BGES, INC.

ENVIRONMENTAL CONSULTANTS

ALASKA REAL ESTATE PARKING LOT
4TH AND GAMBELL
ANCHORAGE, ALASKA

REPORT FOR GROUNDWATER SEEP EVALUATION (2018) AND INDOOR AIR SAMPLING ACTIVITIES (2019)

APRIL 2019

Submitted to:

Grant Lidren
Alaska Department of Environmental Conservation
Contaminated Sites Division
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Anchorage, Alaska 99501

Submitted by:

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ACRONYMS

AAC	-	Alaska Administrative Code
ADEC	-	Alaska Department of Environmental Conservation
BGES	-	Braunstein Geological and Environmental Services
C	-	Celsius
CPG	-	Certified Professional Geologist
EPA	-	Environmental Protection Agency
ESA	-	Environmental Site Assessment
Eurofins	-	Eurofins Air Toxics, Inc.
LOQ	-	Limit of Quantitation
MDL	-	Method Detection Limit
µg/L	-	micrograms per Liter
$\mu g/m^3$	-	micrograms per cubic meter
ml/min	-	milliliters per minute
MOA	-	Municipality of Anchorage
O&M	-	Operations & Maintenance
PCE	-	Tetrachloroethene
PID	-	Photoionization Detector
QC	-	Quality Control
QEP	-	Qualified Environmental Professional
RPD	-	Relative Percent Different
SGS	-	SGS North America, Inc.
TCE	-	Trichloroethylene
UST	-	Underground Storage Tank
VI	-	Vapor Intrusion
VOC	-	Volatile Organic Compound

1.0 INTRODUCTION

BGES, Inc. (BGES) was retained by the Alaska Department of Environmental Conservation (ADEC) to conduct an indoor air and groundwater seep evaluation, and operations and maintenance (O&M) of vapor intrusion mitigation systems associated with the property located at 4th and Gambell, Anchorage, Alaska (Figures 1 and 2); hereafter referred to as the subject property. The ADEC File Number is 2100.38.434 and the ADEC Hazard Identification Number is 4084 for the subject property.

2.0 SITE BACKGROUND

The subject property is located in the downtown (northern) portion of Anchorage, Alaska. The project site is currently undeveloped and used as a parking lot. The subject property was formerly occupied by a variety of businesses, including the former New Method and C&K Cleaners (which reportedly operated at the site from 1955 to 1969), and NC Tire Center, which was the last occupant of the former building on site. The findings of a Phase I Environmental Site Assessment (ESA) in 1993 indicated that underground storage tanks (USTs) were thought to exist at locations in the northeast corner of the property (where BGES did subsequently encounter USTs as described in our September 2004 Phase II ESA Report), and in the north-central portion of the property (where USTs were not encountered during our subsurface assessment).

Widespread tetrachloroethylene (PCE) contamination has been documented at the subject property in soils, groundwater, and with respect to the vapor intrusion pathway. Contamination has also been documented on the adjacent properties to the north of the subject property. The owner of the buildings at 736 East 3rd Avenue (hereafter referred to as the north and south duplexes) installed sub-slab depressurization systems in 2009. These vapor mitigation systems seemed to reduce the indoor PCE vapor concentrations; however, the PCE vapor concentrations beneath the north duplex still exceeded the ADEC's target level for indoor air. Indoor air monitoring was performed in the north and south duplexes as well as two other residential buildings (710 and 720 East 3rd Avenue) located north of the subject property between March 2009 and May of 2010. The results indicated that the PCE concentrations in the indoor air were greater in the winter and lower in the spring. Conversely, the soil gas concentrations were greater in the spring and lower in the winter. Vapor intrusion (VI) mitigation systems were installed by the Environmental Protection Agency (EPA) Emergency Response Program in 2014 in four buildings located north of the subject property, and indoor air samples were collected to evaluate the effectiveness of these systems. Sub-membrane and sub-slab depressurization passive systems were installed beneath these four buildings because the crawl spaces contained both concrete floors and dirt floors, except for the south duplex building which only had a dirt

floor. After the collection of indoor air samples, the systems located at 720 East 3rd Avenue and the north duplex (736 East 3rd Avenue) were upgraded to active systems. The subsequent round of indoor air samples collected in October of 2014 indicated that all concentrations of PCE were below the ADEC's target levels for indoor air. Currently, the buildings located at 710 and 720 East 3rd Avenue are unoccupied and boarded up, and the north and south duplexes (736 East 3rd Avenue) are occupied by tenants. The north and south duplexes have operational vapor mitigation systems, the monitoring and maintenance of which is part of the project activities described herein.

The full extent of contamination is not known at and downgradient from the subject property. At a minimum, groundwater contamination extends northward across East 3rd Avenue, and down the bluff towards the Anchorage Terminal Reserve. The groundwater flow direction is to the northeast between the subject property and East 1st Avenue, then the groundwater flow direction changes to northwesterly and westerly along the railroad tracks.

Ongoing work includes groundwater and indoor air monitoring, and continued operations of the VI Mitigation Systems in the occupied buildings (north and south duplexes located at 736 East 3rd Avenue).

The site activities described below were performed in order to monitor contamination in groundwater and to evaluate the effectiveness of the VI systems in the north and south duplexes that stem from the historic use of PCE on the subject property.

3.0 FIELD ACTIVITIES

Field work for these ongoing groundwater and indoor air monitoring activities were performed by Evan Tyler, Environmental Scientist of BGES, and Kris Shippen, William Schmaltz, Environmental Scientist II's of BGES, and Jayne Martin, Senior Environmental Scientist of BGES; who are all Qualified Environmental Professionals (QEPs) as defined by the ADEC. These monitoring activities were performed in October and December of 2018 and February of 2019. The following paragraphs present the results of the field activities.

3.1 Collection of Groundwater Seep Sample

A potential groundwater seep was discovered in 2014 south of Monitoring Well 4GMW-14, which is located on Municipality of Anchorage (MOA) property and within the fence surrounding the former Alaska Native Medical Center. The seep is located near the base of the bluff and near the intersection of Ingra Street and East 1st Avenue. When flowing, the seep reportedly discharges into one or two pools of water and then infiltrates into the ground cover.

A representative groundwater sample was collected during October of 2018. Because of the location of the fence, field personnel were not able to get any closer than approximately 18 feet to the groundwater seep location. Therefore, a sampling screen attached to tubing was tossed into the pool of water located at the groundwater seep discharge location. The intake of the sampling screen was located approximately 18 inches from the seep discharge location. The water sample was collected using a peristaltic pump and the water quality parameters were monitored using a YSI Pro Plus with a flow-through cell. The water quality meter monitored temperature, pH, conductivity, and oxidation-reduction potential.

As a quality control measure, a duplicate sample was collected from the groundwater seep pool, and was identified as GWS2-1024. The duplicate sample was submitted "blindly" to the laboratory for analysis to evaluate field sampling precision. In addition, a trip blank sample accompanied the project samples scheduled for volatile analyses during the entire sampling and handling process to evaluate potential cross-contamination impacts during each sampling event. The groundwater samples were labeled, placed in a chilled cooler, and submitted under chain of custody protocol to SGS North America, Inc. (SGS) in Anchorage, an ADEC-approved laboratory; for analysis of volatile organic compounds (VOCs) by EPA Method 8260. A copy of the field notes is included in Appendix A. A copy of the laboratory data package for the groundwater seep samples was provided to Grant Lidren, the ADEC Project Manager, via email on October 26, 2018.

3.2 Operation and Maintenance (O&M) of Vapor Intrusion Mitigation Systems

As part of the O&M activities, the VI Mitigation Systems and the vapor barriers in both the North and South duplexes located at 736 East 3rd Avenue were inspected during December of 2018.

O&M at North Duplex (active mitigation system):

The inspection activities were completed on December 5 and 6, 2018 for the VI mitigation system located in the basement of the north duplex. The field observations during the inspection activities were as follows:

- The equipment meter reading was 15,085.3 hours for the active mitigation system;
- Inspection of the vapor barrier and barrier tape revealed several 1-inch holes that were present throughout the vapor barrier and numerous seams were no longer sealed to the concrete walls and the wood posts throughout the basement. It was estimated that the vapor barrier was approximately 50 percent secure. BGES contacted Mr. Lidren at the ADEC to notify him of the condition of the vapor barrier and we recommended that the vapor barrier be repaired. Mr. Lidren contacted Rob Cupples, the property owner, to discuss the recommended repairs to the vapor barrier. Mr. Cupples indicated that he would repair the vapor barrier. Mr. Lidren notified BGES that the vapor had been repaired in February of 2019. BGES inspected the vapor barrier again on February 11, 2019 and

the vapor barrier appeared to be sealed off to the concrete and wooden beams and the holes had also been patched;
- Visual observations of the epoxy coating on the concrete indicated that this seal appeared to be in good condition;
- No areas of moisture or puddles of water were observed on top of the vapor barrier;
- The energized exhaust fans appeared to be in good working order;
- Inspection of the analog manometers on the vertical piping indicated that the exhaust fans were working properly and creating vacuums beneath the vapor barriers;
- Both exhaust stacks located outside of the building were inspected for any indications of potential damage and no damage was observed. The exhaust stacks were not inspected for the presence of water because of the frozen temperatures during December;
- Both wind turbines were spinning, and no unusual noises were noted.

The inspector also checked that the following measures were being adhered to in order to minimize disturbance to the vapor barrier and the aboveground piping sections:

- No heavy and/or sharp objects were present on the liner. One cinder block was present on top of the vapor barrier, east of the furnace;
- No water or drain line leaks were observed on top of the liner in December of 2018;
- No standing water was observed on top of the liner;
- The crawl space was only accessed to evaluate the integrity of the liner. The owner accessed the crawl space to perform the necessary liner repairs; and,
- All of the aboveground piping associated with the mitigation system appeared to be in good condition.

The VI mitigation system was also monitored for performance during December of 2018 and the results are documented in the field notes in Appendix A.

- The air velocity was measured with a hand-held anemometer at the sampling port located adjacent to each analog manometer in the vertical piping for System 1 and System 2;
- The vacuum reading on each analog manometer was documented for System 1 and System 2;
- The vacuum in each sub-slab vapor sampling point was measured using a digital manometer and documented for Vapor Monitoring Points VMP1 and VMP2; and,
- The air flow in the piping was optimized by balancing the air flow between the vapor extraction pipes. The valves were adjusted and all changes in the valve positions were documented.

O&M at South Duplex (passive mitigation system):

The inspection activities were completed on December 5 and 6, 2018 for the VI mitigation system located in the crawl space of the south duplex. The field observations during the inspection activities were as follows:

- Inspection of the vapor barrier and barrier tape revealed several 1-inch holes that were present throughout the vapor barrier and numerous seams were no longer sealed to the concrete walls throughout the basement. BGES contacted Grant Lidren at the ADEC to notify him of the condition of the vapor barrier and we recommended that the vapor barrier be repaired. Mr. Lidren contacted

Rob Cupples, the property owner, to discuss the recommended repairs to the vapor barrier. Mr. Cupples indicated that he would repair the vapor barrier. Mr. Lidren notified BGES that the vapor barrier had been repaired in February of 2019. BGES inspected the vapor barrier again on February 11, 2019 and the vapor barrier appeared to be sealed off to the concrete and the holes had also been patched;

- No areas of moisture or puddles of water were observed on top of the vapor barrier;
- The exhaust stack located outside of the building was inspected for any indications of potential damage and no damage was observed. The exhaust stack was not inspected for the presence of water because of the frozen temperatures during December;
- The wind turbine was spinning, and no unusual noises were noted.

The field observations were documented in the field notes and a copy is included in Appendix A.

3.3 Building Survey and Indoor Air Questionnaire

During December of 2018, completion of a building survey and the Indoor Air Questionnaire was initiated for the north duplex. However, because of the poor condition of the vapor barriers in both duplexes, the building survey was not completed. A large inventory of cleaning products was present inside the bathroom and kitchen areas on the first floor and in the basement of the north duplex.

A building survey was not completed prior to the collection of indoor ambient air samples for the north or south duplexes because of the long wait for repair of the vapor barriers and the laboratory's request for the immediate return of the sampling equipment. An indoor air sampling questionnaire was completed for the north duplex at the time the samples were set up for collection on February 11, 2019.

Copies of the partially completed building survey from December of 2018 and the completed indoor air questionnaire completed on February 11, 2019 are provided in Appendix B.

3.4 Collection of Indoor Air Samples

Indoor air samples were collected on February 11 and 12, 2019, to evaluate the effectiveness of the vapor intrusion mitigation systems located in the north and south duplexes during frozen soil conditions. William Schmaltz, Environmental Scientist II of BGES, and Jayne Martin, Senior Environmental Scientist of BGES, both QEPs, performed the indoor air sampling activities. It is noted that on February 12, 2019, when the air samples were picked up after the 24-hour collection period, a sweet solvent odor was present in the ambient air outside of the South Duplex. The breeze was blowing from a southeasterly direction and there is a printing shop that is located in this direction at the intersection of East 4th Avenue and Ingra Street.

All sampling equipment was evaluated for leaks using a mini-leak test prior to collection of the ambient

indoor and outdoor air samples. After attaching the flow controller to the summa canister, a plug was placed on top of the flow controller and the valve on the summa canister was quickly opened and closed so that a vacuum was indicated on the gauge, which was monitored for a one-minute time period. No leaks were detected during the mini-leak tests for the sampling equipment.

One indoor ambient air sample and one duplicate ambient indoor air sample were collected from the basement/workshop area of the North Duplex from approximately 3 feet above the ground and within the breathing zone (Figure 3). One indoor air sample was collected from the crawl space of the South Duplex from approximately 25 inches above the surface of the crawl space, which was in the breathing zone within the crawl space (Figure 4). Each sample was collected in a 6-liter stainless-steel summa canister equipped with a flow regulator set to collect the sample over a 24-hour period, which was approximately 3.5 milliliters per minute (ml/min). The summa canisters and the flow regulators were 100 percent certified clean by the laboratory for this project. A copy of the indoor air sampling data sheet is included with the field notes in Appendix A.

As a quality control measure, a duplicate sample was collected from the basement of the North Duplex, and was identified as ND-IA2-0212. The duplicate sample was submitted "blindly" to the laboratory for analysis to evaluate field sampling precision. The 6-liter, stainless-steel summa canisters and flow regulators were obtained from Eurofins Air Toxics, Inc. (Eurofins) of Folsom, California, which has received accreditation from the National Environmental Laboratory Accreditation Program (NELAP), as required by the ADEC. After collection of the indoor and outdoor air samples, the canisters and regulators were packaged in cardboard boxes and shipped via Federal Express under standard chain of custody protocol to Eurofins.

