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Draft – Issued for Client Review

D E S I G N B A S I S M E M O R A N D U M

TO: Mr. Mark Chandler, TOC Holdings Co. **DATE**: June 5, 2008

FROM: Ryan Bixby

SUBJECT: **TOC HOLDINGS CO. FACILITY NO. 01-817**
712 AND 714 AVENUE D, SNOHOMISH, WASHINGTON

INTRODUCTION

Sound Environmental Strategies Corporation (SES) prepared this Design Basis Memorandum on behalf of TOC Holdings Co. (TOC) for their Facility No. 01-817, which is located at 712 and 714 Avenue D in Snohomish, Washington (the Property). This memorandum summarizes the design basis for the technology selection and conceptual design of the proposed remediation system for the property.

This memorandum includes a summary of the pilot test activities completed at the Property in March 2008. The data measured during the pilot test was evaluated to calculate the hydraulic conductivity of the aquifer and to identify an appropriate remediation technology. A description of the site background and site conceptual model, a summary of pilot test results, and the basis for the conceptual design are presented below.

SITE BACKGROUND

The Property was occupied by a retail gasoline station between the mid-1950s and early-1970s. The Property was leased and operated as a Time Oil Co. gasoline station until 1971. In 1971 the Property was sold to Armstrong Realty and the gasoline station was subsequently demolished. In 1989 Armstrong Realty sold the Property to the current owners, Keith and Dan Welch. The Property is occupied by the existing 1972-vintage office buildings, which are listed as 712 and 714 Avenue D.

Historical information for the Property indicated that four underground storage tanks (USTs) were formerly present on the Property: two 1,000-gallon tanks; one 6,000-gallon tank; and one 4,000-gallon tank. The Property was initially listed on the Washington State Department of Ecology (Ecology) leaking underground storage tank (LUST) on November 21, 1994. A ground-penetrating radar survey (GPR) conducted at the Property in February 2000 identified potential product lines and vent piping extending from the former UST tank bed towards the dispenser islands; however, no USTs were observed. The locations of the former USTs and fuel-dispensing pump islands were estimated by others based upon field observations and the

results of a GPR survey. The GPR survey suggested that the historical USTs were decommissioned by removal and were not abandoned in place.

A limited environmental site investigation was completed by Alisto Engineering Group (Alisto) in April 1999. Alisto installed groundwater monitoring wells MW-01 through MW-04 and advanced one boring, B-01. Results of the initial soil and groundwater analyses indicated that concentrations of gasoline-range petroleum hydrocarbons (GRPH) and benzene, toluene, ethylbenzene, and xylenes (BTEX) were present at concentrations above their respective Model Toxics Control Act (MTCA) Method A soil and groundwater cleanup levels.

Agra Earth and Environmental, Inc. (Agra) performed Phase I and II Environmental Site Assessments (ESAs) in February and March 2000, respectively. The purpose of the ESAs was to gather historical information for the Property and characterize the extent of GRPH and BTEX in soil and groundwater located both on- and off-Property. Under the Phase II ESA scope of work, Agra advanced 12 borings and collected soil and groundwater samples from each boring for analysis. Agra concluded that the vertical distribution of GRPH and BTEX in soil extended from approximately 6 inches below ground surface (bgs) to 14 feet bgs. The aerial extent of GRPH and BTEX appeared limited to the area around the former dispenser islands and the central portion of the Property between the two existing buildings. Groundwater samples from borings advanced on the northern and eastern portion of the Property had the highest concentrations of GRPH and BTEX. The aerial extent of contaminants in groundwater was not completely defined by the Phase II ESA.

Time Oil Co. contracted Farallon Consulting, LLC (Farallon) in October 2000 to perform groundwater monitoring at the Property. Farallon completed a groundwater monitoring event in April 2001, and groundwater analytical results indicated that samples collected from MW-01, MW-02, and MW-03 contained GRPH and BTEX constituents at concentrations in excess of their respective MTCA Method A cleanup levels. GRPH and BTEX were not detected in the groundwater sample collected from MW-04. Based on groundwater elevation data, Farallon concluded that groundwater flow direction was to the east/northeast. In August 2001 Farallon completed a Subsurface Site Assessment that included the installation of five borings, which were finished as monitoring wells MW-05 through MW-09. The results of analytical testing indicated that only soil samples collected from the boring for MW-05 contained contaminant concentrations of GRPH and benzene above their respective cleanup levels. Groundwater analytical results indicated GRPH and benzene concentrations were above their respective cleanup levels in MW-05 through MW-08 and below laboratory detection limits in MW-09. Farallon concluded that additional site assessment and groundwater monitoring were necessary to fully define the lateral extent of groundwater contamination.

In June 2002 Farallon advanced three additional borings and completed them as monitoring wells MW-10 through MW-12. The soil analytical results indicated that the sample collected from MW-11 had concentrations of GRPH above the MTCA Method A cleanup levels. Groundwater analytical results from MW-11 and MW-12 indicated GRPH and benzene concentrations were also above their respective cleanup levels. Based on the groundwater analytical results from MW-11 and MW-12, Farallon concluded that there is an additional source of GRPH and benzene located in the vicinity of the former fuel dispensers at the 722 Avenue D property.

Quarterly groundwater monitoring activities were initiated at the Property in February 2002. Groundwater analytical data is consistent with previous investigations, with GRPH and benzene concentrations exceeding their respective cleanup levels along the eastern and northern portion

of the Property. In February 2008 SES advanced a boring along the northern limits of the inferred UST tank bed and completed it as monitoring well MW-13. Concentrations of GRPH and benzene exceeded the MTCA Method A cleanup levels for soil collected between depths of 7.5 to 17.5 feet bgs.

Based on the results of several subsurface investigations conducted by others on both the former Time Oil Co.'s. property and on the parcel located adjacent to the north (722 Avenue D), it appears that two distinct plumes of contamination exist at the former Time Oil Co. property and the parcel adjacent to the north. The data indicates that the two plumes are the result of two independent sources.

SITE CONCEPTUAL MODEL

GEOLOGY

The *Ground-water Resources of Snohomish County, Washington* characterizes the soil in the vicinity of the Property as primarily till; however, a younger alluvium deposit is found east of the Property. The till consists of a gray concrete-like mixture, principally 20 to 150 feet thick, which can contain sandy and gravelly streaks. The younger alluvium consists of clay, silt, peat, sand, and gravel with some artificial fill included. (*Ground-water Resources of Snohomish County Washington* 1952).

Based on subsurface investigation and drilling activities, a fill material consisting of loose, wet, brown, silty sand with some gravel is present from 4 to 7 feet bgs at varying thicknesses across the Property. Underlying the fill is a wet to saturated, gray, fine sandy silt grading to a sandy gravel below 7 to 12 feet bgs.

HYDROGEOLOGY

The *Ground-water Resources of Snohomish County, Washington* characterizes the till and younger alluvium deposits as follows: "Till - Essentially impervious, but the included sandy and gravelly streaks, as well as the disintegrated surface zone, yield small quantities of groundwater. Younger Alluvium - Course-grained materials yield large quantities of groundwater."

Based on historical groundwater data for the Property, the groundwater flow direction is northeasterly across the Property and northerly off-Property to the north. The hydraulic gradient (feet/foot) along the eastern portion of the Property, from MW-05 to MW-08, was calculated at 0.07 and 0.08 feet/foot for the March and September 2007 groundwater monitoring events, respectively. There is an apparent zone of higher permeability in the central portion of the Property when compared to the eastern portion. The calculated hydraulic gradient along the central portion of the Property, from MW-04 to MW-03, is approximately 0.001 feet/foot.

