due Dates
Draft Work Plan for Ground Water Monitoring Well Assessment	N/A
Final Work Plan for Ground Water Monitoring Well Assessment	No later than the end of the AO public comment period, anticipated to be June 19, 2015
Implementation of Final Work Plan for Ground Water Monitoring Well Assessment	Initiated no longer than two weeks following Ecology approval of Work Plan for Ground Water Monitoring Well Assessment
Receipt of complete laboratory analytical package	Seven to 10 days after ground water sample submittal to the laboratory
Draft Ground Water Monitoring Report and EIM data submittal	No later than 30 days following receipt of all final laboratory data. Note the data will also be concurrently incorporated into the draft RI Work Plan.

5.0 Sampling and Analysis Plan

The SAP presented below is based on the site data gaps previously discussed. The SAP describes the field procedures, methodologies, and analytical methods for each work task based on the SOW presented in Section 3. Sample locations are shown on Figure 6.

The ground water monitoring well assessment sampling activities at the site will be performed to provide data of sufficient quality and quantity to satisfy the investigation objectives for ground water at the entire site, including all potential contaminant source areas.

5.1 Sampling Plan

5.1.1 Ground Water Elevation Monitoring

As discussed in Section 3.2.2, ground water elevation levels will be collected at high and low tide during the ground water monitoring well assessment.

Water level measurements will include all site monitoring wells for each event. Measurements will be completed within a two-hour time span for each event and will coincide with published times for high and low tides (with at least a 4-foot change in tidal height) forecasted at the Duwamish Waterway at 8^{th} Avenue South Station (#9447029) within the week of proposed sampling activities. Measurements will begin no earlier than half an hour before each tidal extreme. For this assessment, water level measurements will be made on the same day during consecutive tidal cycles (i.e., the high tide immediately following a low tide, or vice-versa). It should be noted that ground water sampling activities will be performed on a different schedule, which is outlined below. Well caps will be loosened prior to collecting the water level measurements to allow the static water level to equilibrate.

Water levels will be measured using an electric interface probe at each well location. The probe will be cleaned between measurements of different wells. The water level in each well will be measured to the nearest 0.01 foot from the north side of the casing by using an electric water level probe.

Where free product is indicated by the interface probe, visual confirmation will be performed using a bailer. Ground water will be collected into the bailer from the water table interface and visually examined for the presence, nature and thickness of free product. If measurable (>0.01 foot) product is present, ground water from the monitoring well will not be collected for laboratory analysis. Free product thickness will also be measured and recorded using the interface probe.

5.1.2 Ground Water Monitoring

Two ground water monitoring events are included in the ground water monitoring well assessment SOW, one event during high tide conditions and one event during low tide conditions. The tide cycle sampling events will be spread out across each tide occurrence (i.e., high and low) for several consecutive days. Each tide cycle sampling event is anticipated to take two to four days to complete.

Monitoring well sampling locations are shown on Figure 6. Ground water samples collected from all accessible monitoring wells, during both tidal cycles, will be analyzed for the following:

- Gasoline-range Total Petroleum Hydrocarbons (TPH)
- Diesel- and oil-range TPH
- Benzene, toluene, ethylbenzene and total xylenes (BTEX)
- Methyl tertiary butyl ether (MTBE)
- 1,2-dichloroethane (EDC)
- 1,2-dibromoethane (EDB)
- Naphthalenes
- n-Hexane
- Total and dissolved lead.

The ground water sampling procedures include the following:

- Upon loosening and removing the well cap, the vapors at the well head will be screened with a photoionization detector (PID) in order to aid in the determination of well sampling order. Wells will be sampled from the lowest PID reading to the highest in an attempt to avoid cross contamination of the wells.

- The depths to ground water will be measured in the monitoring wells before sampling. The water level in each well will be measured to the nearest 0.01 foot from the north side of the well casing using an electronic water level probe. Water depths will be recorded on a dedicated purge and sample field form, and will include date, time, and sampler's initials.

- The monitoring wells will be purged using low-flow procedures. Ground water samples will be collected using a peristaltic pump fitted with silicon tubing and either Tygon® or polyethylene tubing. Pump tubing will be lowered to the middle of the saturated screen depth for purging and sampling. Monitoring wells in which the screened interval is fully saturated will be noted and also be sampled. Monitoring wells will be purged at a rate of less than 0.3 liter per minute. The flow rate will be adjusted as necessary to prevent ground water level from dropping more than 10 percent.

- Field parameters will be measured in purged ground water as it is discharging through a flow-through cell. Ground water will be passed through the cell and discharged into a temporary storage container. Field parameters will be periodically measured (every three minutes) and recorded during well purging and upon stabilization. Field parameters will be measured using a multi-parameter meter. All meters used during sampling will be calibrated that day prior to use and either checked or re-calibrated prior to the second round of sampling activities (if any) that day. Field parameter measurements will include:

    - Temperature
    - pH
    - Dissolved oxygen
    - Redox potential
    - Specific conductance
    - Turbidity

- Ground water samples will collected after the field parameters have stabilized to within 10 percent of the previous reading. If the parameters do not stabilize, a maximum of five well volumes from each well that does not stabilize will be purged. The purge water will be stored in DOT-approved 55-gallon drums pending characterization. The drums will be disposed of in accordance with the characterization results

- Ground water samples will be collected using low-flow sampling techniques. Pump tubing will be maintained at a mid-screen depth for sampling. Ground water samples will be collected after recording final field parameter readings.

- Ground water samples will be collected from the discharge line of the peristaltic pump. All samples will be transferred in the field from the sampling equipment into the laboratory-prepared containers and stored in a cooler on ice pending transport to the laboratory. Sample container requirements will be verified for the selected analytical laboratory prior to the start of field sampling activities.

- Samples will be labeled, handled, and shipped using the procedures described above. Sample custody will be maintained until delivery to the analytical laboratory. All sampling field activity and data will be recorded on a dedicated purge and sample field form.

- The sampler(s) will wear new nitrile gloves at each sampling location. New Tygon® or polyethylene down-well tubing and new silicon pump-head tubing will be used at each sampling location.

- Quality assurance samples will be collected at the frequency described in Section 4 of Appendix C. Duplicate samples will be collected by alternately filling similar containers until both containers are filled.

5.2 Analytical Methods

All of the ground water samples will be submitted to a local analytical laboratory certified by Ecology for the suite of analyses required for all site media. Laboratories for all analyses will be identified, and analytical methods verified, prior to start of work and Ecology will be notified. Sample analyses will not be performed without Ecology approval of the selected analytical methods and laboratories.

A practical quantitation limit (PQL) of each of the sample analyses as described in the SAP will be applied to ensure that the lowest practical detection limit is used. However, if interference in reporting limit that is technically feasible for the sample matrix.

Target PQLs are included in the QAPP (see Appendix C). The parties will submit a list of actual PQLs and detection limits for their selected analytical laboratories to Ecology for review and approval prior to performing any sampling activities.

5.2.1 Ground Water

Laboratory analyses and analytical methods anticipated for ground water samples include the following:

- Gasoline-range total petroleum hydrocarbons (TPH) using Method NWTPH-Gx.

- Diesel- and oil-range TPH using Method NWTPH-Dx.

- Benzene, toluene, ethyl benzene, total xylenes (BTEX) compounds, methyl tertiary butyl ether (MTBE), 1,2-dichloroethane (EDC), 1,2-dibromoethane (EDB), naphthalenes, and/or n-hexane, as appropriate, using Method 8020 or similar method.

- Total and dissolved lead using Method 200.8.

Ground water samples intended for dissolved lead will be filtered in the field using an in-line, 0.45-micron, filter cartridge. The ground water will be collected into a nitric acid-preserved polyethylene container.

5.3 Sample Labeling Procedures

Ground water samples will be identified by the monitoring well from which they are collected as well as the tide cycle at the time of collection. For example, the sample collected from boring MW-1 at low tide, would be designated “MW-1 GW-L.”

QA samples (field duplicates) will be submitted blind (i.e., not identified as QA samples) to the laboratory. The QA samples will be labeled with a fictitious sample name (e.g., a nonexistent monitoring well). Trip blanks will be identified with sequential sample number and a date suffix (e.g., TB-1-0612) on the container. Extra samples collected for laboratory duplicates and matrix spike and matrix spike duplicate (MS/MSD) analyses will be identified with the same designation as the sample.

5.4 Sample Management

Sampling Labeling. Sample container labels will be completed immediately before or immediately after sample collection. Container labels will include the following information:

- Project name
- Sample number
- Name of collector
- Date and time of collection
- Analyses requested.

Sample Shipping. Samples will be transported in a sealed, iced cooler. In each cooler, glass bottles will be separated by a shock-absorbing and absorbent material to prevent breakage and leakage. Ice sealed in separate plastic bags, will be placed into each cooler with the samples. All sample coolers will be accompanied by a chain-of-custody form. The completed form will be sealed in a plastic bag and will be transported with the cooler(s). Sample coolers will be transported to the laboratory via courier or by the field sampler.

Chain-of-Custody. Once a sample is collected, it will remain in the custody of the sampler or other Terracon personnel until delivered to the laboratory or picked up by the laboratory's courier. Upon transfer of sample containers to subsequent custodians, a chain-of-custody will be signed by each person transferring custody of the sample container. Upon receipt of samples at the laboratory, the condition of the samples will be recorded by the receiver. Chain-of-custody records will be included in the analytical report prepared by the laboratory.

5.5 Decontamination Procedures

A decontamination area will be established for cleaning the water level probe. The water level probe will be cleaned by the following procedure:

- Tap water rinse
- Non-phosphatic detergent (Alconox®) and tap water wash
- Tap water rinse
- Distilled water rinse (three times)
- Stored in clean, closed container for next use.

Tygon®/polyethylene and silicone tubing, as well as cartridge filters will be dedicated to each well.

5.6 Residuals Management

The water generated by the cleaning of the water level probe and purging of the wells will be stored at the site in properly labeled 55-gallon drums.

5.7 Field Quality Assurance

As described in the QAPP (see Appendix C), field QA will be maintained through compliance with the sampling plan, collection of field QA samples, and documentation of sampling plan alterations.

Duplicate ground water samples will be collected at a minimum frequency of one duplicate sample per ten samples. Duplicate samples will be labeled similar to the other samples and submitted blind to the laboratory. The locations for duplicate sample collection will be determined in the field.

References

Environmental Resolutions, Inc. (ERI). 2004. Soil Probe Investigation, Boeing Field Chevron. 12 March.

ERI. 2004. Groundwater Monitoring Well Installation, Boeing Field Chevron Station. 19 October.

ERI. 2005. Soil Probe Investigation, Boeing Field Chevron Station. 11 April.

ERI. 2005. Work Plan for Soil and Groundwater Assessment, Boeing Field Chevron. 19 July.

ERI. 2005. Groundwater Monitoring Well Installation, Boeing Field Chevron Station. 28 December.

Gettler-Ryan Inc. 2003. Groundwater Monitoring & Sampling Report, Chevron Service Station 9-3099. 15 December.

G-Logics. 2006. Workplan for Initial Product Removal, Boeing Field Chevron. 13 January.

G-Logics. 2006. Subsurface Assessment and Fenton's Reagent Treatment, Boeing Field Chevron. 17 March.

G-Logics. 2008. Free-Product Recovery Workplan, Boeing Field Chevron. 4 March.

