January 2022
Proposed Dungeness Reservoir Project

ANCHOR QEA

Phase 2 Environmental Site Assessment of the Old Sequim Dump Site

Prepared for Clallam County

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1 Introduction

This report describes the methods and findings of a Phase 2 Environmental Site Assessment (Phase 2 ESA) conducted by Anchor QEA, LLC (Anchor QEA) on behalf of Clallam County (County). The Phase 2 ESA was performed to evaluate whether petroleum or other hazardous substances have been released from waste materials located in a former waste disposal area known as the Old Sequim Dump Site (Dump) at concentrations actionable Washington's cleanup regulation, the Model Toxics Control Act (MTCA; WAC 173-340).

The Dump is located on a portion of a vacant property (Clallam County Tax Parcel 04303621000) currently owned by the State of Washington and managed by the Department of Natural Resources (DNR). The property and the adjacent parcel (Tax Parcel 043036130000) are proposed for acquisition by the County for development of the Dungeness Off-Channel Reservoir and associated public access and recreation uses. The location of the properties proposed for acquisition by the County are shown in Figure 1.

A previous Phase 1 Environmental Site Assessment (Phase 1) was performed by Anchor QEA (Anchor QEA, 2021) to review the history of the two properties proposed for acquisition, and to identify any areas of potential concern that might be impaired by contamination from past releases of petroleum or other hazardous materials. The Phase 1 report identified only the Dump portion of the properties as requiring completion of a Phase 2 ESA.

As described in the Phase 1 (Anchor QEA, 2021), the Dump includes wastes and debris disposed of primarily between the 1930s and the 1950s, and there has been no reported waste disposal activity at the Dump since the mid-1970s. The dumping was not a State-authorized activity, and no individuals or organizations responsible for the dumping have been identified. Wastes appear to have been dumped by individuals trespassing on the Property. The materials were dumped down a hillside west of an old railroad grade adjacent to River Road.

The Dump location is shown in Figure 2. As described in the Phase 1, the Dump had been estimated by DNR staff to cover an area approximately 800 feet long (north-south direction) and 100 feet wide (east-west). The waste materials include automobile bodies and car parts, household appliances, broken glass and other debris and solid wastes.

The scope of the Phase 2 ESA was defined in a Personal Services Agreement between Anchor QEA and the County. The work included preliminary mapping of the waste materials and completion of soil and groundwater testing. Test methods are described in Section 2, and testing results are described in Section 3 of this report. Conclusions and recommendations of the Phase 2 ESA are described in Section 4.

2 Methods

This section describes the methods used for completion of the Phase 2 ESA activities. That work included visual delineation and mapping of waste materials in the Dump, testing of groundwater using temporary soil borings, and testing of soils from the Dump area.

2.1 Delineation of Waste Materials

Visual reconnaissance was conducted to delineate the approximate lateral extent of the Dump, and to assess the quantities and types of materials contained within it. Visible waste locations were recorded using a Trimble global position system (GPS) device.

Within the dump, there were three areas containing more abundant waste materials and a greater proportion of larger objects (e.g., auto bodies, car parts, appliances, tires). These three areas are labeled Area A (south), Area B (middle) and Area C (north) on Figure 3. The waste materials outside of these areas tended to be smaller in size, more scattered, and covered in vegetation. Daily logs documenting the visual reconnaissance and inventory are attached as Appendix A.

2.2 Initial Groundwater Testing

Initial groundwater testing was performed in May of 2021. Groundwater gradients near the Dump were estimated in the Phase 1 to flow in a north-northwesterly direction toward the Dungeness River, following local topography and the flow of the Dungeness River. Three downgradient sampling locations were located on the access roadway immediately west of the Dump. These downgradient locations were as close as practicable to the Dump without requiring clearing or grading work.

Public and private utility locates were performed to verify the absence of underground utilities in the work areas. Then a sonic drilling rig operated by Cascade Drilling, Inc. was used to advance three 6-inch diameter boreholes to depths at least five feet below the apparent water table.

During drilling, continuous soil cores were collected and logged by an Anchor QEA geologist licensed in the State of Washington. After reaching the total depth of each borehole, the advancement tooling was removed from the borehole and a temporary well consisting of 2-inch diameter polyvinyl chloride (PVC) well casing with 5-feet of pre-packed screen was installed in the open borehole. Field boring logs for the three soil borings including depth and screened interval of the temporary wells are included in Appendix B.

After installation of the temporary wells, groundwater was purged via low-flow purge methods with a peristaltic pump until water quality parameters (temperature, dissolved oxygen, specific conductivity, pH, oxidation-reduction potential, and turbidity) in the purge water stabilized for three consecutive

3-minute interval readings. Field Sampling Data Sheets with groundwater monitoring parameters measured during purging for the three groundwater samples are included in Appendix C.

Groundwater samples were collected by peristaltic pump into pre-cleaned sample containers for analytical testing. Groundwater samples were submitted to ALS Environmental (ALS) analytical laboratory in Kelso, Washington and analyzed for the following parameters:

- Volatile Organic Compounds by Environmental Protection Agency (EPA) Method 8260C
- Gasoline-range Total Petroleum Hydrocarbons (TPH) by method NWTPH-Gx
- Extractable TPH by method NWTPH-Dx (method includes diesel and residual-range hydrocarbons; paired analysis performed both with and without silica gel cleanup)
- Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270D with selective ion monitoring (SIM)
- 13 Priority Pollutant Metals (total and dissolved) by EPA Method 6020A (most metals) and 7470A (Mercury only).

The chain-of-custody form for the groundwater samples from the temporary wells is attached in Appendix D.

Because groundwater sampling was performed using open borings and temporary well screens rather than from permanent monitoring wells, groundwater samples were anticipated to contain elevated levels of turbidity. For heavy metals, which are particularly sensitive to turbidity artifacts, groundwater sampling included analysis for both total and dissolved metals. Samples for dissolved metals were filtered in the field with a 0.45-micron in-line filter. Data interpretation in Section 3 considered the expectations outlined in the MTCA rule (see WAC 173-340-720(9)(b)). That portion of the rule addresses the impact of turbidity on metals concentrations in groundwater samples. The measured turbidity levels in the total metals samples and the differences between the total and dissolved metals provide a basis for quantifying the effects of turbidity and naturally occurring metals on the measured results.

The groundwater sampling areas were located in areas of extensive vegetation and porous sandy soils. The test methods for extractable total petroleum hydrocarbons can produce false-positive results in the presence of this type of naturally occurring, polar organic matter. The NWTPH-Dx test method includes a cleanup step (silica gel cleanup) that can be used to remove polar organic matter without removing petroleum hydrocarbons from the sample. Given the likely presence of vegetation-related polar organic matter in the groundwater samples, the testing for petroleum by the NWTPH-Dx analysis was performed twice, once with and once without the silica gel cleanup step.

2.3 Soil Testing

Soil testing was performed in May 2021. Soil testing was performed following visual delineation of the extent of the waste materials in the Dump. Testing locations were selected based on the nature and extent of debris observed during the reconnaissance. A total of 20 sampling locations were selected as shown in Figure 3.

At each sampling location, surficial vegetation (leaf litter, pine needles, etc.) was removed. Soil samples were then collected from 0-6 inches below the ground surface. Soil samples were collected with a decontaminated stainless-steel spoon. Additional soil aliquots were collected in sealable plastic bags for volatile organic compound headspace analysis with a photoionization detector (PID).

During sample collection, observations were made regarding the composition of nearby waste debris. Soil sample collection details are presented in Table 2.