A copy of the laboratory data package for the indoor air samples was provided to Grant Lidren, the ADEC Project Manager, via email on March 5, 2019.

4.0 EVALUATION OF LABORATORY DATA

Laboratory analyses of the groundwater and ambient indoor air samples collected during these monitoring activities were performed by SGS and Eurofins, respectively. Analytical results for the groundwater and the indoor air samples are presented in Tables 1 and 2, respectively; and a copy of each laboratory data package is provided in Appendix C.

The analytical results for the groundwater seep sample were compared to the ADEC's Groundwater

Cleanup Levels in 18 Alaska Administrative Code (AAC) 75.345 (October 27, 2018).

The analytical results for the ambient indoor air samples were compared to the ADEC's Indoor Air Target Levels presented in the *Vapor Intrusion Guidance for Contaminated Sites*, Appendix D (November 2017).

4.1 Groundwater Sample Results

The groundwater sample collected from the seep was labeled, for example, GWS1-1024; where the prefix "GWS" indicates a groundwater seep sample, "1" indicates the sample number, and "-1024" indicates the month and the day the sample was collected. The groundwater seep sample and the duplicate groundwater seep sample were analyzed for VOCs by EPA Method 8260C.

As a quality control procedure, a trip blank sample accompanied the field sample scheduled for volatile analyses at all times from sample collection until submission to the laboratory, and was analyzed by the same method listed above, to determine if cross-contamination of the samples had occurred.

Groundwater Seep Sample GWS1-1024 exhibited a PCE concentration of 92.9 micrograms per liter (µg/L), which exceeds the ADEC cleanup criterion of 41 µg/L for this analyte. GWS1-1024 exhibited concentrations of cis-1,2-dichloroethene at 3.87 µg/L and trichloroethene (TCE) at 1.77 µg/L; which are below the ADEC cleanup criteria of 36 µg/L, and 2.8 µg/L, respectively. All other analytes in this water sample were not detected at concentrations exceeding the laboratory's limits of quantitation (LOQs).

Groundwater Seep Sample GWS2-1024 (duplicate of GWS1-1024) exhibited a PCE concentration of 91.4 µg/L, which exceeds the ADEC cleanup criterion of 41 µg/L for this analyte. GWS2-1024 exhibited concentrations of chloromethane at 10.7 µg/L, cis-1,2-dichloroethene at 3.83 µg/L, and TCE at 1.74 µg/L; which are below the ADEC cleanup criteria of 190 µg/L, 36 µg/L, and 2.8 µg/L, respectively. All other analytes in this water sample were not detected at concentrations exceeding the laboratory's LOQs.

Analytical results for the groundwater seep samples are listed in Table 1; a copy of the laboratory analytical results is included in Appendix C; and the approximate groundwater seep sample location and sample results are shown on Figure 2.

4.2 Air Sample Results

The indoor air samples collected from the subject property were numbered, for example, ND-IA1-0212, where the prefix "ND" indicates the North Duplex, "IA1" indicates the number of the indoor air sample and "-0212" indicates the month and day the sample was collected.

One indoor air sample and one sample duplicate were collected from the basement/workshop area of the North Duplex and one ambient air sample was collected from the crawl space of the South Duplex on February 11 and 12, 2019. The indoor air samples were analyzed for VOCs by Modified EPA Method TO-15.

Indoor Air Samples ND-IA1-0212 and ND-IA2-0212 were collected from basement area of the North Duplex. These samples did not exhibit concentrations of any analytes that exceeded the ADEC target levels for Indoor Air, for residential or commercial use. All analytes in the Indoor Air Sample ND-IA1-0212 were below the laboratory's LOQ. Indoor Air Sample ND-IA2-0212 (duplicate of ND-IA1-0212) exhibited a PCE concentration of 1.1 micrograms per cubic meter ($\mu g/m^3$), which is below the ADEC target level of 41 $\mu g/m^3$ (Figure 3). All other analytes in this indoor air sample were not detected at concentrations exceeding the laboratory's LOQs.

Indoor Air Sample ND-IA3-0212 was collected from crawl space area of the South Duplex. Indoor Air Sample ND-IA3-0212 exhibited a PCE concentration of 2.2 $\mu g/m^3$, which is below the ADEC target level of 41 $\mu g/m^3$ (Figure 4). All other analytes in this indoor air sample were not detected at concentrations exceeding the laboratory's LOQs.

Analytical results for the indoor air samples for both the North and South Duplexes are listed in Table 2; a copy of the laboratory analytical results is included in Appendix C; and the approximate indoor air sample locations and sample results are shown on Figures 3 and 4.

5.0 LABORATORY DATA QUALITY REVIEW

Data quality was reviewed in accordance with ADEC guidance and standard industry practices. An ADEC laboratory data review checklist was completed for each of the laboratory work orders, and these checklists are included in Appendix D. The checklists provide an overview of the quality of the laboratory data. The following is a discussion of our evaluation of sample conditions and laboratory procedures for the groundwater samples collected on October 24, 2018 and the ambient indoor air samples collected on February 12, 2019.

5.1 Groundwater Samples - Work Order 1186096

Groundwater seep sample analyses were provided by SGS, which is approved to conduct the specified analyses by the ADEC. The groundwater samples were hand-delivered to SGS in Anchorage by BGES personnel under chain of custody protocol. The water samples contained the proper preservatives for the requested analyses and no unusual sample conditions were noted by the laboratory. The temperature within

the sample cooler measured at the laboratory at the time of receipt was 1.4 degrees Celsius (C), which is within the ADEC-prescribed optimal range of 0 to 6 degrees C. The case narrative did not identify any quality control (QC) errors associated with the water samples for this work order.

The LOQ and the method detection limit (MDL) for 1,2,3-trichloropropane within Water Samples GWS1-1024 and GWS2-1024 (duplicate of GWS1-1024) exceeded the applicable ADEC cleanup criterion. This analyte is italicized in Table 1 to reflect this occurrence. As such, it cannot be determined if this analyte is present at concentrations exceeding the ADEC cleanup criterion.

Bromoform and dibromochloromethane were detected in the trip blank sample for this work order. Because of the presence of these two compounds in the trip blank sample, there is a potential for the concentrations of bromoform and dibromochloromethane to be biased high in Project Samples GWS1-1024 and GWS2-1024 (duplicate of GWS1-1024). Because these analytes were not detected in the project samples, they are not presented in Table 1. Because these analytes were reported in the project samples as non-detectable at concentrations below the LOQs, and because the LOQs in the field samples were below the ADEC cleanup criteria, it is our opinion that this data QC failure does not affect the interpretation of the data.

The relative percent differences (RPDs) for all analytes that were detected in both Sample GWS1-1024 and its duplicate GWS2-1024 were less than the ADEC-prescribed limit of 30 percent for water. The RPDs ranged from 1 to 1.7 percent for the detected analytes which indicates excellent sampling precision.

5.2 Air Samples - Work Order 1902387

Sample analyses for the indoor air samples were provided by Eurofins. The samples were shipped to Eurofins in Folsom, California via Federal Express under standard chain of custody protocol. A case narrative was included with the laboratory data package. The laboratory did not note any receiving discrepancies regarding the sample containers. The case narrative did not list any QC errors or discrepancies associated with the ambient air samples for this work order.

The RPDs for all analytes in both Sample ND-IA1-0212 and its duplicate ND-IA1-0212 could not be calculated because one or more of the analytes were non-detectable.

6.0 CONCLUSIONS AND RECOMMENDATIONS

As described above, a groundwater sample and a duplicate sample were collected from a groundwater seep area located northeast of the subject property in October of 2018. The sample exhibited a PCE

concentration of 92.9 µg/L, which exceeds the ADEC's cleanup criterion of 41 µg/L.

The VI Mitigation Systems in both the North and South Duplexes were evaluated during December of 2018 to verify that these systems were in good operating condition. All of the VI Mitigation Systems were in good operating condition with one exception. As mentioned above, the vapor barriers in both duplexes were in need of repair because of holes in the barrier and because the edges were not sealed to the concrete walls. The property owner completed the repairs during February of 2019.

Two indoor air samples (including a duplicate sample) were collected from the North Duplex and one indoor air sample was collected the South Duplex on February 12, 2019. The sample results did not exhibit any analyte concentrations exceeding the ADEC target levels for indoor air for residential commercial properties.

It is recommended that the groundwater seep and the indoor air at both duplexes continued to be monitored as required by the ADEC Contaminated Sites Program.

7.0 EXCLUSIONS AND CONSIDERATIONS

This report presents facts, observations, and inferences based on conditions observed during the period of our project activities, and only those conditions that were evaluated as part of our scope of work. Our conclusions are based solely on our observations made and work conducted, and only apply to the immediate vicinities of the locations where samples were collected, or areas that could be visually inspected. In addition, changes to site conditions may have occurred since the completion of our project activities. These changes may be from the actions of man or nature. Changes in regulations may also impact the interpretation of site conditions. BGES will not disclose our findings to any parties other than our client as listed above, except as directed by our client, or as required by law.

Field work for these ongoing groundwater and indoor air monitoring activities were performed by Evan Tyler, Environmental Scientist of BGES, and Kris Shippen, William Schmaltz, Environmental Scientist II's of BGES, and Jayne Martin, Senior Environmental Scientist of BGES; who are all QEPs as defined by the ADEC. Mr. Shippen and Mr. Schmaltz have performed numerous similar groundwater and air monitoring projects and they have more than nine years of environmental and sampling experience throughout Alaska. This report was prepared by Vanessa Crandell-Beck, Environmental Scientist with BGES, and Jayne Martin, Senior Environmental Scientist with BGES. Ms. Crandell-Beck is a QEP as defined by the ADEC. Ms. Crandell-Beck has conducted numerous site characterization projects throughout Alaska. Ms. Martin

has more than 30 years of professional environmental and geological consulting experience throughout Alaska and the lower 48 states. This report was reviewed by Robert N. Braunstein, a Certified Professional Geologist (CPG) and Principal of BGES. Mr. Braunstein has more than 35 years of professional environmental and geological consulting experience, and has conducted and managed thousands of environmental projects involving site characterization and remediation efforts throughout Alaska and the lower 48 states.

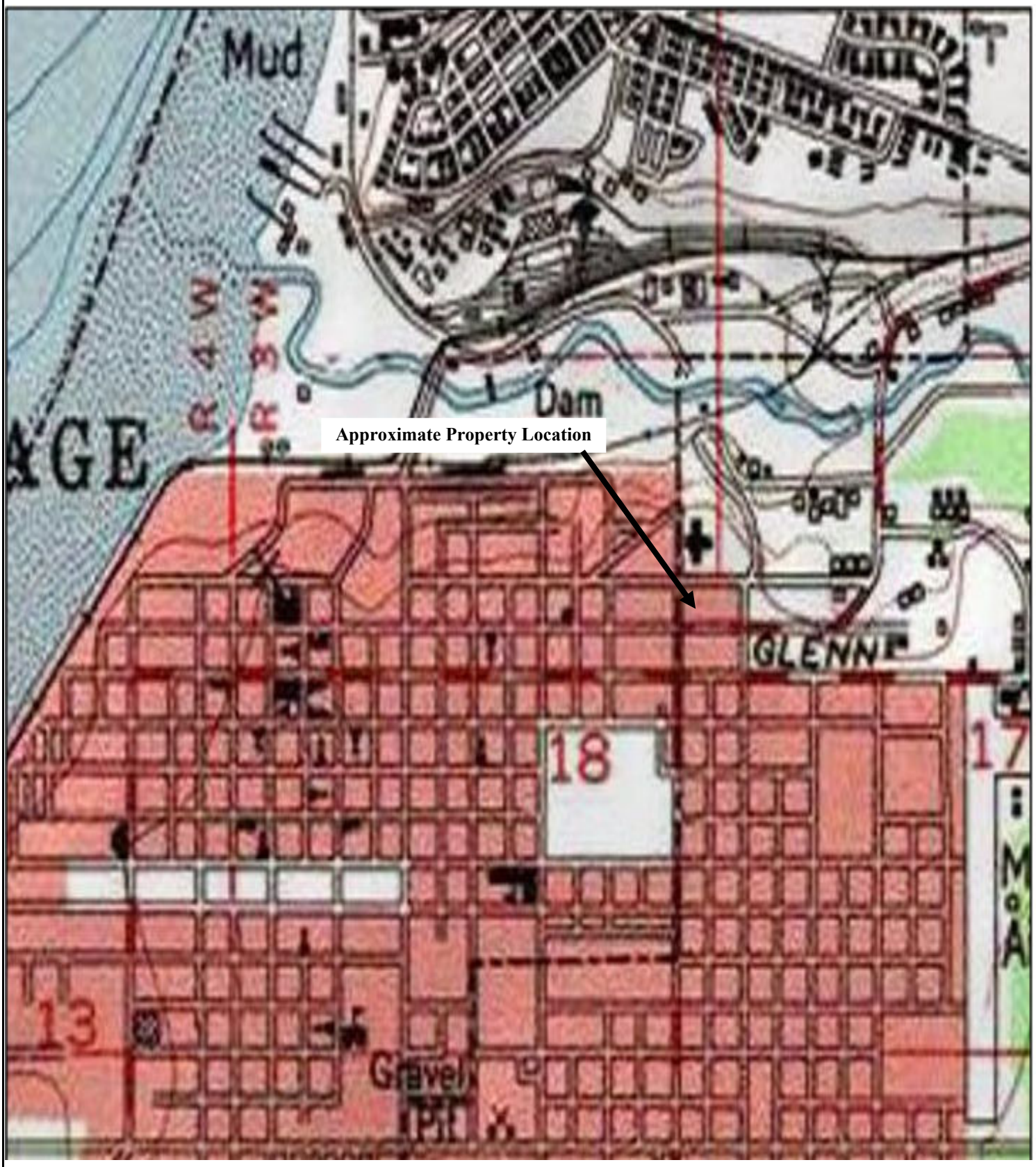
Sincerely,
BGES, INC.