G-Logics. 2008. Free-Product Recovery Workplan, Revised, Boeing Field Chevron. 21 April.

G-Logics. 2008. Subsurface Site Characterization, Boeing Field Chevron. 19 May.

G-Logics. 2012. April 2012 Free-Product Recovery Update, Boeing Field Chevron. 2 April.

Hart Crowser. 1990. Summary of Work to Date, Chevron Station No. 3099. 27 December.

Hart Crowser. 1992. Soil Sampling and Analysis Results, Underground Storage Tank Removal and Closure, Decommissioned Chevron Service Station No. 60093099. 30 November.

Hart Crowser. 1993. Site Assessment and Remediation Report – Soils, Decommissioned Chevron Service Station No. 60093099. 2 March.

Hart Crowser. 1993. Addendum to Tank Closure Report (November 30, 1992), Chevron Station No. 60093099. 2 March.

Hart Crowser. 1993. Site Assessment and Remediation Report – Groundwater, Decommissioned Chevron Service Station No. 60093099. 7 April.

Hart Crowser. 1994. Independent Remedial Action Report Summary, Decommissioned Chevron Service Station No. 60093099. 29 November.

Pacific Environmental Group, Inc. (PEG). 1997. Environmental Investigation – Undocumented Underground Storage Tank, Former Chevron Service Station 9-3099. 4 March.

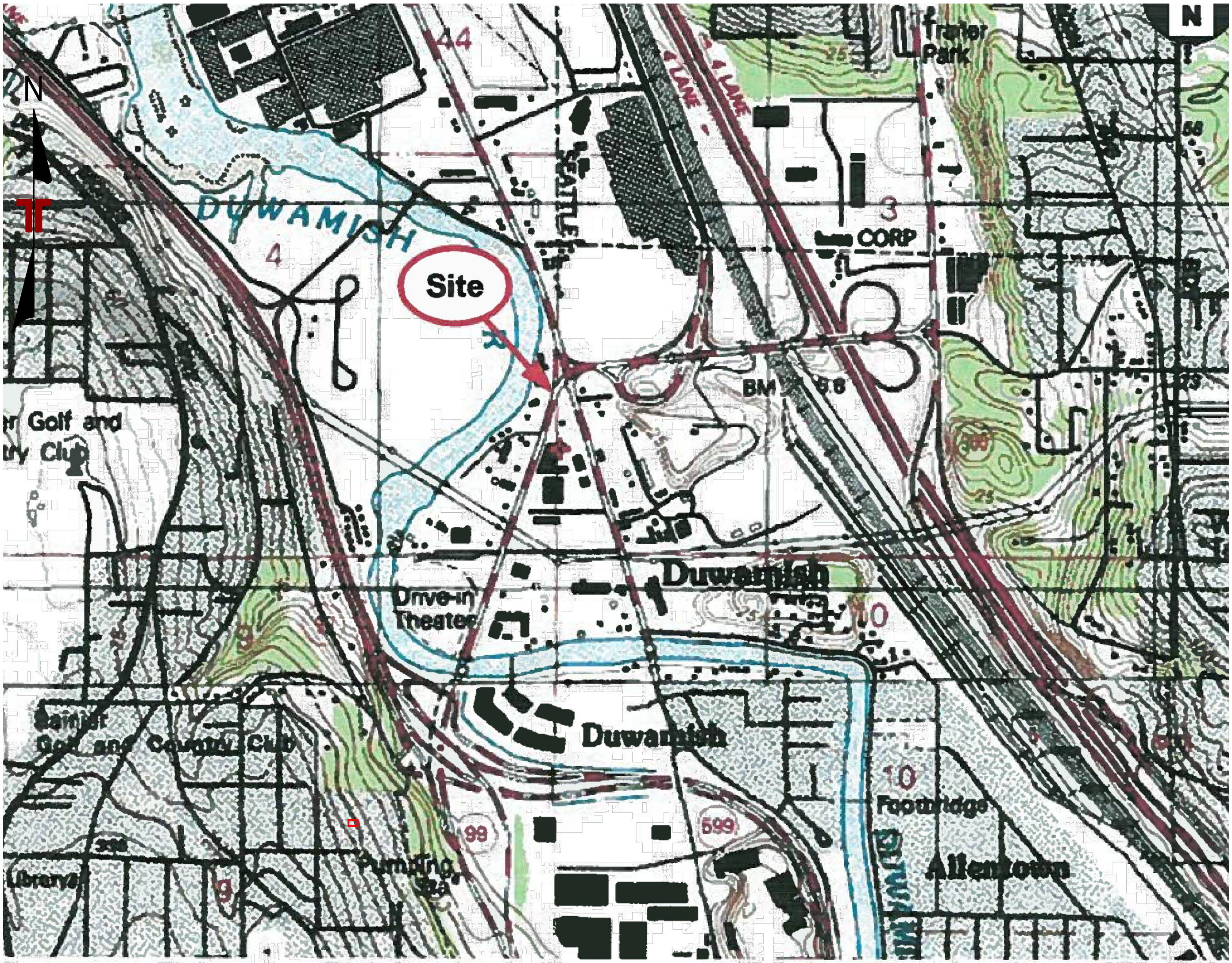
PEG. 1997. Environmental Assessment. Chevron Service Station 9-3099. 4 December.

Rittenhouse-Zeman & Associates, Inc. (RZA). 1990. Summary of Remedial Activities, Former Chevron Station No. 3099. 23 May.

RZA. 1990. Subsurface Environmental Site Characterization and Remediation, Former Chevron Station No. 3099. 21 August.

