WORK PLAN

Delineation of Subsurface Petroleum Hydrocarbon Contamination

Horse Heaven Hills Travel Plaza
101 Merlot Drive
Prosser, Washington 99350

Prepared for:
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1.0 PROJECT DESCRIPTION

1.1 Purpose and Objectives

This work plan, prepared by Blue Mountain Environmental Consulting Company, Inc. ("BMEC"), presents an approach for conducting additional delineation of the petroleum hydrocarbon (PHC) contamination in the subsurface soils for the Horse Heaven Hills Travel Plaza property located at 101 Merlot Drive, Prosser, Washington (hereafter referred to as the "Site"). If vertical extent of PHC contamination in soils is deep enough; delineation of PHCs in the groundwater below the Site and potentially within the vicinity of the Site may also be warranted.

The main objective of this Work Plan is to develop a sampling and analysis program that will further characterize the nature and extent of subsurface contamination per the Washington Department of Ecology (DOE) guidelines based on the Model Toxics Cleanup Act (MTCA) Cleanup Levels.

Specific objectives for the investigation include:

- Additional delineation of the horizontal and vertical extent of remaining petroleum contaminated soil (PCS) identified beneath the diesel dispensers at concentrations exceeding the MTCA Cleanup Levels during the September 18, 2013 soil investigation.

- Remediation of all PCS identified beneath the diesel dispensers at concentrations exceeding the MTCA Cleanup Levels during the September 18, 2013 soil investigation. PCS remediation shall occur via excavation and proper disposal at a licensed landfill facility. Excavation and confirmation soil sampling shall occur in the vicinity of the diesel dispensers until laboratory analytical results indicate that the PHCs in soil have been remediated to levels below the MTCA Cleanup Levels.

- Backfill and proper compaction of the excavation with clean soil.

- If applicable, delineation of the extent and magnitude of PHCs in groundwater beneath the diesel dispensers at concentrations exceeding the MTCA Cleanup Levels.

- Removal of all existing diesel fuel pumps and associated piping and installation of updated diesel dispensers and associated piping with proper containment design per the 1998 Federal UST regulations.

- Completion of a report documenting the field activities performed during the subsurface soil and groundwater investigation(s) including the results of field activities performed and potential recommendations for future work at the Site.

1.2 Location

Legal Description: Parcel number 1-3594-301-1661-001, in the northwest quarter of the southeast quarter of Section 35, Township 9 North, Range 24 East, Willamette Meridian, Benton County. The address for the Site is 101 Merlot Drive in Prosser, Washington 99350.

1.3 Organization

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1.4 Schedule

The Site investigation will begin as soon as the work plan has been approved by the Client and DOE, and the appropriate subcontractor(s) have been secured. The field investigation (soil sampling and potentially groundwater sampling) is expected to take approximately three to six days for completion of site work and sampling. The field work may require more than one mobilization to the Site. A report on the field investigation and data results would be completed within an estimated timeframe of four to five weeks following completion of all field activities.

1.5 Reports

The project report will include details of all field work performed, a summary of analytical data and related risk-based assessments, laboratory data report, Site and sampling location maps, photographs, beneficial water use survey results (if necessary), and conclusions and recommendations. All risk-based assessments will be in comparison to Washington MTCA Cleanup Levels.

2.0 SITE BACKGROUND

2.1 Description of Provided Information

The Site is defined by a retail petroleum refueling station for standard passenger vehicles, as well as large truck-and-tractor rigs. The Site was developed as a retail fuel facility in 1995. A site investigation was performed at the Site by BMEC personnel on September 18, 2013 and the results of that site investigation indicated that PCS exists beneath several of the diesel fuel dispensers at concentrations exceeding MTCA Cleanup Levels. The approximate depth of the PCS beneath the diesel fuel dispensers was observed to be at a minimum of one foot bsg.

2.2 Physical Setting

The Site is located within the city limits of Prosser, Washington, and is surrounded primarily by commercial properties. The property consists of one parcel of land with improvements and is accessible from Merlot Drive. The Site address is 101 Merlot Drive, Prosser, Washington 99350. The nearest roadway is Interstate I-82 which is approximately 500 feet north of the Site (Figure 1). The nearest surface water body is the Yakima River approximately one mile southeast of the Site. The approximate Site elevation is 720 feet above mean sea level.

2.3 Geology and Hydrogeology

According to the U.S. Department of Agriculture Soil Survey of Yakima County, Washington, the Site is underlain by the Ashue Silt Loam which is considered very deep and moderately well-drained with moderately coarse textures. A typical cross-section of the Ashue Silt Loam includes a 9-inch thick surface layer of light brown to brown loam, underlain by an approximate 15-inch thick layer of light gray, gravelly sandy loam, and further underlain by light yellowish brown and pale brown very gravelly sand up to 60 inches thick.