Prepared by:

Vanessa Crandell-Beck
Environmental Scientist

Reviewed and Approved by:

Robert N. Braunstein, C.P.G.
Principal Geologist



Source: USGS Map, https://ngmdb.usgs.gov/topoview/viewer/#15/61.1389/-149.8786

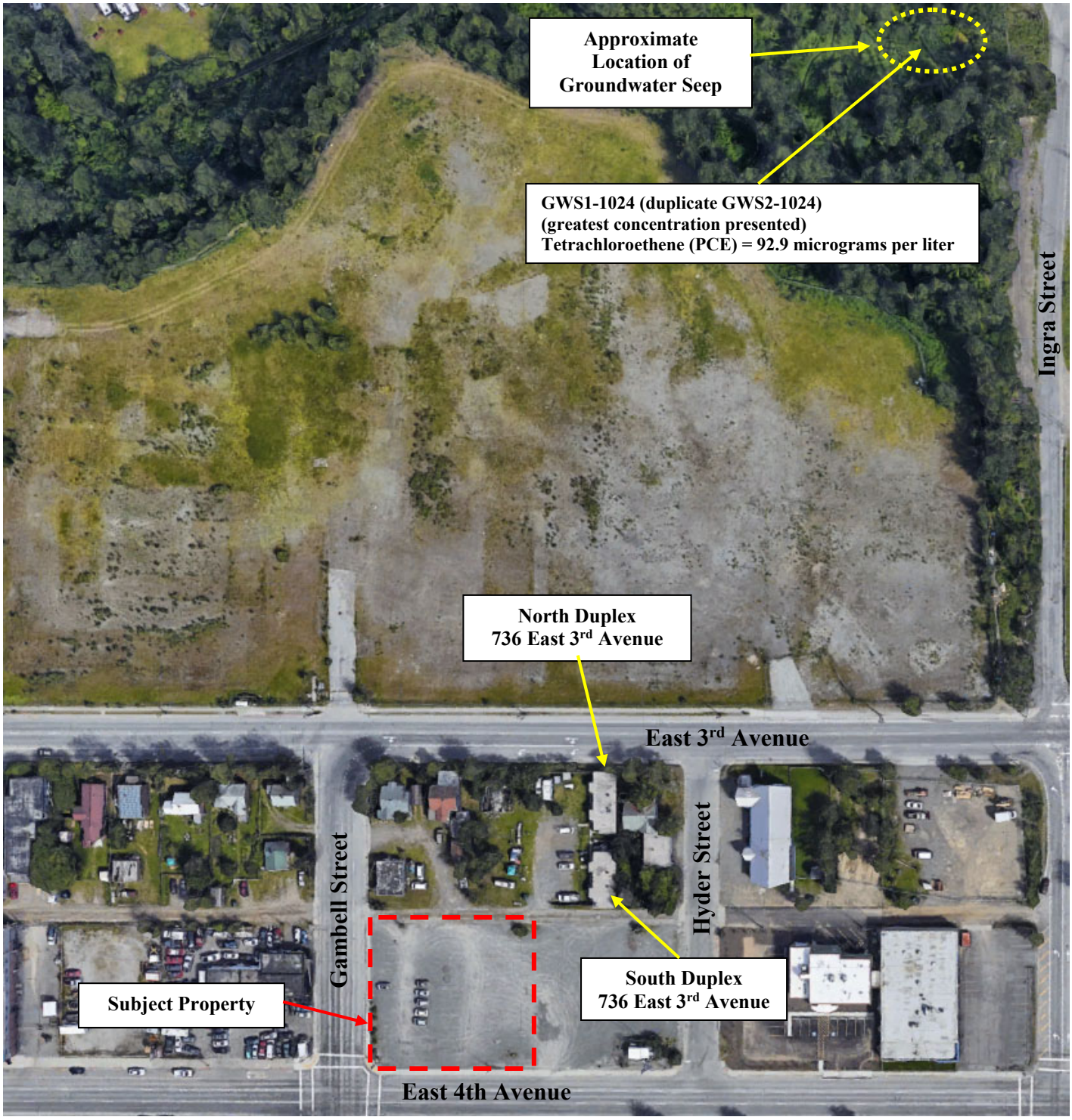
N

0 ½ 1

Approximate Scale (in miles)

Alaska Real Estate Parking Lot
4th and Gambell
Anchorage, AK
Property Vicinity Map

BGES, INC. | **April 2019** | **Figure 1**



Source: Google Earth Pro ©

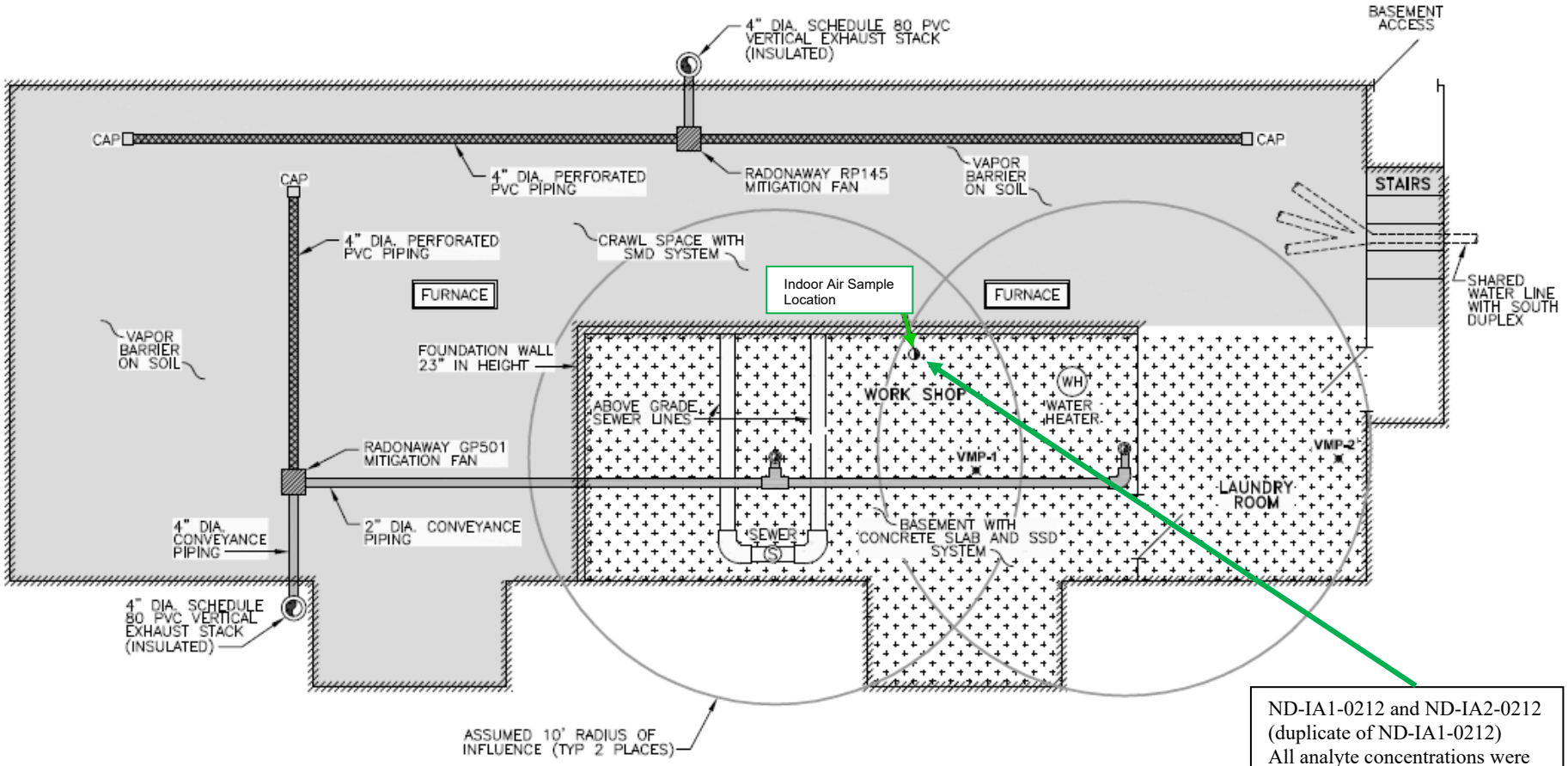
0 100 200 400

Approximate Scale in Feet

N

Alaska Real Estate Parking Lot
Anchorage, Alaska
Site Vicinity Map and Groundwater Seep Results (2018)

BGES, INC. | **April 2019** | **Figure 2**



Source: Adapted from Ahtna Engineering Services, LLC *Vapor Mitigation Systems Monitoring, Maintenance, and Repair Plans*

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LEGEND

- VMP-1 — VAPOR MONITORING POINT LOCATION
- INDOOR AIR SAMPLE LOCATION
- 2" DIAMETER EXTRACTION WELL LOCATION
- VAPOR BARRIER ON SOIL
- RETRO-COAT APPLICATION AREA
- FOUNDATION WALLS WHERE RETRO-COAT WAS APPLIED
- PERFORATED PVC PIPE
- CONVEYANCE PIPE

0 5 10 20

Approximate Scale in Feet

Alaska Real Estate Parking Lot
Anchorage, Alaska
Vapor Intrusion Mitigation System - North Duplex

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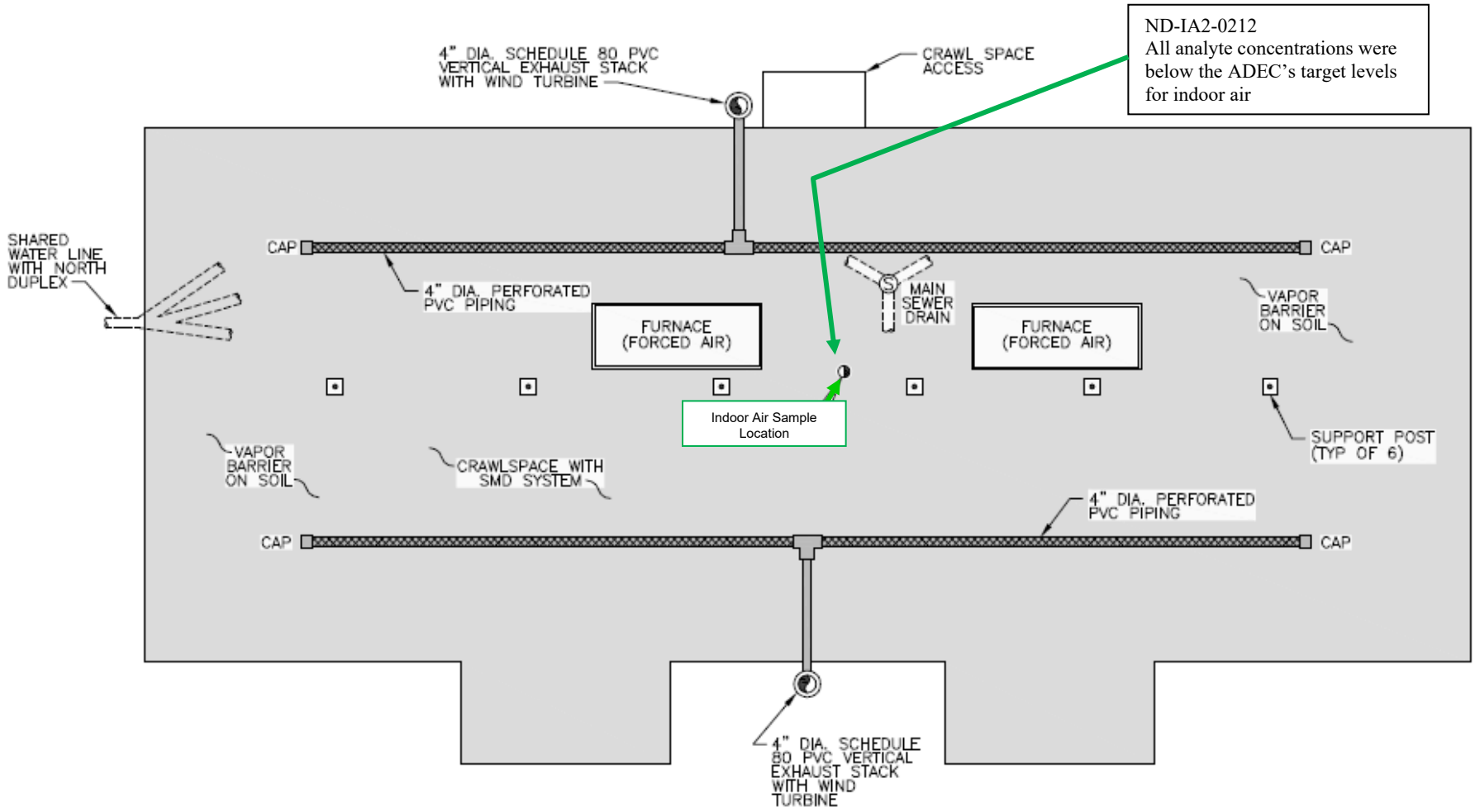
April 2019

Figure 3



Source: Adapted from Ahtna Engineering Services, LLC *Vapor Mitigation Systems Monitoring, Maintenance, and Repair Plans*

LEGEND

- INDOOR AIR SAMPLE LOCATION
- VAPOR BARRIER ON SOIL
- RETRO-COAT APPLICATION AREA
- FOUNDATION WALLS WHERE RETRO-COAT WILL BE APPLIED
- PERFORATED PVC PIPE
- CONVEYANCE PIPE

0 5 10 20

Approximate Scale in Feet

Alaska Real Estate Parking Lot
Anchorage, Alaska
Vapor Intrusion Mitigation System - South Duplex

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April 2019

Figure 4

TABLE 1
ALASKA REAL ESTATE PARKING LOT
4TH AND GAMBELL
ANCHORAGE, ALASKA
ANALYTICAL RESULTS - GROUNDWATER SEEP SAMPLES (OCTOBER 2018)

Sample No.	Parameter	Results (µg/L)	LOQ (µg/L)	MDL (µg/L)	ADEC Cleanup Criteria (µg/L)[1]	Analytical Method
GWS1-1024	*1,2,3-Trichloropropane*	*ND*	*1.00*	*0.310*	0.0075	SW8260C
	cis-1,2-Dichloroethene	3.87	1.00	0.310	36	SW8260C
	Tetrachloroethene (PCE)	**92.9**	1.00	0.310	41	SW8260C
	Trichloroethene (TCE)	1.77	1.00	0.310	2.8	SW8260C
	All Other VOCs	ND	varies	varies	varies	SW8260C
GWS2-1024						
Duplicate of	*1,2,3-Trichloropropane*	*ND*	*1.00*	*0.310*	0.0075	SW8260C
GWS1-1024	Chloromethane	10.7	1.00	0.310	190	SW8260C
RPD = 1.0%	cis-1,2-Dichloroethene	3.83	1.00	0.310	36	SW8260C
RPD = 1.6%	**Tetrachloroethene (PCE)**	**91.4**	1.00	0.310	41	SW8260C
RPD = 1.7%	Trichloroethene (TCE)	1.74	1.00	0.310	2.8	SW8260C
	All Other VOCs	ND	varies	varies	varies	SW8260C

[1] Groundwater cleanup criteria are obtained from ADEC 18 AAC 75.345, Table C (October 27, 2018).
AAC = Alaska Administrative Code; ADEC = Alaska Department of Environmental Conservation; µg/L = micrograms per liter;
VOCs = volatile organic compounds; LOQ = limit of quantitation; ND = non-detectable; MDL = method detection limit;
Bold = concentration exceeds the ADEC cleanup criterion.
Italics = The LOQ and/or MDL exceeds the applicable ADEC cleanup criterion.

