

December 3, 2021
File No. 23212007.09

Ms. Maria Lammers
Ohio EPA Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Subject: Village of St. Bernard Landfill
MP-9 Contingency Monitoring 3rd 30-day/End of Contingency Monitoring Report

Dear Ms. Lammers:

Per the approved EGMP for the above referenced site, every 30 days from the date of initial detection above threshold limits, until contingency monitoring plan discontinuation criteria are met, the owner/operator will submit a report to the Ohio EPA and Hamilton County Public Health containing:

- a. Analysis and summary of the results from the contingency monitoring including the lateral extent of explosive gas concentrations above the threshold limit and a characterization of explosive gas pathways. Characterization, based on visual inspection, of the pathways will include the degree of saturation and porosity (textural classification or fracturing) within the pathways and the possible causes of the increase in gas concentrations such as landfill operational procedures, gas control system failure or upset, climatic conditions, or other activities being conducted on or near the site.
- b. A summary of the steps taken to ensure protection of human health and the environment and an analysis of their effectiveness.

Following meeting the criteria for ending contingency monitoring, a report summarizing the contingency monitoring will be submitted. This letter serves as the third 30-day report and the end of contingency monitoring summary report. The 30-day submittal date is December 7, 2021. Submittal of this report on December 3, 2021, (within 30 days after the last 30-day report) fulfills the requirements of the applicable rule, OAC 3745-27-12 (E)(5)(g)(ii). A site map is presented as Figure 1 in Attachment A.

Analysis and Summary

The results of the contingency monitoring performed to date are summarized in the table included in Attachment B. The first reading below the threshold concentration at MP-9 occurred on November 10, 2021, with subsequent below threshold readings on November 15, 2021, November 17, 2021, and November 24, 2021.

Pathway Characterization

The description of the site setting and site geology has been summarized from the EGMP. With respect to regional geology, the site is situated on the southeast edge of the Mill Creek Valley. The



regional geology reflects multiple glacial advances and is consistent with a glacial outwash valley. Generally, regional geologic sequences consist of glacial valleys incised within Ordovician bedrock formations. These valley fills consist of highly variable interbedded sands, gravels, clays, silts, boulders, and cobbles.

With respect to site specific geology, the most significant feature includes a glacial till/outwash sequence which appears to form the base of the site. This unit is predominated by low permeability clays and or silts interbedded with silty sands within the areas investigated. Both oxidized and non-oxidized native materials have been found at depth, suggesting deposition in multiple sequences.

Although interbedded sands represent a potential zone of migration, those materials examined via borings were saturated and included a high percentage of silt (estimated at 40 percent or higher). As such, although classified as granular material, the potential for large scale gas transmission is seen as limited.

Along the northern perimeter of the site, the former landfill property is contiguous with several residential properties along Bank Avenue. Essentially, this area consists of a flat terrace, projecting out from the toe of the landfill slope and transitioning into the back yards of the Bank Avenue residences. This terrace was raised to its current elevation by the placement of two generations of fill. A cross section along this northern perimeter is presented as Figure 2 in Attachment A. The boring logs used to prepare the cross section are presented in the EGMP. The log for MP-9 is included in this report in Attachment C. The fill soils, in particular the lower fill, contain hard fill and miscellaneous debris. As a result, the near surface geologic profile of this terrace is varied. The fill soil matrix in the vicinity of MP-9 is a sandy silt or sandy clay. The presence of the hard fill and debris likely increases the porosity and results in a porosity that approaches that typically assumed for granular soils, i.e. 25 percent. Recent water level measurements show that the fill soil in the vicinity of MP-9 is saturated at approximately 7 feet below the ground surface. MP-9 is screened from approximately 2 to 12 feet below the ground surface.

As part of the delineation investigation conducted in 2013, a test pit, TP-7, was excavated in the vicinity of MP-9. The log for TP-7 is included in Attachment C. The unsaturated portion of the fill layer is the primary pathway. Geotechnical testing of this material as part of the delineation investigation showed that it can be classified as silty sand with gravel. Porosity of the soil matrix of the fill is considered to be moderate. The presence of large pieces of concrete debris within the fill results in the potential for isolated, unconnected open void space, depending on the location and orientation of the concrete debris.

Possible Causes of Exceedance

Just prior to the detection of the initial exceedance at MP-9 on September 7, 2021, the St. Bernard area experienced a wet period with frequent precipitation. The depth to water below ground surface at MP-9 during the June event was approximately 4 feet. At the time of the September 2021 event, the depth to water below ground surface had fallen to approximately 7 feet below the ground surface. The infiltration into the landfill of significant quantities of water could have displaced methane in the landfill into the pathway monitored by MP-9. Alternatively, the additional water that infiltrated into the landfill could have resulted in an increase in the generation of methane, some of which reached MP-9. The saturation of the cap could have closed pathways that had previously been providing vertical gas migration to the atmosphere.