Appendix A

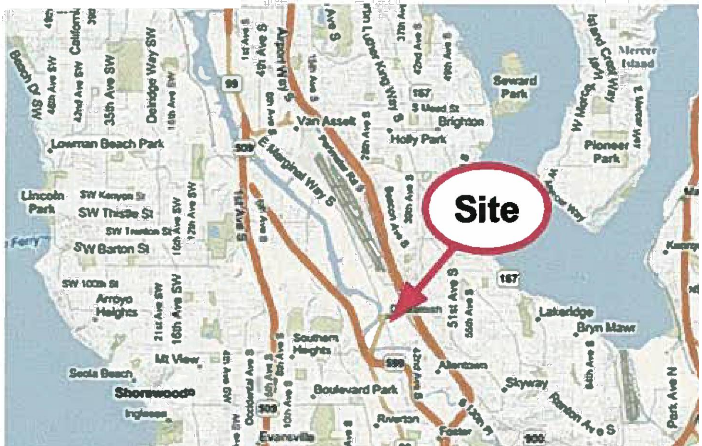
Figures



USGS Seattle South, 198

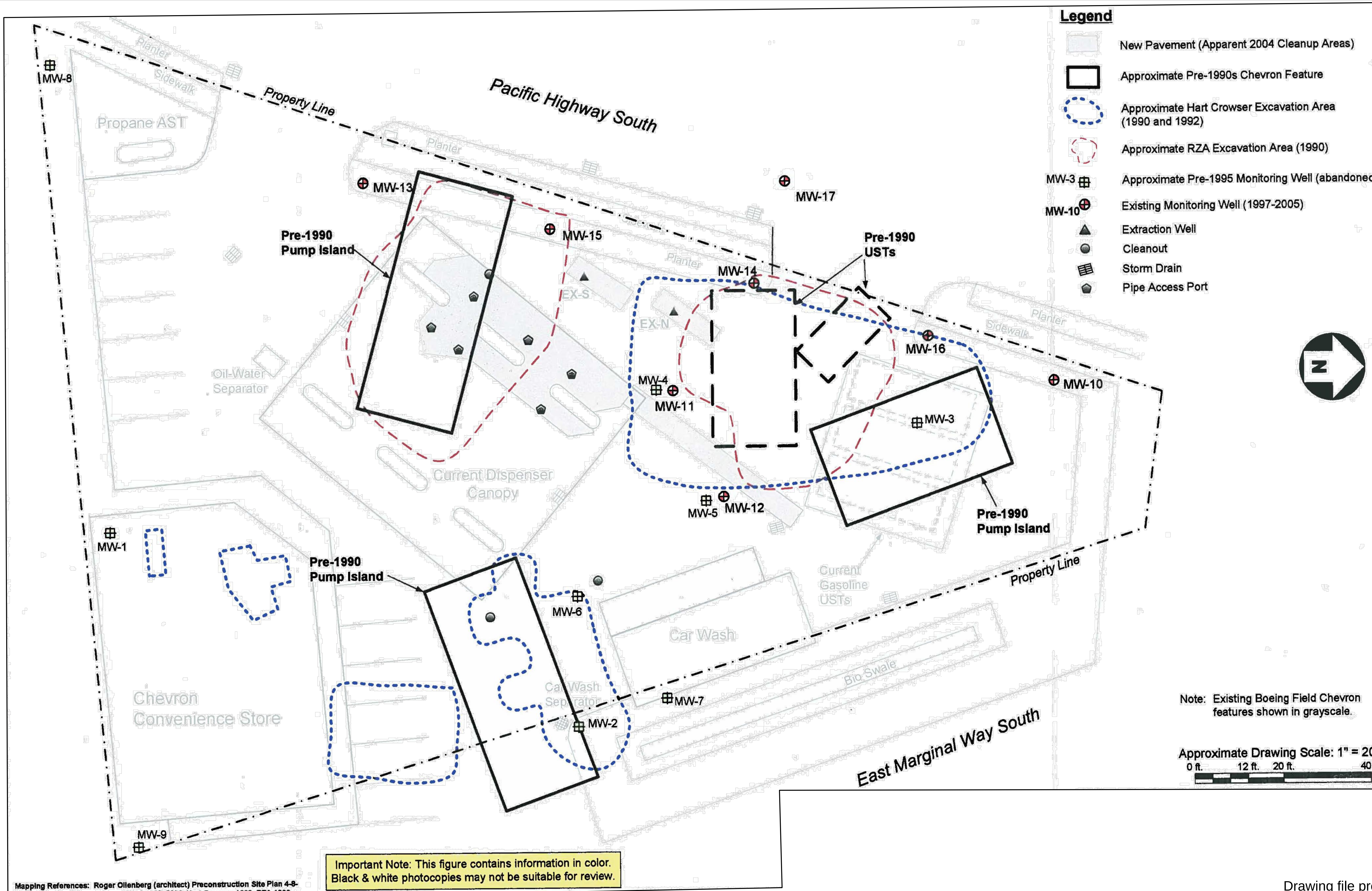
Windows Local Live

Seattle DPD GIS, 1999 Photo



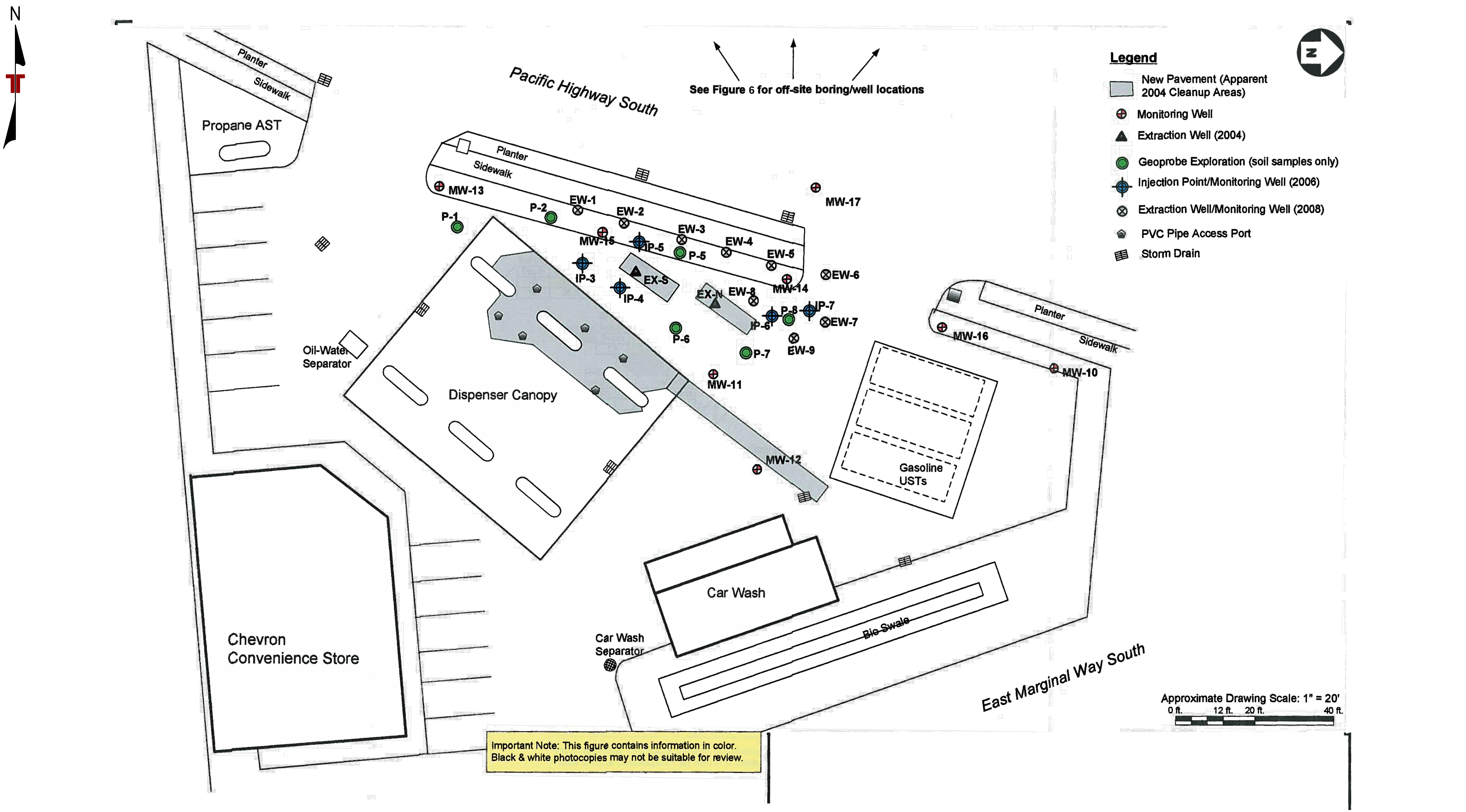
Basemap PDF file provided by Client and modified by Terracon.

Project Mngr: TAH	Project No. B2157002	**Terracon** Consulting Engineers and Scientists	**SITE VICINITY MAP**	FIG. No.
Drawn By: HRG	Scale: Not to scale		Boeing Field Chevron	1
Checked By: MYW	File No. figure1.dwg	21905 64th Avenue W., Ste 100 Mountlake Terrace, WA 98043	10805 Tukwilla International Boulevard	
Approved By: MYW	Date: May 2015	PH. (425) 771-3304 FAX. (425) 771-3549	Tukwilla, King County, Washington	



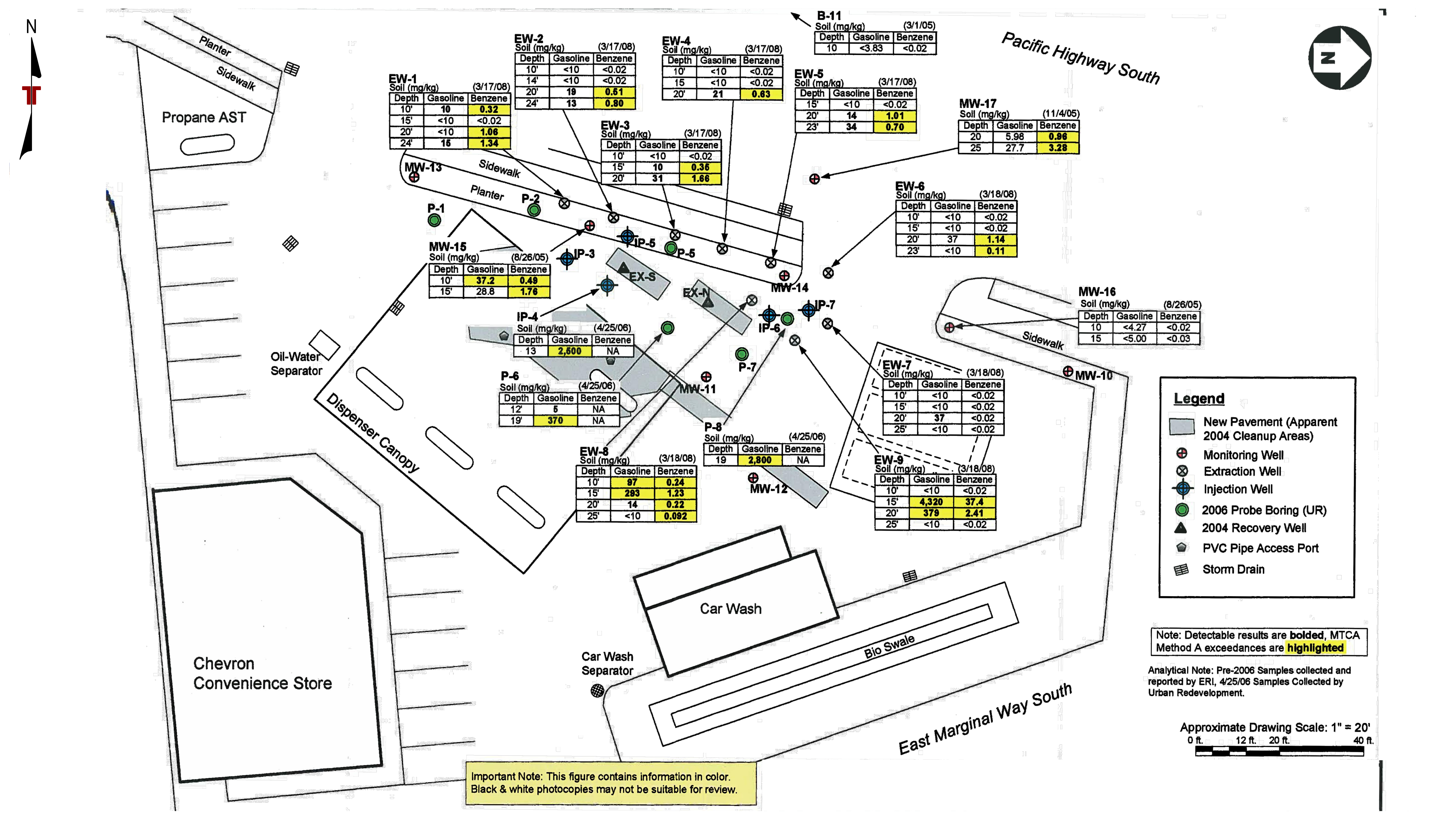
Drawing file provided by Client

Project Mngr: EAR	Project No. B2157002	Terracon	HISTORICAL SITE CONDITIONS	FIG. No.
Drawn By: TLH	Scale: AS SHOWN	Consulting Engineers and Scientists	Boeing Field Chevron	2
Checked By: EAR	File No. Fig2.dwg	21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043	10805 Tukwila International Boulevard	
Approved By: MYW	Date: March 2015	PH. (425) 771-3304 FAX. (425) 771-3549	Tukwila, King County, Washington	



Basemap PDF file provided by Client and modified by Terracon.

Project Mngr: EAR	Project No. B2157002	Terracon Consulting Engineers and Scientists 21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043 PH. (425) 771-3304 FAX. (425) 771-3549	**EXISTING BORING AND WELL LOCATIONS** Boeing Field Chevron 10805 Tukwila international Boulevard Tukwila, King County, Washington
Drawn By: AAS	Scale: AS SHOWN		FIG. No. 3
Checked By: EAR	File No. *.dwg		
Approved By: MYW	Date: May, 2015		



EW-1 Soil (mg/kg) (3/17/08)

Depth	Gasoline	Benzene
10'	**10**	**0.32**
15'	<10	<0.02
20'	<10	**1.06**
24'	**15**	**1.34**

EW-2 Soil (mg/kg) (3/17/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
14'	<10	<0.02
20'	**19**	**0.61**
24'	**13**	**0.80**

EW-4 Soil (mg/kg) (3/17/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
15	<10	<0.02
20'	**21**	**0.63**

B-11 Soil (mg/kg) (3/1/05)

Depth	Gasoline	Benzene
10	<3.83	<0.02

EW-5 Soil (mg/kg) (3/17/08)

Depth	Gasoline	Benzene
15'	<10	<0.02
20'	**14**	**1.01**
23'	**34**	**0.70**

MW-17 Soil (mg/kg) (11/4/05)

Depth	Gasoline	Benzene
20	5.98	**0.96**
25	27.7	**3.28**

EW-3 Soil (mg/kg) (3/17/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
15'	**10**	**0.35**
20'	**31**	**1.66**

EW-6 Soil (mg/kg) (3/18/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
15'	<10	<0.02
20'	37	**1.14**
23'	<10	**0.11**

MW-15 Soil (mg/kg) (8/26/05)

Depth	Gasoline	Benzene
10'	**37.2**	**0.49**
15'	28.8	**1.76**

MW-16 Soil (mg/kg) (8/26/05)

Depth	Gasoline	Benzene
10	<4.27	<0.02
15	<5.00	<0.03

IP-4 Soil (mg/kg) (4/25/06)

Depth	Gasoline	Benzene
13	**2,600**	NA

P-6 Soil (mg/kg) (4/25/06)

Depth	Gasoline	Benzene
12'	**5**	NA
19'	**370**	NA

EW-7 Soil (mg/kg) (3/18/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
15'	<10	<0.02
20'	**37**	<0.02
25'	<10	<0.02

P-8 Soil (mg/kg) (4/25/06)

Depth	Gasoline	Benzene
19	**2,800**	NA

EW-8 Soil (mg/kg) (3/18/08)

Depth	Gasoline	Benzene
10'	**97**	**0.24**
15'	**283**	**1.23**
20'	**14**	**0.22**
25'	<10	**0.092**

