

Appendix **10**

Methane Survey Report

METHANE SURVEY REPORT

Mirman School

16180 Mulholland Drive
Los Angeles, California 90049

January 30, 2019

Partner Project Number: 18-210817.3

Prepared for:

Mirman School

16180 Mulholland Drive
Los Angeles, California 90049



January 30, 2019

Michael Novak
Mirman School
16180 Mulholland Drive
Los Angeles, California 90049

Subject: Methane Survey Report
Mirman School
16180 Mulholland Drive
Los Angeles, California 90049
Partner Project Number: 18-210817.3

Dear Mr. Novak:


Partner Engineering and Science, Inc. (Partner) is pleased to provide the results of the assessment performed on the above-referenced property. The following report describes the field activities, methods, and findings of the Methane Survey conducted at the above-referenced property.

This assessment was performed utilizing methods and procedures consistent with good commercial or customary practices designed to conform to acceptable industry standards. The independent conclusions represent Partner's best professional judgment based upon existing conditions and the information and data available to us during the course of this assignment.

We appreciate the opportunity to provide these services. If you have any questions concerning this report, or if we can assist you in any other matter, please contact Cody Taylor at (559) 742-1520.

Sincerely,

Partner Engineering and Science, Inc.


Mark Bullivant
Project Geologist


Samantha J. Fujita, PG
Regional Manager-Subsurface Investigation


Cody Taylor
National Client Manager



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1.0 INTRODUCTION

1.1 Purpose

The purpose of the investigation was to evaluate the potential impact of methane to soil gas as a consequence of off-gassing from the nearby landfill site. The scope herein is not intended to fulfill any regulatory requirements but is intended to evaluate the potential for on-site migration of methane. Mirman School provided project authorization of Partner Proposal Number 18-210817.2.

1.2 Limitations

This report presents a summary of work conducted by Partner. The work includes observations of site conditions encountered and the analytical results provided by an independent third-party laboratory of samples collected during the course of the project. The number and location of samples were selected to provide the required information. However, it cannot be assumed that the limited available data are representative of subsurface conditions in areas not sampled.

Conclusions and/or recommendations are based on the observations, laboratory analyses, and the governing regulations. Conclusions and/or recommendations beyond those stated and reported herein should not be inferred from this document.

Partner warrants that the environmental consulting services contained herein were accomplished in accordance with generally-accepted practices in the environmental engineering, geology, and hydrogeology fields that existed at the time and location of work. No other warranties are implied or expressed.

1.3 User Reliance

Partner was engaged by Mirman School (the Addressee), or their authorized representative, to perform this investigation. The engagement agreement specifically states the scope and purpose of the investigation, as well as the contractual obligations and limitations of both parties. This report and the information therein, are for the exclusive use of the Addressee. This report has no other purpose and may not be relied upon, or used, by any other person or entity without the written consent of Partner. Third parties that obtain this report, or the information therein, shall have no rights of recourse or recovery against Partner, its officers, employees, vendors, successors or assigns. Any such unauthorized user shall be responsible to protect, indemnify and hold Partner, the Addressee and their respective officers, employees, vendors, successors and assigns harmless from any and all claims, damages, losses, liabilities, expenses (including reasonable attorneys' fees) and costs attributable to such use. Unauthorized use of this report shall constitute acceptance of, and commitment to, these responsibilities, which shall be irrevocable and shall apply regardless of the cause of action or legal theory pled or asserted.

This report has been completed under specific Terms and Conditions relating to scope, relying parties, limitations of liability, indemnification, dispute resolution, and other factors relevant to any reliance on this report. Any parties relying on this report do so having accepted Partner's standard Terms and Conditions, a copy of which can be found at <http://www.partneresi.com/terms-and-conditions.php>

2.0 SITE BACKGROUND

2.1 Site Description

The subject property consists of five parcels of land comprising approximately 5.16 acres located on the south side of Mulholland Drive within a mixed institutional and residential area of Los Angeles County. The subject property is currently occupied by The Mirman School for educational use. On-site operations consist of classroom instruction, food preparation and service, and routine facility maintenance. In addition to the current structures, the subject property is also improved with paved playground areas and sport courtyards, gymnasium equipment, paved parking areas, walkways, and landscaping.

The subject property is bound by Bel Air Presbyterian Church to the north across Mulholland Drive, Berkley Hall School to the south across a fire road, undeveloped land to the east, and Westland School to the west.

