



July 7, 2021

Mr. Matthew Gavora
Gavora, Inc.
246 Illinois Street, #3B
Fairbanks, AK 99707

RE: OCTOBER 2020 INDOOR AIR AND CRAWLSPACE AIR SAMPLING SUMMARY
REPORT REV01, SHOPPER'S FORUM MALL ANNEX, FAIRBANKS, ALASKA

DEC FILE NO. 102.38.100

Shannon & Wilson is pleased to present this revised summary report for indoor- and crawlspace-air monitoring at the Shopper's Forum Mall Annex (Annex), located at 1255 Airport Way in Fairbanks, Alaska. The objective of our work was to monitor concentrations of tetrachloroethene (PCE), trichloroethene (TCE), and their related compounds (1,1-dichloroethene, cis-1,2-dichloroethene, and trans-1,2-dichloroethene) in crawlspace-air and indoor-air at the Annex. This report documents the results of the annual air-quality monitoring performed in October 2020. Our scope of services for this project included:

- Collecting indoor- and crawlspace-air samples at select locations within the Annex;
- Inspecting the operation of the sub-slab depressurization (SSD) system as part of compliance with the Operation and Maintenance (O&M) Plan for the Annex; and
- Preparing this summary report documenting sampling activities and analytical results.

We performed these sampling activities following our July 2013 *Site Characterization and Vapor-Intrusion Mitigation Work Plan* which was reviewed and approved by the Alaska Department of Environmental Conservation (DEC).

We submitted *Operation and Maintenance Plan, Vapor Intrusion Mitigation System Plan* (O&M Plan) in April 2020 and received DEC approval on July 9, 2020. This report documents the start of the O&M plan and the activities associated with maintaining the vapor mitigation system in place at the Annex.

We received comments from DEC for the first draft of this document on May 3, 2021. Our response to comments is included as an attachment.

SAMPLING AND OBSERVATIONS

On October 7, 2020, Kristen Freiburger from Shannon & Wilson's Fairbanks office performed the sampling described herein. We deployed the Radiello® 130 passive samplers in the breathing space (head height) in discrete locations within each unit and crawlspace. The samplers remained in-place for approximately 24 hours. The passive samplers consist of an outer cylindrical diffusive surface (porous polypropylene) surrounding an interior adsorbing surface. Air constituents small enough to pass through the pore space of the exterior surface are adsorbed onto the interior surface allowing for a sample to be analyzed. Per the laboratory, "RAD 130 cartridges can be exposed for as short as 8 hours, or as long as 30 days depending on your reporting limits. 7 days is ideal for outdoor, but can sit out longer for low concentration environments." The 24-hour period was selected based on a limited study at the site during a previous sampling where 24-hour samples were collected using a summa canister and the RAD 130 cartridges. Results were similar when comparing the summa canisters and RAD 130 cartridges. Prior to discontinuation of the O&M plan, summa canisters would be used to verify air concentrations no longer exceed the regulatory limits.

We collected three indoor-air samples from Miguel's restaurant lease spaces (Figure 1), one indoor-air sample from Bamboo Panda (Figure 2), and one indoor-air sample from F&H Fitness (Figure 3). F&H Fitness occupies the retail space formerly occupied by Fairbanks Fast Foto. We also collected air samples from two crawlspace locations: one from beneath Bamboo Panda and the other from beneath F&H Fitness.

We collected indoor-air project samples *Miguels-Kitchen* from the pantry behind the cash register in Miguel's kitchen, *Miguels-Office* from Miguel's main office, *Miguels-Banquet* from the banquet space adjacent to the main dining area in Miguel's, *Bamboo* from the kitchen at Bamboo Panda, and *F&H* from the office of F&H Fitness. We collected crawlspace-air project sample *Bamboo-Crawlspace* from the crawlspace beneath Bamboo Panda, and the crawlspace-air field-duplicate pair, named *F&H-Crawlspace* and *F&H-CS*, from the crawlspace beneath F&H Fitness.

At the end of deployment, we retrieved the passive samplers and shipped them to the Eurofins Air Toxics, LLC (Eurofins) testing laboratory in Folsom, California. We submitted the samplers for analysis of PCE, TCE, 1,1-dichloroethene, cis-1,2-dichloroethene, and trans-1,2-dichloroethene by the laboratory's custom gas chromatography mass spectrometry (GC/MS) modified method EPA TO-17. TCE and PCE were determined quantitatively, but concentrations of the other analytes were estimated.

The heat recovery ventilation system, installed in the crawlspaces beneath F&H Fitness and Bamboo Panda in April 2013, and the sub-slab depressurization system, installed at Miguel's in October 2013, were operating throughout the October 2020 sampling event. On October 7, Kristen Freiburger and Shawn Tisdell with DEC tested the sub-slab pressure differential at nine locations within the Annex using a micromanometer to assess the operation of the SSD system. They also tested the vacuum pressure of the SSD system from three test ports located in Miguel's restaurant.

In February 2021, Dana Fjare from Shannon & Wilson, and Tom Phillips from Gavora completed the building photoionization detector (PID) walkthrough to check for changes in the slab or the crawlspace vapor barrier that could decrease the effectiveness of the SSD system. In the crawlspace below F&H Fitness, we identified a tear in the vapor barrier and some areas where the vapor barrier had pulled away from the foundation wall. A PID capable of measuring chlorinated solvents was used for this event. In the Bamboo Panda crawlspace, the vapor barrier was in poor condition near the refrigeration units at the south end. A section of the vapor barrier had been cut away, exposing the crawlspace dirt floor. PID readings were less than one part per million (effectively non-detects) across all air spaces measured. On March 1, Gavora personnel repaired the vapor barrier in the crawlspace by taping over small tears, re-sealing areas that had pulled away from the wall, and replacing a portion of the vapor barrier below Bamboo Panda. In June 2021, a Shannon & Wilson representative posted four signs in the crawlspace that warn against damaging the vapor barrier and provide a point of contact in case vapor barrier damage occurs.

Gavora personnel have followed the O&M Plan maintenance schedule and maintained the SSD system operation throughout the year. We note Gavora does not have plans to install an alarm for the HRV system, as suggested by DEC comments to the O&M plan. However, they believe that an alarm for the HRV is not necessary because of the frequency with which Gavora personnel visit the crawlspace.

We have enclosed copies of our sampling forms and inspection forms for this project with this report.

RESULTS

We present the analytical results of the indoor-air and crawlspace-air samples in the enclosed Table 1.

PCE was detected in each project sample at concentrations below the associated DEC Target Level. The other requested analytes were not detected above their respective laboratory

reporting limits. Results were similar to previous sampling events (Table 2). The DEC Target Levels were obtained from the November 2017 DEC *Vapor Intrusion Guidance for Contaminated Sites*. Indoor-air and crawlspace-air samples were compared to the commercial values listed in Appendix D of the guidance document.

The SSD system pressure ranged from -2.11 to -2.46 inches of water (in. H₂O) between the three test ports. The negative pressure differential confirms that the SSD system is operational and effective. The sub-slab pressure differential measurements collected from the nine ports around the Annex were close to zero, indicating that there is not a significant movement of air from the sub-slab into the Annex units.

QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance (QA) and quality control (QC) activities for this project were designed to achieve data quality and reliability. We reviewed the analytical results for laboratory QC samples and conducted our own QA assessment for this project. Our QA-review procedures allow us to document the accuracy and precision of the analytical data, and check that the analyses are sufficiently sensitive to detect analytes at levels below regulatory standards.

For this report, we reviewed the indoor-air and sub-slab soil-gas data reported by Eurofins Work Order (WO) 2010295. The laboratory report contained a case narrative, documenting sample receipt, and analytical results for project and laboratory QC samples. Details regarding the results of our QA analysis are presented in the DEC data-review checklist, enclosed with this report, along with a copy of the laboratory report.

Sample Handling and Holding Times

We reviewed the laboratory narrative provided by the laboratory. The samples were noted to have been received in good condition upon receipt at the Eurofins laboratory.

Analytical Sensitivity

Consistent with our previous air-sampling reports, we compared indoor air sample reporting limits to DEC Target Levels for commercial indoor-air and crawlspace-sample reporting limits to DEC Target Levels for commercial sub-slab soil-gas. The commercial indoor air and commercial sub-slab soil-gas Target Levels were obtained from the November 2017 DEC *Vapor Intrusion Guidance for Contaminated Sites* Appendix D and Appendix E, respectively. Results were reported at levels sufficiently sensitive enough to determine if the analytes are present at concentrations below the DEC Target Levels.