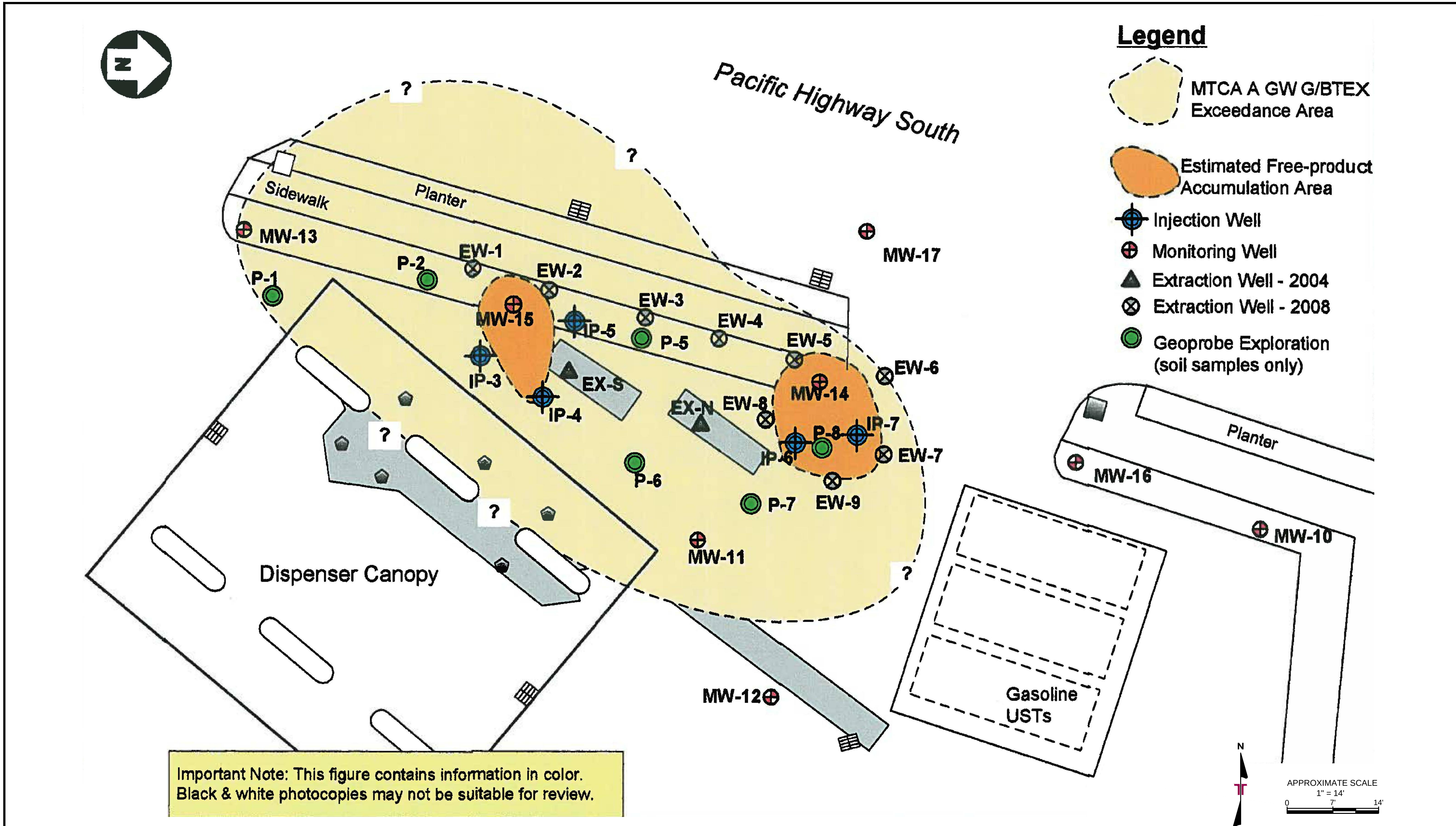
EW-9 Soil (mg/kg) (3/18/08)

Depth	Gasoline	Benzene
10'	<10	<0.02
15'	**4,320**	**37.4**
20'	**379**	**2.41**
25'	<10	<0.02

Basemap PDF file provided by Client and modified by Terracon.

Project Mngr: EAR	Project No. B2157002	Terracon Consulting Engineers and Scientists	GASOLINE AND BENZENE IN SOIL
Drawn By: AAS	Scale: AS SHOWN	21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043	Boeing Field Chevron
Checked By: EAR	File No. *.dwg	PH. (425) 771-3304 FAX. (425) 771-3549	10805 Tukwila international Boulevard
Approved By: MYW	Date: May, 2015		Tukwila, King County, Washington

FIG. No. 4

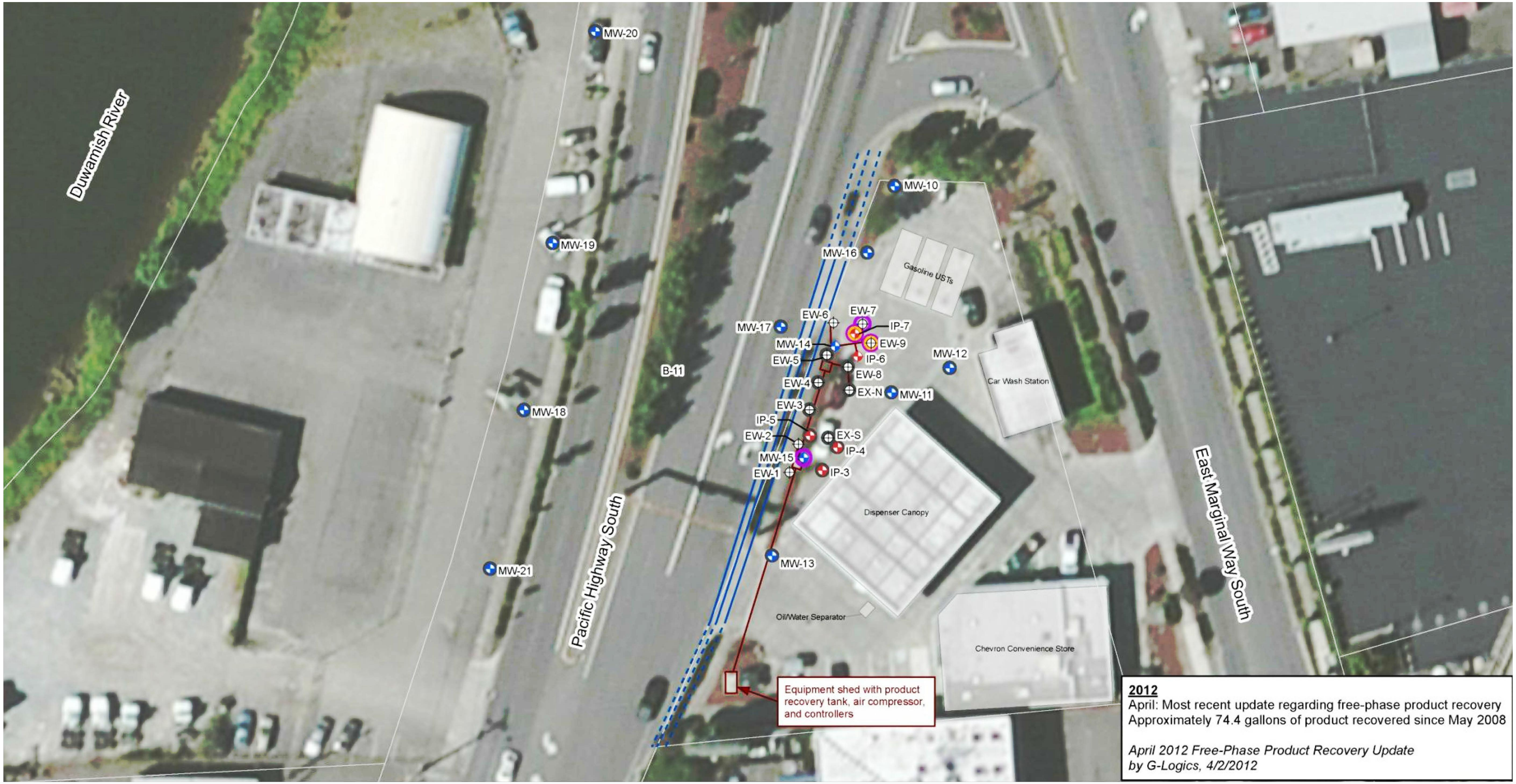


Project Mngr: EAR	Project No. B2157002
Drawn By: TLH	Scale: AS SHOWN
Checked By: EAR	File No. Fig2.dwg
Approved By: MYW	Date: March 2015

Terracon
Consulting Engineers and Scientists
21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043
PH. (425) 771-3304 FAX. (425) 771-3549

GASOLINE AND BTEX IN GROUNDWATER
Boeing Field Chevron
10805 Tukwila International Boulevard
Tukwila, King County, Washington

FIG. No. 5



Legend

- Monitoring Well
- Extraction Well/Monitoring Well
- Injection Point/Monitoring Well
- Locations with measurable free phase hydrocarbons in 2011 and 2012
- Locations where absorbent socks used for free product recovery in 2012
- Locations not sampled
- Approximate Location of Underground Utility Lines (from Hart Crowser drawings; dashed where inferred)
- Current Site Features

Notes:

1. All features shown are approximate
2. UST = Underground storage tank
3. Background imagery source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
4. Tax parcel information from King County iMAP

N

APPROXIMATE SCALE
1" = 42'
0 21' 42'

Boeing Field Chevron
King County, Washington

Site Chronology
2012 Free Product Recovery

Project Mngr: EAR	Project No. B2157002	Terracon Consulting Engineers and Scientists	**Site Overview Map**
Drawn By: TLH	Scale: Not to Scale	21905 64th Avenue W, Ste 100 Mountlake Terrace, WA 98043	Boeing Field Chevron
Checked By: EAR	File No. Fig2.dwg	PH. (425) 771-3304 FAX. (425) 771-3549	10805 Tukwila International Boulevard
Approved By: MYW	Date: March 2015		Tukwila, King County, Washington

