

2025 Annual Groundwater Monitoring and Corrective Action Report

Ottumwa Midland Landfill
Ottumwa, Iowa

Prepared for:

Alliant Energy



SCS ENGINEERS

25225073.00 | January 30, 2026

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OVERVIEW OF CURRENT STATUS

Ottumwa-Midland Landfill 2025 Annual Report

In accordance with §257.90(e)(6), this section at the beginning of the annual report provides an overview of the current status of groundwater monitoring and corrective action programs for the Coal Combustion Residual (CCR) unit. The groundwater monitoring system at the Ottumwa Midland Landfill (OML) monitors a single CCR unit. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
Monitoring Status – Start of Year	(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Detection
Monitoring Status – End of Year	(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Detection
Statistically Significant Increases (SSIs)	(iii) If it was determined that there was an SSI over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>October 2024</u> No SSIs <u>April 2025</u> No SSIs
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Not applicable Assessment monitoring not required

Category	Rule Requirement	Site Status
Statistically Significant Levels (SSL) Above Groundwater Protection Standard	(iv) If it was determined that there was an SSL above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	Not applicable In detection monitoring
	(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	
Selection of Remedy	(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Not applicable In detection monitoring
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable In detection monitoring

Table of Contents

Section	Page
Overview of Current Status	i
1.0 Introduction.....	1
2.0 Background.....	1
2.1 Geologic and Hydrogeologic Setting.....	1
2.1.1 Regional Information.....	1
2.1.2 Site information	2
2.2 CCR Rule Monitoring System	2
3.0 § 257.90(e) Annual Report Requirements.....	3
3.1 §257.90(e)(1) Site Map.....	3
3.2 §257.90(e)(2) Monitoring System Changes.....	3
3.3 §257.90(e)(3) Summary of Sampling Events.....	3
3.4 § 257.90(e)(4) Monitoring Transition Narrative.....	4
3.5 § 257.90(e)(5) Other Requirements.....	5
3.5.1 § 257.90(e) General Requirements.....	5
3.5.2 § 257.94(d) Alternative Detection Monitoring Frequency.....	5
3.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring	6
3.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency.....	6
3.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards	6
3.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring .	6
3.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment	6
3.6 §257.90(e)(6) Overview.....	7
4.0 References.....	7

Tables

Table 1.	Groundwater Monitoring Well Network
Table 2.	CCR Rule Groundwater Samples Summary
Table 3.	Groundwater Elevation – CCR Rule Monitoring Network
Table 4.	Horizontal Gradients and Flow Velocity
Table 5A.	Groundwater Analytical Results Summary – October 2024
Table 5B.	Groundwater Analytical Results Summary – April/May 2025
Table 6.	Groundwater Field Data Summary

Figures

Figure 1.	Site Location Map
Figure 2.	Site Plan and Monitoring Well Locations
Figure 3.	CCR Potentiometric Surface Elevation Contour Map, April 7-9, 2025
Figure 4.	CCR Potentiometric Surface Elevation Contour Map, October 27-30, 2025

Appendices

- Appendix A Regional Hydrogeologic Information
- Appendix B Boring Logs and Well Construction Documentation
- Appendix C Laboratory Reports
- Appendix D Historical Monitoring Results

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1.0 INTRODUCTION

This 2025 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2025 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units.

This report covers the period of groundwater monitoring from January 1, 2025, through December 31, 2025.

The groundwater monitoring system at the Ottumwa Midland Landfill (OML) monitors a single CCR unit with two phases:

- OML Landfill & OML Landfill Expansion - Phase 1 (existing landfill)

The system is designed to detect monitored constituents in the uppermost aquifer at the waste boundary of OML as required by 40 CFR 257.91(d). The groundwater monitoring system consists of two upgradient and three downgradient monitoring wells.

2.0 BACKGROUND

To provide context for the annual report, the following background information is provided in this section of the report, prior to the annual report requirement sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

The uppermost bedrock unit in the site area consists of Pennsylvanian shales with minor siltstone, sandstone, limestone, and coal intervals. The continuity of these minor beds is highly variable. The thickness of the Pennsylvanian shale is variable; in some areas of Wapello County, it is over 100 feet thick, while in other areas it is absent. The variation in thickness is due to erosion of the bedrock surface. Underlying the Pennsylvanian shales are Mississippian limestone and dolomite, with some shale and sandstone. The Devonian units underlying the Mississippian are composed of shale, dolomite, and limestone, and are in turn underlain by Silurian dolomite (Montgomery Watson, 1994). A summary of the regional hydrogeologic stratigraphy is presented in **Appendix A**.

The Des Moines River and associated alluvial aquifers are a major source of surface water and shallow groundwater in the area; however, the alluvial aquifer is not present at the OML site. Unconsolidated deposits at the site consist of clays overlain by loess, which are not productive sources of groundwater. The uppermost Pennsylvanian bedrock unit is considered to be a regional aquitard. The Mississippian unit is the shallowest regional bedrock aquifer. The Cambrian-Ordovician aquifer, comprised of dolomite and sandstone, is commonly the source of municipal and industrial high-capacity wells in the region (Coble, 1971).

A summary of the regional hydrogeologic stratigraphy and a map showing regional bedrock surface topography and the top of the Mississippian limestone in Southeastern Iowa are included in **Appendix A**. The bedrock surface elevation is highly variable due to erosion. Regional information indicates that groundwater flow within the Mississippian limestone is to the south-southeast. A map showing the regional potentiometric surface in the Mississippian limestone is included with the hydrogeologic background information presented in **Appendix A**.

For the purposes of groundwater monitoring, the Mississippian limestone unit is considered to be the uppermost aquifer unit at the OML site as defined under 40 CFR 257.53.

2.1.2 Site information

Unconsolidated soils at the site include clay, loam, silt loam, silty clay, sandy loam, and intermediate types. Where present, these soils are generally 5 to 7 feet thick. Pennsylvanian shales and Mississippian limestone underlie the unconsolidated soils. Soils encountered during the drilling and installation of the existing background wells, MW-102M and MW-122M, were described as 10 to 11 feet of lean clay, overlying 126 to 129 feet of shale with intermittent stringers of sandstone and coal. The shale was underlain by Mississippian limestone at 138 to 139 feet below ground surface.

During drilling of CCR wells MW-301, MW-302, and MW-303, soils were described as 4 to 11 feet of clay and silt, overlying 112 to 173 feet of shale with intermittent stringers of sandstone and coal. The shale was underlain by Mississippian limestone at 116 to 168 feet below ground surface.

The boring logs for the landfill CCR monitoring wells are provided in **Appendix B**. All CCR monitoring wells are screened within the Mississippian bedrock unit.

Based on water level monitoring performed for the state monitoring program, shallow groundwater flow at the water table appears to be controlled partially by the landfill underdrain system and partially by the top of the Pennsylvanian shale. Shallow groundwater, near the current fill area, flows toward the landfill and the sedimentation pond. The landfill underdrain system includes a drainage layer and collection piping below the landfill liner and is used to ensure shallow groundwater does not affect performance of the landfill liner.

Based on water levels in the existing Mississippian piezometers at the OML site, a generally south-southeast flow direction has been identified in the Mississippian limestone aquifer, consistent with the regional flow information. The potentiometric surface elevations and groundwater flow directions for the April 2025 monitoring event are shown on **Figure 3**, and the potentiometric surface elevations and groundwater flow directions for the October 2025 monitoring event are shown on **Figure 4**. The groundwater elevation data for the CCR monitoring wells are provided in **Table 3**. Calculated horizontal gradients and flow velocities for each of the flow paths are provided in **Table 4**.

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established within the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells (**Table 1** and **Figure 2**). The upgradient monitoring wells include MW-122M and MW-102M. The downgradient monitoring wells include MW-301, MW-302, and MW-303. The CCR Rule wells are installed in the upper portions of the Mississippian Limestone aquifer. Well depths range from approximately 150.0 to 204.5 feet, measured from the top of the well casing.

3.0 § 257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For CCR management units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31, 2029, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

3.1 §257.90(E)(1) SITE MAP

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

A map showing the location of the site is provided as **Figure 1**. The OML CCR units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program are shown on **Figure 2**.

3.2 §257.90(E)(2) MONITORING SYSTEM CHANGES

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

No new monitoring wells were installed for the CCR program and no wells were decommissioned as part of the groundwater monitoring program for OML in 2025.

3.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS

In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

Two semiannual groundwater sampling events were completed in 2025 for OML as part of ongoing detection monitoring.

Groundwater samples collected during the semiannual events, in April and October 2025, were analyzed for the Appendix III constituents. A retest sample was collected for chloride in MW-303 in May 2025. A summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the

sample was required by the detection monitoring or assessment monitoring program is included in **Table 2**.

The validation and evaluation of the October 2024 monitoring event data was completed and transmitted to IPL on January 29, 2025. The validation and evaluation of the April/May 2025 monitoring event data was completed and transmitted to IPL on August 20, 2025. The validation and evaluation of the October 2025 monitoring event data was in progress at the end of 2025 and will be transmitted to IPL in 2026; therefore, the October 2025 monitoring results will be included in the 2026 annual report. The October 2025 groundwater elevation data is included in this report.

The sampling results for Appendix III parameters in October 2024 and April/May 2025 are summarized in **Tables 5A** and **5B**. Field parameter results for the October 2024 and April/May 2025 sampling events are provided in **Table 6**. The results of the analytical laboratory analyses are provided in the laboratory reports in **Appendix C**. Historical results for each monitoring well through May 2025 are summarized in **Appendix D**.

3.4 § 257.90(E)(4) MONITORING TRANSITION NARRATIVE

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);

There were no transitions between monitoring programs in 2025. OML remained in the detection monitoring program. No SSIs were identified based on the October 2024 and April 2025 monitoring data evaluations.

The monitoring results for the October 2024 and April/May 2025 monitoring events were evaluated for SSIs in detection monitoring parameters relative to background. For all parameters except chloride, the comparison to background was based on a prediction limit approach, comparing the results to interwell upper prediction limits (UPLs) based on background monitoring results from the upgradient wells (MW-122M and MW-102M). For chloride, the comparison to background used intrawell UPLs based on background monitoring results from the compliance wells (MW-301, MW-302, and MW-303).

In the April 2025 monitoring event, chloride was detected at a concentration above the UPL for MW-303 in the April sample, but was below the UPL in the May retest sample and, therefore, not an SSI under the 1-of-2 resampling approach.

The interwell and intrawell UPLs were most recently updated in August 2023 using background data collected through April 2023 for interwell UPLs and through October 2022 for intrawell UPLs. The August 2023 Statistical Analysis was included in the 2023 Annual Report. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U.S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses. For semiannual monitoring, an update interval of 2 to 3 years is recommended.

3.5 § 257.90(E)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in italics, followed by applicable information relative to the 2025 Annual Groundwater Monitoring and Corrective Action Report for OML.

3.5.1 § 257.90(e) General Requirements

For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

Status of Groundwater Monitoring and Corrective Action Program. The groundwater monitoring and corrective action program is currently in detection monitoring.

Summary of Key Actions Completed.

- Statistical evaluation and determination of SSIs for the October 2024 and April/May 2025 monitoring events.
- Two semiannual detection monitoring events (April and October 2025).
- One retest sampling event in May 2025 for chloride.

Description of Any Problems Encountered. In October 2025, there was insufficient water to collect samples for laboratory analysis in MW-122M.

Discussion of Actions to Resolve the Problems. Not applicable.

Projection of Key Activities for the Upcoming Year (2026).

- Statistical evaluation and determination of any SSIs for the October 2025 and April 2026 monitoring events.
- If an SSI is determined, then within 90 days either:
 - Complete Alternative Source Demonstration (ASD) (if applicable), or
 - Establish an assessment monitoring program.
- Two semiannual groundwater sampling and analysis events (April and October 2026).

3.5.2 § 257.94(d) Alternative Detection Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. No alternative detection monitoring frequency has been proposed.

3.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. No ASDs were completed in 2025.

3.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. Assessment monitoring has not been initiated.

3.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. Assessment monitoring has not been initiated.

3.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. Assessment monitoring has not been initiated.

3.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment

The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. Corrective measures assessment has not been initiated.

3.6 §257.90(E)(6) OVERVIEW

A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit.

The specific requirements for the overview under §257.90(e)(6) are listed and the information is provided at the beginning of this report, before the Table of Contents.

4.0 REFERENCES

Coble, R.W., and Roberts, J.V., 1971, The Water Resources of Southeast Iowa: Iowa Geological Survey Water Atlas Number 4, 101 p.

Montgomery Watson, 1994, May 24, 1994, Hydrogeological Investigation Report and Hydrologic Monitoring System Plan, Ottumwa-Midland Commercial Landfill, Montgomery Watson, 1994.

U.S. Environmental Protection Agency (U.S. EPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530-R-09-007, March 2009.

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Tables

- 1 Groundwater Monitoring Well Network
- 2 CCR Rule Groundwater Samples Summary
- 3 Groundwater Elevation – CCR Rule Monitoring Network
- 4 Horizontal Gradients and Flow Velocity
- 5A Groundwater Analytical Results Summary – October 2024
- 5B Groundwater Analytical Results Summary – April/May 2025
- 6 Groundwater Field Data Summary

**Table 2. CCR Rule Groundwater Samples Summary
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00**

Sample Dates	Background Wells		Compliance Wells		
	MW-102M	MW-122M	MW-301	MW-302	MW-303
April 8-9, 2025	D	D	D	D	D
May 12, 2025	--	--	--	--	D-R
October 28-30, 2025	D	--*	D	D	D
Total Samples	2	1	2	2	3

Abbreviations:

D = Required by Detection Monitoring Program

D-R = Detection Monitoring Retest Sample

* = Insufficient water for sample collection. Only field parameters collected.

-- = Not Sampled

Last revision by: NLB
Checked by: RM

Date: 11/14/2025
Date: 12/2/2025

**Table 3. Groundwater Elevation - CCR Rule Monitoring Network
Ottumwa-Midland Landfill / SCS Engineers Project #25225073.00**

Ground Water Elevation in feet above mean sea level (amsl)					
Well Number	MW-301	MW-302	MW-303	MW-102M	MW-122M
Measurement Date					
May 4, 2016	686.46	685.80	686.04	728.73	729.27
June 22, 2016	686.40	685.79	687.72	718.74	725.67
August 9, 2016	686.19	685.48	687.77	715.65	725.16
October 25-26, 2016	683.70	684.94	685.56	716.94	724.61
January 17, 2017	685.57	685.68	685.60	717.91	724.02
April 19-20, 2017	685.72	684.73	685.51	717.80	724.04
June 20-21, 2017	685.88	684.76	685.59	714.83	723.51
July 17, 2017	NM	NM	684.92	NM	NM
August 21-22, 2017	684.96	683.89	684.70	713.23	722.02
November 7-8, 2017	684.50	683.38	684.26	713.53	720.52
April 16-18, 2018	684.85	683.87	684.68	717.38	723.25
October 15-16, 2018	684.58	683.52	684.33	717.05	723.36
April 16-17, 2019	686.38	685.35	686.13	717.97	723.43
June 6, 2019	NA	NA	686.05	NA	NA
August 7, 2019	NA	NA	NA	712.00	720.42
October 14-15, 2019	686.56	685.44	686.08	715.50	708.94
May 20-26, 2020	687.29	686.25	687.14	717.61	724.23
June 29, 2020	NA	NA	687.36	NA	NA
October 5-6, 2020	686.80	685.86	686.35	712.05	718.39
April 12 - 13, 2021	687.25	686.26	687.05	710.95	720.52
October 5, 2021	686.87	685.85	686.84	714.85	717.76
April 13-14, 2022	687.00	685.07	686.91	710.24	704.81
October 24-27, 2022	686.01	684.97	685.86	709.07	719.03
April 3-5, 2023	686.58	685.65	686.51	701.93	706.90
October 11, 2023	684.55	684.12	684.95	720.93	707.90
April 3-4, 2024	684.96	684.00	684.82	709.84	700.90
October 7-8, 2024	684.69	683.75	684.51	706.63	699.12
April 7-9, 2025	685.29	684.37	685.16	707.61	693.35
May 12, 2025	NM	NM	685.39	NM	NM
October 27-30, 2025	684.87	683.87	684.60	710.43	689.21

NM = not measured

Last rev. by: RM
Checked by: LH

Date: 11/14/2025
Date: 11/14/2025

I:\25225073.00\Deliverables\2025 Annual CCR Report\Tables\[Table 3 - OML CCR GW Elevation Summary though 2025.xls]levels

**Table 4. Horizontal Gradients and Flow Velocity
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00
January - December 2025**

Sampling Dates	Flow Path - South/Southeast				
	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
April 7-9, 2025	700.00	684.37	1437	0.011	0.2
October 27-30, 2025	700.00	683.87	1322	0.012	0.2

Well	(cm/sec)	(ft/d)
MW-102M	N/A	N/A
MW-122M	N/A	N/A
MW-301	8.0E-04	2.3
MW-302	3.6E-04	1.0
MW-303	1.1E-02	30
Geometric Mean	1.5E-03	4.1

Assumed Porosity, n
0.25

Groundwater flow velocity equation: $V = [K*(\Delta h/\Delta l)] / n$

ft = feet

ft/d = feet per day

K = hydraulic conductivity

n = effective porosity

cm/sec = centimeters per second

V = groundwater flow velocity

h1, h2 = point interpreted groundwater elevation at locations 1 and 2

Δl = distance between location 1 and 2

Δh/Δl = hydraulic gradient

N/A = Not applicable, geometric mean K based on downgradient wells

Notes:

1. See Figures 3 and 4 for velocity calculation flow path locations.

Last revision by: NLB Date: 12/1/2025
 Checked by: LH Date: 12/2/2025

Table 5A. Groundwater Analytical Results Summary
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00

Parameter Name	Interwell UPL	Background Wells		Compliance Wells					
		MW-102M	MW-122M	MW-301		MW-302		MW-303	
		10/8/2024	10/8/2024	Intrawell UPL	10/8/2024	Intrawell UPL	10/8/2024	Intrawell UPL	10/8/2024
Groundwater elevation (ft amsl)		706.63	699.12		684.69		683.75		684.51
Appendix III									
Boron, ug/L	6,400	1,400	4,000		580		770		660
Calcium, mg/L	599	20	430		99		60		100
Chloride, mg/L		43	8.3	62.9	22	10.2	7.4	8.72	7.3
Fluoride, mg/L	5.70	3.6	<0.38		0.84 J		1.2		0.49 J
Field pH, Std. Units	8.52	7.54	6.67		6.63		7.11		6.74
Sulfate, mg/L	17,500	690	10,000		220		65		220
Total Dissolved Solids, mg/L	18,100	1,800	13,000		780		620		830

4.4 Blue shaded cell indicates the compliance well result exceeds the UPL and the LOQ.

Abbreviations:

UPL = Upper Prediction Limit

SSI = Statistically Significant Increase

LOQ = Limit of Quantitation

LOD = Limit of Detection

Std. Units = Standard Units

µg/L = micrograms per liter

mg/L = milligrams per liter

ft amsl = feet above mean sea level

Lab Notes:

J = Estimated concentration at or above the LOD and below the LOQ.