Seven of the 20 samples were submitted to the laboratory (ALS Kelso) for chemical analysis. The analytical laboratory was instructed to archive the remaining 13 samples in case they were required for further analysis. The 7 primary soil samples were analyzed for following:

- Polychlorinated Biphenyls (PCBs) by EPA method 8082A
- PAHs by EPA Method 8270D SIM
- Extractable TPH by NWTPH-Dx (performed without silica gel cleanup)
- 13 Priority Pollutant Metals by EPA Method 6020A and 7471A (Mercury only)

Because none of the soil samples exhibited elevated PID readings during the headspace analysis (meaning that volatile hydrocarbons were absent), none of the soil samples were submitted for analysis of gasoline hydrocarbons or volatile organic compounds.

2.4 Follow-Up Groundwater Testing

As follow-up to the initial groundwater testing as described in Section 2.2, a permanent monitoring well was installed adjacent to soil boring location SB3 on September 23, 2021. The well was installed to allow for follow-up monitoring of groundwater at this location. For details on the well installation activities, refer to the *Phase 1 Geotechnical Data Report* (Shannon & Wilson, 2021).

Following installation, monitoring well SB3 was developed by Anchor QEA on October 12, 2021, by a combination of surging the well screen with a tight-fitting surge block and purging groundwater with a peristaltic pump. Development continued until at least ten casing volumes of water were removed, water quality parameters (temperature, pH, and conductivity) stabilized within 10% for three consecutive readings, and as much sediment as feasibly possible was removed from the well sump.

Two groundwater samples (an original and a duplicate) were collected from SB3 on October 13, 2021, approximately 16 hours after development, using a peristaltic pump via low flow purging and sampling methods. The samples were submitted to Apex Laboratories in Tigard, Oregon for analysis. The original sample was analyzed for the following:

- Extractable TPH by method NWTPH-Dx (method includes diesel and residual-range hydrocarbons; paired analysis performed both with and without silica gel cleanup)
- Total Metals (arsenic and chromium) by EPA Method 200.8
- Dissolved Metals (arsenic and chromium) by EPA Method 200.8.

The duplicate sample was analyzed only for extractable TPH (with and without silica gel cleanup) by the same methods as above.

3 Results

This section summarizes the results of Phase 2 ESA. Results of chemical testing of groundwater and soils are presented in Tables 3 and 4. Measured chemical concentrations are compared to applicable MTCA cleanup levels for groundwater (WAC 173-340-720; Table 3) and soils (WAC 173-340-740; Table 4) at sites with unrestricted land use, respectively. Results indicate the presence of limited soil and groundwater contamination in the immediate vicinity of the Dump.

3.1 Extent of Debris

The estimated lateral extent of debris at the Dump is shown in Figure 3. The waste materials cover a contiguous, irregularly shaped area that is up to 750 feet long (north-south direction) and up to 100 feet wide (east-west direction). This is generally consistent with the description provided by DNR staff and records as summarized in the Phase 1 (Anchor QEA, 2021).

Three areas of the Dump contain more extensive accumulations of debris, including significant larger waste materials (automobile bodies and parts, tires, appliances) and thicker accumulations of smaller debris (broken glass, small metal objects, household refuse). These areas are identified on Figure 3 as Area A (southernmost area), Area B (middle area) and Area C (northernmost area). Areas A, B and C are surrounded by a larger area of scattered debris with fewer large objects and thinner waste accumulations. The total areal extent of the Dump is estimated to be roughly one acre:

Area A (south):	7,780 square feet (0.18 acre)
Area B (middle):	4,525 square feet (0.10 acre)
Area C (north):	6,250 square feet (0.14 acre)
Areas of scattered debris	21,855 square feet (0.50 acre)
Total area (Figure 3):	40,410 square feet (0.93 acre)

Due to the irregular distribution of waste materials and the extensive vegetation present in the area, the areas listed above and shown in Figure 3 are considered preliminary and may not include all waste debris. A more complete delineation could be accomplished using a metal detector (to identify metal objects covered in vegetation or cover soil). This type of work may be appropriate to perform prior to waste removal to refine the waste removal boundary.

3.2 Groundwater Quality

Groundwater samples were initially tested at three temporary boring locations immediately downgradient of the Dump (Figure 3), and follow-up groundwater testing was performed with a groundwater monitoring well installed at one of these locations.

The temporary borings and the groundwater monitoring well were installed with sonic drilling methods. This was selected for the work, because the subsurface soils contain extensive gravel and cobbles that limit the effectiveness of other drilling methods (e.g., Geoprobe testing or drilling with a hollow-stem auger).

3.2.1 Results of Initial Groundwater Testing

Groundwater was encountered between 16 and 18 feet below ground surface. Shallow soils encountered in the borings included a layer of roadbed materials and an underlying layer of native organic soils containing roots and woody debris. Deeper soils encountered during drilling included primarily sandy silty gravel and cobbles. The temporary soil borings were extended to depths of 25 feet prior to placing the temporary well screens and collecting groundwater samples. Boring logs are contained in Appendix A.

Groundwater samples were collected from temporary well screens placed in the three boreholes. Groundwater sampling data sheets are included in Appendix B. Water samples were collected using a peristaltic pump. Pumping was continued to purge turbid water prior to collection of analytical samples. However, high turbidity remained present in all samples, with the water samples appearing cloudy with a brown tint. This is typical for water samples collected from temporary borings (permanent monitoring wells include a sand pack and are developed to remove turbidity associated with the temporary disturbance of well installation). Water that is visibly clear typically has turbidity values of less than 10 nephelometric turbidity units (NTUs), whereas the turbidity readings of the samples collected during the Phase 2 ESA ranged from 283 to 658 NTUs.

Analytical testing results for the three groundwater samples from the temporary soil borings are presented in Table 3 along with applicable data qualifiers. Laboratory testing reports are attached in Appendix G. Results that are "U" qualified were not detected. Results that are "J" qualified were above the Method Detection Limit (MDL), but below its Method Reporting Limit (MRL). These J-qualified values should be considered estimates. Other data qualifiers are listed in the table notes.

Groundwater testing results were compared to MTCA Method A and Method B groundwater cleanup levels as described below:

- Heavy metals: There were no confirmed exceedances of MTCA cleanup levels for groundwater at any of the three locations. Dissolved metals results in all three water samples were well below applicable cleanup levels. There were no exceedances of groundwater cleanup levels for any of the 13 heavy metal compounds tested in the total metals measurements from any of the borings except for arsenic and chromium, which were slightly elevated (by 23 and 4 percent, respectively) at location SB3. These two compounds were well below the cleanup levels in the corresponding filtered groundwater sample for SB3.

Comparison of the total and dissolved metals results and the high measured turbidity values in the samples (658 NTU) confirm that the detected arsenic and chromium concentrations in the total metals analysis were the result of excessive sample turbidity and do not indicate the presence of groundwater contamination.