Accuracy

The laboratory assessed the accuracy of their analytical procedures by analyzing laboratory control samples (LCS) and LCS duplicates (LCSDs). LCS/LCSD analysis allows the laboratory to evaluate their ability to recover analytes added to clean matrices. LCS/LCSD samples were reported for each analyte in the laboratory report. Accuracy is also assessed for organic analyses by evaluating the recovery of a surrogate added to each project sample. The LCS/LCSD and surrogate recovery data for each sample were within laboratory control limits and the results are considered accurate.

Precision

To evaluate data precision and reproducibility of our sampling techniques, we calculated the relative percent difference (RPD) of duplicate results. RPD is defined as the difference between the sample and its field duplicate divided by the mean of the two. We can only evaluate RPDs if the result for both the sample and its duplicate are greater than the reporting limit for a given analyte.

We collected a field-duplicate pair from the crawlspace beneath F&H Fitness; the samples were named *F&H-Crawlspace* and *F&H-CS*. The RPDs were within QC criteria for the field-duplicate pair, where calculable.

Data Quality Summary

By working in accordance with our proposed scope of services, we consider the indoor-air and sub-slab soil-gas samples we collected to be representative of the site conditions at the locations and times they were collected. Based on our QA review, no sample results were rejected as unusable due to QC failures. For this project, the quality of the analytical data is acceptable for its intended use.

CONCLUSIONS

Based on our observations and analytical-sample results, Shannon & Wilson presents the following conclusions and recommendations:

PCE was detected in each of the project samples at concentrations below its indoor air or sub-slab soil-gas (crawlspace air) DEC Target Level. Other target analytes were not detected above their respective reporting limits.

In their July 9, 2020 letter DEC suggested differential pressure measurements between the building interior and outside, as well as between the building interior and sub-slab measurement points should be collected using a manometer capable of measuring a building differential of at least 0.005 in. H₂O. DEC provided a meter capable of measuring at these levels for the sampling event, as one is not available through the typical environmental equipment rental vendors. These measurements should be collected when a problem is observed or major maintenance is required (HRV system malfunction, increase in contaminant concentrations, tuning the building's heating, ventilation, or HVAC system, etc.) and are not necessary on an annual basis, as posed in Section 4.1 of the O&M plan.

A Dwyer magnehelic pressure gauge (recorded to the nearest 0.02 in H₂O) may still be used to measure the vacuum pressure in the SSD system. Higher-resolution measurements from a micromanometer are not likely to provide additional meaningful information since we would expect to observe a change in indoor air contaminant concentrations, which are also monitored annually, if there was a problem in the SSD system functioning. These measurements should be collected on an annual basis during the annual inspection.

PCE was detected within historical trends and was less than the DEC commercial Target Level at all sample locations (Table 2), and TCE was not detected in any sample collected in October 2020. Since PCE was detected in each sample, it is likely that the SSD system is still required to mitigate PCE contamination in crawlspace-air and indoor-air. We recommend continuing the annual sampling event and O&M activities to maintain optimal performance of the mitigation system.

CLOSURE

This report was prepared for the exclusive use of Gavora, Inc., and their representatives. We understand this report will be used to monitor indoor-air and sub-slab soil-gas at the Annex. This report should not be used for other purposes without Shannon & Wilson's review. We have prepared the document "*Important Information about Your Geotechnical/Environmental Report*" to help you and others understand the use and limitations of this report.

Our observations represent site conditions as they existed during our sampling activities on October 7 and 8, 2020 and February 8, 2021. Our observations are specific to the locations and times noted herein and may not be applicable to all areas of the site. No number of indoor-air and sub-slab soil-gas samples can precisely predict the characteristics, quality, or distribution of site conditions. Potential variations include, but are not limited to:

- The conditions between sampling points may be different.

- The passage of time or intervening causes (natural and manmade) may result in changes to site conditions.
- Contaminant concentrations may change in response to natural conditions, chemical reactions, and/or other events.
- The presence, distribution, and concentration of contaminants may vary from our sampling locations. Our tests may not represent the highest contaminant concentrations at the site.

The report should not be used without our approval if any of the following occurs:

- Conditions change due to natural forces or human activity under, at, or adjacent to the site.
- Project details change or new information becomes available such that our analyses, conclusion, and recommendations may be affected.
- If the site ownership or land use has changed.
- More than ten years has passed since the date of this summary letter report.
- Regulations, laws, or cleanup levels change.
- If the site's regulatory status has changed.

If any of these occur, we should be retained to review the applicability of our analyses, conclusions, and recommendations.

State and/or federal agencies may require reporting of the information included in this report. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study unless specifically requested and authorized by Gavora, Inc., or as required by law. Regulatory agencies may reach different conclusions than Shannon & Wilson.

We are pleased to have had the opportunity to continue assisting you with this project. Please contact me if you have any questions.

Sincerely,

SHANNON & WILSON

Kristen Freiburger
Associate

ALF:DHF:KRF/dhf

- Enc. Table 1 – October 2020 Indoor Air and Crawlspace Air Analytical Sample Results
Table 2 – Historical Air Sample Results for Crawlspace and Indoor Air
Figure 1 – Sample Locations, Miguel’s
Figure 2 – Sample Locations, Bamboo Panda
Figure 3 – Sample Locations, F&H Fitness
Eurofins Air Toxics, Inc. Laboratory Report of Analysis (WO 2010295)
Laboratory Data Review Checklist for Air Samples
Field-Sampling Forms for October 7-8, 2020 Sampling Event
Inspection Forms for October 7 & December 7, 2020, February 8 & March 1, 2021
Photographs of Crawlspace Repair and Sign Installation
Crawlspace Signage
Response to DEC Comments
Important Information about Your Geotechnical/Environmental Report

Table 1 - October 2020 Indoor Air and Crawlspace Air Analytical Sample Results

Analytical Method and Sample Matrix	Analyte	DEC Target		Bamboo	F&H	Miguels-Banquet	Miguels-Kitchen	Miguels-Office	Bamboo-Crawlspace	F&H-Crawlspace	
		Level	Units							Primary	Duplicate
EPA TO-17 (Indoor Air)	1,1-Dichloroethene	79	µg/m ³	<3.4C	<3.4C	<3.5C	<3.5C	<3.5C	—	—	—
	cis-1,2-Dichloroethene	—	µg/m ³	<1.0C	<1.0C	<1.1C	<1.1C	<1.1C	—	—	—
	Tetrachloroethene	41	µg/m ³	3.7	7.0	11	14	12	—	—	—
	trans-1,2-Dichloroethene	790	µg/m ³	<2.1C	<2.1C	<2.2C	<2.2C	<2.2C	—	—	—
	Trichloroethene	2.2	µg/m ³	<0.93	<0.93	<0.97	<0.96	<0.97	—	—	—
EPA TO-17 (Crawlspace Air)	1,1-Dichloroethene	79	µg/m ³	—	—	—	—	—	<3.4C	<3.4C	<3.4C
	cis-1,2-Dichloroethene	—	µg/m ³	—	—	—	—	—	<1.0C	<1.0C	<1.0C
	Tetrachloroethene	41	µg/m ³	—	—	—	—	—	35	13	14
	trans-1,2-Dichloroethene	790	µg/m ³	—	—	—	—	—	<2.1C	<2.1C	<2.1C
	Trichloroethene	2.2	µg/m ³	—	—	—	—	—	<0.93	<0.93	<0.92

NOTES:

 Indoor air target levels from DEC's November 2017 *Vapor Intrusion Guidance*, Appendix D, Commercial Indoor Air.

Data reported from Eurofins laboratory Work Order 2010295.

