

Technical Memorandum

TO: Jacques Dean, Road Superintendent, Kitsap County Department of Public Works
FROM: Stephanie Renando and Piper Roelen, PE
DATE: June 7, 2021
RE: **Addendum 1: Groundwater Characterization
Soil and Groundwater Characterization Work Plan
North Road Shop Site
301 Bernt Road
Poulsbo, Washington
LAI Project No. 0544013.040**

Introduction

On behalf of Kitsap County (County), Landau Associates, Inc. (LAI) prepared this Work Plan Addendum to present the additional scope of work and procedures for conducting further groundwater characterization activities at the County's North Road Shop Site (Site) located at 301 Bernt Road in Poulsbo, Washington. This Work Plan Addendum (Addendum 1) addresses comments made by the Washington State Department of Ecology (Ecology) on the Soil and Groundwater Characterization Report (LAI 2020) and describes the proposed locations for new monitoring wells, sampling locations, field methods, and analytical testing recommended to fulfill Ecology's request.

Background Information

The County conducted a groundwater investigation at the Site in 2019 in response to Ecology's 5-year periodic review, which was conducted in 2018. A Soil and Groundwater Characterization Report was submitted to Ecology in June 2020 (LAI 2020). Ecology provided comments on the report on July 30, 2020 (Welty 2020), which included a request to conduct additional groundwater characterization at the Site to determine whether contamination is migrating off the property and to identify seasonal trends in groundwater elevation and petroleum hydrocarbon concentrations. In August 2020, LAI conducted a limited groundwater elevation survey at three existing monitoring wells; however, additional monitoring well installation and groundwater sampling are required to fully address Ecology's comments.

Additional Groundwater Characterization

Additional groundwater characterization activities include installation of two new monitoring wells and sampling of groundwater from five (three existing, two new) permanently constructed groundwater monitoring wells. The monitoring well installation and sampling activities described in this Work Plan Addendum are being conducted to address the following data gaps identified during the Ecology periodic review and the 2019 investigation:

- One groundwater monitoring well will be installed in the immediate vicinity of soil boring SB-8 to further characterize petroleum contamination in that area. During the 2019 investigation, a

groundwater grab sample was collected from SB-8 and analyzed for gasoline-, diesel-, and oil-range organics, and benzene, toluene, ethylbenzene, and xylenes (BTEX). Diesel was detected at a concentration (230 micrograms per liter [µg/L]) below the Model Toxics Control Act (MTCA) Method A cleanup level, and no other analytes were detected at concentrations above the laboratory reporting limits. However, the laboratory reporting limit for the diesel-range organics (590 µg/L) was above the cleanup level (500 µg/L).

- One groundwater monitoring well will be installed as close to practicable to the 1996 groundwater grab sampling location #3, which was the only prior sampling location with petroleum hydrocarbon concentrations above cleanup levels. Location #3 is located within the Washington State Department of Transportation right-of-way, and adjacent to a drainage ditch outside of the Site's western fence line. Because of limited access for drilling at location #3, the monitoring well will be installed on the inside of, and as close to, the existing fence line, as feasible (Figure 1).
- Groundwater samples will be collected at all five monitoring wells (MW-1, MW-2, MW-3, and the two new wells) to continue characterization of groundwater flow direction and contaminant concentrations potentially migrating into the right-of-way. The sampling will be conducted during the summer of 2021 to coincide with dry-season conditions.

The following sections describe the tasks that will be performed in conjunction with the additional groundwater characterization at the Site.

Utility Locating

Prior to any subsurface activities, LAI will coordinate public and private utility locates to identify potential utility conflicts with the new proposed monitoring well locations. An LAI environmental professional will visit the Site and mark the proposed boring locations, as required prior to notifying public utility locators. LAI will subcontract with a private utility locating company to identify non-conductible utilities near the boring locations on the same day as drilling activities.

Groundwater Monitoring Well Installation

LAI will subcontract with a drilling contractor to install two new monitoring wells at the Site in accordance with the Ecology-approved work plan (LAI 2019). Based on previous well installations at the Site, LAI assumes that the new wells will be installed to a maximum depth of 10 feet below ground surface using hollow-stem auger drilling techniques, and will be constructed with 2-inch-diameter polyvinyl chloride well casings and screens. Monitoring wells will be completed at the ground surface with flush-mounted well monuments. During drilling, soil cuttings will be screened for evidence of petroleum contamination (e.g., staining, sheen, odor, elevated photoionization detector readings).

