GeoEngineers

Memorandum

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cc:	Brenda Treadwell and Brad Tesch – Port of Anacortes
Date:	March 8, 2024
File:	5147-024-12
Subject:	Remedial Investigation/Feasibility Study Work Plan Addendum No. 2 for Supplemental Soil and Groundwater Characterization in the Riparian and Southern Boundary Areas of the Quiet Cove Site, Anacortes, Washington Ecology Agreed Order No. DE 11346

1.0 INTRODUCTION

This memorandum is being provided as an addendum (Addendum No. 2) to the Washington State Department of Ecology (Ecology)-approved Remedial Investigation/Feasibility Study (RI/FS) Work Plan (GeoEngineers 2017a) and Sampling and Analysis Plan (SAP; GeoEngineers 2017b) to further characterize soil and groundwater conditions at the Quiet Cove Site (Site) located in Anacortes, Washington. In accordance with the Ecology-approved RI/FS Work Plan, and as required by Agreed Order No. DE 11346 (Agreed Order), remedial investigation activities are being completed by the Port of Anacortes (Port) to collect sufficient environmental data to evaluate cleanup action alternatives to address Site contamination resulting from historical land use. Pursuant to the Agreed Order, initial RI sampling and analysis was completed by the Port in 2017/2018 to evaluate Site conditions and define the nature and extent of contamination. In addition to the initial RI sampling and analysis, an Interim Action was completed in 2020 to remediate a portion of the Site. Based on review of the soil, groundwater and sediment data generated by the initial RI and Interim Action, Ecology identified that additional sampling and analysis is required to more completely define the nature and extent of contamination at the Site for the purposes of completing the RI. The following areas of the Site were identified by Ecology as containing data gaps:

- **2nd Street Right-of-Way (ROW)** located north and generally downgradient of the Interim Action area.
  - Soil sampling and analysis was completed in 2022 within the 2nd Street ROW in response to Ecology's request for additional data. The sampling and analysis work was completed in general accordance with the Ecology approved RI/FS Work Plan Addendum No. 1 (GeoEngineers 2022a) and the results of the investigation were documented in the Supplemental 2nd Street Right-of-Way Soil Investigation Data Report (GeoEngineers 2022b). Following review of the data report, Ecology confirmed that sufficient data has been collected from the 2nd Street ROW area to complete the RI. No further sampling in this area is proposed.
- **Riparian Area** located west Interim Action area above mean higher high water (MHHW).
  - The supplemental characterization proposed for the Riparian Area is described by this RI/FS Work Plan Addendum.
- **Southern Property Boundary Area** located southwest of the Interim Action area.
  - The supplemental characterization proposed for the Riparian Area is described by this RI/FS Work Plan Addendum.

- **Sediment Area** located west of the Riparian Area below MHHW.
  - A future work plan addendum may be developed in coordination with Ecology at a later date describing the proposed sediment sampling and analysis plan for the Sediment Area, if necessary.

Environmental data collected as part of this addendum will be integrated into the RI Report for Ecology approval and used in the evaluation and selection of cleanup actions for the upland portion of the Site in the FS.

2.0 BACKGROUND

2.1. Location and Description

The 0.8-acre Quiet Cove property is located between 2nd and 3rd Streets west of O Avenue and is being used by the Port to support operations and services for the Curtis Wharf International Shipping Terminal facility (Curtis Wharf). The ground surface within the property boundary is generally flat with an approximate elevation of 13 feet above mean lower low water (MLLW). Within the surrounding area, the ground surface gently slopes to the northwest toward the southern shoreline of Guemes Channel.

Historically, the Quiet Cove property was used for bulk fuel storage and distribution from approximately 1909 to at least 1977. Between 1997 and 2013, a storage yard for marine vessels and recreational vehicles, and warehouse space for lease to various tenants for commercial purposes operated at the property. In 2013, the property was purchased by the Port to support terminal operations at Curtis Wharf.

2.2. Previous Investigations and Cleanup Actions

Prior to the initial RI and 2nd Street ROW soil investigation (described above), previous environmental investigations to evaluate impacts from historical property and adjacent property operations included a soil and groundwater investigation by ThermoRetec in 2000 and a focused site investigation by GeoEngineers in 2014 (GeoEngineers 2014). The 2000 ThermoRetec investigation was completed to characterize the type and extent of petroleum contamination located within the N Avenue ROW southwest of the Site in conjunction with a public beach access and parking area development project being completed by the City of Anacortes (ThermoRetec 2000). The focused site investigation completed by GeoEngineers in 2014 was completed through an Integrated Planning Grant (IPG) to evaluate soil and groundwater conditions following the Port's purchase of the Quiet Cove property. Between August and November 2020, an interim action cleanup (Interim Action) was completed in accordance with the Ecology-approved Interim Action Work Plan (IAWP; GeoEngineers 2020) to address petroleum contaminated soil resulting from historical bulk fueling operations to clear environmental encumbrances prior to development of the Port-owned property at the Site. The Interim Action resulted in decommissioning existing monitoring wells located within the remedial excavation footprint, demolishing existing building structures and paved surfaces and excavation of petroleum hydrocarbon-related contaminants resulting from historical land use. Details of the Interim Action are described in Interim Action Construction Completion Report (GeoEngineers 2021a). Post-Interim Action groundwater conditions completed in accordance with the Ecology-approved Post-Interim Action Construction Monitoring Plan (GeoEngineers 2021b) are documented in the Post-Interim Action Groundwater Monitoring Report (GeoEngineers 2022c).

2.3. Regulatory Framework

On February 23, 2016, the Port entered Agreed Order No. DE 11346 with Ecology. Under the Agreed Order, RI activities are being completed by the Port in accordance with the Ecology-approved RI/FS Work Plan and supplemental addenda to fill identified data gaps in the Site characterization, determine the nature and extent of contamination in media of concern, and to complete the RI and FS for the Site. Pursuant to the IAWP, an Interim Action was completed by the Port under the Agreed Order.

Following Ecology's determination that sufficient data has been collected to characterize the Site, an RI/FS Report and draft Cleanup Action Plan (CAP) will be completed as required by the Agreed Order documenting current Site conditions, contaminant nature and extent, and to screen and select a remedial alternative to address the remaining contamination at the Site.

3.0 INVESTIGATION ACTIVITIES

3.1. Abandoned Pipe Locate

During the Interim Action, multiple abandoned product pipes were encountered at depths of approximately 2.5 feet below ground surface (bgs) within the excavation area. With the exception of one product pipe (approximately 4-inch diameter) extending to the west of the excavation limit, product pipes encountered during the Interim Action were removed. On September 22, 2020, a trench excavation was completed to expose and remove the remaining identified product pipe. The location of this trench excavation is shown in Figure 1. At the western edge of the trench excavation, the product pipe was observed to change direction with a new orientation extending to the northeast and could not be extracted at the time of construction. Subsequently, the product pipe was cut and capped at the western limit of the trench excavation. The extent to which the remaining product pipe extends to the northeast is unknown.