Geologically, the Site is located in the Yakima Fold Belt east of the Cascade Range in a much dryer climate that receives between 6 to 18 inches of rainfall annually. The Yakima Fold Belt is dominated by east-west trending anticlinal ridges and synclinal valley(s). The near surface soils are formed primarily from deposition of Quaternary sediments that overlie Miocene Columbia River Basalt Group flood basalts. Fine-grained slackwater sediments characterized by rhythmically graded bedding were deposited throughout the Pleistocene atop the Miocene basalts in the area of the Columbia Gorge extending north to the Yakima Valley including in the region surrounding the Site. Volcanic ash deposits and wind-blown loess deposits are also noted throughout the region.

Hydrogeologically, depth to shallow groundwater in the vicinity of the Site varies from 5 to 20 feet bsg. Based on location of the Yakima River in relation to the Site, the groundwater flow direction is presumed to be to the southeast. If necessary due to extensive depth of PCS, depth to

groundwater and groundwater flow direction can be confirmed for the Site via monitoring well installation and assessment.

3.0 SITE INVESTIGATION APPROACH

3.1 Site Investigation

The proposed site investigation consists of the collection and laboratory analysis of soil and groundwater samples. The proposed soil samples will be obtained from the base and sidewalls of the excavation created by the removal of all diesel fuel pump dispensers, as well as from the borings advanced for monitoring well installation. Up to 28 soil samples shall be obtained for laboratory analysis; fourteen confirmatory soil samples from the bottom of the excavation; ten confirmatory soil samples from the sidewalls of the excavation; and four soil samples from the advancement of the monitoring well borings (one per boring). The locations of the proposed soil samples are illustrated on **Figure 3.**

The proposed groundwater samples shall be obtained from four monitoring wells installed in the vicinity of the diesel fuel pump island (one per monitoring well). One of the monitoring wells shall be installed up-gradient of the diesel fuel pump island and three of the monitoring wells shall be installed down-gradient of the diesel fuel pump island. The locations of the proposed monitoring wells are illustrated on **Figure 3.** The proposed monitoring well locations are based on an assumed groundwater gradient to the southeast towards the Yakima River.

Utility locating services, including private locating services (if necessary) shall be utilized prior to the commencement of any intrusive groundwork.

3.1.1 Soil Sampling

The 24 confirmatory soil samples proposed for collection and laboratory analysis in the excavation beneath the diesel fuel pump islands shall be obtained from depths of 3 to 6 inches below the freshly exposed surface subsequent to excavation. The proposed confirmatory soil samples shall be obtained after field screening assessment suggests that PCS has been removed in that immediate area via excavation. Field screening methodology shall consist of a combination of visual, olfactory, and photo-ionization detector (PID) assessment.

The field geologist will visually assess all soil brought to the surface per monitoring well boring, and record the soil on the borehole logs. The sampling technician and/or field geologist will field-screen each section of soil with a PID and the various PID readings will be recorded on the borehole logs. Soil samples will be obtained for laboratory analyses based on a combination of the PID readings, olfactory and visible evidence, and depth of sample. If no PID, olfactory, or visible staining evidence is noted, a soil sample will be collected from the base of the borehole by default. All soil samples will also be field-

screened by sheen testing (adding water to a sample retained in a sampling spoon and checked for the presence of a visible oily sheen).

3.1.2 Monitoring Well Installation

A total of four 2-inch diameter, flush-mounted monitoring wells will be installed in the vicinity of the diesel fuel pump island in an attempt to assess the status of the shallow groundwater beneath the source of diesel fuel PCS. Each monitoring well shall be constructed of schedule 40 PVC with 10 feet of 0.010-slotted screen. In theory, all four monitoring wells should be installed no deeper than 20 feet bsg. Each well shall be completed with a sandpack installed 2-3 feet above the top of the screened interval; a 2- to 3-foot bentonite plug on top of the sandpack; a bentonite/grout mixture to within approximately one foot of the ground surface; and completed with a lock and cap.