Samples collected using passive S.E. Radiello 130 media

— Not applicable

C Estimated concentration due to calculated sampling rate, flag applied by the laboratory

< Analyte not detected; listed as less than the laboratory reporting limit

 DEC = Alaska Department of Environmental Conservation; µg/m³ = micrograms per cubic meter

Table 2 - Historical Air Sample Results for Crawlspace and Indoor Air

Sampling Location	Date	PCE µg/m ³	TCE µg/m ³	Active Air Quality Mitigation Systems				
				Portable GAC	In-Line GAC	HRV	SSD	
DEC Indoor Air Target Level		41	2.2					
Miguel's - Kitchen (Indoor Air)	April 2011	250E	1.6					
	February 2012	280J	1.7J					
	April 2013	260	1.8		x	x		
	August 2013	1,200	7.6		x	x		
	Sub-slab depressurization system startup, October 2013							
	October 2013	43	<1.0		x	x	x	
	November 2013	29	<1.0			x	x	
	February 2014	27	<1.0	x		x	x	
	February 2017	32	<0.1			x	x	
	October 2017	12	<0.96			x	x	
	January 2018	14	<0.99			x	x	
	April 2018	14	<1.0			x	x	
	July 2018	7	<1.0			x	x	
September 2019	13	<0.99			x	x		
October 2020	14	<0.96			x	x		
Miguel's - Office (Indoor Air)	February 2012	940	4.6					
	April 2013*	470	2.7	x	x	x		
	August 2013*	4,800	25	x	x	x		
	Sub-slab depressurization system startup, October 2013							
	October 2013	67	<1.0	x	x	x	x	
	November 2013*	47	<1.0	x		x	x	
	February 2014*	34JL	<1.0JL	x		x	x	
	February 2017	27	<1.0			x	x	
	October 2017	14	<0.95			x	x	
	January 2018	13	<1.0			x	x	
April 2018	16	<1.0			x	x		

Table 2 - Historical Air Sample Results for Crawlspace and Indoor Air

Sampling Location	Date	PCE µg/m ³	TCE µg/m ³	Active Air Quality Mitigation Systems			
				Portable GAC	In-Line GAC	HRV	SSD
DEC Indoor Air Target Level		41	2.2				
Miguel's - Office (Indoor Air)	July 2018	7.3	<1.0			x	x
	September 2019	11	<0.99			x	x
	October 2020	12	<0.97			x	x
	April 2011	1,600^a	7.3			x	
Sub-slab depressurization system startup, October 2013							
	November 2013	45	<1.0			x	x
	February 2014	25	<1.0	x		x	x
Miguel's - Banquet Room (Indoor Air)	February 2017	28	<1.0			x	x
	October 2017	14	<0.95			x	x
	January 2018	13	<1.0			x	x
	April 2018	15	<1.0			x	x
	July 2018	7.3	<1.0			x	x
	September 2019	9.1	<0.99			x	x
	October 2020	11	<0.97			x	x
	February 2012	730J	3.6J				
	Crawlspace ventilation startup, October 2012						
	April 2013	210	1.4		x	x	
	August 2013	5.3	<0.93		x	x	
	November 2013	27	<1.0			x	x
Bamboo Panda (Indoor Air)	February 2014	12	<1.0	x		x	x
	February 2017	18	<1.0			x	x
	October 2017	14	<0.98			x	x
	January 2018	9.6	<1.0			x	x
	April 2018	10	<1.0			x	x
	July 2018	23	<1.0			x	x
	September 2019	8.0	<1.0			x	x

Table 2 - Historical Air Sample Results for Crawlspace and Indoor Air

Sampling Location	Date	PCE µg/m ³	TCE µg/m ³	Active Air Quality Mitigation Systems				
				Portable GAC	In-Line GAC	HRV	SSD	
DEC Indoor Air Target Level		41	2.2					
Bamboo Panda (Indoor Air)	October 2020	3.7	<0.93			x	x	
	February 2012	25	0.41					
Crawlspace ventilation startup, October 2012								
	April 2013	260	1.6		x	x		
	August 2013	46	<0.93		x	x		
	November 2013	47	<1.0			x	x	
F&H Fitness (Indoor Air)	February 2014	26	<1.0	x		x	x	
	February 2017	1.8	<1.0			x	x	
	October 2017	2.9	<0.96			x	x	
	January 2018	8.4	<1.0			x	x	
	April 2018	23	<1.0			x	x	
	July 2018	9.0	<1.0			x	x	
	September 2019	2.9	<1.0			x	x	
	October 2020	7.0	<0.93			x	x	
	Crawlspace Samples		41	2.2				
		April 2011	2,000	9.8				
	February 2012	3,600	20					
Crawlspace ventilation startup, October 2012								
	April 2013	1,400	7.1		x	x		
	August 2013	190	<0.94		x	x		
Bamboo Panda (Crawlspace Air)	November 2013	180	<1.0			x	x	
	February 2014	73	<1.0	x		x	x	
	February 2017	75	<1.0			x	x	
	October 2017	98	<0.96			x	x	
	January 2018	34	<1.0			x	x	
	April 2018	48	<1.0			x	x	

Table 2 - Historical Air Sample Results for Crawlspace and Indoor Air

Sampling Location	Date	PCE µg/m ³	TCE µg/m ³	Active Air Quality Mitigation Systems			
				Portable GAC	In-Line GAC	HRV	SSD
DEC Indoor Air Target Level		41	2.2				
Bamboo Panda (Crawlspace Air)	July 2018	190	1.2			x	x
	September 2019	47	<0.99			x	x
	October 2020	35	<0.93			x	x
F&H Fitness (Crawlspace Air)	April 2013	620	3.1		x	x	
	August 2013	120	<0.94		x	x	
	November 2013	90	<1.0			x	x
	February 2014	42	<1.0	x		x	x
	February 2017	14	<1.0			x	x
	October 2017	27	<0.98			x	x
	January 2018	21	<1.0			x	x
	April 2018	40	<1.0			x	x
	July 2018	150	1.1			x	x
	September 2019	11	<1.0			x	x
October 2020	14	<0.92			x	x	

NOTES:

Only the highest concentration from each duplicate pair is reported in this table.

Target levels from DEC's November 2017 *Vapor Intrusion Guidance*, Appendix D: Commercial Indoor Air

< Analyte not detected; listed as less than the laboratory reporting limit

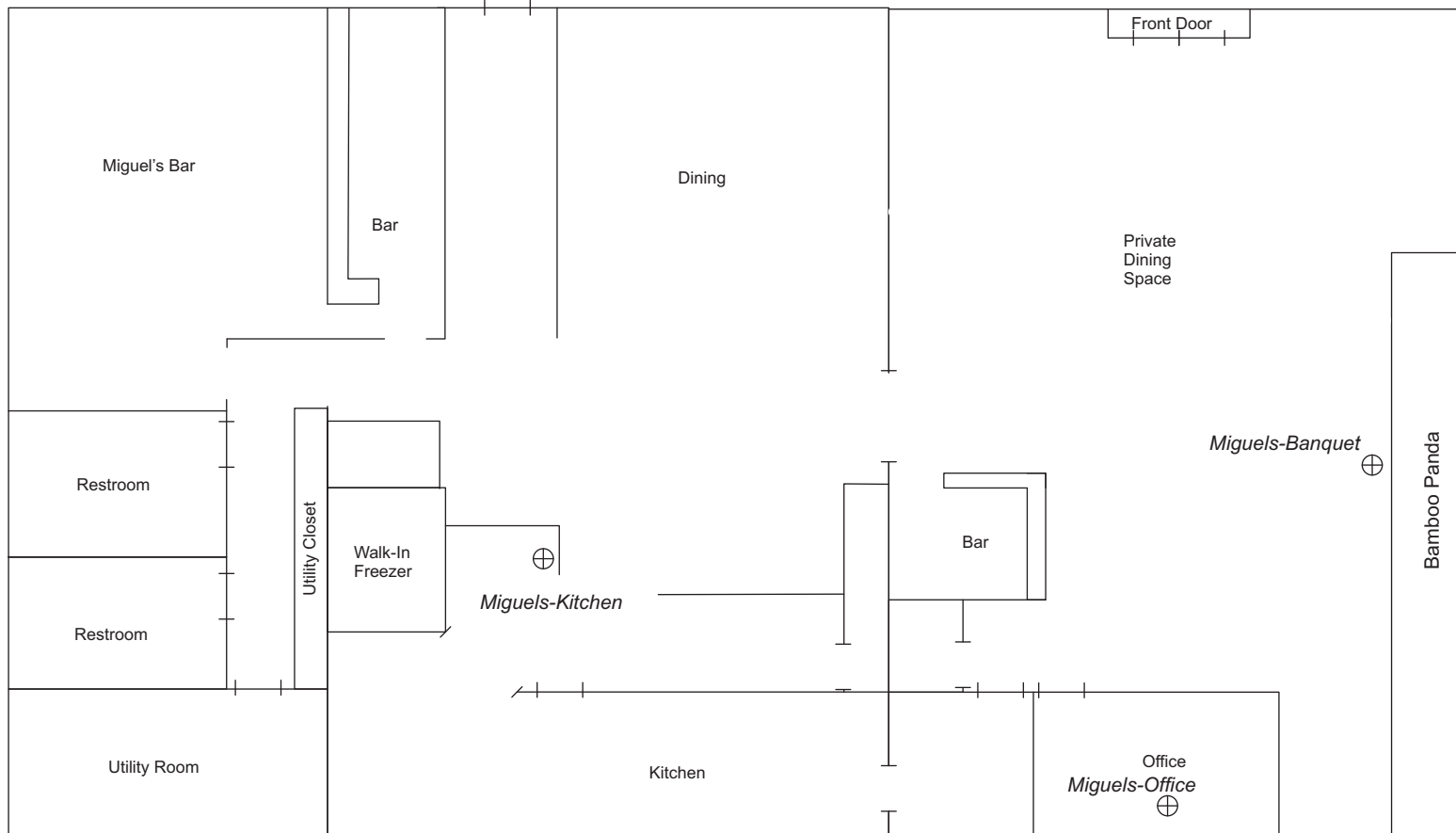
Bold Detected concentration exceeds ADEC Target Level

E Exceeds instrument calibration range. Flag applied by the laboratory.