Notes:

1. An individual result above the UPL does not constitute an SSI above background. See the accompanying report text for identification of statistically significant results.
2. Interwell UPLs calculated based on results from background wells MW-102M and MW-122M for the period from May 2016 through April 2023. Interwell UPLs based on 1-of-2 retesting approach. The UPLs were updated in August 2023
3. Intrawell UPL for chloride was calculated based on results from each monitoring well for the period from May 2016 through October 2022. Intrawell UPLs based on 1-of-2 retesting approach. The UPLs were updated in August 2023.

Created by: RM
 Last revision by: RM
 Checked by: KMV

Date: 5/16/2022
 Date: 11/4/2024
 Date: 11/4/2024

**Table 5B. Groundwater Analytical Results Summary
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00**

Parameter Name	Interwell UPL	Background Wells		Compliance Wells						
		MW-102M	MW-122M	MW-301		MW-302		MW-303		
		4/8/2025	4/9/2025	Intrawell UPL	4/8/2025	Intrawell UPL	4/9/2025	Intrawell UPL	4/8/2025	5/12/2025
Groundwater Elevation (ft amsl)		707.61	693.35		685.29		684.37		685.16	685.39
Appendix III										
Boron, ug/L	6,400	1,600	5,500		690		800		670	--
Calcium, mg/L	599	27	400		88		120		86	--
Chloride, mg/L		61	9.0	62.9	18	10.2	6.7	8.72	9.6	8.1
Fluoride, mg/L	5.70	3.5	<0.38		0.88 J		1.1		1.1	--
Field pH, Std. Units	8.52	7.67	6.78		6.77		7.15		6.88	6.88
Sulfate, mg/L	17,500	1,000	11,000		190		68		200	--
Total Dissolved Solids, mg/L	18,100	2,700	15,000		740		660		810	--

4.4 Blue shaded cell indicates the compliance well result exceeds the UPL and the LOQ.

Abbreviations:

UPL = Upper Prediction Limit

SSI = Statistically Significant Increase

-- = Not Analyzed

LOQ = Limit of Quantitation

LOD = Limit of Detection

Std. Units = Standard Units

µg/L = micrograms per liter

mg/L = milligrams per liter

ft amsl = feet above mean sea level

Lab Notes:

J = Estimated concentration at or above the LOD and below the LOQ.

Notes:

1. An individual result above the UPL does not constitute an SSI above background. See the accompanying report text for identification of statistically significant results.
2. Interwell UPLs calculated based on results from background wells MW-102M and MW-122M for the period from May 2016 through April 2023. Interwell UPLs based on 1-of-2 retesting approach. The UPLs were updated in August 2023
3. Intrawell UPLs for chloride were calculated based on results from each monitoring well for the period from May 2016 through October 2022. Intrawell UPLs based on 1-of-2 retesting approach. The UPLs were updated in August 2023.

Created by: RM 5/16/2022
 Last revision by: RM 5/29/2025
 Checked by: BLJ 5/29/2025

**Table 6. Groundwater Field Data Summary
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00**

Sample	Date	Groundwater Elevation (ft. amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
MW-301	10/8/2024	684.69	14.5	6.63	0.41	1,580	-40.5	33
	4/8/2025	685.29	13.3	6.77	0.42	1,247	49.5	9
MW-302	10/8/2024	683.75	13.8	7.11	0.43	1,308	-37.6	295
	4/9/2025	684.37	14.0	7.15	0.12	1,130	10.0	337
MW-303	10/8/2024	684.51	14.2	6.74	0.4	1,634	-35.3	350
	4/8/2025	685.16	13.1	6.88	0.03	1,332	97.4	106
	5/12/2025	685.39	15.5	6.88	0.49	1,546	25.9	145
MW-102M	10/8/2024	706.63	22.6	7.54	6.28	3,158	114.6	29
	4/8/2025	707.61	14.8	7.67	5.32	3,487	151.5	51
MW-122M	10/8/2024	699.12	20.2	6.67	5.18	18,250	120.6	25
	4/9/2025	693.35	10.8	6.78	6.42	14,844	256.1	47

Abbreviations:

amsl = above mean sea level

µmhos/cm = micromhos per centimeter

NA = not applicable

mg/L = milligrams per liter

mV = millivolts

Std. Units = Standard Units

Last revision by: LH

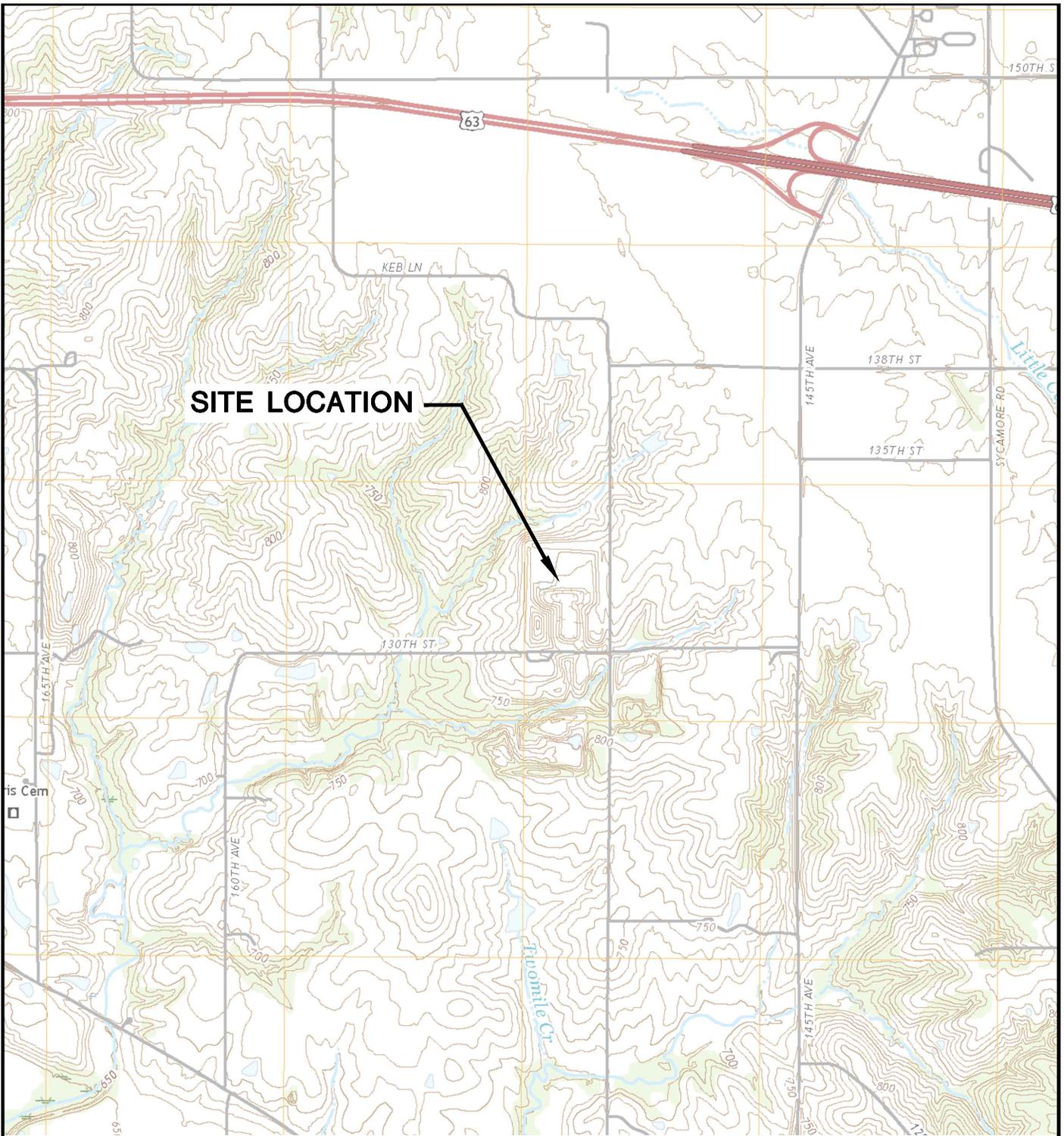
Date: 11/19/2025

Checked by: RM

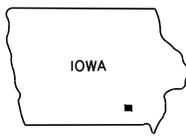
Date: 12/8/2025

Figures

- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 CCR Potentiometric Surface Elevation Contour Map,
April 7-9, 2025
- 4 CCR Potentiometric Surface Elevation Contour Map,
October 27-30, 2025

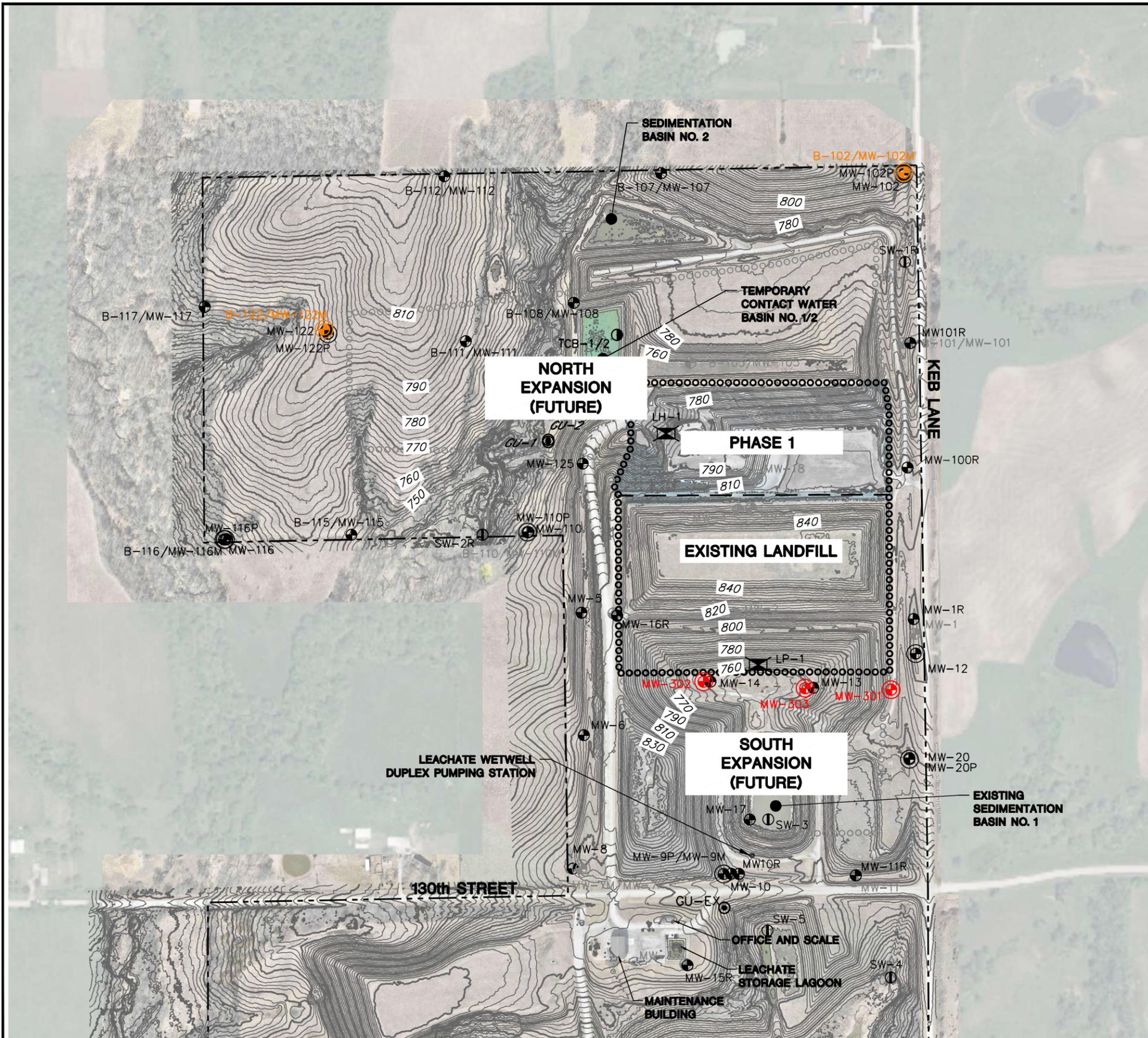


OTTUMWA NORTH QUADRANGLE
 IOWA-WAPELLO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 2018
 SCALE: 1" = 2,000'



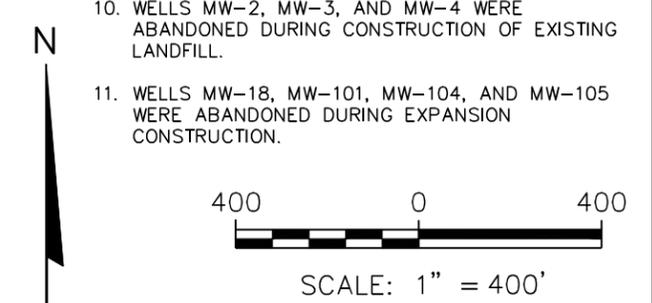
CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130TH STREET OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP		
	PROJECT NO.	252519073.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE	1
	DRAWN:	11/18/2019		CHECKED BY:	MDB				
REVISED:	01/13/2020	APPROVED BY:	TK 01/30/2020						

I:\25219073.00\Drawings\CCR 2019 Annual Report\Site Location Map.dwg, 1/30/2020 3:56:54 PM



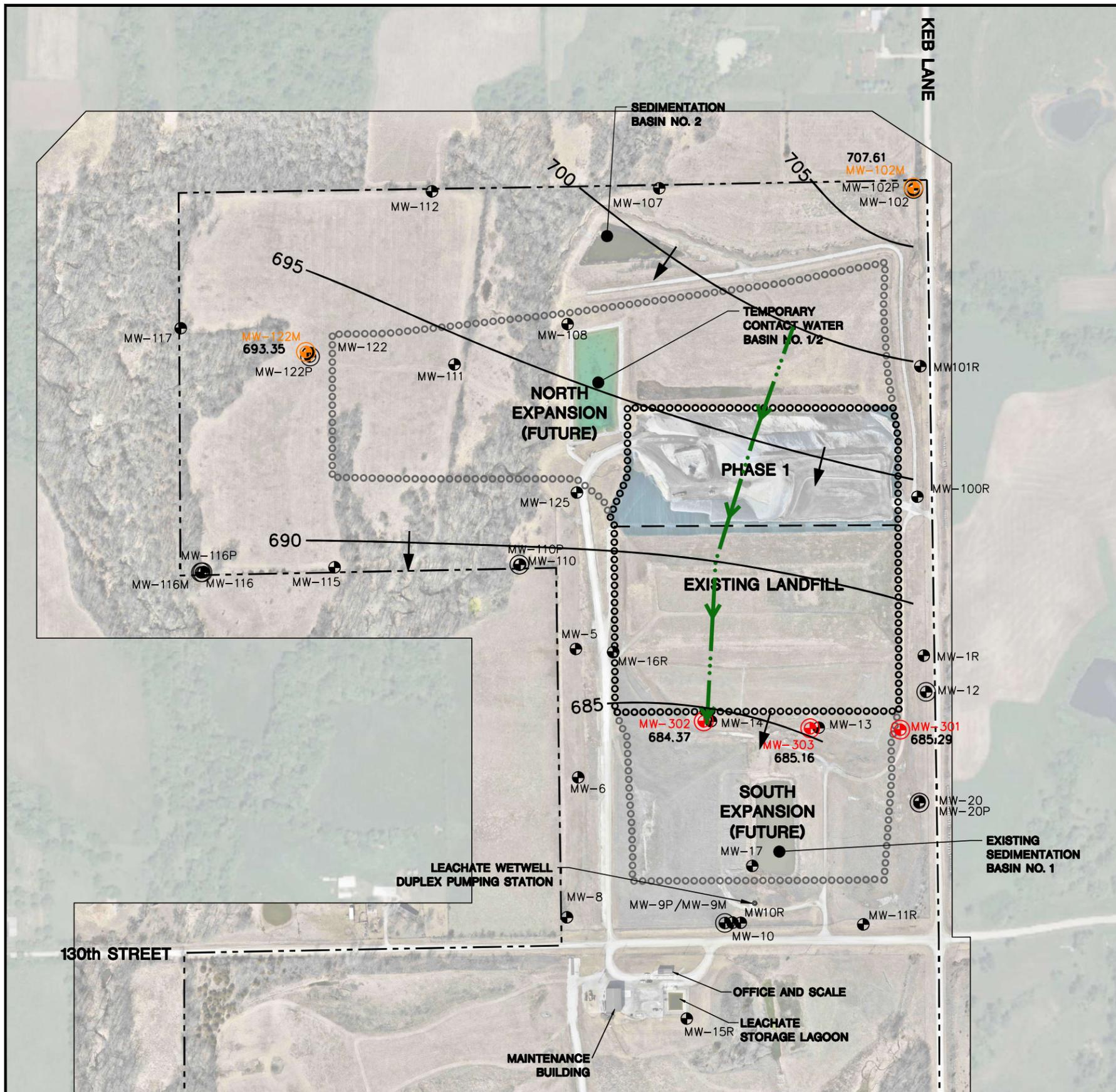
LEGEND			
---	APPROXIMATE PROPERTY LINE	⊕	CCR RULE PIEZOMETER
○	APPROVED WASTE LIMITS	⊙	CCR BACKGROUND MONITORING WELL
●	EXISTING WASTE LIMITS	⊕	EXISTING MONITORING WELL
---	PHASE LIMIT	⊕	EXISTING PIEZOMETER
—800—	EXISTING GRADE (10' CONTOUR)	⊕	EXISTING SURFACE WATER MONITORING STAFF GAUGE
—	EXISTING GRADE (2' CONTOUR)	⊕	ABANDONED MONITORING WELL
		⊕	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
		⊕	LEACHATE HEADWELL
		⊕	GROUNDWATER UNDERDRAIN
		⊕	TEMPORARY CONTACT WATER BASIN

- NOTES:
- BACKGROUND AERIAL IMAGE IS A COMPOSITE OF PHOTOGRAPHY IMPORTED FROM BING MAPS USING AUTOCAD GEOLOCATION TOOL, AND DRONE PHOTO BY SCS ENGINEERS DATED MARCH 11, 2025.
 - EXISTING GRADES FROM MARCH 11, 2025 DRONE SURVEY BY SCS ENGINEERS.
 - DRAWING COORDINATES: IOWA STATE PLAN, SOUTH ZONE, US FOOT, NAD8E DATUM. VERTICAL DATUM IS NAVD 88.
 - PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
 - PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
 - EXISTING LIMITS OF WASTE ARE APPROXIMATE.
 - MONITORING WELLS MW-301, AND MW-302 WERE INSTALLED BY CASCADE DRILLING BETWEEN NOVEMBER 16, 2015, AND DECEMBER 3, 2015.
 - MONITORING WELL MW-303, WAS INSTALLED BY TEAM SERVICES BETWEEN APRIL 11, 2016 AND APRIL 26, 2016.
 - THE BACKGROUND MONITORING WELLS FOR OTTUMWA MIDLAND LANDFILL ARE: MW-122M AND MW-102M.
 - WELLS MW-2, MW-3, AND MW-4 WERE ABANDONED DURING CONSTRUCTION OF EXISTING LANDFILL.
 - WELLS MW-18, MW-101, MW-104, AND MW-105 WERE ABANDONED DURING EXPANSION CONSTRUCTION.