TABLE 2
ALASKA REAL ESTATE PARKING LOT
4TH AND GAMBELL
ANCHORAGE, ALASKA
ANALYTICAL RESULTS - INDOOR AIR SAMPLES (FEBRUARY 2019)

Sample No.	Analyte	Results ($\mu g/m^3$)	Reporting Limit ($\mu g/m^3$)	Analytical Method	ADEC Target Level ($\mu g/m^3$)[1]	
					Residential	Commercial
ND-IA1-0212	Vinyl Chloride	ND	0.48	Modified TO-15	1.7	28
North Duplex Basement	1,1-Dichloroethene	ND	0.74	Modified TO-15	79	79
	trans-1,2-Dichloroethene	ND	0.74	Modified TO-15	790	790
	cis-1,2-Dichloroethene	ND	0.74	Modified TO-15	N/A	N/A
	Trichloroethene (TCE)	ND	1.0	Modified TO-15	2.0	2.2
	Tetrachloroethene (PCE)	ND	1.3	Modified TO-15	41	41
ND-IA2-0212	Vinyl Chloride	ND	0.37	Modified TO-15	1.7	28
Duplicate of ND-IA1-0212	1,1-Dichloroethene	ND	0.58	Modified TO-15	79	79
	trans-1,2-Dichloroethene	ND	0.58	Modified TO-15	790	790
	cis-1,2-Dichloroethene	ND	0.58	Modified TO-15	N/A	N/A
	Trichloroethene (TCE)	ND	0.78	Modified TO-15	2.0	2.2
	Tetrachloroethene (PCE)	1.1	0.99	Modified TO-15	41	41
SD-IA3-0212	Vinyl Chloride	ND	0.34	Modified TO-15	1.7	28
South Duplex Crawl Space	1,1-Dichloroethene	ND	0.54	Modified TO-15	79	79
	trans-1,2-Dichloroethene	ND	0.54	Modified TO-15	790	790
	cis-1,2-Dichloroethene	ND	0.54	Modified TO-15	N/A	N/A
	Trichloroethene (TCE)	ND	0.72	Modified TO-15	2.0	2.2
	Tetrachloroethene (PCE)	2.2	0.92	Modified TO-15	41	41

Notes:
[1] = Indoor Air Target Levels were obtained from the Alaska Department of Environmental Conservation (ADEC) Vapor Intrusion Guidance For Contaminated Sites, Appendix D - Target Levels for Indoor Air (November 2017).
$\mu g/m^3$ = micrograms per cubic meter; ND = Non-detectable; N/A = Not Available

APPENDIX A
FIELD NOTES

10/24/18 48°F Cloudy

1

1050 - BGES, Kris and evan, onsite.
1055 - MLP Rep. drove by and indicated needles were present in our vicinity and warned use to move with caution.
1105 - Hosing in GW seep pond. Hose & stainless steel screen approx 18 inches from GW seep influent location. Using parastaltic pump and YSI Pro Plus to pump and monitor water quality respectively.

Temp	Cond.	pH	ORP	Time
9.5	214.8	5.90	132.8	11:13
8.2	218.0	6.00	125.6	11:15
7.0	207.0	6.13	116.4	11:17

1120 - Collect 2 GW samples.
1130 - Pack sampling equip
1138 - BGES offsite

Rite in the Rain

12/5/18 20°F Clear

13:00 Schmaltz & Shippen of BGES. Met with Rob Cupples to discuss site access. Began survey in North Unit.

O^2 = 20.9 CO_2 = 800

VOCs = 0

Meter = 15,084.9 Hours
15,085.3 Hrs (North Fan)

Canister #	Vacuum
6L0757	28 in Hg (viable)
6L0641	29 in Hg (viable)
6L0978	29 in Hg (viable)
6L1824	26 in Hg (marginally viable)

14:20 BGES off site

WJS

12/6/18 15°F Clear

15:00 Schmaltz, Shippen of BGES on site. Measuring air velocity

Initial Air Flow
EX1 = 9.3 cfm
EX2 = 13 cfm
measurments in field notes (sheet)

See seperate data sheet for additional information

16:30 BGES off site

WJS

2/11/19 10:26, wjs, jam, vcb, kaf

Sample start time - 1040 (North unit)

ND-IA1-0212 28" of Hg

ND-IA2-0212 29" of Hg

SD-IA3-0212 27" of Hg 1103 (South unit)

Onsite for the collection of indoor air samples for the North & South duplexes located at 736 E. 3rd Ave, Anchorage

See additional data page for Indoor air sampling details

Rob Cupples stopped by when setting IA samplers.

BGES offsite ~11:10Am

2/12/19

10:33Am JAM, WJS of BGES onsite to collect IA summa canister samples

Picked up Indoor Air samples from North & South duplexes.

Outside South duplex (East side of building) a sweet solvent odor was present in the ambient air. There is a print shop to the southeast of the South duplex.

11:10Am Rob Cupples shows up as BGES is leaving. BGES offsite.

FIELD NOTE PAGES

Task 3 – VI Mitigation System Maintenance

The north and south duplexes located at 736 East 3rd Avenue each have an operational VI mitigation system in place. Prior to each indoor air sampling event, BGES will inspect these systems for integrity and to determine if any maintenance may be required. Any damages will be identified and repaired as necessary. BGES personnel will be extremely careful not to puncture and/or damage the vapor barriers during project activities.

FIELD NOTES 12/5 AND 12/6/2018
K. SHIPPEN & W. SCHMALTZ

O&M at North Duplex (active mitigation system):

The inspection activities at the north duplex will include:

- ✓ Documenting the hourly meter reading in the field notebook;
- ✓ Inspecting the integrity of the vapor barrier; several holes (1 inch) seams on wood post not secure seams not secure (50%)
- ✓ Inspecting the integrity of the epoxy coating on the concrete; Good
- ✓ Checking for the presence of moisture or puddles on top of the vapor barrier; none
- ✓ Inspecting the energized exhaust fans for any indications of potential damage;
- ✓ Checking the analog manometers that are located on the vertical piping to verify that the exhaust fans are creating vacuums beneath the vapor barriers. If the red oil on the right side of the manometer drops to zero, the system is not operational. BGES will determine the reason(s) why the system is not operational, then BGES will notify the ADEC Project Manager that the system is not operating, and we will discuss what will be required to repair the system; OK
- ✓ Inspecting both exhaust stacks outside the building for any indications of potential damage;
- ✓ Verifying that the wind turbines are spinning, and noting any unusual noises; and,
- ✓ Checking the exhaust stacks for the presence of water in the spring and fall, during non-freezing conditions, to remove any water (condensation and/or precipitation). A container such as a 5-gallon bucket will be placed beneath the drain valves to capture any water. The container will be labeled as containing hazardous waste and temporarily stored inside the basement until arrangements for disposal can be completed. Any fluids that are recovered will be managed as a F002-listed hazardous waste, and will be disposed of by NRC Alaska within 90 days of generation. NA

The inspector will also verify that the following measures are being adhered to in order to minimize disturbance to the vapor barrier and the aboveground piping sections:

- OK ✓ No heavy and/or sharp objects have been placed on the liner; cinder blocks
- NA ✓ All water and drain line leaks over the vapor barrier are repaired in a timely manner;
- NA ✓ Removing any standing water from the vapor barrier that were caused by the leaks;
- ✓ Avoiding accessing the crawl space with the exception of performing system monitoring events and/or necessary repairs; and,
- ✓ Minimizing disturbance to all of the aboveground piping associated with the mitigation system.

The system will also be monitored for performance by conducting the following activities during each sampling event and documenting the results on the vapor mitigation system data sheet (Attachment 1):

Field Notes (continued) 12/5 & 12/6/2018

- ✓ The air velocity will be measured with a handheld anemometer at the sampling port located adjacent to each analog manometer in the vertical piping;
- ✓ The vacuum reading on each analog manometer will be documented;
- ✓ The vacuum in each sub-slab vapor sampling point will be measured using a digital manometer and documented; and,
- ✓ The air flow in the piping will be calculated in order to optimize the mitigation system by balancing the air flow between the vapor extraction pipes. The valves will be adjusted, if necessary, and all changes in the valve positions will be documented. The velocity and vacuum readings will be measured again and documented on the vapor mitigation system data sheet (Attachment 1) after adjusting the valve positions.

If the system or one of the exhaust fans stops working, the troubleshooting procedures to be performed will consist of the following:

- Verify whether or not the circuit breaker and the power switch are in the "ON" position;
- If the power is on and there is no air moving through the system and the manometer reading(s) are zero, then there may be blockage in the conveyance piping or the exhaust stack piping. The potential source of the blockage will be evaluated and removed, as feasible. During the winter months, the blockage could be caused by snow or ice buildup, which will likely be temporary. In order to avoid damaging the exhaust piping, the ice will not be removed. During warmer months, blockage may be caused by debris, animal nesting, or other issues. If such a blockage is identified in the exhaust piping, then a lower than average (or decreasing) reading in the manometer would likely be observed and this blockage will likely require removal; and,
- If the power is on and there is no blockage, then a non-operational fan is likely the problem. The fan will then be evaluated for blockage and/or failure. If the fan is the problem, then it will be recommended to be repaired or replaced.

All field observations and readings collected during each routine inspection of the VI mitigation system in the north duplex will be documented in either a field notebook or on the vapor mitigation system data sheet (Attachment 1).

O&M at South Duplex (passive mitigation system):

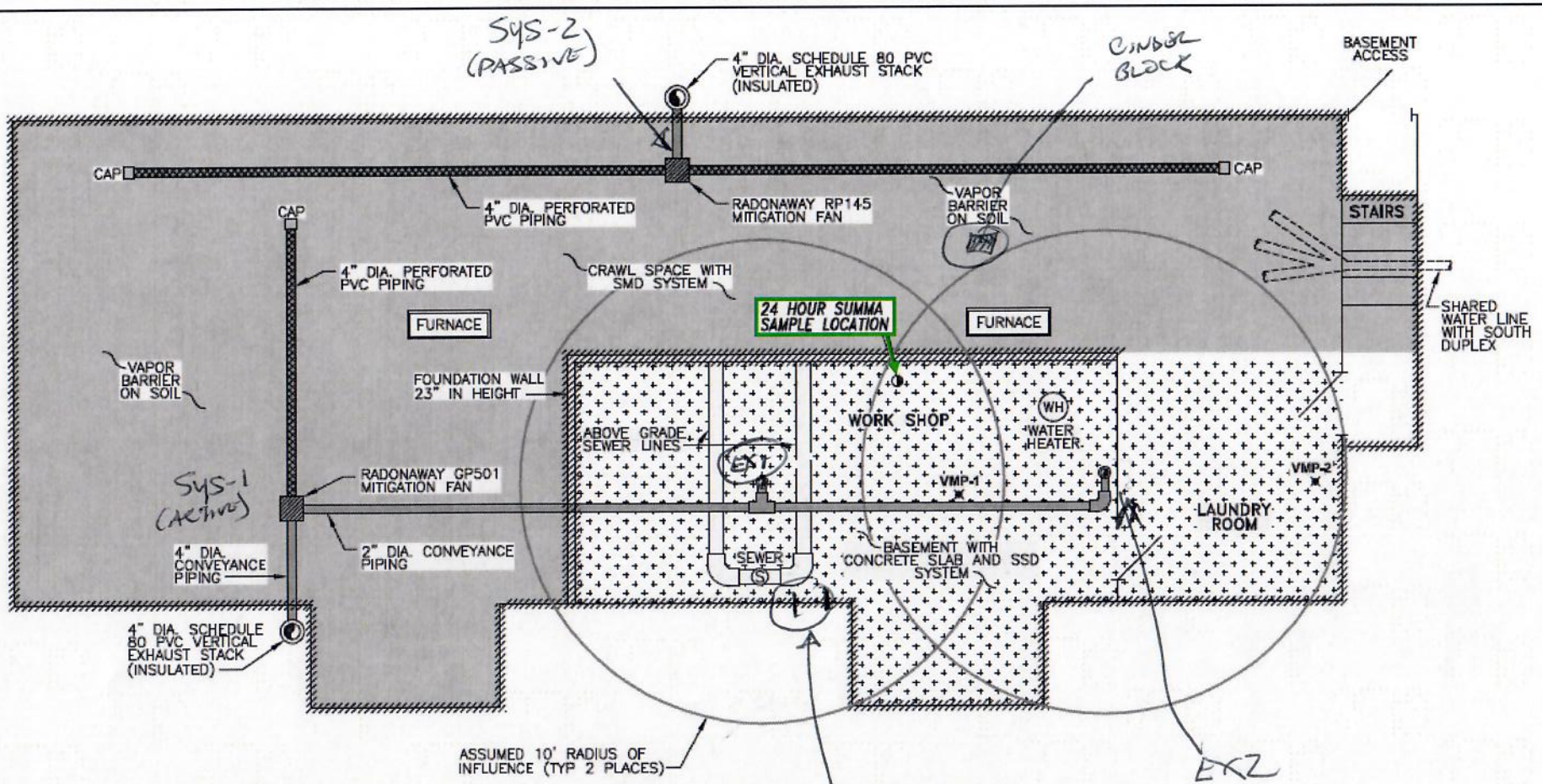
Atmosphere before entering crawl space

The inspection activities at the south duplex will include:

O2 20.9 CO2 580 VOC 0

- Inspecting the integrity of the vapor barrier; seams need tape
- Inspecting the integrity of the barrier tape on the concrete walls; numerous places not attached
- ✓ Checking for the presence of moisture or puddles on top of the vapor barrier;
- ✓ Inspecting the exhaust stacks and ventilation fans for any indications of potential damage;
- ✓ Verifying that the wind turbines are spinning, and noting any unusual noises; and,
- Checking the exhaust stacks for the presence of water in the spring and fall, during non-freezing conditions, to remove any water (condensation and/or precipitation). A container such as a 5-gallon bucket will be placed beneath the drain valves to capture any water. The container will be labeled as containing hazardous waste and temporarily stored inside the crawl space until arrangements for disposal can be completed. Any fluids that are recovered will be managed as a F002-listed hazardous waste, and will be disposed of by NRC Alaska within 90 days of generation.