Summary of the Steps Taken to Protect Human Health and the Environment

The collection and control system is not operating at this time under an extension of the blower shutdown test. Beginning on September 22nd and continuing through November 3rd, a bar punch, temporary BP-1, was being performed approximately 5 feet from the property line fence between 437 Bank Avenue and MP-9. No combustible gas was detected at temporary BP-1. Semi-annual compliance monitoring will resume in March 2022. Quarterly monitoring for the extended blower shutdown test will occur in December 2021.

Conclusion

The contingency monitoring at MP-9 has satisfied the requirements to return to regular monitoring per OAC 3745-27-12 (E)(5)(e), specifically four readings below the threshold limit over a period of the minimum two weeks were recorded. The semi-annual compliance monitoring will recommence in March 2022 and the extended blower shutdown test monitoring will occur in December 2021. No additional permanent monitors (probes or bar punch locations) are proposed at this time. Adjacent residences are equipped with combustible gas alarms. None of the alarms that have occurred in any of the residences have been shown to be due to combustible gas from the landfill. The existing permanent monitor probes are sufficiently closely spaced that additional monitors are not needed.

Should you have any questions or comments, please contact the undersigned.

Sincerely,



Randall C. Mills, P.G.
Senior Project Professional
SCS Engineers



James J. Walsh, P.E.
Principal
SCS Engineers

RCM/JJW

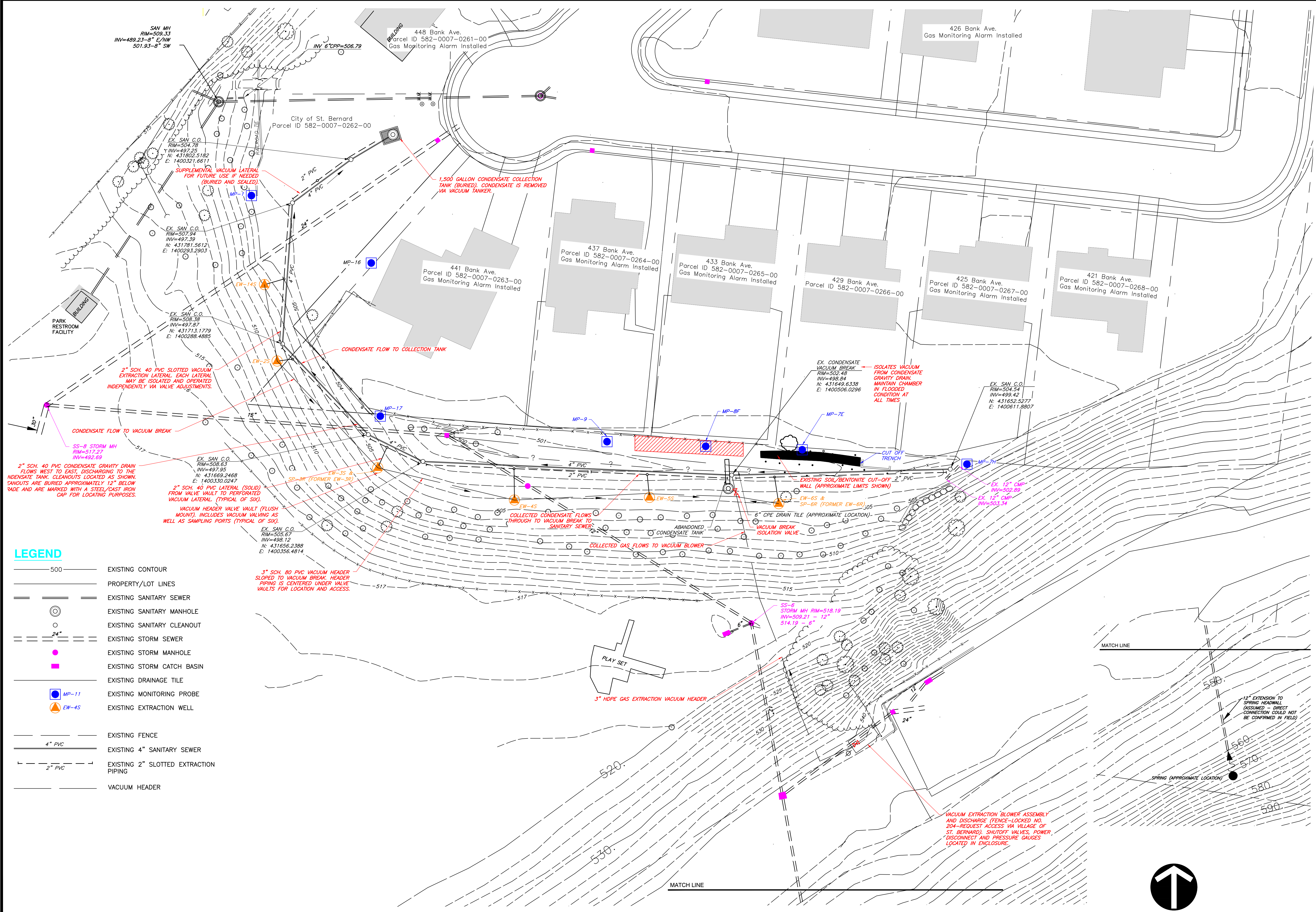
cc: Nick Schapman, GHD
Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Chuck DeJonckheere, R.S., Hamilton County Public Health

