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September 5, 2019

Mr. Washin Murakami
c/o Bakalian & Associates PS
8201 164th Avenue Northeast, Suite 200
Redmond, Washington 98052

RE: VAPOR INTRUSION ASSESSMENT
MORNINGSIDE ACRES TRACTS
5001, 5015 AND 5021 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON
FARALLON PN: 1355-001

Dear Mr. Murakami:

Farallon Consulting, L.L.C. (Farallon) has prepared this letter report to present the results of the recent vapor intrusion assessment conducted at the Morningside Acres Tracts property consisting of three contiguous tax parcels at 5001 Rainier Avenue South, 5015 Rainier Avenue South, and 5021 Rainier Avenue South in Seattle, Washington (herein referred to as the Property) (Figure 1). As you know, Farallon performed this assessment in response to the Washington State Department of Ecology (Ecology) June 18, 2019 letter and request for an evaluation of the potential trichloroethylene contamination risks at the Site[1] (2019 Evaluation Request letter).

The objective of the vapor intrusion assessment was to evaluate whether the trichloroethene (TCE) contamination at the Property is posing a vapor intrusion risk to the indoor air at the Property buildings. The vapor intrusion assessment also was conducted to evaluate whether concentrations of petroleum vapors from the parcel at 5001 Rainier Avenue South is posing a vapor intrusion risk to the indoor air at the Property building at 5015 Rainier Avenue South.

This letter report provides a description of the Property and relevant background information, a description of the scope of work and the results, and Farallon's conclusions regarding the vapor intrusion assessment.

SITE DESCRIPTION AND BACKGROUND

The Property, which has been owned by Mr. Washin Murakami since 1964, consists of three contiguous tax parcels in Seattle, Washington (Figures 1 and 2): King County Parcel Nos. 5649600135 (5001 Rainier Avenue South), 5649600133 (5015 Rainier Avenue South), and 5649600130 (5021 Rainier Avenue South). The combined area of the three parcels is 0.51 acre.

[1] Letter regarding Request for Evaluation of Trichloroethylene Risks at the following Site, Morningside Acres Tracts South, 5021 Rainier Avenue South, Seattle, WA 98118 dated June 18, 2019, from Ms. Kim Wooten of Ecology to Mr. Washin Murakami.

The northern parcel (5001 Rainier Avenue South) is developed as an asphalt-paved commercial parking lot (Figure 2). The middle parcel (5015 Rainier Avenue South) is developed with a one-story commercial building constructed of wood and a south-adjacent unpaved parking lot. The entire footprint of the southern parcel (5021 Rainier Avenue South) is developed with a one-story building constructed of brick, stucco, and wood. The original, western portion of the building on the southern parcel is configured as warehouse and shop space and has a basement; the building's eastern addition is configured as office or retail space.

No buildings are present on the northern parcel. Historically, two generations of gasoline service stations occupied the northern parcel from at least 1927 until about 1972, along with an automotive maintenance and repair facility from approximately 1974 until 1980.

The middle parcel currently is occupied by a convenience store operating as "Smoke & Beyond" (Smoke Shop) and a south-adjacent unpaved parking lot. The building was constructed in 1926 and has been used as a lumberyard office from 1926 until at least 1961, an insurance agent office from sometime between 1966 and 1971 until at least 1976, and a convenience store from sometime between 1981 and 1989 until the present.

The eastern portion of the building on the southern parcel is occupied by a bookstore, and the western portion is vacant. The original, western portion of the building was constructed in 1924; the building's eastern addition was constructed in 1926. Historical uses of the building included an automotive maintenance and repair facility further described below, automobile and boat dealerships, a plumbing supply business, a pool hall, a fitness center, and a bookstore.

Wash's Auto Repair, an automotive maintenance and repair facility, operated in the western portion of the building on the southern parcel from approximately 1964 until approximately 2006 or 2007. The facility operations included a paint shop, a used-oil aboveground storage tank (AST), a parts washing sink, and a cleaning solvent AST on the first floor; and a hydraulic-oil AST, a fuel-oil underground storage tank, a fuel-oil-burning furnace, a floor-drain sump, and an oil-water separator were present in the basement. The three ASTs were stored above a concrete surface.

Previous subsurface investigations and remedial actions at the former Wash's Auto Repair have been conducted by Wolfe Environmental in 2005; G-Logics, Inc. in 2007; and The Riley Group in 2013. From December 2017 to October 2018, Farallon conducted supplemental soil and groundwater sampling on and off the Property to further characterize the nature and extent of petroleum hydrocarbon and chlorinated volatile organic compound (VOC) contamination identified at the Property during the earlier field investigations.

The Property is impacted by multiple sources of contamination that currently are under investigation by Farallon pursuant to the Washington State Model Toxics Control Act Cleanup Regulation (MTCA). Farallon is in the process of completing a remedial investigation and feasibility study in accordance with MTCA (WAC 173-340-350), to identify and determine the extent and nature of the impacts from the VOC and petroleum-related contamination on and off the Property.

