SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

April 12, 2021

Mr. Peter Campbell
Alaska Department of Environmental Conservation
43335 Kalifornsky Beach Road, Suite 11
Soldotna, AK 99669

RE: RELEASE INVESTIGATION ACTIVITIES WORK PLAN, KASILOF RIVERVIEW LODGE, 57400 STERLING HIGHWAY, KASILOF, ALASKA; ADEC FILE NO. 2319.26.002

Dear Mr. Campbell:

We are pleased to submit herein our work plan to conduct release investigation activities at the Kasilof Riverview Lodge located at 57400 Sterling Highway in Kasilof, Alaska. A vicinity map is included as Figure 1 and a site plan is included as Figure 2.

BACKGROUND

In 1993 and 1994 an on-site 6,000-gallon gasoline underground storage tank (UST) failed tightness tests. The tank was subsequently closed. In 1998, to evaluate the extent of contamination associated with the closed tank, three borings were advanced at the site by Gilfilian Engineering & Environmental Testing, Inc. (GE^2T). Samples collected from each of the borings contained concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX), and gasoline range organics (GRO) at concentrations exceeding the Alaska Department of Environmental Conservation (ADEC) cleanup levels, applicable at that time.

Tank upgrades were conducted at the site in 1999. At this time, soil was excavated from around the tanks and test pits were advanced. Based on soil samples collected during this effort, GE^2T concluded that the extent of contamination was not fully determined.

In 2003, A.C.E. Engineering advanced three borings (SB1, SB2, and SB3), completed as groundwater monitoring wells (MW1, MW2, and MW3), at the site. Monitoring Wells MW1, MW2, and MW3 were advanced southeast, northeast, and west of the Kasilof Riverview Lodge, respectively, as shown on Figure 2. Groundwater was encountered at approximately 24 to 27 feet below ground surface (bgs) during drilling, and groundwater flow direction was to the east. A soil sample collected from Boring SB1 contained 0.0889 milligrams per kilogram (mg/kg) benzene, which exceeds the current ADEC cleanup level of 0.022 mg/kg. A groundwater sample collected from Well MW1 contained 0.00626 milligrams per liter (mg/L) benzene, which exceeds the current ADEC cleanup level of

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0.0046 mg/L. A.C.E. Engineering collected additional groundwater samples from the wells in 2005 and 2016. A groundwater sample collected from Well MW1 in 2016 contained 0.0536 mg/L benzene, which exceeds the applicable ADEC cleanup level.

In 2018 and 2019, EHS collected groundwater samples from the site wells. The samples did not contain detected concentrations of the tested analytes.

In 2019, Shannon & Wilson monitored the removal of one approximately 2,000-gallon diesel UST, and in-place closure of two approximately 6,000-gallon and one 3,000-gallon gasoline USTs. Soil samples collected from the gasoline and diesel UST excavations contained concentrations of GRO, diesel range organics (DRO), volatile organic compounds (VOCs), and/or polynuclear aromatic hydrocarbons (PAHs) exceeding the ADEC cleanup levels.

It is our understanding that Mr. Peter Campbell of the ADEC has requested additional delineation and/or cleanup of the contamination identified during the 2019 UST closure activities. The purpose of the project is to further evaluate the extent of contamination southwest of the former gasoline USTs.

PROJECT ACTIVITIES

The project will consist of advancing a soil boring, installing a groundwater monitoring well, collecting soil and groundwater samples, disposing of investigation-derived waste (IDW), and reporting. Discovery Drilling, Inc. (Discovery) will provide the equipment and personnel to advance the boring and install the well. Soil and groundwater samples will be submitted to SGS North America Inc. (SGS) for laboratory analysis. If necessary, US Ecology will dispose/treat of the IDW generated during the project.

Task 1- Soil Boring and Sampling

At least three days prior to advancing the boring, the local utilities will be contacted to mark buried utilities within the project area and identify potential conflicts such that the proposed boring location can be adjusted, if necessary.

One soil boring, designated Boring B4, will be advanced by Discovery using a GeoProbe® direct-push drill rig in the approximate locations shown on Figure 2. The boring will be advanced until groundwater is encountered, which is assumed to be approximately 15 to 20 feet bgs. The boring will be advanced southwest of the former gasoline USTs.

Soil samples will be recovered on a continuous basis using 5-foot sampling sleeves until groundwater is encountered. Immediately following retrieval and opening of the sampling sleeves, the analytical samples and field screening samples will be collected. Two analytical soil samples will be collected from the boring and submitted for analysis. The samples will be collected from the interval just above the soil/water interface and from the sample interval with the highest PID measurement. The analytical sample jars for volatile analyses will be collected first, followed by the non-volatile analytical sample jars, and finally the field screening sample. Each soil sample will be visually described and "screened" for VOCs using a photoionization detector (PID) and ADEC-approved headspace screening techniques. The field screening samples will be collected in re-sealable plastic bags, warmed to at least 40 degrees Fahrenheit, and tested within 60 minutes of collection. To screen, the sample will be agitated for about 15 seconds, the seal of the bag will be opened slightly, the instrument probe will be inserted into the air space above the soil, and the bag held closed around the probe. The maximum ionization response as the PID draws vapor from the sample bag will be recorded. The PID will be calibrated with 100 parts per million (ppm) isobutylene in air standard gas.