Encl.

ATTACHMENT A

FIGURES

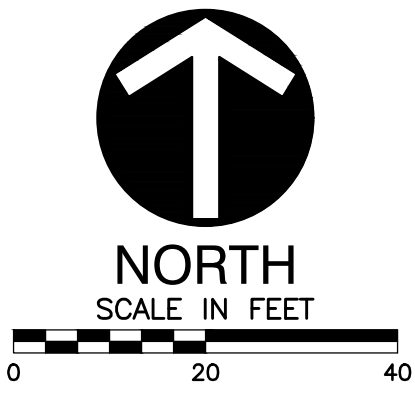
C:\Users\4572adaf\Desktop\pdrf\St. Bernard\Fig 4.dwg Sep 02, 2021 - 5:56pm Layout Name: FIG 4 By: 4572adaf



LEGEND

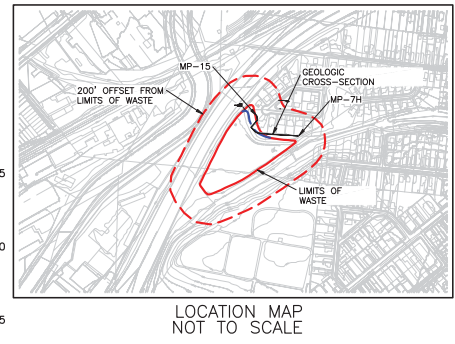
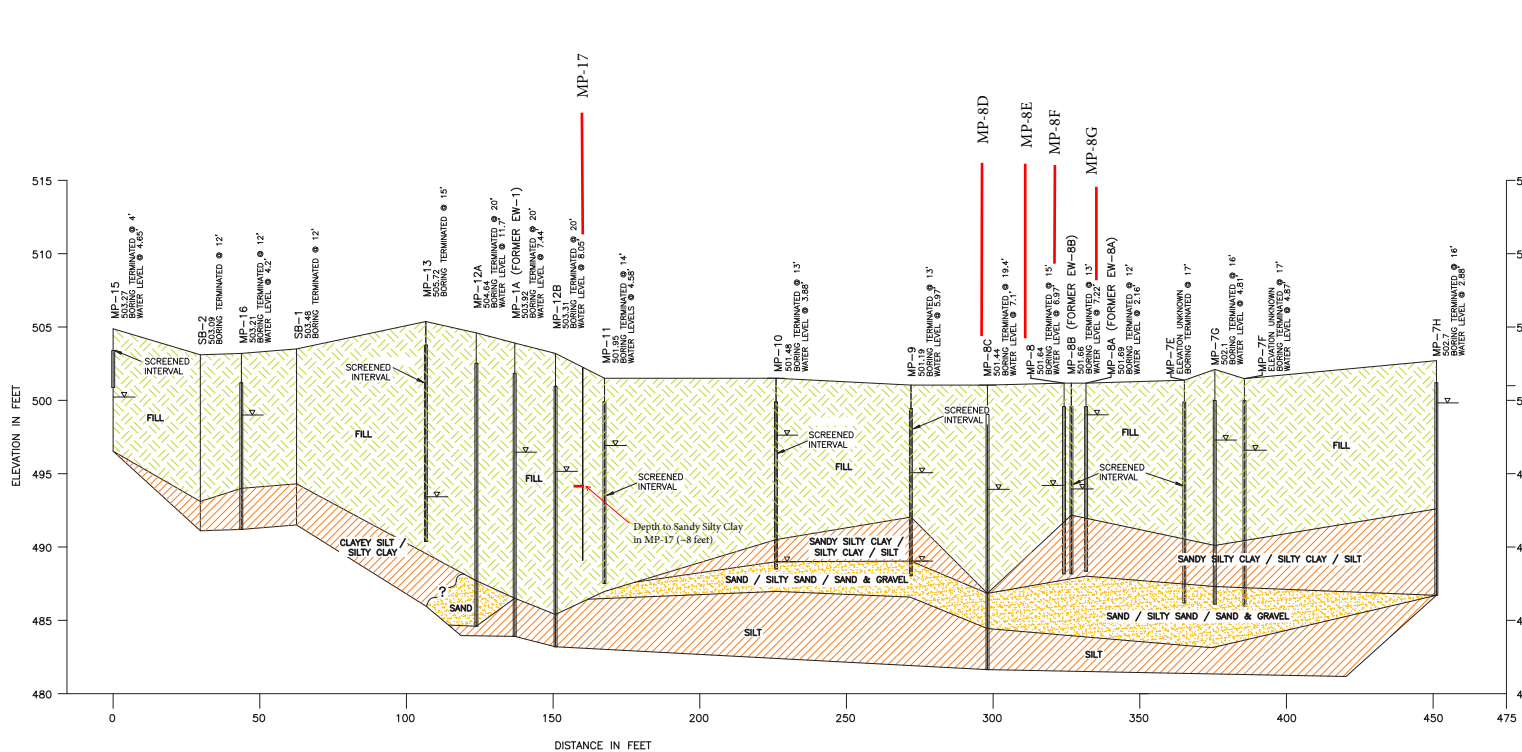
	EXISTING CONTOUR
	PROPERTY/LOT LINES
	EXISTING SANITARY SEWER
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY CLEANOUT
	EXISTING STORM SEWER
	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING DRAINAGE TILE
	EXISTING MONITORING PROBE
	EXISTING EXTRACTION WELL
	EXISTING FENCE
	EXISTING 4\"/>
	EXISTING 2\"/>
	VACUUM HEADER