JL Estimated result, biased low, due to quality control failures. Flag applied by Shannon & Wilson, Inc.

J Estimated result due to quality control failures, or a detected result below the reporting limit.

DEC = Alaska Department of Environmental Conservation; GAC = granular activated carbon; HRV = heat recovery ventilation; SSD = sub-slab depressurization; µg/m³ = micrograms per cubic meter




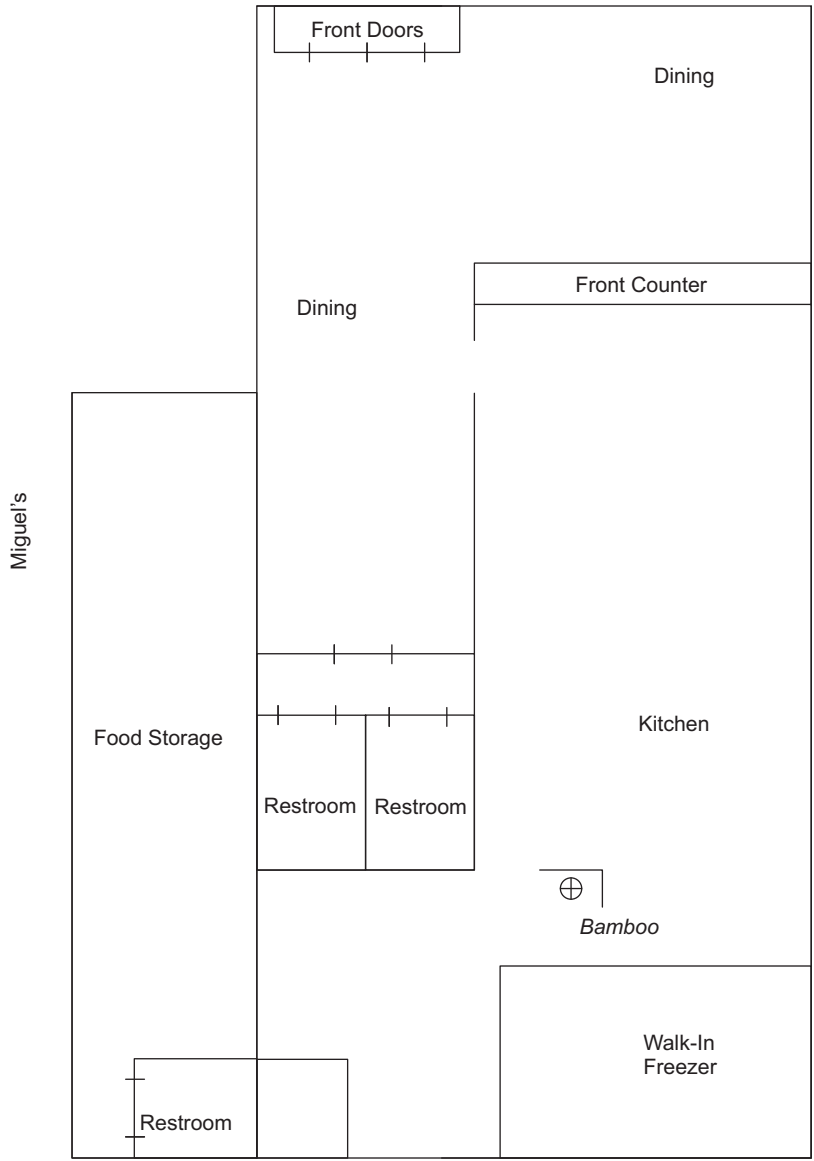
Not to Scale

Legend

⊕ Approximate indoor-air sampling location



Shopper's Forum Annex Fairbanks, Alaska	
SAMPLE LOCATIONS, MIGUEL'S	
July 2021	103777-001
 SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	Figure 1




Legend

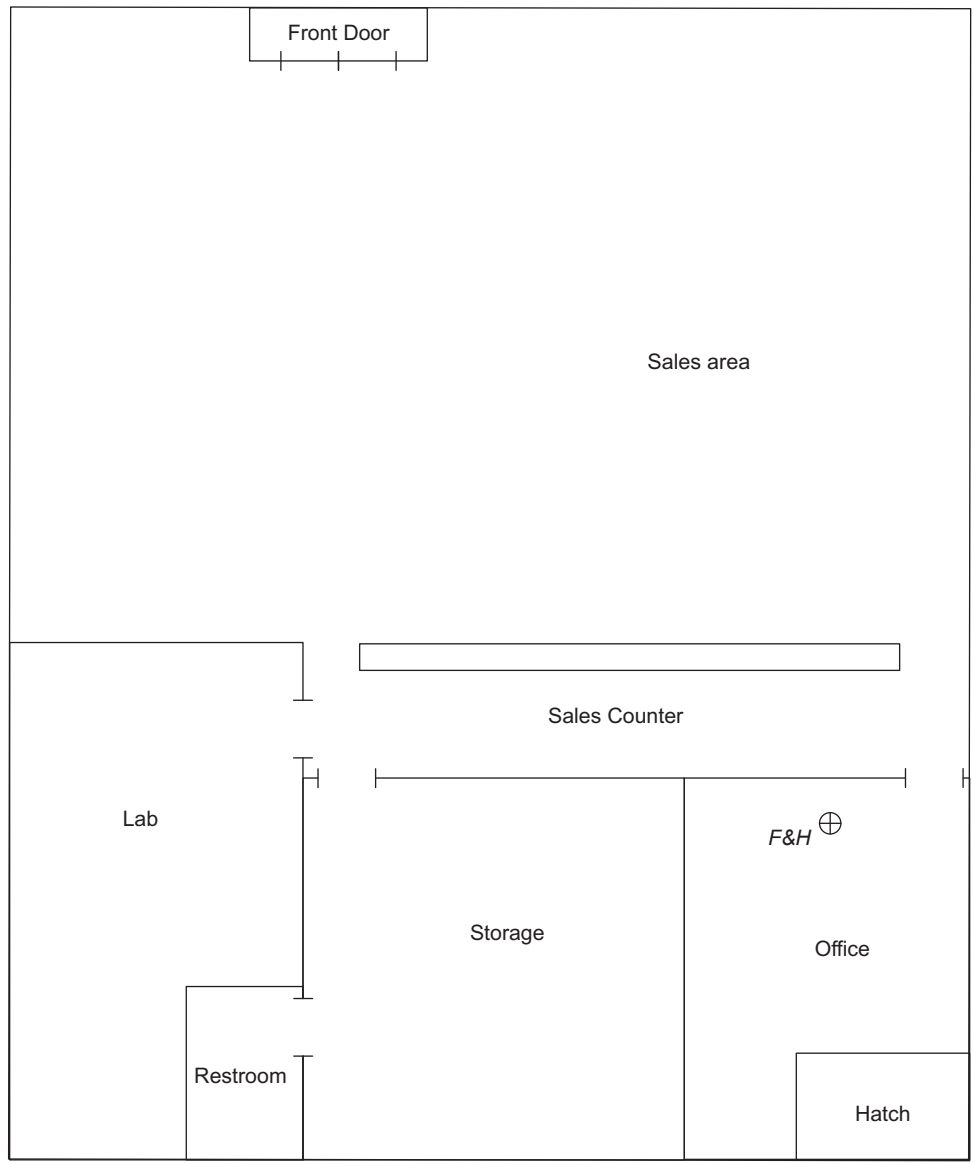
⊕ Approximate indoor-air sampling location

Not to Scale



Shopper's Forum Annex Fairbanks, Alaska	
SAMPLE LOCATIONS, BAMBOO PANDA	
July 2021	103777-001
 SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	Figure 2

Bamboo Panda



Legend

⊕ Approximate indoor-air sampling location

Not to Scale

Shopper's Forum Annex
Fairbanks, Alaska

SAMPLE LOCATIONS, F&H FITNESS

July 2021

103777-001

 **SHANNON & WILSON, INC.**
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3



10/26/2020

Ms. Kristen Freiburger
Shannon & Wilson, Inc.
2355 Hill Road

Fairbanks AK 99709

Project Name:
Project #: 103777-001
Workorder #: 2010295

Dear Ms. Kristen Freiburger

The following report includes the data for the above referenced project for sample(s) received on 10/13/2020 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by Passive S.E. RAD130/SKC 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 LLC. 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: Alexandra Winslow at 916-985-1000 if you have any questions regarding the data in this report.