Historical depth-to-water data was evaluated for the Property and the parcel adjacent to the north. The average depth to water for all 21 monitoring wells was 6.02 feet bgs. The monitoring well with the greatest historic water elevation change was monitoring well MW-12, which exhibited a fluctuation of 7.05 feet. The shallowest depth to water was 1.19 feet bgs in MW-01W and the greatest depth to water was 19.48 feet bgs in MW-12. Seasonal fluctuations in groundwater are evident with higher groundwater elevations in the winter and early spring and lower groundwater elevations during the summer and fall.

EXTENT OF CONTAMINATION

Petroleum impacts of subsurface soil and groundwater both on- and off-Property have been documented in the previous site investigations as stated above. Some historic soil and recent groundwater data is provided in Attachments 1 and 2, respectively. Attachment 1 presents a site figure which illustrates the vertical and horizontal distribution of petroleum-impacted soil. This figure was prepared by Farallon in a previous report. Attachment 2 is a figure from the 2007 Second Semester Groundwater Monitoring Report which presents recent groundwater analytical results for the Property.

Generally speaking, the lateral extent of impacted soil extends east from monitoring well MW-04 to MW-02 and then north northeast toward the northern property boundary. The vertical extent of subsurface soil impacted with petroleum hydrocarbon presented in Attachment 1 varies from 2 to 9 feet bgs. Recent drilling of monitoring well MW-13 indicates that the vertical extent of impacted soil in the vicinity of that well extends from 7.5 to 17.5 feet bgs.

Review of the historical groundwater data indicates that the residual petroleum hydrocarbons in soil have impacted groundwater along the eastern and northeastern portion of the Property. Second Semester 2007 groundwater analytical results show that the maximum concentrations of GRPH and benzene were detected in groundwater collected from MW-02 at concentrations of 5,500 and 320 micrograms per liter, respectively. This groundwater data is presented on the figure in Attachment 2. Separate-phase hydrocarbons have been historically observed in MW-05 and MW-12.

PILOT TEST PROCEDURES AND RESULTS

The objectives of the pilot test were to evaluate the conductivity of the aquifer and test the effectiveness of dual-phase extraction (DPE) technology to address petroleum hydrocarbon-impacted soil and groundwater at the Property.

AQUIFER DRAWDOWN TEST

Aquifer testing for hydraulic parameters was conducted on March 5, 2008. Two constant-rate or near-constant-rate discharge tests were performed on monitoring well MW-05 with water level observations in that monitoring well and nearby monitoring well MW-02.

The test was conducted using a Grundfos 2-inch submersible pump with variable speed drive and two PT2X pressure transducers with internal data loggers from Instrumentation Northwest, Inc. of Seattle, Washington. The transducers were calibrated prior to being taken to the field. In addition to the automatic data logging, measurements of water elevation during and after the test for MW-05 and MW-02 were collected using an interface probe and water level meter, respectively.

Static water levels in pumping well MW-05 were 3.56 and 3.57 feet below top of casing for the 3 and 1.25 gallon per minute (gpm) pump tests, respectively. The top of the pressure transducer was located approximately 17 feet below the top of casing during the tests and approximately 2 feet above the pump. The test well is approximately 25 feet deep and the aquifer thickness was estimated to be 21 feet.

A constant rate of 3 gpm was extracted for the first 14 minutes of the 135-minute test. Analysis of this data shows the hydraulic conductivity of the aquifer was estimated to be 1.41×10^{-3}

centimeters per second (cm/sec) using the Cooper-Jacob method for drawdown versus time. Storativity measurements were collected from observation well MW-02 and the storativity was estimated to be 2.5 x 10^{-3}. Of additional interest is the fact that the aquifer test could not be sustained with a pumping rate of 3 gpm.

A constant or near constant rate of 1.25 gpm was extracted for the first 30 minutes of the 88-minute test and this data was analyzed. Analysis shows the hydraulic conductivity of the aquifer was estimated to be 1.5 X 10^{-3} cm/sec using the Cooper-Jacob method for drawdown vs. time. Storativity measurements were collected from observation well MW-02 and the storativity was estimated to be 2.0 x 10^{-3}.

DUAL-PHASE EXTRACTION TEST

On March 4, 2008 SES performed DPE pilot testing on monitoring wells MW-03, MW-05, and MW-13. Individual DPE tests were performed on each of the wells. A vacuum truck was used to apply vacuum to the wellhead in an effort to withdraw groundwater and air from the individual test wells. A wellhead manifold was constructed to control/regulate the amount of vacuum applied to the test wells. The manifold was equipped with a 1-inch polyvinyl chloride drop-tube (stinger), a moisture separator, bleed air assembly, and miscellaneous equipment for monitoring vacuum and measuring air flow rates. The drop tube was placed within the test well and was utilized to convey water and air from the test well. Several observation wells were used to monitor the effect of applying vacuum on the test well. The drop tube was intended to be used to lower the elevation of the groundwater to 12 feet bgs within the test wells and thus expose the impacted soil during testing. Field data sheets were used to document the parameters observed during the pilot testing. The amount of vacuum applied and the elevation of the drop tube were adjusted as needed to regulate the removal of air and groundwater from the test wells. An 18-gallon capacity moisture separator was used to separate the extracted groundwater from the extracted air. The limited capacity of the separator would not allow for continuous vacuum to be applied to the wells during each of the test, because the moisture separator required periodic draining. The data collected during the DPE pilot testing for monitoring wells MW-03, MW-05, and MW-13 are presented in Table sets 1, 2, and 3, respectively.

MW-03 Dual-Phase Extraction Results

An approximate 2.5-hour DPE test was conducted on monitoring well MW-03. The inlet of the 1-inch diameter stinger was positioned approximately 12 feet below the top of casing and remained in this location throughout the test. The vacuum applied to MW-03 during this test ranged from 42.0 to 193.0 inches of water (iow) (Table 1-1). The flow rates of air extracted during this test ranged from 11.3 to 15.0 standard cubic feet per minute (scfm), with the maximum air flow rate occurring at 193 iow (Table 1-1). Monitoring wells MW-01, 02, 05, 06, 09, 13, 01W, D, and E were utilized as observation points during this test to measure the effects of the applied vacuum (Table 1-2) Limited to no vacuum influence was evident in all of the wells with the exception of MW-05. The observed vacuum at MW-05 ranged from 0.0 to 0.31 iow. The greatest vacuum radius of influence (ROI) was observed from MW-03 with an applied vacuum of 189 iow and corresponding observed vacuum pressure of 0.31 iow at MW-05 located 43 feet to the southeast from MW-03 (Table 1-2). The average groundwater extraction rate observed during the test was 0.38 gpm, with a maximum rate of 1.64 gpm. A total of 54 gallons of water was removed from MW-03 during this test (Table 1-3).

MW-05 Dual-Phase Extraction Results

An approximate 2-hour DPE test was conducted on monitoring well MW-05. The inlet of the 1-inch diameter stinger was initially positioned approximately 4.5 feet below the top of casing and was lowered throughout the test to depth of 12 to 13 feet. The vacuum applied to MW-05 during this test ranged from 60.0 to 197.1 iow (Table 2-1). The flow rates of air extracted from MW-05 ranged from 13.1 to 19.3 scfm, with the maximum air flow rate occurring at 197.1 iow (Table 2-1). Monitoring wells MW-01, MW-02, MW-03, MW-06, MW-09, MW-13, MW-01W, MW-D, and MW-E were utilized as observation points during this test to measure the effects of the applied vacuum (Table 2-2). Limited to no vacuum influence was evident in all of the wells with the exceptions of MW-02 and MW-03. The observed vacuums at MW-02 and MW-03 ranged from 0.0 to 0.15 and 0.0 to 0.02 iow, respectively. The greatest ROI observed from DPE test well MW-05 with an applied vacuum of 197.1 iow was 0.15 iow at MW-02 located 18 feet to the south of MW-05 (Table 2-2). The average groundwater extraction rate observed during the test was 1.53 gpm, with a maximum rate of 6.0 gpm achieved during the initial dewatering of the test well (Table 2-3). A total of 162 gallons of water was removed from MW-05 during this test (Table 2-3).