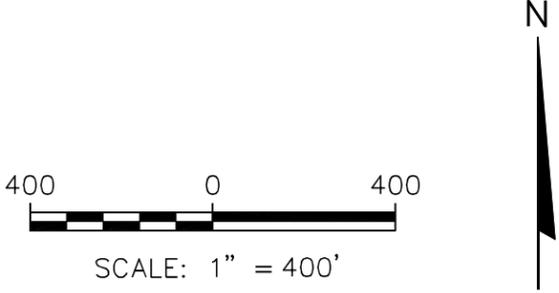
PROJECT NO. 25225073.00	DRAWN BY: AR/RVG	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 15300 130th STREET OTTUMWA, IA 52501	SITE OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	FIGURE
DRAWN: 12/03/2025	CHECKED BY: NLB 1/19/2026		ENGINEER APPROVED BY: TK, 1/19/26	SITE PLAN AND MONITORING WELL LOCATIONS	2
REVISED: 01/19/2026	APPROVED BY: TK, 1/19/26				

I:\Client\Alliant\PROJECT SITES\Ottumwa\CAD Master References OML\02_Ottumwa Site Plan.dwg, 1/19/2026 10:19:20 AM



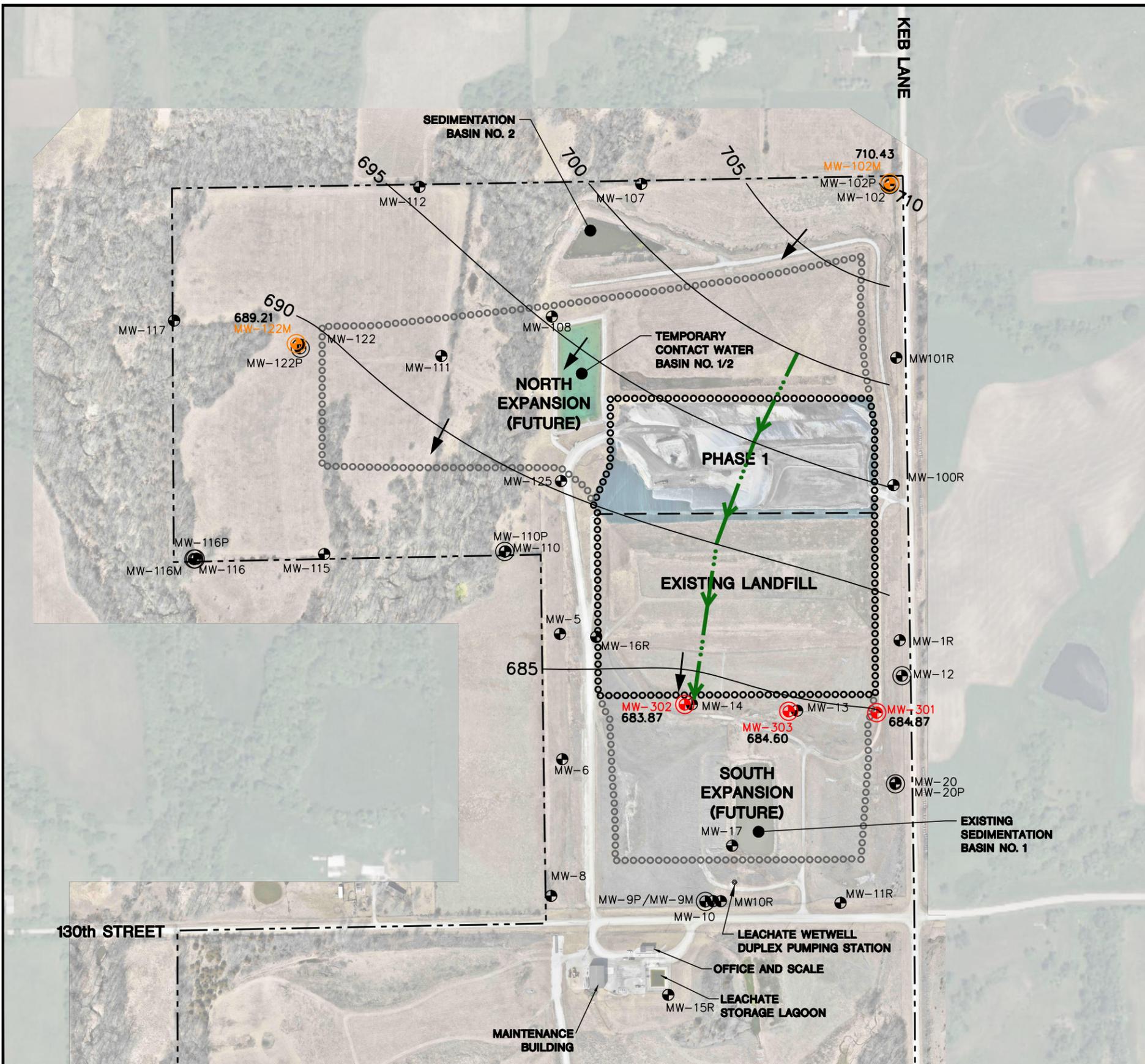
- LEGEND
- APPROXIMATE PROPERTY LINE
 - APPROVED WASTE LIMITS
 - EXISTING WASTE LIMITS
 - PHASE LIMIT
 - ⊕ EXISTING MONITORING WELL
 - ⊕ EXISTING PIEZOMETER
 - ⊕ CCR MONITORING WELL
 - ⊕ CCR BACKGROUND MONITORING WELL
 - 699.12 WATER TABLE ELEVATION MEASURED IN APRIL 2025
 - POTENTIOMETRIC SURFACE ELEVATION CONTOUR 5-FOOT CONTOUR INTERVAL (DASHED WHERE INFERRED)
 - APPROXIMATE GROUNDWATER FLOW DIRECTION
 - FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)

- NOTES:
1. BACKGROUND AERIAL IMAGE IS A COMPOSITE OF PHOTOGRAPHY IMPORTED FROM BING MAPS USING AUTOCAD GEOLOCATION MAP TOOL AND DRONE PHOTO BY SCS ENGINEERS DATED MARCH 11, 2025.
 2. PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
 3. PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
 4. EXISTING LIMITS OF WASTE ARE APPROXIMATE.
 5. THE BACKGROUND MONITORING WELLS FOR THE OTTUMWA MIDLAND LANDFILL ARE: MW-122M AND MW-102M.



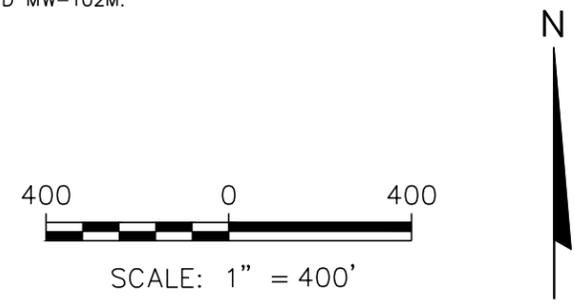
PROJECT NO. 25225073.00	DRAWN BY: KP/RVG	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 15300 130th STREET OTTUMWA, IA 52501	SITE	OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	CCR POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP APRIL 7-9, 2025	FIGURE 3
DRAWN: 04/23/2025	CHECKED BY: NLB 1/19/2026						
REVISED: 01/19/2026	APPROVED BY: TK, 1/19/26						
ENGINEER							

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- LEGEND
- APPROXIMATE PROPERTY LINE
 - APPROVED WASTE LIMITS
 - EXISTING WASTE LIMITS
 - PHASE LIMIT
 - ⊕ EXISTING MONITORING WELL
 - ⊕ EXISTING PIEZOMETER
 - ⊕ CCR MONITORING WELL
 - ⊕ CCR BACKGROUND MONITORING WELL
 - 689.21** WATER TABLE ELEVATION MEASURED IN OCTOBER 2025
 - POTENTIOMETRIC SURFACE ELEVATION CONTOUR
2-FOOT CONTOUR INTERVAL
(DASHED WHERE INFERRED)
 - APPROXIMATE GROUNDWATER FLOW DIRECTION
 - FLOW PATH FOR VELOCITY CALCULATION
(SEE TABLE 4)

- NOTES:
1. BACKGROUND AERIAL IMAGE IS A COMPOSITE OF PHOTOGRAPHY IMPORTED FROM BING MAPS USING AUTOCAD GEOLOCATION MAP TOOL AND DRONE PHOTO BY SCS ENGINEERS DATED MARCH 11, 2025.
 2. PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
 3. PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
 4. EXISTING LIMITS OF WASTE ARE APPROXIMATE.
 5. THE BACKGROUND MONITORING WELLS FOR THE OTTUMWA MIDLAND LANDFILL ARE: MW-122M AND MW-102M.

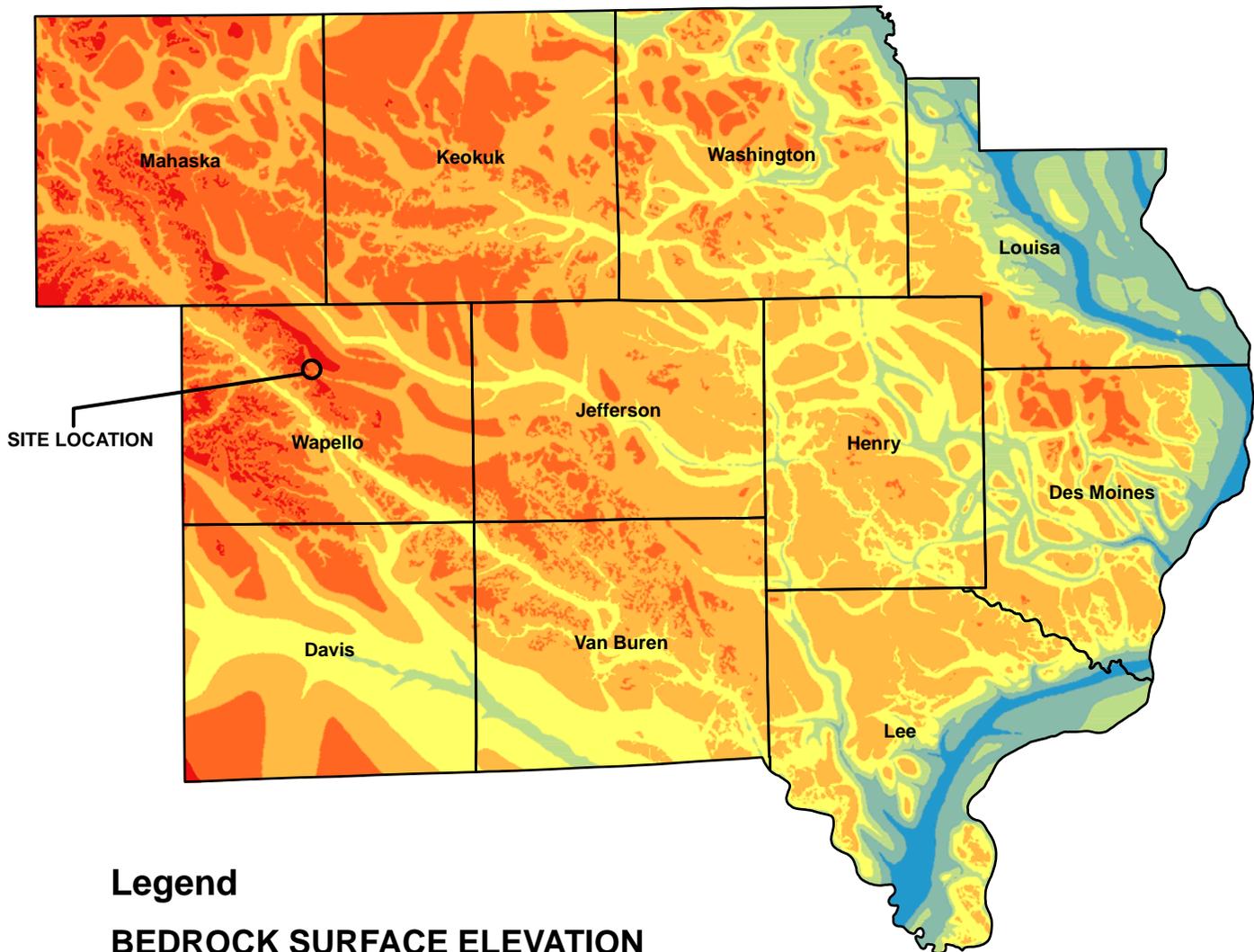


PROJECT NO. 25225073.00	DRAWN BY: SB/RVG	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130th STREET OTTUMWA, IA 52501	SITE	OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	CCR POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP OCTOBER 27-30, 2025	FIGURE
DRAWN: 11/20/2025	CHECKED BY: NLB 01/27/2026							
REVISED: 01/27/2026	APPROVED BY: TK 01/27/2026							
						4		

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Appendix A
Regional Hydrogeologic Information

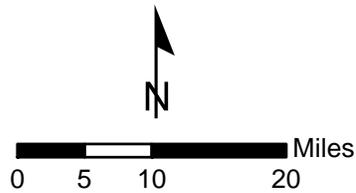


Legend

BEDROCK SURFACE ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

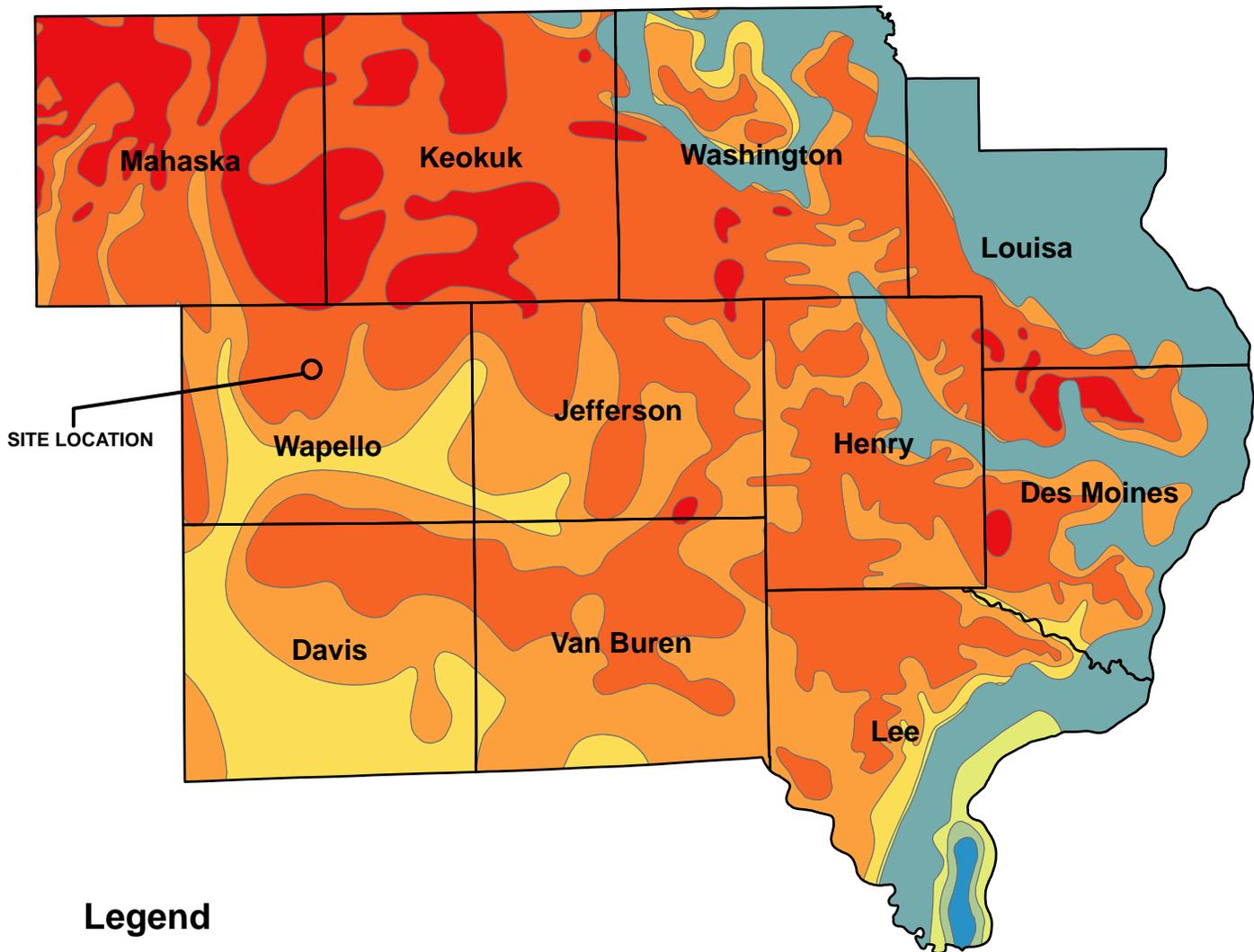
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 IOWA BEDROCK SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130TH STREET OTTUMWA, IA 52501	SITE	OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	SE IOWA REGIONAL BEDROCK SURFACE ELEVATION
PROJECT NO.	25215053.03	DRAWN BY:	JB	SCS ENGINEERS <small>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839</small>
DRAWN:	07/29/13	CHECKED BY:	MDB	
REVISED:	08/02/13	APPROVED BY:		
				FIGURE 4

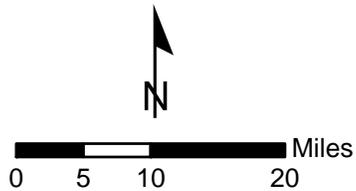
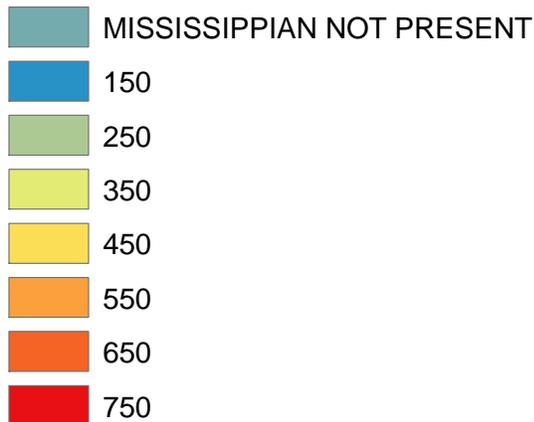
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Legend