3.1.3 Monitoring Well Development and Groundwater Sampling

A minimum of 16 hours shall pass after the installation of each monitoring well, prior to the initialization of monitoring well development. Depth-to-water static level measurements shall be obtained from a notch in the top of casing PVC per monitoring well via a water level meter that has been decontaminated, prior to introduction into each successive monitoring well. Each monitoring well shall be developed by using a peristaltic pump or bladder pump to remove approximately 10 standing well volumes from the well casing while measuring groundwater parameters (i.e., pH, temperature, and conductivity) to assess when stabilization of the aquifer in the vicinity of each specific monitoring well has occurred. When the groundwater parameters have all stabilized [temperature (± 3°F); pH (± 0.1 unit); conductivity (3%)] for three successive readings and subsequent to the removal of approximately 10 standing water well volumes, the monitoring well will be considered to be fully developed. The groundwater parameters shall be recorded on groundwater sampling data sheets and included in the ensuing report.

Immediately subsequent to monitoring well development, groundwater sampling in each well will be conducted using low-flow purging or bailer and rope sampling techniques. During sampling, new tubing or bailers will be lowered down the well casing. Groundwater sample containers will be prepared according to protocol established by the analytical laboratory.

3.1.4 Sample Collection

A fresh pair of latex or Nitrile gloves shall be donned, prior to collection of each successive soil and groundwater sample. Soil samples shall be collected in 4-ounce glass jars and properly sealed. Groundwater samples shall be collected in 1-Liter amber glass containers

preserved with hydrochloric acid or unpreserved depending on which analysis the sample will be subjected to (TPH-Dx or polynuclear aromatic hydrocarbons [PAHs]). The samples will be stored in a cool environment (4 degrees Celsius) until released, with a chain-of-custody, to OnSite Laboratory (OnSite) in Redmond, Washington. All sampling tools will be decontaminated between the collection of successive samples, or disposed of properly.

3.2 Laboratory Analytical Methods

The soil samples will be relinquished to the laboratory for analyses by Northwest Method NWTPH-Dx All groundwater and confirmatory soil samples with TPH-Dx results exceeding MTCA Cleanup Levels (i.e., > 2000 milligrams per Kilogram [mg/Kg]), shall also be analyzed via EPA Method 8270 SIM for PAHs.

3.3 Data Quality Objectives and Sample Analysis

Data quality objectives for the proposed investigation are to generate data of known and documented quality that can be used to determine whether chemicals of potential concern are present above detection levels and at levels that pose an unacceptable risk to receptors. Data will be compared to MTCA Cleanup Levels to determine whether these levels are exceeded and to support decision-making regarding the need for further investigation.

3.4 Quality Assurance

Samples will be obtained according to standard field methods and will be prepared in accordance with protocol established by the analytical laboratory for containers, preservation, storage and transport to the laboratory. A chain-of-custody will be prepared for all samples obtained for laboratory analysis. Appropriate decontamination procedures will be followed to prevent cross contamination of the drilling and sampling equipment between drill holes, as well as the soil and groundwater samples between sample depths and between drilling borehole locations. Any investigation derived waste, soil and groundwater, will be containerized and left on-Site by the drilling subcontractor. During drilling, a continuous geologic log will be prepared describing the subsurface materials encountered, depth to groundwater, presence of saturated zones, and any other pertinent geologic or environmental observations.

3.5 Investigation-Derived Waste Disposal

All soil and water (i.e., groundwater and decontamination water) investigation-derived waste (IDW) shall be containerized in separate 55-gallon drums. Each drum shall be properly labeled, sealed, and temporarily staged onsite at a location approved by the client, prior to future disposal at a licensed waste facility. All gloves, plastic, paper towels, bailers and rope shall be containerized in a plastic trash bag and disposed onsite and standard refuse.

4.0 QUALIFICATIONS

We have prepared this Work Plan in accordance with customary principles and practices in the fields of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. BMEC, Inc. is not responsible for the independent conclusions, opinions or

recommendations made by others based on the records review, site observations, field exploration, or laboratory test data presented in this report.

Environmental assessments and evaluations are inherently limited in that conclusions are drawn and recommendations developed from information obtained from limited research and site evaluation. For these types of evaluations, it is often necessary to use information prepared by others and BMEC, Inc. cannot be responsible for the accuracy of such information. Additionally, the passage of time may result in a change in the environmental characteristics at this and any other site and surrounding properties. This Work Plan does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated. This Work Plan is not a regulatory compliance audit and is not intended to satisfy the requirements of any local, state, or federal real estate transfer laws.

This Work Plan is intended for the sole use of **Horse Heaven Hills and the Washington DOE.** This Work Plan may not be used or relied upon by any other party without the written consent of BMEC, Inc. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

BMEC, Inc. does not warrant the correctness, completeness, current standing, merchantability, or fitness of any information related to records review provided in this Work Plan. Such information is not the product of an independent review conducted by BMEC, Inc., but is only available environmental information obtained by or provided to BMEC, Inc.