SCOPE OF WORK

The vapor intrusion assessment was conducted in response to the 2019 Evaluation Request letter. Farallon was contracted by Mr. Murakami to conduct a vapor intrusion assessment in July 2019. Farallon completed the work in accordance with *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* review draft dated October 2009 and revised April 2018, *Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings: Implementation Memorandum No. 18* dated January 10, 2018 and *Vapor Intrusion (VI) Investigations and Short-term Trichloroethene (TCE) Toxicity: Implementation Memorandum No.* 22 dated November 21, 2018, prepared by Ecology. The scope of work involved conducting a building inspection and indoor and outdoor air sampling. These work elements are detailed below.

INDOOR AND OUTDOOR AIR SAMPLING

Farallon conducted indoor and outdoor air sampling on July 16, 2019 to evaluate potential impacts to indoor air quality due to the vapor intrusion risk posed by the soil and groundwater contamination. It was noted on the day of sampling that none of the buildings on the Property had operational heating, ventilating, and air conditioning (HVAC) systems. The absence of a working HVAC system has the potential to bias results higher than those obtained under typical working conditions. Weather conditions, including barometric pressure, precipitation, and wind speed and direction, were monitored before and during sampling. These conditions also have the potential to affect the interpretation of sample results.

As depicted on Figure 2, indoor air sample IA-1 was collected from the first floor of the Smoke Shop storage room at 5015 Rainier Avenue South. Indoor air samples IA-2 and IA-6 were collected from the first floor in the front and back of the bookstore at 5021 Rainier Avenue South, respectively. Indoor air samples IA-3 through IA-5 were collected from the front of the bookstore basement in the crawlspace, the former automotive maintenance and repair facility basement, and the back of the bookstore basement in the crawlspace, respectively (Figure 2). Indoor air samples IA-1 through IA-6 were collected within the typical average worker's breathing space at an elevation of approximately 4 to 6 feet above the floor.

Outdoor air sample OA-1 was collected at a central location at the Property between the Smoke Shop and bookstore building at an elevation of approximately 4 feet above the ground surface to assess background ambient air concentrations (Figure 2). During the vapor intrusion assessment, concentrations of constituents of concern detected in outdoor ambient air are typically subtracted from indoor air sampling data as background concentrations. Sampling was performed using 6-liter Summa canisters with flow controllers calibrated to collect an air sample over a period of approximately 8 hours, the equivalent of a typical work shift for a commercial business employee. Evaluation of vapor intrusion risk typically targets worker exposure under a commercial setting, because the duration of a worker's time at a site usually is considerably longer than that of visitors and patrons. Sampling was discontinued after approximately 8 hours as intended. The final

pressure measured in each Summa canister had the recommended vacuum in each canister that is necessary to ensure sample integrity.

Upon completion of indoor and outdoor air sample collection, the Summa canisters were labeled, sealed, packed into their original shipping containers, and returned to Friedman & Bruya, Inc. of Seattle, Washington for laboratory analysis. The indoor and outdoor air samples were analyzed for volatile constituents of concern detected in groundwater samples at concentrations exceeding MTCA Method B screening levels for indoor air, including TCE, vinyl chloride, 1,2-DCA, and 1,2-DCP by U.S. Environmental Protection Agency Method TO-15 Selective Ion Mode, and extractable petroleum hydrocarbons by Method MA-APH to achieve the reporting limits necessary for comparison to regulatory action levels for indoor air.

According to weather data obtained from the University of Washington Department of Atmospheric Sciences website accessed on August 19, 2019[2], weather conditions during sampling consisted of overcast clouds, with an average temperature of 78 degrees Fahrenheit. According to the Seattle-Tacoma International Airport weather station data for July 16, 2019[1], winds from the north to the south were estimated at approximately 5 miles per hour. Barometric pressure at the time of arrival at the Property and at the conclusion of sampling was approximately 30.0 inches of mercury with minor fluctuating trends throughout the day. Weather conditions during sampling were recorded to assist in the evaluation of factors that may affect sampling results. Weather conditions at the time of sampling were conducive to collecting representative indoor air samples and are not anticipated to have biased sample results.

RESULTS

Concentrations of detected constituents of concern in outdoor air were subtracted from indoor air concentrations. The corrected indoor air sampling results were then compared to MTCA Method B screening levels for indoor air for commercial setting to evaluate whether the vapor intrusion is a complete pathway. The MTCA Method B screening levels modified for commercial setting are the applicable screening levels to evaluate the vapor intrusion pathway for current use of the Property buildings.

Chlorinated VOCs

1,2-DCA was detected in the bookstore crawlspace at an indoor-corrected concentration of 0.59 micrograms per cubic meter (µg/m^3) in indoor air sample IA-6, which slightly exceeds the MTCA Method B indoor air screening level for commercial exposure calculated at 0.502 µg/m^3 (Table 1; Figure 2). 1,2-DCA also was detected at indoor-corrected concentrations of 0.36 and 0.31 µg/m^3 in indoor air samples IA-1 (Smoke Shop) and IA-2 (bookstore), respectively, which are less than the MTCA Method B indoor air screening level for commercial exposure. The 1,2-DCA corrected concentration of 0.0 µg/m^3 was calculated for indoor air samples IA-3 through IA-5. The outdoor air concentration for 1,2-DCA was 0.057 µg/m^3.

