



Supplemental Characterization and Compliance Monitoring Work Plan

Reserve at Lynnwood
19815 Scriber Lake Road
Lynnwood, Washington 98036
Ecology F/S No. 21845
Ecology VCP No. NW3052

Prepared for:
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FIGURES

Figure 1: Vicinity Map

Figure 2: Site Plan with Proposed Monitoring Well Location

1.0 INTRODUCTION

PBS Engineering and Environmental (PBS) prepared this Supplemental Site Characterization and Compliance Monitoring Work Plan on behalf of Reserve at Lynnwood Partners LLLP for the Reserve at Lynnwood property, located at 19815 Scriber Lake Road in Lynnwood, Washington (Property; Figure 1). This work plan was prepared pursuant to the recommended actions to address data gaps for the Site by the Washington State Department of Ecology (Ecology) presented in "Re: Opinion pursuant to WAC 173-340-515(5) on Remedial Action for Reserve at Lynnwood, dated November 25, 2019" (Opinion). Ecology issued the Opinion in response to the request for regulatory review and written comment on the "Remedial Investigation Report and Model Remedy Selection, Reserve at Lynnwood – Facility ID 21845" dated July 11, 2019.

While significant milestones (site characterization and interim cleanup actions) have been completed to address the contamination encountered at the project site, further actions are required to meet the State of Washington Department of Ecology (Ecology) Model Toxics Cleanup Act (MTCA) WAC Chapter 173-340 criteria for the cleanup of contaminants in the environment. The proposed scope of services is intended to comply with the MTCA regulations with the goal of achieving a conditional "no further action" designation from Ecology using Ecology's Model Remedy 4 as defined in Ecology Publication No. 6-09-057 Model Remedies for Sites with Petroleum Impacts to Groundwater (Rev. December 2017). That remedy requires the site to meet the following conditions:

- *Soil removal was implemented to the greatest degree practicable.*
- *Enough monitoring data have been collected and sufficiently analyzed to document that the plume is stable or receding.*
- *The conditional point(s) of compliance are as close as practicable to the source of the hazardous substances.*
- *An environmental covenant [is] filed to impose groundwater use restrictions and to document that contaminated soil remains on the property.*

2.0 BACKGROUND

2.1 General Site Information

The Property comprises 2.60 acres located at 19185 Scriber Lake Road (formerly 5800 198th Street Southwest) in Lynnwood, Snohomish County, Washington, and is identified as Snohomish County Tax Parcel #00575600000100. The Property is in the northwest quarter of Section 21, Township 27 North, Range 4 East, at an elevation of approximately 375 feet above mean sea level (Figure 1). The Property is located on a relatively level parcel approximately 850 feet west-southwest of Scriber Lake. The Property is zoned as Highway 99 Mixed Use space in the City of Lynnwood, Washington.

2.2 Site History

The Property is currently owned by Reserve at Lynnwood Partners LLLP. The Property was acquired in 2015 and is currently developed as a multi-tenant residential apartment complex.

Previous uses identified in the Phase I Environmental Site Assessment (ESA) conducted by Zipper Geo Associates (Zipper or ZGA¹) in August 2015 indicate the Property was undeveloped and forested from at least 1941 to around 1952, when portions of the Property were cleared. The Property was developed with a 29,679 square foot, single-story commercial strip mall structure constructed in 1964. The retail strip mall leased to various commercial tenants from 1964 to 2014. There were no reported releases or evidence of prior storage tanks or operations that handled hazardous substances by tenants at the former retail center. According to the Snohomish County Assessor's Office, the prior owner was The Reis Group. The prior buildings at the Property were demolished in 2016 to make way for the new development.

Discovery of contamination in the subsurface of the property occurred during development of the Property in 2015. A diesel-range petroleum product (possibly kerosene) was initially encountered in soils. Details of how the historic release occurred have not been determined. The source of the release likely relates to the period before first development of the property in 1965 (Phase I ESA – ZGA, 2015).

2.3 Site Use

The Property is currently developed as a 6-story apartment development for seniors with paved parking on the east and south sides of the building. A single level below-grade parking garage is located below the living spaces. The finished elevations of the first floor and garage floor are 378.0 and 368.0 feet, respectively. Stormwater management will be provided using an underground stormwater retention vault along the east side of the Property.