Regards,




Alexandra Winslow
Project Manager

WORK ORDER #: 2010295

Work Order Summary

CLIENT:	Ms. Kristen Freiburger Shannon & Wilson, Inc. 2355 Hill Road Fairbanks, AK 99709	BILL TO:	Ms. Kristen Freiburger Shannon & Wilson, Inc. 2355 Hill Road Fairbanks, AK 99709
PHONE:	907-479-0600	P.O. #	
FAX:	907-479-5691	PROJECT #	103777-001
DATE RECEIVED:	10/13/2020	CONTACT:	Alexandra Winslow
DATE COMPLETED:	10/26/2020		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>
01A	F&H-Crawlspace	Passive S.E. RAD130/SKC
02A	F&H-CT	Passive S.E. RAD130/SKC
03A	Bamboo-Crawlspace	Passive S.E. RAD130/SKC
04A	F&H	Passive S.E. RAD130/SKC
05A	Bamboo	Passive S.E. RAD130/SKC
06A	Miguels-Banquet	Passive S.E. RAD130/SKC
07A	Miguels-Office	Passive S.E. RAD130/SKC
08A	Miguels-Kitchen	Passive S.E. RAD130/SKC
09A	Lab Blank	Passive S.E. RAD130/SKC
10A	LCS	Passive S.E. RAD130/SKC
10AA	LCSD	Passive S.E. RAD130/SKC

CERTIFIED BY:  DATE: 10/26/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.

Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards
This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
 (916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

**LABORATORY NARRATIVE
RAD130 Passive SE by Mod EPA TO-17
Shannon & Wilson, Inc.
Workorder# 2010295**

Eight Radiello 130 (Solvent) samples were received on October 13, 2020. The laboratory analyzed the charcoal sorbent bed of the passive sampler following modified method EPA TO-17. The VOCs were chemically extracted using carbon disulfide and an aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

The reference method used for this procedure is EPA TO-17, which describes the collection of VOCs in ambient air using sorbents and analysis by GC/MS. Because TO-17 describes active sample collection using a pump and thermal desorption as the preparation step, several modifications are required. Modifications to TO-17 are listed in the table below:

<i>Requirement</i>	<i>TO-17</i>	<i>ATL Modifications</i>
Sample Collection	Pump pulls measured air volume through sorbent tube	VOCs in air adsorbed onto sorbent bed passively through diffusion
Sample Preparation	Thermal extraction	Solvent extraction
Sorbent tube conditioning	Condition newly packed tubes prior to use	Charcoal-based sorbent is a single use media and conditioning is conducted by vendor.
Instrumentation	Thermal desorption introduction system	Liquid injection introduction system
Internal Standard	Gas-phase internal standard introduced on the tube or focusing trap during analysis	Liquid-phase internal standard introduced on the tube at the time of extraction
Media and sample storage	<4 deg C, 30 days	Media shelf life is determined by vendor; sample hold-time is 6 months for the RAD130 and WMS. Sample preservation requirements are storage in a cool, solvent-free refrigerator and optional use of ice during shipping.
Internal Standard Recovery	+/-40% of daily CCV area	-50% to +100% of daily CCV area

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The uptake rates were corrected based on average field temperatures if provided. In the absence of field temperatures, the uptake rates determined at 25 deg C were used.

If validated uptake rates were not available, rates were estimated using the chemical's diffusion coefficient in air and the geometric constant of the sampler. Chemicals that are poorly retained by the sorbent over the sampling duration may exhibit a low bias. All concentrations calculated using estimated rates are qualified with a "C" flag.

To calculate ug/m³ concentrations in the Lab Blank, a sampling duration of 1566 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures were provided, the rate was adjusted in the same manner as the field samples.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicate 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.

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

N - The identification is based on presumptive evidence.

C - Estimated concentration due to calculated sampling rate

CN - See case narrative explanation.

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

Summary of Detected Compounds VOCS BY PASSIVE SAMPLER - GC/MS

Client Sample ID: F&H-Crawlspace

Lab ID#: 2010295-01A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	1.2	13

Client Sample ID: F&H-CT

Lab ID#: 2010295-02A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	1.3	14

Client Sample ID: Bamboo-Crawlspace

Lab ID#: 2010295-03A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	3.2	35

Client Sample ID: F&H

Lab ID#: 2010295-04A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	0.64	7.0

Client Sample ID: Bamboo

Lab ID#: 2010295-05A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	0.34	3.7

Client Sample ID: Miguels-Banquet

Lab ID#: 2010295-06A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	0.98	11

**Summary of Detected Compounds
VOCS BY PASSIVE SAMPLER - GC/MS**

Client Sample ID: Miguels-Office

Lab ID#: 2010295-07A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	1.0	12

Client Sample ID: Miguels-Kitchen

Lab ID#: 2010295-08A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.10	1.1	1.2	14



Client Sample ID: F&H-Crawlspace

Lab ID#: 2010295-01A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101912sim	Date of Collection:	10/8/20 3:21:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 01:42 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.93	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	1.2	13
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1561 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	84	70-130



Air Toxics

Client Sample ID: F&H-CT

Lab ID#: 2010295-02A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101913sim	Date of Collection:	10/8/20 3:16:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 02:08 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.92	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	1.3	14
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1566 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	84	70-130



Air Toxics

Client Sample ID: Bamboo-Crawlspace

Lab ID#: 2010295-03A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101914sim	Date of Collection:	10/8/20 3:29:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 02:35 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.93	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	3.2	35
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1564 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130



Air Toxics

Client Sample ID: F&H

Lab ID#: 2010295-04A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101915sim	Date of Collection:	10/8/20 3:34:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 03:02 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.93	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	0.64	7.0
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1556 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130



Air Toxics

Client Sample ID: Bamboo

Lab ID#: 2010295-05A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101916sim	Date of Collection:	10/8/20 3:46:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 03:29 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.93	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	0.34	3.7
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1555 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130



Air Toxics

Client Sample ID: Miguels-Banquet

Lab ID#: 2010295-06A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101917sim	Date of Collection:	10/8/20 3:49:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 03:55 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.97	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	0.98	11
1,1-Dichloroethene	0.40	3.5	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.1	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.2	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1497 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	84	70-130



Air Toxics

Client Sample ID: Miguels-Office

Lab ID#: 2010295-07A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101918sim	Date of Collection:	10/8/20 3:54:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 04:22 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.97	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	1.0	12
1,1-Dichloroethene	0.40	3.5	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.1	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.2	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1498 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	84	70-130



Air Toxics

Client Sample ID: Miguels-Kitchen

Lab ID#: 2010295-08A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101919sim	Date of Collection:	10/8/20 4:00:00 PM
Dil. Factor:	1.00	Date of Analysis:	10/19/20 04:49 PM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.96	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	1.2	14
1,1-Dichloroethene	0.40	3.5	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.1	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.2	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1502 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130



Client Sample ID: Lab Blank

Lab ID#: 2010295-09A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101905sim	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	10/19/20 09:53 AM
		Date of Extraction:	10/19/20

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.92	Not Detected	Not Detected
Tetrachloroethene	0.10	1.1	Not Detected	Not Detected
1,1-Dichloroethene	0.40	3.4	Not Detected C	Not Detected C
cis-1,2-Dichloroethene	0.10	1.0	Not Detected C	Not Detected C
trans-1,2-Dichloroethene	0.20	2.1	Not Detected C	Not Detected C

C = Estimated concentration due to calculated sampling rate.

Temperature = 77.0F , duration time = 1566 minutes.

Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 2010295-10A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101903sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 10/19/20 08:58 AM
		Date of Extraction: 10/19/20

Compound	%Recovery	Method Limits
Trichloroethene	86	70-130
Tetrachloroethene	83	70-130
1,1-Dichloroethene	94	70-130
cis-1,2-Dichloroethene	92	70-130
trans-1,2-Dichloroethene	94	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	84	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 2010295-10AA

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	c101904sim	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	10/19/20 09:24 AM
		Date of Extraction:	10/19/20

Compound	%Recovery	Method Limits
Trichloroethene	84	70-130
Tetrachloroethene	81	70-130
1,1-Dichloroethene	93	70-130
cis-1,2-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	92	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	83	70-130

Laboratory Data Review Checklist for Air Samples

Completed by:	Andrew Frick		
Title:	Environmental Scientist	Date:	January 7, 2021
CS Report Name:	Shopper's Forum	Report Date:	October 26, 2020
Consultant Firm:	Shannon & Wilson, Inc.		
Laboratory Name:	Eurofins Air Toxics, Inc	Laboratory Report Number:	2010295
ADEC File Number:	102.38.100	ADEC Haz ID:	3682

1. Laboratory

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

Yes No NA (Please explain.) Comments:

Samples were analyzed by Eurofins Air Toxics Ltd. in Folsom, CA.