- VOC Compounds: There were no exceedances of applicable cleanup levels for volatile organic compounds in any of the water samples. Detections of VOCs were limited to trace levels below applicable reporting limits (i.e., all detected values were J-flagged).
- PAH compounds: There were no exceedances of applicable cleanup levels for PAH compounds. Detections of PAHs were limited to trace levels below applicable reporting limits (i.e., all detected values were J-flagged). No carcinogenic PAH compounds (cPAH) were detected).
- Petroleum Compounds:
    - Gasoline Hydrocarbons: There were no exceedances of gasoline cleanup levels in any of the groundwater samples. Detections of gasoline were limited to trace levels below applicable reporting limits (i.e., all detected values were J-flagged).
    - Extractable Petroleum Hydrocarbons: Extractable hydrocarbons were confirmed to be present in excess of MTCA cleanup levels at one location, boring SB3, but not at the other two groundwater sampling locations:
        - Testing Results for Locations SB1 and SB2: Testing results indicate that petroleum concentrations are below MTCA method A cleanup levels at locations SB1 and SB2. At these locations, extractable hydrocarbons were initially detected at low levels (0.39 to 0.51 mg/L). But the analyst noted that the chromatographic patterns did not match the petroleum standards. Additionally, when silica gel cleanup was included in the petroleum analysis (that cleanup step removes polar organic materials associated with vegetation or other naturally occurring non-petroleum hydrocarbons, leaving only non-polar petroleum hydrocarbons) the measured hydrocarbon concentrations dropped below method detection limits. Results confirm that the detected hydrocarbons at SB1 and SB2 were polar organic matter, either non-petroleum hydrocarbons or heavily biodegraded petroleum hydrocarbons.
        - Testing Results for Location SB3: At location SB3, the analyses performed with and without silica gel indicated both the presence of polar (i.e., non-

petroleum) and non-polar (i.e., petroleum) hydrocarbons. The extractable hydrocarbon concentrations were initially detected at a concentration of 1.65 mg/L. After silica gel cleanup was included in the analysis to remove non-petroleum hydrocarbons, this concentration decreased to 0.94 mg/L. Results indicate that some, but not all, of the detected hydrocarbons at SB3 were non-petroleum hydrocarbons or heavily degraded petroleum. However, the concentration of the initial (tested without silica gel) and remaining (tested with silica gel) hydrocarbons exceeded the MTCA Method A cleanup level for groundwater (0.5 mg/L). The laboratory report indicated that the detected hydrocarbons were heavier than the residual oil calibration standard used in the analysis.

3.2.2 Results of Follow-Up Groundwater Testing

The groundwater well installed at location SB3 was used for follow-up testing to confirm the results of groundwater monitoring performed using the temporary soil borings. Following installation and development, the well was sampled for heavy metals (arsenic and chromium) and extractable TPH (with and without silica gel).

- Heavy metals: Arsenic and chromium were both below method detection limits in the follow-up groundwater testing. Results confirm that groundwater is not impacted by these contaminants.

- Petroleum Hydrocarbons: Results for testing performed without silica gel confirmed the presence of extractable hydrocarbons at an average concentration of 0.542 mg/L. Results for testing performed with silica gel were not significantly different (0.565 mg/L), confirming that these hydrocarbons represented petroleum compounds. Results of both analyses slightly exceeded the MTCA Method A groundwater cleanup level (0.5 mg/L).

Taken together with the initial groundwater testing results, the follow-up testing results confirm that groundwater is impacted by low levels of oil-range petroleum hydrocarbons at concentrations slightly above applicable cleanup levels. The groundwater is not impacted by heavy metals.

3.3 Soil Quality

Analytical results for the seven soil samples collected from areas A, B and C and submitted for chemical testing are presented in Table 5. Corresponding laboratory reports are included in Appendix G. Concentrations that are "U" qualified were not detected. Concentrations that are "J" qualified, indicate that the analyte was detected low concentrations, above the MDL but below the MRL.

Soil testing results were compared to MTCA Method A and Method B soil cleanup levels. Results confirmed the presence of soil contamination in one portion of Area A. The contamination included cadmium and lead, consistent with the presence of older, painted metal debris in the Dump waste materials. No other soil contamination was detected at concentrations exceeding MTCA cleanup levels. Specific testing observations included the following:

- Heavy metals:
    - Sample A5: Soil cleanup levels were exceeded at sample A5 collected within Area A. In that sample there were notably increased concentrations of cadmium, lead and zinc. These three metals are common in older paint formulations. Both cadmium and lead exceeded the applicable soil cleanup levels. Lead concentrations (586 mg/kg) exceeded the cleanup level (250 mg/kg) by a factor of more than two times. Zinc did not exceed the applicable Method B soil cleanup level.
    - Other Soil Samples: No cleanup levels were exceeded for heavy metals in the other soil samples. Cadmium concentrations were elevated in sample A3 but remained slightly below the applicable cleanup level (1.74 mg/kg in comparison to a cleanup level of 2.0 mg/kg).
- PAH compounds: There were no exceedances of applicable cleanup levels for PAH compounds in any of the soil samples tested. The highest concentrations of cPAH compounds were measured in sample A5 (36 ug cPAH TEQ/kt), but they remained at a concentration below the applicable cleanup level (100 ug cPAH TEQ/kg).
- PCB Aroclors: PCB compounds were not detected in any of the seven soil samples tested.
- Petroleum Compounds:
    - Gasoline hydrocarbons: No hydrocarbon vapors were present during the PID headspace screenings performed on any of the samples. Therefore, no testing was performed for gasoline hydrocarbons in the soil samples.
    - Extractable petroleum hydrocarbons: There were no exceedances of cleanup levels for extractable petroleum hydrocarbons (diesel and oil) in any of the test samples. As no silica gel cleanup was used in the analytical testing for soils, measured values are likely biased high due to the presence of vegetation and naturally occurring organic matter in the soils. The highest concentrations were measured in sample A1 (640 mg/kg), with the other measured values ranging from 43 to 206 mg/kg. All of these measured concentrations are well below the cleanup level of 2,000 mg/kg.

4 Conclusions and Recommendations

Results of the Phase 2 ESA confirmed that a limited amount of soil and groundwater contamination is associated with the Dump, located in the southern portion of the Property. Additional actions will be required to correct those conditions.

The location and overall footprint of the Dump is generally consistent with previous information provided by DNR. Mapping of the Dump materials indicates that the waste debris covers an irregularly shaped area of approximately one acre in size as shown in Figure 3.

The extent of existing soil contamination at the Property appears to be limited at this time, with exceedances of MTCA soil cleanup levels detected in only one of the seven soil samples analyzed during the Phase 2 ESA. Detected soil contaminants included cadmium and lead, both of which are common in older paint formulations. These contaminants were likely released to the soil during decomposition (i.e., flaking and rusting) of painted metal debris present in the Dump.

Results of testing confirm that some hazardous substances are present in the waste materials and have the potential to release additional contamination to surface soils if the waste materials are not removed. Therefore, Anchor QEA recommends that the waste materials be removed. Given the type and quantity of waste materials present, a thin layer of soil and some trees and other vegetation would need to be removed along with the wastes.

Groundwater testing included analysis for a wide range of parameters. No impacts to groundwater were present for heavy metals, PAH compounds, VOC compounds, gasoline or diesel hydrocarbons. However, low levels of oil-range hydrocarbons were identified in one of three groundwater testing locations collected adjacent to the Dump from temporary soil borings. Exceedance of groundwater cleanup levels at that location was confirmed in follow-up testing performed using a groundwater monitoring well installed adjacent to the original testing location. The concentrations exceeded the cleanup levels by less than 20 percent in that location.

Waste removal, with confirmation testing of soils to confirm that no contaminated soil remains, would restore compliance of the Dump Site soils with Washington's MTCA cleanup regulations. Some additional groundwater testing will also be required to verify that no additional actions (beyond waste removal) are required to resolve groundwater quality concerns associated with the Dump.

If performed by Clallam County, waste removal, soil cleanup work and confirmation groundwater monitoring at the Dump would likely be eligible for cleanup grants under Washington's remedial action grant program (see WAC 173-322A). That program can fund up to 50 percent of eligible

cleanup work performed by a qualifying local government. If performed by DNR, the work would not be eligible for that particular grant program.