NOTES:
 1. BASE MAP SOURCE CEC DRAWING 2B, DATED MARCH 31, 2011



CK. BY	
DESCRIPTION	
REV. DATE	
SHEET TITLE	MONITORING NETWORK
PROJECT TITLE	ST. BERNARD LANDFILL VILLAGE OF ST. BERNARD, OHIO
CLIENT	VILLAGE OF ST. BERNARD 110 WASHINGTON AVENUE ST. BERNARD, OHIO 45217
SCS ENGINEERS	STEARN, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 2060 READING ROAD, CINCINNATI, OH 45202 PH. (615) 421-5583
CADD FILE:	FIG 4
DATE:	AUGUST 2021
SCALE:	AS SHOWN
DRAWING NO.	FIG 1

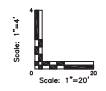
REVISION RECORD		
NO.	DATE	DESCRIPTION




THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME

LEGEND	
	FILL (GAS MIGRATION ZONE)
	CLAY / SILTY CLAY / SANDY SILTY CLAY / SILT
	SAND / SILTY SAND / SAND & GRAVEL
	INITIAL WATER LEVEL RECORDED DURING PROBE INSTALLATION

- NOTES:
1. WATER LEVELS MEASURED ON 03/04/2011.
 2. SEE DRAWING NO. 2 FOR PROBE LOCATIONS. CROSS-SECTION TRACE INTERCEPTS PROBE LOCATIONS SHOWN.
 3. FILL OR DEBRIS INDICATED IS OUTSIDE OF LIMITS OF WASTE PLACEMENT. FILL SHOWN WAS OBSERVED TO CONSIST PRIMARILY OF INERT FILL WITH INCIDENTAL QUANTITIES OF ORGANIC DEBRIS.