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:

Samples were not transferred to another 'network' or sub-contracted laboratory.

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:

The laboratory noted that there were no receiving discrepancies.

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 laboratory noted that there were no receiving discrepancies. However, sample F&H-CS was reported as F&H-CT in the Eurofins report. Sample name F&H-CS as stated on the COC is correct and has been used in our reporting. Data quality was not affected.

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

Yes No NA (Please explain)

Comments:

The data quality and usability were not affected; see above.

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:

The laboratory did not note any discrepancies, errors, or QC failures.

c. Were all corrective actions documented?

Yes No NA (Please explain)

Comments:

Corrective actions were not required.

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

Comments:

The case narrative notes that chemicals that are poorly retained by the sorbent over the sampling duration may exhibit a low bias. All concentrations calculated using estimated rates are qualified with a "C" flag.

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:

Reporting limits were below commercial target levels for all analytes.

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:

None; the target analytes were not detected in the method blank.

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 samples are affected; target analytes were not detected in the method blank.

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

Comments:

The data quality and/or usability are not affected; see above.

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:

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

Yes No NA (Please explain)

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits for the requested method.

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

Yes No NA (Please explain)

Comments:

No qualification was required; see above.

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

Comments:

The data quality and/or usability is not affected; see above.

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:

There are no surrogate recovery failures associated with this work order.

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

Comments:

The data quality and/or usability are not affected; see above.

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:

The field duplicate samples F&H-Crawlspace and F&H-CS were submitted with this work order.

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No NA (Please explain)

Comments:

The relative precision demonstrated between the detected analyte concentrations of the field duplicate samples was within the recommended DQO of 25%, where calculable.

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

Comments:

The data quality and/or usability are not affected; see above.

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

Yes No NA (Please explain)

Comments:

Samples for this project are not collected with reusable equipment, so the prospect of foreign contaminants being introduced through equipment contamination is not plausible.

i. All results less than PQL?

Yes No NA (Please explain)

Comments:

Field blanks were not used; see above.

ii. If above PQL, what samples are affected?

Comments:

Field blanks were not used.

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

Comments:

Data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

Yes No NA (Please explain)

Comments:

There were no data flags or qualifiers.

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°F

Project name Shopper's Forum

Initials KRF

Sample ID F&H-Crawlspace

time (start) 13:20

date (start) 10/7/2020

time (end) 15:21

date (end) 10/8/2020

Duplicate F&H-CS

dup. time 13:10

dup end 15:16

Sample tube serial # J286T (dup)

Lab Eurofins Air Toxics

Duplicate tube serial # J287T (primary)

Sampler Radiello 130

Notes _____

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°F

Project name Shopper's Forum

Initials KRF

Sample ID Bamboo-Crawlspace time (start) 13:25 date (start) 10/7/2020

time (end) 15:29 date (end) 10/8/2020

Duplicate _____ dup. time _____

Sample tube serial # J285T

Lab Eurofins Air Toxics

Duplicate tube serial # _____

Sampler Radiello 130

Notes _____

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AKProject number 103777-001Weather 46°FProject name Shopper's ForumSample ID F&H time (start) 1338 date (start) 10/7/2020Initials KRFtime (end) 1534 date (end) 10/8/2020Duplicate — dup. time —Sample tube serial # J284TLab Eurofins Air ToxicsDuplicate tube serial # —Sampler Radiello 130

Notes Spoke w/ Tina (owner), most used space is
in front where trainers are most of day with
clients. Placed in window in front, furthest
from door.

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°T

Project name Shopper's Forum

Sample ID Bamboo

Initials KRF

time (start) 1351 date (start) 10/7/2020

time (end) 1546 date (end) 10/8/2020

Duplicate —

dup. time —

Sample tube serial # J283T

Lab Eurofins Air Toxics

Duplicate tube serial # —

Sampler Radiello 130

Notes _____

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°F

Project name Shopper's Forum

Initials KRF

Sample ID Miguels-Banquet

time (start) 1452 date (start) 10/7/2020

time (end) 1549 date (end) 10/8/2020

Duplicate —

dup. time —

Sample tube serial # J 280 T

Lab Eurofins Air Toxics

Duplicate tube serial # —

Sampler Radiello 130

Notes _____

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°F

Project name Shopper's Forum

Initials KRF

Sample ID Miguel's - office

time (start) 1456 date (start) 10/7/2020

time (end) 15:54 date (end) 10/8/2020

Duplicate _____

dup. time _____

Sample tube serial # J281T

Lab Eurofins Air Toxics

Duplicate tube serial # _____

Sampler Radiello 130

Notes outside of fire

PASSIVE SAMPLING LOG

Address 1255 Airport Way, Fairbanks, AK

Project number 103777-001

Weather 46°F

Project name Shopper's Forum

Initials KRF

Sample ID Miguels - Kitchen time (start) 1458 date (start) 10/7/2020

time (end) 1600 date (end) 10/8/2020

Duplicate _____ dup. time _____

Sample tube serial # J282T

Lab Eurofins Air Toxics

Duplicate tube serial # _____

Sampler Radiello 130

Notes _____

FIELD ACTIVITIES DAILY LOG

Date 10/7/2020

Sheet 1 of 1

Project No. 103777-001

Project Name: Shopper's Forum - Annual Monitoring

Field Activity Subject: Rad 130 Samples

Description of daily activities and events:

12:55 - Shawn notes at site, almost there

13:00 - onsite, meet Tom, meet Shawn (DEC) onsite ~ 13:10

- Set out Rad 130 samplers
- Conducted pressure differential test w/ Shawn's meter

~ 1515 - offsite

1530 - office

10/8/2020

~ 1510 - meet to M onsite, pick up samplers

- picked up samplers following 24 hour placement

owner of M'suel's noted next year sample placement for

banquet room should be outside office wall, where they

smell "chemicals" sometimes, Added note to file.

Also noted similar health issues for him and wife

~ 1615 - offsite

~ 1630 - office

Visitors on site: Shawn Tisdell, Tom (Gavora)

Changes from plans/specifications and other special orders and important decisions:

Weather conditions:

Important ^{conversation} telephone calls: noted smoke pencil shows direction of air flow

Personnel on site: KRF

Signature: [Signature] Date: 10/8/2020

KRF

Passive Sorbent Chain of Custody

WO#:

Case Seal #: _____

Company: Shumatek Project #: 63771-001 P.O.# _____
 Project Manager: _____ Project Name: _____
 Contact phone/email: _____ Collected by: Date of retrieval Time of retrieval

Lab ID	Sample Identification	Sampler ID	Date of Deployment (mm/dd/yy)	Time of Deployment (hr:min)	Date of Retrieval (mm/dd/yy)	Time of Retrieval (hr:min)	Sample Matrix (check one)				Reporting Units (circle)		Turn Around Time:
							Indoor/Outdoor Air	Soil Gas	Workplace Monitoring	Other	ppbv ug/m3	ppmv mg/m3	
	F&H-Crawlspace	J287T	10/7/2020	10/8/2020	13:20	15:21	X					see notes	Indoor Air
	F&H-CS	J286T	↓	↓	13:10	15:16	X					↓	↓
	Bamboo-Crawlspace	J285T	↓	↓	13:25	15:29	X					↓	↓
	F&H	J284T	↓	↓	13:38	15:34	X					↓	↓
	Bamboo	J283T	↓	↓	13:51	15:46	X					↓	↓
	Miguel's-Banquet	J280T	↓	↓	14:52	15:49	X					↓	↓
	Miguel's-Office	J281T	↓	↓	14:56	15:54	X					↓	↓
	Miguel's-Kitchen	J282T	↓	↓	14:58	16:00	X					↓	↓

Relinquished by: <u>[Signature]</u>	Date: <u>10/8/2020</u>	Time: <u>17:15</u>	Received by: _____	Date: _____	Time: _____	Notes to Lab: tetrachloroethene trichloroethene 1,1-dichloroethene cis-1,2-dichloroethene trans-1,2-dichloroethene
Relinquished by: _____	Date: _____	Time: _____	Received by: _____	Date: _____	Time: _____	

Relinquishing signature on this document indicates that samples are shipped in compliance with all applicable local, State, Federal, and international laws, regulations, and ordinances of any kind. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Eurofins Air Toxics against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples.