5 References

Anchor QEA, 2021. Phase 1 Environmental Assessment, DNR River Road Properties. Prepared on behalf of Clallam County in support of the Proposed Dungeness Reservoir Project. January 2021.

Tables

Table 1
Groundwater Sample Details

Location ID	Coordinates		Sample ID	Date Collected	Time Collected	Estimated Ground Surface Elevation (feet NAVD88)	Total Depth Drilled (feet bgs)	Depth to Groundwater (feet bgs)	Screened Interval (feet bgs)
	Latitude	Longitude							
SB1	48.045406	-123.143318	SB1-GW-050621	5/6/2021	16:00	412.0	25.0	19.82	17.8 - 22.8
SB2	48.044881	-123.143705	SB2-GW-050621	5/6/2021	12:30	416.0	25.0	17.59	17.1 - 22.1
SB3	48.044322	-123.144078	SB3-GW-050621	5/6/2021	14:45	418.0	25.0	16.67	16.0 - 21.0
MW-SB3[1]	48.044322	-123.144078	DR-101321-01	10/13/2021	9:00	418.0	25.0	17.76	15.0 - 25.0
MW-SB3[1]	48.044322	-123.144078	DR-101321-02	10/13/2021	9:05	418.0	25.0	17.76	15.0 - 25.0

Notes:
1: Sample collected from the new monitoring well installed approximately 3 feet from the location of SB3 (MW-SB3).

Table 2
Soil Sample Collecton Details

Sub-area	Sample ID	Date Collected	Coordinates		Headspace Screening		Analyzed	Archived	Location	Comments/Contents
			Latitude	Longitude	Peak (ppm)	Stable (ppm)				
A	A1-SOIL-050721	5/7/2021	48.044033	-123.143555	1.5	0.7	X		Near tank	Gravelly silt topsoil with abundant roots
	A2-SOIL-050721	5/7/2021	48.044037	-123.143425	1.5	1.0		X	Near refrigerator	Gravelly silt topsoil, broken glass debris
	A3-SOIL-050721	5/7/2021	48.044094	-123.143507	1.5	0.6	X		Near car gas tank	Gravelly silt topsoil
	A4-SOIL-050721	5/7/2021	48.044281	-123.143507	1.0	0.6		X	In the midst of partial cars	Gravelly silt topsoil
	A5-SOIL-050721	5/7/2021	48.044246	-123.143524	1.8	0.5	X		Near partial car	Gravelly silt topsoil, glass, metal, and shell debris
	A6-SOIL-050721	5/7/2021	48.044224	-123.143509	1.3	0.5		X	Near partial car	Gravelly silt topsoil, broken glass debris
	A7-SOIL-050721	5/7/2021	48.044327	-123.143463	1.3	0.6		X	Near partial car	Gravelly silt topsoil
B	B1-SOIL-050721	5/7/2021	48.044900	-123.143376	1.6	1.4	X		Next to small drum	Gravelly silt topsoil
	B2-SOIL-050721	5/7/2021	48.044961	-123.143254	4.4	1.6	X		Next to fuel tanks	Gravelly silt topsoil
	B3-SOIL-050721	5/7/2021	48.044880	-123.143329	2.5	0.7		X	Near partial cars	Silty topsoil
	B4-SOIL-050721	5/7/2021	48.044994	-123.143224	2.3	1.1		X	Near partial cars	Silty topsoil
C	C1-SOIL-050721	5/7/2021	48.045557	-123.142804	1.7	0.6		X	Near partial cars	Silty topsoil
	C2-SOIL-050721	5/7/2021	48.045410	-123.142822	2.7	1.3	X		Near partial cars	Silty topsoil
	C3-SOIL-050721	5/7/2021	48.045347	-123.142827	2.6	1.2		X	Near partial cars	Silty topsoil
	C4-SOIL-050721	5/7/2021	48.045143	-123.142937	5.8	2.0	X		Near partial cars	Silty topsoil
	C5-SOIL-050721	5/7/2021	48.045181	-123.143028	1.9	0.9		X	Near refrigerator	Mostly organic material (decayed leaves and twigs)
	C6-SOIL-050721	5/7/2021	48.045273	-123.142799	1.0	1.0		X	Near partial cars	Gravelly silt topsoil, broken glass debris

Table 3
Initial Groundwater Testing Results

	Location ID	SB1		SB2		SB3	
	Sample ID	SB1-GW-050621		SB2-GW-050621		SB3-GW-050621	
	Sample Date	5/6/2021		5/6/2021		5/6/2021	
	Depth	19.82 - 22.8 ft		17.59 - 22.1 ft		16.67 - 21 ft	
	Sample Type	Normal		Normal		Normal	
	Matrix	Groundwater		Groundwater		Groundwater	
	Latitude	48.045416		48.048820		48.045099	
	Longitude	-123.143330		-123.143726		-123.045099	
	Screening Levels: MTCA Method A and B[1]	Total	Dissolved	Total	Dissolved	Total	Dissolved
Metals (µg/L)							
Antimony	6.4[(B)]	**0.196**	**0.137**	**0.242**	**0.104**	**0.486**	**0.192**
Arsenic	5	**3.08**	**0.25 J**	**3.51**	**0.2 J**	**6.16** [2]	**0.17 J**
Beryllium	32[(B)]	**0.267**	**0.02 U**	**0.251**	**0.02 U**	**0.563**	0.02 U
Cadmium	5	**0.094**	**0.025**	**0.081**	**0.02 U**	**0.304**	**0.043**
Chromium	50	**25.2**	**0.15 J**	**24.0**	**0.15 J**	**52.1** [2]	**0.16 J**
Copper	640[(B)]	**29.5**	**0.87**	**29.7**	**0.58**	**92**	**0.92**
Lead	15	**4.69**	**0.019 J**	**4.67**	**0.012 J**	**10.5**	**0.022**
Mercury	2	0.2 U	0.2 U	0.2 U	0.2 U	**0.05 J**	0.2 U
Nickel	320[(B)]	**25.6**	**0.99**	**25.0**	**0.8**	**63.4**	**2.02**
Selenium	80[(B)]	**0.3 J**	**0.2 J**	**0.3 J**	**0.3 J**	**0.3 J**	**0.2 J**
Silver	80[(B)]	**0.121**	**0.02 U**	**0.177**	**0.02 U**	**0.343**	0.02 U
Thallium	0.16[(B)]	**0.042**	**0.02 U**	**0.05**	**0.02 U**	**0.111**	**0.018 J**
Zinc	4800[(B)]	**37.0**	**6.8**	**33.8**	**2.2**	**99.7**	**9.6**
Volatile Organics (µg/L)							
Acetone [3]	7200[(B)]	**13 J**	---	**9.6 J**	---	**17 J**	---
Benzene	5	**0.14 J**	---	**0.12 J**	---	**0.12 J**	---
Carbon disulfide	800[(B)]	**0.09 J**	---	**0.11 J**	---	**0.07 J**	---
Cymene, p- (4-Isopropyltoluene)	---	**0.38 J**	---	**0.17 J**	---	2 U	---
Ethylbenzene	700	0.5 U	---	0.5 U	---	**0.07 J**	---
m,p-Xylene	---	0.5 U	---	0.5 U	---	**0.16 J**	---
Methyl ethyl ketone (2-Butanone) [3]	4800[(B)]	**3.0 J**	---	20 U	---	**5.9 J**	---
o-Xylene	1600[(B)]	0.5 U	---	0.5 U	---	**0.09 J**	---
Toluene	1000	**0.2 J**	---	**0.14 J**	---	**0.1 J**	---
All other VOC compounds	--	None Detected	---	None Detected	---	None Detected	---
Polycyclic Aromatic Hydrocarbons (µg/L)							
2-Methylnaphthalene	32[(B)]	**0.0043 J**	---	**0.0087 J**	---	**0.012 J**	---
Acenaphthene	960[(B)]	**0.0018 J**	---	**0.0028 J**	---	0.02 U	---
Acenaphthylene	---	0.02 U	---	**0.0017 J**	---	**0.0072 J**	---
Anthracene	4800[(B)]	**0.0031 J**	---	0.02 U	---	0.02 U	---
Dibenzofuran	16[(B)]	**0.0027 J**	---	**0.0028 J**	---	**0.0065 J**	---
Fluoranthene	640[(B)]	0.02 U	---	0.02 U	---	**0.0026 J**	---
Fluorene	640[(B)]	**0.0048 J**	---	**0.0052 J**	---	**0.017 J**	---
Naphthalene	160	**0.0081 J**	---	**0.0092 J**	---	**0.014 J**	---
Phenanthrene	---	**0.0055 J**	---	**0.0081 J**	---	**0.024**	---
Pyrene	480[(B)]	**0.002 J**	---	**0.0032 J**	---	**0.0048 J**	---
All other PAH Compounds	--	None Detected	---	None Detected	---	None Detected	---
Total cPAH TEQ (7 CAEPA 2005) (U = 1/2)	0.1	0.02 U	---	0.02 U	---	0.02 U	---
Total Naphthalene (1- and 2-Methyl and Naph) (U = 1/2)	160	**0.0124 J**	---	**0.0179 J**	---	**0.026 J**	---
Gasoline Range Petroleum Hydrocarbons (mg/L)							
Gasoline Hydrocarbons	1	0.012U	---	**0.0216 J**	---	**0.0208 J**	---