To locate and map the extent of the remaining portion of the product pipe, a utility locate utilizing electromagnetic and/or direct connection (conduction) methods is proposed. If necessary, the product pipe will be exposed utilizing hand tools at the location where it was previously cut and capped. Care will be taken to avoid damage to the pipe to prevent the release of residual product potentially contained within the pipe. Where exposed, the abandoned product pipe will be observed for size, condition, and composition.

The alignment of the abandoned product pipe will be delineated in the field with spray paint, flags or other markers and surveyed using a hand-held Trimble global positioning system (GPS) unit (or similar device). The GPS unit will have an accuracy of approximately +/- 3 feet or less. As needed, the position of the located pipe will reference physical features at the Site and/or surrounding area to ensure accuracy of the pipe alignment and facilitate ease in future relocation.

3.2. Soil Sampling and Analysis

Soil sampling and analysis is proposed to further characterize contaminated soil in the Riparian and Southern Boundary Areas of the Site. The locations of the proposed soil borings are shown in Figure 2. Sampling and analysis will include:

- Completion of 13 soil borings using direct-push (DP) drilling methods.

- Collection of continuous soil cores at each location to document soil conditions and provide sufficient material for sample collection and chemical analysis.
- Submittal of selected soil samples for chemical analysis to define the nature and extent of contamination within the Riparian and Southern Boundary Areas.

The positions of the sampling locations may need to be adjusted in the field to avoid utilities, structural obstruction and/or minimize impacts to operations at Curtis Wharf, the operator in the Southern Boundary Area and adjacent properties. GeoEngineers will coordinate the access and positioning of the proposed sample locations with the Port and adjacent property owners in advance of drilling to ensure that the sampling locations are accessible, free of utility conflicts and do not impact operations at Curtis Wharf or adjacent properties. Sampling locations that require repositioning by more than 10 feet from the target location will be approved by Ecology prior to sample collection to ensure that the sampling objectives are being met.

An access agreement is anticipated to be required to complete the fieldwork within the private property in the Southern Boundary Area.

3.2.1. Soil Sample Collection and Processing

DP borings will utilize a track- or truck-mounted DP drilling rig. It is anticipated that the DP borings will be advanced at least 3 feet into the native soil or up to approximately 20 feet bgs, whichever occurs first. If evidence of petroleum contamination is observed, the boring will be advanced to at least 3 feet below the observed base depth of the contamination, or until refusal. DP borings will be completed by a licensed driller in the State of Washington.

A representative from GeoEngineers' staff will be present to examine and classify the soils encountered and prepare a detailed boring log of each exploration. Continuous soil samples in 2-foot intervals will be obtained from the DP borings using a "macrocore" sampler or equivalent in direct pushes up to 5 feet in length. A 2-foot interval is required to collect sufficient soil volume for chemical analysis. The boring push length may be reduced if recovery is poor. Soil from each sample interval will be visually classified, field screened and logged as described in the RI/FS Work Plan.

Using the same approach as with the initial RI and 2nd Street ROW investigations, samples will be collected that are representative of contaminated or potentially contaminated materials and/or different material types. For each full-length core (GEI-54 through GEI-66), samples will be collected continuously on 2-foot intervals. A minimum of three samples will be initially submitted for analysis as summarized in Table 1 and described below:

- Non-saturated fill material.
- Saturated fill material at the water table level.
- Native material without evidence of petroleum contamination and at least 1-foot below the fill/native soil interface.

Samples collected from the borings that are not submitted for initial chemical analysis will be archived for potential follow-up testing. Sample intervals will be individually homogenized and placed into the appropriate laboratory-supplied sample containers. Samples for volatile analysis (i.e., gasoline and/or

volatile organic compounds [VOCs]) will be collected from the approximate center of the sampling interval from undisturbed soil sample prior to homogenization using United States Environmental Protection Agency (EPA) Method 5035A sampling procedures consistent with Ecology guidance to reduce volatilization and biodegradation of the sample constituents. Immediately upon collection of the samples, the samples will be placed into a cooler with ice and logged on the chain-of-custody using quality assurance and control procedures in accordance with the RI/FS Work Plan.

3.2.2. Soil Sample Chemical Analysis

Soil samples will be submitted to OnSite Environmental, Inc. (OnSite) of Redmond, Washington, for chemical analysis. Table 1 identifies the proposed sample locations, target sample horizons, laboratory analysis and rationale for the data that will be collected to further characterize the nature and extent of contamination of soil. Table 2 summarizes the analytical methods, sample size, containers, preservation and holding times for laboratory analysis. Sufficient material will be collected from each sample interval to perform each of the listed analyses in accordance with the RI/FS Work Plan and SAP. Selected soil samples as identified in Table 1 will be submitted for a combination of the following:

- Gasoline-range total petroleum hydrocarbons (TPH) by NWTPH-Gx;
- Diesel- and Heavy oil--range TPH by NWTPH-Dx;
- Benzene, ethylbenzene, toluene, and xylenes (BETX) by EPA Method 8260D;
- Ethylene dibromide (EDB), ethylene dichloride (EDC), methyl tert-butyl ether (MTBE) and n-hexane by EPA Method 8260D; and
- Metals (arsenic, cadmium, chromium [total], lead, and mercury) by EPA Method 6010D/7471B.
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270E/SIM.

Samples that are not submitted for initial analysis will be archived for potential follow-up testing based on the initial soil sample results. Follow-up analysis of archive samples will be completed for a given investigation location when supplemental data is needed to characterize or delineate the extent of contamination if present and unbound in the initial sample(s) submitted for chemical analysis. Soil samples initially submitted for volatile analysis will be on an expedited turnaround time (TAT) to ensure that archive sample analysis, if completed, are within the recommended method holding times.

3.2.3. Underground Utility Locate

Prior to drilling, a public one-call utility locate will be completed. Additionally, a private company will complete an underground utility locate in the area of each proposed soil boring location to identify any subsurface utilities and/or potential underground physical hazards.

3.2.4. Sampling Location Survey

GeoEngineers field personnel will record the soil boring locations, and other pertinent information, using hand-held GPS unit (or similar device) during sampling activities. The accuracy of measured and recorded horizontal coordinates will be within approximately +/-3 feet. As needed, the position of the borings will reference physical features at the Site and/or surrounding area to ensure accuracy sample location.

3.3. Groundwater Sampling and Analysis

Groundwater sampling and analysis is proposed to further document groundwater quality following completion of the Interim Action. To evaluate seasonal variability and for consistency with the Post-Interim Action Construction Groundwater Monitoring Plan, groundwater monitoring activities will be completed on a quarterly basis for one year (four quarterly monitoring events total) during the months of February, May, August, and October. Proposed monitoring well locations for additional sampling and chemical analysis are shown in Figure 3. Additional proposed groundwater sampling and analysis includes:

- Collection of groundwater samples from eight existing monitoring wells on a quarterly basis for one year.
- Submittal of groundwater samples from each of the proposed monitoring wells for chemical analysis to monitor changes in groundwater quality since the removal of source material that occurred during the Interim Action.