[2] http://www-k12.atmos.washington.edu/k12/grayskies/nw_weather.html

TCE was detected in the bookstore basement crawlspace at an indoor-corrected concentrations of 0.62, 0.59, and 0.69 µg/m^3 in indoor air samples IA-3, IA-4, and IA-5, respectively, which are less than the MTCA Method B indoor air screening level for commercial exposure of 1.9 µg/m^3 (Table 1; Figure 2). TCE was not detected at a concentration exceeding the laboratory practical quantitation limit (PQL) in indoor air samples IA-1, IA-2, or IA-6, which were collected in the first floor of the bookstore and the Smoke Shop, or in the outdoor air control sample.

Vinyl chloride was detected at an indoor-corrected concentration of 0.56 µg/m^3 in indoor air sample IA-4 (bookstore crawlspace), which is less than the MTCA Method B indoor air screening level for commercial exposure (Table 1; Figure 2). Vinyl chloride was not detected at a concentration exceeding the laboratory PQL in any of the other five indoor air samples or the outdoor air control sample.

1,2-DCP was not detected at a concentration exceeding the laboratory PQL in any of the six indoor air samples or the outdoor air control sample (Table 1; Figure 2).

Petroleum Hydrocarbons

C5-C8 and C9-C12 aliphatics were detected in all the indoor air samples and the outdoor air control sample at concentrations less than the MTCA Method B residential exposure cleanup level (Table 2; Figure 2). The MTCA Method B screening level for commercial setting has not been calculated for these compounds because the MTCA Method B residential exposure cleanup levels are more conservative and had not been exceeded by any air sampling results. C9-10 aromatics were detected a concentration of 33 µg/m^3 in the bookstore crawlspace indoor air sample IA-4, which is less than the residential exposure MTCA Method B indoor air cleanup level of 182 µg/m^3. C9-C10 aromatics were not detected a concentration exceeding the laboratory PQL in the other five indoor air samples or the outdoor air control sample. The total corrected TPH values, which are the sum of C5-C8 and C9-C12 aliphatics and the C9-C10 aromatics, were compared to the site-specific cleanup level calculated in accordance with Ecology Implementation Memorandum 18. Total indoor-corrected TPH concentrations for each air sample were less than the calculated MTCA Method B site-specific residential exposure cleanup level.

The laboratory analytical data package was reviewed by Farallon; laboratory quality assurance and quality control testing results indicated that the reported data were representative. The laboratory analytical report is provided in Attachment A.

CONCLUSIONS

Based on the July 16, 2019 air monitoring event, indoor and outdoor air sampling results demonstrate that a vapor intrusion pathway from the subsurface to the basement to the first-floor indoor air is incomplete under current commercial use of the buildings; therefore, no further action regarding the indoor air risk is required under MTCA. Even though 1,2-DCA was detected in all indoor air samples collected, the indoor air analytical results corrected for the outdoor air background sample for the three basement indoor air samples, IA-3 through IA-5, is calculated at 0.0 µg/m^3, indicating that basement air is not impacted beyond the background conditions. The 1,2-DCA indoor air–corrected analytical results for the three first floor indoor air samples, IA-1, IA-2, and IA-6, all exceed the MTCA Method B residential exposure cleanup level, and bookstore back room sample IA-6 also exceeds the MTCA Method B commercial exposure screening level. However, since the corrected analytical value for the three basement samples is 0.0 µg/m^3, the vapor intrusion pathway from the subsurface to the basement to the first-floor indoor air is incomplete.

There could also be an unidentified source of 1,2-DCA that affects the first floor breathing air, in which case the value in Title 29 of Chapter 1910-1000 Subpart Z: Table Z-2 of the Occupational Safety and Health Administration (OSHA) Standards becomes the applicable standard. The 8-hour time-weighted average for 1,2-DCA is 50 parts per million (ppm) and the maximum exposure concentration is 200 ppm. The highest 1,2-DCA detection of 0.65 µg/m^3 in indoor air sample IA-6 calculates to 0.00016 ppm, which is far less than the OSHA standard.

TCE and vinyl chloride indoor-corrected air concentrations exceed the MTCA Method B residential indoor air cleanup level in the basement indoor air samples IA-3 through IA-5, but are less than the calculated MTCA Method B commercial exposure scenario. TCE and vinyl chloride were not detected in the first-floor indoor air or the outdoor air samples. Based on the Property's current use and occupancy, the detected concentrations of VOCs do not pose a vapor intrusion or worker safety issue to the bookstore or Smoke Shop occupants. The concentrations of vapors migrating from the subsurface media into the first floor of these two buildings are less than the MTCA Method B screening level for commercial use; therefore, no further action is necessary at this time.