Lab Use Only

Shipper Name:	Custody Seals Intact?	Yes	No	None	Sample Condition Upon Receipt: (circle)	Good	SDR
Air bill #:	Temperature (°C)						

INSPECTION FORM

Address: Shopper's Forum Mall, 1255 Airport Way, Fairbanks, Alaska

Owner/Occupant: Gavora, Inc.

Weather Conditions 46°F
 Barometric Pressure 29.77 in Hg
 Approx. Temperature (inside) 270°F

Date 10/17/2020
 Time 1300
 Inspector KRF, Shawn Tisdell, Tom (Gavora)

Sub-Slab Differential Pressure Measurements

note for outdoor air control, cracked door

Reference	Monitoring Point	measure	Differential Pressure (in. H2O)
High Pressure		Low Pressure	
Outdoor Air	F&H Fitness		0.010
Outdoor Air	F&H Fitness Crawlspace		-0.003
Outdoor Air	Bamboo Panda	*	0.006
Outdoor Air	Bamboo Panda Crawlspace		0.008
Outdoor Air	Miguel's		0.009
Outdoor Air	Miguel's Floor Hole	*	
Outdoor Air	Boiler Room Floor Hole		0.003
F&H Fast Foto	F&H Fast Foto Crawlspace		-0.004
Bamboo Panda	Bamboo Panda Crawlspace		0.007
Miguel's	Miguel's Floor Hole	*	
Miguel's	Boiler Room Floor Hole		-0.003

note * no longer exists
 note ≠ seal for these measurements was not ideal
 note * unknown where point is located, unable to find

#

SYSTEM INSPECTION AND MAINTENANCE

Sub-Slab Depressurization System

Task	Frequency	Notes / Comments
Verify connections are tight and leak-free.	Annual	
Ensure the blower fan and ducting are secure and vibration-free.	Annual	
Verify system vacuum pressure with manometer or equivalent.	Annual	within range yes/ no 3 units test @ ① -2.11 ② -2.34 ③ -2.46
Indoor Air Verification Sampling.	Annual	
Alarm Testing	Annual	
Other (Specify)	Annual	

① miguel's closet
 ② miguel's banquet room
 ③ miguel's liquor storage closet

Heat Recovery Ventilator

Task	Frequency	Notes / Comments
Inspect exterior hood.	Once a month	
Clean air filters (refer to manual for steps).	Quarterly	
Clean system core (refer to manual for steps).	Bi-annual	
Inspect and drain the condensate line.	Annual	
Clean duct work running to and from system.	Annual	
Wipe down inside of the cabinet to remove dirt, bugs, or debris.	Bi-annual	
Verify all connections are tight and leak-free.	Annual	
Other (Specify)	Annual	

INSPECTION FORM

Address: Shopper's Forum Mall, 1255 Airport Way, Fairbanks, Alaska

Owner/Occupant: Gavora, Inc.

Weather Conditions cloudy
 Barometric Pressure 29.25
 Approx. Temperature -7 f

Date 12/7/2020
 Time 10:00 am
 Inspector Tom Phillips

Sub-Slab Differential Pressure Measurements

Monitoring Point		Differential Pressure (in. H2O)
Reference Point	Measurement	
Outdoor Air	F&H Fitness	
Outdoor Air	F&H Fitness Crawlspace	
Outdoor Air	Bamboo Panda	
Outdoor Air	Bamboo Panda Crawlspace	
Outdoor Air	Miguel's	
Outdoor Air	Miguel's Floor Hole	
Outdoor Air	Boiler Room Floor Hole	
Fast Foto	Fast Foto Crawlspace	
Bamboo Panda	Bamboo Panda Crawlspace	
Miguel's	Miguel's Floor Hole	
Miguel's	Boiler Room Floor Hole	

SYSTEM INSPECTION AND MAINTENANCE

Sub-Slab Depressurization System

Task	Frequency	Notes / Comments
Verify connections are tight and leak-free.	Annual	all ok
Ensure the blower fan and ducting are secure and vibration-free.	Annual	all ok
Verify system vacuum pressure with manometer or equivalent.	Annual	within range: yes / no Yes
Indoor Air Verification Sampling.	Annual	N/A Completed October 7, 2020
Alarm Testing	Annual	all ok
Other (Specify)	Annual	

Heat Recovery Ventilator

Task	Frequency	Notes / Comments
Inspect exterior hood.	Once a month	all ok
Clean air filters (refer to manual for steps).	Quarterly	Done
Clean system core (refer to manual for steps).	Bi-annual	Done
Inspect and drain the condensate line.	Annual	Done
Clean duct work running to and from system.	Annual	N/A
Wipe down inside of the cabinet to remove dirt, bugs, or debris.	Bi-annual	Done
Verify all connections are tight and leak-free.	Annual	Done
Other (Specify)	Annual	

INSPECTION FORM

Address: Shopper's Forum Mall, 1255 Airport Way, Fairbanks, Alaska

Owner/Occupant: Gavora, Inc.

Weather Conditions Clear
 Barometric Pressure 30.76 in
 Approx. Temperature -35 F

Date 2/8/2021
 Time 9:00 AM
 Inspector Dana Fjare

Sub-Slab Differential Pressure Measurements

Monitoring Point		Differential Pressure (in. H2O)
Reference Point	Measurement	
Outdoor Air	F&H Fitness	
Outdoor Air	F&H Fitness Crawlspace	
Outdoor Air	Bamboo Panda	
Outdoor Air	Bamboo Panda Crawlspace	
Outdoor Air	Miguel's	
Outdoor Air	Miguel's Floor Hole	
Outdoor Air	Boiler Room Floor Hole	
Fast Foto	Fast Foto Crawlspace	
Bamboo Panda	Bamboo Panda Crawlspace	
Miguel's	Miguel's Floor Hole	
Miguel's	Boiler Room Floor Hole	

SYSTEM INSPECTION AND MAINTENANCE

Sub-Slab Depressurization System

Task	Frequency	Notes / Comments
Verify connections are tight and leak-free.	Annual	
Ensure the blower fan and ducting are secure and vibration-free.	Annual	
Verify system vacuum pressure with manometer or equivalent.	Annual	within range: yes / no
Indoor Air Verification Sampling.	Annual	
Alarm Testing	Annual	
Other (Specify)	Annual	

Heat Recovery Ventilator

Task	Frequency	Notes / Comments
Inspect exterior hood.	Once a month	OK
Clean air filters (refer to manual for steps).	Quarterly	
Clean system core (refer to manual for steps).	Bi-annual	
Inspect and drain the condensate line.	Annual	
Clean duct work running to and from system.	Annual	
Wipe down inside of the cabinet to remove dirt, bugs, or debris.	Bi-annual	
Verify all connections are tight and leak-free.	Annual	
Other (Specify)	Annual	

Vapor Barrier

Task	Frequency	Notes / Comments
Inspection of areas of attachment & identification of rips or tears.	Annual	The vapor barrier below F&H Fitness had one notable hole in the liner near the north end and some areas where the liner had pulled away from the wall. Bamboo Panda crawlspace had extensive damage to the vapor barrier. Portions had been cut away in the middle of the crawlspace, exposing bare soil. The seal around the wall was also separating in several areas. It appeared that there was a poor seal near the refrigeration units at the south end.
Building Walk-Through Using PID	Annual	See table below.

Area of Inspection	PID Reading (ppm)	Slab Condition
Miguels, mechanical room	0.4	Good, a few small cracks
Miguels, main dining room	0.3	Slab not visible
Miguels, east dining room	0.3	Slab not visible
Crawlspace, F&H Fitness	0.8	Hole in liner, some separation of liner from wall
Crawlspace, Bamboo Panda	0.7	Liner in poor condition, bare soil exposed near middle

DAMAGE OR ABNORMAL CONDITIONS

Description of Alarm or Malfunction	Date/Time	Corrective Action or Parts Replacement

Additional Notes:

There have been several spills and other water-related incidents at Bamboo Panda over the years, which likely led to the vapor barrier getting compromised. Apparently the tenant (not Gavora) is responsible for addressing these issues, because Tom was not aware of the vapor barrier damage in the Bamboo Panda crawlspace. Tom will schedule a repair of the vapor barrier as soon as possible.

INSPECTION FORM

Address: Shopper's Forum Mall, 1255 Airport Way, Fairbanks, Alaska

Owner/Occupant: Gavora, Inc.