Table 3
Initial Groundwater Testing Results

	Location ID	SB1		SB2		SB3	
	Sample ID	SB1-GW-050621		SB2-GW-050621		SB3-GW-050621	
	Sample Date	5/6/2021		5/6/2021		5/6/2021	
	Depth	19.82 - 22.8 ft		17.59 - 22.1 ft		16.67 - 21 ft	
	Sample Type	Normal		Normal		Normal	
	Matrix	Groundwater		Groundwater		Groundwater	
	Latitude	48.045416		48.048820		48.045099	
	Longitude	-123.143330		-123.143726		-123.045099	
	Screening Levels: MTCA Method A and B[1]	Total	Dissolved	Total	Dissolved	Total	Dissolved
Exctractable Petroleum Hydrocarbons (mg/L) (analyzed without silica gel cleanup step)							
Diesel range organics (C12 - C25)	0.5	**0.15 J**	---	**0.19 J**	---	**0.71 Z**	---
Residual range organics (C25 - C36)	0.5	**0.36 J**	---	**0.2 J**	---	**0.94 O**	---
Total Diesel and Residual Hydrocarbons	0.5	**0.51** [4]	---	**0.39** [4]		**1.65** [4]	
Exctractable Petroleum Hydrocarbons (mg/L) (analyzed with silica gel cleanup step)							
Diesel range organics (C12 - C25)	0.5	0.012 U	---	0.012 U	---	0.012 U	---
Residual range organics (C25 - C36)	0.5	0.020 U	---	0.021 U	---	**0.94** [4]	---
Total Diesel and Residual Hydrocarbons	0.5	None detected	---	None detected		**0.94** [4]	

Detected concentration represents a confirmed exceedance of MTCA groundwater cleanup levels.

Bold = Detected result

J = Estimated Value. The analyte was detected at or above the Method Detection Limit but below the Method Reportling Limit.

U = Compound analyzed, but not detected above detection limit

H: The chromatographic fingerprint was identified by the lab as being heavier than the calibration standard.

O: The chromatographic fingerprint was identified by the lab as not matching the calibration standard.

Z: The chromatographic fingerprint was identified by the laboratory as not resembling a petroleum product.

1: Screening level shown is MTCA Method A unless a superscript (B) is present, in which case it is MTCA Method B Direct Contact

2: Value is from an unfiltered sample subject to turbidity interferences. Dissolved sampling results confirm that the elevated results are due to turbidity and are not indicative of the presence of groundwater contamination.

3. Acetone and methyl-ethyl ketone are common laboratory interferences.

4. Results of paired analysis with/without silica gel and the hydrocarbon patterns on the chromatograms from the hydrocarbon analysis (Appendix E) confirm that the detected hydrocarbons include naturally occuring polar organic material or partially-biodegraded petroleum hydrocarbons.

µg/L: Micrograms per liter

MTCA: Model Toxics Control Act

--- Not applicable or does not exist

mg/L: Milligrams per liter

Table 4
Comparison of Groundwater Monitoring Results at Location SB3 and MW-SB3

	Location ID	**SB3**		**MW-SB3**	
	Sample ID	**SB3-GW-050621**		**DR-101321-01**	
	Sample Date	**5/6/2021**		**10/13/2021**	
	Depth	**16.67 - 21 ft**		**17.76-25 ft**	
	Sample Type	**Normal**		**Normal**	
	Matrix	**Groundwater**		**Groundwater**	
	Latitude	**48.045099**		**48.045099**	
	Longitude	**-123.14223**		**-123.14223**	
	Screening Levels: MTCA Method A and B[1]	**Total**	**Dissolved**	**Total**	**Dissolved**
Metals (µg/L)					
Antimony	6.4(B)	**0.486**	**0.192**	---	---
Arsenic	5	**6.16** [2]	**0.17 J**	0.50 U	0.50 U
Beryllium	32(B)	**0.563**	0.02 U	---	---
Cadmium	5	**0.304**	**0.043**	---	---
Chromium	50	**52.1** [2]	**0.16 J**	1.0 U	1.0 U
Copper	640(B)	**92**	**0.92**	---	---
Lead	15	**10.5**	**0.022**	---	---
Mercury	2	**0.05 J**	0.2 U	---	---
Nickel	320(B)	**63.4**	**2.02**	---	---
Selenium	80(B)	**0.3 J**	**0.2 J**	---	---
Silver	80(B)	**0.343**	0.02 U	---	---
Thallium	0.16(B)	**0.111**	**0.018 J**	---	---
Zinc	4800(B)	**99.7**	**9.6**	---	---
Exctractable Petroleum Hydrocarbons (mg/L) (analyzed without silica gel cleanup step)					
Diesel range organics (C12 - C25)	0.5	**0.71 Z**	---	0.099 U	---
Residual range organics (C25 - C36)	0.5	**0.94 O**	---	**0.542** [4]	---
Total Diesel and Residual Hydrocarbons	0.5	**1.65** [3]	---	**0.542** [4]	---
Exctractable Petroleum Hydrocarbons (mg/L) (analyzed with silica gel cleanup step)					
Diesel range organics (C12 - C25)	0.5	0.012 U	---	0.099 U	---
Residual range organics (C25 - C36)	0.5	**0.94** [3]	---	**0.565** [4]	---
Total Diesel and Residual Hydrocarbons	0.5	**0.94** [3]	---	**0.565** [4]	---

Detected concentration represents a confirmed exceedance of MTCA groundwater cleanup levels.

Bold = Detected result

J = Estimated Value. The analyte was detected at or above the Method Detection Limit but below the Method Reportling Limit.