Outdoor air sampling results indicate low detections of 1,2-DCA and petroleum hydrocarbons C5-C8 and C9-C12 aliphatics. No contributing sources of TCE, vinyl chloride, or 1,2-DCP in the outdoor air from the adjacent properties that could have biased sampling results.

The MTCA Method B screening levels for the commercial exposure scenario were developed to protect worker safety during business hours where a potential for vapor intrusion exposure exists. Overall indoor air sampling data on the first floor of the buildings that were subject to the assessment demonstrates that indoor air concentrations for constituents of concern are less than MTCA Method B screening levels for commercial exposure scenario. Vapor intrusion is not a threat to worker safety in the Smoke Shop and bookstore occupied spaces. No further action regarding the vapor intrusion pathway for the sites affecting the Property is required under MTCA as long as the Property use remains commercial or until after the anticipated future remedial actions.

CLOSING

Farallon trusts that information presented in this letter provides sufficient information for Ecology's needs. Please contact either of the undersigned at (425) 295-0800 if you have questions or comments regarding this letter report.

Sincerely,

Farallon Consulting, L.L.C.

Joe Rounds
Senior Project Manager

Branislav Jurista, L.G
Principal Geologist

Attachments: Figure 1, *Site Vicinity Map*
Figure 2, *Sampling Locations*
Table 1, *Air Sampling Results for HVOCs*
Table 2, *Air Sampling Results for Petroleum Hydrocarbons*
Attachment A, Laboratory Analytical Report

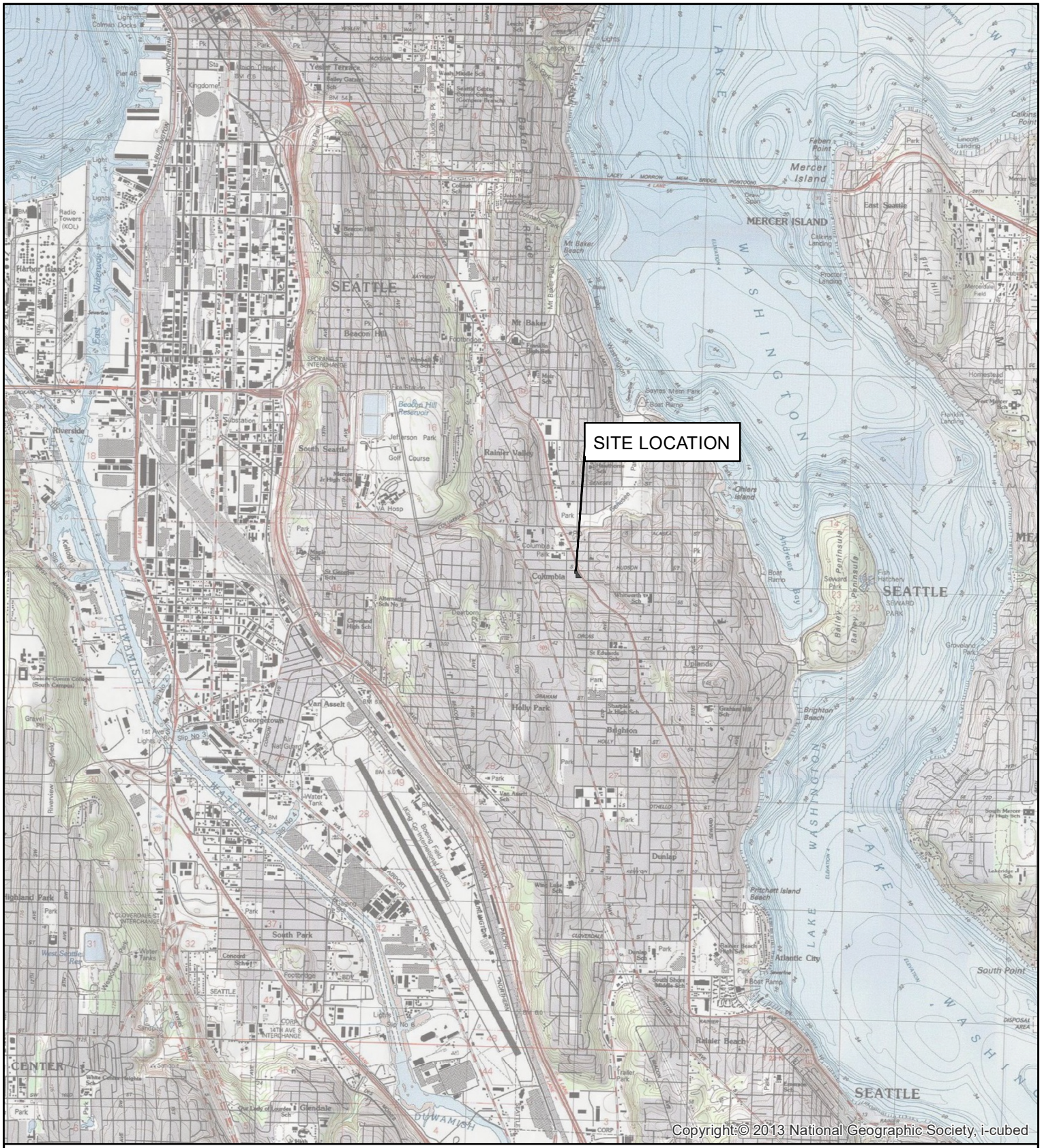
cc: Allan Bakalian, Bakalian & Associates PS