2.2 Site History

Partner completed a *Phase I Environmental Site Assessment Report* (Phase I), dated May 2, 2018, prepared on behalf of Eyestone Environmental. According to the reviewed historical sources, the subject property was formerly undeveloped as early as 1894 until the development of the current school improvements in 1971. Tenants on the subject property have included The Mirman School (1971-Present).

A methane investigation was requested by the client to evaluate the potential impact of methane to soil gas as a consequence of off-gassing from a nearby landfill site.

2.3 Geology and Hydrogeology

Based on a review of the United States Geological Survey (USGS) *Van Nuys, California* Quadrangle topographic map, the subject property is situated at an elevation approximately 1,320 feet above mean sea level, and the local topography is sloping gently to the north-northwest. Refer to Figure 2 for a topographic map of the site vicinity.

According to the California Geological Survey, the subject property is situated in the Peninsular Ranges which are a series of ranges separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks. The Peninsular Ranges extend into lower California and are bound on the east by the Colorado Desert. The Los Angeles Basin and the island group (Santa Catalina, Santa Barbara, and the distinctly terraced San Clemente and San Nicolas islands), together with the surrounding continental shelf (cut by deep submarine fault troughs), are included in the province.

Based on boring B1 advanced during this investigation, the underlying subsurface consists predominantly of silty sand (SM) from the ground surface to approximately six feet below ground surface (bgs). From six to 11 feet bgs, the subsurface consists predominantly of sandy silt (ML). From 11 to 20 feet bgs, the subsurface consists predominantly of silty sand (SM). Refer to Appendix A for a boring log from this investigation.

Groundwater was not encountered during this investigation and was not a part of the scope of work. According to the State Water Resources Control Board (SWRCB) Geotracker website, a nearby Leaking

Underground Storage Tank (LUST) site is located at 651 Sepulveda Boulevard in the City of Brentwood, which is approximately 3.6 miles southwest of the subject property and is overseen by the Los Angeles Regional Water Quality Control Board (LARWQCB) as Case Number 900490098. The site maintained five groundwater monitoring wells in the area. The most recent monitoring data available on the GeoTracker Website was for May 25, 2007, with depth to groundwater ranging from 57.95 to 65.04 feet bgs with a direction of flow to the south.

3.0 FIELD ACTIVITIES

The scope of the Methane Survey included the advancement of four borings (B1 through B4) for the collection and analysis of soil gas samples. The scope herein was not intended to fulfill any regulatory requirements but was intended to evaluate the potential for on-site migration of methane. Refer to Table 1 for a summary of the borings and sampling schedule for this investigation.

3.1 Preparatory Activities

Prior to the initiation of fieldwork, Partner completed the following activities.

3.1.1 Utility Clearance

Partner delineated the work area with white spray paint and notified Underground Service Alert (USA) to clear public utility lines as required by law at least 48 hours prior to drilling activities. USA issued ticket number A183600302 for the project.

In addition, Partner subcontracted with Ground Penetrating Radar Systems (GPRS) on January 3, 2019 to clear boring locations of utilities. GPRS systematically free-traversed each proposed boring location with a Radiodetection model RD7000 electromagnetic induction (EM) equipment unit with line-tracing capabilities, and a GSSI model SIR-3000 ground penetrating radar (GPR) unit. The data was interpreted in real time for evidence of utility lines and/or other subsurface features of potential concern. Based on the findings of the GPR survey, no subsurface utilities were identified within the proposed boring locations.

3.1.2 Health and Safety Plan

Partner prepared a site-specific Health and Safety Plan, which was reviewed with on-site personnel involved in the project prior to the commencement of drilling activities.

3.2 Drilling Equipment

On January 3, 2019, Partner subcontracted with Munoz Direct Push (Munoz) to provide and operate drilling equipment. Munoz, under the direction of Partner, advanced borings B1 through B4 with a truck-mounted Geoprobe Model 5400 direct push drill rig.

3.3 Boring Locations

Borings B1 through B4 were advanced in the areas of the proposed development. Borings B1 through B3 were advanced in the northwest, southwest, and southeast areas of the landscaping located in the central portion of the subject property, respectively. Boring B4 was advanced in the easternmost landscaped area of the subject property.

Refer to Figure 3 for a map indicating boring locations.

3.4 Soil Sampling

Borings B1 through B4 were unpaved. Borings B1 through B3 were advanced to a terminal depth of 20 feet bgs. Boring B4 encountered refusal at a depth of five feet bgs at several locations.