3.3.1. Water Level Measurements

Prior to groundwater sampling, a groundwater level "snapshot" will be completed by measuring water levels in each of the wells within an approximate 1-hour duration. Prior to collecting water level measurements, the wells will be opened to allow equilibrium with the atmosphere. Water levels will then be measured using a decontaminated electronic water level indicator and will be recorded to the nearest 0.01 foot. The measurement will be made from the north rim of the top of the well casing.

3.3.2. Groundwater Sampling Procedures

Due to the proximity to the shoreline, the sampling of monitoring wells will be completed within approximately 1 hour before and 3 hours after the day-time low tide to the extent practicable to minimize tidal influence. The wells will be purged, and groundwater samples will be collected from the wells using a peristaltic or submersible pump and disposable polyethylene tubing. Groundwater samples will be collected by field personnel using low-flow/low-turbidity sampling techniques (EPA 2010) to minimize the suspension of sediment in the sample water. Groundwater will be purged from the wells at a rate not to exceed 0.5 liter per minute to minimize drawdown. The base of the tubing (i.e., intake) will be positioned at the approximate midpoint of the observed water column. A Horiba or YSI (or similar) water quality measuring system with a flow-through cell will be used to monitor the following water quality parameters during purging:

- Electrical conductivity;
- Dissolved oxygen;
- pH;
- Salinity;
- Turbidity;
- Total dissolved solids;
- Oxidation-reduction potential; and
- Temperature.

Samples will be collected from the wells after the monitored water quality parameters vary by less than approximately 10 percent on three consecutive measurements or after five well volumes have been removed, whichever occurs first. The measurements of the water quality parameters will be documented in a field log.

Following well purging, the flow-through cell will be disconnected, and the groundwater samples will be collected in laboratory-prepared containers. Groundwater samples will be placed into a cooler with ice and logged on the chain-of-custody following the procedures described in the IAWP Compliance Monitoring Plan/Quality Assurance Project Plan (CMP/QAPP) included as Appendix F of the IAWP (GeoEngineers 2020). The containers for VOC analyses ("VOA" vials) will be filled with the goal of "no head space" remaining. Note that the presence of several very small air bubbles (less than several millimeters in diameter) are occasionally unavoidable. Samples collected for dissolved metals analyses will be filtered in the field using a disposable inline 0.45-micron filter. Reusable sampling equipment that comes in contact with groundwater will be decontaminated before each use as discussed in Section 3.5.

3.3.3. Groundwater Sample Chemical Analysis

Groundwater samples will be submitted to OnSite for chemical analysis. Table 3 identifies the proposed sample locations and chemical analysis to be completed for each monitoring well. Table 4 summarizes the analytical methods, sample size, containers, preservation and holding times for laboratory analysis. Sufficient water will be collected from each well to perform each of the listed analyses in accordance with the RI/FS Work Plan and SAP. Groundwater samples as identified in Table 3 will be submitted for a combination of the following chemical and geochemical parameters.

Chemical Parameters:

- Gasoline-range TPH by Ecology Method NWTPH-Gx;
- Diesel- and heavy oil-range TPH by Ecology Method NWTPH-Dx;
- VOCs including BETX, EDB and EDC, MTBE and n-hexane by EPA Method 8260D; and,
- Total and Dissolved metals including arsenic, cadmium, chromium, lead, and mercury by EPA Method 6010D/200.8/7470A.

Geochemical Parameters:

- Total alkalinity by SM 2420B;
- Ferrous iron by SM 3500-Fe B-97:
- Nitrate and sulfate by EPA Method 300.0;
- Dissolved manganese by EPA Method 6020B; and
- Dissolved methane by EPA Method RSK-175.

3.4. Decontamination

The drilling equipment will be decontaminated before beginning each soil boring using a pressure washer. In addition, reusable sampling/monitoring equipment (spoons, bowls, core barrels, etc.) that comes in contact with the soil or groundwater will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

- Wash with non-phosphate detergent solution (Liqui-Nox® and distilled water);
- Rinse with distilled water;
- Place the decontaminated sampling equipment on clean plastic sheeting or in a plastic bag; and
- Place decontaminated drilling equipment (e.g., core barrels, rods) on the drill rig or with other non-contaminated drilling equipment until it is used again.

Field personnel will limit cross-contamination by changing gloves between samples. Wash water used to decontaminate the sampling equipment will be stored on Site in labeled drums for subsequent characterization and disposal.

3.5. Disposal of Investigation Derived Materials

Soil cuttings, purge water and decontamination water during this investigation will be placed in labeled and sealed drums. The drums will be stored temporarily at a secure location pending receipt of analytical results and until appropriate final disposal is completed.

Incidental waste generated during sampling activities includes items such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of at local trash receptacle or county disposal facility.

3.6. Quality Control/Quality Assurance

Sample handling procedures, including labeling, container and preservation for soil and groundwater samples are described in the SAP and IAWP CMP/QAPP, respectively. Duplicate samples will be collected during the investigation activities to measure the precision and consistency of laboratory analytical procedures and methods, as well as the consistency of the field sampling techniques. Duplicate samples for the Riparian and South Boundary Area soil investigation will be at a frequency of 1 per 20 samples. Additionally, a minimum of one duplicate sample will be collected during each groundwater monitoring event. For both the soil and groundwater investigations, a trip blank prepared by the testing laboratory will be analyzed for gasoline and VOCs at a rate of one trip blank per cooler containing samples for gasoline and VOCs analysis.

3.7. Data Quality Objectives

The specific data quality objectives (DQOs) for soil and groundwater sampling and analysis are detailed in the RI/FS Work Plan. An EPA-defined Stage 2B validation will be completed on organic and inorganic analytical data in general accordance with EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 2004) and EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA 2008). Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and quality assurance/quality control (QA/QC) information requested are present. At a minimum, the following items will be reviewed to verify the data as applicable:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries

- Method Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Laboratory and Field Duplicates
- Reporting Limits

4.0 INADVERTENT DISCOVERY OF CULTURAL RESOURCES

This work is being conducted under an Ecology remedial action grant. As such, Ecology initiated a 05-05 cultural resource consultation with the Department of Archaeology and Historic Preservation (DAHP). Based on the findings of a cultural resources assessment completed prior to the 2020 Interim Action (Lenz 2019), Ecology determined that any ground disturbing activities would require oversight by an archeologist to document the inadvertent discovery of cultural resources, if encountered.

Following completion of the Interim Action and subsequent installation of new monitoring wells to perform post-interim action groundwater activities, DAHP's Washington Information System for Architectural and Archaeological Records Data (WISAARD) database was updated to document the observed Site conditions and provide recommendations for future monitoring and procedures to be followed at the Site during any future work (Lenz 2021 and 2022). Based on the cultural resource assessments completed to date, cultural resource consultation with DAHP and as determined by Ecology, the proposed supplemental investigation activities that will results in ground disturbances will be completed with oversight from an archaeologist to observe and document the potential discovery of cultural materials, if encountered. The Port will coordinate with Ecology, DAHP, and other relevant parties regarding any requirements for the inadvertent discovery of cultural resources as outlined in the RI/FS Work Plan.