FIG. No. 6

Appendix B

Table 2

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-1 TOC 101.44 (17.97)											
Adandoned											
12/20/1997	10.99	6.98	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	12.89	5.08	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	12.91	5.06	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	14.3	3.67	ND (<50)	ND (<250)	---	1.6	3	ND (<0.5)	2.3	---	---
6/24/1993	13.3	4.67	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	3.5	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	4.4	---
6/17/1992	NR	NR	ND	ND	---	1.2	ND	ND	ND	---	---
3/3/1992	NR	NR	ND (<1,000)	ND (<1,000)	---	**5.4**	ND	ND	ND	---	---
3/20/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	2.4	ND	ND	ND	---	---
1/8/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	3.8	ND	ND	ND	---	---
11/16/1990	12.06	5.91	ND (<1,000)	ND (<1,000)	---	**5**	ND (<0.5)	ND (<0.5)	ND (<0.5)	---	---
8/15/1990	15.29	2.68	ND (<1,000)	ND (<1,000)	---	2.8	ND (<0.5)	ND (<0.5)	0.8	---	---
8/3/1990	15.4	2.57	---	---	---	---	---	---	---	---	---
7/30/1990	14.9	3.07	---	---	---	---	---	---	---	---	---
6/27/1990	13.82	4.15	---	---	---	---	---	---	---	---	---
6/13/1990	14.65	3.32	ND (<10,000)	---	---	6	ND (<1)	ND (<1)	ND (<1)	---	---
MW-2 TOC 100.52											
Replaced with MW-2R 2/5/1993											
11/16/1990	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS	NS
8/15/1990 [1]	---	---	**2,000**	ND (<1,000)	---	**130**	ND (<0.5)	56	180	---	---
8/15/1990		4.97	ND (<1,000)	ND (<1,000)	---	**81**	1.9	32	120	---	---
8/3/1990	12.00	88.52	---	---	---	---	---	---	---	---	---
7/30/1990	11.41	89.11	---	---	---	---	---	---	---	---	---
6/27/1990	10.69	89.83	---	---	---	---	---	---	---	---	---
6/22/1990	NR	NR	ND (<10,000)	---	---	**249**	2	127	555	---	---
6/13/1990	9.85	90.67	ND (<10,000)	---	---	**100**	4	120	922	---	---
MW-2R TOC 17.51											
Adandoned											
12/20/1994	12.15	5.36	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	16.08	1.43	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	13.82	3.69	ND (<50)	ND (<250)	---	3.3	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	15.66	1.85	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/24/1993	14.33	3.18	ND (<50)	300	---	2.6	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993 [1]	NR	NR	ND (<50)	300	---	**17**	ND (<0.5)	ND (<0.5)	ND (<1.5)	**30**	---
4/12/1993	NR	NR	ND (<50)	300	---	**16**	ND (<0.5)	ND (<0.5)	ND (<1.5)	**31**	---
2/9/1993 [1]	NR	NR	ND (<100)	ND (<500)	---	**19**	ND (<0.5)	ND (<0.5)	ND (<0.5)	**25**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	**19**	ND (<0.5)	ND (<0.5)	0.5	**25**	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-3 TOC 101.44											
Replaced with MW-3R on 2/4/1993											
6/17/1992	NR	NR	120	ND (<1,000)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
3/3/1992	NR	NR	120	ND (<1,000)	---	ND (<0.5)	0.5	ND (<0.5)	0.5	---	---
3/20/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	ND (<0.5)	ND (<0.5)	3.5	1.2	---	---
1/8/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	ND (<0.5)	ND (<0.5)	1.1	ND	---	---
11/16/1990		4.23	ND (<1,000)	ND (<1,000)	---	ND (<0.5)	2	0.7	ND (<0.5)	---	---
8/15/1990		0.2	ND (<1,000)	ND (<1,000)	---	ND (<0.5)	ND (<0.5)	0.7	0.7	---	---
8/3/1990	18	83.44	---	---	---	---	---	---	---	---	---
7/30/1990	17.24	84.2	---	---	---	---	---	---	---	---	---
6/27/1990	15.07	86.37	---	---	---	---	---	---	---	---	---
6/13/1990	15.25	86.19	ND (<10,000)	---	---	ND (<1)	ND (<1)	ND (<1)	6	---	---
MW-3R TOC 17.68											
Destroyed											
3/18/1996	11.53	6.15	940	0.32	ND (<250)	ND (<0.5)	ND (<0.5)	1.6	ND	12	---
12/8/1995	12.6	5.08	260	**550**	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	ND	---
9/28/1995	12.76	4.92	ND (<50)	320	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	ND	---
12/20/1994	12.06	5.62	130	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
6/2/1994	16.43	1.25	160	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
12/20/1993	13.73	3.95	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
9/28/1993	15.98	1.7	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
6/24/1993	14.4	3.28	160	300	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND	---	---
4/12/1993	NR	NR	380	ND (<250)	---	ND (<0.5)	ND (<0.5)	0.7	0.7	**56**	---
2/9/1993	NR	NR	790	**2,900**	---	ND (<0.5)	ND (<0.5)	3.1	2	**36**	---
MW-4 TOC 101.03											
Replaced 2/4/1993											
6/17/1992 [1]	NR	NR	620	ND	---	ND	ND	17	1.9	---	---
6/17/1992	NR	NR	710	240	---	ND	ND	18	2	---	---
4/23/1992	NR	NR	---	---	---	ND	6.7	350	350	---	---
3/3/1992	NR	NR	**12,000**	**1,700**	---	1.2	310	**1,000**	**3,200**	---	---
7/23/1991	NR	NR	**2,400**	**2,900**	---	**8.0**	ND	170	130	---	---
3/20/1991	NR	NR	**3,000**	ND (<1,000)	---	**11**	5.7	170	240	---	---
1/8/1991	NR	NR	**16,000**	**3,000**	---	**79**	160	**960**	**2,000**	---	---
11/16/1990		8.21	**22,000**	ND (<1,000)	---	ND (<250)	**1,600**	510	**2,300**	---	---
8/15/1990		6.83	ND (<1,000)	ND (<1,000)	---	**190**	ND (< 1)	3	7	---	---
8/3/1990	10.5	90.53	---	---	---	---	---	---	---	---	---
7/30/1990	10.48	90.55	---	---	---	---	---	---	---	---	---
7/18/1990	NR	NR	ND (<10,000)	---	---	**85**	ND (<1)	3	7	---	---
6/27/1990	10.1	90.93	---	---	---	---	---	---	---	---	---
6/13/1990	9.95	91.08	---	---	---	---	---	---	---	---	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-4R TOC 18.14											
Destroyed											
3/18/1996	10.65	7.49	ND (<50)	ND (<250)	ND (<250)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	4.8	---
12/8/1995	10.60	7.54	ND (<50)	340	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**20**	---
9/28/1995	13.61	4.53	ND (<50)	290	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	ND	---
12/20/1994 [1]	NR	NR	110	ND (<250)	---	0.5	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1994	11.93	6.21	ND (<50)	ND (<250)	---	0.6	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994 [1]	NR	NR	110	ND (<250)	---	**7.3**	ND (<0.5)	ND (<0.5)	2.1	---	---
6/2/1994	16.64	1.5	160	ND (<250)	---	**7**	ND (<0.5)	ND (<0.5)	1.9	---	---
12/20/1993 [1]	NR	NR	ND (<50)	ND (<250)	---	**16**	ND (<0.5)	0.7	12	---	---
12/20/1993	14.29	3.85	ND (<50)	ND (<250)	---	**16**	ND (<0.5)	0.7	11	---	---
9/28/1993 [1]	NR	NR	190	ND (<250)	---	**16**	0.7	2.9	21	---	---
9/28/1993	16.34	1.8	200	ND (<250)	---	**18**	0.6	3.7	24	---	---
6/24/1993	14.55	3.59	130	ND (<250)	---	**41**	0.5	3.7	19	---	---
4/12/1993 [1]	NR	NR	ND (<50)	ND (<250)	---	**53**	ND (<0.5)	0.5	7.3	---	---
4/12/1993	NR	NR	ND (<50)	ND (<250)	---	**52**	ND (<0.5)	ND (<0.5)	6.6	**53**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	**39**	ND (<0.5)	ND (<0.5)	2.5	**24**	---
MW-5 TOC 101.07											
Destroyed 9/1992											
6/17/1992	NR	NR	430	230	---	ND (<0.5)	ND (<0.5)	15	48	---	---
3/3/1992	NR	NR	94	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	0.54	---	---
7/23/1991	NR	NR	46	ND (<250)	---	0.62	ND (<0.5)	3.4	10	---	---
3/20/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	1.2	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
1/8/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	4.2	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
11/16/1990		8.43	ND (<1,000)	ND (<1,000)	---	**200**	ND (<0.5)	3.7	1	---	---
8/15/1990		6.97	ND (<1,000)	ND (<1,000)	---	**53**	ND (<0.5)	1.8	5.3	---	---
8/3/1990	10.17	90.9	---	---	---	---	---	---	---	---	---
7/30/1990	10.16	90.91	---	---	---	---	---	---	---	---	---
7/18/1990	NR	NR	ND (<10,000)	---	---	**10**	ND (<1)	ND (<1)	ND (<1)	---	---
6/27/1990	10.1	90.97	---	---	---	---	---	---	---	---	---
6/13/1990	10	91.07	---	---	---	---	---	---	---	---	---
MW-6 TOC 100.91											
Destroyed											
6/17/1992	NR	NR	ND (<50)	ND (<250)	---	2.4	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
3/3/1992	NR	NR	43	ND (<250)	---	**9.8**	ND (<0.5)	ND (<0.5)	0.6	---	---
3/3/1992	NR	NR	60	ND (<250)	---	**9.2**	ND (<0.5)	1.5	4.4	---	---
7/23/1991	NR	NR	130	ND (<250)	---	**35**	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
3/20/1991 [1]	NR	NR	ND (<1,000)	ND (<1,000)	---	**58**	ND (<0.5)	1.7	ND (<1.5)	---	---
3/20/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	**54**	ND (<0.5)	1.2	ND (<1.5)	---	---
1/8/1991 [1]	NR	NR	ND (<1,000)	ND (<1,000)	---	**52**	ND (<0.5)	4.6	11	---	---
1/8/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	**41**	ND (<0.5)	3.7	11	---	---
11/16/1990 [1]	NR	NR	600	ND (<1,000)	---	**100**	ND (<25)	ND (<25)	440	---	---
11/16/1990		8.21	500	ND (<1,000)	---	**130**	ND (<25)	69	500	---	---
8/15/1990		6.71	ND (<1,000)	ND (<1,000)	---	**150**	0.6	1.5	17	---	---
8/3/1990	10.65	90.26	---	---	---	---	---	---	---	---	---
7/30/1990	10.56	90.35	ND (<10,000)	---	---	**173**	ND (<1)	ND (<1)	15	---	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-7 TOC 100.86 (17.91)											
Abandoned											
12/20/1994	10.08	7.83	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/20/1994	11.09	6.82	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	10.43	7.48	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	11.80	6.11	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/24/1993	11.93	5.98	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**27**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	**40**	---
6/17/1992	NR	NR	ND	ND	---	ND	ND	ND	ND	---	---
3/3/1992	NR	NR	ND	ND (<1,000)	---	ND	ND	ND	ND	---	---
7/23/1991	NR	NR	ND	ND (<1,000)	---	ND	ND	ND	ND	---	---
3/20/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	0.5	ND	0.6	ND	---	---
1/8/1991	NR	NR	ND (<1,000)	ND (<1,000)	---	1.9	ND	0.5	2.6	---	---
11/16/1990	10.12	7.79	ND (<1,000)	ND (<1,000)	---	**11**	ND (<0.5)	ND (<0.5)	ND (<0.5)	---	---
8/15/1990	11.29	6.62	ND (<1,000)	ND (<1,000)	---	0.7	ND (<0.5)	ND (<0.5)	ND (<0.5)	---	---
8/3/1990	10.69	7.22	---	---	---	---	---	---	---	---	---
7/30/1990	10.51	7.4	ND (<10,000)	---	---	ND (<1)	ND (<1)	ND (<1)	ND (<1)	---	---
MW-8 TOC 16.93											