U = Compound analyzed, but not detected above detection limit

O: The chromatographic fingerprint was identified by the lab as not matching the calibration standard.

Z: The chromatographic fingerprint was identified by the laboratory as not resembling a petroleum product.

1: Screening level shown is MTCA Method A unless a superscript (B) is present, in which case it is MTCA Method B Direct Contact

2: Value is from an unfiltered sample subject to turbidity interferences. Dissolved sampling results, and the results from follow-up groundwater monitoring performed with MW-SB3, confirm that the elevated results are due to turbidity and are not indicative of the presence of groundwater contamination.

3. Results of paired analysis with/without silica gel and the hydrocarbon patterns on the chromatograms from the hydrocarbon analysis (Appendix E) indicate that the detected hydrocarbons include either naturally occuring polar organic material or partially-biodegarded petroleum hydrocarbons.

4. Value shown in the average of the normal sample and duplicate sample results

µg/L: Micrograms per liter

MTCA: Model Toxics Control Act

--- Not applicable or does not exist

mg/L: Milligrams per liter

Table 5
Soil Testing Results

	Location ID	A1	A3	A5	B1	B2	C2	C4
	Sample ID	A1-Soil-050721	A3-Soil-050721	A5-Soil-050721	B1-Soil-050721	B2-Soil-050721	C2-Soil-050721	C4-Soil-050721
	Sample Date	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021
	Depth	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
	Screening Levels: MTCA Method A or Method B[1]							
Conventional Parameters (percent)								
Total Solids	---	**67.7**	**78.9**	**82.5**	**89.6**	**85.1**	**79.1**	**75.8**
Metals (mg/kg)								
Antimony	32/5.4 (B)	**0.134**	**0.334**	**1.48**	**0.096**	**0.32**	**0.114**	**0.085**
Arsenic	20	**4.37**	**6.00**	**10.7**	**4.69**	**4.73**	**4.47**	**4.47**
Beryllium	160/63 (B)	**0.336**	**0.434**	**0.214**	**0.41**	**0.521**	**0.403**	**0.449**
Cadmium	2	**0.304**	**1.74**	**2.6**	**0.137**	**0.231**	**0.182**	**0.181**
Chromium	2000	**29.2**	**39.3**	**37.5**	**40.1**	**37.8**	**41.8**	**38.3**
Copper	3200/280 (B)	**28.7**	**38.6**	**63.1**	**28.8**	**26.6**	**29.6**	**26.0**
Lead	250	**10.7**	**24.7**	**586**	**8.79**	**24.3**	**10.2**	**11.0**
Mercury	2	**0.064**	**0.031**	**0.108**	**0.025**	**0.014 J**	**0.018 J**	**0.017 J**
Nickel	1600/130 (B)	**30.9**	**44.6**	**44.2**	**39.7**	**36.3**	**58.6**	**37.0**
Selenium	400/5.2 (B)	**0.2 J**	**0.2 J**	**0.2 J**	**0.2 J**	**0.16 J**	**0.2 J**	**0.2 J**
Silver	400/14 (B)	**0.08**	**0.065**	**0.204**	**0.044**	**0.05**	**0.036**	**0.05**
Thallium	0.8/0.23 (B)	**0.057**	**0.056**	**0.041**	**0.041**	**0.051**	**0.035**	**0.046**
Zinc	24000/6000 (B)	**106**	**91.8**	**606**	**65.7**	**67.5**	**66.5**	**66.0**
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene	320000/--- (B)	**2.3 J**	**2.2 J**	**6.1**	**1.2 J**	**1.2 J**	**1.5 J**	**2.7 J**
Acenaphthene	4800000/98000 (B)	**1.1 J**	**0.63 J**	**0.56 J**	**0.4 J**	**0.41 J**	**0.46 J**	**1.1 J**
Acenaphthylene	---	**0.49 J**	**2.2 J**	**6.5**	5.5 U	5.8 U	6.1 U	6.1 U
Anthracene	24000000/2300000 (B)	**0.67 J**	**2.9 J**	**4.5 J**	5.5 U	5.8 U	6.1 U	6.1 U
Benzo(a)anthracene	---	**1.1 J**	**3.3 J**	**26**	**0.69 J**	**0.52 J**	**0.87 J**	**0.56 J**
Benzo(a)pyrene	100	7.2 U	**9.2**	**27**	**1.2 J**	**1 J**	**1.8 J**	**1.6 J**
Benzo(b,j)fluoranthene	---	**2.9 J**	**11**	**32**	**1.1 J**	**0.89 J**	**1.6 J**	**1.4 J**
Benzo(g,h,i)perylene	---	**2.8 J**	**22**	**23**	**0.6 J**	**0.66 J**	**0.99 J**	**0.96 J**
Benzo(k)fluoranthene	---	**0.85 J**	**2.2 J**	**11**	5.5 U	5.8 U	6.1 U	6.1 U
Chrysene	---	**3.7 J**	**7.7**	**35**	**1.4 J**	**1.3 J**	**1.7 J**	**1.9 J**
Dibenzo(a,h)anthracene	---	**0.42 J**	**3.7 J**	**4.1 J**	5.5 U	5.8 U	6.1 U	6.1 U
Dibenzofuran	80000/--- (B)	**1.2 J**	**1.5 J**	**2.3 J**	**1.3 J**	**2.3 J**	**0.91 J**	**4.3 J**
Fluoranthene	3200000/630000 (B)	**4.4 J**	**6.3**	**49**	**1.3 J**	**1.7 J**	**1.7 J**	**2.1 J**
Fluorene	3200000/100000 (B)	**1.2 J**	**0.94 J**	**1.3 J**	5.5 U	5.8 U	6.1 U	**0.9 J**
Indeno(1,2,3-c,d)pyrene	---	**1.7 J**	**17**	**18**	**0.46 J**	**0.52 J**	**0.77 J**	**0.68 J**

Table 5
Soil Testing Results

	Location ID	A1	A3	A5	B1	B2	C2	C4
	Sample ID	A1-Soil-050721	A3-Soil-050721	A5-Soil-050721	B1-Soil-050721	B2-Soil-050721	C2-Soil-050721	C4-Soil-050721
	Sample Date	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021	5/7/2021
	Depth	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
	Screening Levels: MTCA Method A or Method B[1]							
Naphthalene	5000	**1.8 J**	**2.7 J**	**12**	**2.9 J**	**2.1 J**	**1.6 J**	**4.5 J**
Phenanthrene	---	**5.4 J**	**5.9 J**	**28**	**2.6 J**	**2.8 J**	**3.3 J**	**5.6 J**
Pyrene	2400000/650000[(B)]	**3.9 J**	**7.1**	**71**	**1.2 J**	**1.3 J**	**1.6 J**	**1.5 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)	100	**4.334 J**	**12.997 J**	**36.46 J**	**1.989 J**	**1.786 J**	**2.751 J**	**2.493 J**
Total Naphthalene (1- and 2-Methyl and Naph) (U = 1/2)	5000	**4.1 J**	**4.9 J**	**18.1**	**4.1 J**	**3.3 J**	**3.1 J**	**7.2 J**
PCB Aroclors (µg/kg)								
Aroclor 1016	5600/---[(B)]	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1221	---	29 U	23 U	25 U	22 U	22 U	25 U	26 U
Aroclor 1232	---	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1242	---	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1248	---	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1254	500/---[(B)]	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1260	500/---[(B)]	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Aroclor 1262	---	15 U	12 U	17 U	11 U	11 U	13 U	13 U
Aroclor 1268	---	15 U	12 U	13 U	11 U	11 U	13 U	13 U
Total PCB Aroclors (U = 1/2)	1000	29 U	23 U	25 U	22 U	22 U	25 U	26 U
Total Petroleum Hydrocarbons (mg/kg) (Tested without silica gel cleanup)								
Diesel range organics (C12 - C25)	2000	**140**	**66**	**14 J**	**16 J**	**14 J**	**8.5 J**	**5 J**
Residual range organics (C25 - C36)	2000	**500**	**140**	**120**	**66 J**	**61 J**	**85 J**	**38 J**
Total Diesel and Residual Hydrocarbons	2000	**640**	**206**	**120**	**82**	**75**	**93.5**	**43**

Detected concentration represents a confirmed exceedance of applicable MTCA soil cleanup levels

Bold = Detected result

J = Estimated Value. The analyte was detected at or above the Method Detection Limit but below the Method Reportling Limit.