MW-13 Dual-Phase Extraction Results

An approximate 1-hour and 40-minute DPE test was conducted on monitoring well MW-13. The inlet of the 1-inch diameter stinger was initially positioned approximately 12 feet below the top of casing and was raised to 9 feet at the end of the test. The vacuum applied to MW-13 during this test ranged from 15 to 28 iow (Table 3-1). The flow rates of air extracted during this test ranged from 8.2 to 18.6 scfm, with the maximum air flow rate occurring at a vacuum of 21 iow (Table 3-1). Monitoring wells MW-01, MW-02, MW-03, MW-05, MW-06, MW-09, MW-01W, MW-D, and MW-E were utilized as observation points during this test to measure the effects of the applied vacuum (Table 3-2). Limited to no vacuum influence was evident in all of the wells with the exceptions of MW-06 and MW-01W. The observed vacuums at MW-06 and MW-01W ranged from 0.0 to 0.14 and 0.0 to 1.0 iow, respectively. The average groundwater extraction rate observed during the test was 1.88 gpm, with a maximum rate of 18 gpm. A total of 154 gallons of water was removed from MW-13 during this test (Table 1-3).

DUAL-PHASE EXTRACTION EFFECTS ON WATER TABLE AND VAPOR RESULTS

Depth-to-water measurements were collected from various monitoring wells after each of the DPE tests were completed to document the effects the test had on the surrounding water table. A summary of the depth-to-water measurements is presented in Table 4. Vapor samples were collected at the conclusion of each DPE test. The samples were collected in a Tedlar bags and submitted for analysis of GRPH by Northwest Method NWTPH-Gx and benzene, toluene, ethylbenzene, and xylenes by United States Environmental Protection Agency Method 8021B. The results of the vapor samples are presented in Table 5.

It was observed during the pilot testing that monitoring wells across the site are screened similarly with the top of the screen section located approximately 4 feet bgs; however, the high seasonal groundwater elevation encountered during the time of the DPE test limited the length of exposed well screen in observation wells, thus decreasing the area of vadose zone soil available for vapor extraction.

DESIGN BASIS

TECHNOLOGY SELECTION

Results of an aquifer drawdown test and DPE pilot test indicate that permeability of site soil is relatively low, suggesting that DPE technology would be an effective remedial solution for the Property. The following site characteristics suggest that DPE technology will result in remedial success for on-Property soil and groundwater:

- The relatively low air and water flow permeability of the soil will limit the transfer rate of volatiles in subsurface.
- Groundwater beneath the site is relatively shallow (approximately 2 to 3 feet bgs), which significantly reduces the effectiveness of a soil vapor extraction system. DPE will lower the groundwater level exposing more vadose zone soil for vapor extraction.

CONCEPTUAL DESIGN PARAMETERS

DPE will be implemented by applying vacuum to three existing wells (MW-01, MW-05, and MW-13) and three additional wells (MW-14, MW-15, and MW-16) that are scheduled to be installed in June 2008 (Figure 1). Groundwater will be extracted four of those six wells (MW-13 through MW-16) using either drop-tubes or down well pumps. The depth to water is anticipated to be less than 3 feet during much of the year. By depressing the groundwater, the vapor-phase hydrocarbon within the vadose zone can be extracted.

The DPE tests show mixed results relative to applied vacuum and the radius of influence of vacuum in the vadose zone. This is assumed to be the result of the seasonally high groundwater table at the time of the pilot testing. The water table elevation was located above the top of the screen on several of the observation wells, thus providing poor data for estimating the design ROI. A high relative vacuum (+190 iow) was needed on suction wells MW-03 and MW-05 to generate an observable vacuum influence at 43 feet and 18 feet, respectively; whereas only a 20 iow vacuum was needed to generate an observable influence in monitoring well MW-13, located approximately 22 feet from the suction well. For design purposes it is assumed an ROI of 53 feet will be used. This ROI was selected because DPE will expose more vadose zone via dewatering and thus increase the ROI observed during pilot testing. Figure 1 illustrates an estimated vapor capture zone for the proposed DPE system.

A hydraulic analysis was performed using the aquifer characteristics identified from the aquifer drawdown test. The capture zone for an individual DPE well extends 9 feet downgradient and 30 feet crossgradient from the well. The analysis, provided on Table 6, forms the basis for the well spacing and well construction design. Figure 2 illustrates the approximate extent of groundwater beneath the Property containing concentrations of GRPH that exceed the MTCA cleanup level, as well as the theoretical groundwater capture zones for a DPE system. The individual capture zones for the proposed DPE well locations (MW-13 through MW-16) are also shown in Figure 2. The cumulative capture zone illustrated on Figure 2 represents the theoretical capture zone of groundwater when all four DPE wells are operating.

PRELIMINARY FLOW RATES FOR EXTRACTION WELLS

Monitoring well MW-13 may be hydraulically linked to the former UST excavation, which may have caused a “short-circuit” and limited the amount of drawdown that occurred during the

relatively short duration of the pilot test. The DPE pilot test and drawdown tests on monitoring well MW-05 showed complete drawdown using a pump rate of 1.25 gpm.

Using the data from the pilot test and the conservative gradient of 0.0816 feet/foot, the groundwater flux within the GRPH-plume area is approximately 4.7 gpm (Table 6). Considering the calculated hydraulic capture zone, the three additional wells (MW-14, MW-15 and MW-16) will be required to effectively capture the water leaving the Property. Figure 2 shows the projected capture zone. The groundwater recovery rate for individual DPE wells is anticipated to be approximately 1 gpm, with a cumulative recovery rate of 4 to 5 gpm for the four pumping wells. Preliminary design calculations indicate that a system of six DPE wells, four of which will be equipped with drop-tubes or down well pumps, provides adequate coverage for the on-Property contamination.

Based on the air flow rates calculated from the DPE pilot tests, the vapor extraction rate for individual DPE wells is anticipated to be 15 to 20 scfm at a vacuum pressure of 100 to 125 iow. The vapor flow rate for the conceptual design is anticipated to be 90 to 120 scfm at a vacuum pressure of 125 iow. The vapor extraction ROI was measured at more than 43 feet and is assumed to be 53 feet for design as stated earlier. This suggests that six wells will be adequate to address the soil contamination beneath the Property. The proposed location and spacing of the DPE wells, based on this analysis, is provided on Figures 1 and 2.

PERMITS

Analytical testing revealed that the vapor extracted during the DPE test contained relatively low concentrations of GRPH (Table 5). Based on these findings, treatment of soil vapor will probably not be required prior to discharging to the atmosphere. The effluent concentration is expected to increase after the treatment system reaches steady state operating conditions, which will likely occur more than a month after system startup. Vapor samples will continue to be collected and analyzed to ensure the annual discharge limits of 1,000 pounds GPRH and 15 pounds of benzene are not exceeded. The actual influent vapor concentrations from six DPE wells could exceed the concentrations detected during the DPE pilot test. The system design should conservatively plan for possible system expansion for vapor-phase, granular-activated carbon to treat the vapors prior to discharge.

Based on historical groundwater concentrations it will be necessary to treat the groundwater extracted by the DPE system using granular-activated carbon or an air stripping technology. A wastewater discharge permit would need to be applied for with the City of Snohomish Public Works Department.