Abandoned	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1994	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/24/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	300	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**33**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	**25**	---
MW-8A TOC 16.84											
Abandoned											
12/20/1994	9.11	7.73	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	9.84	7	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	9.78	7.06	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	10.87	5.97	ND (<50)	ND (<250)	---	3	6.1	0.7	3.3	---	---
6/24/1993	9.75	7.09	ND (<50)	ND (<250)	---	ND (<0.5)	0.6	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**74**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	**18**	---
MW-9 TOC 16.72											
Adandoned											
12/20/1994	11.23	5.49	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	14.89	1.83	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	13.02	3.70	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	14.50	2.22	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/24/1993	13.57	3.15	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**42**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	**23**	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-9A TOC 16.68											
Adandoned											
12/20/1994	8.3	8.38	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/2/1994	9.38	7.3	ND (<50)	260	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
12/20/1993	8.69	7.99	ND (<50)	280	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/28/1993	10.23	6.45	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
6/24/1993	9.27	7.41	ND (<50)	390	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
4/12/1993	NR	NR	ND (<50)	300	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	**120**	---
2/9/1993	NR	NR	ND (<100)	ND (<500)	---	ND (<0.5)	ND (<0.5)	0.8	0.5	**75**	---
MW-10 TOC 99.21											
3/27/2008	NR	NR	ND	---	---	ND	ND	ND	ND	---	---
8/16/2004	15.8	83.38	**6,710**	---	---	**191**	555	130	626	---	---
11/13/2003	14.08	85.13	**1,100**	250	<250	**82**	31	38	140	---	21/18
05/05-07/03	13.32	85.89	**1,300**	<250	<250	**78**	41	43	190	---	**20/20**
11/24/2002	14.15	85.06	550	<250	<250	**180**	2.3	28	120	---	**27/23**
5/22/2002	15.59	83.62	---	---	---	---	---	---	---	---	---
2/20/2002	13.52	85.69	<50	<250	---	**22**	3.1	0.51	3.1	---	18/17
11/30/2001	11.48	87.73	254	**554**	<500	**90.4**	15.2	2.46	16.3	---	**42.3/37.7**
9/9/2001	14.58	84.63	---	---	---	---	---	---	---	---	---
6/10/2001	13.35	85.86	<50	435	---	**73**	4.7	<0.5	4.62	---	**36.4/39**
3/25/2001	14.01	85.2	ND (<50)	377	---	**79.6**	6.72	ND (<0.5)	5.24	---	**40.6/43.0**
12/17/2000	13.74	85.47	62.6	ND (<250)	---	**87.5**	7.24	ND (<0.5)	1.67	---	**46.6/41.9**
10/2/2000	14.48	84.73	ND (<50)	ND (<250)	---	**37.2**	3.25	ND (<0.5)	ND (<1.5)	---	**31.7/23.4**
11/16/1999	12.1	87.11	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	19.5/13.3
9/4/1999	15.26	83.95	ND (<50)	339	---	2.05	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	15.9
5/29/1999	13.42	85.79	ND (<50)	301	---	0.839	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	9.93
3/24/1999	10.81	88.4	ND (<50)	---	---	ND (<0.5)	0.553	ND (<0.5)	ND (<1.5)	---	ND (<2.5)
11/24/1998	10.49	88.72	ND (<50)	ND (<250)	---	0.714	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	8.08
9/2/1998	16.46	82.75	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**22.6**
6/19/1998	15.75	83.46	ND (<50)	ND (<250)	---	3.88	ND (<0.5)	ND (<0.5)	ND (<1.5)	**21.2**	**29.7**
3/18/1998	15.68	83.53	ND (<50)	ND (<250)	ND (<250)	3.86	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/5/1997	15.1	84.11	ND (<50)	ND (<250)	ND (<750)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1)	---	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-11 TOC 98.15											
3/27/2008	NR	NR	**10,600**	---	---	**96.2**	97.3	167	985	---	---
11/16/2005	NR	NR	**61,800**	---	---	**1,710**	---	---	---	---	---
8/16/2004	16.15	81.97	**79,000**	---	---	**3,340**	**11,600**	**2,010**	**10,600**	---	---
11/13/2003	16.5	84.98	---	---	---	---	---	---	---	---	---
05/05-07-03	14.5	86.45	---	---	---	---	---	---	---	---	---
11/24/2002	13.79	84.36	50	<250	<250	0.83	0.57	<0.5	<1.5	---	**30/20**
5/22/2002	10.72	87.43	72	**500**	<750	<0.5	0.87	<0.5	<1.5	---	<2.5
2/20/2002	9.22	88.93	<50	<250	---	<0.5	<0.5	<0.5	<1.5	---	<2.5
11/30/2001	9.81	88.34	<50	293	<500	<0.5	<0.5	<0.5	<1.0	---	<1.0/<0.5
9/9/2001	14.58	83.57	<50	494	<500	<0.5	<0.5	<0.5	<1.0	---	**27.8/27.8**
6/10/2001	12.11	86.04	<50	**790**	---	<0.5	<0.5	<0.5	<1.0	---	6.64/7.3
3/25/2001	12.16	85.99	ND (<50)	**912**	---	ND (<0.5)	0.64	ND (<0.5)	1.51	---	5.01/5.12
12/17/2000	12.99	85.16	ND (<50)	435	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	9.11/8.93
10/2/2000	15.05	83.1	ND (<50)	252	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**31.6/35.0**
11/16/1999	8.31	89.84	ND (<50)	369	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**44.8/33.9**
9/4/1999	10.95	87.2	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**48.2**
5/29/1999	9.92	88.23	ND (<50)	ND (<250)	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**32.7**
3/24/1999	10.43	87.72	ND (<50)	ND (<250)	---	3.97	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	11.2
11/24/1998	11.93	86.22	ND (<50)	ND (<250)	---	**13.5**	0.546	ND (<0.5)	2.91	---	16.7
9/2/1998	10.88	87.27	ND (<50)	ND (<250)	---	**31.2**	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**44.3**
6/19/1998	13.56	84.59	ND (<50)	297	---	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	6.79
3/18/1998	11.06	87.09	ND (<50)	390	ND (<750)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/5/1997	14.59	83.56	77.2	376	ND (<750)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1)	---	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-12 TOC 97.49											
3/27/2008 D	NR	NR	ND	---	---	ND	ND	ND	ND	---	---
3/27/2008	NR	NR	ND	---	---	ND	ND	ND	ND	---	---
11/16/2005	NR	NR	ND (<50)	---	---	ND (<0.50)	---	---	---	---	---
8/16/2004	9.9	87.58	ND (<50)	---	---	ND (<0.50)	0.935	ND (<0.50)	1.84	---	---
11/13/2003	9.74	88.75	<50	<250	<250	<0.50	<0.50	<0.50	<1.5	---	<2.5/5
05/05-07/03	8.72	89.77	<50	<250	450	<0.50	<0.50	<0.50	<1.5	---	<2.5
11/24/2002	9.86	88.63	**1,200**	<250	<250	**98**	5.5	47	150	---	12/10
5/22/2002	8.95	89.54	110	<250	<750	<0.50	0.71	<0.50	<1.5	---	<2.5
2/20/2002	8.22	90.27	<50	<250	---	<0.50	<0.50	<0.50	<1.5	---	<2.5
11/30/2001	8.43	90.06	<50	311	<500	**5.11**	<0.50	<0.50	1.27	---	4.95/3.93
9/9/2001	10.03	88.46	78.5	653	<500	**15.7**	5.04	0.947	9.18	---	15.4/13.6
6/10/2001	9.73	88.76	<50	**759**	---	**24.3**	5.33	0.54	4.05	---	16/17
3/25/2001	10.11	88.38	74.1	**779**	---	**24.7**	0.998	0.936	5.19	---	15.3/18.2
12/17/2000	9.25	89.24	284	252	---	**190**	13.9	3.43	31.3	---	**26.0/22.6**
10/2/2000	10.97	87.52	347	**2430**	---	**286**	49.4	3.91	58.4	---	**49.7/49.8**
11/16/1999	7.8	90.69	**1,410**	**4,650**	---	**442**	360	6.05	123	---	**70.1/70.7**
9/4/1999	11.21	87.28	ND (<50)	ND (<250)	---	**168**	15.4	3.46	37.3	---	**132**
5/29/1999	12.8	85.69	ND (<50)	ND (<250)	---	**30.9**	0.646	ND (<0.5)	3.69	---	**51.3**
3/24/1999	11.46	87.03	ND (<50)	ND (<250)	---	**10.3**	1.2	ND (<0.5)	1.13	---	17.1
11/24/1998	11.29	87.2	ND (<50)	ND (<250)	---	**6.05**	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	**22.4**
9/2/1998	14.94	83.55	ND (<50)	ND (<250)	---	**66.2**	ND (<0.5)	ND (<0.5)	1.65	---	**146**
6/19/1998	14.09	84.4	ND (<50)	**653**	---	**11.3**	0.909	ND (<0.5)	ND (<1.5)	1.53	**47**
3/18/1998	13.4	85.09	ND (<50)	ND (<250)	ND (<250)	**9.52**	ND (<0.5)	ND (<0.5)	ND (<1.5)	---	---
9/5/1997	13.75	83.74	ND (<50)	366	ND (<750)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<1)	---	---
MW-13 TOC 97.23											
3/27/2008	NR	NR	ND	---	---	**28.5**	3.3	ND	3.9	---	---
5/8/2006	NR	NR	ND	---	---	ND	ND	ND	3.3	---	---
11/16/2005	NR	NR	**12,600**	---	---	**3,360**	---	---	---	---	---
8/16/2004	16.71	80.52	**14,400**	---	---	**3,850**	138	332	**1,150**	---	---
MW-14 TOC 98.07											
8/16/2004	17.9	80.17	**175,000**	---	---	**8,820**	**31,700**	**4,010**	**21,300**	---	---
MW-15											
5/8/2006	NR	NR	28	---	---	**1,600**	**7,900**	**1,300**	**7,000**		
MW-16											
3/27/2008	NR	NR	ND	---	---	ND	ND	ND	ND	---	---
11/6/2005	NR	NR	ND (<50)	---	---	0.741	---	---	---	---	---
MW-17											
4/11/2008	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---
11/16/2005	NR	NR	ND (<50)	---	---	1.5	---	---	---	---	---
MW-18											
4/18/2008	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---
MW-19											
4/18/2008	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	Gasoline-range TPH (ug/L)	Diesel-range TPH (ug/L)	Oil-range TPH (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)	Methyl Tutiary Butyl Ether (ug/L)
MW-20											
4/18/2008	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---
MW-21											
4/18/2008 D	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---
4/18/2008	NR	NR	ND (<100)	---	---	ND (<1)	ND (<2)	ND (<1)	ND (<3)	---	---
B-11											
3/1/2005	NR	NR	ND (<50)	---	---	ND (0.50)				---	---
IP-3											
3/27/2008	NR	NR	**62,900**	---	---	**6,120**	**8,850**	**968**	**4,420**	---	---
5/8/2006	NR	NR	28	---	---	**1,800**	**13,000**	**1,000**	**8,300**	---	---
IP-4											
3/27/2008	NR	NR	**84,400**	---	---	**14,600**	**22,100**	**4,920**	**17,600**	---	---
5/8/2006	NR	NR	110	---	---	**15,000**	**48,000**	**3,700**	**23,000**	---	---
IP-5											
3/27/2008	NR	NR	**13,300**	---	---	**711**	**1,260**	363	**1,370**	---	---
5/9/2006	NR	NR	48	---	---	**2,100**	**18,000**	**3,500**	**20,000**	---	---
EW-1											
4/4/2008	NR	NR	11,000	---	---	435	493	276	920	---	---
EW-4											
4/4/2008	NR	NR	130	---	---	26.3	ND	ND	5.6	---	---
EW-5											
4/11/2008 D	NR	NR	1,420	---	---	129	3.5	83.2	166	---	---
4/11/2008	NR	NR	1,420	---	---	130	3.6	74	173	---	---
EW-6											
4/4/2008	NR	NR	ND	---	---	14.8	2.6	1.8	7.1	---	---
EW-7											
4/4/2008 D	NR	NR	2,510	---	---	16.3	93.6	ND	255	---	---
4/4/2008	NR	NR	2,460	---	---	16.8	98.8	ND	270	---	---