U = Compound analyzed, but not detected above detection limit

1: Screening Level shown is MTCA Method A, unless a (B) in superscript is present, in which case the screening levels presented are (Method B Soil Contact/Method B Protective of Groundwater in Vadose Zone)

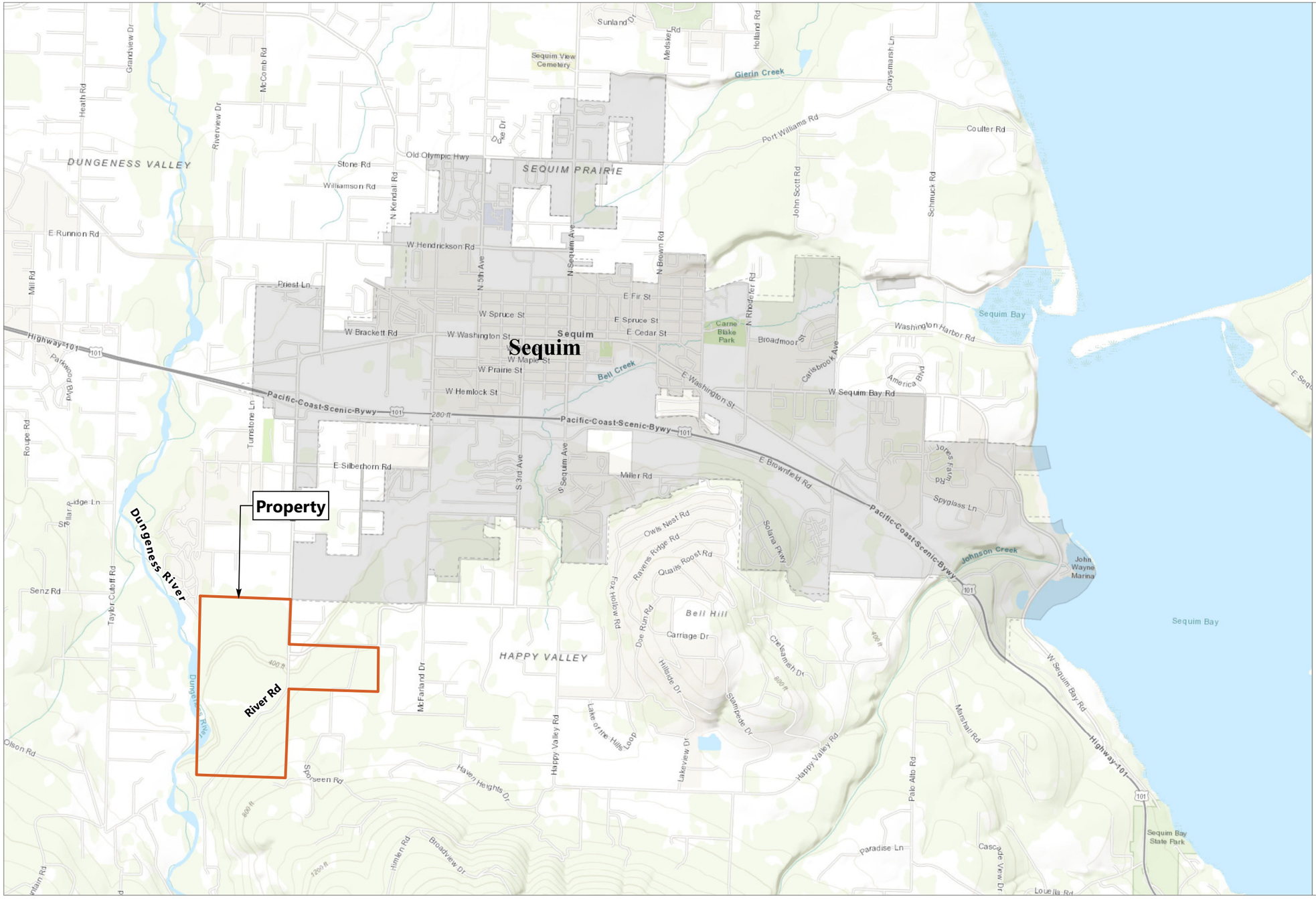
--- Not applicable or does not exist

µg/kg: Micrograms per kilogram

MTCA: Model Toxics Control Act

mg/kg: milligrams per kilogram

Figures



LEGEND:

Property Boundary

NOTE:

1. Basemap imagery sourced from Esri World Topographic Map service.

0 1

Miles

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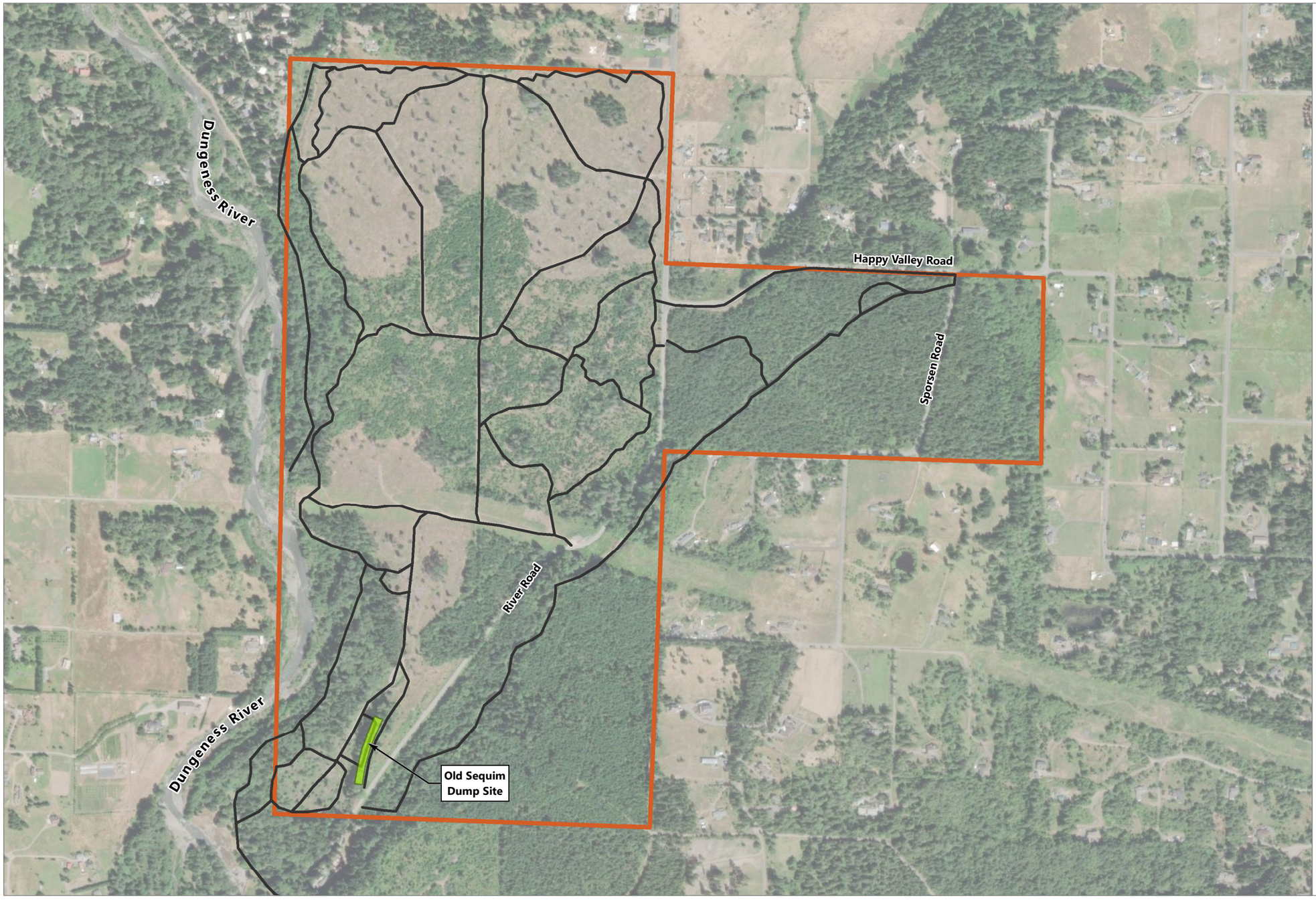
Filepath: \\orcas\gis\Jobs\Clallam_County_1439\DungenessProperty\maps\Phase_2_Sampling\AQ_DungenessProperty_Fig1_PropertyVicinity.mxd