MISSISSIPPIAN AQUIFER ELEVATION

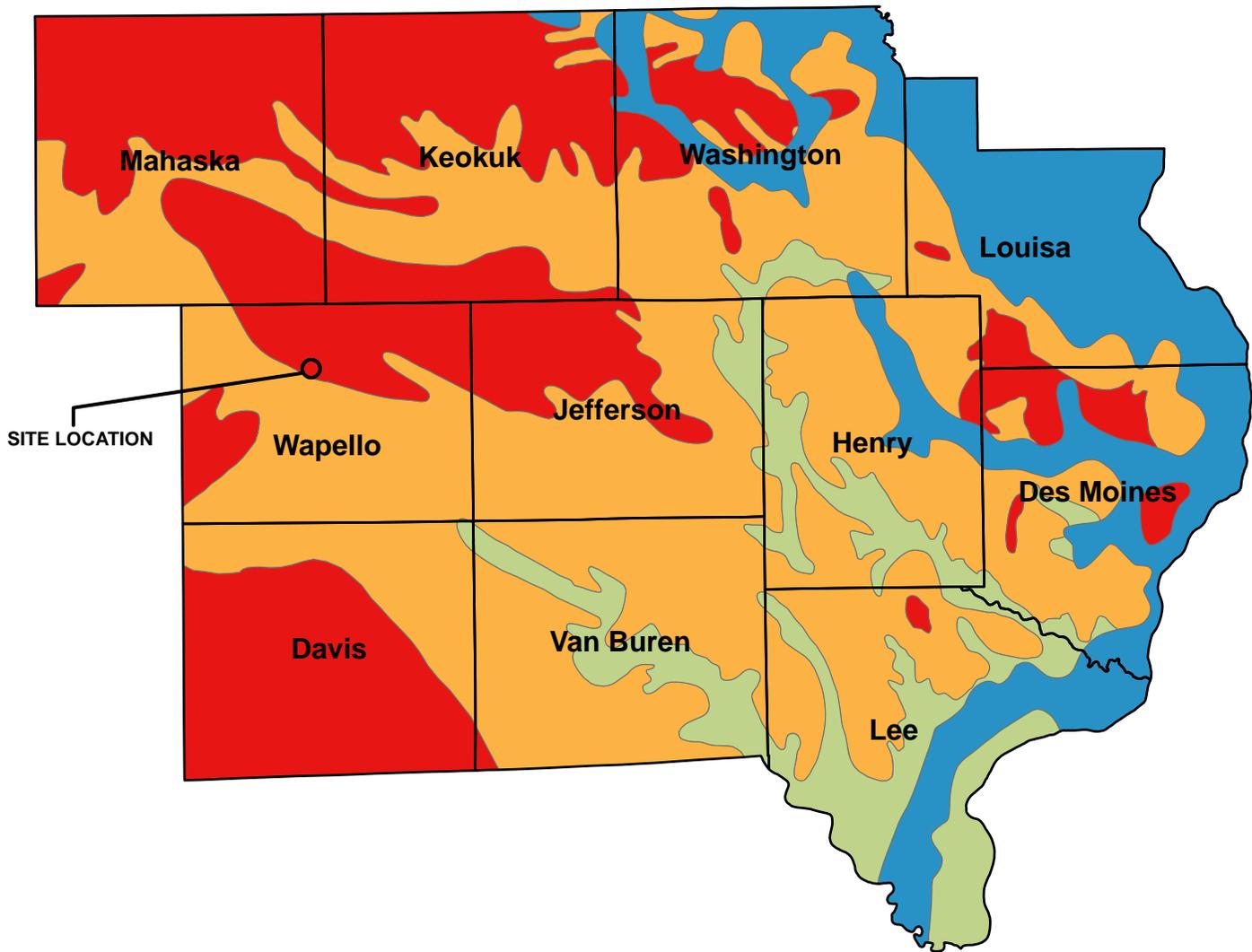
ELEVATION ABOVE MEAN SEA LEVEL IN FEET



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 MISSISSIPPIAN AQUIFER SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130TH STREET OTTUMWA, IA 52501	SITE	OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	ENGINEER	SCS ENGINEERS <small>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839</small>	FIGURE	5
	PROJECT NO. 25215053.03		DRAWN BY: JB				
	DRAWN: 07/29/13		CHECKED BY: MDB				
	REVISED: 08/02/13		APPROVED BY:				

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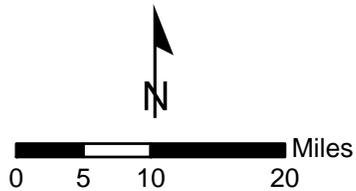


Legend

MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

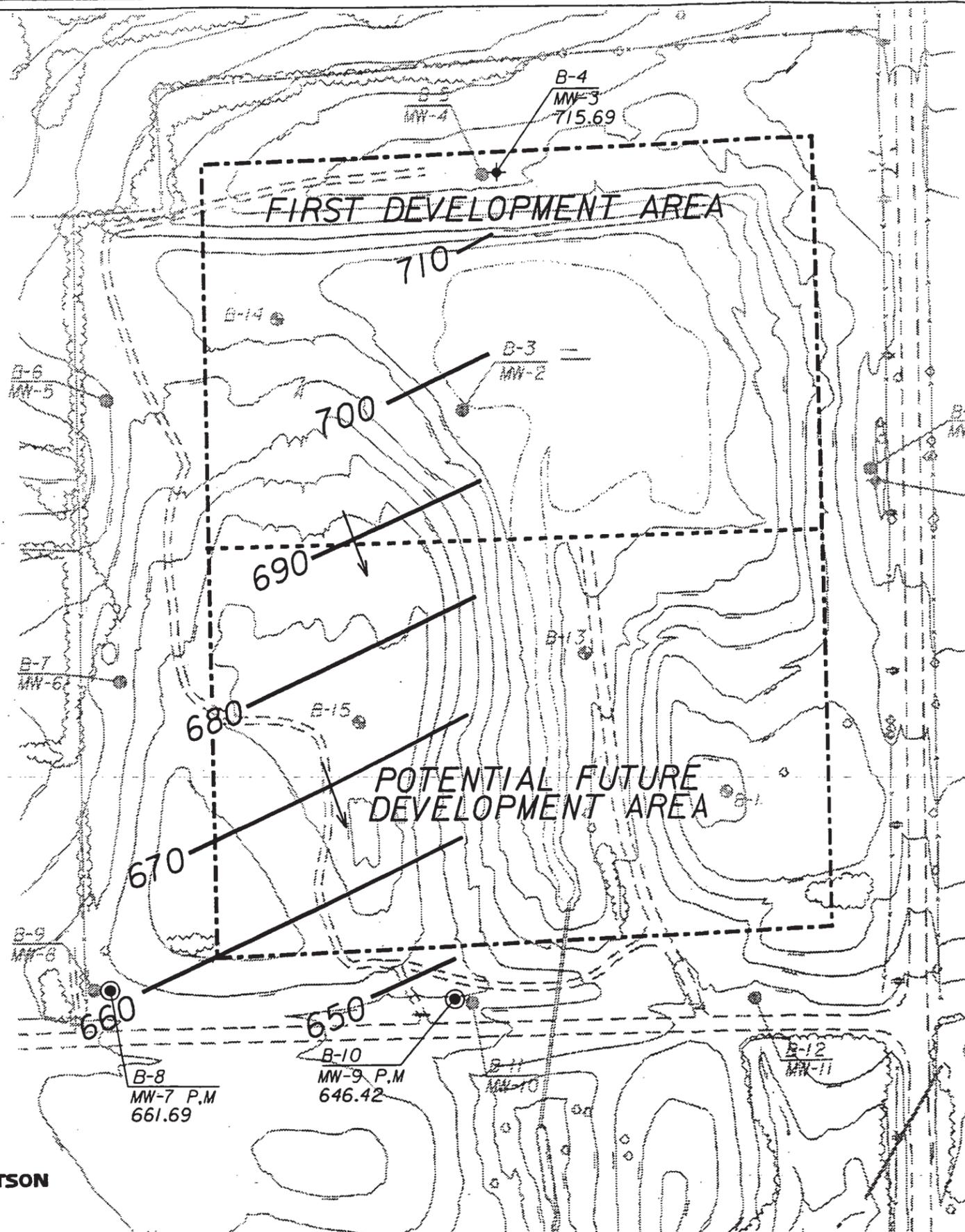
- MISSISSIPPIAN NOT PRESENT
- 550
- 650
- 750



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130TH STREET OTTUMWA, IA 52501	SITE	OTTUMWA MIDLAND LANDFILL OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION
PROJECT NO.	25215053.03	DRAWN BY:	JB	SCS ENGINEERS <small>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839</small>
DRAWN:	07/29/13	CHECKED BY:	MDB	
REVISED:	08/02/13	APPROVED BY:		
				FIGURE 7

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LEGEND:

- BORING
- ⊕ DEEP MONITORING WELL
- ⊙ MULTIPLE-CASED DEEP WELL
- SHALLOW MONITORING WELL
- PROPOSED LANDFILL BOUNDARY
- 661.69 POTENTIOMETRIC SURFACE ELEVATION ON 03-02-94
- INFERRED DIRECTION OF GROUNDWATER FLOW

NOTES:

1. CONTOUR INTERVAL = 10 FT.
2. ALL ELEVATIONS ARE REFERENCED TO NGVD.

OTTUMWA-MIDLAND
DEVELOPMENT CORPORATION

POTENTIOMETRIC SURFACE
CONTOURS - MISSISSIPPIAN
(03-02-94)

FIGURE 4-18





Appendix B
Boring Logs and Well Construction Documentation

SCS ENGINEERS
Civil & Environmental Engineering

SOIL BORING LOG INFORMATION

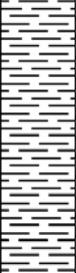
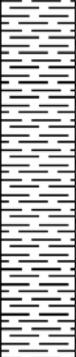
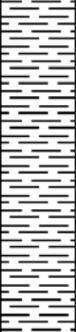
10-92

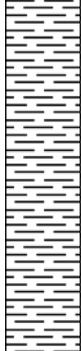
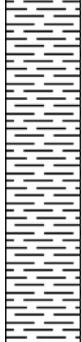
Facility/Project Name Ottumwa Midland Landfill		SCS # 25211509.03		License/Permit/Monitoring Number		Boring Number B-102	
Boring Drilled By (Firm name and name of crew chief) Boart Longyear Paul Dickinson				Drilling Started 08/20/2012		Drilling Completed 08/27/2012	
Facility Well No.		Unique Well No.		Common Well Name MW-102M		Static Water Level Feet	
				Surface Elevation 795.0 Feet		Borehole Diam. 10.5/6 Inches	
Boring Location State Plane N, E NE 1/4 of SE 1/4 of Section 34, T. 73 N., R. 14 W.				Lat. Long.		Local Grid Location (If applicable)	
County Wapello				Location Code		Civil Town/City/or Village Ottumwa	

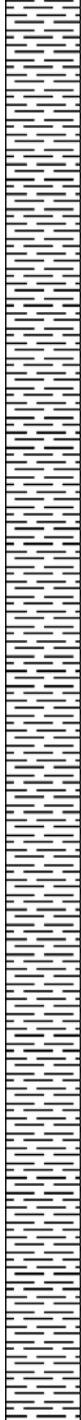
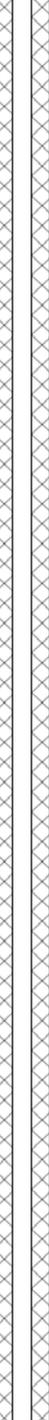
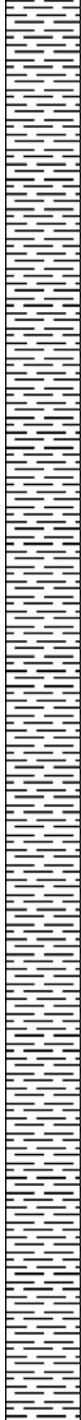
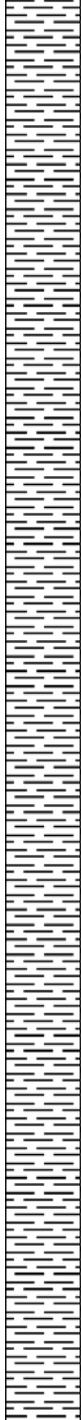
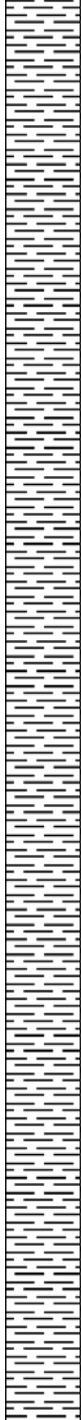
Sample Number	Length Recovered	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
									Standard Penetration	Moisture Content	P200	
S1	8	05,07 09,12		SILTY CLAY, dark brown (10YR 3/3), stiff, massive, few roots (topsoil/loess).	CL-ML				1.25	M		begin drilling with 6-1/4" hollow stem augers and sampling with split-spoons and 140 lb hammer
S2	8	06,13 09,18		LEAN CLAY, mottled olive yellow (2.5Y 6/8) and light olive brown (2.5Y 5/3), hard, blocky (loess).	CL				>4.5	M		
S3	14	12,17 10,14	5	LEAN CLAY, very dark grayish brown (2.5Y 3/2) mottled dark red (2.5YR 3/6), with silt, very stiff, cobble at 6' (till).	CL				>4.5	M		
S4 ST	24				CL					M		

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS ENGINEERS Tyler Munson
---------------	------------------------------------

Sample			Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered	Blow Counts							Standard Penetration	Moisture Content	P200	
S5	10	12,21	12	CLAY, grayish brown (10YR 5/2) with black (10YR 2/1) and dark reddish brown (2.5YR 2.5/4) mottles, hard.	CL				4.25	M		at 15' auger refusal, begin drilling with 6" air hammer and sample drill cuttings
		38, 30/2"							>4.5	M		
S6	12	22,17 61/4"	12	WEATHERED SHALE, gray (2.5Y 5/1), trace to few black (2.5Y 2.5/1) zones, massive, with silt (Pennsylvanian). As above, except silty with pale red zones instead of black zones.	Shale				>4.5	M		
S7			15	SHALE, light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6).								
S8			20	As above, except trace very dark grayish brown (10YR 3/2).	Shale							
S9			25	As above, except gray (10YR 6/1 to 10YR 5/1).								

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S10			35	As above.	Shale							
				SHALE with coal, black (10YR 2/1) to very dark brown (10YR 2/2).								
				COAL, black (10YR 2/1).								
				SHALE, light gray (10YR 7/1) to gray (10YR 6/1).								
S11			40	Coal								
S12			45	Shale								
S13												

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S14			55	SHALE, gray (10YR 5/1)								
S15			60	As above, except gray (10YR 6/1) to dark gray (10YR 4/1).	Shale							
S16			65	As above, except very dark gray (10YR 3/1).								
S17												

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments									
Number	Length Recovered								Standard Penetration	Moisture Content	P200										
S18				SHALE, gray (10YR 6/1).	Shale							at 74', begin NQ3 coring									
Run 1	58/78		75	SILTY SHALE, gray (10YR 5/1), 1mm to 3mm-thick lamina, intensely fractured.	Shale							Run 1 (74' to 81.5') TCR=74% SCR=74% MCR=45% RQD=Poor									
				SANDSTONE, gray (10YR 5/1) with some light yellowish brown (10YR 6/4) lamina, strong, moderately fractured.	Sandstone																
				SILTY SHALE, gray (10YR 5/1), 1mm to 3mm-thick lamina, moderately fractured, moderate to strong.	Shale																
				SANDSTONE, gray (10YR 5/1) with some light yellowish brown (10YR 6/4) lamina, strong, moderately fractured.	Sandstone																
				SANDSTONE, gray (10YR 5/1) with some light yellowish brown (10YR 6/4) lamina, strong, moderately fractured.	Shale																
				SILTY SHALE, gray (10YR 5/1), 1mm to 3mm-thick lamina, moderately fractured, moderate to strong.	Sandstone																
				SANDSTONE, gray (10YR 5/1), strong, moderately fractured.	Sandstone																
				VOID or FRACTURES in possible shale.																	
					Shale																
					Shale																
Run 2	8/24		80	WEATHERED SHALE (clay).	Shale							Run 2 (81.5' to 83.5') TCR=33% SCR=0% MCR=0% RQD=Very Poor									
				SHALE, very dark gray (10YR 3/1), moderate strength, intensely fractured, few pyrite nodules up to 1mm by 3mm in size, some highly decomposed zones.	Shale																
Run 3	57/96		85		Shale							Run 3 (83.5' to 91.5') TCR=59% SCR=53% MCR=8% RQD=Very Poor									

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 4	31/ 120			As above.	Shale							Run 4 (91.5' to 101.5') TCR=26% SCR=21% MCR=3% RQD=Very Poor
			95	SILTY SHALE, black (10YR 2/1), weak to moderate strength, intensely fractured.	Shale							
Run 5	88/ 120		100									Run 5 (101.5'-111.5') TCR=73% SCR=73% MCR=35% RQD=Poor
			105	SILTY SHALE, dark brown (7.5YR 3/2), very weak, 1mm to 3mm-thick lamina, highly decomposed. SILTY SHALE, dark gray (7.5YR 4/1), moderate strength to strong, massive, few weak zones, no decomposition.	Shale							
					Shale							

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 6	119/ 120		115	As above, except calcitic, pyrite nodules 5mm by 20mm in size at 112.8' and 117.3', slightly disintegrated and decomposed, slightly fractured, with some pyrite infilling.	Shale						Run 6 (111.5'-121.5') TCR=99% SCR=99% MCR=84% RQD=Good	
			120	SHALE, greenish gray (5GY 6/1), weak to moderate strength, pyrite mineralization along laminated zones, few disintegrated zones.	Shale							
Run 7	44/ 120		125	As above, except dark gray (7.5YR 4/1), massive, aphanitic.	Shale							Run 7 (121.5'-131.5') TCR=37% SCR=35% MCR=27% RQD=Poor
				SHALE, reddish brown (2.5YR 4/3), highly decomposed.	Shale							
				SHALE, gray (7.5YR 5/1), weak to moderate strength, with white limestone	Shale							