Notes: Results above the respective Model Toxics Control Act Method A cleanup levels, if any, are in **bold**.
ug/L = micrograms per Liter (equivalent to parts per billion).
ND = non detect.
--- = not sampled.
NR = Not Reported
TPH = Total Petroleum Hydrocarbons.
[1] A duplicate sample was collected for quality control measures.

Appendix C

Final Quality Assurance Project Plan

Section 1: Introduction

The purpose of this Quality Assurance Project Plan (QAPP) is to identify the quality assurance and quality control (QA/QC) protocols necessary to achieve the project-specific data quality objectives for sample collection and analysis during the ground water monitoring well assessment at the Boeing Field Chevron site. The objectives for the monitoring activities as well as the background, project description, project organization and schedule, and sampling procedures are described in the Agency Review Draft Work Plan for Ground Water Monitoring Well Assessment (Work Plan).

Section 2: Quality Objectives

The data quality objectives (DQOs) for this project are to describe and implement field and laboratory procedures that ensure: 1) data will be representative of actual environmental conditions, and 2) data are of known and acceptable quality. Measurements will be made to yield accurate and precise results representative of the media and conditions measure. Data will be calculated and reported in units consistent with those used by regulatory agencies to allow for comparability of data.

Accuracy, precision, completeness, representativeness, comparability, and sensitivity are terms used to describe the quality of analytical data. Routine procedures for measuring precision and accuracy include use of quality control samples (i.e., replicate analyses, check or laboratory control samples, matrix spikes, and procedural blanks). These indictors of data quality are discussed below.

2.1 Precision

Precision is an appraisal of the reproducibility of a set of measurements. Precision can be better defined as the variability of a group of measurements compared to their average value. Variability for environmental monitoring programs contains both an analytical component and a field component.

Analytical precision will be evaluated by the analyses of matrix spike duplicate and laboratory duplicate samples, which can be mathematically expressed as the relative percent difference (RPD) between duplicate samples analyses. RPD is calculated using the following equation:

$$RPD = \frac{C1 - C2}{C} x\ 100$$

where:

$C1$ = First concentration value or recovery value measured for a variable

$C2$ = Second concentration value or recovery value measured for a variable

The frequency of the performance of matrix spike duplicate and laboratory duplicate samples, where applicable, is usually one per batch (which typically consists of up to 20 samples) for each sample matrix received.

Field duplicate samples will be submitted blind to the laboratory as a means to determine field variability. Frequency of field duplicate samples is discussed in Section 4.2.

Precision quantities will be calculated for analyses with method reporting limits of the same order of magnitude and with detection concentrations greater than or equal to five times the method reporting limits. In instances where no criteria have been established (e.g., field duplicates), relative percent difference project goals will be 30 percent for water samples.

2.2 Bias and Accuracy

Bias is the systematic or persistent distortion of a measurement process that causes error in one direction. Accuracy refers to how close a measurement is to the true value. Bias and accuracy will be evaluated by the analysis of matrix spike samples and laboratory control samples and can be mathematically expressed as the percent recovery of an analyte that has been used to fortify a field sample or clean laboratory matrix sample at a known concentration prior to analysis. The percent recovery (R) for a matrix spike sample is calculated as follows:

$$R = \frac{SSR - SR}{SA}\ x\ 100$$

where:

SSR = Spiked sample result

SR = Sample result

SA = Spike added.

The following calculation is used to determine *R* for a laboratory control sample or reference material:

$$R = \frac{RM}{RC}\, x\ 100$$

where:

RM = Reference material result

RC = Known reference concentration

Results of matrix spike and laboratory control samples will be evaluated to the laboratory's control limits. Control limits are defined as the mean recovery, plus or minus three standard deviations, of the 20 data points, with the warning limits set as the mean, plus or minus two standard deviations. The laboratory will review the QC samples and surrogate standard recoveries for each analysis to ensure that internal QC data lie within the limits of acceptability. The laboratory will investigate any suspect trends and take appropriate corrective actions.

Field blank samples and method blank samples will also be used to evaluate bias of the data. Results for field and method blanks can reflect systematic bias that results from contamination of samples during collection or analysis. Analytes detected in field or method blank samples will be evaluated as potential indicators of bias.

2.3 Representativeness

Representativeness concerns the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Where appropriate, sampling locations will be selected on both systematic and biased (judgmental) samples bases in an attempt to spatially cover the study area. Sampling locations and methods for selection of these sampling locations are presented in the Work Plan.

2.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system. Completeness will be measured for each set of data received by dividing the number of valid measurements actually obtained by the number of valid measurements that were planned. Although 100 percent is the goal for completeness, 90 percent is the minimum acceptable level.

2.5 Comparability

Comparability is a qualitative QA criterion that expresses the confidence in the ability to compare one data set with another. Comparability among data sets is achieved through the use of similar sampling procedures and analytical methods. Sampling procedures will be performed as specified in the Work Plan. Analytical procedures will be conducted according to the methods discussed in this QAPP.

2.6 Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest. The method detection limit (MDL) is defined as the statistically calculated minimum amount that can be measured with 99 percent confidence that the report value is greater than zero. MDLs are specified in the individual methods and are developed by the laboratory for each analyte of interest representing the aqueous and solid matrices within the capability of an analytical method.

The method reporting limit (MRL) or practical quantitation limit (PQL) is the lowest value to which the laboratory will report an unqualified quantitative result for an analyte. The PQL is always greater than the statistically determined MDL. The PQLs required for this project are such that data can be compared to the lowest possible applicable, relevant, and appropriate requirements (ARARs) suitable for the site. PQLs are discussed in greater detail in Section 3.

Section 3: Analytical Procedures

The analytical laboratory(s) selected to analyze samples for this project will be certified by Washington State Department of Ecology (Ecology) for all the analytical methods required for the project. The analytical methods for the analyses, applicable sample containers, and holding times are summarized in Table C-1 below. Target PQLs are summarized in Table C-2 below.

Analysis of the ground water samples will be performed using the following methods:

- Method NWTPH-Gx: Gasoline-range organics by GC/FID (Ecology 1997).
- Method NWTPH-Dx: Diesel-range organics and heavy oil-range organics by GC/FID (Ecology 1997).
- Method 8020: Benzene, toluene, ethyl benzene, total xylenes (BTEX) compounds, methyl tertiary butyl ether (MTBE), 1, 2-dichloroethane (EDC), 1,2-dibromoethane (EDB), naphthalenes, and/or n-hexane (EPA 1986).
- Method 200.8: Total and dissolved lead (EPA 1986).

Any special analytical method employed will be determined with laboratory concurrence prior to beginning sample analysis. In addition, field parameters will be measured during ground water sampling as outlined in the Work Plan.

Section 4: Quality Control

QC samples will be assessed for both field and laboratory operations to evaluate overall precision/bias and accuracy throughout the project. Field QC samples will include field duplicate and blank samples. The types and frequency for QC samples are discussed below.

4.1 Laboratory Quality Control

Laboratory QC parameters, criteria, and frequency will be performed in accordance with the analytical methods referenced in Section 3. Comparison of QC sample results against established criteria is performed during the data validation process as described in Section 7.3. Laboratory QC data may include:

- Laboratory control and laboratory duplicate samples
- Matrix spikes and matrix spike duplicate samples
- Laboratory duplicates
- Surrogate standards
- Internal standards

- Method and instrument blanks
- Post-digestion spikes

The frequency of analysis for laboratory control samples, matrix spike samples, matrix spike duplicate samples, laboratory duplicate samples, and method blank samples will be one for every 20 samples or one per batch, where applicable, or as specified in the analytical methods. Surrogate spikes and internal standards will be added to samples as required by the methods. Laboratory control limits and performance-based criteria presented in the methods will be used to establish the acceptability of the data or the need for re-analysis of a sample. Analytical data will be evaluated by the laboratory based on the following criteria, where applicable:

- Performance of analytical method tests
  - Holding times
  - Matrix spike and matrix spike duplicate results
  - Calibration data using check compound and system performance check with compound analysis results
  - Laboratory blank sample analysis results
  - Interference check samples analysis results
  - Laboratory check sample analysis results
  - Comparison of calibration and sample analysis
  - Linearity of response and linear range.
- Analytical results of internal standards and the calculation of percent recoveries
- Reporting limits obtained
- Accuracy and precision of matrix spike/matrix spike duplicate analysis
- Comparison of the percentage of missing or undetected substances among duplicate samples.

During data validation, analytical results will be evaluated against the performance criteria noted in the QAPP and the individual analytical methods.

4.2 Field Quality Control Samples

Field duplicate samples are designed to monitor overall sampling and analytical precision. In general, duplicate samples will be collected at a frequency of approximately one duplicate sample per 10 samples or one duplicate sample per batch of samples if less than 10 samples are collected.

For duplicate water samples, sample containers will be alternately filled. The locations for duplicate sample collection will be determined in the field. Duplicate samples will be treated as separate samples from the originals (assigned unique sample numbers), and not identified to the laboratory as duplicate samples. Field duplicate samples will be documented on the daily field report, in the field logbook, or other appropriate field form.

Trip blank samples will also be collected. Volatile organic compound (VOC) samples are susceptible to contamination by diffusion of organic contaminants through the sample vials. Therefore, trip blank samples will be submitted to monitor for possible sampling contamination during shipment if VOC analyses are performed. Trip blank samples will be prepared by the analytical laboratory by filling volatile organic analysis (VOA) vials with organic-free water and shipping the blank samples with the clean sample containers. Trip blank samples will accompany the sample containers through collection and shipment to the laboratory and will be stored with the samples.

Section 5: Data Management

5.1 Documentation and Records

Records will be maintained documenting activities performed and data generated during implementation of the Work Plan. The types of documents that will be generated during implementation of the Work Plan are discussed below.

5.1.1. Field Documentation

Field personnel will document their field activities on either a daily field log or in a field logbook and complete other field forms applicable to the field activities being performed. The daily field logs and field logbooks will document information regarding who was present during field activities (field personnel, subcontractors, visitors), weather conditions, work conducted that day, problems encountered and corrective actions, if any, etc. Field logs will be filed in the project files.

Field logbooks and other types of field forms (e.g., ground water purge and sample forms, boring log/well construction logs, test pit excavation logs) will be used to record data obtained during various field activities. The individual field personnel will be responsible for maintaining these forms. Field daily logs, field logbooks, and other field forms will then be archived in the project files.

5.1.2. Laboratory Documentation

Records related to sample analysis will be documented by the laboratory. The laboratory will be required to submit data that are supported by sufficient backup information and QC results to enable reviewers to determine the quality of the data. The laboratory will submit the data in electronic and paper format. The paper format (i.e., hard copy) data packages from the laboratory will consist of the following information, where applicable:

- A cover letter for each sample batch will include a summary of any QC, sample, shipment, or analytical problems, and will document internal decision. Problems will be outlined and final solutions documented. A copy of the signed chain-of-custody form for each batch of samples will be included in the deliverable.

- Sample concentrations will be reported on standard data sheets in proper units and to the appropriate number of significant figures. For undetected values, the lower limit of detection for each compound will be reported separately for each sample. Dates of sample extraction or preparation and analysis will be included.