PROPOSED LIST OF REMEDIAL CONSTRUCTION DRAWINGS

The following list of construction drawings will be prepared during the design phase of the remedial system:

- Sheet G-101 Cover Page
- Sheet G-102 Piping and Instrumentation Diagram Legend
- Sheet G-103 Existing Site Layout
- Sheet G-104 Proposed Site Layout
- Sheet G-105 Well Schedule
- Sheet G-106 Piping and Instrumentation Diagram

- Sheet C-101 Well Vault Details
- Sheet C-102 Utility Trench Details
- Sheet M-101 Remedial System Compound
- Sheet M-102 Manifold Details
- Sheet M-103 Equipment Schedule

Please note the above list of construction drawings is preliminary and may change as the design progresses and are not appended to this document.

Attachments: Figure 1, Vapor Capture Plan
Figure 2, Groundwater Capture Plan
Table 1-1, DPE Pilot Test Results MW-03, Recovery Well Measurements
Table 1-2, DPE Pilot Test Results MW-03, Observation Wellhead Vacuums
Table 1-3, DPE Pilot Test Results MW-03, Water Recovery
Table 2-1, DPE Pilot Test Results MW-05, Recovery Well Measurements
Table 2-2, DPE Pilot Test Results MW-05, Observation Wellhead Vacuums
Table 2-3, DPE Pilot Test Results MW-05, Water Recovery
Table 3-1, DPE Pilot Test Results MW-13, Recovery Well Measurements
Table 3-2, DPE Pilot Test Results MW-13, Observation Wellhead Vacuums
Table 3-3, DPE Pilot Test Results MW-13, Water Recovery
Table 4, DPE Pilot Test Results, Depth to Water Measurements
Table 5, DPE Pilot Test Results, Vapor Samples Analytical Results
Table 6, Groundwater Capture Zone Analysis
Attachment 1, *Figure 5 Soil Analytical Results* from Subsurface Site Assessment Report prepared by Farallon Consulting
Attachment 2, *Figure 3 Groundwater Analytical Results* from Groundwater Monitoring Report Second Semester 2007 prepared by SES

FIGURES

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LEGEND

MW-11	MONITORING WELL
MW-14	PROPOSED MONITORING WELL
	PROPERTY BOUNDARY
UST	UNDERGROUND STORAGE TANK
	SHALLOW GROUNDWATER FLOW DIRECTION (SEPTEMBER 10, 2007)
DPE	DUAL-PHASE EXTRACTION
	ESTIMATED CUMULATIVE DPE VAPOR CAPTURE ZONE

SHED
GRAVEL SURFACE
MINI STORAGE
ASPHALT-PAVED PARKING
MINI STORAGE
MW-04
MW-10
MW-03W
EXISTING BUILDING 712 AVENUE D
EXISTING BUILDING 714 AVENUE D
WINDERMERE REALTY 722 AVENUE D
FORMER USTS
FORMER WASTE OIL UST
FORMER UST EXCAVATION AREA
MW-15
MW-03
MW-F
MW-02W
FORMER PUMP ISLANDS
FORMER UST EXCAVATION AREA
MW-13
MW-01W
PLANTER STRIP
FORMER FUEL DISPENSERS
MW-09
MW-05
MW-02
MW-01
MW-06
MW-D
MW-C
MW-A
MW-B
MW-14
SIGN
PLANTER
SIDEWALK
MW-16
PLANTER
SIDEWALK
PLANTER
MW-E
SIDEWALK
MW-11
MW-12
AVENUE D
MW-08
CUMULATIVE DPE VAPOR CAPTURE ZONE

REFERENCE: FIGURE 2, GEOENGINEERS 2005

SOUND ENVIRONMENTAL STRATEGIES
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DATE: 03/12/08
DRAWN BY: VPB
CHECKED BY: RKB
CAD FILE: 01-817_2008DBM_VCP

PROJECT NAME: TOC HOLDINGS CO. FACILITY 01-817
SES PROJECT NUMBER: 0440-039-03
STREET ADDRESS: 712 AVENUE D
CITY, STATE: SNOHOMISH, WASHINGTON

REGION:

0 5 10 15 30 60
APPROXIMATE SCALE IN FEET 1 INCH = 30 FEET

FIGURE 1
VAPOR CAPTURE PLAN

6/4/2008
P:\0440 TOC Holdings Co\01-817 Snohomish -712 Ave D\Technical\CAD\2008DBM\01-817_2008DBR_Flg1_VCP.dwg
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LEGEND

MW-11	MONITORING WELL
MW-14	PROPOSED MONITORING WELL
	PROPERTY BOUNDARY
UST	UNDERGROUND STORAGE TANK
	SHALLOW GROUNDWATER FLOW DIRECTION (SEPTEMBER 10, 2007)
DPE	DUAL-PHASE EXTRACTION
	ESTIMATED EXTENT OF GRPH-CONTAMINATED GROUNDWATER
	ESTIMATED NDIVIDUAL DPE WELL CAPTURE ZONE
	ESTIMATED CUMULATIVE DPE CAPTURE ZONE FOR FOUR DPE WELLS

SHED
GRAVEL SURFACE
MINI STORAGE
ASPHALT-PAVED PARKING
MINI STORAGE
MW-03W
MW-04
MW-10
FORMER USTS
EXISTING BUILDING 712 AVENUE D
EXISTING BUILDING 714 AVENUE D
WINDERMERE REALTY 722 AVENUE D
APPROXIMATE LIMIT OF MTCA CLEANUP LEVEL FOR GRPH IN GROUNDWATER (SEPT 2007 DATA)
MW-15
MW-03
FORMER WASTE OIL UST
FORMER UST EXCAVATION AREA
MW-F
MW-02W
FORMER PUMP ISLANDS
FORMER UST EXCAVATION AREA
MW-13
MW-01W
PLANTER STRIP
FORMER FUEL DISPENSERS
MW-09
MW-05
MW-02
MW-14
MW-01
MW-06
MW-D
MW-C
MW-A
MW-B
MW-07
PLANTER
SIGN
PLANTER
SIDEWALK
MW-16
PLANTER
SIDEWALK
PLANTER
MW-E
SIDEWALK
MW-11
MW-12
INDIVIDUAL DPE WELL CAPTURE ZONE (Q = 2.125gpm) (TYP)
AVENUE D
MW-08
ESTIMATED EXTENT OF GRPH CONTAMINATION CONTRIBUTED BY THE FORMER TOC HOLDINGS CO. GASOLINE STATION
CUMULATIVE DPE CAPTURE ZONE FOR FOUR DPE WELLS

REFERENCE: FIGURE 2, GEOENGINEERS 2005

SOUND ENVIRONMENTAL STRATEGIES
SOUNDENVIRONMENTAL.COM

DATE: 03/12/08
DRAWN BY: VPB
CHECKED BY: RKB
CAD FILE: 01-817_2008DBM_GCP

PROJECT NAME: TOC HOLDINGS CO. FACILITY 01-817
SES PROJECT NUMBER: 0440-039-03
STREET ADDRESS: 712 AVENUE D
CITY, STATE: SNOHOMISH, WASHINGTON

REGION:

0 5 10 15 30 60
APPROXIMATE SCALE IN FEET 1 INCH = 30 FEET

FIGURE 2
GROUNDWATER CAPTURE PLAN

6/5/2008
P:\0440 TOC Holdings Co\01-817 Snohomish -712 Ave D\Technical\CAD\2008DBM\01-817_2008DBR_Fig2_GCPtm tsm.dwg
SOUNDENVIRONMENTAL.COM