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 8	0/120			gravel, slightly to moderately disintegrated.	Shale							
			135	WEATHERED SHALE, highly decomposed, possibly soft shale in clay. Possible limestone at 138'.	Shale							Run 8 (131.5'-141.5') TCR=0% SCR=0% MCR=0% RQD=Very Poor at 138', driller reports change in drilling
Run 9	29/60		140	LIMESTONE, gray (10YR 5/1), strong (Mississippian).	Lime-stone							Run 9 (141.5'-146.5') TCR=48% SCR=38% MCR=15% RQD=Very Poor
			145	Blind drill.								after coring, reamed hole with 6" air hammer to 153'

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
				Blind drill.								
			155	End of boring @ 153'. Set MW-102M with 5' PVC screen to 148'.								
			160									
			165									

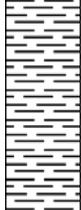
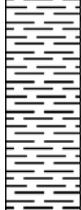
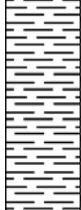
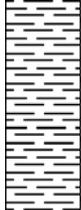
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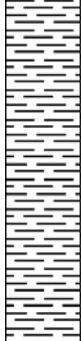
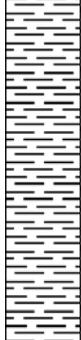
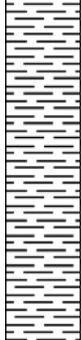
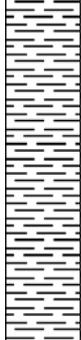
SOIL BORING LOG INFORMATION

10-92

Facility/Project Name Ottumwa Midland Landfill		SCS # 25211509.03		License/Permit/Monitoring Number		Boring Number B-122						
Boring Drilled By (Firm name and name of crew chief) Boart Longyear Paul Dickinson				Drilling Started 12/06/2012		Drilling Completed 12/09/2012		Drilling Method HSA, Air Hammer, Core				
Facility Well No.		Unique Well No.		Common Well Name MW-122M		Static Water Level Feet		Surface Elevation 790.6 Feet		Borehole Diam. 10.5/6 Inches		
Boring Location State Plane NW 1/4 of SE 1/4 of Section 34, T. 73 N., R. 14 W.				Lat. Long.		Local Grid Location (If applicable)						
County Wapello				Location Code		Civil Town/City/or Village Ottumwa						
Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S1	9	06-10 14-20		SILT, dark yellowish brown (10YR 4/4), massive, few roots (topsoil/loess).	ML				1.5	M		
				LEAN CLAY, olive yellow (2.5Y 6/6) mottled gray (2.5Y 6/1) and reddish brown (5YR 4/4), trace fine to coarse sand (till).	CL				2.75			
S2	24	06-17 20-26		CLAY, gray (5Y 5/1), few olive yellow (2.5Y 6/6) and dark reddish brown (5YR 3/4) layers, hard, 1mm to 5mm-thick lamina (weathered shale).	CL				4.5	M		
S3 ST	20		5		CL							
S4	24	07-17 27-34		As above, except less gray and with black layers/lamina.	CL				3.5	M		at 10', auger refusal, and begin drilling with 6" air hammer and sampling drill cuttings
				CLAY, black (2.5Y 2.5/1), 1mm to 2mm-thick lamina (weathered shale)								
I hereby certify that the information on this form is true and correct to the best of my knowledge.												
Signature					Firm SCS ENGINEERS Meghan Blodgett							

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S5				WEATHERED SHALE, black (2.5Y 2.5/1), lamina up to 5mm-thick.								
S6			15	WEATHERED SHALE, dark gray (2.5Y 4/1) to black (2.5Y 2.5/1).								
S7			20	SHALE and WEATHERED SHALE, dark gray (2.5Y 4/1).	Shale							
S8			25	SHALE and WEATHERED SHALE, dark gray (2.5Y 4/1) to black (2.5Y 2.5/1).								

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S9				As above.								
S10			35	SHALE, dark gray (2.5Y 4/1).								
S11			40	As above.	Shale							
S12			45	As above.								

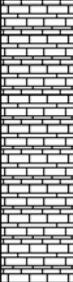
Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
S13				SHALE, dark gray (2.5Y 4/1) to black (2.5Y 2.5/1).								
S14			55	As above.								
S15			60	As above, except 6" coal seam at approximately 64.5'.	Shale							
S16			65	SHALE, light gray (2.5Y 7/1) to very dark gray (2.5y 3/1).								

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 1	68/78			SHALE, very dark gray (2.5Y 3/1) to gray (2.5Y 5/1), weak to moderate strength, 1mm to 5mm-thick lamina, moderately decomposed (clay along fractures), intensely fractured, some sand at 70' to 71'.							begin NQ3 coring at 70' Run 1 (70' to 76.5') TCR=87% SCR=82% MCR=46% RQD=Poor	
Run 2	54/60		75	As above, except few sandy intervals up to 2" in length at 77.5' to 78.5'.							Run 2 (76.5' to 81.5') TCR=90% SCR=75% MCR=8% RQD=Very Poor	
Run 3	40/60		80	SHALE, very dark gray (2.5Y 3/1) with little gray (2.5Y 5/1 & 6/1), 1mm to 5mm-thick lamina, moderately weathered (clay along fractures), trace pyrite nodules throughout.	Shale						Run 3 (81.5' to 86.5') TCR=67% SCR=55% MCR=0% RQD= Very Poor	
Run 4	36/60		85	As above.							Run 4 (86.5' to 91.5') TCR=60% SCR=53% MCR=40% RQD=Poor	

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 4 (cont)				As above.	Shale							four 6" to 8" bit drops one foot apart indicated possible voids from 93' to 97'
				SILTSTONE, very dark gray (2.5Y 3/1), moderately strong, massive, trace fractures infilled with calcite.	Silt-stone							
			95	SHALE, very dark gray (2.5Y 3/1), very weak to weak, 1mm to 5mm-thick lamina, moderately to highly decomposed (highly decomposed in top 2' of recovered shale), trace pyrite throughout, possible voids from approximately 93' to 97', bedding planes are horizontal where present.								
Run 5	59/120											
			100									
				SHALE, light to dark gray (2.5Y 7/1 to 4/1), weak, 1mm to 3mm-thick lamina, massive from 104' to 105', trace coal on fracture planes, trace pyrite throughout.	Shale							Run 6 (101.5'-106.5') TCR=80% SCR=68% MCR=48% RQD=Poor
Run 6	48/60											
			105									
				SHALE, gray (2.5Y 5/1), weak to moderate strength, 1mm to 3mm-thick lamina, silty.								Run 7 (106.5'-111.5') TCR=10% SCR=10% MCR=7% RQD=Very Poor
Run 7	6/60											

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 7 (cont)				As above.								
Run 8	30/30			SHALE, dark gray (2.5Y 4/1) with gray (2.5Y 5/1), weak to moderate strength, bedding vairable, 1mm-thick lamina to 2cm-thick beds, moderately decomposed (clay in fractures), few 1cm to 3cm-thick sandy zones, trace pyrite nodules throughout.								Run 8 (111.5'-114') TCR=100% SCR=80% MCR=60% RQD=Fair
Run 9	65/90		115	Interbedded SHALE, SILTSTONE, and SANDSTONE, gray (10YR 6/1) to very dark gray (10YR 3/1), weak strength to strong, sandstone/siltstone/shale intervals are 1" to 10"-thick, bedding ranges from 1mm-thick lamina in shale to massive in siltstones, some slump/flame structures in sand, intensely fractured, fresh to moderately decomposed (clay in fractures), trace pyrite throughout.	Shale							Run 9 (114'-121.5') TCR=72% SCR=70% MCR=9% RQD=Very Poor
Run 10	12/12		120									Run 10 (121.5'-122.5') TCR=100% SCR=92% MCR=0% RQD=Very Poor
			125	SHALY SILTSTONE and SANDSTONE, black (2.5Y 2.5/1) with bands of light gray (2.5Y 7/1), moderate strength, 1mm to 10mm-thick lamina, trace pyrite throughout, moderately to intensely fractured.	Silt-stone							
Run 11	108/108			SHALE, black (2.5Y 2.5/1), weak, 1mm to 5mm-thick lamina, some silt and sand, moderatly decomposed, moderately fractured, trace pyrite throughout.	Shale							Run 11 (122.5'-131.5') TCR=100% SCR=95% MCR=60% RQD=Fair

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 11 (cont)				As above.	Shale							
			135	SHALE, dark greenish gray (5GY 4/1), weak to moderate strength, 1mm to 5mm-thick lamina, moderately to highly decomposed.	Shale							
Run 12	110/ 120			LIMESTONE CONGLOMERATE, reddish brown (5YR 5/3) with gray shale between clasts, weak, massive.	Lime-stone							Run 12 (131.5'-141.5') TCR=92% SCR=86% MCR=63% RQD=Fair
			140	SHALY LIMESTONE, greenish gray (5GY 5/1), weak, massive, 2" of light gray clay at interface with above conglomerate.	Lime-stone							
Run 13	114/ 120			SHALY LIMESTONE, reddish brown (5YR 4/3), few greenish gray zones, moderate strength, few clasts of hard competent limestone up to 1.5" in diameter, moderately decomposed.	Lime-stone							Run 13 (141.5'-151.5') TCR=95% SCR=95% MCR=73% RQD=Fair
			145									

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties			RQD/ Comments
Number	Length Recovered								Standard Penetration	Moisture Content	P200	
Run 13 (cont)	30/30			SHALY LIMESTONE, yellowish gray (5GY 5/1), weak, massive, fresh to slightly decomposed.	Lime-stone							Run 14 (151.5'-154') TCR=100% SCR=90% MCR=90% RQD=Good
Run 14				As above.								
			155	End of Boring @ 154'. Set MW-122M with 5' PVC screen to 152'.								
			160									
			165									

Route To: Watershed/Wastewater Waste Management
Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Midland Landfill SCS#: 25215135.50		License/Permit/Monitoring Number 90-SDP-8-92P		Boring Number MW-301	
Boring Drilled By: Name of crew chief (first, last) and Firm Todd Schmalfeld Cascade Drilling			Date Drilling Started 11/16/2015		Date Drilling Completed 11/19/2015
Unique Well No. N/A		DNR Well ID No. N/A	Common Well Name MW-301	Final Static Water Level Feet	
				Surface Elevation 815.5 Feet	
				Borehole Diameter 8.5"/6" in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 1,930,292 N, 394,330 E S/C/N			Lat ° ' "		Local Grid Location
NE 1/4 of SE 1/4 of Section 34, T 73 N, R 14 W			Long ° ' "		<input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
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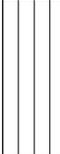
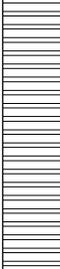
Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments		
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
S1	16	5 6 8 10	1	FAT CLAY, very dark grayish brown, (2.5Y 3/2).	CH											
S2	16	5 6 6 9	3	FAT CLAY, black (2.5Y 2.5/1).												
S3	22	5 5 6 7	6	Same as above, except very dark grayish brown (2.5Y 3/2).												
S4	5	8 7 8 12	8	Same as above, except black (2.5Y 2.5/1).	CH											
S5	20	3 6 7 11	11													
S6	21	3 5 7 9	14	Same as above, except very dark grayish brown (2.5Y 3/2).												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number MW-301

Page 2 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S7	23	3 4 8 9	16 17	LEAN CLAY WITH SAND, gray (2.5Y 5/1), fine grained sand.	CL										
S8	20	4 9 9 11	18 19	FAT CLAY, primary color-black (2.5Y 2.5/1), secondary color-yellowish brown (10YR 5/6).	CH										
S9	24	8 27 22 24	20 21 22	SILT, ash, black (2.5Y 2.5/1).	ML										
S10	16	18 28 34 44	23 24	SHALE, gray (10YR 5/1) matrix, moderate strength, massive.											Saturation @ 23.5 ft bgs
S11			25 26 27 28 29 30												Air Rotary
S12			31 32 33	Same as above, except light yellowish brown (10YR 6/4).											
S13			34 35 36 37 38 39 40	Same as above, except gray (10YR 5/1).											

Boring Number MW-301

Page 3 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S14			41	SHALE, gray (10YR 5/1) matrix, moderate strength, massive. (continued)										
			42											
S15			43	Same as above, except yellowish brown (10YR 6/4).										
			44											
S16			45											
			46											
S17			47											
			48											
S18			49											
			50											
			51											
			52											
			53											
			54											
			55											
			56											
			57											
			58											
			59	Same as above, except dark gray (10YR 4/1).										
			60											
			61											
			62											
			63	Same as above, except black (10YR 2/1).										
			64											
			65											

Boring Number MW-301

Page 4 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S19			66	SHALE, gray (10YR 5/1) matrix, moderate strength, massive. (continued)											
			67												
			68												S
			69												
			70												
S20			71												
			72												
			73												S
			74												
			75												
S21			76	Same as above, except light gray (2.5Y 7/1).											
			77												
			78												S
			79												
			80												
S22			81												
			82												
			83												S
			84												
			85												
S23			86	Same as above, except very dark gray (5Y 3/1).											
			87												
			88												S
			89												
			90												

Boring Number MW-301

Page 5 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S24			91	SHALE, gray (10YR 5/1) matrix, moderate strength, massive. (continued)											
			92												
			93												S
			94												
			95												
S25			96	Same as above, except black (10YR 2/1).											
			97												
			98												S
			99												
			100												
S26			101												
			102												
			103												S
			104												
			105												
			106	VOID.											
			107												
			108												
			109												
			110												
			111												
			112												
			113												
			114												
			115												
S27			113	SHALE, black (10YR 2/1).											
			114												S
			115												

Void @ 105
ft bgs, sulfur
smell.

Boring Number MW-301

Page 6 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
				SHALE, black (10YR 2/1). (continued)										
			116											
S28			117							S				
			118											
			119											
			120											
S29			121							S				
			122											
			123											
			124											
			125											
S30			126							S				
			127											
			128											
			129											
			130											
			131											
S31			132							S				
			133											
			134											
			135											
			136											
S32			137							S				
			138											
			139											
			140											

Boring Number MW-301

Page 7 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S33			141	SHALE, black (10YR 2/1). (continued)										
			142											
			143											S
			144											
			145											
S34			146	Same as above, except drak grayish brown (10YR 3/2).										
			147											
			148											S
			149											
			150											
S35			151	Same as above, except drak grayish brown (10YR 3/2).										
			152											
			153											S
			154											
			155											
S36			156	WEATHERED SHALE AND LIMESTONE, dark grayish brown (10YR 3/2), gray limestone (10YR 6/1).										
			157											
			158											S
			159											
			160											
			161	NO RECOVERY.										
			162											
			163											
			164	WEATHERED SHALE, gray (2.5Y 6/1), soft shale in clay.										
			165											

Boring Number MW-301

Page 8 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
R1	62/72		166	WEATHERED SHALE, gray (2.5Y 6/1), soft shale in clay. <i>(continued)</i>									Run 1 164'-170' bgs TCR=86% SCR=73% MCR=33%	
			167	LIMESTONE, gray (10YR 5/1), strong, massive.										
R2	22/24		168	LIMESTONE, gray (10YR 5/1), strong, massive.									Run 2 170'-172'bgs TCR=92% SCR=92% MCR=66%	
			169											
R3	32/36		170										Run 3 172'- 175' bgs TCR=88% SCR=88% MCR=82%	
			171	SHALE, greenish gray (5G 5/1), with pyrite, weak.										
R4	18/120		173	SHALE, greenish gray (5G 5/1), with pyrite, weak.									Run 4 175'- 185' bgs TCR=98% SCR=98% MCR=89%	
			174	LIMESTONE, gray (10YR 5/1), interbedded with shale laminations, strong.										
			175											
			176	LIMESTONE, gray (10YR 5/1), interbedded with shale laminations, strong.										
			177											
			178											
			179											
			180											
			181											
			182											
			183											
			184	SHALE, greenish gray (5G 5/1), weak.										
			185	LIMESTONE, gray (10YR 5/1), strong.										
			186											
			187	SHALE, grayish green (5G 4/2), weak.										
			188											
			189	LIMESTONE, gray (10YR 5/1), strong.										
			190											

Boring Number MW-301

Page 9 of 9

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
R5	16/120		185	LIMESTONE, gray (10YR 5/1), strong. <i>(continued)</i>										Run 5 185'-195' bgs TCR=97% SCR=93% MCR=84%
			191	SHALE, greenish gray (5G 5/1), clayey.										
			192											
			193											
			194	SANDSTONE, greenish gray (5G 6/1), strong, well cemented.										
			195											
			196											
			197	Very weak.										
R6	33/60		198											Run 6 195'-200' bgs TCR=55% SCR=47% MCR=13%
			199											
			200											
			201											
			202	End of Boring at 202 feet bgs. Boring reamed to 202' bgs prior to installation of MW-301.										

Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Midland Landfill		SCS#: 25215135.50		License/Permit/Monitoring Number 90-SDP-8-92P		Boring Number MW-302	
Boring Drilled By: Name of crew chief (first, last) and Firm Todd Schmalfeld Cascade Drilling				Date Drilling Started 12/1/2015		Date Drilling Completed 12/3/2015	
Unique Well No. N/A		DNR Well ID No. N/A		Common Well Name MW-302		Final Static Water Level Feet	
				Surface Elevation 759.5 Feet		Borehole Diameter 8.5"/6" in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 1,929,605 N, 394,359 E S/C/N				Lat ° ' "		Local Grid Location	
NW 1/4 of SE 1/4 of Section 34, T 73 N, R 14 W				Long ° ' "		<input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Wapello		Civil Town/City/ or Village Ottumwa			

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments		
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
S1	20	2 3 5 8	1	TOPSOIL FAT CLAY, dark gray (10YR 4/1), secondary color- Dark yellowish brown (10YR 4/4), organics, fill.	TOPSOIL											
S2	6	3 50	2	Weathered Shale	CH											
S3	18	6 17 44 50	3	SHALE, dark gray (10YR 4/1), moderate strength, massive.												
S4	16	3 15 26 28	4													
S5	5	6 50	5													
S6	12	2 50	6													Saturation @12.5 ft bgs.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number MW-302

Page 2 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S7			16	SHALE, dark gray (10YR 4/1), moderate strength, massive. <i>(continued)</i>										
			17	same as above, except black (2.5Y 2.5/1), clayey.										
			18											
			19											
			20											
S8			21											
			22											
			23											
			24											
			25											
S9			26											
			27	same as above, except dark gray (2.5Y 4/1), clayey.										
			28											
			29											
			30											
S10			31											
			32											
			33											
			34											
			35											
S11			36											
			37											
			38											
			39											
			40											

Boring Number MW-302

Page 3 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments		
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
S12			41	SHALE, dark gray (10YR 4/1), moderate strength, massive. <i>(continued)</i> same as above, except black (2.5Y 2.5/1).												
			42													
			43													
			44													
			45													
			46													
S13			47													
			48													
			49													
			50													
			51													
			52													
S14			53													
			54													
			55													
			56													
			57													
S15			58													
			59													
			60													
			61													
			62													
S16			63													
			64													
			65													

a lot of
water @ 62
ft bgs.