The soil samples tested for volatile constituents will be collected using methanol preservation. In accordance with the method, at least 25 grams of soil will be quickly placed into a laboratory supplied 4-ounce jar that had been pre-weighed. Afterward, 25 milliliters of reagent grade methanol will be added to submerge the soil. The methanol extracts the hydrocarbons from the soil at the time of sampling, thereby reducing the possible loss of volatile constituents prior to sample analysis. The sample jars for non-volatile analyses will be collected after the volatile analysis jars. All samples will be transferred to the appropriate laboratory supplied jars using decontaminated stainless-steel spoons, and transferred to the laboratory in coolers with ice packs using chain-of-custody procedures.

Each sample will be analyzed for GRO by Alaska Method (AK) 101, DRO by AK 102, VOCs by Environmental Protection Agency (EPA) Method 8260D, and PAHs by EPA Method 8270D SIM. For quality control purposes, one duplicate sample and one trip blank will be submitted for analysis.

Task 2 – Monitoring Well Installation and Development

Boring B4 will be completed as Monitoring Well MW4. The well will be constructed of 2-inch nominal inside diameter 40 polyvinyl chloride (PVC) pipe with threaded connections. The lower portion of the well will consist of an approximately 10-foot section of 0.010-inch slotted well screen. The screen will extend approximately 5-feet below the soil/groundwater

interface. A continuous sand pack will be used to backfill around the well screen to 1 to 2 feet above the screened section. Hydrated bentonite chips will be used to backfill the borehole from the top of the sand pack to approximately 2 feet bgs to create a seal. A stick-up protective casing will be used around the monitoring well and finished with concrete at the base to protect the well.

The monitoring well will be developed at least 24 hours following installation, using a surge block and submersible pump (3 to 5-minute cycles of each). Water quality parameters, including pH, temperature, turbidity, and conductivity will be collected to evaluate the effectiveness of the development process. Development will be considered complete when the following stabilization criteria are met over three successive readings: pH is within 0.1 unit, temperature is within 3 percent (minimum 0.2 degree Celsius), conductivity is within three percent, and turbidity is within 10 percent or three consecutive readings of less than 10 Nephelometric Turbidity Units (NTU). If the stabilization criteria are not met once 55-gallons of water are removed or 3 hours of effort per well is expended, development will be considered complete. The monitoring well will not be sampled if free product is encountered.

Task 3 – Monitoring Well Sampling

The newly installed well will be allowed to recharge to 80 percent of the original water volume before sample collection. If more than 24 hours passes to allow for recharge, the well will be purged before sampling. Water samples will be obtained from the screened portion of the well using a submersible pump with dedicated disposable tubing. Analytical samples will be collected by transferring water directly from the pump tubing into the laboratory supplied containers. The sample jars will be filled in decreasing order of volatility.

Groundwater samples will also be collected from pre-existing Monitoring Wells MW1, MW2, and MW3 using a low-flow sampling method. The submersible pump will be placed within 2 feet of the surface of the groundwater column. The pump rate will be adjusted with a goal of limiting the sustained water drawdown to a maximum of 0.3 foot. During the purging process, field personnel will monitor water quality parameters and purge volume. Purging will be considered complete when at least one well volume is removed, and water quality parameters stabilize. Water quality parameters will be considered stabilized when three consecutive measurements collected 3 to 5 minutes apart indicate that at least four of the five parameters are within the following tolerance ranges: pH is within 0.1 unit,

temperature is within 3 percent, conductivity is within 3 percent, , and turbidity is within 10 percent or is less than 10 NTU.

If the drawdown does not stabilize at the lowest usable pumping rate of the submersible pump or if the water quality parameters do not stabilize within one hour of purging, stabilization of water quality parameters will not be required. The well will be samples after at least 1 well volume has been removed and the well has recovered to at least 80 percent of the pre-purge volume.

The samples will be analyzed for GRO by AK 101, DRO by AK 102, VOCs by EPA Method 8260D, and PAHs by EPA Method 8270D SIM. For quality control purposes, one duplicate sample and one trip blank will be submitted for analysis.

Task 4 – Investigation-Derived Waste

IDW will consist of development/purge water and soil cuttings. Water generated during monitoring well development and sampling will be containerized in 55-gallon drums, labeled, and stored onsite pending analytical results. The drill cuttings from the borehole will be containerized in a labeled 55-gallon drum and stored on site pending analytical results. If the groundwater and/or soil samples contain concentrations greater than the applicable ADEC cleanup levels, prior approval will be obtained from ADEC to transport and treat the water and/or drill cuttings. If contaminant concentrations do not exceed the applicable ADEC cleanup levels, the water and/or soil will be discharged and/or landspread on an unpaved portion of the property, following ADEC approval.