5.0 REPORTING

Upon completion of the sampling and analysis activities, the results will be transmitted to Ecology. The abandoned pipe locate and soil sampling and analysis results will be provided to Ecology in a data report. Quarterly groundwater monitoring progress reports will be submitted to Ecology following the first three quarters of groundwater monitoring. After the final quarter of groundwater monitoring, sample and analytical results for each of the four quarterly events will be summarized in a single data report that will be provided to Ecology. The groundwater monitoring data report will include a discussion on source evaluation and whether there are supporting lines of evidence of multiple petroleum sources.

Chemical analytical data for soil and groundwater samples will be submitted to Ecology in electronic format in accordance with Ecology's Environmental Information Management (EIM) Policy 840 following review and validation.

6.0 SCHEDULE

This supplemental sampling and analysis will be completed following Ecology approval of this RI/FS Work Plan Addendum. Pending Ecology approval, driller availability, access to the private property comprising the Southern Boundary area, and Port operations, it is anticipated that field soil boring completion and soil

sample collection will occur in March/April 2024. If an access agreement takes longer to obtain, the Port may complete the riparian area field work as a separate mobilization from the southern boundary samples on the adjacent property. Groundwater monitoring will begin in March/April 2024 and continue through January/February 2025.

7.0 REFERENCES

United States Environmental Protection Agency (EPA), "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA 540-R-04-004, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated October 2004.

United States Environmental Protection Agency (EPA), 2008, "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-08-01," Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated June 2008.

GeoEngineers, 2014. "Focused Environmental Site Investigation Data Report, Quiet Cove Property, Anacortes, Washington," GEI No. 5147-024-01, dated October 20, 2014.

GeoEngineers 2017a. Final Remedial Investigation/Feasibility Study Work Plan, Quiet Cove Property, Anacortes Washington, Ecology Agreed Order No. DE 11346. Prepared for the Washington Department of Ecology on behalf of the Port of Anacortes. January 25, 2017.

GeoEngineers 2017b. Final Sampling and Analysis Plan, Quiet Cove Property, Anacortes Washington, Ecology Agreed Order No. DE 11346. Prepared for the Washington Department of Ecology on behalf of the Port of Anacortes. January 25, 2017.

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GeoEngineers, 2021b. Post-Interim Action Construction Groundwater Monitoring Plan, Quiet Cove Site, Anacortes, WA; Ecology Agreed Order No. DE 11346, dated August 19, 2021.

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GeoEngineers, 2022b. Data Report Technical Memorandum. Supplemental 2nd Street Right-of-Way Soil Investigation Data Report for the Quiet Cove Site, Anacortes, Washington Ecology Agreed Order No. 11346. October 3, 2022.

GeoEngineers, 2022c. Post-Interim Action Construction Groundwater Monitoring Report, Quiet Cove Site, Anacortes, Washington, Ecology Agreed Order No. DE 11346. October 6, 2022.

Lenz, Brett R. "Cultural Resources Assessment for the Port of Anacortes Quiet Cove Property Cleanup, Skagit County, WA. May 19, 2019.

Lenz, Brett R. "Cultural Resources Report; Monitoring of Well Installation at the Quiet Cove Cleanup, Skagit County, WA". March 26, 2021.

Lenz, Brett R. "Cultural Resources Report; Monitoring of the Quiet Cove Cleanup, Skagit County, WA". March 14, 2022.

ThermoRetec, "Results of Soil and Groundwater Sampling, Former Anacortes Terminal, Corner of 3rd Street and N-Avenue, Anacortes, Washington," dated May 26, 2000.

Attachments:
Table 1. Soil Sampling and Analysis Plan Addendum for Riparian and Southern Boundary Areas
Table 2. Soil Sample Test Methods, Sample Size, Containers, Preservation and Holding Times
Table 3. Groundwater Sampling and Analysis Plan Addendum
Table 4. Groundwater Sample Test Methods, Sample Size, Containers, Preservation and Holding Times

Figure 1. Approximate Product Line Location
Figure 2. Previous Soil Investigation Results Summary and Additional Proposed Soil Sampling Locations
Figure 3. Proposed Groundwater Sampling Locations

BJT:RST:JMH:leh

Table 1

Soil Sampling and Analysis Plan Addendum for Riparian and Southern Boundary Areas

Quiet Cove Property
Anacortes, Washington

Sample Location[1]	Target Sample Interval[2,3] (feet bgs)	Total Petroleum Hydrocarbons (TPH)		Volatile Organic Compounds (VOCs)		MTCA Metals[4] (EPA 6010D/ 7471B)	Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270E/SIM)	Purpose of Supplemental Data Collection Sampling Location
		Gasoline-Range (NWTPH-Gx)	Diesel- and Heavy Oil-Range (NWTPH-Dx)	BETX (EPA 8260D)	EDB, EDC, MTBE and n-Hexane (EPA 8260D)			
Riparian Area Direct-Push (DP) Sample Location								
GEI-54 and GEI-57	0-2	A	A	A	A	A	A	Delineate the extent of petroleum hydrocarbons exceeding the PSL in soil at locations GEI-1, GEI-39, GEI-46 and in vicinity where product piping was observed during Interim Action excavation activities. Provide additional information for PAHs and metals in soil within the Riparian Zone between the beach area and Interim Action area.
	2-4	X	X	X	X	X	X	
	4-6	A	A	A	A	A	A	
	6-8	A	A	A	A	A	A	
	8-10	X	X	X	X	X	X	
	10-12	A	A	A	A	A	A	
	12-14	X	X	X	X	X	X	
	14-16	A	A	A	A	A	A	
	16-18	A	A	A	A	A	A	
	18-20	A	A	A	A	A	A	
GEI-55, GEI-56 and GEI-58 through GEI-60	0-2	A	A	A	A	A	A	Evaluate soil condtions in the vicinity of MW-13 and MW-8 where petroleum hydrocarbons and VOCs exceeded the PSL during one or more groundwater monitoring events. Provide additional information for petroluem hydrocarbons, VOCs, PAHs and metals in soil within the Riparian Zone between the beach area and Interim Action area to evaluate if the source of contamination is likely from the Quiet Cove Site or an offsite source.
	2-4	X	X	X	X	X	X	
	4-6	A	A	A	A	A	A	
	6-8	A	A	A	A	A	A	
	8-10	X	X	X	X	X	X	
	10-12	A	A	A	A	A	A	
	12-14	X	X	X	X	X	X	
	14-16	A	A	A	A	A	A	
	16-18	A	A	A	A	A	A	
	18-20	A	A	A	A	A	A	