Boring Number MW-302

Page 4 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S17			66	SHALE, dark gray (10YR 4/1), moderate strength, massive. <i>(continued)</i>										
			67	Shale, black (2.5Y2.5/1), not as clayey as above.										
			68											
			69											
			70											
S18			71											
			72											
			73											
			74											
			75											
S19			76	same as above, except dark gray (2.5Y 4/1).										
			77											
			78											
			79											
			80											
S20			81											
			82											
			83											
			84											
			85											
S21			86											
			87											
			88											
			89											
			90											

Boring Number MW-302

Page 5 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S22			91	SHALE, dark gray (10YR 4/1), moderate strength, massive. <i>(continued)</i>										
			92	same as above, except gray (2.5Y 5/1).										
			93											
			94											
			95											
R1	24/36		96	WEATHERED SHALE, greenish gray (5G 5/1), clayey.									Run 1 96'-99' bgs TCR=66% SCR=66% MCR=47%	
			97											
			98	SHALE, greenish gray (5G 5/1), weak, massive.										
R2	02/120		99											Run 2 99'-109' bgs TCR=85% SCR=77% MCR=52%
			100											
			101	SHALE, very dark brown (2.5YR 2.5/3), very weak.										
			102											
			103											
			104	SHALE, clayey, greenish gray (5G 5/1), very weak.										
			105											
R3	68/72		106											Run 3 109'-117' bgs TCR=95% SCR=90%
			107											
			108											
			109											
			110											
			111											
			112											
			113											
			114											
			115											

Boring Number MW-302

Page 6 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
R4	24/24		116	SHALE, clayey, greenish gray (5G 5/1), very weak. <i>(continued)</i> not as clayey, weak.									MCR=75%	
			117											
			118											
			119											
R5	16/120		120										Run 4 117'-119' bgs TCR=100% SCR=100% MCR=92%	
			121											
			122											
			123											
R6	20/120		124	LIMESTONE, gray (10YR 6/1), interbedded with shale laminations, strong.									Run 5 119'-129' bgs TCR=97% SCR=97% MCR=93%	
			125											
			126											
			127											
R6	20/120		128										Run 6 129'-139' bgs TCR=100% SCR=100% MCR=95%	
			129											
			130											
			131											
R6	20/120		132											
			133											
			134											
			135											
R6	20/120		136											
			137											
			138											
			139											
			140	SHALE, greenish gray (5G 5/1), weak.										

Boring Number MW-302

Page 7 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments		
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
R7	03/120		141	LIMESTONE, gray (10YR 6/1), strong.												
			142	SHALE, greenish gray (5G 5/1), weak.												
R8	45/60		143													
			144													
			145	SANDSTONE, greenish gray (5G 5/1), very weak, fine grained.												
			146													
			147													
			148													
			149													
			150													
			151													
			152													
	153															
	154															
	155															
	156															
				End of Boring at 156.5 ft bgs. Boring reamed with air rotary prior to installation of MW-302.												

Run 7
139'-149'
bgs
TCR=88%
SCR=85%
MCR=74%

Run 8
149'-154'
bgs
TCR=75%
SCR=75%
MCR=57%

Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Midland Landfill		SCS#: 25215135.50		License/Permit/Monitoring Number 90-SDP-8-92P		Boring Number MW-303	
Boring Drilled By: Name of crew chief (first, last) and Firm Don Carlson Team Services				Date Drilling Started 4/11/2016		Date Drilling Completed 4/26/2016	
Unique Well No. N/A		DNR Well ID No. N/A		Common Well Name MW-303		Final Static Water Level Feet	
				Surface Elevation 759.9 Feet		Borehole Diameter 8.5"/6" in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 1,929,977 N, 394,335 E S/C/N				Lat ° ' "		Local Grid Location	
NW 1/4 of SE 1/4 of Section 34, T 73 N, R 14 W				Long ° ' "		<input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Wapello		Civil Town/City/ or Village Ottumwa			

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S1	11	24 6	1	TOPSOIL.	TOPSOIL										
			2	FAT CLAY, light gray (10YR 7/1).	CH										
S2	16	23 16	3	SHALE, Gray (10YR 6/1), very weak, massive, clayey.											
S3	0	50/5	5	Same as above except, dark gray (10YR 4/1).											No return-refusal.
S4			8												
S5			15												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number MW-303

Page 2 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S6			16	SHALE, Gray (10YR 6/1), very weak, massive, clayey. <i>(continued)</i>										
			17	Same as above except, black (10YR 3/1).										
			18											
S7			19											
			20	Same as above except, light gray (10YR 1/1).										
			21											
S8			22											
			23											
			24											
S9			25	Same as above except, gray (10YR 6/1).										
			26											
			27											
S10			28											
			29											
			30	Same as above except, light gray (10YR 7/1).										
		31												
		32												
		33												
		34												
		35		Same as above except, gray (10YR 6/1).										
		36												
		37												
		38												
		39												
		40												

Cave-in 32'
to 45' bgs.

Boring Number MW-303

Page 3 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S11			41	SHALE, Gray (10YR 6/1), very weak, massive, clayey. <i>(continued)</i>										
			42											
			43											
			44											
			45											
S12			46	Same as above except, dark gray (10YR 4/1), clayey.										
			47											
			48											
			49											
			50											
S13			51	Same as above except, black (10YR 2/1), less clayey.										
			52											
			53											
			54											
			55											
S14			56											
			57											
			58											
			59											
			60											
S15			61											
			62											
			63											
			64											
			65											

38'-45' no
return. need
to add water.

Borehole
producing a
lot of water.

Boring Number MW-303

Page 4 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S16			66	SHALE, Gray (10YR 6/1), very weak, massive, clayey. <i>(continued)</i>										
			67	Same as above except, black (10YR 2/1) and gray (10YR 6/1), laminated.										
			68											
			69											
			70											
S17			71											
			72											
			73											
			74											
			75											
S18			76											
			77											
			78											
			79											
			80	Same as above except, gray (10YR 6/1), clayey.										
S19			81											
			82											
			83											
			84											
			85	Same as above except, gray (10YR 6/1), black (10YR 2/1), Reddish brown (5YR 4/3).										
S20			86									Sulfur smell.		
			87											
			88											
			89											
			90											

Boring Number MW-303

Page 5 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S21			91	SHALE, Gray (10YR 6/1), very weak, massive, clayey. <i>(continued)</i>										
			92	Same as above except, black (10YR 2/1), reddish brown (5YR 4/3), dark greenish gray (5GY 4/1).										
			93											
			94											
			95											
S22			96											
			97											
			98											
			99											
			100											
S23			101	Same as above with laminations.									Sulfur smell.	
			102											
			103											
			104											
			105	SHALE, black (10YR 2/1), reddish brown (5YR 4/3), dark greenish gray (5G 4/1), clayey.										
S24			106											
			107											
			108											
			109											
			110	Same as above except, black (10YR 3/1), pale brown (10YR 6/3), reddish brown (5YR 4/3), Dark Greenish Gray (5GY 4/1), clayey.										
S25			111											
			112											
			113											
			114	Same as above except, limestone fragments are encountered.										
			115											

Boring Number MW-303

Page 6 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			116	SHALE, Gray (10YR 6/1), very weak, massive, clayey. <i>(continued)</i>										
S26			117	LIMESTONE, dark greenish gray (5G 4/1), clayey, clay is pale brown (10YR 6/3) and reddish brown (5YR 4/3), shale fragments, shale is black (10YR 3/1).										Air rotary drilling complete.
			118											
			119											
R1	8/12		120	SHALE, greensih gray (5GY 6/1), strong, massive, clayey.										Run 1 120'-121'.
R2	12/12		121											Run 1 TCR=66% SCR=66% MCR=42%
			122	LIMESTONE, gray (10YR 6/1), interbedded with shale laminations, strong, shells.										Run 2 121'-122'.
R3	36/36		123											Run 2 TCR=100% SCR=100% MCR=77%.
			124	SHALE, greenish gray (5GY 6/1), shells, very weak, clayey, massive.										Run 3 122'-125'.
			125											Run 3 TCR=100% SCR=100% MCR=92%.
			126	LIMESTONE, gray (10YR 5/1), strong.										
			127											
			128	SHALE, greenish gray (5GY 6/1), weak.										
			129	LIMESTONE, gray (10YR 5/1), strong, interbedded with shale laminations.										
R4	00/120		130											Run 4 125.5'-135.5'.
			131											Run4 TCR=83% SCR=83% MCR= 76%.
			132											
			133											
			134											
			135											
			136	SHALE, dark greenish gray (5GY 4/1), clayey, weak, interbedded with limestone-gray (10YR 5/1).										
			137											
R5	59/60		138											Run 5 135.5'-140.5'.
			139											TCR= 99% SCR=94% MCR= 75%.
			140											

Boring Number MW-303

Page 7 of 7

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Vane Shear	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
R6	87/120		141	SANDSTONE, greenish gray (5GY 6/1), very weak, fine grained.										
			142											
			143											
			144											
			145											
			146											
			147											
			148											
			149	SHALE, dark greenish gray (5GY 4/1), clayey, weak, interbedded with limestone-gray (10YR 5/1).										
			150											
				End of boring at 150.5 ft bgs. Boring reamed with 6" rotary before installation of MW-303.										
														Run 6 140.5'-150.5' Run 6 TCR=73% SCR=69% MCR=59%.



IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: Ottumwa Midland Landfill Permit No.: 38223
 Well or Piezometer No: MW-102M
 Dates Started: August 20, 2012 Date Completed: August 27, 2012

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (\pm 0.5 ft): _____	Name & Address of Construction Company: _____
Specify corner of site: <u>NE</u>	<u>Boart Longyear</u>
Distance & direction along boundary: <u>29 S</u>	<u>901D Grossman Drive</u>
Distance & direction from boundary to wall: <u>7 W</u>	<u>Schofield, WI 54476</u>
Elevations (\pm 0.01 ft MSL): _____	Name of Driller: <u>Paul Dickinson</u>
Ground Surface: <u>795.50</u>	Drilling Method: <u>HSA, Air Hammer, NQ3 Core</u>
Top of protective casing: <u>798.23</u>	Drilling Fluid: <u>Air, Water</u>
Top of well casing: _____ <u>798.03</u>	Bore Hole Diameter: <u>10.5/6.0 in</u>
Benchmark elevation: <u>820.39</u>	Soil Sampling Method: <u>Split spoon, screen chips, core</u>
Benchmark description: <u>Brass cap in concrete, 408 ft N of MW-20</u>	Depth of Boring: <u>153 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: <u>Flush threaded PVC schedule 80</u>	Placement method: <u>Gravity</u>
Length of casing: _____ <u>152.1</u>	Volume: <u>0.7 ft³</u>
Outside casing diameter: _____ <u>2.4 in</u>	Backfill (if different from seal): _____
Inside casing diameter: _____ <u>1.9 in</u>	Material: <u>Bentonite Slurry</u>
Casing joint type: _____ <u>Flush Threaded</u>	Placement method: <u>Tremie pumped</u>
Casing/screen joint type: <u>Flush Threaded</u>	Volume: <u>40.1 ft³</u>
Screen material: _____ <u>Sch 80 PVC</u>	Surface seal design: _____
Screen opening size: <u>0.01 in</u>	Material of protective casing: <u>Steel</u>
Screen length: _____ <u>5 ft</u>	Material of grout between protective casing and well casing: <u>bentonite & concrete</u>
Depth of well: _____ <u>147.9 ft</u>	Protective cap: _____
Filter Pack: _____	Material: <u>Aluminum</u>
Material: _____ <u>Red Flint Filter Sand</u>	Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Grain size: _____ <u>#40</u>	Well Cap: _____
Volume: _____ <u>1.5 ft³</u>	Material: <u>plastic with rubber gasket</u>
Seal (minimum 3 ft length above filter pack): _____	Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Material: <u>3/8 inch bentonite chips</u>	

D. GROUNDWATER MEASUREMENT (\pm 0.01 ft below top of inner well casing)	
Water level: <u>100.81</u>	Stabilization Time: <u>1 week</u>
Well development method: <u>Surged & bailed with bailer and pump</u>	
Average depth of frostline: <u>3 feet</u>	

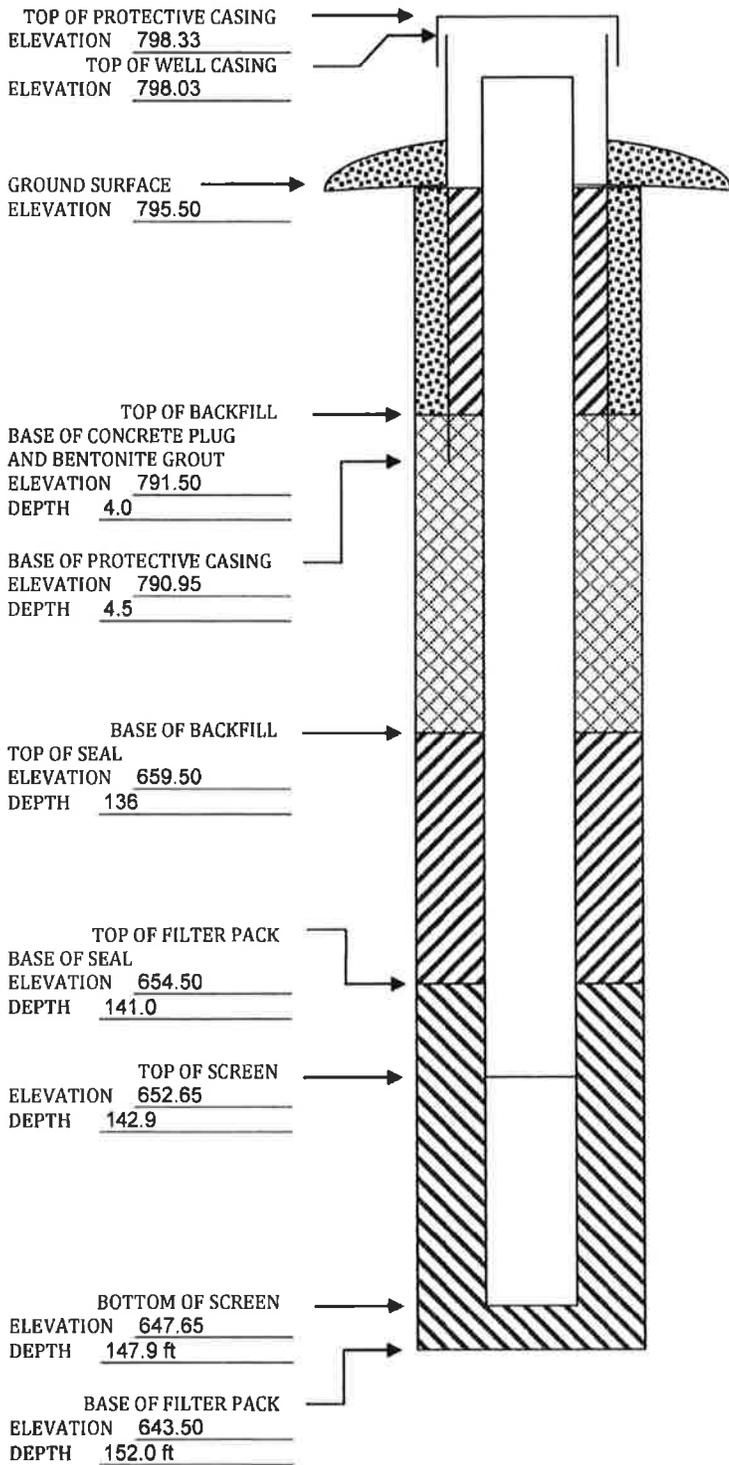
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: Ottumwa Midland Landfill Permit No.: 38230

Well or Piezometer No: MW-122M

Dates Started: December 6, 2012 Date Completed: December 9, 2012

A. SURVEYED LOCATIONS AND ELEVATIONS
B. SOIL BORING INFORMATION
Locations (± 0.5 ft):
Specify corner of site: NW
Distance & direction along boundary: 553 S
Distance & direction from boundary to wall: 462 E
Elevations (± 0.01 ft MSL):
Ground Surface: 790.74
Top of protective casing: 792.94
Top of well casing: 792.70
Benchmark elevation: 820.39
Benchmark description: Brass cap in concrete, 408 ft N of MW-20
Name & Address of Construction Company:
Boart Longyear
901D Grossman Drive
Schofield, WI 54476
Name of Driller: Paul Dickinson
Drilling Method: Rotary, HSA
Drilling Fluid: Air
Bore Hole Diameter: 10.5" to 10', 6" below 10'
Soil Sampling Method: Split spoon, screen air rotary chips
Depth of Boring: 154 ft

C. MONITORING WELL INSTALLATION
Casing material: Flush threaded PVC schedule 80
Length of casing: 155.3
Outside casing diameter: 2.4 in
Inside casing diameter: 1.89 in
Casing joint type: Flush Threaded
Casing/screen joint type: Flush Threaded
Screen material: PVC
Screen opening size: 0.01 in
Screen length: 5 ft
Depth of well: 152.8 ft
Filter Pack:
Material: Red Flint Filter Sand
Grain size: #40
Volume: 1.5 ft^3
Seal (minimum 3 ft length above filter pack):
Material: 3/8 inch bentonite chips
Placement method: Gravity
Volume: 0.67 ft^3
Backfill (if different from seal):
Material: Bentonite Slurry / 3/8" Chips
Placement method: Tremie Pumped / Gravity
Volume: 400 gal. Slurry / 6 ft^3 Chips
Surface seal design:
Material of protective casing: Steel
Material of grout between protective casing and well casing: bentonite & concrete
Protective cap:
Material: aluminum
Vented: [X] Yes [] No Locking: [X] Yes [] No
Well Cap:
Material: plastic with rubber gasket
Vented: [X] Yes [] No

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)
Water level: 68.81 Stabilization Time: 1 week
Well development method: Surged & bailed with bailer and pump
Average depth of frostline: 3 feet