ANCHOR QEA

Figure 1
Property Location
Old Sequim Dump Site - Phase 2 Environmental Assessment
River Road Properties



LEGEND:

- Property Boundary
- Existing Trail
- Old Sequim Dump Site

NOTES:

0 1,000
Feet

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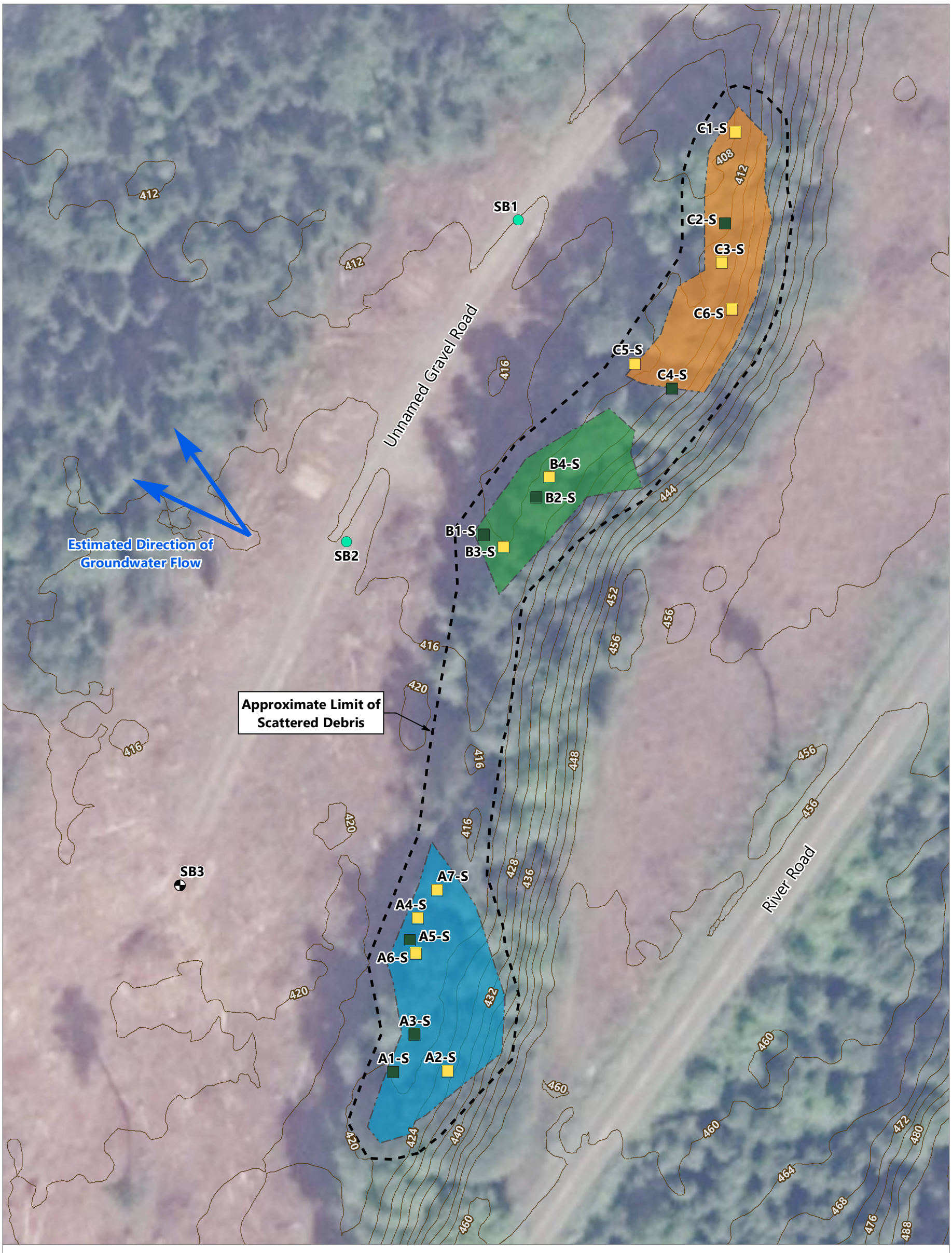
ANCHOR QEA

Figure 2
Old Sequim Dump Site Location
Old Sequim Dump Site - Phase 2 Environmental Assessment
River Road Properties



LEGEND:

- Soil Boring and Temporary Well Point Location
- Monitoring Well and Temporary Well Point
- Analyzed Soil Sample
- Archived Soil Sample
- 4-foot Contours

Areas of Concentrated Larger Debris

- Dump Sub-area A
- Dump Sub-area B
- Dump Sub-area C

NOTES:

1. Aerial imagery sourced from Google Earth Pro ©2016.
2. Topographic contours from National Oceanic and Atmospheric Administration (NOAA), dated May 2020.
3. Horizontal Datum: Washington State Plane North NAD83, U.S. Feet.
4. Vertical Datum: NAVD88.
5. Due to space limitations, the soil sample location IDs have been abbreviated.
6. A soil boring was advanced and a temporary well point was installed at location SB3 prior to the installation of the monitoring well.

0 100
Feet

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Filepath: \\orcas\gis\Jobs\Clallam_County_1439\DungenessProperty\maps\Phase_2_Sampling\AQ_DungenessProperty_Fig3_Sequim_Dump_and_Sampling_Locations.mxd

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Figure 3
Old Sequim Dump Site Extent and Sampling Locations
Old Sequim Dump Site - Phase 2 Environmental Assessment
River Road Properties

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Figure 4

Selected Photographs of Existing Waste Materials

Old Sequim Dump Site – Phase 2 Environmental Site Assessment

River Road Properties

Appendix A
Daily Logs and Chains of Custody

Appendix B
Boring Logs

Appendix C
Field Sampling Data Sheets

Appendix D
Analytical Laboratory Testing Reports