Sample Location[1]	Target Sample Interval2,3 (feet bgs)	Total Petroleum Hydrocarbons (TPH)		Volatile Organic Compounds (VOCs)		MTCA Metals[4] (EPA 6010D/ 7471B)	Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270E/SIM)	Purpose of Supplemental Data Collection Sampling Location
		Gasoline-Range (NWTPH-Gx)	Diesel- and Heavy Oil-Range (NWTPH-Dx)	BETX (EPA 8260D)	EDB, EDC, MTBE and n-Hexane (EPA 8260D)			
Southern Boundary Area Direct-Push (DP) Sample Location								
GEI-61 and GEI-63	0-2	A	A	A	A	A	A	Delineate the extent of petroleum hydrocarbon, VOCs, PAHs and metal exceedances identified in sidewall verification samples collected along the southern boundary of the Interim Action excavation to evaluate if the source of contamination is likely from the Quiet Cove Site or an offsite source.
	2-4	**X**	**X**	**X**	**X**	**X**	**X**	
	4-6	A	A	A	A	A	A	
	6-8	A	A	A	A	A	A	
	8-10	**X**	**X**	**X**	**X**	**X**	**X**	
	10-12	A	A	A	A	A	A	
	12-14	**X**	**X**	**X**	**X**	**X**	**X**	
	14-16	A	A	A	A	A	A	
	16-18	A	A	A	A	A	A	
	18-20	A	A	A	A	A	A	
GEI-62 and GEI-64 through GEI-66	0-2	A	A	A	A	A	A	Collect samples for potential archive analysis to further delineate contamination based on the initial investigation results to evaluate if the source of contamination is likely from the Quiet Cove Site or an offsite source.
	2-4	A	A	A	A	A	A	
	4-6	A	A	A	A	A	A	
	6-8	A	A	A	A	A	A	
	8-10	A	A	A	A	A	A	
	10-12	A	A	A	A	A	A	
	12-14	A	A	A	A	A	A	
	14-16	A	A	A	A	A	A	
	16-18	A	A	A	A	A	A	
	18-20	A	A	A	A	A	A	

Notes:

[1] The approximate sample locations are shown on Figure 2.

[2] Sample intervals may be adjusted based on observed field conditions to collect samples representative of the fill and native soil horizon, and interface between the saturated and vadose zone. Continuous samples will be collected in approximate two foot intervals for each sample location. Samples for initial analysis based on (1) fill material above the water; (2) interval at the interface of the saturated and vadose zone and; (3) interval within native material. If field evidence indicates evidence of contamination additional sample intervals may be added to initial analysis. Sample intervals not identified for initial analysis will be collected and archived.

[3] Field screening will be completed continuously for each boring in accordance with the Ecology-approved RI/FS Work Plan.

[4] MTCA metals include arsenic, cadmium, chromium (total), lead and mercury.

A = Archive sample for potential follow-up analysis .

BETX = benzene, ethylbenzene, toluene and xylenes

bgs = below ground surface

Dx = diesel- and heavy oil-range

EDB = ethylene dibromide

EDC = ethylene dichloride

EPA = Environmental Protection Agency

Gx = gasoline-range

MTBE = methyl tert-butyl ether

MTCA = Model Toxics Control Act

NWTPH = Northwest Total Petroleum Hydrocarbon

PSL = preliminary screening level

SIM = Selective Ion Monitoring

VOC = Volatile Organic Compound

X = Submit sample for initial analysis.

Table 2

Soil Sample Test Methods, Sample Size, Containers, Preservation and Holding Times

Quiet Cove Property
Anacortes, Washington

Laboratory Analysis	Analytical Method	Minimum Sample Size	Sample Container	Sample Preservation	Holding Time[1]
MTCA Metals[2]	EPA 6010D/7471B	100 g	4-oz glass WM with Teflon-lined lid	Cool ≤6°C	180 days/28 days for Mercury
Gasoline-Range Hydrocarbons	NWTPH-Gx	5 g	Two 40mL glass vial (VOA)	Cool ≤6°C	14 days to extraction/analysis[3]
Diesel- and Oil-Range Hydrocarbons	NWTPH-Dx	100 g	8-oz amber glass WM with Teflon-lined lid	Cool ≤6°C	14 days to extraction/analysis[3]
VOCs including BETX, EDB, EDC, MTBE and n-Hexane	EPA 8260D	5 g	Three 40mL glass vial (VOA)	Cool ≤6°C Two VOAs - Sodium Bisulfate One VOA - Methanol	14 days to extraction/analysis[3]
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA 8270E/SIM	100 g	8-oz amber glass WM with Teflon-lined lid	Cool ≤6°C	14 days to extraction, 40 days from extraction to analysis

Notes:

[1] Holding times are based on elapsed time from date of collection.

[2] MTCA metals include arsenic, cadmium, chromium (total), lead and mercury.

[3] Initial samples for NWTPH-Gx, NWTPH-Dx and EPA 8260 analysis will be submitted for a 5-day turnaround time to be able to submit potential follow-up archive samples within hold time.

°C = degrees Celsius
BETX = benzene, ethylbenzene, toluene and xylenes
Dx = diesel- and heavy oil-range
EDB = ethylene dibromide
EDC = ethylene dichloride
EPA = Environmental Protection Agency
g = gram
Gx = gasoline-range
mL = milliliter
MTBE = methyl tert-butyl ether
NWTPH = Northwest Total Petroleum Hydrocarbon
oz. = ounce
PAHs = semi-volatile organic compound
SIM = Selective Ion Monitoring
VOC = Volatile Organic Compound
WM = wide mouth

Table 3

Groundwater Sampling and Analysis Plan Addendum

Quiet Cove Property
Anacortes, Washington

Sample Location[1]	Total Petroleum Hydrocarbons (TPH)			Volatile Organic Compounds (VOCs)		MTCA Metals[2]		Geochemical Parameters				
	Gasoline-Range (NWTPH-Gx)	Diesel- and Heavy Oil-Range without SGC Method (NWTPH-Dx)	Diesel- and Heavy Oil-Range with SGC Method (NWTPH-Dx)	BETX (EPA 8260D)	EDB, EDC, MTBE and n-Hexane (EPA 8260D)	Total Metals (6010D/200.8/7470A)	Dissolved Metals[3] (6010D/200.8/7470A)	Total Alkalinity (SM 2420B)	Ferrous Iron (SM 3500-Fe B-97)	Nitrate and Sulfate (EPA 300.0)	Dissolved Manganese (EPA 6020B)	Dissolved Methane (EPA RSK-175)
MW-3	X	X	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X	X	X
MW-8	X	X	X	X	X	X	X	X	X	X	X	X
MW-1A	X	X	X	X	X	X	X	X	X	X	X	X
MW-2A	X	X	X	X	X	X	X	X	X	X	X	X
MW-13	X	X	X	X	X	X	X	X	X	X	X	X
MW-14	X	X	X	X	X	X	X	X	X	X	X	X
MW-15	X	X	X	X	X	X	X	X	X	X	X	X

Notes:

[1] The approximate monitoring well locations are shown on Figure 3.

[2] MTCA metals include arsenic, cadmium, chromium (total), lead and mercury.

[3] Samples for dissolved metals will be field filtered.