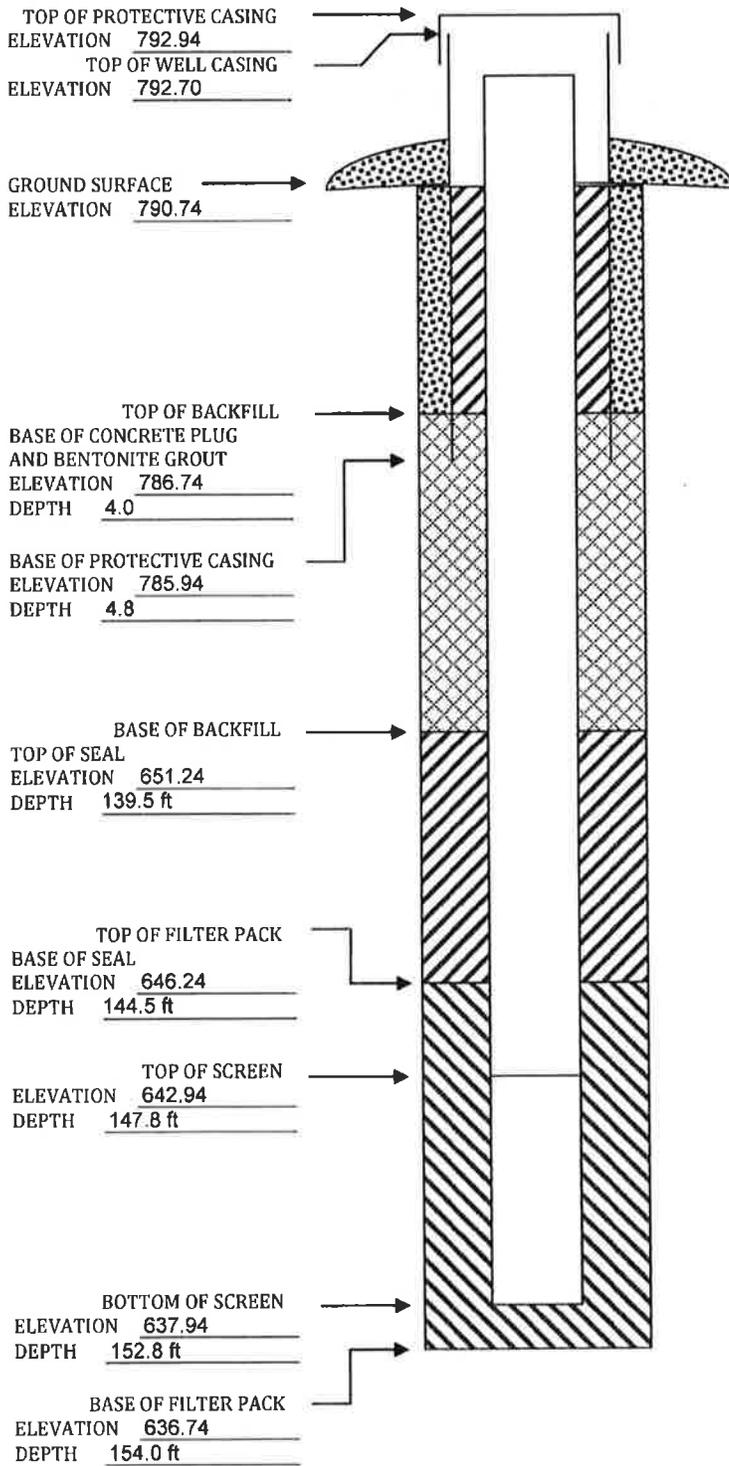
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL)





IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Midland LandfillPermit No.: 90-SDP-8-92PWell or Piezometer No: MW-301Dates Started: 11/23/15Date Completed: 11/24/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft): _____	Name & Address of Construction Company: _____
Specify corner of site: <u>SE</u>	<u>Cascade Drilling, LP</u>
Distance & direction along boundary: <u>700'N</u>	<u>301 Alderson St</u>
Distance & direction from boundary to wall: <u>90' W</u>	<u>Schofield, WI 54476</u>
Elevations (± 0.01 ft MSL): _____	Name of Driller: <u>Todd Schmalfeld</u>
Ground Surface: <u>815.51'</u>	Drilling Method: <u>4.25' HSA to 24.5'/Air Rotary to 164'/coring</u>
Top of protective casing: <u>818.36'</u>	Drilling Fluid: <u>NA</u>
Top of well casing: _____ <u>817.88'</u>	Bore Hole Diameter: <u>8.50 inch/ 6 inch</u>
Benchmark elevation: <u>818.70</u>	Soil Sampling Method: <u>Split Spoon/cuttings/core</u>
Benchmark description: <u>Control Point #2</u>	Depth of Boring: <u>202'</u>

C. MONITORING WELL INSTALLATION	
Casing material: <u>sch 80 PVC</u>	Placement method: <u>tremie</u>
Length of casing: <u>196'</u>	Volume: <u>400 gallons</u>
Outside casing diameter: <u>2.38"</u>	Backfill (if different from seal): _____
Inside casing diameter: <u>1.9"</u>	Material: <u>3/8" bentonite chips and Aqua Guard grout</u>
Casing joint type: <u>threaded</u>	Placement method: <u>gravity/tremie</u>
Casing/screen joint type: <u>threaded</u>	Volume: _____
Screen material: <u>PVC</u>	Surface seal design: _____
Screen opening size: <u>0.010</u>	Material of protective casing: <u>Steel 6 inch</u>
Screen length: <u>5 ft</u>	Material of grout between protective casing and well casing: <u>sand</u>
Depth of well: <u>201 ft</u>	Protective cap: _____
Filter Pack: _____	Material: <u>Steel</u>
Material: <u>Red Flint</u>	Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Grain size: <u>#40</u>	Well Cap: _____
Volume: <u>2 cubic ft</u>	Material: <u>PVC</u>
Seal (minimum 3 ft length above filter pack): _____	Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Material: <u>AquaGuard grout</u>	

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)	
Water level: <u>125.9</u>	Stabilization Time: <u>20 HR</u>
Well development method: <u>Surged and bailed, then pumped to reduce turbidity.</u>	
Average depth of frostline: <u>3.5'</u>	

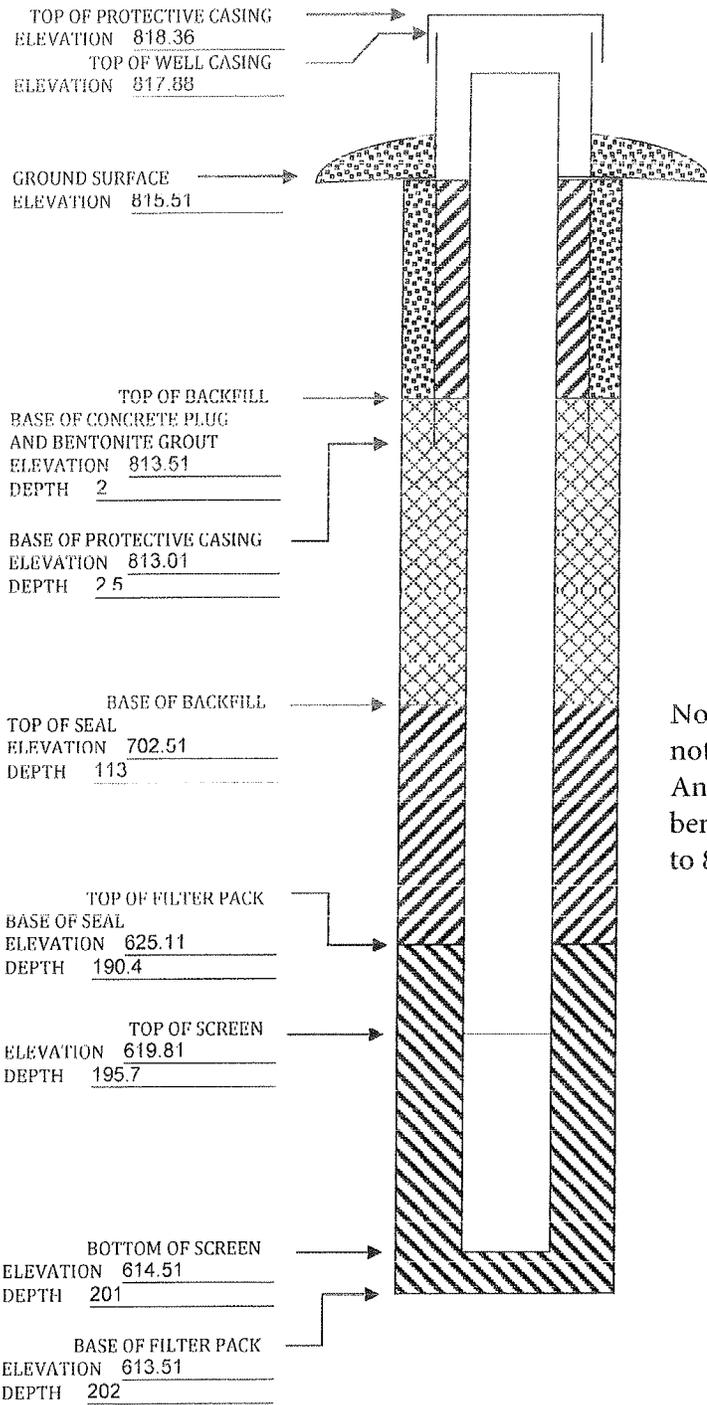
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

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ELEVATIONS: ± 0.01 ft MSL
 DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
 (SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)



Note: Grout placed from 190.4' bgs to 113' bgs. Void noted from 105' bgs to 113'. Grout basket placed at 95' bgs. Annular space above grout basket sealed with 3/8" bentonite chips (80'-95' bgs) and bentonite grout (3' bgs to 80' bgs).



IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Midland LandfillPermit No.: 90-SDP-8-92PWell or Piezometer No: MW-302Dates Started: 12/1/15Date Completed: 12/3/15**A. SURVEYED LOCATIONS AND ELEVATIONS**Locations (± 0.5 ft): _____Specify corner of site: SEDistance & direction along boundary: 700' NDistance & direction from boundary to wall: 725' WElevations (± 0.01 ft MSL): _____Ground Surface: 759.50'Top of protective casing: 762.31'Top of well casing: 761.77'Benchmark elevation: 818.70Benchmark description: Control Point #2**B. SOIL BORING INFORMATION**

Name & Address of Construction Company: _____

Cascade Drilling, LP301 Alderson StSchofield, WI 54476Name of Driller: Todd SchmalfeldDrilling Method: 4.25'HSA to 14.5'/Air Rotary to 95'/coringDrilling Fluid: NABore Hole Diameter: 8.5 inch/6 inchSoil Sampling Method: Spoon/cuttings/coreDepth of Boring: 156.5'**C. MONITORING WELL INSTALLATION**Casing material: sch 80 PVCLength of casing: 150'Outside casing diameter: 2.38"Inside casing diameter: 1.9"Casing joint type: threadedCasing/screen joint type: threadedScreen material: PVCScreen opening size: 0.010Screen length: 5'Depth of well: 155'

Filter Pack: _____

Material: Red FlintGrain size: #40Volume: 2 cubic ft

Seal (minimum 3 ft length above filter pack): _____

Material: 3/8" bentonite chipsPlacement method: gravityVolume: 0.5 cubic ft

Backfill (if different from seal): _____

Material: Agua Guard GroutPlacement method: TremieVolume: 300 gallons

Surface seal design: _____

Material of protective casing: Steel 6 inchMaterial of grout between
protective casing and well casing: sand

Protective cap: _____

Material: SteelVented: Yes NoLocking: Yes No

Well Cap: _____

Material: PVCVented: Yes No**D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)**Water level: 75.97'Stabilization Time: <1 hourWell development method: Surged and bailed then pumped to reduce turbidityAverage depth of frostline: 3.5'

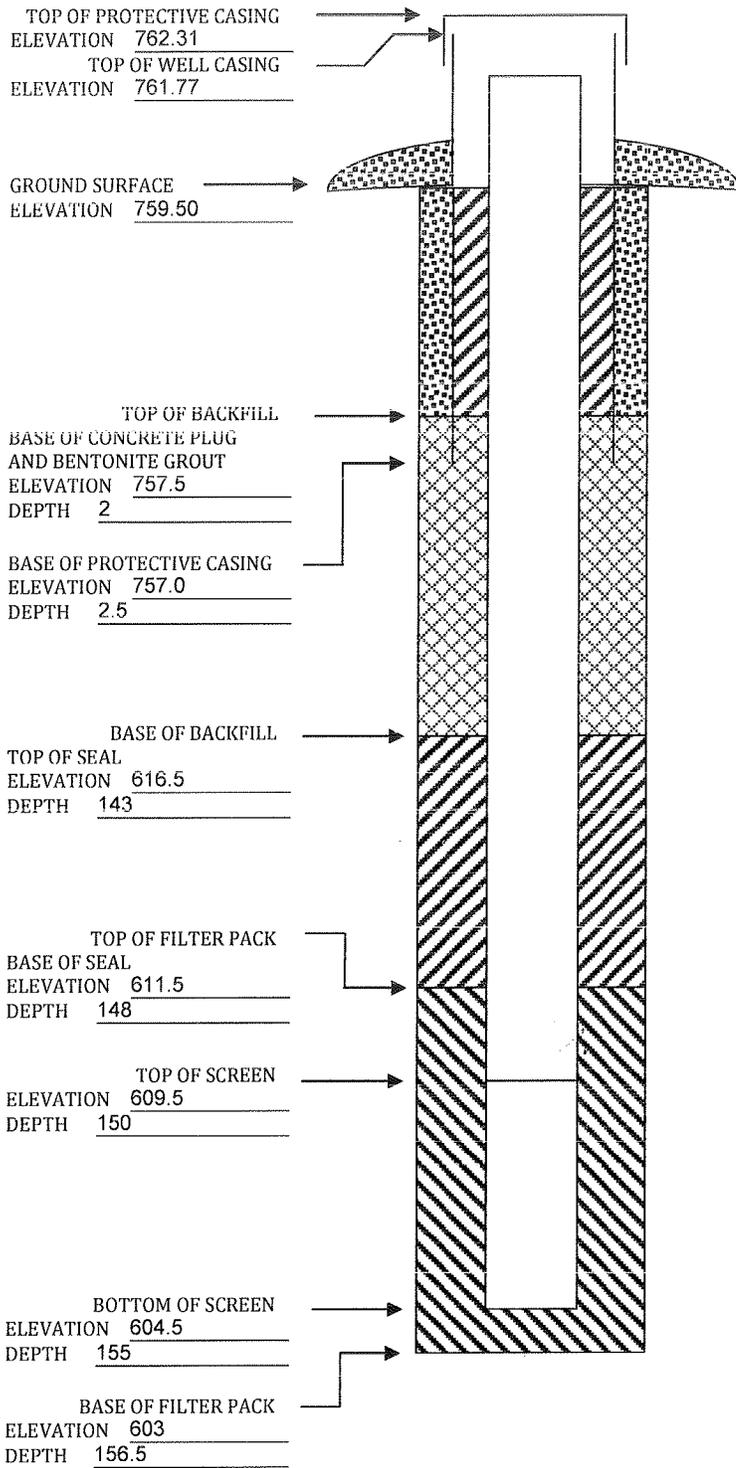
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Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Midland Landfill Permit No.: 90-SDP-8-92P

Well or Piezometer No: MW-303

Dates Started: 4/25/16 Date Completed: 4/26/16

A. SURVEYED LOCATIONS AND ELEVATIONS B. SOIL BORING INFORMATION

Locations (± 0.5 ft): Specify corner of site: SE Distance & direction along boundary: 700' N Distance & direction from boundary to wall: 350' W Elevations (± 0.01 ft MSL): Ground Surface: 759.93 Top of protective casing: 762.94 Top of well casing: 762.40 Benchmark elevation: 818.70 Benchmark description: Control Point #2

Name & Address of Construction Company: Name of Driller: Drilling Method: 4.25'HSA to/Air Rotary/coring Drilling Fluid: NA Bore Hole Diameter: 8.5 inch/6 inch Soil Sampling Method: Spoon/cuttings/core Depth of Boring:

C. MONITORING WELL INSTALLATION

Casing material: sch 80 PVC Length of casing: 142' Outside casing diameter: 2.40" Inside casing diameter: 1.9" Casing joint type: threaded Casing/screen joint type: threaded Screen material: PVC sch 80 Screen opening size: 0.010 Screen length: 5' Depth of well: 147' Filter Pack: Material: Unamin Filtersil Grain size: 10/20 mesh Volume: 2.5 cubic ft Seal (minimum 3 ft length above filter pack): Material: 3/8" bentonite chips

Placement method: tremie Volume: 300 gal Backfill (if different from seal): Material: 3/8" bentonite chips Placement method: gravity Volume: 15 cubic ft Surface seal design: Material of protective casing: steel Material of grout between protective casing and well casing: bentonite chips and sand Protective cap: Material: steel Vented: [X] Yes [] No Locking: [] Yes [] No Well Cap: Material: Plastic Vented: [] Yes [] No

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)

Water level: 76.36 Stabilization Time: <1hr. Well development method: surged and bailed, then pumped to reduce turbidity. Average depth of frostline: 3.5

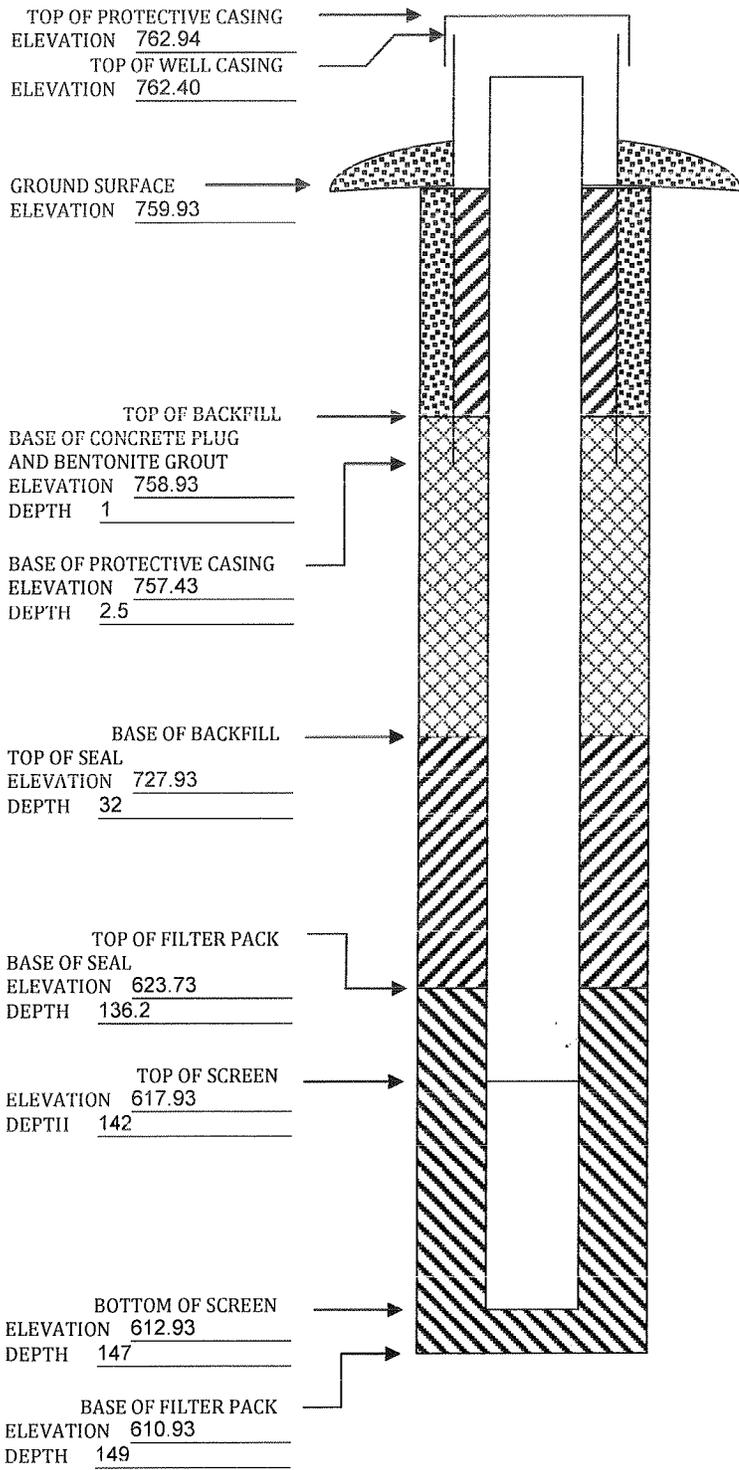
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Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