Soil samples were collected from boring B1 for lithologic soil logging purposes only using a two-foot long by 1.5-inch diameter sampler with a two-foot long acetate liner and sampling point. The sampler was advanced by the direct-push drill rig using four-foot long by 1.25-inch diameter hollow rods. The sampler was driven into the subsurface to allow undisturbed soil to enter the open barrel and retrieved in four-foot intervals to recover the soil-filled liners.

A lengthwise section of each acetate liner was removed with a splitting tool to expose the soil. The soil column was visually inspected for discoloration, monitored for odors, and classified in accordance with the Unified Soil Classification System (USCS).

3.5 Soil Gas Sampling

Soil Gas Probe Construction

Soil gas probes were constructed within the borings upon completion of soil sampling. A new section of ¼-inch diameter polyethylene tubing with a new ¼-inch diameter polypropylene filter at the terminal end was inserted into the borehole to the desired sampling depth. One-inch diameter polyvinyl chloride (PVC) casing was used as a guide for the tubing to ensure that the desired sampling depth was achieved. Sand was poured into the boring annulus to form an approximately one-foot long sand pack around the polypropylene filter, at which time the PVC piping was withdrawn. Approximately one foot of dry, granular bentonite was placed atop the sand pack and the remainder of the borehole was backfilled with hydrated bentonite to the next desired sampling depth where a soil gas probe was similarly constructed. Upon installation of the shallowest probe, the remainder of the borehole was backfilled with hydrated bentonite to the ground surface to form a seal. The sampling end of the tubing was fitted with a valve and the probe was labeled for identification.

Methane Testing

Soil gas probes were allowed to equilibrate for at least 24 hours after installation prior to conducting two sequential sampling events conducted at least 24 hours apart. Subsurface methane levels were measured using a Landtec Model GEM 5000 landfill gas analyzer. Prior to methane sampling, the subsurface pressure was measured in inches of water column using the GEM 5000 built-in pressure transducer. Methane levels were measured in percent by volume by connecting a soil gas probe to the instrument sampling port. The GEM 5000 was allowed to run for approximately one minute or until readings stabilized, whichever was sooner, prior to recording gas levels. The barometric pressure was also measured in inches of mercury column at the start and end of each sampling event using the GEM 5000 built-in barometer.

Methane samples were collected from borings B1 through B3 at five, 10, and 20 feet bgs and from boring B4 at five feet bgs.

3.6 Post-Sampling Activities

Temporary soil gas probes were removed from the subsurface and the boreholes were backfilled with hydrated bentonite chips following sampling activities.

No significant amounts of derived wastes were generated during this investigation.

4.0 LABORATORY ANALYSIS

Soil gas samples from borings B1 through B4 were analyzed on-site using the Landtec GEM 5000 landfill gas analyzer.

4.1 Soil Gas Sample Analytical Results

Methane was detected in each of the soil gas probes at concentrations ranging from 1,000 to 92,000 parts per million by volume (ppmv).

Refer to Table 2 for a summary of the methane analytical results.

5.0 DISCUSSION AND CONCLUSIONS

Partner conducted a Methane Survey at the subject property to evaluate the potential impact of methane to soil gas as a consequence of off-gassing from the nearby landfill site. The scope of the Methane Survey included the advancement of four borings for the collection of representative subsurface methane concentrations.

Subsurface lithology encountered in the upper 20 feet bgs consisted of silty sand and sandy silt.

Methane was detected in each of the soil gas probes between 1,000 and 92,000 ppmv. While there are no specific regulatory guidelines for methane, the Los Angeles Department of Building and Safety (LADBS) methane mitigation requirements for properties located in a Methane Zone (Table 71) indicate that the subject property would meet the criteria for Level V methane mitigation design if located in a Methane Zone. Level V methane mitigation design includes sub-slab venting and depressurization upon redevelopment.

Based on the results of this investigation, the subject property appears to be affected by off-gassing from the nearby landfill.

TABLES

PARTNER

Table 1: Summary of Investigation Scope
 16180 Mulholland Drive
 Los Angeles, California 90049
 Partner Project Number 18-210817.3
 January 2019

Boring Identification	Location	Terminal Depth (feet bgs)	Matrix Sampled	Sampling Depths* (feet bgs)	Target Analytes
B1	Northwest area of the central landscaping	20	Soil Gas	5, 10, 20	Methane
B2	Southwest area of the central landscaping	20	Soil Gas	5, 10, 20	Methane
B3	Southeast area of the central landscaping	20	Soil Gas	5, 10, 20	Methane
B4	Easternmost landscaped area	5**	Soil Gas	5	Methane

Notes:

*All depths analyzed for methane using a Landtec GEM 5000 landfill gas analyzer.