BETX = benzene, ethylbenzene, toluene and xylenes
Dx = diesel- and heavy oil-range
EDB = ethylene dibromide
EDC = ethylene dichloride
EPA = Environmental Protection Agency
Gx = gasoline-range
MTBE = methyl tert-butyl ether
MTCA = Model Toxics Control Act
NWTPH = Northwest Total Petroleum Hydrocarbon
SGC = Silica Gel Cleanup
SIM = Selective Ion Monitoring
VOC = Volatile Organic Compound
X = Indicates that a groundwater sample will be collected and analyzed.

Table 4

Groundwater Sample Test Methods, Sample Size, Containers, Preservation and Holding Times

Quiet Cove Property
Anacortes, Washington

Laboratory Analysis	Analytical Method	Minimum Sample Size	Sample Container	Sample Preservation	Holding Time[1]
Diesel- and Heavy Oil-Range Hydrocarbons	NWTPH-Dx	500 mL amber Bottle	Two 500 mL amber glass with Teflon-lined lid	Preserved with HCl, Cool ≤6 C	14 days to extraction
Diesel- and Heavy Oil-Range Hydrocarbons	NWTPH-Dx with silica gel cleanup				40 days from extraction to analysis
Gasoline-Range Hydrocarbons	NWTPH-Gx	40 mL VOA vials with HCl	Two 40 mL VOA vials with HCl	Preserved with HCl, Cool ≤6 C	14 days to analysis
VOCs including BETX, EDB, EDC, MTBE and n-Hexane	EPA 8260D	40 mL VOA vials with HCl	Three 40 mL VOA vials with HCl	Preserved with HCl, Cool ≤6 C	14 days to analysis
Total MTCA Metals[2]	EPA 6010D/200.8/7470A	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Preserved with HNO_3, Cool ≤6 C	6 months (Hg-28 Days)
Dissolved MTCA Metals[2] - Field Filtered	EPA 6010D/200.8/7470A	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Preserved with HNO_3, Cool ≤6 C	6 months (Hg-28 Days)
Total Alkalinity	SM 2320B	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Cool ≤6°C No Headspace	14 days to extraction
Ferrous Iron	SM 3500-Fe B-97	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Cool ≤6°C No Headspace	24 hours
Sulfate/Nitrate	EPA 300.0	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Cool ≤6°C No Headspace	48 hours (Nitrate) 28 days (Sulfate) to analysis
Dissolved Manganese- Field Filtered* Can be combined with Dissolved MTCA Metals bottle	EPA 6020B	500 mL HDPE Poly bottle	One 500 mL Poly bottle	Preserved with HNO_3, Cool ≤6 C	6 months
Dissolved Methane	EPA RSK-175	40 mL VOA vials with HCl	Two 40 mL VOA vials with HCl	Preserved with HCl, Cool ≤6 C	14 days to analysis

Notes:

[1] Holding times are based on elapsed time from date of collection.

[2] MTCA metals include arsenic, cadmium, chromium (total), lead and mercury.

NWTPH = Northwest Total Petroleum Hydrocarbon; Gx = Gasoline Range; Dx = Diesel and Heavy-Oil Range