N/A Frozen



Source: Ahtna Engineering Services, LLC *Vapor Mitigation Systems Monitoring, Maintenance, and Repair Plans*

Velocity
EX1 = 1.35
EX2 = 1.9
SYS-1 = 0.5

WALL NEEDS SEAL FOR VAPOR BARRIER

LEGEND

- VMP-1 — VAPOR MONITORING POINT LOCATION
- INDOOR AIR SAMPLE LOCATION
- 2" DIAMETER EXTRACTION WELL LOCATION
- VAPOR BARRIER ON SOIL
- RETRO-COAT APPLICATION AREA
- FOUNDATION WALLS WHERE RETRO-COAT WAS APPLIED
- PERFORATED PVC PIPE
- CONVEYANCE PIPE

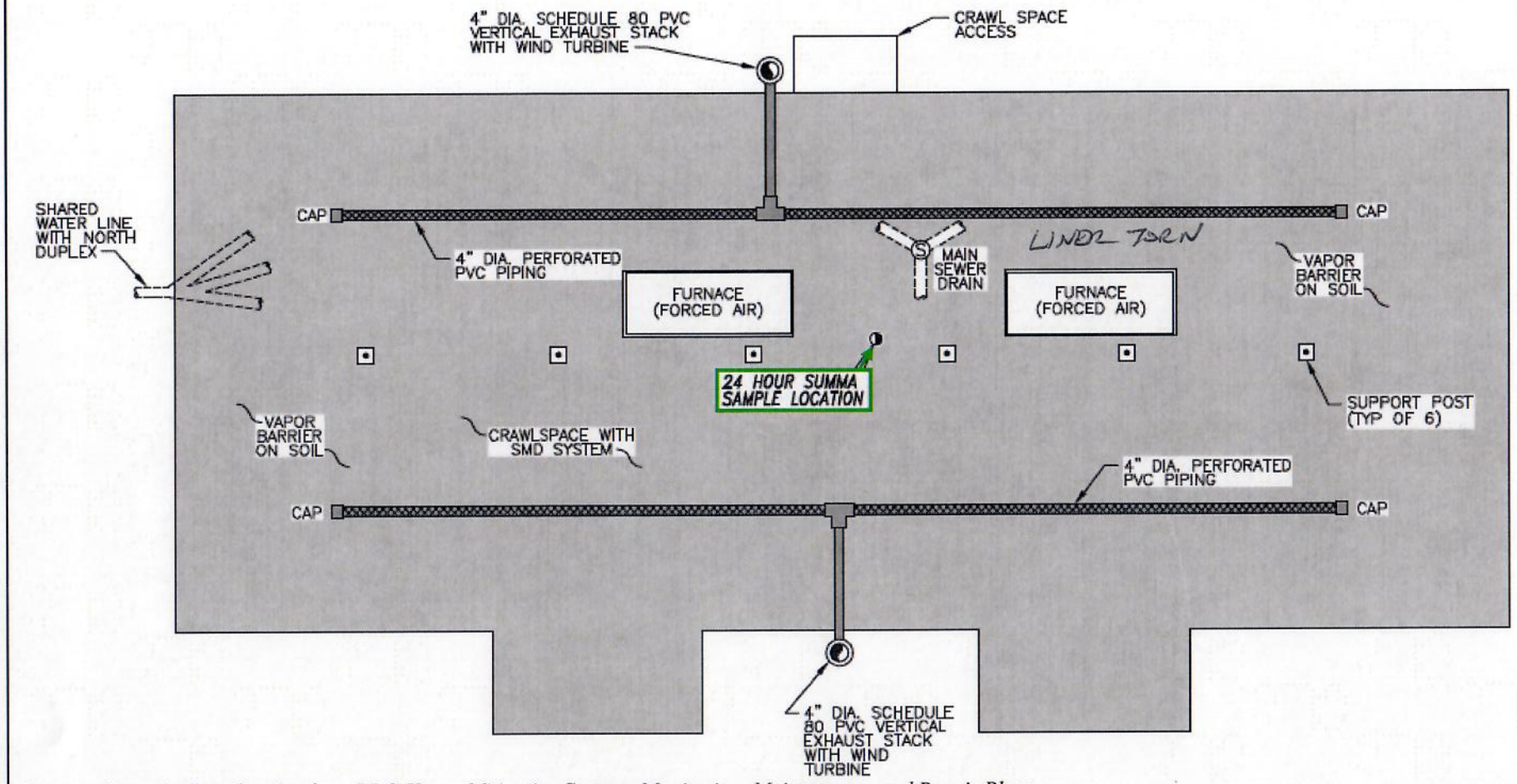
0 5 10 20

Approximate Scale in Feet

Alaska Real Estate Parking Lot
Anchorage, Alaska
Vapor Intrusion Mitigation System - North Duplex

BGES, INC. ENVIRONMENTAL CONSULTANTS	**September 2018**	**Figure 2**

Field Notes (Continued) 12/5 & 12/6/2018



Source: Ahtna Engineering Services, LLC *Vapor Mitigation Systems Monitoring, Maintenance, and Repair Plans*

LEGEND

- INDOOR AIR SAMPLE LOCATION
- VAPOR BARRIER ON SOIL
- RETRO–COAT APPLICATION AREA
- FOUNDATION WALLS WHERE RETRO–COAT WILL BE APPLIED
- PERFORATED PVC PIPE
- CONVEYANCE PIPE

0 5 10 20

Approximate Scale in Feet

Alaska Real Estate Parking Lot
Anchorage, Alaska
Vapor Intrusion Mitigation System - South Duplex

BGES, INC. ENVIRONMENTAL CONSULTANTS | **September 2018** | **Figure 3**

FIELD NOTES (CONTINUED) 12/5-6/2018

VAPOR MITIGATION SYSTEM DATA SHEET

Project Number: 18-052-01 **Client:** ADEC

Project Name: Alaska Real Estate Parking Lot (4th & Gambell) **Sampler:** K. Shippen & W. Schmeltz

Weather: ~~12/5/18 ~48°F, Windy, 30.46 "Hg~~ 30F, 8mph; 30.11"Hg **Date/Time:** 12/5/18 @ 1300

12/6/18 ~30°F, Calm; 29.3" Hg 12/6/18 @ 1500

736 EAST 3RD AVENUE - NORTH DUPLEX

Location ID	Vacuum (InWC)		Velocity (Ft/min)		Flow (CFM)		Valve Position (% open)		Comments
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	
SYSTEM 1 (SMD AND EXTRACTION WELLS)									
EX-1	—	—	1.35	—	9.3	9.8	45%	50%	
EX-2	—	—	1.9	—	13	9.7	55%	50%	
SYS-1 (4" DIA)	66.5	—	0.5	—	—	-	—	—	
SYSTEM 2 (SMD SYSTEM)									
SYS-2	134	—	—	—	—	—	—	—	
VAPOR MONITORING POINTS									
VMP-1 (North)	0.15								
VMP-2 (South)	0.10								

Comments/Observations:

SYS-2 IS A PASSIVE SYSTEM.

INDOOR AIR / AMBIENT AIR SAMPLING DATA SHEET

Date: Feb 11, 2019

Client: ADEC

Project Location: AK Real Estate

Barometric Pressure: Day 1: 30.22 in. Hg @ 12:42pm

Day 2:

Sampler(s): WJS, jam

Project #: 18-052-01

Precipitation/Weather: 12:42pm Day 1: 21°F, 86% Humidity, Wind @ 5 N/NW

Day 2: 12:23 pm; 73% Humidity, 33°F; Wind @ 13MPH

Sampling Equipment: 6-liter Summa Canisters and flow controllers

Sample Location	Sample ID No.	1-Liter Summa Canister ID No.	Canister Certification Label No.	Flow Controller / Flow Rate (ml/min)	Mini Shut-In Test Completed?	Humidity (%)			Temperature (degrees F)			Sample Collection Time			Canister Vacuum (" of Hg)		
						Initial	Middle	Final	Initial	Middle	Final	Initial	Middle	Final	Initial	Middle	Final
North Duplex	ND-IA1-0212	6L0757	121869	~~3.5~~ 3.5	✓	23	NA	39%	59	NA	54°	1041	NA	1041	28	NA	9.5
North Duplex Duplicate	ND-IA2-0212	6L0978	121869	3.5	✓	23	NA	39%	59	NA	54°	1041	NA	1041	29	NA	4.8
South Duplex	SD-IA3-0212	6L0641	121869	3.5	✓	NA	NA	NA	NA	NA	NA	1103	NA	1103	27	NA	4.0

Comments:

No outdoor ambient air samples were collected.

North Duplex - 8 samples collected in basement area.

South Duplex - sample collected from crawl space.

North Duplex	South Duplex
PID = 0	PID = 0
CO_2 = 560	CO_2 = 330
O_2 = 20.9	O_2 = 20.9

2/12/19 Ambient air - sweet solvent ~~odor~~ outside South Duplex

APPENDIX B
BUILDING SURVEY AND
INDOOR AIR QUESTIONNAIRE

ALASKA DEPARTMENT OF ENVIRONMENAL CONSERVATION
BUILDING INVENTORY AND INDOOR AIR SAMPLING QUESTIONNAIRE

This form should be prepared by a person familiar with indoor air assessments with assistance from a person knowledgeable about the building. Complete this form for each building where interior samples (e.g., indoor air, crawl space, or subslab soil gas samples) will be collected. Section I of this form should be used to assist in choosing an investigative strategy during workplan development. Section II should be used to assist in identification of complicating factors during a presampling building walk-through.

Preparer's Name WILLIAM SCHMALTZ Date/Time Prepared 12/5/2018

Preparer's Affiliation BGES, Inc. Phone No. 644-2900

Purpose of Investigation INDOOR AIR SAMPLING FOR EVALUATION OF VI MITIGATION SYSTEM IN BASEMENT

SECTION I: BUILDING INVENTORY

1. OCCUPANT OR BUILDING PERSONNEL:

Interviewed: Y / (N)

Last Name _____ First Name _____

Address _____

City _____

Phone No. _____

Number of Occupants/people at this location _____ Age of Occupants _____

2. OWNER or LANDLORD: (Check if same as occupant ____.)

Interviewed: (Y) / N

Last Name CUPPLES First Name Rob

Address _____

City _____

Phone No. _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response.)

Residential	School	(Commercial)/Multi-use BED & BREAKFAST
Industrial	Church	Other _____

If the property is residential, what type? (Circle appropriate response.)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouse/Condo
Modular	Log Home	(Other) DUPLEX FOR RENTAL

If multiple units, how many? 2

If the property is commercial, what type?

Business types(s) B&B & BREAKFAST

Does it include residences (i.e., multi-use)? Y / (N) If yes, how many?

Other characteristics:

Number of floors 1.5 Building age

Is the building insulated? (Y) / N How airtight? Tight / (Average) / Not Tight

Have occupants noticed chemical odors in the building? Y / N

If yes, please describe:

4. AIRFLOW

Use air current tubes, tracer smoke, or knowledge about the building to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow in building near suspected source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply.)

a. Above-grade construction:	wood frame	log	concrete	brick
	constructed on pilings with enclosed air space		constructed on pilings with open air space	
b. Basement type:	full	crawlspace	slab-on-grade	other_____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	unsealed	sealed	sealed with_____	
e. Foundation walls:	poured	block	stone	other _____
f. Foundation walls:	unsealed	sealed	sealed with _____	
g. The basement is:	wet	damp	dry	
h. The basement is:	finished	unfinished	partially finished	
i. Sump present?	Y / N			
j. Water in sump?	Y / N / not applicable			

Basement or lowest level depth below grade_____(feet).

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, and drains).

_____

_____

6. **HEATING, VENTING, and AIR CONDITIONING** (Circle all that apply.)

Type of heating system(s) used in this building: (Circle all that apply – not just primary.)

Hot air circulation	Heat pump	Hot water baseboard	
Space heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other_____

The primary type of fuel used is:

Natural gas	Fuel oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank is fueled by:_____

Boiler/furnace is located in: (Basement) Outdoors Main floor Other_____

Do any of the heating appliances have cold-air intakes? Y / N

Type of air conditioning or ventilation used in this building:

Central air	Window units	Open windows	None
Commercial HVAC	Heat-recovery system	Passive air system	

Are there air distribution ducts present? Y / N

Describe the ventilation system in the building, its condition where visible, and the tightness of duct joints. Indicate the location of air supply and exhaust points on the floor plan.

VAPOR INTRUSION

Is there a radon mitigation system for the building/structure? (Y) / N Date of Installation 2014

Is the system active or passive? (Active)/(Passive) THERE IS 1 ACTIVE SYSTEM & 1 PASSIVE SYSTEM IN THE NORTH DUPLEX.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time (Occasionally) Seldom Almost never

Level	**General Use of Each Floor (e.g., family room, bedroom, laundry, workshop, or storage).**
Basement	STORAGE AND LAUNDRY ROOM
1st Floor	RENTAL - LIVING SPACES & BEDROOMS
2nd Floor	NA
3rd Floor	NA

8. WATER AND SEWAGE

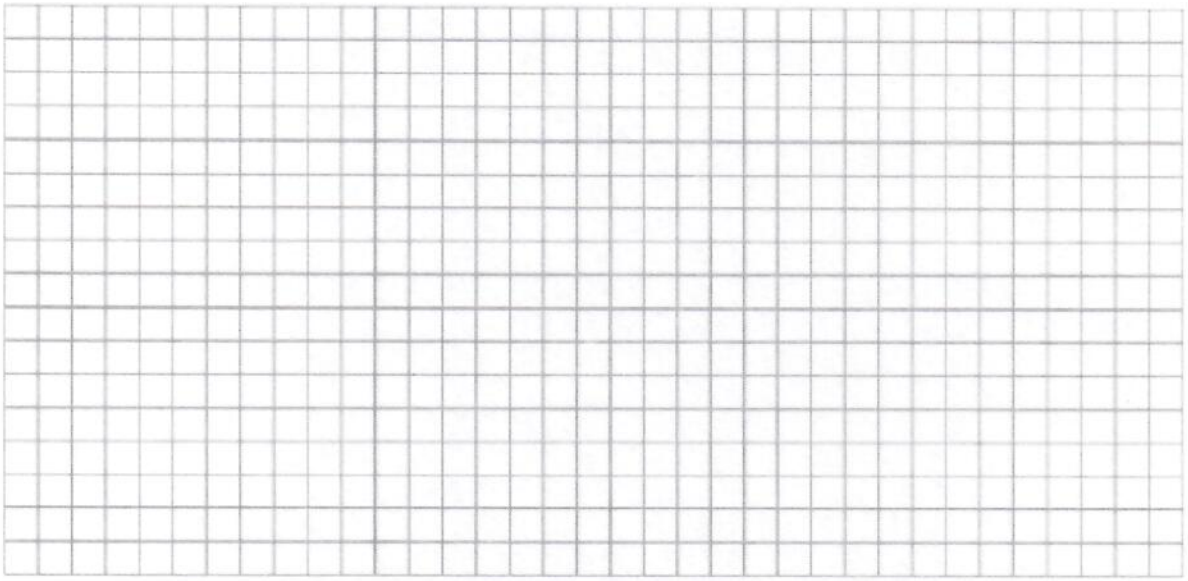
Water supply: (Public water) Drilled well Driven well Dug well Other