2.4 Site Geology/Hydrogeology

Prior to the current development, fill material was present under the project site ranging from 2 to 8 feet below ground surface (bgs)². Underlying the fill material is unconsolidated very dense silty sand (glacial till) that extends to at least 30 feet bgs. Underlying the dense till is heterogeneous loose to medium-dense glacial outwash consisting of fine- to medium-grained sands with silt and/or gravel. At some locations, the sands were noted as causing "heave", resulting in difficulty collecting samples and installing wells at those locations.

Local groundwater occurs within the underlying outwash deposit at depths of approximately 26 to 34 feet below ground surface, corresponding to elevations of 338 to 344 feet above the Mean Sea Level (MSL) datum. Based on variations in ground water elevations across the property, groundwater flow direction is towards the north-northeast.

¹ Phase I Environmental Site Assessment, Reserve at Lynnwood, ZGA, August 2015

² Geotechnical Study, Reserve at Lynnwood, ZGA, August-2014

There are no surface water bodies on the site. The closest surface water to the site is Scriber Lake, located approximately 1,000 feet to the northeast. The surrounding area has an undulating surface (high and low trending ridges) consistent with glacial till deposit with Scriber Lake located at a relative lower elevation than the subject Property.

2.5 Previous Investigations and Remedial Actions

A detailed history of previous investigations and descriptions of interim remedial actions conducted at the Site are presented in *Remedial Investigation and Model Remedy Selection, Reserve at Lynnwood, 19815 Scriber Lake Road, Lynnwood, Washington 98036* prepared by PBS and dated July 11, 2019 (PBS, 2019).

3.0 SCOPE OF WORK

The following activities will be completed to address the Site characterization data gaps as identified in the Opinion letter. The additional proposed Site characterization is intended to meet the substantive criteria for the *Model Remedies for Sites with Petroleum Impacts to Groundwater* (Model Remedy 4), as selected as the cleanup remedy for the Site (PBS, 2019).

3.1 Soil Contamination Distribution

The soils data will be reviewed to memorialize the degree and location of the soil contamination remaining in place at the Site. PBS will revise Figures 2 and 4a (PBS-July 2019) or present new figures to accurately depict the location of soil borings, sample locations, and data collected during the site investigation and remediation phases of the project.

A detailed description of the location of soil impacts and associated lithology and hydrogeology of the Site will be presented to further document the distribution of the contaminants of concern. While additional soil sampling is not feasible under the existing building footprint, further description of the soil distribution considering the influence of dense till overlying a glacial outwash will be demonstrated.

3.2 Monitoring Well Installation

3.2.1 Pre-Field Activities

A site- and job-specific health and safety plan that promotes personnel safety and preparedness during the planned activities will be developed prior to conducting the proposed work at the Site. On the morning of the day that the field activities are to commence, a "tailgate" meeting will be conducted with Site workers to discuss the health and safety issues and concerns related to the specific work.

A traffic control plan for 198th Street SW will be prepared and submitted to the City of Lynnwood along with an application for a street use permit. The street use permit will include working in the right-of-way and installation of permanent monitoring wells at locations within the right-of-way.

Prior to beginning field work, Notice of Intent forms and applicable fees will be submitted to

Ecology. Drilling locations will be marked with white paint or staked according to Washington Northwest Utility Notification Center (NUNC) requirements. At least two days prior to commencing work at the site, NUNC will be notified. The NUNC ticket will be maintained as long as work continues at the site and will be updated as necessary for any adjustments that are made based upon field reconnaissance. In addition, a private utility locator will be contracted to confirm the absence of buried utilities at each proposed well location.

3.2.2 Monitoring Well Installation

Two (2) groundwater monitoring wells (MW-9 and MW-10) will be installed within the City of Lynnwood right-of-way along 198th Street SW at locations north of MW-5 and MW-4. Tentative locations are shown on Figure 2. The final locations will be selected based on access and presence of utilities (buried and overhead) within the work area.

Pilot soil borings will be advanced at each location to approximately 40 ft bgs with a sonic drilling rig for the installation of groundwater monitoring wells. The first five feet of the borings will be completed via air-knife in order to ensure that underground utilities are not disturbed.

A complete lithological log will be developed during advancement of the pilot boring. Soil samples will be collected continuously starting at 5 feet bgs to the maximum boring depth using a split-spoon sampler. Each core sample will be logged in accordance with the Unified Soil Classification System (USCS; ASTM D-2487) and will include:

- Soil description (color, texture, structure, moisture/wetness, odor);
- Depth to groundwater;
- Total depth; and
- Drill rig type and drilling method.