**Refusal encountered at the terminal depth

bgs = below ground surface

Table 2: Soil Gas Sample Methane Analytical Results
16180 Mulholland Drive
Los Angeles, California 90049
Partner Project Number 18-210817.3
January 2019

Date	Time	Probe Set*	Probe Depth (feet bgs)	Concentration (ppmv)	Differential Pressure ("Hg)	Barometric Pressure ("Hg)
1/3/2019	11:00	B1	5	3,000	-0.200	28.88 steady
1/3/2019	11:02	B1	10	3,000	-0.150	
1/3/2019	11:04	B1	20	1,000	-0.130	
1/3/2019	11:06	B2	5	1,000	0.015	
1/3/2019	11:08	B2	10	4,000	0.040	
1/3/2019	11:10	B2	20	2,000	0.050	
1/3/2019	11:12	B3	5	16,000	0.030	
1/3/2019	11:14	B3	10	37,000	0.040	
1/3/2019	11:16	B3	20	82,000	0.000	
1/3/2019	11:06	B4	5	2,000	0.000	
1/4/2019	11:00	B1	5	3,000	-0.001	28.69 steady
1/4/2019	11:02	B1	10	4,000	0.000	
1/4/2019	11:04	B1	20	4,000	0.000	
1/4/2019	11:06	B2	5	4,000	0.000	
1/4/2019	11:08	B2	10	5,000	0.000	
1/4/2019	11:10	B2	20	5,000	0.000	
1/4/2019	11:12	B3	5	91,000	0.000	
1/4/2019	11:14	B3	10	92,000	0.000	
1/4/2019	11:16	B3	20	73,000	0.000	
1/4/2019	11:06	B4	5	3,000	0.000	
1/7/2019	11:00	B1	5	1,000	0.000	28.50 steady
1/7/2019	11:02	B1	10	1,000	0.100	
1/7/2019	11:04	B1	20	1,000	0.400	
1/7/2019	11:06	B2	5	2,000	0.200	
1/7/2019	11:08	B2	10	1,000	0.820	
1/7/2019	11:10	B2	20	1,000	0.200	
1/7/2019	11:12	B3	5	4,000	0.600	
1/7/2019	11:14	B3	10	78,000	0.400	
1/7/2019	11:16	B3	20	2,000	0.410	
1/7/2019	11:06	B4	5	4,000	0.390	

Notes:

*Soil gas samples analyzed for methane using a Landtec GEM 5000 landfill gas analyzer

bgs = below ground surface

ppmv = parts per million by volume

"Hg = inches of mercury

FIGURES

PARTNER



PARTNER

Engineering and Science, Inc.
2154 Torrance Boulevard, Suite 200
Torrance, California 90501

Project Number: 18-210817.3



Legend

Subject Property



Site Plan

Figure	Prepared By	Date
1	M. Bullivant	January 2019
16180 Mulholland Drive Los Angeles, California 90049		



Map created with TOPOLOG ©2008 National Geographic

PARTNER

Engineering and Science, Inc.
2154 Torrance Boulevard, Suite 200
Torrance, California 90501