Sewage disposal: (Public sewer) Septic tank Leach field Dry well Other

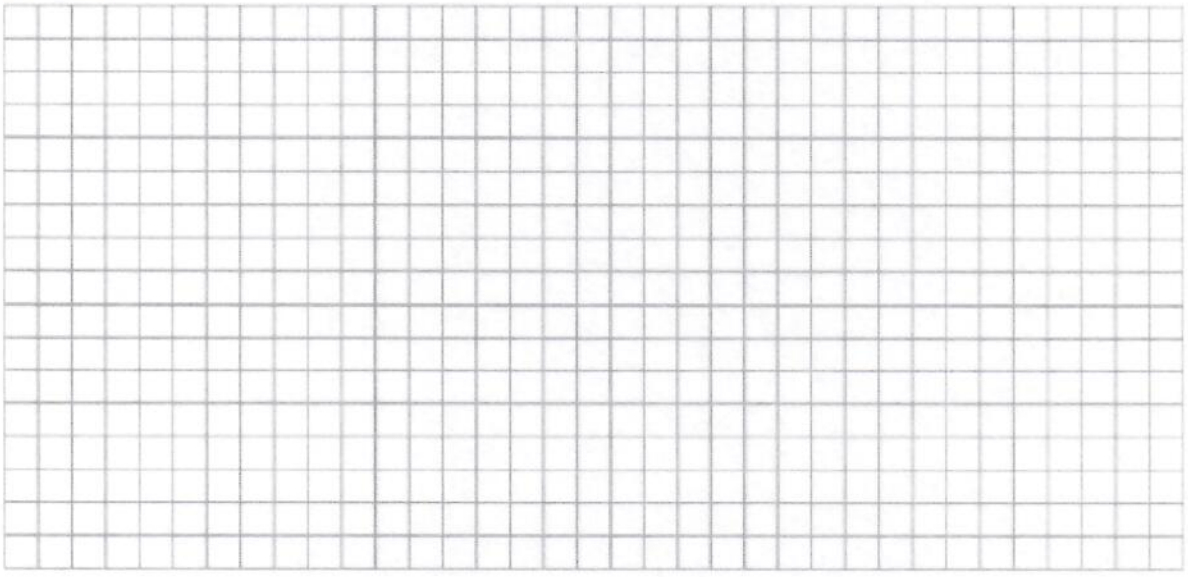
9. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note that.

Basement:



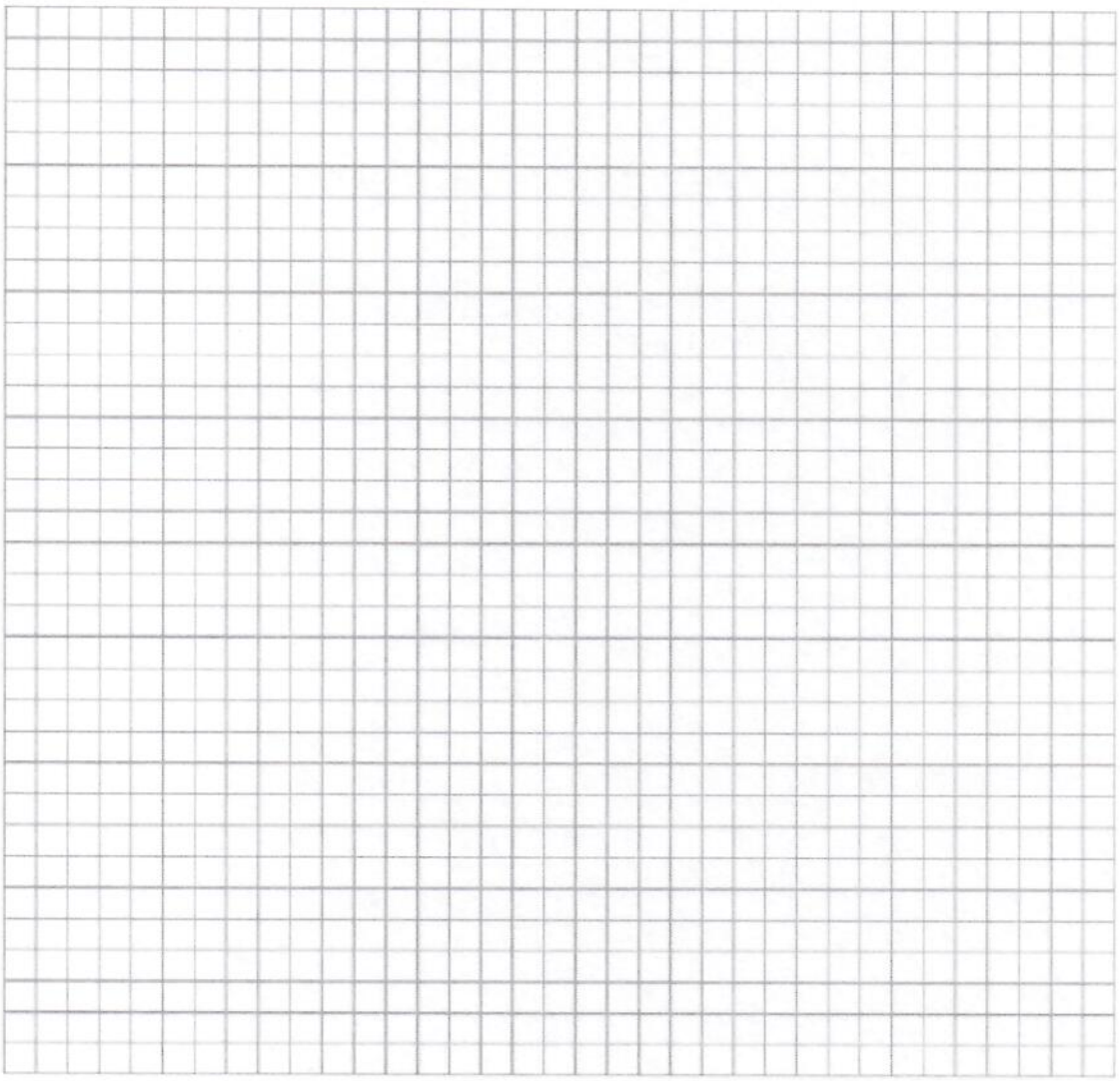
First Floor:



10. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (e.g., industries, gas stations, repair shops, landfills, etc.), outdoor air sampling locations and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the location of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



2/11/19 COMPLETE BUILDING SURVEY WAS PERFORMED PREVIOUSLY. JM

SECTION II: INDOOR AIR SAMPLING QUESTIONNAIRE

This section should be completed during a presampling walk-through. If indoor air sources of COCs are identified and removed, consider ventilating the building prior to sampling. However, ventilation and heating systems should be operating normally for 24 hours prior to sampling.

a) 1. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

Is there an attached garage? Y / (N)

Does the garage have a separate heating unit? Y / N / (NA)

Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, ATV, or car) Y / N / (NA)

Please specify_____

Has the building ever had a fire? Y / (N) When?_____

Is a kerosene or unvented gas space heater present? Y / (N) Where?_____

Is there a workshop or hobby/craft area? (Y) / N Where and type BASEMENT – WORKSHOP

Is there smoking in the building? Y / (N) How frequently?_____

Has painting/staining been done in the last six months? Y / (N) Where and when?_____

Is there new carpet, drapes or other textiles? Y / (N) Where and when?_____

Is there a kitchen exhaust fan? (Y) N If yes, where is it vented?_____

Is there a bathroom exhaust fan? (Y) N If yes, where is it vented?_____

Is there a clothes dryer? (Y) / (N) JSS If yes, is it vented outside? (Y) / N In N. Unit Basement

Are cleaning products, cosmetic products, or pesticides used that could interfere with indoor air sampling? (Y) / N

If yes, please describe CLEANING PRODUCTS (SEE PHOTOS); WATER SEAL, BRUSH CLEANER (PAINT BRUSH); PAINT, CAULKING, ETC.

Do any of the building occupants use solvents at work? Y / N / (NA) BNB FACILITY

(For example, is the building used for chemical manufacturing or a laboratory, auto mechanic or auto body shop, painting shop, fuel oil delivery area, or do any of the occupants work as a boiler mechanic, pesticide applicator, or cosmetologist?)

If yes, what types of solvents are used?_____

If yes, are his/her/their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry cleaning regularly (weekly) No

Yes, use dry cleaning infrequently (monthly or less) (Unknown)

Yes, work at a dry cleaning services

2. **PRODUCT INVENTORY FORM** (For use during building walk-through.)

Make and model of field instrument used: GX - 6000

List specific products found in the residence that have the potential to affect indoor air quality:

SEE PHOTOS FOR PRODUCTS STORED IN BASEMENT.

Location	Product Description	Site (units)	Condition[1]	Chemical Ingredients	Field Instrument Reading (units) PPM	Photo[2] Y / N
BASEMENT	CLOROX WIPES	HOUSE HOLD SIZE	GOOD		0	Y
	LYSOL AIR SPRAY					
	FABRIC SOFTNER					
	DRAIN CLOG REMOVER					
	WOOLITE RUG CLEANER					
	GLASS CLEANER					
	LAUNDRY PACS					
	BATHROOM CLEANER					
	DISHWASHING SOAP					
	CAULKING					
	PAINT BRUSH CLEANER					
	WATER SEAL					
	PAINT					
	KILZ					
	ETC.					

[1] Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D).**

[2] Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

This form was modified from:

ITRC (Interstate Technology and Regulatory Council). 2007. *Vapor Intrusion Pathway: A Practical Guideline*. VI-1. Washington, D.C.: Interstate Technology and Regulatory Council, Vapor Intrusion Team. Available at: www.itrcweb.org.

APPENDIX C
LABORATORY ANALYTICAL DATA

Laboratory Report of Analysis

To: BGES Inc.
1042 E. 6th Ave.,
Anchorage, AK 99501
(907)644-2900

Report Number: **1186096**

Client Project: **4th and Gambell**

Dear Jayne Martin,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jillian at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

SGS North America Inc.
Environmental Services - Alaska Division
Project Manager

Jillian Vlahovich
2018.10.26
15:13:46 -08'00'

Jillian Vlahovich Date
Project Manager
Jillian.Vlahovich@sgs.com

Print Date: 10/26/2018 2:03:22PM

Results via Engage

Case Narrative

SGS Client: **BGES Inc.**
SGS Project: **1186096**
Project Name/Site: **4th and Gambell**
Project Contact: **Jayne Martin**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
GWS1-1024	1186096001	10/24/2018	10/24/2018	Water (Surface, Eff., Ground)
GWS2-1024	1186096002	10/24/2018	10/24/2018	Water (Surface, Eff., Ground)
Trip Blank	1186096003	10/24/2018	10/24/2018	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	Volatile Organic Compounds (W) FULL

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Detectable Results Summary

Client Sample ID: **GWS1-1024**
Lab Sample ID: 1186096001
Volatile GC/MS

Parameter	Result	Units
cis-1,2-Dichloroethene	3.87	ug/L
Tetrachloroethene	92.9	ug/L
Trichloroethene	1.77	ug/L

Client Sample ID: **GWS2-1024**
Lab Sample ID: 1186096002
Volatile GC/MS

Parameter	Result	Units
Chloromethane	10.7	ug/L
cis-1,2-Dichloroethene	3.83	ug/L
Tetrachloroethene	91.4	ug/L
Trichloroethene	1.74	ug/L

Client Sample ID: **Trip Blank**
Lab Sample ID: 1186096003
Volatile GC/MS

Parameter	Result	Units
Bromoform	1.03	ug/L
Dibromochloromethane	1.00	ug/L

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Results of **GWS1-1024**

Client Sample ID: **GWS1-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096001
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		10/25/18 15:54
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		10/25/18 15:54
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		10/25/18 15:54
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,2-Dichloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 15:54
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		10/25/18 15:54
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 15:54
Benzene	0.400	U	0.400	0.120	ug/L	1		10/25/18 15:54
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
Bromoform	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
Bromomethane	5.00	U	5.00	1.50	ug/L	1		10/25/18 15:54
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		10/25/18 15:54
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 15:54
Chloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 15:54

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Results of **GWS1-1024**

Client Sample ID: **GWS1-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096001
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Chloromethane	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
cis-1,2-Dichloroethene	3.87		1.00	0.310	ug/L	1		10/25/18 15:54
cis-1,3-Dichloropropene	0.500 U		0.500	0.150	ug/L	1		10/25/18 15:54
Dibromochloromethane	0.500 U		0.500	0.150	ug/L	1		10/25/18 15:54
Dibromomethane	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Dichlorodifluoromethane	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Ethylbenzene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Freon-113	10.0 U		10.0	3.10	ug/L	1		10/25/18 15:54
Hexachlorobutadiene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Isopropylbenzene (Cumene)	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Methylene chloride	5.00 U		5.00	1.00	ug/L	1		10/25/18 15:54
Methyl-t-butyl ether	10.0 U		10.0	3.10	ug/L	1		10/25/18 15:54
Naphthalene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
n-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
n-Propylbenzene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
o-Xylene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
P & M -Xylene	2.00 U		2.00	0.620	ug/L	1		10/25/18 15:54
sec-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Styrene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
tert-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Tetrachloroethene	92.9		1.00	0.310	ug/L	1		10/25/18 15:54
Toluene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
trans-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
trans-1,3-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Trichloroethene	1.77		1.00	0.310	ug/L	1		10/25/18 15:54
Trichlorofluoromethane	1.00 U		1.00	0.310	ug/L	1		10/25/18 15:54
Vinyl acetate	10.0 U		10.0	3.10	ug/L	1		10/25/18 15:54
Vinyl chloride	0.150 U		0.150	0.0500	ug/L	1		10/25/18 15:54
Xylenes (total)	3.00 U		3.00	1.00	ug/L	1		10/25/18 15:54
Surrogates								
1,2-Dichloroethane-D4 (surr)	95.9		81-118		%	1		10/25/18 15:54
4-Bromofluorobenzene (surr)	101		85-114		%	1		10/25/18 15:54
Toluene-d8 (surr)	102		89-112		%	1		10/25/18 15:54

Print Date: 10/26/2018 2:03:28PM

Results of **GWS1-1024**

Client Sample ID: **GWS1-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096001
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS18499
Analytical Method: SW8260C
Analyst: FDR
Analytical Date/Time: 10/25/18 15:54
Container ID: 1186096001-A

Prep Batch: VXX33432
Prep Method: SW5030B
Prep Date/Time: 10/25/18 10:42
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/26/2018 2:03:28PM

Results of **GWS2-1024**

Client Sample ID: **GWS2-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096002
Lab Project ID: 1186096