Split spoon samplers will be decontaminated between sample intervals. Decontamination will consist of a wash with non-phosphate detergent followed by a potable rinse and final rinse with deionized water.

The monitoring wells will be installed with screen interval and depth designed to intercept the groundwater table beneath the Site to an estimated total depth of approximately 40 ft bgs. The monitoring wells will be installed in accordance with ASTM D5092 Standard Practice for Design and Installation of Groundwater Monitoring Wells and WAC Title 173 Chapter 160. It is anticipated that the well will be constructed of 2-inch diameter polyvinyl chloride (PVC) blank (riser) casing, 10 feet of slotted PVC well screen with a 0.010 slot size, and completed with a #2/12 sand (or equivalent) and sealed with hydrated bentonite chips and cement grout. The total depth and screen interval will be finalized in the field based on subsurface conditions (e.g. depth to groundwater) observed at the time of drilling. At each location, the wellhead will be sealed with a watertight, lockable well cap and a flush-mounted, watertight, traffic-rated well box will be installed over the wellhead.

Each monitoring well will be developed by surging and purging of up to ten well casing volumes of water to remove fine-grained material from the wells. Purge water will be monitored for field parameters including pH, electrical conductivity (EC), temperature, and turbidity. Well

development will continue until field parameters stabilize (i.e., turbidity readings reach between five [5] and fifty [50] Nephelometric Turbidity Units [NTU]) or a minimum of ten well volumes.

3.2.3 Sample Analysis

Two (2) soil samples from each pilot boring will be collected and submitted for laboratory analysis. Soil samples will be collected from the interval exhibiting the greatest evidence of contamination (e.g. staining, odors, elevated PID readings) and immediately above groundwater. If evidence of contamination is not present, only one (1) sample will be collected from immediately above groundwater. Soil samples will be collected directly into laboratory-provided containers that will be sealed and labeled with the project name, sample location ID and depth (e.g. SB02-0.5), date, and time collected. Field personnel will wear new disposable nitrile gloves that will be changed between samples. The samples will be placed in a cooler and stored on ice for the duration of sampling and for transportation to a Washington state-accredited laboratory.

Soil samples will be submitted to the laboratory under chain of custody protocols for analysis of TPH-d and TPH-ho by Method NWTPH-Dx on a standard (10-14 business day) turnaround time. Upon receipt of the laboratory report, the results of the laboratory data quality control/quality assurance testing will be reviewed and any discrepancies will be discussed with the laboratory to determine if repeat or follow-up analysis is warranted.

3.2.4 Survey Coordinates

The horizontal coordinates of the monitoring well and the elevation of the top of the monitoring well casing will be surveyed by a state-licensed surveyor. The horizontal coordinates will be surveyed to the North American Datum of 1983 (NAD83) and the vertical coordinate will be surveyed to the North American Vertical Datum of 1988 (NAVD88).

3.2.5 Investigation Derived Waste

Investigation derived waste (IDW) including soil cuttings, purge water, and decontamination water will be placed in properly labeled 55-gallon drums and stored on site until arrangement for off-site disposal at an appropriate facility is made.

3.3 Groundwater Monitoring and Sampling (4 Quarterly Events)

Groundwater monitoring and sampling will be conducted on a quarterly basis to document groundwater conditions at the Site. The initial groundwater sampling will be scheduled for no earlier than 48-hours following development of the newly installed well.

Prior to groundwater sampling, water levels will be measured in all site wells using an electric water level probe. The probe will be decontaminated between each well with a non-phosphate detergent wash followed by a potable water rinse and a final rinse with deionized water. The water level in each well will be measured to the nearest 0.01 foot from the top of casing.