JR/BJ:cm

FIGURES

VAPOR INTRUSION ASSESSMENT
Morningside Acres Tract
5001 Rainier Avenue South
Seattle, Washington

Farallon PN: 1355-001



REFERENCE: 7.5 MINUTE USGS QUADRANGLE SEATTLE SOUTH, WASHINGTON, DATED 2013

0 4,000
SCALE IN FEET

N

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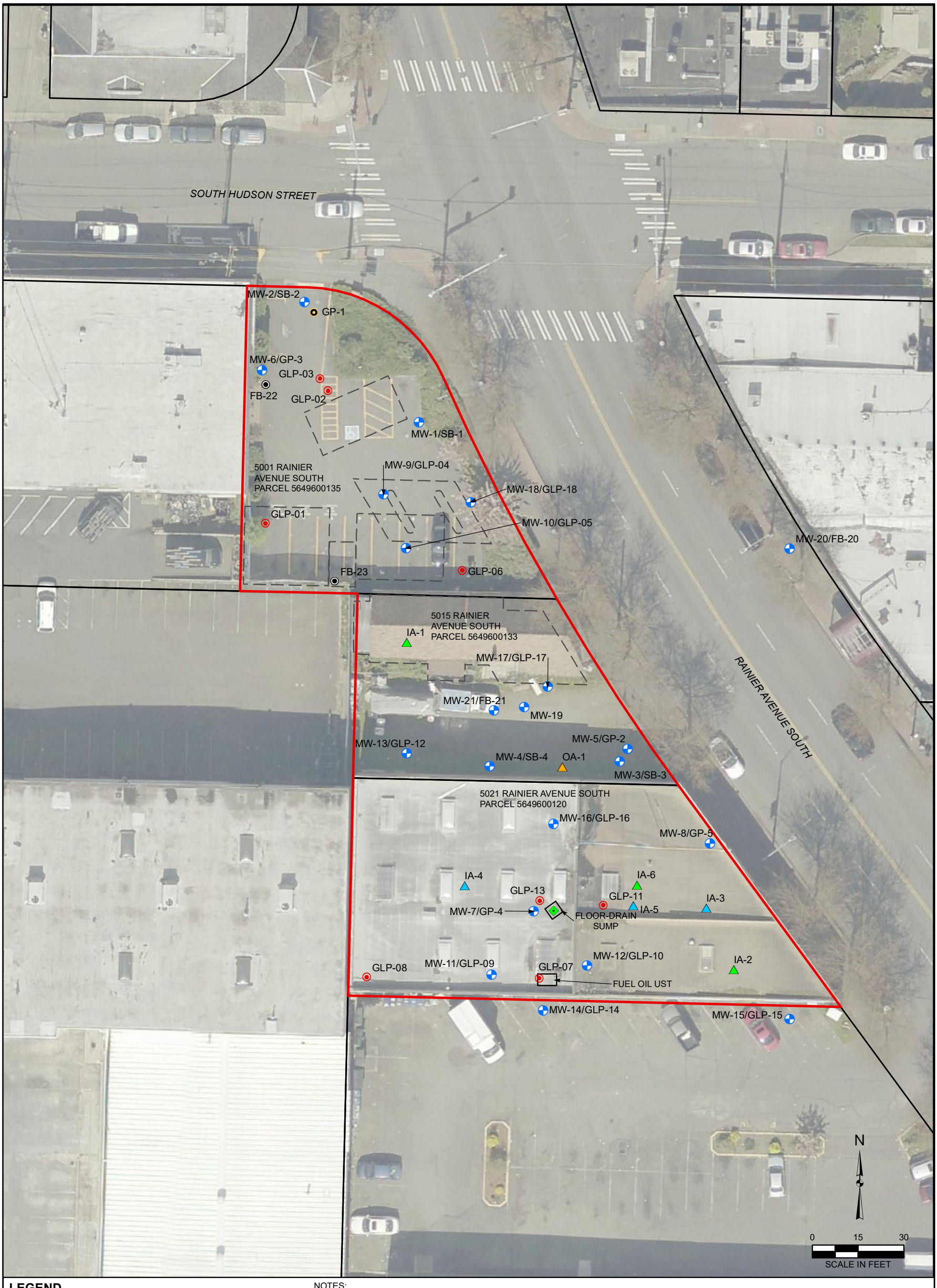
FIGURE 1