Weather Conditions cloudy/snowing
 Barometric Pressure _____
 Approx. Temperature 4 F

Date 3/1/2021
 Time 9:00 AM
 Inspector Tom Phillips

Sub-Slab Differential Pressure Measurements

Monitoring Point		Differential Pressure (in. H2O)
Reference Point	Measurement	
Outdoor Air	F&H Fitness	
Outdoor Air	F&H Fitness Crawlspace	
Outdoor Air	Bamboo Panda	
Outdoor Air	Bamboo Panda Crawlspace	
Outdoor Air	Miguel's	
Outdoor Air	Miguel's Floor Hole	
Outdoor Air	Boiler Room Floor Hole	
Fast Foto	Fast Foto Crawlspace	
Bamboo Panda	Bamboo Panda Crawlspace	
Miguel's	Miguel's Floor Hole	
Miguel's	Boiler Room Floor Hole	

SYSTEM INSPECTION AND MAINTENANCE

Sub-Slab Depressurization System

Task	Frequency	Notes / Comments
Verify connections are tight and leak-free.	Annual	
Ensure the blower fan and ducting are secure and vibration-free.	Annual	
Verify system vacuum pressure with manometer or equivalent.	Annual	within range: yes / no
Indoor Air Verification Sampling.	Annual	
Alarm Testing	Annual	
Other (Specify)	Annual	

Heat Recovery Ventilator

Task	Frequency	Notes / Comments
Inspect exterior hood.	Once a month	Ok
Clean air filters (refer to manual for steps).	Quarterly	Cleaned
Clean system core (refer to manual for steps).	Bi-annual	Clean
Inspect and drain the condensate line.	Annual	Cleaned condensate line and tested pump
Clean duct work running to and from system.	Annual	Ok
Wipe down inside of the cabinet to remove dirt, bugs, or debris.	Bi-annual	Cleaned
Verify all connections are tight and leak-free.	Annual	Ok
Other (Specify)	Annual	



Photo 1. Portion of Bamboo Panda crawlspace where the vapor barrier was removed and replaced. Facing northwest.



Photo 4. Bamboo Panda crawlspace vapor barrier repair. Looking west.



Photo 2. Bamboo Panda crawlspace vapor barrier repair near the refrigeration unit (on left). Looking southwest.



Photo 5. Sign regarding vapor barrier posted on crawlspace access hatch.



Photo 3. Bamboo Panda crawlspace vapor barrier repair. Looking north.



Photo 6. Sign regarding vapor barrier posted just inside crawlspace access point.



Photo 7. Sign regarding vapor barrier posted on door separating the F&H Fitness and Bamboo Panda crawlspaces.



Photo 8. Sign regarding vapor barrier posted on beam near the refrigeration unit on the south end of the Bamboo Panda crawlspace.

ATTENTION

Soil beneath this building contains tetrachloroethene (PCE), a known carcinogen. The vapor barrier in this crawlspace has been installed to mitigate harmful vapors from entering the building.

Care should be taken to prevent damaging the barrier!

If damage occurs to the barrier, you must call maintenance immediately to report the damage.

907-452-6422

ATTENTION

**ADEC Review of the October 2020 Indoor Air and Crawlspace Air Sampling Summary Report,
Shopper’s Forum Mall Annex,
Fairbanks, Alaska, May 2021**

Number	Comment	Response
1.	Crawlspace samples should be compared to the ADEC Vapor Intrusion Guidance Appendix D “DEC Indoor Air Target Levels” for the Commercial Indoor Air target level of 41 ug/m3 for tetrachloroethylene and 2.2 ug/m3 for trichloroethylene. Please adjust Tables 1 and 2 of the report.	Please find the updated tables attached.
2.	ADEC has the general impression that the vapor barrier was discovered to be cut open sometime between the October sample event and the February walk through inspection. Please clarify.	The vapor barrier below Bamboo Panda was discovered on February 8, 2021 to be cut. Gavora maintenance staff do not regularly access that portion of the crawlspace, so it is unknown when the vapor barrier was damaged between the last time it was accessed (October 2020) and February 2021.
3.	Please provide the data that was mentioned on page 2 that justifies using passive Radiello samplers versus summa canisters.	In 2013, we compared indoor air results for samples collected with passive Radiello samplers versus Summa canisters. We concluded that the two methods produced comparable results for PCE and TCE in indoor air. See the attached table. Please note this change was made to keep the long-term monitoring costs down. We acknowledge Radiello samplers are not suitable for site closure and summa canisters would be used to collect samples at that time.
4.	ADEC noted that the vapor barrier was pulled up in two locations under leased spaces in the Annex. If that happens again in the future, we ask that you grab a sample immediately to determine if this system failure has affected indoor air quality. Are you aware of the reason why the tenants cut the vapor barrier?	Gavora maintenance staff was not aware of why or how the vapor barrier had been cut and was not notified by the tenant. According to maintenance staff, the tenants are responsible for responding to issues they have with utilities in the crawlspace. It is possible that the Bamboo Panda had a plumbing issue which led them to access the crawlspace, though it is not clear why they would have cut the vapor barrier. Please note that air sampling materials/equipment is special-order from the laboratory and is not kept on hand. Collecting a sample immediately following a discovery may not be possible.

Number	Comment	Response
5.	<p>The vapor barrier installed is sub-optimal in material strength. There are many more appropriate commercial products available. ADEC recommends installing a specifically designed commercial vapor barrier to prevent vapor intrusion, thereby reducing the need for the HRV, could cut sampling in half by cutting out samples from the crawlspace, and could allow more focus on the indoor air.</p>	<p>Noted.</p>
6.	<p>If a more durable vapor barrier can't be installed, ADEC requests that signage be installed under each leased space to clarify the importance of the vapor barrier and that it is not to be disturbed.</p>	<p>Signs have been installed in the crawlspace near the two entrances leading to and within the crawlspaces. See the photo log. Four total signs were installed, two for each crawlspace unit. Signage states the following:</p> <p style="text-align: center;"> “Attention [in red] Soil beneath this building contains tetrachloroethene (PCE), a known carcinogen. The vapor barrier in this crawlspace has been installed to mitigate harmful vapors from entering the building. Care should be taken to prevent damaging the barrier! If damage occurs to the barrier, you must call maintenance immediately to report the damage. 907-452-6422 Attention [in red]” </p>

Sub-Slab & Crawlspace		ADEC Shallow Soil Gas Target Level	Crawlspace Samples		Sub-Slab Samples		
Analyte	Units		Crawlspace_FF	Crawlspace_BP	SubSlabC	SubSlabA	SubSlabB
Tetrachloroethene (PCE)	µg/m ³	1800	620	1,400	100,000	2,900,000	17,000
PCE by Raidello 130	µg/m ³		340 JL	1,000	—	—	—
<i>Passive-sampler RPD:</i>			58%	33%	—	—	—
Trichloroethene (TCE)	µg/m ³	88	3.1	7.1	3,600	18,000	1,000
TCE by Raidello 130	µg/m ³		1.9 JL	6.7	—	—	—
<i>Passive-sampler RPD:</i>			48%	6%	—	—	—
cis-1,2-Dichloroethene	µg/m ³	310	2.1	5.2	13,000	<7,900	360
trans-1,2-Dichloroethene	µg/m ³	2600	<3.1	<6.4	1,600	<7,900	120
Vinyl Chloride	µg/m ³	280	<0.20	<0.41	<130	<5,100	<29
Indoor Air							
Indoor Air		ADEC Indoor Air Target Level	Indoor Air Samples				
Analyte	Units		FastFoto_office	Bamboo Panda	Miguels_office A	Miguels_office B (duplicate)	Miguels_kitchen
Tetrachloroethene (PCE)	µg/m ³	180	260	200	430	470	260
PCE by Raidello 130	µg/m ³		250	210	390	380	240
<i>Passive-sampler RPD:</i>			4%	5%	10%	21%	8%
Trichloroethene (TCE)	µg/m ³	8.8	1.6	1.1	2.4	2.7	1.7
TCE by Raidello 130	µg/m ³		1.6	1.4	2.6	2.5	1.8
<i>Passive-sampler RPD:</i>			0%	24%	8%	8%	6%
cis-1,2-Dichloroethene	µg/m ³	31	0.94	1.1	3.5	3.6	2.6
trans-1,2-Dichloroethene	µg/m ³	260	<1.4	<1.4	<2.1	<2.2	<1.3
Vinyl Chloride	µg/m ³	28	<0.090	<0.088	<0.13	<0.14	<0.085

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining

your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

IMPORTANT INFORMATION