°C = degrees Celsius

BETX = benzene, ethylbenzene, toluene and xylenes

Dx = diesel- and heavy oil-range

EDB = ethylene dibromide

EDC = ethylene dichloride

EPA = Environmental Protection Agency

Gx = gasoline-range

HCl = hydrochloric acid

HDPE = high density polyethylene

HNO_3 = nitric acid

mL = milliliter

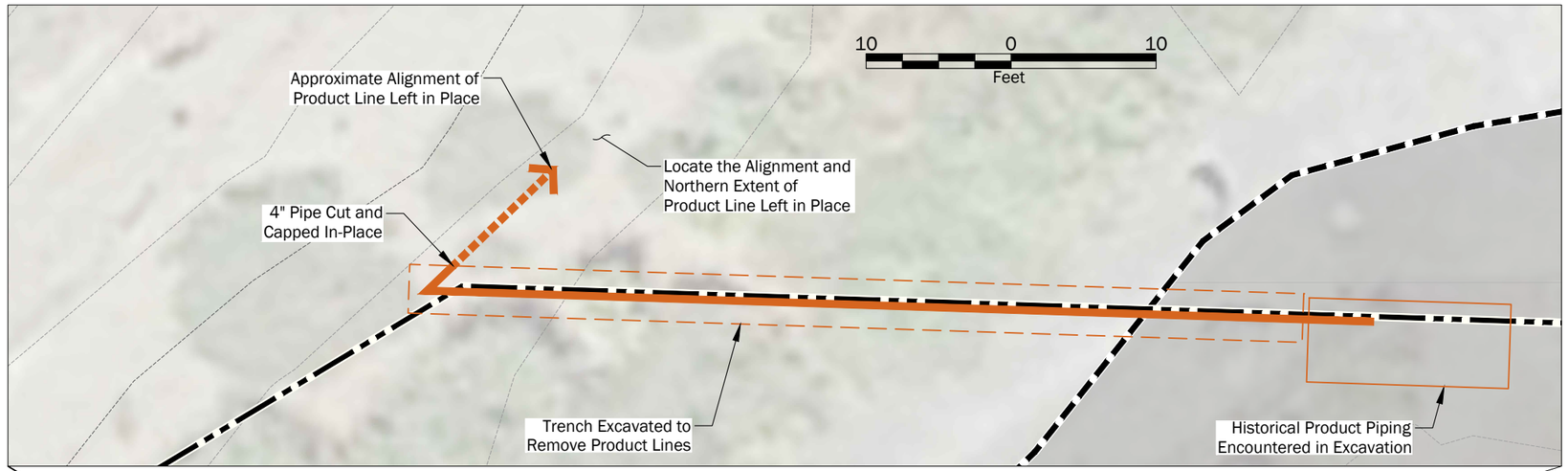
MTBE = methyl tert-butyl ether

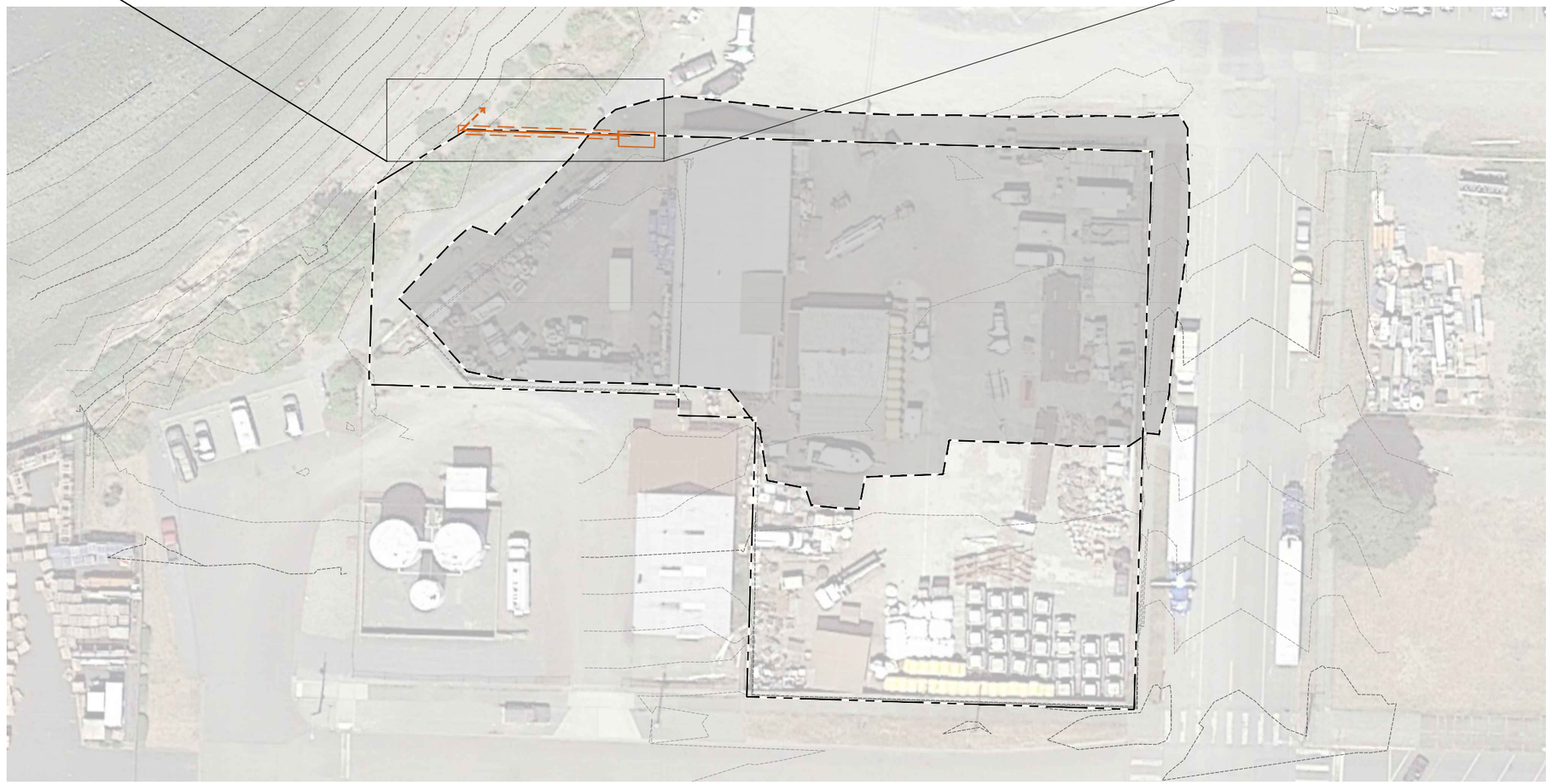
NWTPH = Northwest Total Petroleum Hydrocarbon

SIM = Selective Ion Monitoring

SVOC =Semi-Volatile Organic Compound

VOC = Volatile Organic Compound





Legend

- Port of Anacortes Properties at Quiet Cove Site
- 10 Contour (Feet, NAVD 88)
- Interim Action Remedial Excavation Horizontal Limits

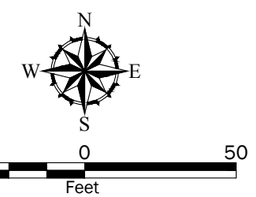
Notes:

1. Interim action excavation limit based on surveys completed by Larry Steele & Associates, Inc. Dated 11/02/2020.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base survey by Sound Development Group on 10/11/2017
Imagery from Google Earth Pro dated 8/15/2020.

Horizontal Datum: NAD83 Washington State Planes, North Zone, US Foot

Vertical Datim: North American Vertical Datum, 1988, US Foot



Approximate Product Line Location

Quiet Cove Site
Anacortes, Washington

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Figure 1

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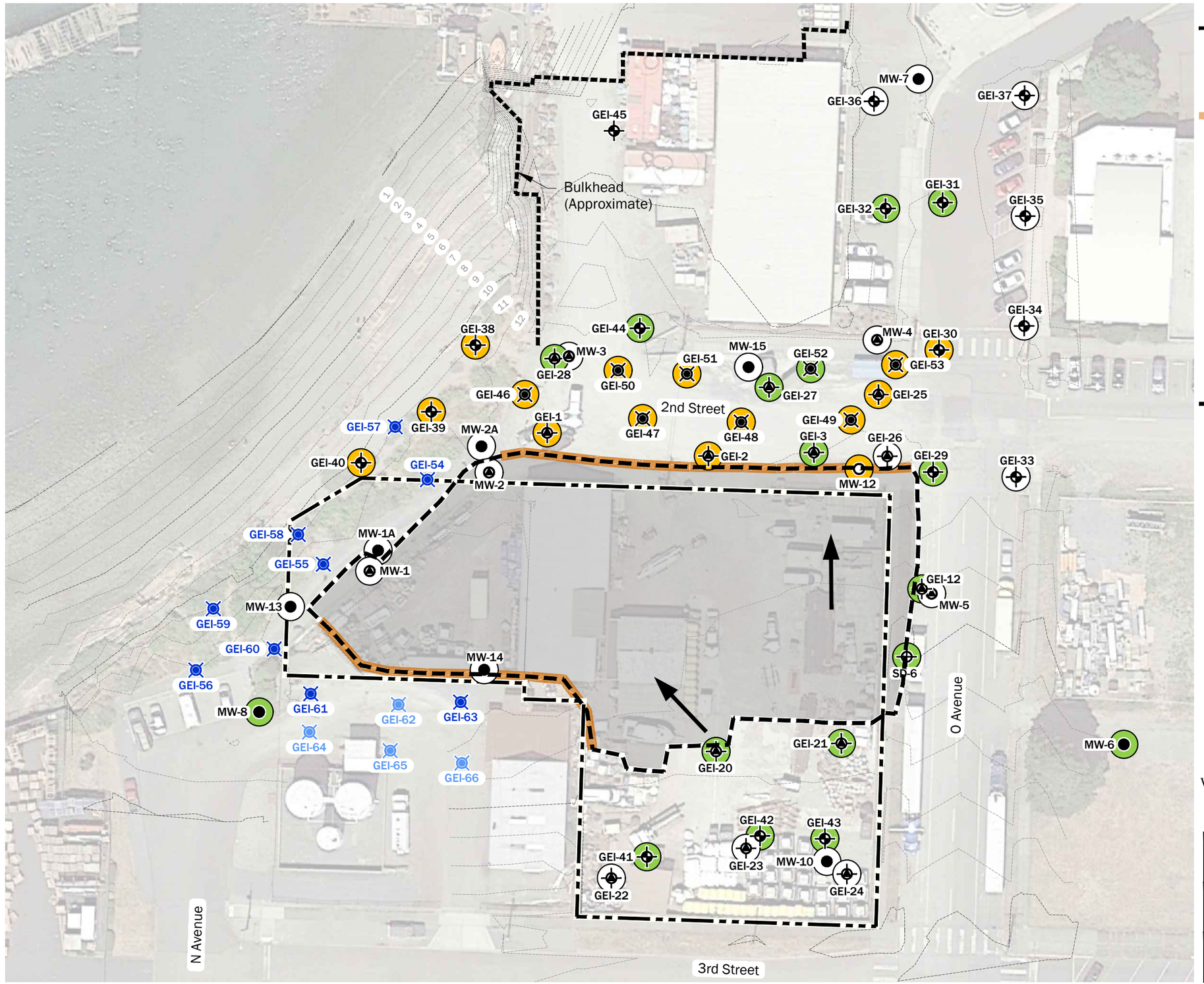