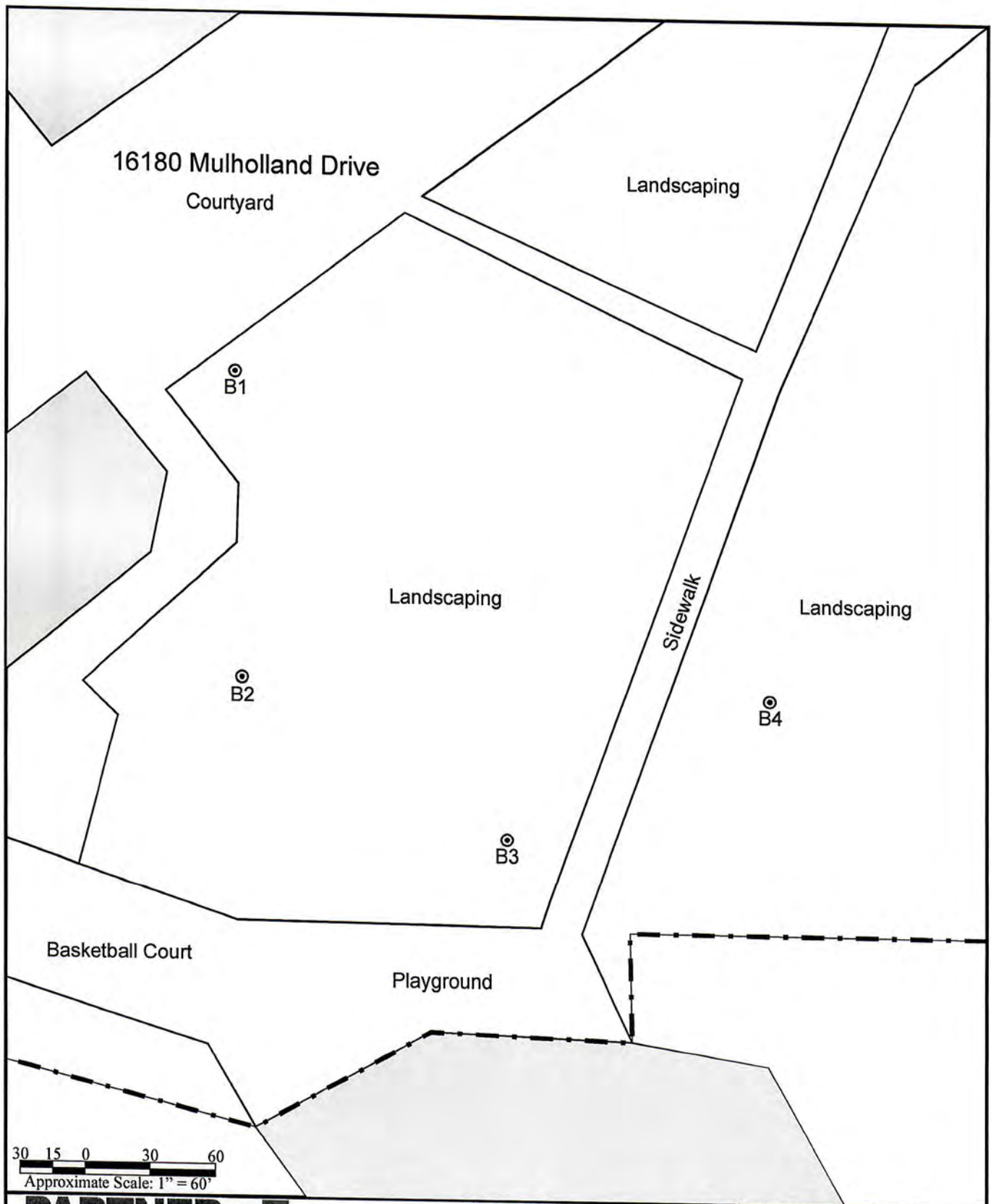
Project Number: 18-210817.3



USGS Van Nuys, California Quadrangle
Version: 1991 Current as of: 1972

Topographic Map

Figure	Prepared By	Date
2	M. Bullivant	January 2019
16180 Mulholland Drive Los Angeles, California 90049		



PARTNER

Engineering and Science, Inc.
2154 Torrance Boulevard, Suite 200
Torrance, California 90501

Project Number: 18-210817.3



Legend

Subject Property



Boring Location



Sample Location Map

Figure	Prepared By	Date
3	M. Bullivant	January 2019

16180 Mulholland Drive
Los Angeles, California 90049

APPENDIX A: BORING LOG

PARTNER

Boring Number:		B1			Page 1 of 1	
Location:		Northwest area of central landscaping			Date Started:	1/3/2019
Site Address:		16180 Mulholland Drive			Date Completed:	1/3/2019
		Los Angeles, California 90049			Depth to Groundwater:	NA
Project Number:		18-210817.3			Field Technician:	M. Bullivant
Drill Rig Type:		Truck-mounted Geoprobe model 5400 direct push			Partner Engineering and Science	
Sampling Equipment:		Acetate liners			2154 Torrance Boulevard, Suite 200	
Borehole Diameter:		1.5"			Torrance, California 90501	
Depth	Sample	PID	USCS	Description	Notes	
1						
2						
3			SM	Silty sand: Light olive brown (2.5Y 5/4), loose to slightly firm, moist.	No odor or discoloration	
4						
5					Temporary soil gas probe installed	
6						
7						
8			ML	Sandy silt: Olive brown (2.5Y 4/4), firm, moist.		
9						
10					Temporary soil gas probe installed	
11						
12					No odor or discoloration	
13				Silty sand: Dark olive brown (2.5Y 3/3), firm, moist.		
14						
15						
16			SM			
17					No odor or discoloration	
18				Silty sand: Yellowish brown (10YR 5/6), firm, damp.		
19						
20					Temporary soil gas probe installed	
21					Boring terminated at 20 feet bgs. Groundwater was not encountered. Probes removed and boring backfilled with hydrated bentonite after sampling.	
22						
23						
24						
25						