Groundwater samples will be collected from new wells MW-9 and MW-10 and six (6) existing

on-site monitoring wells: MW-2, MW-3, MW-4, MW-5, IW-10, and IW-12. The monitoring wells will be purged using low-flow procedures. Groundwater samples will be collected using a peristaltic pump or down-well bladder pump fitted with silicon and/or polyethylene tubing. Pump tubing will be lowered to a mid-screen depth for purging and sampling. 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 the groundwater level from dropping more than 10 percent. Field parameters will be measured in purged groundwater as it is discharging through a flow-through cell. Groundwater will be passed through the cell and discharged into a temporary storage container. Field parameters will be periodically measured (approximately every 3 minutes) and recorded during well purging and upon stabilization. Field parameters will be measured using a multi-parameter meter and groundwater samples will be collected after the field parameters have stabilized as indicated below:

FIELD PARAMETER (Unit of Measurement)	STABILIZATION CRITERIA
Depth to Water (feet below top of casing, ft btoc)	± 0.3 ft
Temperature (degrees Celsius, °C)	± 3%
pH	± 0.1
Specific Conductance (milli Siemens per centimeter, mS/cm)	± 3%
Dissolved Oxygen (milligrams per liter, mg/L)	± 0.3 mg/L
Oxidation Reduction Potential (millivolts, mV)	± 10 mV
Turbidity (Nephelometric Turbidity Unit, NTU)	± 10% or <10 NTU

Bladder pumps, if used, will be decontaminated between monitoring wells. Decontamination will consist of a wash with non-phosphate detergent followed by a potable rinse and final rinse with deionized water.

Eight (8) groundwater samples and one (1) duplicate groundwater sample will be collected via low-flow methods directly into laboratory supplied bottles that will be sealed and labeled with the project name, sample location ID (e.g. MW01), date, and time collected. Field personnel will wear new disposable nitrile gloves. The samples will be placed in a cooler and stored on ice for the duration of sampling and for transportation to a Washington state accredited laboratory.

Groundwater samples will be submitted to the laboratory under chain of custody protocols. They will be analyzed for TPH-g by Method NWTPH-Gx, and TPH-d and TPH-o by Method NWTPH-Dx, and naphthalene and BTEX by method EPA 8260c on a standard (10-14 business day) turnaround time. Upon receipt of the laboratory report, the results of the lab's data quality control/quality assurance testing will be reviewed and any discrepancies will be discussed with the laboratory to determine if repeat or follow-up analysis is warranted.

In addition to analyses indicated above, samples will be collected on a semi-annual basis from (wells MW-1, MW-2, MW-5, MW-9) for analysis of secondary geochemical indicators to evaluate the performance of natural attenuation at the Site. Groundwater samples will be collected for analysis of the following geochemical parameters by the given method:

- Sulfate (SO_4^{2-}) by ASTM D516-07;
- Nitrate (NO_3^-) by EPA Method 353.2;
- Ferrous Iron Soluble (Fe^{+2}) by EPA Method SM 3500-Fe B (after field filtering);
- Manganese Soluble (Mn^{+2}) by EPA Method 6020B/200.8 (after field filtering);
- Methane (CH_4) by RSK 175;
- Alkalinity by EPA Method 310.2/SM 2320B

Investigation derived waste (IDW), including purge water, will be placed in properly labeled 55-gallon drums and stored on site until arrangement for off-site disposal at an appropriate facility is made.

4.0 REPORTING

4.1 Supplemental Site Characterization Report

A site characterization report will be prepared summarizing the field activities and presenting the results of the field investigation, summary of the nature and extent of contamination, identification of ecological and human health receptors, and a conceptual site model for current and future land uses. The report will include site plans and copies of laboratory reports and chain of custody documentation as follows:

- Map of the site showing site features and, sampling locations with sample identification numbers.
- Boring and well construction logs for the newly installed monitoring wells.
- Description of the sampling techniques and the type of analytical methods used. The descriptions will include the number, locations, and depths of samples.
- Tables with analytical results for the soil and groundwater samples collected with sample identification numbers and comparison to the applicable regulatory limits as follows:
 - MTCA Method A cleanup level for soil for unrestricted land use for and
 - MTCA Method A cleanup level for groundwater.
- Copies of original analytical reports and data quality assurance reports, including method detection limits and practical quantitation limits.

4.2 Quarterly Reports

Quarterly groundwater monitoring and sampling reports will be prepared summarizing the field activities and observations and presenting the results of sample analyses. The reports will include a site plan showing the approximate sample locations and the apparent groundwater flow direction, tabulated laboratory results, and copies of laboratory reports and chain of

custody documentation.

4.3 Electronic Sample Data

All sampling data generated for the Site will be submitted to Ecology's electronic Environmental Information Management System (EIM) database as required under Washington Administrative Code (WAC) 173-340-840(5). Data will be uploaded concurrently with submittal of reports to Ecology.