Monitoring Well Development and Survey

At least 48 hours after the new monitoring wells are installed, LAI will return to the Site to develop and survey the wells. Wells are developed to remove particulates within the well casing and in the surrounding sand pack and formation. The wells will be developed by surging and overpumping.

Surging will be accomplished by repeatedly and rapidly raising and lowering a stainless-steel bailer or surge block across the screened interval. Groundwater will be pumped rapidly from each well using a 12-volt submersible (i.e., whale) pump or submersible bladder pump. The pump type and pumping rates will depend on the recharge rate of the well. A minimum of 5 casing volumes will be removed and purge water generated during well development will be stored on Site in 55-gallon steel drums.

LAI will also perform a level-loop survey of the top of well casing elevations to facilitate development of relative groundwater elevation contour maps. Elevation data from existing groundwater monitoring wells will be used as reference elevations for the new monitoring wells. The survey will be conducted using a transit and surveying rod. Monitoring well development and the elevation survey will be conducted in accordance with the work plan (LAI 2019).

Groundwater Sampling

Groundwater sampling protocols call for sampling to be conducted a minimum of 72 hours after well development to allow groundwater to re-establish equilibrium conditions. Groundwater sampling is scheduled to be conducted in August to collect dry-season groundwater data as requested by Ecology. LAI will measure the groundwater levels and collect groundwater samples at all five (three existing and two new) monitoring well locations (Figure 1).

The samples will be collected into laboratory-provided sample containers and delivered to Analytical Laboratory Services (ALS) in Everett, Washington. The following analyses are planned for the groundwater samples:

- Gasoline-range total petroleum hydrocarbons (TPH-G) by the Northwest total petroleum hydrocarbon extended-range gasoline analytical method (NWTPH-Gx)
- BTEX by US Environmental Protection Agency Method 8021B
- Diesel-range total petroleum hydrocarbons (TPH-D) and oil-range total petroleum hydrocarbons (TPH-O) by the Northwest total petroleum hydrocarbon extended-range diesel analytical method (NWTPH-Dx). Extra volume will be collected and submitted to ALS for potential follow-up analysis using silica gel cleanup methodology if initial TPH results exceed applicable cleanup levels.
- One duplicate groundwater sample will be collected for quality assurance purposes and will be analyzed for the same parameters as all the other groundwater samples. One laboratory-provided trip blank will be analyzed for volatile compounds (TPH-G and BTEX).

Investigation-Derived Waste Management

Soil and water investigation-derived waste (IDW) generated during well installation, well development, well sampling (purging), and equipment cleaning/decontamination will be segregated and placed in 55-gallon drums and stored on Site. LAI will coordinate with a local disposal company to transport the drums to an appropriately permitted Resource Conservation and Recovery Act

Subtitle D (solid waste) landfill. One drum each of soil and water IDW is anticipated for the additional groundwater characterization activities.

Data Management, Evaluation, and Reporting

Upon receipt of the groundwater sampling results, LAI will conduct a review of the analytical data for quality control/quality assurance purposes, tabulate the data, and compare the results to applicable MTCA cleanup levels. LAI will then prepare a data report documenting the results and findings of the focused groundwater investigation. Once the County has completed its review of the draft data report, a final version of the report will be submitted to Ecology.


Use of This Technical Memorandum

This technical memorandum has been prepared for the exclusive use of Kitsap County, the Washington State Department of Ecology, and any other applicable regulatory agencies, for specific application to the North Road Shop maintenance facility located at 301 Bernt Road in Poulsbo, Washington. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of LAI. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other projects, without review and authorization by LAI, shall be at the user's sole risk. LAI warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. LAI makes no other warranty, either express or implied.

LANDAU ASSOCIATES, INC.