SITE VICINITY MAP
5001 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 1355-001

Drawn By: jjones Checked By: TC Date: 5/23/2018 Disc Reference:

Document Path: Q:\Projects\1355 Morningside\001 RainierAveS\Mapfiles\1217_Sampling\Figure-01_1355-001_SiteVicinityMap.mxd



LEGEND

- BASEMENT INDOOR AIR SAMPLING LOCATION
- FIRST FLOOR INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION
- MONITORING WELL
- BORING (FARALLON)
- BORING (G-LOGICS)
- BORING (KLEINFELDER)
- SUMP SEDIMENT SAMPLE
- PROPERTY BOUNDARY
- KING COUNTY PARCEL BOUNDARY

UST = UNDERGROUND STORAGE TANK

NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. FIGURE WAS PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 2

SAMPLING LOCATIONS
MORNINGSIDE ACRES TRACTS
5001, 5015, AND 5021
RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 1355-001

Drawn By: jjones | Checked By: JR | Date: 8/8/2019 | Disc Reference:

Document Path: Q:\Projects\1355 Morningside\001 RainierAveS\Mapfiles\008_VI_Assessment\Figure-01_SamplingLocations.mxd

TABLES

VAPOR INTRUSION ASSESSMENT
Morningside Acres Tract
5001 Rainier Avenue South
Seattle, Washington

Farallon PN: 1355-001

Table 1
Air Sampling Analytical Results for HVOCs
Morningside Acres Tract Properties
5001, 5015, and 5021 Rainier Avenue South
Seattle, Washington
Farallon PN: 1355-001

Sample Location	Sample Identification	Location Description	Sample Type	Sample Date	Sample Height (feet)[1]	Analytical Results (micrograms per cubic meter)[2]											
						1,2-Dichloroethane			Trichloroethene (TCE)			Vinyl Chloride			1,2-Dichloropropane		
						Indoor Air	Outdoor Air	Indoor Corrected[3]	Indoor Air	Outdoor Air	Indoor Corrected[3]	Indoor Air	Outdoor Air	Indoor Corrected[3]	Indoor Air	Outdoor Air	Indoor Corrected[3]
First Floor																	
IA-1	IA-1-071619	Smoke Shop Storage Room	Indoor Air	7/16/2019	6	0.42	0.057	**0.36**	< 0.27	< 0.23	< 0.27	< 0.26	< 0.26	< 0.26	< 0.23	< 0.23	< 0.23
IA-2	IA-2-071619	Front of Bookstore	Indoor Air	7/16/2019	4	0.37	0.057	**0.31**	< 0.27	< 0.23	< 0.27	< 0.26	< 0.26	< 0.26	< 0.23	< 0.23	< 0.23
IA-6	IA-6-071619	Bookstore Back Room	Indoor Air	7/16/2019	6	0.65	0.057	**0.59**	< 0.27	< 0.23	< 0.27	< 0.26	< 0.26	< 0.26	< 0.23	< 0.23	< 0.23
Basement																	
IA-3	IA-3-071619	Front of Bookstore Basement	Indoor Air	7/16/2019	5	0.057	0.057	0.000	0.62	< 0.23	**0.62**	< 0.26	< 0.26	< 0.26	< 0.23	< 0.23	< 0.23
IA-4	IA-4-071619	Garage Basement	Indoor Air	7/16/2019	5	0.057	0.057	0.000	0.59	< 0.23	**0.59**	0.56	< 0.26	**0.56**	< 0.23	< 0.23	< 0.23
IA-5	IA-5-071619	Back of Bookstore Basement	Indoor Air	7/16/2019	6	0.057	0.057	0.000	0.69	< 0.23	**0.69**	< 0.26	< 0.26	< 0.26	< 0.23	< 0.23	< 0.23
Outdoor Air																	
OA-1	OA-1-071619	Outside Garage; upwind	Outdoor Air	7/16/2019	4	NA	0.057	NA	NA	< 0.23	NA	NA	< 0.26	NA	NA	< 0.23	NA
MTCA Method B Indoor Air Cleanup Level - Residential Exposure Scenario[4]						**0.0962**			**0.37**			**0.28**			**0.68**		
MTCA Method B Indoor Air Cleanup Level - Commercial Exposure Scenario[5]						**0.502**			**1.9**			**1.5**			**---**		

NOTES:
Results in **bold** denote concentrations exceeding residential exposure screening levels. Results highlighted in yellow exceed commercial exposure screening levels.
< denotes analyte not detected at or exceeding the reporting limit listed.
[1] Feet above ground surface.
[2] Analyzed by U.S. Environmental Protection Agency Method TO-15.
[3] Indoor air corrected value calculated by subtracting outdoor air result from indoor air sample result.
[4]Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method B Cleanup Level for Indoor Air, website link provided in Appendix B of the Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action. Revised February 2016
[5]Washington State MTCA Method B cleanup level calculation with modified exposure parameters adjusted for commercial exposure per Section 750 of MTCA.