4.4 Environmental Covenant

To meet the requirements of Model Remedy 4, an environmental covenant will be prepared and filed for the Site. The environmental covenant will document the location and depths of contaminated soils remaining in place, restrict the disturbance of impacted Site soils, and restrict the removal and use of Site groundwater.

5.0 SIGNATURES

PBS Engineering and Environmental Inc.



Amanda Helen Meugniot

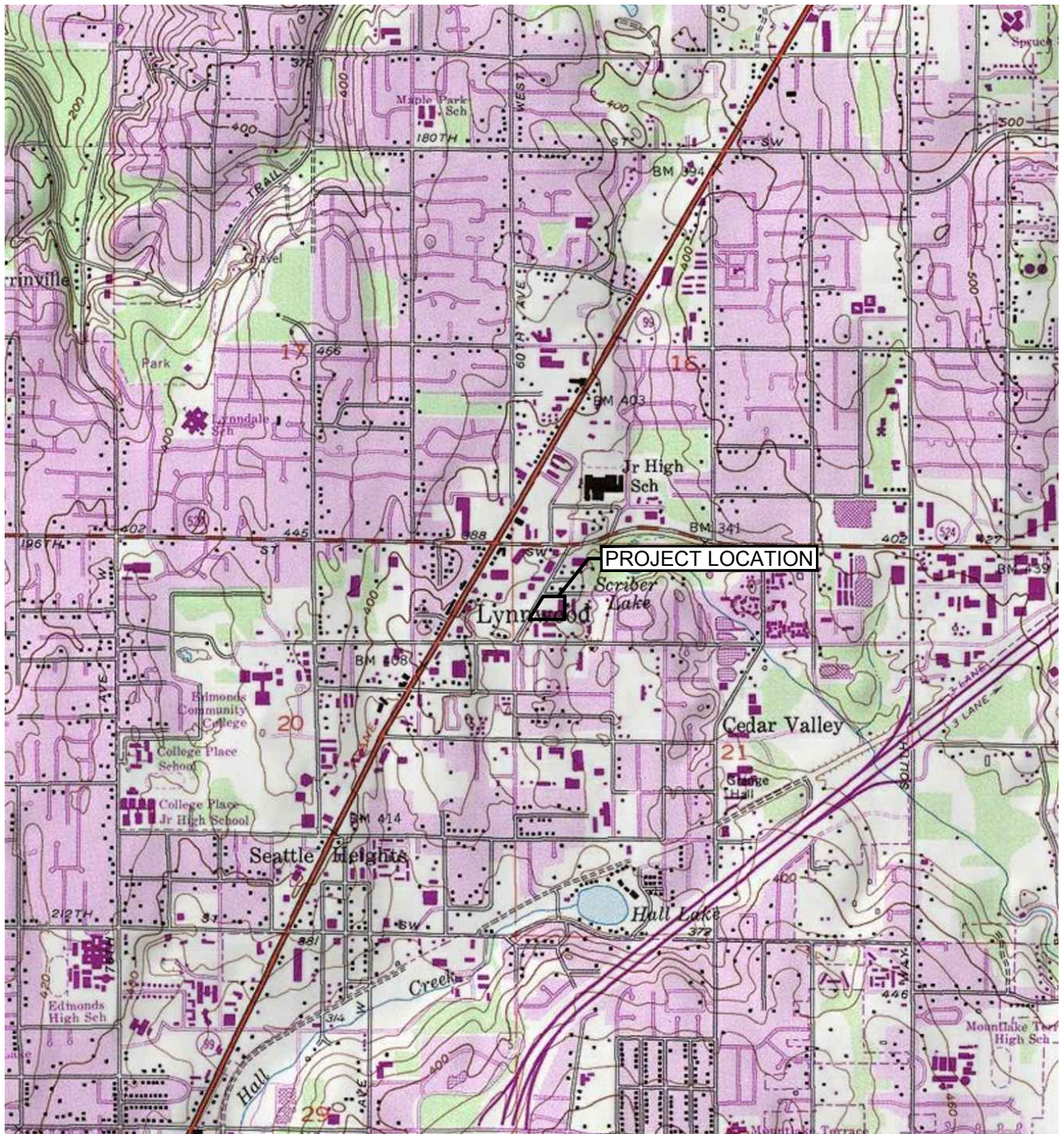
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Figures



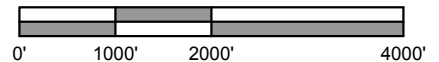
SOURCE: USGS EAST EDMONDS, WA QUADRANGLE 1981



WASHINGTON



Scale 1" = 2000'



PREPARED FOR: RESERVE AT LYNNWOOD, LLLP.