TABLES

Table 1-1
DPE Pilot Test Results MW-03
Recovery Well Measurements
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/4/08
Equipment: 1" Sch 40 PVS stinger to KOT to vacuum truck

DPE Test Well MW-03																	
						Instrument Train								Bleed Air			
Time	Stinger Depth (ft. below well casing)	Barometric Pressure (psi)	Manual Dilution Valve (% open)	Wellhead Vacuum (in. H_2O)	Vacuum Truck Vacuum (in.Hg)	Total Vacuum (in. H_2O)	Differential Pressure (in. H_2O)	Temp (°F)	PID (RRU)	LEL (%)	O_2 (%)	CO_2 (%/ppm)	Flow Rate (scfm)	Total Vacuum (in. H_2O)	Diff. Pressure (in. H_2O)	Temp (°F)	Flow Rate (scfm)
1208	12	14.7	0	NM	19	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
1215	12	14.7	30	NM	NM	42.0	0.04	50	0.0	0.0	20.9	0.0	11.3	37.0	7.5	45	156.9
1255	12	14.7	20	NM	NM	78.0	0.06	48	0.0	0.0	20.9	0.0	13.2	72.0	6.0	44	133.7
1325	12	14.7	10	NM	10	193.0	0.12	49	0.0	0.0	20.9	0.0	15.0	193.0	3.0	47	75.4
1400	12	14.7	10	NM	10	192.0	0.11	49	0.0	0.0	20.9	0.0	14.4	189.0	3.0	47	76.1

Notes:

1) 1157 Start Test
2) At 1215 and 1255 the vacuum truck gauge read 0 in Hg
3) Collect vapor sample MW-03-20080304 @ 1415
4) 1426 End Test

°F = degrees Fahrenheit
ft. = feet
in. H_2O = inches of water
in. Hg = inches of mercury
LEL = lower explosive limit
NM = Not measured
PID = photoionization detector
ppm = parts per million
psi = pounds per square inch
RRU = relative response units
scfm = standard cubic feet per minute

Table 1-2
DPE Pilot Test Results MW-03
Observation Wellhead Vacuums
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08

Equipment: Magnehelic tree

DPE Test Well MW-03 - Observation Measurements											
		Well Heads (in. H_2O)									
Time	Manual Dilution Valve (% open)	MW-01	MW-02	**MW-03**	MW-05	MW-06	MW-09	MW-13	MW-01W	MW-D	MW-E
Distances to DPE Test Well (ft)		53	58	**Applied Vacuum (iow)**	43	82	89	62	74	117	117
1215	30	0.0	0.0	**42.0**	0.18	0.0	0.0	0.0	0.0	0.0	0.0
1255	20	0.0	0.0	**78.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1325	10	0.0	0.0	**193.0**	0.09	0.0	0.01	0.0	0.0	0.0	0.0
1410	10	0.0	0.0	**189.0**	0.31	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

NM = Not measured

DPE = Dual-Phase Extraction

ft = feet

in. H_2O = inches of water

iow = inches of water

Table 1-3
DPE Pilot Test Results MW-03
Water Recovery
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08
KOT Dimensions: 2' 3 3/4" by 1' 7"

DPE Test Well MW-03			
Time	Water Recovered (gal)	Water Flow Rate (gpm)	Comments/Observations
1208	18	1.64	BA closed/ vac back on @ 1210
1347	18	0.19	BA 20%, down to 10% @ 1315
1423	18	0.55	BA 10%, end test @ 1426

Notes:
DPE = Dual-Phase Extraction
gal = gallon
gpm = gallons per minute

Total Gallons Recovered: 54
Average Flow Rate: 0.79
Maximum Flow Rate: 1.64
Minimum Flow Rate: 0.19

Table 2-1
DPE Pilot Test Results MW-05
Recovery Well Measurements
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08

Equipment: 1" Sch 40 PVS stinger to KOT to vacuum truck

DPE Test Well MW-05																	
						Instrument Train								Bleed Air			
Time	Stinger Depth (ft. below well casing)	Barometric Pressure (psi)	Manual Dilution Valve (% open)	Wellhead Vacuum (in. H_2O)	Vacuum Truck Vacuum (in.Hg)	Total Vacuum (in. H_2O)	Differential Pressure (in. H_2O)	Temp (°F)	PID (RRU)	LEL (%)	O_2 (%)	VOCs - 4-gas Meter (ppm)	Flow Rate (scfm)	Total Vacuum (in. H_2O)	Diff. Pressure (in. H_2O)	Temp (°F)	Flow Rate (scfm)
1540	12	14.7	20	NM	3	60.0	0.07	48	0.9	0	20.9	0.3	14.6	63.0	5.0	46	123.4
1600	13	14.7	10	NM	8	154.0	0.09	48	3.4	0.0	20.9	0.9	14.2	152.0	2.5	47	75.1
1620	13	14.7	10	NM	8	158.0	0.08	48	0.6	0.0	20.9	0.4	13.3	158.0	2.5	47	74.2
1640	13	14.7	10	NM	8	164.0	0.08	47	4.7	0.0	20.9	0.9	13.1	163.0	2.5	46	73.5
1655	12	14.7	0	NM	14	197.1	0.20	46	NM	NM	NM	NM	19.3	197.1	0.0	44	0.0
1710	12	14.7	0	NM	15	197.1	0.20	44	0	0	20.9	0.4	19.3	217.1	0.0	41	0.0

Notes:

1) 1510 Start Test

2) Collect vapor sample MW-05-20080304 @ 1630

3) 1715 End Test

°F= degrees Fahrenheit

ft. = feet

in. H_2O = inches of water

in. Hg = inches of mercury

LEL = lower explosive limit

NM = Not measured

PID = photoionization detector

ppm = parts per million

psi = pounds per square inch

RRU = relative response units

scfm = standard cubic feet per minute

Table 2-2
DPE Pilot Test Results MW-05
Observation Wellhead Vacuums
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08
Equipment: Magnehelic tree

DPE Test Well MW-05 - Observation Measurements											
Time	Manual Dilution Valve (% open)	Well Heads (in. H_2O)									
		MW-01	MW-02	MW-03	**MW-05**	MW-06	MW-09	MW-13	MW-01W	MW-D	MW-E
Distances to DPE Test Well (ft)		71	18	43	**Applied Vacuum (iow)**	103	55	85	101	141	133
1540	20	0.0	0.0	0.0	**60.0**	0.0	0.0	0.0	0.0	0.0	0.0
1600	10	0.0	0.0	0.0	**154.0**	0.0	0.005	0.0	0.0	0.0	0.0
1620	10	0.0	0.0	0.005	**158.0**	0.0	0.0	0.00	0.0	0.0	0.0
1640	10	0.0	0.03	0.01	**164.0**	0.0	0.0	0.0	0.0	0.0	0.0
1655	0	0.0	0.15	0.02	**197.1**	0.0	0.0	0.0	0.0	0.0	0.0
1710	0	0.0	0.04	0.02	**197.1**	0.0	NM	0.0	0.0	0.0	0.0

Notes:

DPE = Dual-Phase Extraction

ft = feet

in. H2O = inches of water

iow = inches of water

NM = Not measured

Table 2-3
DPE Pilot Test Results MW-05
Water Recovery
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08
KOT Dimensions: 2' 3-3/4" dia by 1' 7" height