Task 5 – Reporting

A report will be prepared summarizing our field activities and analytical results. The report will include a description of field procedures, a scaled site plan showing soil boring/monitoring well locations, field notes, photographs taken during field activities, soil boring and monitoring well logs, ADEC Laboratory Data Review Checklists (LDRCs), and tabulated field screening and laboratory analytical results. The report will include recommendations for further assessment and/or cleanup, if warranted.

SCHEDULE

The field activities will be conducted over two days in May or June 2021 and our final report will be submitted to Kasilof Riverview Lodge within four weeks following receipt of analytical results.

If you have any questions or comments, please contact the undersigned at (907) 561-2120.

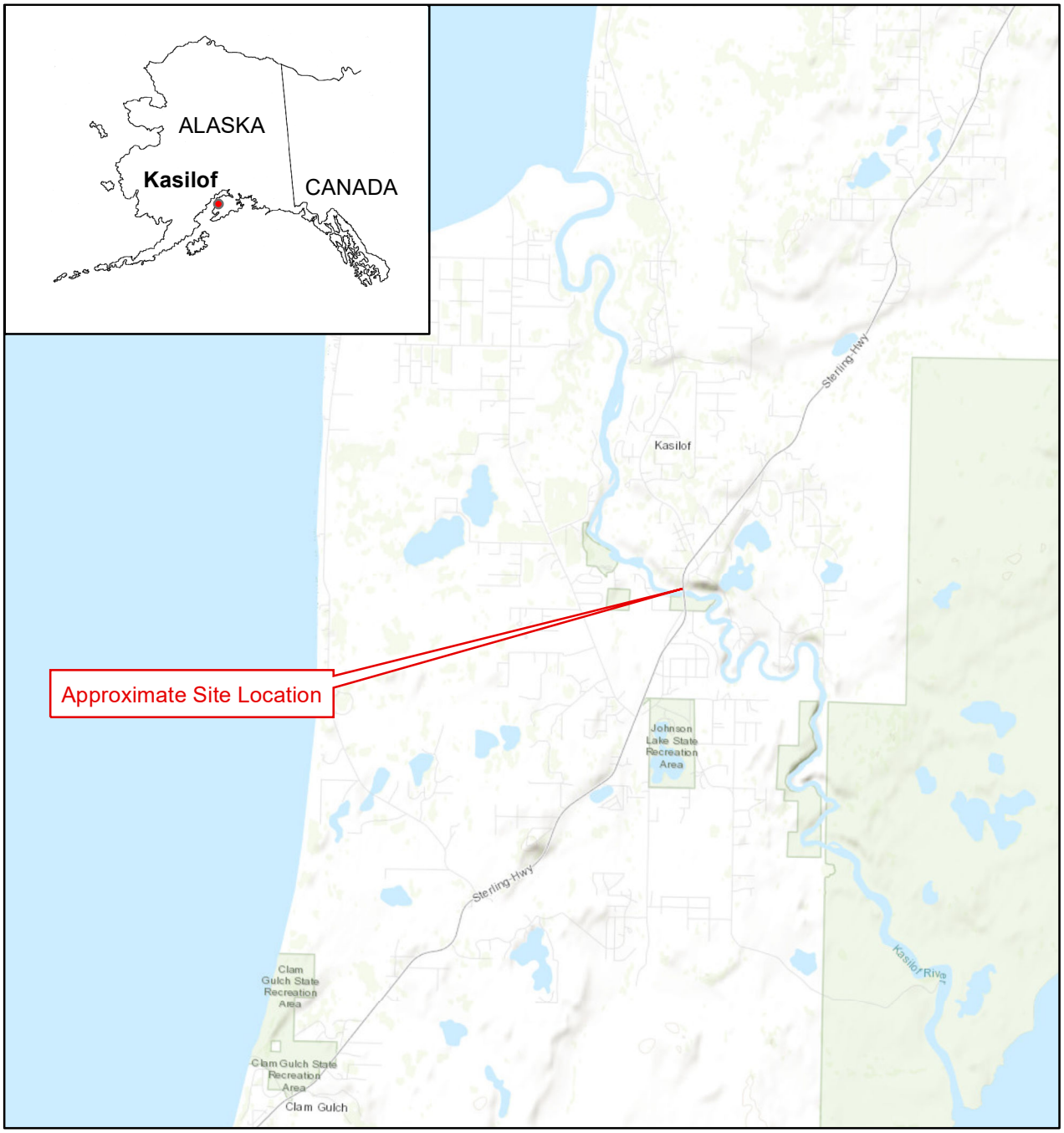
Sincerely,

SHANNON & WILSON

Alec Rizzo
Digitally signed by Alec Rizzo
Date: 2021.04.12 12:27:06 -08'00'

Alec Rizzo
Environmental Staff

Enc. Figures 1 and 2



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Miles

Kasilof Riverview Lodge
Kasilof, Alaska

VICINITY MAP

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FIG. 1

Legend

B4/MW4 — Appoximate Location of Proposed Boring/Monitoring Well B4/MW4

Appoximate Location of Monitoring Well MW1

0 150 300
Feet

N

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Kasilof Riverview Lodge
Kasilof, Alaska

SITE PLAN

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FIG. 2