Civil & Environmental Consultants, Inc.
 4274 Glendale-Milford Road - Cincinnati, OH 45242
 Ph: 513.985.0226 - 800.759.5614 - Fax: 513.985.0228
 www.cecinc.com

**BANK AVENUE LANDFILL
 ST. BERNARD, OHIO
 HAMILTON COUNTY**

DRAWN BY: MLB	CHECKED BY: RJS	APPROVED BY: RHI	PROJECT NO: 100-191
DATE: 03/31/2011	DWG SCALE: AS SHOWN	PROJECT NO: 100-191	DRAWING NO: 4B

GEOLOGIC CROSS-SECTION **4B**

FIGURE 7. CEC 2011 Northern Geologic Cross Section

ATTACHMENT B
CONTINGENCY MONITORING RESULTS

**TABLE 1. SUMMARY OF CONTINGENCY MONITORING RESULTS AT MP-9
METHANE CONCENTRATION (PERCENT BY VOLUME)**

Date	Initial Reading (% combustible gas)		Verification Reading (% combustible gas)		Post 20-minute Evacuation Readings* (% combustible gas)	
	Initial	Sustained	Initial	Sustained	Initial	Sustained
09/08/21	2.3	9.2	9.0	8.8		
09/15/21	47.2	48.3	46.8	46.3	19.1	24.1
09/22/21	40.7	41.9	40.8	40.3	18.2	19.4
09/26/21	39.3	39.7	38.9	38.2	19.4	18.2
10/06/21	27.7	33.6	33.0	32.4	10.3	12.8
10/13/21	44.1	45.5	44.7	43.8	22.2	23.8
10/20/21	47.1	48.7	47.0	45	14.6	19.1
10/27/21	37.4	38.6	37.3	22.5	9.4	12.6
11/03/21	15.7	16.3	15.5	14.1	3.6	4.8
11/10/21	2.1	2.6				
11/15/21	0.2	0.2				
11/17/21	0	0				
11/24/21	0	0				

* MP-9 was evacuated using the GEM 5000 for 20 minutes after the initial and verification readings were performed.

ATTACHMENT C
BORING & TEST PIT LOGS



Civil & Environmental Consultants, Inc.
 Cincinnati, OH Pittsburgh, PA
 (513) 985-0226 • (800) 759-5614 (412) 921-3402 • (800) 365-2324

CITY OF ST. BERNARD

JOB NO.: 200610

LOG OF MP-9

St. Bernard, Ohio

Sheet 1 of 1

LOGGED BY: PCS

GROUND SURFACE ELEVATION:

DRILLER: Jersey West Drilling

TOP OF CASING ELEVATION:

DATE DRILLED: 08/14/00

INITIAL WATER LEVEL: 12 ft. BGS

DATE: 08/14/00

DRILL METHOD: 4 1/4 IN. HSA

STATIC WATER LEVEL:

DATE:

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation, MSL	Depth (ft.)	Graphic Log	Materials Description	Well Completion
5.3						No sample, Vapor reading from open bore hole	
4.9	3	50/3		5	Concrete		
0.0	3	14-6 4-4			Gray silty CLAY w/ fine sand, moist, trace concrete and metal, moist, stiff (FILL)		
0.0	18	2-2 2-2		10	Olive gray silty CLAY w/ fine sand and brown oxidized areas through sample, moist, soft		
0.0	21	1-1 1-1			Very soft		
					Gray silty fine SAND, wet, very loose		
				15		Boring terminated at 13 feet	
				20			
				25			

Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01	Test Pit No.: 7 & "L"		
Project Location: St. Bernard, Ohio	Date Started: 4/16/2013	Page 1 of 1		
Logged By: R. Mills	Date Completed: 4/16/2013	GW Depth (ft)	Date	Time
Excavated By: Petro	Sampling Method:			
Excavation Method: Cat 308E	Weather:			
Backfill: excavated and off-site soil				
Total Test Pit Depth: 8 feet				

Depth (ft.)	Sample No.	Methane Reading (% vol)	PID Scan (ppm)	PID Headspace (ppm)*	Description
0--					Approximately 0.5 feet topsoil.
--					Tan soil fill: CLAY & SILT, little Sand, little Gravel, moist, with occasional brick fragments and small pieces of metal. Less than 5% non-soil debris.
1--				1.5	
--					
2--					
--		0	0.4		At approximately 2.5 feet, grey soil fill: SILT & CLAY, some to little Sand, little Gravel, moist, with glass fragments, brick fragments, slight petroleum odor.
3--					Tire encountered at 3 feet. 5 to 10% non-soil debris.
--					
4--					
--					
5--				8	Fill includes slabs of concrete, small pieces of rusted metal, metal tubing, road sign, car mirror.
--				0.4	
6--					2nd tire and inner tube in initial test pit.
--					
7--					Approximately 6 foot square slab of concrete in west end of "L" at 7.5 feet.
--					
8--					At 8 feet, native soil: olive grey Clayey SILT, some fine Sand, some organic matter.
--					
9--					Bottom of test pit at 8.5 feet.
--					
10--					
--					
11--					

* Unless otherwise indicated, headspace samples were collected from excavated soil fill stockpile prior to backfilling.