- Method blank results.

- Surrogate percent recoveries.

- Laboratory duplicate results, where applicable.

- Laboratory control sample results, where applicable, with percent recoveries and spiking concentrations.

- Matrix spike/matrix spike duplicate percent recoveries, with spiking concentrations and calculated relative percent differences.

- A list of the detection limits calculated for laboratory instruments for all analytes.

- Laboratory data qualifier codes appended to analyte concentrations, as appropriate, and a summary of code definitions.

Sample holding times will be calculated by comparing the date of sample collection (shown on the chain-of-custody form) with the date of sample extraction/analysis. Analytical laboratory deliverables will be validated.

The analytical laboratory will routinely archive raw laboratory data, including initial and continuing calibration data, chromatograms, and quantitation reports for at least five years.

5.2 Instrument/Equipment Calibration and Frequency

Field instruments will be operated, calibrated, and maintained by qualified personnel, according to manufacturer's guidelines and recommendations. At a minimum, instruments will be calibrated before use each day or more frequently as necessary. Calibration records will be recorded in the daily field log, field logbook, or other appropriate forms.

Laboratory instruments will be calibrated and maintained in accordance with the requirements of analytical methods and normal operating standards associated with good laboratory practices. Calibration requirements are specified in each laboratory's QA manual. Calibration records are documented in laboratory logbooks.

5.3 Instrument/Equipment Testing, Inspection, and Maintenance

Sampling equipment that will be used during field activities is discussed in the Work Plan. Preventive maintenance of equipment is essential if project resources are to provide accurate results and are to be used cost-effectively. Preventive maintenance will take two forms: 1) implementation of a schedule of preventive maintenance activities to reduce downtime and maintain accuracy of measurement systems and 2) availability of critical spare parts and backup systems and equipment.

Qualified operators will perform routine inspections and maintenance for field instruments in accordance with manufacturers' recommendations. Field equipment will be inspected prior to the start of sampling activities. Maintenance activities, if performed, will be documented in the daily field log or field logbook. As most types of field equipment that will be used for this project are standard (i.e., used frequently in environmental samples), replacement parts are readily available. The field personnel will be responsible for maintaining the field equipment.

The laboratory's QA manual discusses preventive maintenance for laboratory equipment and instruments. Maintenance and inspection records are documented in laboratory logbooks.

Section 6: Audits and Reports

6.1 Performance Evaluation Audits

Performance evaluation audits are an independent means of establishing the quality of measurement data by analysis of samples provided specifically for the evaluation.

During a performance evaluation audit, the performance of the laboratory technicians and the instrumentation or analytical systems on which they work are evaluated. A performance evaluation audit is accomplished by providing performance evaluation samples containing specific pollutants (in appropriate matrices) whose identities and/or concentrations are unknown to the technician. Laboratories participate in both internal and external performance testing to examine the overall laboratory performance as well as to qualify for various federal, state, and independent certification programs.

The laboratory will be responsible for implementing corrective action for analytical procedures. Corrective action procedures are described in the laboratory's QA manual. If QC data are unacceptable, the cause will be determined and corrected. Corrective actions that affect the integrity of the project analytical data will require re-analysis of the affected sample or qualifying of these data in the final data report. If corrective actions are warranted by a laboratory, the laboratory will document and forward the corrective action(s).

6.2 System and Technical Laboratory Audits

System and technical audits are performed by the laboratory QA Manager according to a predetermined schedule and when requested by laboratory management. An independent audit may be conducted should corrective actions be needed during implementation of the Work Plan (e.g., a laboratory repeatedly does not meet QC criteria, or overall performance of the laboratory is questionable). This audit will be project-specific and will focus only on the performance of the laboratory for this project. A laboratory audit report will be prepared, if necessary.

6.3 Field Operations

A readiness review will be conducted prior to initiation of each field task requiring sampling to verify that the necessary preparations have been made for efficient and effective completion of the task-related field activities. The Project Manager will verify that the necessary field equipment has been assembled for the field activity and that the applicable subcontractors, if necessary, have been scheduled. Any deficiencies noted during this readiness review will be corrected prior to initiation of field activities.

Field personnel are required to maintain continual communication with project members during the duration of field activities. Thereby, should issues arise during field activities, corrective actions can be implemented.

Section 7: Data Tracking, Reduction, and Validation

7.1 Sample Data Tracking System

During field activities, field personnel will be responsible for overseeing field measurements and data recording. Information on field forms will be verified that the following conditions have been met:

- Samples are properly documented in daily field logs, field logbooks and/or other field forms appropriate to the field activities being conducted.
- Chain-of-custody forms are complete and accurate.
- Samples collected are properly documented and field forms are completed.
- Samples and analyses specified in the Work Plan have been collected.
- Correct number of field QC samples was collected.

In addition, upon receipt of samples at the laboratory, it will be verified that samples were received at the appropriate temperature and in good condition (i.e., no excessive headspace, broken sample containers, etc.). If a sample does not arrive at the laboratory at the appropriate temperature or the integrity of the sample is in question, the potential implication of the anomaly will be evaluated and a course of action will be determined.

7.2 Data Reduction

Both field and laboratory data will be collected during implementation of the Work Plan. Data obtained during sample collection will be manually entered onto daily field logs, field logs book, and other field forms.

The laboratory will provide analytical data in electronic and/or paper form. Electronic data will be loaded into project databases and verified with the paper copy.

Some data from these sources (such as sample location name and coordinates, water levels, and field parameters) may also be manually entered into project databases or various programs such as computer-aided drafting and design (CADD). Manually-entered data will be reviewed by a second individual.

The central data management tool for the laboratory is the laboratory information management system (LIMS). The LIMS is used for sample processing, including sample log-in and tracking, instrument data storage and processing, generating data reports, and verifying results. Data collected from each laboratory instrument, either manually or electronically, are reviewed and confirmed by the analyst prior to reporting. Laboratory records including chain-of-custody forms, bench sheets, and analytical results, whether in electronic or hard copy format, are stored chronologically by batch or project.

7.3 Data Review, Verification, and Validation

Field and laboratory data generated during implementation of the Work Plan will be reviewed, verified, and validated. Field data entered into databases will be verified. Error identified during the verification of data will be corrected prior to release of the final data.

The laboratory is responsible for verifying analytical results prior to the submittal of the final laboratory data report. Initially, all analytical data generated by the laboratory are verified by the laboratory. During the analysis process, the analyst and the laboratory QA Manager verify that the results have met various performance-based control limits (e.g., surrogate recoveries and continuing calibration). Non-conformance of various method QC requirements and control limits warrants the re-analysis and/or re-extraction of a sample.

Finally, the data will be verified and validated based on the quality objectives specified in this QAPP and performance-based criteria specified in the analytical methods in accordance with applicable portions of EPA's Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (EPA 2004; 2008). If data do not meet required criteria, they will be flagged with data qualifiers as specified under the action portion of each requirement of the functional guidelines (EPA 2004; 2008).

Data verification and validation will be conducted to assess the laboratory's performance in meeting the quality objectives identified in the QAPP (e.g., reporting limits and control limits) and performance-based criteria specified in the analytical methods. The components to be evaluated during the data validation process are summarized below:

- Holding times
- Method blank results
- Surrogate recovery results for organic analyses
- Laboratory control sample results

- Field duplicate results
- Field blank results
- Laboratory duplicate results, where applicable
- Matrix spike/matrix spike duplicate (MS/MSD) results for all relevant analyses
- Completeness
- Reported detection limits for analyses

If data do not meet the quality objectives and required criteria, they will be flagged with data qualifiers as specified under the action portion of each requirement of the functional guidelines (EPA 2004; 2008). Typical data qualifiers include, but are not limited to, “J,” used to indicate an estimated value, “B,” used to indicate blank contamination, and “R,” used to indicate a rejected value. The findings of the data validation will be presented in the ground water monitoring report. Limitations to the usability of the data will also be discussed in the report.

References

American Public Health Association, American Water Works Association, Water Environment Federation. 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition, ISBN 0-87553-235-7.

ASTM International (ASTM). 2007. Standard D422-63, Standard Test Method for Particle Size Analysis of Soils. DOI 10-1520/D0422-63R07.

U.S. Environmental Protection Agency (EPA). 1986, as amended through February 2007. Test Methods for Evaluated Solid Waste, Physical/Chemical Methods. SW-846.

U.S. Environmental Protection Agency (EPA) Office of Water. 1999. 821/R-99-017.

U.S. Environmental Protection Agency (EPA) Office of Water. 2002. 821/R-02-019.

U.S. Environmental Protection Agency (EPA). 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA 540-R-04-004. October 2004.

U.S. Environmental Protection Agency (EPA). 2008. Contract Laboratory Program National Functional Guidelines for Superfund Organic Data Review. EPA 540-R-08-01. June 2008.

U.S. Environmental Protection Agency (EPA) Office of Water. 2009. 600/R-09-122. September 2009.

Washington Department of Ecology. 1997. Analytical Methods for Petroleum Hydrocarbons. Publication No. ECY 97-602. June 1997

TABLE C-1: SUMMARY OF SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES [1]				
		Groundwater		
Analyte	Method	Container	Preservative	Holding Time
Gasoline-range TPH	NWTPH-Gx	4-40 mL CGV	HCL pH<2, Cool ≤6°C	2 Days/ 14 Days [2]
Diesel- and oil-range TPH	NWTPH-Dx	500 mL AG	Cool ≤6°C	7 Days
BTEX	Method 8020	4-40 mL CGV	HCL pH<2, Cool ≤6°C	2 Days/ 14 Days [2]
MTBE	Method 8020			
EDC	Method 8020			
EDB	Method 8020			
Naphthalenes	Method 8020			
n-hexane	Method 8020			
Total/dissolved lead	Method 6010	500 mL poly	HNO3 pH<2, ≤6°C	6 months

TPH = total petroleum hydrocarbons
BTEX = benzene, toluene, ethylbenzene, total xylenes
MTBE = methyl tertiary butyl ether
EDC = 1,2-dichloroethane
EDB = 1,2-dibromoethane
°C = degrees Celsius
AG = amber glass boston round bottle
CGV = clear glass vial
HCL = hydrochloric acid
HNO3 - nitric acid
mL = milliliters

[1] All sampling requirements and holding times to be verified by PLPs prior to any sample collection activities.
[2] Holding time is 2 days if upreserved, 14 days otherwise.

TABLE C-2: SUMMARY OF TARGET PQLs [1]	
Analyte	Groundwater Target PQL[2] µg/L
Total Petroleum Hydrocarbons	
Gasoline Range	100
Oil Range	250
Diesel Range	50
Volatile Organic Compounds	
Benzene	0.35
Toluene	1
Ethylbenzene	1
Total xylenes	3
Methyl tertiary butyl ether (MTBE)	1
1,2-Dibromoethane (EDB)	0.01
1,2-Dichloroethane (EDC)	1
Naphthalene	1
n-Hexane	1
Total/Dissolved lead	2

µg/L = micrograms per liter
PQL = Practical Quantitaiton Limit

[1] Target PQL values in this table are based on Limit of Quantitation values from Friedman & Bruya, Inc (F&BI) of Seattle, Washington, unless otherwise noted.

[2] PQLs from selected analytical laboratories to be verified by PLPs and submitted to Ecology for approval prior to start of field sampling activities.