DPE Test Well MW-05			
Time	Water Recovered (gal)	Water Flow Rate (gpm)	Comments/Observations
1510	0	0	Start Test
1513	18	6.00	vac @ 1510, BA closed, stinger @ 4.5'
1520	18	3.60	vac on @ 1515, BA closed, stinger @ 8.5'
1527	18	4.50	vac on @ 1523, BA closed, drop stinger to 12'
1610	18	0.44	vac on @ 1529, BA 10% open, stinger @ 13'
1630	18	1.00	vac on @ 1612, BA 10% open, stinger @ 13'
1650	18	1.00	vac on @ 1632, BA 10% open, stinger @ 13'
1656	18	4.50	vac on @ 1652, BA closed, stinger @ 12'
1705	18	2.57	vac on @ 1658, BA closed, stinger @ 12'
1713	18	3.00	vac on @ 1707, BA closed, stinger @ 12'

Notes:
DPE = Dual-Phase Extraction
gal = gallon
gpm = gallons per minute

Total Gallons Recovered: 162
Average Flow Rate: 1.53
Maximum Flow Rate: 6.00
Minimum Flow Rate: 0.44

Table 3-1
DPE Pilot Test Results MW-13
Recovery Well Measurements
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings 01-817 Field Personnel: SER/BAJ Date: 03/04/08

Equipment: 1" Sch 40 PVS stinger to KOT to vacuum truck

DPE Test Well MW-13																	
						Instrument Train								Bleed Air			
Time	Stinger Depth (ft. below well casing)	Barometric Pressure (psi)	Manual Dilution Valve (% open)	Wellhead Vacuum (in. H_2O)	Vacuum Truck Vacuum (in.Hg)	Total Vacuum (in. H_2O)	Differential Pressure (in. H_2O)	Temp (°F)	PID (RRU)	LEL (%)	O_2 (%)	CO_2 (% / ppm)	Flow Rate (scfm)	Total Vacuum (in. H_2O)	Diff. Pressure (in. H_2O)	Temp (°F)	Flow Rate (scfm)
900	12	14.7	60	NM	NM	15.0	0.02	40	0.0	0.0	20.9	NM	8.4	7.5	9.5	40	184.4
925	12	14.7	20	NM	NM	21.0	0.10	40	0.0	0.0	20.9	NM	18.6	19.0	6.5	39	150.5
955	9	14.7	40	NM	NM	28.0	0.02	40	0.0	0.0	20.9	NM	8.2	20.0	8.0	41	166.4

Notes:

1) 0835 Start Test

2) Vapor sample collected @ 1000, MW13-20080304

3) 1015 End Test

in. Hg = inches of mercury

°F = degrees Fahrenheit

CO_2 = carbon dioxide

ft. = feet

in. H_2O = inches of water

LEL = lower explosive limit

NM = Not measured

O_2 = oxygen

PID = photoionization detector

ppm = parts per million

psi = pounds per square inch

RRU = relative response units

scfm = standard cubic feet per minute

Table 3-2
DPE Pilot Test Results MW-13
Observation Wellhead Vacuums
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings 01-817 Field Personnel: SER/BAJ Date: 03/04/08
Equipment: Magnehelic tree

DPE Test Well MW-13 - Observation Measurements											
		Well Heads (in. H_2O)									
Time	Manual Dilution Valve (% open)	MW-01	MW-02	MW-03	MW-05	MW-06	MW-09	**MW-13**	MW-01W	MW-D	MW-E
Distances to DPE Test Well (ft)		17	113	62	81	22	141	**Applied Vacuum (iow)**	19	56	50
0900	60	0.0	0.0	0.0	0.0	0.0	0.0	**15.0**	0.0	0.0	0.0
0925	20	0.0	0.0	0.0	0.0	0.14	0.0	**21.0**	1.0	0.0	0.0
0955	40	0.0	0.0	0.0	0.0	0.0	0.0	**28.0**	0.0	0.0	0.0

Notes:
NM = Not measured
DPE = Dual-Phase Extraction
ft = feet
in. H_2O = inches of water
iow = inches of water

Table 3-3
DPE Pilot Test Results MW-13
Water Recovery
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings 01-817 Field Personnel: SER/BAJ Date: 03/04/08
KOT Capacity: gal KOT Dimensions: 2' 3 3/4" by 1' 7"

DPE Test Well MW-13			
Time	Water Recovered (gal)	Water Flow Rate (gpm)	Comments/Observations
0837	18	9.00	start vac @ 0835, BA 20% open
0842	18	9.00	vac on well @ 0840, BA 20% open
0844	18	9.00	vac on well @ 0842, BA 20% open
0848	-	-	set stinger @ 12' below well casing; BA 60% open
0910	-	-	BA 20% open
0935	-	-	BA closed
0938	18	0.35	vac on well @ 0846 BA closed
0942	18	18.00	vac on well @ 0941, BA closed
0945	18	18.00	vac on well @ 0944, BA closed
0948	18	9.00	vac on well @ 0946, BA 20% open
0952	18	9.00	vac on well @ 0950, BA 20% open, raise stinger to 11'
0953	-	-	BA 40% open, raise stinger to 9'
1010	10	0.56	BA 40% open from 0950-1010

Notes:
- = no information
DPE = Dual-Phase Extraction
gal = gallon
gpm = gallons per minute

Total Gallons Recovered: 154
Average Flow Rate: 1.88
Maximum Flow Rate: 18.00
Minimum Flow Rate: 0.35

Table 4
DPE Pilot Test Results
Depth to Water Measurements
TOC Holdings Co. Facility No. 01-817

Site: TOC Holdings Co. Facility No. 01-817 Field Personnel: SER/BAJ Date: 03/04/08
Equipment: Interface Probe #2

DPE Pilot Test - Depth to Water Measurements (in feet below top of casing)										
Time	MW-01	MW-02	MW-03	MW-05	MW-06	MW-09	MW-13	MW-01W	MW-D	MW-E
0800	3.75	3.88	4.82	3.68	2.00	4.71	3.72	1.83	2.17	4.81
1025	3.80	3.79	4.77	3.61	2.05	4.68	3.77	1.88	2.17	4.60
1140	NM	NM	4.73	NM	NM	NM	NM	NM	NM	NM
1428	3.73	3.80	4.91	3.64	1.99	NM	3.71	1.81	2.13	4.40
1715	3.75	4.40	4.93	9.23	1.97	4.91	3.70	1.80	2.11	4.39

Notes:

NM = Not measured
DPE = Dual-Phase Extraction

SOUND ENVIRONMENTAL STRATEGIES
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Table 5
DPE Pilot Test Results
Vapor Samples Analytical Results
TOC Holdings Co. Facility No. 01-817

Well ID	Sample Date	Vapor Samples[1]				
		GRPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]
MW-03	03/04/08	15	0.5	1	<0.1	<0.3
MW-05	03/04/08	<10	0.3	0.8	<0.1	<0.3
MW-13	03/04/08	<10	0.1	0.3	<0.1	<0.3

NOTES:

Results measured in mg/m^3.

[1]Vapor samples collected from DS-300 on the well head leg of the instrument train.

[2]Analyzed by Northwest Method NWTPH-Gx.

[3]Analyzed by EPA Method 8021B.