Collection Date: 10/24/18 11:24
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		10/25/18 16:11
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		10/25/18 16:11
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,2-Dichloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
Benzene	0.400	U	0.400	0.120	ug/L	1		10/25/18 16:11
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
Bromoform	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Bromomethane	5.00	U	5.00	1.50	ug/L	1		10/25/18 16:11
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
Chloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11

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Results of **GWS2-1024**

Client Sample ID: **GWS2-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096002
Lab Project ID: 1186096

Collection Date: 10/24/18 11:24
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Chloromethane	10.7		1.00	0.310	ug/L	1		10/25/18 16:11
cis-1,2-Dichloroethene	3.83		1.00	0.310	ug/L	1		10/25/18 16:11
cis-1,3-Dichloropropene	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
Dibromochloromethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 16:11
Dibromomethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Dichlorodifluoromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Ethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Freon-113	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
Hexachlorobutadiene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Isopropylbenzene (Cumene)	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Methylene chloride	5.00	U	5.00	1.00	ug/L	1		10/25/18 16:11
Methyl-t-butyl ether	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
Naphthalene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
n-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
n-Propylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
o-Xylene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
P & M -Xylene	2.00	U	2.00	0.620	ug/L	1		10/25/18 16:11
sec-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Styrene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
tert-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Tetrachloroethene	91.4		1.00	0.310	ug/L	1		10/25/18 16:11
Toluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
trans-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
trans-1,3-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Trichloroethene	1.74		1.00	0.310	ug/L	1		10/25/18 16:11
Trichlorofluoromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 16:11
Vinyl acetate	10.0	U	10.0	3.10	ug/L	1		10/25/18 16:11
Vinyl chloride	0.150	U	0.150	0.0500	ug/L	1		10/25/18 16:11
Xylenes (total)	3.00	U	3.00	1.00	ug/L	1		10/25/18 16:11
Surrogates								
1,2-Dichloroethane-D4 (surr)	98.2		81-118		%	1		10/25/18 16:11
4-Bromofluorobenzene (surr)	103		85-114		%	1		10/25/18 16:11
Toluene-d8 (surr)	103		89-112		%	1		10/25/18 16:11

Results of **GWS2-1024**

Client Sample ID: **GWS2-1024**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096002
Lab Project ID: 1186096

Collection Date: 10/24/18 11:24
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS18499
Analytical Method: SW8260C
Analyst: FDR
Analytical Date/Time: 10/25/18 16:11
Container ID: 1186096002-A

Prep Batch: VXX33432
Prep Method: SW5030B
Prep Date/Time: 10/25/18 10:42
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096003
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		10/25/18 14:11
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		10/25/18 14:11
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,2-Dichloroethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
Benzene	0.400	U	0.400	0.120	ug/L	1		10/25/18 14:11
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
Bromoform	1.03		1.00	0.310	ug/L	1		10/25/18 14:11
Bromomethane	5.00	U	5.00	1.50	ug/L	1		10/25/18 14:11
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
Chloroethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11

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Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096003
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Chloromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
cis-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
cis-1,3-Dichloropropene	0.500	U	0.500	0.150	ug/L	1		10/25/18 14:11
Dibromochloromethane	1.00		0.500	0.150	ug/L	1		10/25/18 14:11
Dibromomethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Dichlorodifluoromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Ethylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Freon-113	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
Hexachlorobutadiene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Isopropylbenzene (Cumene)	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Methylene chloride	5.00	U	5.00	1.00	ug/L	1		10/25/18 14:11
Methyl-t-butyl ether	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
Naphthalene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
n-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
n-Propylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
o-Xylene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
P & M -Xylene	2.00	U	2.00	0.620	ug/L	1		10/25/18 14:11
sec-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Styrene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
tert-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Tetrachloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Toluene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
trans-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
trans-1,3-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Trichloroethene	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Trichlorofluoromethane	1.00	U	1.00	0.310	ug/L	1		10/25/18 14:11
Vinyl acetate	10.0	U	10.0	3.10	ug/L	1		10/25/18 14:11
Vinyl chloride	0.150	U	0.150	0.0500	ug/L	1		10/25/18 14:11
Xylenes (total)	3.00	U	3.00	1.00	ug/L	1		10/25/18 14:11
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.8		81-118		%	1		10/25/18 14:11
4-Bromofluorobenzene (surr)	103		85-114		%	1		10/25/18 14:11
Toluene-d8 (surr)	101		89-112		%	1		10/25/18 14:11

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Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **4th and Gambell**
Lab Sample ID: 1186096003
Lab Project ID: 1186096

Collection Date: 10/24/18 11:20
Received Date: 10/24/18 14:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS18499
Analytical Method: SW8260C
Analyst: FDR
Analytical Date/Time: 10/25/18 14:11
Container ID: 1186096003-A

Prep Batch: VXX33432
Prep Method: SW5030B
Prep Date/Time: 10/25/18 10:42
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/26/2018 2:03:28PM

Method Blank

Blank ID: MB for HBN 1788308 [VXX/33432]
Blank Lab ID: 1485249

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1186096001, 1186096002, 1186096003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.150	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	2.50U	5.00	1.50	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Method Blank

Blank ID: MB for HBN 1788308 [VXX/33432]
Blank Lab ID: 1485249

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1186096001, 1186096002, 1186096003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	2.50U	5.00	1.00	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	96.5	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	101	89-112		%

Method Blank

Blank ID: MB for HBN 1788308 [VXX/33432]
Blank Lab ID: 1485249

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1186096001, 1186096002, 1186096003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS18499
Analytical Method: SW8260C
Instrument: VPA 780/5975 GC/MS
Analyst: FDR
Analytical Date/Time: 10/25/2018 10:49:00AM

Prep Batch: VXX33432
Prep Method: SW5030B
Prep Date/Time: 10/25/2018 10:42:53AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1186096 [VXX33432]
Blank Spike Lab ID: 1485250
Date Analyzed: 10/25/2018 11:06

Spike Duplicate ID: LCSD for HBN 1186096 [VXX33432]
Spike Duplicate Lab ID: 1485251
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186096001, 1186096002, 1186096003

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	30	30.9	103	30	30.1	100	(78-124)	2.60	(< 20)
1,1,1-Trichloroethane	30	28.0	93	30	27.8	93	(74-131)	0.57	(< 20)
1,1,2,2-Tetrachloroethane	30	30.8	103	30	30.2	101	(71-121)	1.90	(< 20)
1,1,2-Trichloroethane	30	30.1	100	30	29.9	100	(80-119)	0.67	(< 20)
1,1-Dichloroethane	30	28.0	94	30	27.7	92	(77-125)	1.10	(< 20)
1,1-Dichloroethene	30	27.4	91	30	27.4	91	(71-131)	0.11	(< 20)
1,1-Dichloropropene	30	28.8	96	30	28.5	95	(79-125)	1.10	(< 20)
1,2,3-Trichlorobenzene	30	31.1	104	30	28.3	94	(69-129)	9.60	(< 20)
1,2,3-Trichloropropane	30	30.4	101	30	29.7	99	(73-122)	2.20	(< 20)
1,2,4-Trichlorobenzene	30	31.2	104	30	29.3	98	(69-130)	6.40	(< 20)
1,2,4-Trimethylbenzene	30	31.6	105	30	31.2	104	(79-124)	1.10	(< 20)
1,2-Dibromo-3-chloropropane	30	31.4	105	30	29.3	98	(62-128)	7.00	(< 20)
1,2-Dibromoethane	30	30.1	100	30	30.4	101	(77-121)	0.89	(< 20)
1,2-Dichlorobenzene	30	29.9	100	30	29.7	99	(80-119)	0.71	(< 20)
1,2-Dichloroethane	30	27.5	92	30	27.6	92	(73-128)	0.40	(< 20)
1,2-Dichloropropane	30	29.7	99	30	29.2	98	(78-122)	1.50	(< 20)
1,3,5-Trimethylbenzene	30	31.7	106	30	30.7	102	(75-124)	3.40	(< 20)
1,3-Dichlorobenzene	30	30.8	103	30	30.2	101	(80-119)	1.80	(< 20)
1,3-Dichloropropane	30	30.1	100	30	30.0	100	(80-119)	0.50	(< 20)
1,4-Dichlorobenzene	30	30.4	101	30	30.2	101	(79-118)	0.86	(< 20)
2,2-Dichloropropane	30	28.5	95	30	27.8	93	(60-139)	2.30	(< 20)
2-Butanone (MEK)	90	89.0	99	90	85.7	95	(56-143)	3.80	(< 20)
2-Chlorotoluene	30	31.1	104	30	30.4	101	(79-122)	2.20	(< 20)
2-Hexanone	90	96.1	107	90	92.8	103	(57-139)	3.40	(< 20)
4-Chlorotoluene	30	31.0	103	30	30.6	102	(78-122)	1.20	(< 20)
4-Isopropyltoluene	30	31.7	106	30	31.1	104	(77-127)	2.10	(< 20)
4-Methyl-2-pentanone (MIBK)	90	95.5	106	90	93.3	104	(67-130)	2.40	(< 20)
Benzene	30	28.7	96	30	28.3	94	(79-120)	1.30	(< 20)
Bromobenzene	30	30.3	101	30	29.8	100	(80-120)	1.50	(< 20)
Bromochloromethane	30	28.0	93	30	28.2	94	(78-123)	0.82	(< 20)
Bromodichloromethane	30	29.1	97	30	29.1	97	(79-125)	0.03	(< 20)
Bromoform	30	31.7	106	30	31.6	105	(66-130)	0.22	(< 20)
Bromomethane	30	28.0	93	30	27.8	93	(53-141)	0.75	(< 20)
Carbon disulfide	45	41.6	92	45	41.4	92	(64-133)	0.58	(< 20)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186096 [VXX33432]
Blank Spike Lab ID: 1485250
Date Analyzed: 10/25/2018 11:06

Spike Duplicate ID: LCSD for HBN 1186096 [VXX33432]
Spike Duplicate Lab ID: 1485251
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186096001, 1186096002, 1186096003

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Carbon tetrachloride	30	29.3	98	30	29.3	98	(72-136)	0.07	(< 20)
Chlorobenzene	30	28.8	96	30	28.2	94	(82-118)	2.00	(< 20)
Chloroethane	30	28.2	94	30	27.8	93	(60-138)	1.10	(< 20)
Chloroform	30	26.9	90	30	26.6	89	(79-124)	0.82	(< 20)
Chloromethane	30	31.3	104	30	30.8	103	(50-139)	1.60	(< 20)
cis-1,2-Dichloroethene	30	28.0	93	30	27.9	93	(78-123)	0.43	(< 20)
cis-1,3-Dichloropropene	30	30.1	100	30	30.4	101	(75-124)	0.89	(< 20)
Dibromochloromethane	30	30.7	102	30	30.6	102	(74-126)	0.29	(< 20)
Dibromomethane	30	28.2	94	30	28.7	96	(79-123)	2.00	(< 20)
Dichlorodifluoromethane	30	27.4	91	30	27.4	91	(32-152)	0.26	(< 20)
Ethylbenzene	30	29.8	99	30	29.6	99	(79-121)	0.47	(< 20)
Freon-113	45	42.7	95	45	42.6	95	(70-136)	0.21	(< 20)
Hexachlorobutadiene	30	29.8	99	30	29.7	99	(66-134)	0.37	(< 20)
Isopropylbenzene (Cumene)	30	30.9	103	30	30.1	100	(72-131)	2.60	(< 20)
Methylene chloride	30	28.9	97	30	28.9	96	(74-124)	0.24	(< 20)
Methyl-t-butyl ether	45	42.7	95	45	43.1	96	(71-124)	0.79	(< 20)
Naphthalene	30	31.8	106	30	29.9	100	(61-128)	6.10	(< 20)
n-Butylbenzene	30	31.7	106	30	31.1	104	(75-128)	1.90	(< 20)
n-Propylbenzene	30	31.5	105	30	31.2	104	(76-126)	0.80	(< 20)
o-Xylene	30	30.1	100	30	29.8	99	(78-122)	1.00	(< 20)
P & M -Xylene	60	60.4	101	60	59.9	100	(80-121)	0.95	(< 20)
sec-Butylbenzene	30	31.5	105	30	31.3	104	(77-126)	0.51	(< 20)
Styrene	30	31.0	103	30	30.5	102	(78-123)	1.60	(< 20)
tert-Butylbenzene	30	31.3	104	30	31.0	103	(78-124)	0.96	(< 20)
Tetrachloroethene	30	29.9	100	30	29.0	97	(74-129)	3.20	(< 20)
Toluene	30	28.4	95	30	27.8	93	(80-121)	2.40	(< 20)
trans-1,2-Dichloroethene	30	27.9	93	30	27.7	92	(75-124)	0.83	(< 20)
trans-1,3-Dichloropropene	30	31.4	105	30	31.4	105	(73-127)	0.06	(< 20)
Trichloroethene	30	28.5	95	30	28.1	94	(79-123)	1.60	(< 20)
Trichlorofluoromethane	30	26.7	89	30	26.8	89	(65-141)	0.30	(< 20)
Vinyl acetate	30	29.7	99	30	30.1	100	(54-146)	1.10	(< 20)
Vinyl chloride	30	29.3	98	30	28.9	96	(58-137)	1.40	(< 20)
Xylenes (total)	90	90.5	101	90	89.6	100	(79-121)	0.97	(< 20)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186096 [VXX33432]
Blank Spike Lab ID: 1485250
Date Analyzed: 10/25/2018 11:06

Spike Duplicate ID: LCSD for HBN 1186096 [VXX33432]
Spike Duplicate Lab ID: 1485251
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186096001, 1186096002, 1186096003

Results by **SW8260C**

	Blank Spike (%)			Spike Duplicate (%)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	92	92	30	92.8	93	(81-118)	0.87	
4-Bromofluorobenzene (surr)	30	103	103	30	102	102	(85-114)	0.39	
Toluene-d8 (surr)	30	102	102	30	101	101	(89-112)	0.89	

Batch Information

Analytical Batch: **VMS18499**
Analytical Method: **SW8260C**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **FDR**

Prep Batch: **VXX33432**
Prep Method: **SW5030B**
Prep Date/Time: **10/25/2018 10:42**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1186096

Locations Nationwide

Alaska	Maryland
New Jersey	New York
North Carolina	Indiana
West Virgina	Kentucky

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: BGES Inc

CONTACT: Jayne PHONE NO: 907-644-2900

PROJECT NAME: 4th and Gambell PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Jayne@bgesinc.com E-MAIL:

INVOICE TO: Carol@bgesinc.com QUOTE #: OPEN P.O. #: -

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative HCl	Preservative VOC 8260	REMARKS/ LOC ID
(1) A-C	GWS1-1024	10/24/18	11:20	Water	3	Grab	X		
(3) A-C	Trip Blank	—	—	Water	3	—	X		
(2) A-C	GWS2-1024	10/24/18	11:24	Water	3	Grab	X		

Section 5

	Date	Time	Received By:
Relinquished By: (1)	10/24/18	14:04	
Relinquished By: (2)			
Relinquished By: (3)			
Relinquished By: (4)	10/24/18	14:04	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID: ONLY 1

Data Deliverable Requirements: Level 2

Requested Turnaround Time and/or Special Instructions:

10-DAY Standard

Temp Blank °C: 1.4 D11

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) HD

INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

SGS

Returned Bottles Inventory

Name of individual returning bottles: _____

Date Received: 10/24/18

Client Name: BGES

Received by: KET

Project Name: 4th and Gambell

SGS PM: JKV

HDPE/Nalgene:	1-L						
	500-ml						
	250-ml or 8-oz						
	~~125-ml or 4-oz~~						
	60-ml or 2-oz						
	other						
amber glass:	1-L						
	500-ml						
	250-ml or 8-oz						
	125-ml or 4-oz with or without septa						
	40-ml VOA vial	15 @$4 each					
	other						
Subtotal:		15					

Note: Returned bottles (regardless of size/pres.) are billed back at $4/bottle ***unless otherwise quoted.***

Amount to Invoice Client $: 60.00

WO#: 1186096

e-Sample Receipt Form

SGS Workorder #: **1186096**

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		YES Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	ABSENT
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: ONLY 1 @ 1.4 °C Therm. ID: D11
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	YES	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	YES	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	YES	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	YES	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	YES	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	YES	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1186096001-A	HCL to pH < 2	OK			
1186096001-B	HCL to pH < 2	OK			
1186096001-C	HCL to pH < 2	OK			
1186096002-A	HCL to pH < 2	OK			
1186096002-B	HCL to pH < 2	OK			
1186096002-C	HCL to pH < 2	OK			
1186096003-A	HCL to pH < 2	OK			
1186096003-B	HCL to pH < 2	OK			
1186096003-C	HCL to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

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3/2/2019
Ms. Jayne Martin
BGES, Inc.
1042 E. 6th Ave

Anchorage AK 99501

Project Name: ALASKA REAL ESTATE
Project #:
Workorder #: 1902387

Dear Ms. Jayne Martin

The following report includes the data for the above referenced project for sample(s) received on 2/19/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1902387

Work Order Summary

CLIENT:	Ms. Jayne Martin BGES, Inc. 1042 E. 6th Ave Anchorage, AK 99501	**BILL TO:**	Ms. Jayne Martin BGES, Inc. 1042 E. 6th Ave Anchorage, AK 99501
PHONE:	907-644-2900	**P.O. #**	
FAX:		**PROJECT #**	ALASKA REAL ESTATE
DATE RECEIVED:	02/19/2019	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/02/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	ND-IA1-0212	Modified TO-15	8.4 "Hg	5 psi
02A	ND-IA2-0212	Modified TO-15	2.6 "Hg	4.8 psi
03A	SD-IA3-0212	Modified TO-15	0.2 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/02/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
BGES, Inc.
Workorder# 1902387

Three 6 Liter Summa Canister (100% Cert Ambient) samples were received on February 19, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: ND-IA1-0212

Lab ID#: 1902387-01A

No Detections Were Found.

Client Sample ID: ND-IA2-0212

Lab ID#: 1902387-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.15	0.16	0.99	1.1

Client Sample ID: SD-IA3-0212

Lab ID#: 1902387-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.14	0.32	0.92	2.2

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Client Sample ID: ND-IA1-0212

Lab ID#: 1902387-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022620**	**Date of Collection: 2/12/19 10:41:00 AM**	
Dil. Factor:	**1.86**	**Date of Analysis: 2/26/19 10:17 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.19	Not Detected	0.48	Not Detected
1,1-Dichloroethene	0.19	Not Detected	0.74	Not Detected
trans-1,2-Dichloroethene	0.19	Not Detected	0.74	Not Detected
cis-1,2-Dichloroethene	0.19	Not Detected	0.74	Not Detected
Trichloroethene	0.19	Not Detected	1.0	Not Detected
Tetrachloroethene	0.19	Not Detected	1.3	Not Detected

Container Type: 6 Liter Summa Canister (100% Cert Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: ND-IA2-0212

Lab ID#: 1902387-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022621**	**Date of Collection: 2/12/19 10:41:00 AM**	
Dil. Factor:	**1.46**	**Date of Analysis: 2/26/19 10:53 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.15	Not Detected	0.37	Not Detected
1,1-Dichloroethene	0.15	Not Detected	0.58	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.58	Not Detected
cis-1,2-Dichloroethene	0.15	Not Detected	0.58	Not Detected
Trichloroethene	0.15	Not Detected	0.78	Not Detected
Tetrachloroethene	0.15	0.16	0.99	1.1

Container Type: 6 Liter Summa Canister (100% Cert Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: SD-IA3-0212

Lab ID#: 1902387-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022622**	**Date of Collection: 2/12/19 11:03:00 AM**	
Dil. Factor:	**1.35**	**Date of Analysis: 2/27/19 07:29 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.14	Not Detected	0.34	Not Detected
1,1-Dichloroethene	0.14	Not Detected	0.54	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.54	Not Detected
cis-1,2-Dichloroethene	0.14	Not Detected	0.54	Not Detected
Trichloroethene	0.14	Not Detected	0.72	Not Detected
Tetrachloroethene	0.14	0.32	0.92	2.2

Container Type: 6 Liter Summa Canister (100% Cert Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1902387-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022608**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/26/19 01:50 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: CCV

Lab ID#: 1902387-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/26/19 08:23 AM**	

Compound	%Recovery
Vinyl Chloride	98
1,1-Dichloroethene	100
trans-1,2-Dichloroethene	98
cis-1,2-Dichloroethene	101
Trichloroethene	98
Tetrachloroethene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	110	70-130

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Client Sample ID: LCS

Lab ID#: 1902387-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/26/19 09:13 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	105	70-130
1,1-Dichloroethene	101	70-130
trans-1,2-Dichloroethene	91	70-130
cis-1,2-Dichloroethene	116	70-130
Trichloroethene	93	70-130
Tetrachloroethene	97	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	117	70-130

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Client Sample ID: LCSD

Lab ID#: 1902387-06AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**21022606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/26/19 11:48 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	102	70-130
1,1-Dichloroethene	105	70-130
trans-1,2-Dichloroethene	90	70-130
cis-1,2-Dichloroethene	117	70-130
Trichloroethene	94	70-130
Tetrachloroethene	96	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

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Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager JAYNE MARTIN

Collected by: (Print and Sign) JAYNE MARTIN

Company BGES Email jayne@bgesinc.com

Address 1042 E 6th AVE City ANCHORAGE State AK Zip 95501

Phone 907-644-2900 Fax

Project Info:

P.O. # N/A

Project # N/A

Project Name ALASKA REAL ESTATE

Turn Around Time:

☒ Normal

☐ Rush

specify

Lab Use Only

Pressurized by:

Date:

Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	ND-IA1-0212	6L0757	2/12/19	10:41	TO15 - LOW LEVEL	28	9.5		
02A	ND-IA2-0212	6L0978	2/12/19	10:41	"	29	4.8		
03A	SD-IA3-0212	6L0641	2/12/19	11:03	"	27	4.0		

Relinquished by: (signature) Date/Time: 2/14/19 12:00PM

Received by: (signature) Date/Time: FedEx 2/14/19 12:00PM

Relinquished by: (signature) Date/Time:

Received by: (signature) Date/Time: CATC 2/19/19 1035

Relinquished by: (signature) Date/Time:

Received by: (signature) Date/Time:

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	Good	Yes / No / None	1902387

Form 1293 rev.11

APPENDIX D
LABORATORY DATA REVIEW CHECKLISTS

Laboratory Data Review Checklist

Completed By:

Jayne Martin

Title:

Senior Environmental Scientist

Date:

April 30, 2019

CS Report Name:

Report for Groundwater Seep Evaluation (2018) and
Indoor Air Sampling Activities (2019)

Report Date:

April 2019

Consultant Firm:

BGES, INC.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1186096

ADEC File Number:

2100.38.434

Hazard Identification Number:

4084

1186096

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☑ No Comments:

   The samples were not transferred to another laboratory.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No Comments:

   b. Correct Analyses requested?

   ☑ Yes ☐ No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   ☑ Yes ☐ No Comments:

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ☑ Yes ☐ No Comments:

   c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

   ☑ Yes ☐ No Comments:

   No data QC failures were noted in association with the sample conditions upon submittal to the laboratory.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No Comments:

No discrepancies were documented.

e. Data quality or usability affected?

Comments:

Not applicable.

4. Case Narrative

a. Present and understandable?

☑ Yes ☐ No Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

☑ Yes ☐ No Comments:

The limit of quantitation (LOQ) and the method detection limit (MDL) for 1,2,3-trichloropropane within Water Samples GWS1-1024 and GWS2-1024 (duplicate of GWS1-1024) exceeded the applicable ADEC cleanup criterion. This analyte is italicized in Table 1 to reflect this occurrence. As such, it cannot be determined if this analyte is present at concentrations exceeding the ADEC cleanup criterion.

c. Were all corrective actions documented?

☑ Yes ☐ No Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

See 4 b above

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

☑ Yes ☐ No Comments:

b. All applicable holding times met?

☑ Yes ☐ No Comments:

c. All soils reported on a dry weight basis?

☐ Yes ☑ No Comments:

Not applicable. There were no soil samples for this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No Comments:

See 4 b above

e. Data quality or usability affected?

☐ Yes ☑ No Comments:

See 4 b above

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

☐ Yes ☑ No Comments:

iii. If above LOQ, what samples are affected?

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☑ No Comments:

Not applicable.

v. Data quality or usability affected?

Comments:

Not applicable.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☑ No Comments:

Not applicable. The samples were not analyzed for metals/inorganics.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Not applicable.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☑ No Comments:

Not applicable.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Not applicable.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☑ Yes ☐ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes ☑ No Comments:

Not applicable.

iv. Data quality or usability affected?

Comments:

Not applicable.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

☑ Yes ☐ No Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☑ Yes ☐ No Comments:

Samples were delivered in one cooler.

iii. All results less than LOQ?

☐ Yes ☒ No Comments:

Bromoform and dibromochloromethane were detected in the trip blank sample for this work order. Because of the presence of these two compounds in the trip blank sample, there is a potential for the concentrations of bromoform and dibromochloromethane to be biased high in Project Samples GWS1-1024 and GWS2-1024 (duplicate of GWS1-1024). Because these analytes were not detected in the project samples, they are not presented in Table 1. Because these analytes were reported in the project samples as non-detectable at concentrations below the LOQs, and because the LOQs in the field samples were below the ADEC cleanup criteria, it is our opinion that this data QC failure does not affect the interpretation of the data.

iv. If above LOQ, what samples are affected?

Comments:

See 6, d, iii above.

v. Data quality or usability affected?

Comments:

See 6, d, iii above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No Comments:

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☒ Yes ☐ No Comments:

The relative percent differences (RPDs) for all analytes that were detected in both Sample GWS1-1024 and its duplicate GWS2-1024 were less than the ADEC-prescribed limit of 30 percent for water. The RPDs ranged from 1 to 1.7 percent for the detected analytes which indicates excellent field sampling precision.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Not applicable.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

☐ Yes ☐ No ☒ Not Applicable

No equipment blanks were collected in relation to the groundwater seep sampling activities.

i. All results less than LOQ?

☐ Yes ☐ No Comments:

N/A

ii. If above LOQ, what samples are affected?

Comments:

N/A

iii. Data quality or usability affected?

Comments:

N/A

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☐ Yes ☒ No Comments:

Laboratory Data Review Checklist for Air Samples

Completed by:	Jayne Martin		
Title:	Senior Environmental Scientist	Date:	April 30, 2019
CS Report Name:	Report for Groundwater Seep Evaluation (2018) and Indoor Air Sampling Activities (2019)	Report Date:	April 2019
Consultant Firm:	BGES, Inc.		
Laboratory Name:	Eurofins Air Toxics	Laboratory Report Number:	1902387
ADEC File Number:	2100.38.434	ADEC Haz ID:	4084

1. Laboratory

a. Did a NELAP certified laboratory receive and perform all of the submitted sample analyses?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

( ) Yes (•) No (•) NA (Please explain.) Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample condition documented -Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. If there were any discrepancies, were they documented? For example, incorrect sample containers/ preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

○ Yes ○ No ◉ NA (Please explain) Comments:

The samples were received in good condition and no discrepancies were noted.

c. Data quality or usability affected? (Please explain.)

○ Yes ◉ No ○ NA (Please explain) Comments:

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No ○ NA (Please explain) Comments:

b. Discrepancies, errors or QC failures identified by the lab?

○ Yes ◉ No ○ NA (Please explain) Comments:

c. Were all corrective actions documented?

◉ Yes ○ No ○ NA (Please explain) Comments:

No corrective actions were required for these samples.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

NA

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

◉ Yes ○ No ○ NA (Please explain) Comments:

b. Samples analyzed within 30 days of collection or within the time required by the method?

◉ Yes ○ No ○ NA (Please explain) Comments:

c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

◉ Yes ○ No ○ NA (Please explain) Comments:

d. Data quality or usability affected?

Comments:

NA

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected?

Comments:

NA

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No QC issues were noted for the method blank.

v. Data quality or usability affected? (Please explain.)

Comments:

NA

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

( ) Yes (•) No ( ) NA (Please explain) Comments:

The RPDs were not reported in the lab report.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

○ Yes ○ No ◉ NA (Please explain) Comments:

The %R were within the acceptable limits.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

The %R were within the acceptable limits.

vi. Data quality or usability affected? (Please explain.)

Comments:

NA

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

All of the surrogate recoveries within acceptable limits.

iv. Data quality or usability affected? (Please explain.)

Comments:

NA

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 type (soil gas, indoor air etc.) samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs? (Recommended: 25 %)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

The RPDs for all analytes in both Sample ND-IA1-0212 and its duplicate ND-IA1-0212 could not be calculated because one or more of the analytes were non-detectable.

iv. Data quality or usability affected? (Please explain.) Comments:

NA

e. Field Blank (If not used explain why).

( ) Yes ( ) No (•) NA (Please explain) Comments:

The collection of a field blank was not part of the scope of work for this project.

i. All results less than PQL?

( ) Yes ( ) No (•) NA (Please explain) Comments:

The collection of a field blank was not part of the scope of work for this project.

ii. If above PQL, what samples are affected? Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

NA

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

( ) Yes ( ) No (•) NA (Please explain) Comments:

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