Legend

- Port of Anacortes Properties at Quiet Cove Site
- 10 — Contour (Feet, NAVD 88)
- Interim Action Remedial Excavation Horizontal Limits
- Interim Action Sidewall Soil Sample with Preliminary Screening Level Exceedance
- SD-6 — Supplemental RI Soil Boring Location
- MW-12 — Supplemental RI Monitoring Well
- GEI-31 — RI Soil Boring Location
- MW-6 — RI Monitoring Well
- GEI-1 — Focused Site Investigation Soil Boring Location
- MW-1 — Focused Site Investigation Monitoring Well
- MW-2 — 2nd Street Data Gap Soil Boring Location (GeoEngineers 2022)
- GEI-46 — Proposed Soil Boring Location for Initial Analysis
- GEI-62 — Proposed Soil Boring Location for Archive Analysis
- Inferred Groundwater Flow Direction
- Soil Investigation Results Summary
  Preliminary Screening Level Exceedance in one or more samples
- No Soil Sample Exceedance of the Preliminary Screening Level
- No Soil Data

Notes:

1. Interim action excavation limit based on surveys completed by Larry Steele & Associates, Inc. Dated 11/02/2020.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base survey by Sound Development Group on 10/11/2017
Imagery from Google Earth Pro dated 8/15/2020.

Horizontal Datum: NAD83 Washington State Planes, North Zone, US Foot

Vertical Datim: North American Vertical Datum, 1988, US Foot

N
W E
S

50 0 50
Feet

Previous Soil Investigation Results Summary and Additional Proposed Soil Sampling Locations

Quiet Cove Site
Anacortes, Washington

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Figure 2

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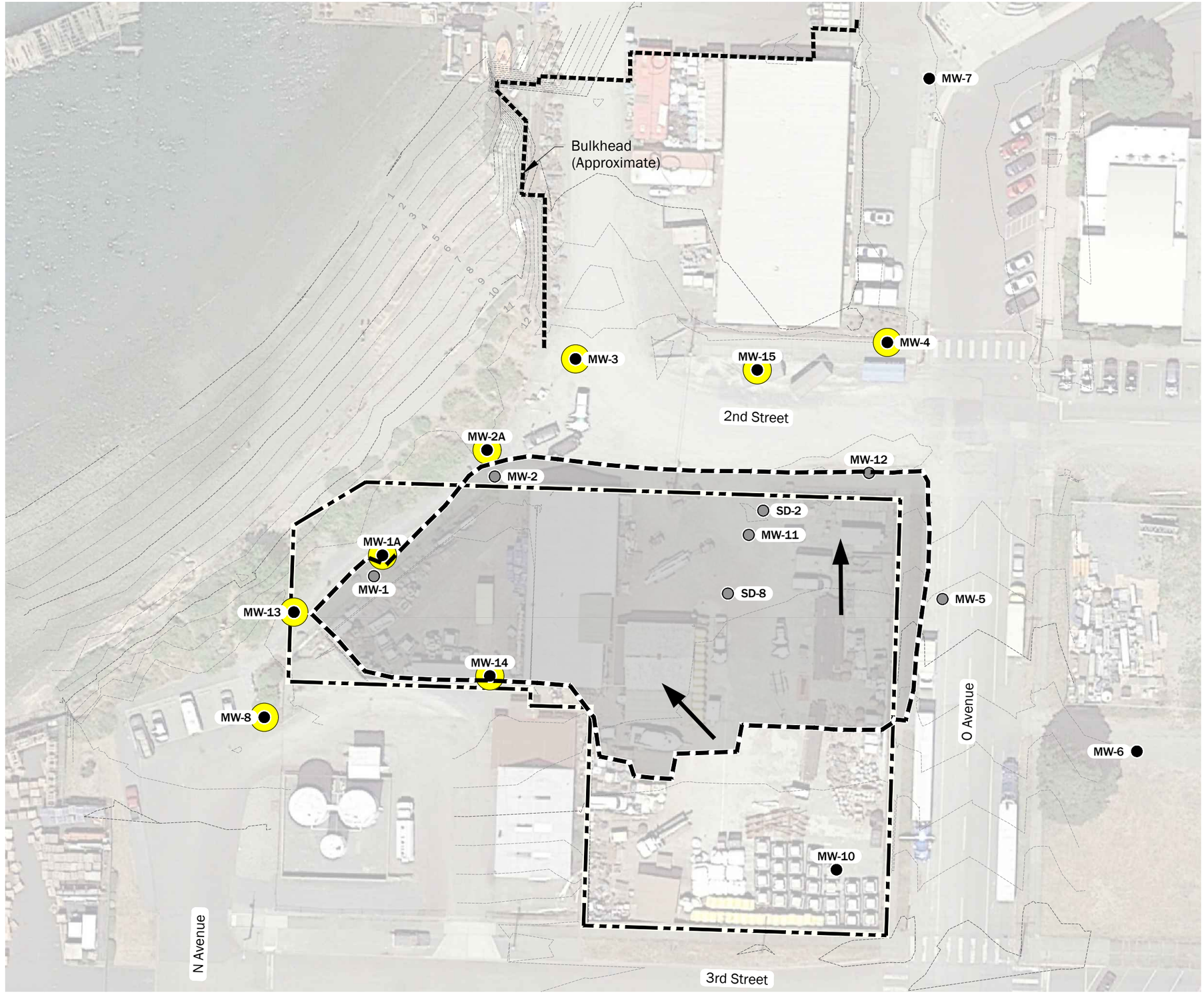

Legend

- Port of Anacortes Properties at Quiet Cove Site
- 10 Contour (Feet, NAVD 88)
- Interim Action Remedial Excavation Horizontal Limits
- MW-6 Existing Monitoring Well Location
- MW-2 Monitoring Well Decommissioned During Interim Action Construction
- Inferred Groundwater Flow Direction
- Proposed Groundwater Monitoring Location

Notes:

1. Interim action excavation limit based on surveys completed by Larry Steele & Associates, Inc. Dated 11/02/2020.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base survey by Sound Development Group on 10/11/2017
Imagery from Google Earth Pro dated 8/15/2020.

Horizontal Datum: NAD83 Washington State Planes, North Zone, US Foot

Vertical Datim: North American Vertical Datum, 1988, US Foot

N W E S

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Feet

Proposed Groundwater Sampling Locations

Quiet Cove Site
Anacortes, Washington

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Figure 3

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