5.0 Signature

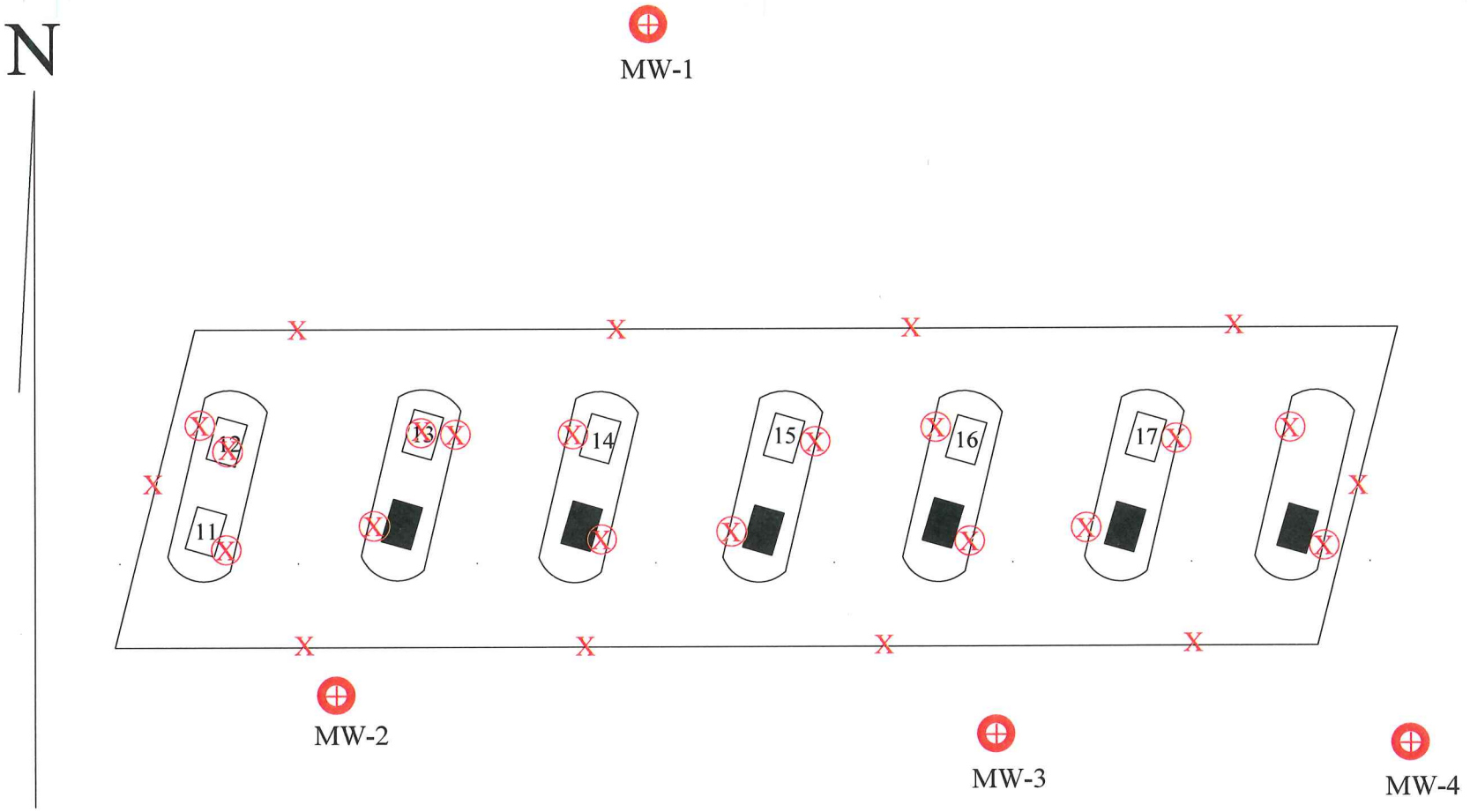
Blue Mountain Environmental Consulting, Inc.

Brent N. Bergeron, PG

FIGURE 1: SITE LOCATION MAP Image Provided by ESRI

	SITE LOCATION MAP **Horse Heaven Hills Travel Plaza** **101 Merlot Drive** **Prosser, WA 99350**


GAS PUMPS
CONVIENENCE STORE
DIESEL PUMPS
101 Merlot Dr, Pr
© 2013 Google
Google earth
feet
meters
200
70



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PROPOSED SAMPLE LOCATIONS

⊕ = Monitoring Well

X = Soil Sidewall Sample

⊗ = Soil Bottom Sample