HVOC = halogenated volatile organic compound
MTCA = Washington State Model Toxics Control Act Cleanup Regulation
NA = not applicable

Table 2
Air Sampling Analytical Results for Petroleum Hydrocarbons
Morningside Acres Tract Properties
5001, 5015, and 5021 Rainier Avenue South
Seattle, Washington
Farallon PN: 1355-001

Sample Location	Sample Identification	Location Description	Sample Type	Sample Date	Sample Height (feet)[1]	Analytical Results (micrograms per cubic meter)[2]									Total Corrected TPH[4]
						C5-C8 Aliphatics			C9-C12 Aliphatics			C9-C10 Aromatics			
						Indoor Air	Outdoor Air	Indoor Corrected[3]	Indoor Air	Outdoor Air	Indoor Corrected[3]	Indoor Air	Outdoor Air	Indoor Corrected[3]	
First Floor															
IA-1	IA-1-071619	Smoke Shop Storage Room	Indoor Air	7/16/2019	6	100	68	32	72	63	9	< 25	< 25	< 25	41
IA-2	IA-2-071619	Front of Bookstore	Indoor Air	7/16/2019	4	180	68	112	73	63	10	< 25	< 25	< 25	122
IA-6	IA-6-071619	Bookstore Back Room	Indoor Air	7/16/2019	6	210	68	142	76	63	13	< 25	< 25	< 25	155
Basement															
IA-3	IA-3-071619	Front of Bookstore Basement	Indoor Air	7/16/2019	5	120	68	52	73	63	10	< 25	< 25	< 25	62
IA-4	IA-4-071619	Garage Basement	Indoor Air	7/16/2019	5	170	68	102	120	63	57	33	< 25	33	192
IA-5	IA-5-071619	Back of Bookstore Basement	Indoor Air	7/16/2019	6	100	68	32	85	63	22	< 25	< 25	< 25	54
Outdoor Air															
OA-1	OA-1-071619	Outside Garage; upwind	Outdoor Air	7/16/2019	4	NA	68	NA	NA	63	NA	NA	< 25	NA	131
MTCA Method B Indoor Air Cleanup Level - Residential Exposure Scenario[4]						**2,720**			**136**			**182**			**301[5]**

NOTES:

< denotes analyte not detected at or exceeding the reporting limit listed.

MTCA = Washington State Model Toxics Control Act Cleanup Regulation

NA = not applicable

[1] Feet above ground surface.

[2] Analyzed by Method MA-APH.

[3] Indoor air corrected value calculated by subtracting outdoor air result from indoor air sample result.

[4] Sum of indoor air corrected values.

[4]Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method B Cleanup Level for Indoor Air, website link provided in Appendix B of the Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action. Revised February

[5]Site-specific cleanup level calculated following Washington State Department of Ecology Implementation Memorandum No. 18: Petroleum Vapor Intrusion (PVI): Updated Screening Levels, and Assessing PVI Threats to Future Buildings.

ATTACHMENT A
LABORATORY ANALYTICAL REPORTS

VAPOR INTRUSION ASSESSMENT
Morningside Acres Tract
5001 Rainier Avenue South
Seattle, Washington

Farallon PN: 1355-001

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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July 29, 2019

Joe Rounds, Project Manager
Farallon Consulting, L.L.C.
975 5th Avenue Northwest
Issaquah, WA 98027

Dear Mr Rounds:

Included are the results from the testing of material submitted on July 17, 2019 from the Morning Acres 1355-001, F&BI 907294 project. There are 20 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: jrounds@farallonconsulting.com
FLN0729R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on July 17, 2019 by Friedman & Bruya, Inc. from the Farallon Consulting, L.L.C. Morning Acres 1355-001, F&BI 907294 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Farallon Consulting, L.L.C.
907294 -01	IA-1-071619
907294 -02	IA-2-071619
907294 -03	IA-3-071619
907294 -04	IA-4-071619
907294 -05	IA-5-071619
907294 -06	IA-6-071619
907294 -07	OA-1-071619

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-1-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-01
Date Analyzed:	07/18/19	Data File:	071816.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	93	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	100
APH EC9-12 aliphatics	72
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-2-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-02
Date Analyzed:	07/18/19	Data File:	071817.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	180
APH EC9-12 aliphatics	73
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-3-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-03
Date Analyzed:	07/18/19	Data File:	071818.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	79	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	120
APH EC9-12 aliphatics	73
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-4-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-04
Date Analyzed:	07/19/19	Data File:	071819.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	170
APH EC9-12 aliphatics	120
APH EC9-10 aromatics	33