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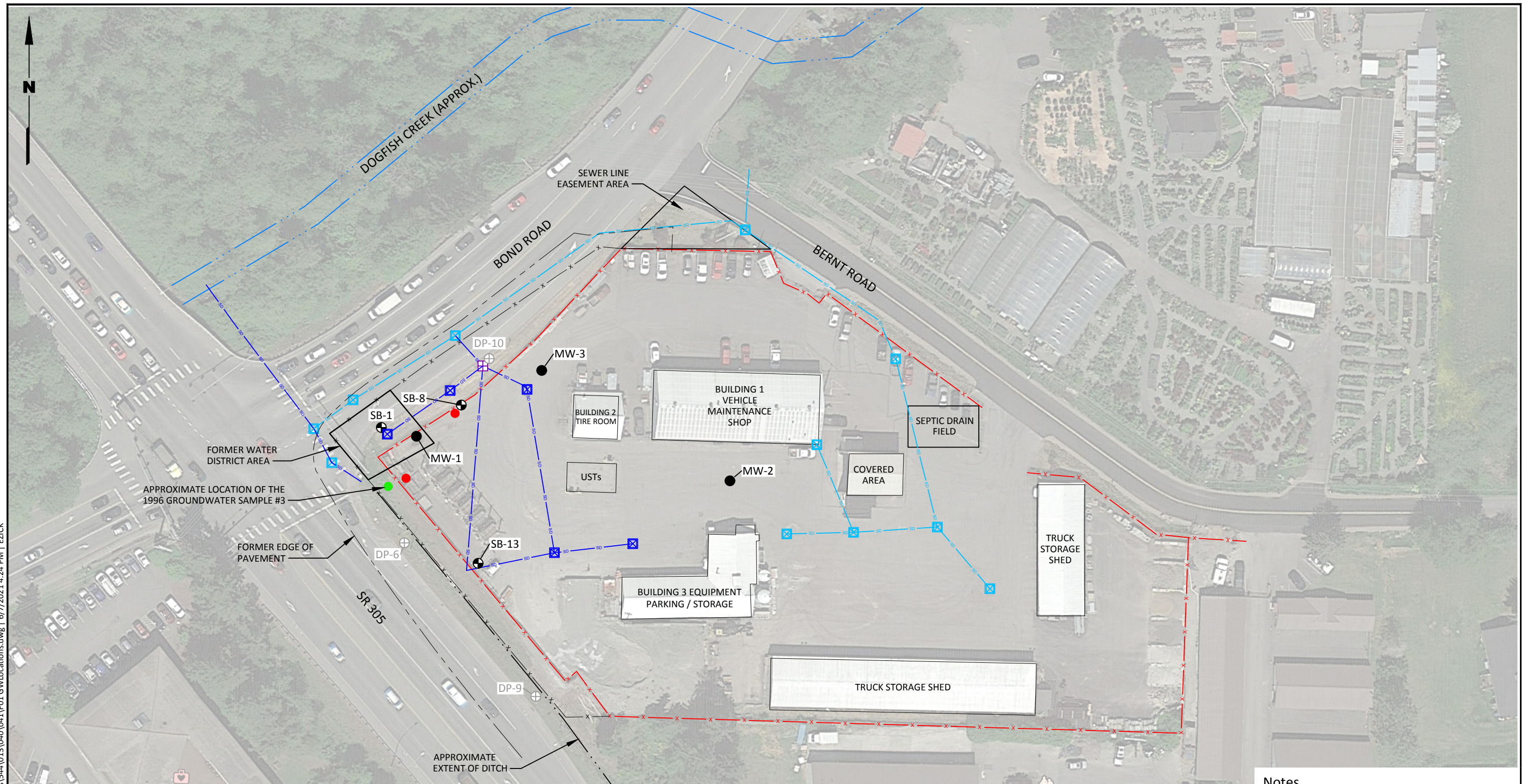
References

- LAI. 2019. Work Plan: Soil and Groundwater Characterization, North Road Shop - Kitsap County Site, Poulsbo, Washington. Landau Associates, Inc. November 26.
- LAI. 2020. Final: Soil and Groundwater Characterization Report, North Road Shop - Kitsap County Site, Poulsbo, Washington. Landau Associates, Inc. June 15.
- Welty, T. 2020. "Re: North Road Shop - Soil and Groundwater Final Report." From Tamara Welty, Washington State Department of Ecology, to Jacques Dean, Kitsap County Department of Public Works; Kate Cleveland, Landau Associates, Inc. July 30.

Attachment

Figure 1: Groundwater Sampling Locations

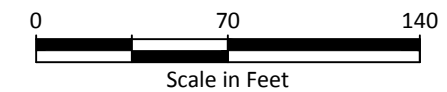
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Legend

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|--|--|--|--------------------------|
| | Catch Basin | | Existing Fence |
| | Unidentified Catch Basin | | Former Fence |
| | Existing Storm Drain | | Former Edge of Pavement |
| | Approximate Location of Storm Drain (Based on Information from Previous Reports) | | Oil/Water Separator |
| | | | Proposed Monitoring Well |

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|------|---|
| DP-1 | Previous Soil Boring Location (Post-1997 Remedial Excavation) |
| SB-8 | 2019 Groundwater Grab Sampling Location |
| MW-1 | Existing Monitoring Well |



Source: Kitsap County Topo, 2002; Bing Aerial Imagery, 2019

Notes

1. UST = Underground Storage Tank
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.