< = analyte not detected at concentrations above the laboratory's lower reporting limit

EPA = United States Environmental Protection Agency

GRPH = gasoline-range petroleum hydrocarbons

mg/m^3 = milligrams per cubic meter

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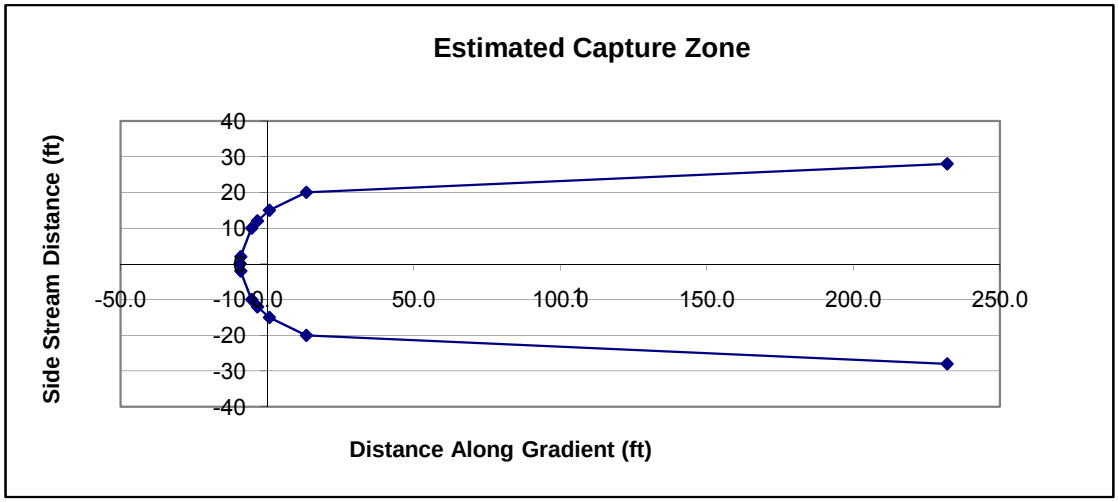
Table 6
Groundwater Capture Zone Analysis
TOC Holdings Co. Facility No. 01-817

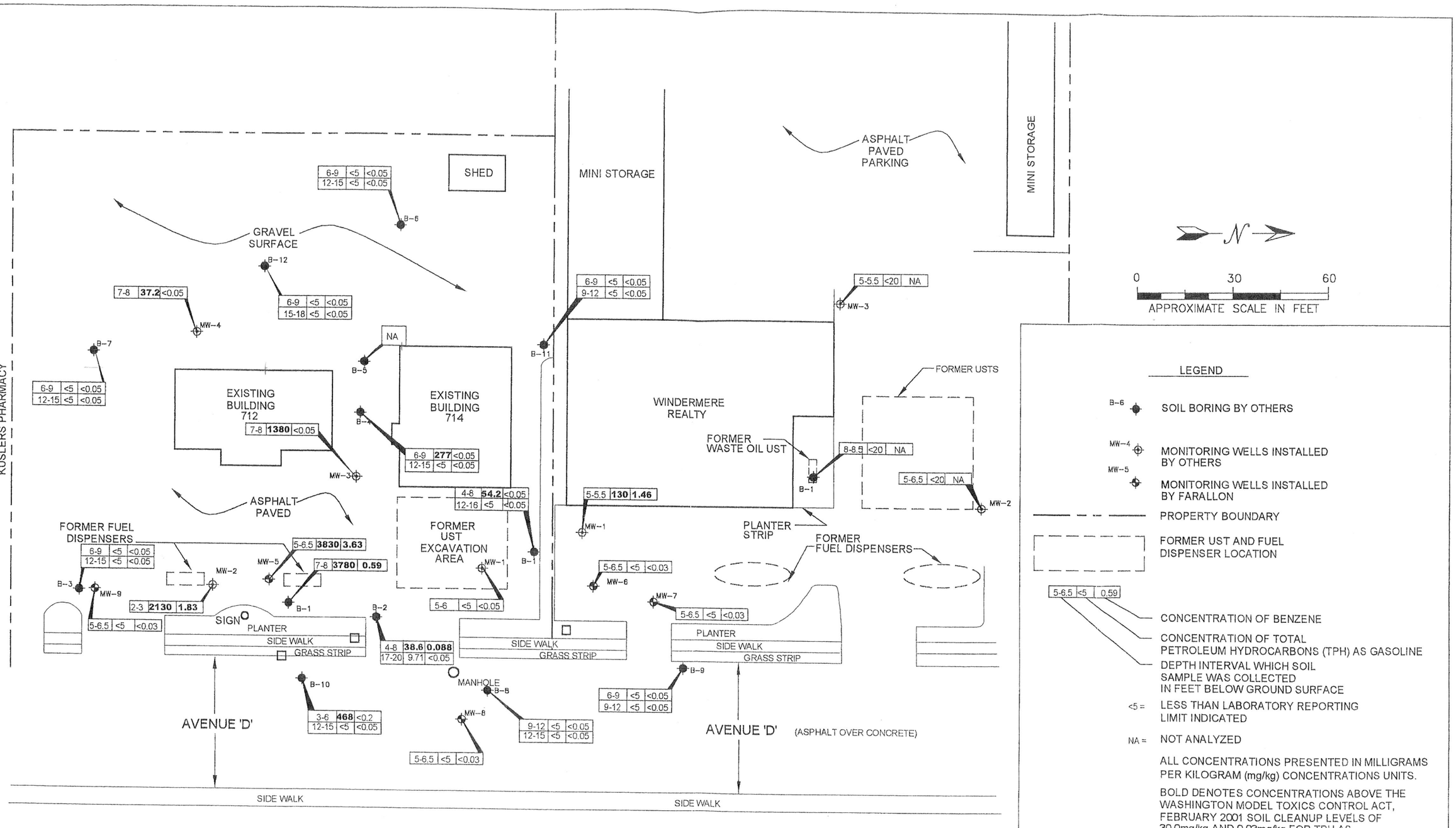
Hydraulic Parameters of Aquifer					
Aquifer Thickness	B =	21	(ft)		
Hydraulic Conductivity	k =	4.1	(ft/day)		
Hydraulic Gradient	i =	0.0816	(ft/ft)		
Groundwater Extraction Rate	Q =	2.125	(gpm)	409.09	(ft^3/day)
Regional Groundwater Velocity	u =	0.3346	(ft/day)		
Width of the Plume	w =	100	(ft)		
Total Groundwater Flow Through Plume	Q_{plume} =	702.58	ft^3/day	3.65	(gpm)

Capture Zone Analysis			
Max Y value where X = ∞	Q/2Bu =	29.11	(ft)
X Stagnation Point @ Y = 0 =	Q/2πBu =	9.27	(ft)
Y @ X = 0, Side Stream =	+/- Q/4Bu	14.56	(ft)

Capture Zone Plot Details		
X (ft)	Y (ft)	Equations
232.0	28	X = Y/tan((1-(2Bu/Q)Y)3.14)
13.3	20	X = Y/tan((1-(2Bu/Q)Y)3.14)
0.7	15	X = Y/tan((1-(2Bu/Q)Y)3.14)
-3.4	12	X = Y/tan((1-(2Bu/Q)Y)3.14)
-5.3	10	X = Y/tan((1-(2Bu/Q)Y)3.14)
-9.1	2	X = Y/tan((1-(2Bu/Q)Y)3.14)
-9.3	0	Q/2πBu =
-9.1	-2	X = Y/tan((-1-(2Bu/Q)Y)3.14)
-5.3	-10	X = Y/tan((-1-(2Bu/Q)Y)3.14)
-3.4	-12	X = Y/tan((-1-(2Bu/Q)Y)3.14)
0.7	-15	X = Y/tan((-1-(2Bu/Q)Y)3.14)
13.3	-20	X = Y/tan((-1-(2Bu/Q)Y)3.14)
232.0	-28	X = Y/tan((-1-(2Bu/Q)Y)3.14)



ATTACHMENT 1



LEGEND

- B-6 — SOIL BORING BY OTHERS
- MW-4 — MONITORING WELLS INSTALLED BY OTHERS
- MW-5 — MONITORING WELLS INSTALLED BY FARALLON
- PROPERTY BOUNDARY
- FORMER UST AND FUEL DISPENSER LOCATION

5-6.5 | <5 | 0.59

- CONCENTRATION OF BENZENE
- CONCENTRATION OF TOTAL PETROLEUM HYDROCARBONS (TPH) AS GASOLINE
- DEPTH INTERVAL WHICH SOIL SAMPLE WAS COLLECTED IN FEET BELOW GROUND SURFACE

<5 = LESS THAN LABORATORY REPORTING LIMIT INDICATED

NA = NOT ANALYZED

ALL CONCENTRATIONS PRESENTED IN MILLIGRAMS PER KILOGRAM (mg/kg) CONCENTRATIONS UNITS.