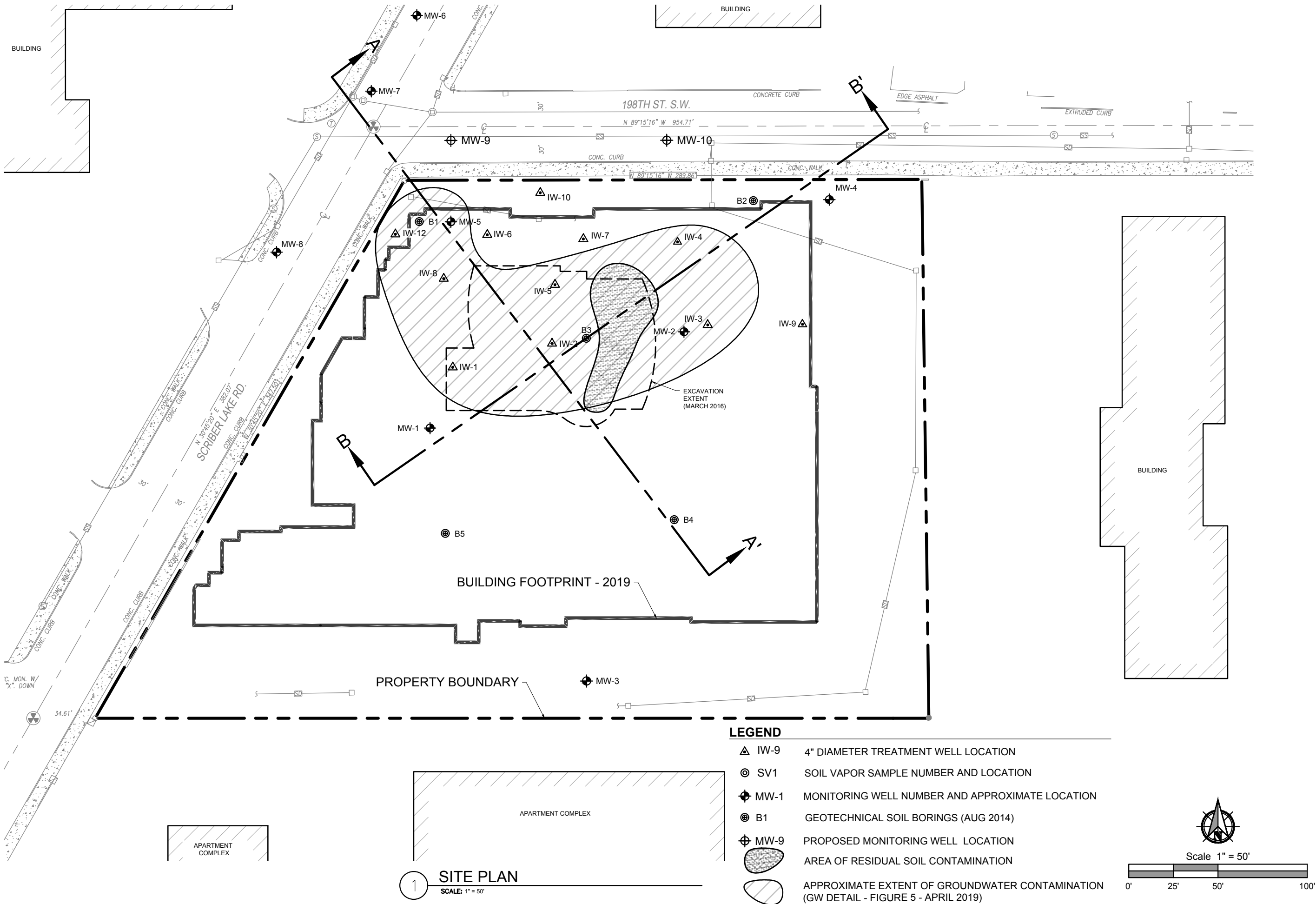
VICINITY MAP

19815 SCRIBER LAKE ROAD
LYNNWOOD, WASHINGTON

DEC 2019
41391.000

FIGURE

1



WORK PLAN
RESERVE AT LYNNWOOD
19815 SCRIBER LAKE ROAD, LYNNWOOD, WA

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