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-5-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-05
Date Analyzed:	07/19/19	Data File:	071820.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	100
APH EC9-12 aliphatics	85
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-6-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-06
Date Analyzed:	07/19/19	Data File:	071821.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	210
APH EC9-12 aliphatics	76
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	OA-1-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-07
Date Analyzed:	07/19/19	Data File:	071822.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	99	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	68
APH EC9-12 aliphatics	63
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Method Blank	Client:	Farallon Consulting, L.L.C.
Date Received:	Not Applicable	Project:	Morning Acres 1355-001
Date Collected:	Not Applicable	Lab ID:	09-1687 mb
Date Analyzed:	07/18/19	Data File:	071811.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<46
APH EC9-12 aliphatics	<35
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-1-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-01
Date Analyzed:	07/18/19	Data File:	071816.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	90	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.42	0.10
Trichloroethene	<0.27	<0.05
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-2-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-02
Date Analyzed:	07/18/19	Data File:	071817.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	95	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.37	0.091
Trichloroethene	<0.27	<0.05
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-3-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-03
Date Analyzed:	07/18/19	Data File:	071818.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	77	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.057	0.014
Trichloroethene	0.62	0.12
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-4-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-04
Date Analyzed:	07/19/19	Data File:	071819.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	0.56	0.22
1,2-Dichloroethane (EDC)	0.057	0.014
Trichloroethene	0.59	0.11
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-5-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-05
Date Analyzed:	07/19/19	Data File:	071820.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.057	0.014
Trichloroethene	0.69	0.13
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-6-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-06
Date Analyzed:	07/19/19	Data File:	071821.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.65	0.16
Trichloroethene	<0.27	<0.05
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	OA-1-071619	Client:	Farallon Consulting, L.L.C.
Date Received:	07/17/19	Project:	Morning Acres 1355-001
Date Collected:	07/16/19	Lab ID:	907294-07
Date Analyzed:	07/19/19	Data File:	071822.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	0.057	0.014
Trichloroethene	<0.27	<0.05
1,2-Dichloropropane	<0.23	<0.05

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	ClientID
Date Received:	Not Applicable	Project:	ProjectID
Date Collected:	Not Applicable	Lab ID:	09-1687 mb
Date Analyzed:	07/18/19	Data File:	071811.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
Trichloroethene	<0.27	<0.05
1,2-Dichloropropane	<0.23	<0.05

Date of Report: 07/29/19
Date Received: 07/17/19
Project: Morning Acres 1355-001, F&BI 907294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD MA-APH

Laboratory Code: 907307-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
APH EC5-8 aliphatics	ug/m3	320	290	10
APH EC9-12 aliphatics	ug/m3	140	120	15
APH EC9-10 aromatics	ug/m3	<25	<25	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
APH EC5-8 aliphatics	ug/m3	45	90	70-130
APH EC9-12 aliphatics	ug/m3	45	120	70-130
APH EC9-10 aromatics	ug/m3	45	90	70-130

Date of Report: 07/29/19
Date Received: 07/17/19
Project: Morning Acres 1355-001, F&BI 907294

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ppbv	5	113	70-130
1,2-Dichloroethane (EDC)	ppbv	5	107	70-130
1,2-Dichloropropane	ppbv	5	109	70-130
Trichloroethene	ppbv	5	98	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

907294

SAMPLE CHAIN OF CUSTODY

ME 07/17/19

Page # 1 of 1

Report To Joe Rounds
Company Farallon Consulting
Address 975 5th AVE NW
City, State, ZIP Issaquah WA 98027
Phone 425-295-0543 Email jrounds@farallonconsulting.com

SAMPLERS (*signature*)

PROJECT NAME: Morning Acres
PO #: 1355-001

REPORTING LEVEL
☒ Indoor Air ☐ Deep Soil Gas
☐ Sub Slab/Soil Gas ☐ SVE/Grab

INVOICE TO

TURNAROUND TIME
☒ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Archive Samples
☐ Other

ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Contr. ID	Date Sampled	Field Initial Press. (Hg)	Field Initial Time	Field Final Press. (Hg)	Field Final Time	TO-15 Full Scan	TO-15 BTEXN	TO-15 cVOCs	APH	Notes
IA-1-071619	01	23231	08183	7/16/19	30	0951	7	1751			X	X	X - per 7/17/19 pr coc ME Please analyze samples for
IA2-071619	02	18561	08182	7/16/19	30	0808	6	1609			X	X	the following:
IA3-071619	03	23229	07851	7/16/19	29	0818	6	1618			X	X	- Trichloroethane
IA-4-071619	04	18566	08054	7/16/19	30	0825	8	1625			X	X	- Vinyl chloride
IA-5-071619	05	20547	07852	7/16/19	30	0813	8	1613			X	X	- 1,2-dichloroethane - 1,2-dichloropropane
IA-6-071619	06	18573	08181	7/16/19	30	0805	7	1607			X	X	APH sent to TR 7/17/19 mLS - ~~Volatile petroleum hydrocarbons~~
OA-1-071619	07	18580	07847	7/16/19	30	0831	5	1631			X	X	- ~~Extractable petroleum hydrocarbons~~
													by EPA TO-15 using ion monitor

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Greg Peters	Farallon	7/17/19	1000
Received by:	Nhan Phan	FEBT	7/17/19	1600
Relinquished by:				
Received by:		Samples received at 21 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
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