BOLD DENOTES CONCENTRATIONS ABOVE THE WASHINGTON MODEL TOXICS CONTROL ACT, FEBRUARY 2001 SOIL CLEANUP LEVELS OF 30.0mg/kg AND 0.03mg/kg FOR TPH AS GASOLINE AND BENZENE RESPECTABLY

FARALLON CONSULTING
320 3rd Avenue NE, Suite 200
Issaquah, WA 98027

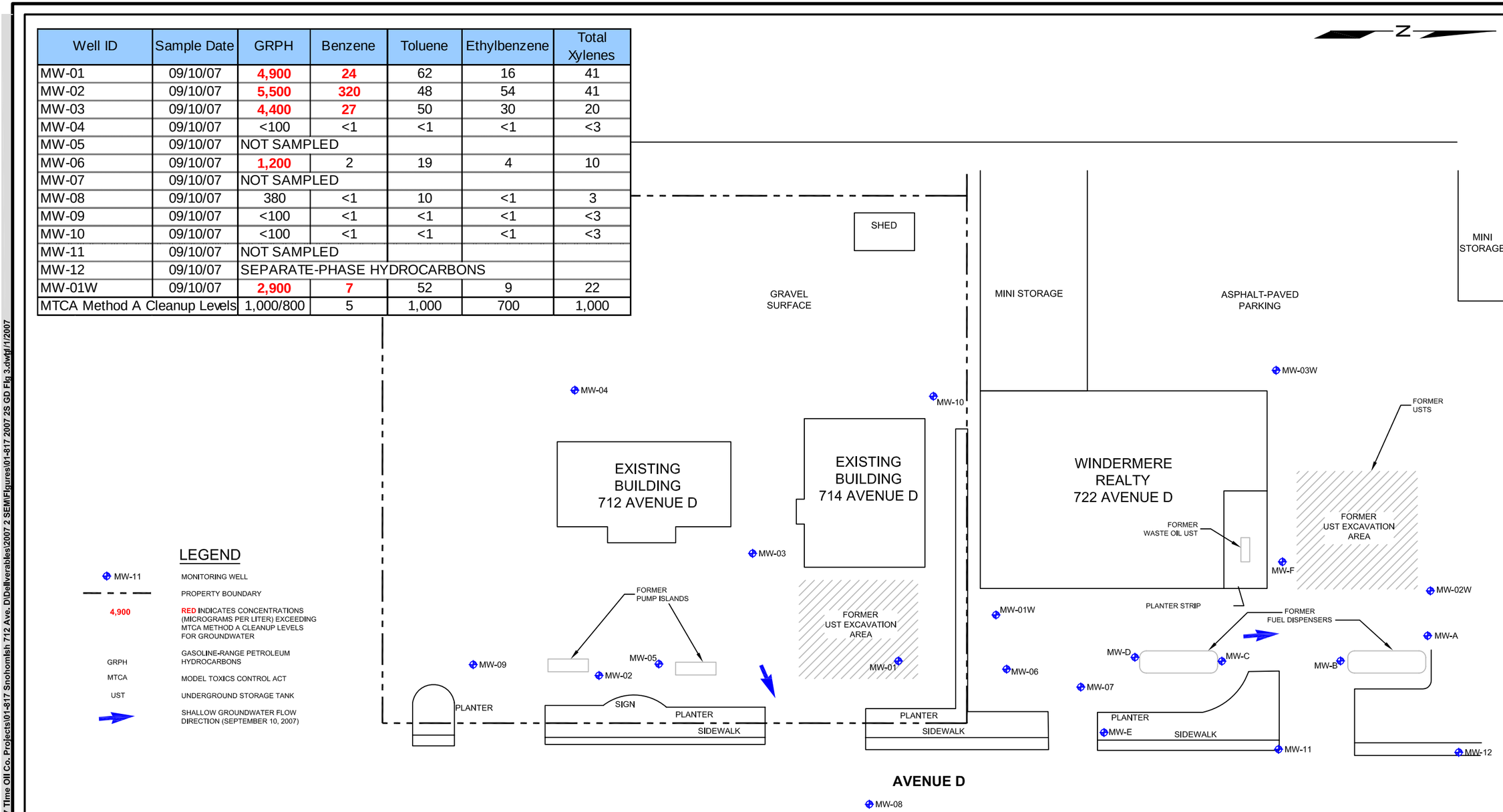
FIGURE 5

SOIL ANALYTICAL RESULTS
FORMER TIME OIL CO. PROPERTY 01-817
712 AVENUE D
SNOHOMISH, WASHINGTON

FARALLON PN: 675-004

ATTACHMENT 2

Well ID	Sample Date	GRPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-01	09/10/07	**4,900**	**24**	62	16	41
MW-02	09/10/07	**5,500**	**320**	48	54	41
MW-03	09/10/07	**4,400**	**27**	50	30	20
MW-04	09/10/07	<100	<1	<1	<1	<3
MW-05	09/10/07	NOT SAMPLED				
MW-06	09/10/07	**1,200**	2	19	4	10
MW-07	09/10/07	NOT SAMPLED				
MW-08	09/10/07	380	<1	10	<1	3
MW-09	09/10/07	<100	<1	<1	<1	<3
MW-10	09/10/07	<100	<1	<1	<1	<3
MW-11	09/10/07	NOT SAMPLED				
MW-12	09/10/07	SEPARATE-PHASE HYDROCARBONS				
MW-01W	09/10/07	**2,900**	**7**	52	9	22
MTCA Method A Cleanup Levels		1,000/800	5	1,000	700	1,000



LEGEND

MW-11	MONITORING WELL
— — —	PROPERTY BOUNDARY
4,900	RED INDICATES CONCENTRATIONS (MICROGRAMS PER LITER) EXCEEDING MTCA METHOD A CLEANUP LEVELS FOR GROUNDWATER
GRPH	GASOLINE-RANGE PETROLEUM HYDROCARBONS
MTCA	MODEL TOXICS CONTROL ACT
UST	UNDERGROUND STORAGE TANK
→	SHALLOW GROUNDWATER FLOW DIRECTION (SEPTEMBER 10, 2007)

REFERENCE: FIGURE 2, GEOENGINEERS 2005

SOUND ENVIRONMENTAL STRATEGIES
SOUNDENVIRONMENTAL.COM

DATE: 09/24/07
DRAWN BY: BLR
CHECKED BY: RKB
CAD FILE: 01-817 2007 2S GD

PROJECT NAME: TIME OIL CO. FACILITY NO. 01-817
SES PROJECT NUMBER: 0440-039-03
STREET ADDRESS: 712 AVENUE D
CITY, STATE: SNOHOMISH, WASHINGTON

REGION:

0 5 10 15 30 60
APPROXIMATE SCALE IN FEET 1 INCH = 30 FEET

FIGURE 3
GROUNDWATER ANALYTICAL RESULTS

F:\SES CURRENT PROJECTS\0440 TIme Oil\2007 TIme Oil Co. Projects\01-817 Snohomish 712 Ave. D\Deliverables\2007 2 SEM\Figures\01-817 2007 2S GD Fig 3.dwg 11/1/2007