Appendix C
Laboratory Reports



ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 10/31/2024 1:11:04 PM

JOB DESCRIPTION

Ottumwa Midland Landfill 25223073

JOB NUMBER

310-292667-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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Authorized for release by
Sandie Fredrick, Senior Project Manager
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660



Table of Contents

Cover Page	1
Table of Contents	3
Case Narrative	4
Sample Summary	5
Detection Summary	6
Client Sample Results	8
Definitions	14
QC Sample Results	15
QC Association	17
Chronicle	19
Certification Summary	21
Method Summary	22
Chain of Custody	23
Receipt Checklists	25
Field Data Sheets	26

Case Narrative

Client: SCS Engineers
Project: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Job ID: 310-292667-1

Eurofins Cedar Falls

Job Narrative 310-292667-1

Receipt

The samples were received on 10/11/2024 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

HPLC/IC

Methods 300.0, 9056A: The following sample was diluted due to the nature of the sample matrix: MW-122M (310-292667-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method 3005A: The reference method requires samples to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH of >2: MW-122M (310-292667-5). The sample(s) was preserved to the appropriate pH in the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Eurofins Cedar Falls

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-292667-1	MW-301	Water	10/08/24 13:02	10/11/24 17:10
310-292667-2	MW-302	Water	10/08/24 09:20	10/11/24 17:10
310-292667-3	MW-303	Water	10/08/24 10:54	10/11/24 17:10
310-292667-4	MW-102M	Water	10/08/24 13:44	10/11/24 17:10
310-292667-5	MW-122M	Water	10/08/24 14:20	10/11/24 17:10
310-292667-6	Field Blank	Water	10/08/24 13:20	10/11/24 17:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-301

Lab Sample ID: 310-292667-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.84	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	220		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	580		100	76	ug/L	1		6020B	Total/NA
Calcium	99		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	780		50	42	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	684.69				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-40.5				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.41				mg/L	1		Field Sampling	Total/NA
Field pH	6.63				SU	1		Field Sampling	Total/NA
Field Conductivity	1580				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.5				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	32.85				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-302

Lab Sample ID: 310-292667-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.4		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	1.2		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	65		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	770		100	76	ug/L	1		6020B	Total/NA
Calcium	60		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	620		50	42	mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	683.75				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-37.6				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.43				mg/L	1		Field Sampling	Total/NA
Field pH	7.11				SU	1		Field Sampling	Total/NA
Field Conductivity	1308				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.8				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	294.64				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-303

Lab Sample ID: 310-292667-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.3		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.49	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	220		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	660		100	76	ug/L	1		6020B	Total/NA
Calcium	100		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	830		50	42	mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	684.51				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-35.3				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.4				mg/L	1		Field Sampling	Total/NA
Field pH	6.74				SU	1		Field Sampling	Total/NA
Field Conductivity	1634				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.2				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	350.47				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-102M

Lab Sample ID: 310-292667-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	43		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	3.6		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	690		20	8.4	mg/L	20		9056A	Total/NA
Boron	1400		100	76	ug/L	1		6020B	Total/NA
Calcium	20		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	1800		250	210	mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	706.63				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	114.6				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	6.28				mg/L	1		Field Sampling	Total/NA
Field pH	7.54				SU	1		Field Sampling	Total/NA
Field Conductivity	3158				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	22.6				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	28.53				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-122M

Lab Sample ID: 310-292667-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.3		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	10000		500	210	mg/L	500		9056A	Total/NA
Boron	4000		100	76	ug/L	1		6020B	Total/NA
Calcium	430		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	13000		2500	2100	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	699.12				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	120.6				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	5.18				mg/L	1		Field Sampling	Total/NA
Field pH	6.67				SU	1		Field Sampling	Total/NA
Field Conductivity	18250				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	20.2				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	25.06				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-292667-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	0.19	J	0.50	0.19	mg/L	1		6020B	Total/NA
pH	6.0	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-301
 Date Collected: 10/08/24 13:02
 Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-1
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	22		5.0	2.3	mg/L			10/22/24 19:44	5
Fluoride	0.84	J	1.0	0.38	mg/L			10/22/24 19:44	5
Sulfate	220		5.0	2.1	mg/L			10/22/24 19:44	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	580		100	76	ug/L		10/15/24 09:30	10/25/24 21:12	1
Calcium	99		0.50	0.19	mg/L		10/15/24 09:30	10/26/24 21:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	780		50	42	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	7.0	HF	1.0	1.0	SU			10/11/24 22:59	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	684.69				ft			10/08/24 13:02	1
Oxidation Reduction Potential	-40.5				mV			10/08/24 13:02	1
Oxygen, Dissolved	0.41				mg/L			10/08/24 13:02	1
Field pH	6.63				SU			10/08/24 13:02	1
Field Conductivity	1580				umhos/cm			10/08/24 13:02	1
Field Temperature	14.5				Degrees C			10/08/24 13:02	1
Field Turbidity	32.85				NTU			10/08/24 13:02	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-302
 Date Collected: 10/08/24 09:20
 Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-2
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.4		5.0	2.3	mg/L			10/22/24 19:59	5
Fluoride	1.2		1.0	0.38	mg/L			10/22/24 19:59	5
Sulfate	65		5.0	2.1	mg/L			10/22/24 19:59	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	770		100	76	ug/L		10/15/24 09:30	10/25/24 21:16	1
Calcium	60		0.50	0.19	mg/L		10/15/24 09:30	10/26/24 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	620		50	42	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	7.6	HF	1.0	1.0	SU			10/11/24 23:00	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	683.75				ft			10/08/24 09:20	1
Oxidation Reduction Potential	-37.6				mV			10/08/24 09:20	1
Oxygen, Dissolved	0.43				mg/L			10/08/24 09:20	1
Field pH	7.11				SU			10/08/24 09:20	1
Field Conductivity	1308				umhos/cm			10/08/24 09:20	1
Field Temperature	13.8				Degrees C			10/08/24 09:20	1
Field Turbidity	294.64				NTU			10/08/24 09:20	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-303
 Date Collected: 10/08/24 10:54
 Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-3
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.3		5.0	2.3	mg/L			10/22/24 20:15	5
Fluoride	0.49	J	1.0	0.38	mg/L			10/22/24 20:15	5
Sulfate	220		5.0	2.1	mg/L			10/22/24 20:15	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	660		100	76	ug/L		10/15/24 09:30	10/25/24 21:19	1
Calcium	100		0.50	0.19	mg/L		10/15/24 09:30	10/26/24 22:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	830		50	42	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	7.1	HF	1.0	1.0	SU			10/11/24 22:57	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	684.51				ft			10/08/24 10:54	1
Oxidation Reduction Potential	-35.3				mV			10/08/24 10:54	1
Oxygen, Dissolved	0.4				mg/L			10/08/24 10:54	1
Field pH	6.74				SU			10/08/24 10:54	1
Field Conductivity	1634				umhos/cm			10/08/24 10:54	1
Field Temperature	14.2				Degrees C			10/08/24 10:54	1
Field Turbidity	350.47				NTU			10/08/24 10:54	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-102M

Lab Sample ID: 310-292667-4

Date Collected: 10/08/24 13:44

Matrix: Water

Date Received: 10/11/24 17:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	43		5.0	2.3	mg/L			10/22/24 20:31	5
Fluoride	3.6		1.0	0.38	mg/L			10/22/24 20:31	5
Sulfate	690		20	8.4	mg/L			10/23/24 10:10	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1400		100	76	ug/L		10/15/24 09:30	10/25/24 21:23	1
Calcium	20		0.50	0.19	mg/L		10/15/24 09:30	10/26/24 22:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1800		250	210	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	7.9	HF	1.0	1.0	SU			10/11/24 22:51	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	706.63				ft			10/08/24 13:44	1
Oxidation Reduction Potential	114.6				mV			10/08/24 13:44	1
Oxygen, Dissolved	6.28				mg/L			10/08/24 13:44	1
Field pH	7.54				SU			10/08/24 13:44	1
Field Conductivity	3158				umhos/cm			10/08/24 13:44	1
Field Temperature	22.6				Degrees C			10/08/24 13:44	1
Field Turbidity	28.53				NTU			10/08/24 13:44	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-122M

Lab Sample ID: 310-292667-5

Date Collected: 10/08/24 14:20

Matrix: Water

Date Received: 10/11/24 17:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.3		5.0	2.3	mg/L			10/22/24 20:46	5
Fluoride	<0.38		1.0	0.38	mg/L			10/22/24 20:46	5
Sulfate	10000		500	210	mg/L			10/22/24 20:02	500

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	4000		100	76	ug/L		10/15/24 09:30	10/25/24 21:27	1
Calcium	430		0.50	0.19	mg/L		10/15/24 09:30	10/26/24 22:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	13000		2500	2100	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	6.9	HF	1.0	1.0	SU			10/11/24 22:53	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	699.12				ft			10/08/24 14:20	1
Oxidation Reduction Potential	120.6				mV			10/08/24 14:20	1
Oxygen, Dissolved	5.18				mg/L			10/08/24 14:20	1
Field pH	6.67				SU			10/08/24 14:20	1
Field Conductivity	18250				umhos/cm			10/08/24 14:20	1
Field Temperature	20.2				Degrees C			10/08/24 14:20	1
Field Turbidity	25.06				NTU			10/08/24 14:20	1



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: Field Blank

Lab Sample ID: 310-292667-6

Date Collected: 10/08/24 13:20

Matrix: Water

Date Received: 10/11/24 17:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			10/23/24 10:26	1
Fluoride	<0.075		0.20	0.075	mg/L			10/23/24 10:26	1
Sulfate	<0.42		1.0	0.42	mg/L			10/23/24 10:26	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<76		100	76	ug/L		10/15/24 09:30	10/30/24 15:43	1
Calcium	0.19	J	0.50	0.19	mg/L		10/15/24 09:30	10/26/24 22:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<42		50	42	mg/L			10/14/24 22:23	1
pH (SM 4500 H+ B)	6.0	HF	1.0	1.0	SU			10/11/24 22:55	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-437303/3
Matrix: Water
Analysis Batch: 437303

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			10/22/24 13:30	1
Fluoride	<0.075		0.20	0.075	mg/L			10/22/24 13:30	1
Sulfate	<0.42		1.0	0.42	mg/L			10/22/24 13:30	1

Lab Sample ID: LCS 310-437303/4
Matrix: Water
Analysis Batch: 437303

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.71		mg/L		97	90 - 110
Fluoride	2.00	1.99		mg/L		100	90 - 110
Sulfate	10.0	10.0		mg/L		100	90 - 110

Lab Sample ID: 310-292667-6 MS
Matrix: Water
Analysis Batch: 437303

Client Sample ID: Field Blank
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	<0.45		5.00	4.64		mg/L		93	80 - 120
Fluoride	<0.075		1.00	0.991		mg/L		99	80 - 120
Sulfate	<0.42		5.00	4.92		mg/L		98	80 - 120

Lab Sample ID: 310-292667-6 MSD
Matrix: Water
Analysis Batch: 437303

Client Sample ID: Field Blank
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	<0.45		5.00	4.89		mg/L		98	80 - 120	5	15
Fluoride	<0.075		1.00	1.08		mg/L		108	80 - 120	8	15
Sulfate	<0.42		5.00	5.23		mg/L		105	80 - 120	6	15

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-436194/1-A
Matrix: Water
Analysis Batch: 436543

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 436194

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	<0.19		0.50	0.19	mg/L		10/15/24 09:30	10/16/24 15:51	1

Lab Sample ID: MB 310-436194/1-A
Matrix: Water
Analysis Batch: 437664

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 436194

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<76		100	76	ug/L		10/15/24 09:30	10/25/24 20:30	1

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-436194/2-A
 Matrix: Water
 Analysis Batch: 437664

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 436194

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	200	188		ug/L		94	80 - 120
Calcium	2.00	2.08		mg/L		104	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-436205/1
 Matrix: Water
 Analysis Batch: 436205

Client Sample ID: Method Blank
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<42		50	42	mg/L			10/14/24 22:23	1

Lab Sample ID: LCS 310-436205/2
 Matrix: Water
 Analysis Batch: 436205

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	1020		mg/L		102	88 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-436035/1
 Matrix: Water
 Analysis Batch: 436035

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

Lab Sample ID: 310-292667-4 DU
 Matrix: Water
 Analysis Batch: 436035

Client Sample ID: MW-102M
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.9	HF	7.9		SU		0.1	20

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

HPLC/IC

Analysis Batch: 437303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	9056A	
310-292667-2	MW-302	Total/NA	Water	9056A	
310-292667-3	MW-303	Total/NA	Water	9056A	
310-292667-4	MW-102M	Total/NA	Water	9056A	
310-292667-4	MW-102M	Total/NA	Water	9056A	
310-292667-5	MW-122M	Total/NA	Water	9056A	
310-292667-5	MW-122M	Total/NA	Water	9056A	
310-292667-6	Field Blank	Total/NA	Water	9056A	
MB 310-437303/3	Method Blank	Total/NA	Water	9056A	
LCS 310-437303/4	Lab Control Sample	Total/NA	Water	9056A	
310-292667-6 MS	Field Blank	Total/NA	Water	9056A	
310-292667-6 MSD	Field Blank	Total/NA	Water	9056A	

Metals

Prep Batch: 436194

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	3005A	
310-292667-2	MW-302	Total/NA	Water	3005A	
310-292667-3	MW-303	Total/NA	Water	3005A	
310-292667-4	MW-102M	Total/NA	Water	3005A	
310-292667-5	MW-122M	Total/NA	Water	3005A	
310-292667-6	Field Blank	Total/NA	Water	3005A	
MB 310-436194/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-436194/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 436543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-436194/1-A	Method Blank	Total/NA	Water	6020B	436194

Analysis Batch: 437664

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	6020B	436194
310-292667-2	MW-302	Total/NA	Water	6020B	436194
310-292667-3	MW-303	Total/NA	Water	6020B	436194
310-292667-4	MW-102M	Total/NA	Water	6020B	436194
310-292667-5	MW-122M	Total/NA	Water	6020B	436194
MB 310-436194/1-A	Method Blank	Total/NA	Water	6020B	436194
LCS 310-436194/2-A	Lab Control Sample	Total/NA	Water	6020B	436194

Analysis Batch: 437720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	6020B	436194
310-292667-2	MW-302	Total/NA	Water	6020B	436194
310-292667-3	MW-303	Total/NA	Water	6020B	436194
310-292667-4	MW-102M	Total/NA	Water	6020B	436194
310-292667-5	MW-122M	Total/NA	Water	6020B	436194
310-292667-6	Field Blank	Total/NA	Water	6020B	436194

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Metals

Analysis Batch: 438162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-6	Field Blank	Total/NA	Water	6020B	436194

General Chemistry

Analysis Batch: 436035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-292667-2	MW-302	Total/NA	Water	SM 4500 H+ B	
310-292667-3	MW-303	Total/NA	Water	SM 4500 H+ B	
310-292667-4	MW-102M	Total/NA	Water	SM 4500 H+ B	
310-292667-5	MW-122M	Total/NA	Water	SM 4500 H+ B	
310-292667-6	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-436035/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-292667-4 DU	MW-102M	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 436205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	SM 2540C	
310-292667-2	MW-302	Total/NA	Water	SM 2540C	
310-292667-3	MW-303	Total/NA	Water	SM 2540C	
310-292667-4	MW-102M	Total/NA	Water	SM 2540C	
310-292667-5	MW-122M	Total/NA	Water	SM 2540C	
310-292667-6	Field Blank	Total/NA	Water	SM 2540C	
MB 310-436205/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-436205/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 437610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-292667-1	MW-301	Total/NA	Water	Field Sampling	
310-292667-2	MW-302	Total/NA	Water	Field Sampling	
310-292667-3	MW-303	Total/NA	Water	Field Sampling	
310-292667-4	MW-102M	Total/NA	Water	Field Sampling	
310-292667-5	MW-122M	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-301
Date Collected: 10/08/24 13:02
Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	437303	ZRI4	EET CF	10/22/24 19:44
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437664	A6US	EET CF	10/25/24 21:12
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 21:58
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 22:59
Total/NA	Analysis	Field Sampling		1	437610	DN	EET CF	10/08/24 13:02

Client Sample ID: MW-302
Date Collected: 10/08/24 09:20
Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	437303	ZRI4	EET CF	10/22/24 19:59
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437664	A6US	EET CF	10/25/24 21:16
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 22:02
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 23:00
Total/NA	Analysis	Field Sampling		1	437610	DN	EET CF	10/08/24 09:20

Client Sample ID: MW-303
Date Collected: 10/08/24 10:54
Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	437303	ZRI4	EET CF	10/22/24 20:15
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437664	A6US	EET CF	10/25/24 21:19
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 22:20
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 22:57
Total/NA	Analysis	Field Sampling		1	437610	DN	EET CF	10/08/24 10:54

Client Sample ID: MW-102M
Date Collected: 10/08/24 13:44
Date Received: 10/11/24 17:10

Lab Sample ID: 310-292667-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	437303	ZRI4	EET CF	10/22/24 20:31
Total/NA	Analysis	9056A		20	437303	ZRI4	EET CF	10/23/24 10:10

Eurofins Cedar Falls

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Client Sample ID: MW-102M

Lab Sample ID: 310-292667-4

Date Collected: 10/08/24 13:44

Matrix: Water

Date Received: 10/11/24 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437664	A6US	EET CF	10/25/24 21:23
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 22:24
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 22:51
Total/NA	Analysis	Field Sampling		1	437610	DN	EET CF	10/08/24 13:44

Client Sample ID: MW-122M

Lab Sample ID: 310-292667-5

Date Collected: 10/08/24 14:20

Matrix: Water

Date Received: 10/11/24 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		500	437303	ZRI4	EET CF	10/22/24 20:02
Total/NA	Analysis	9056A		5	437303	ZRI4	EET CF	10/22/24 20:46
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437664	A6US	EET CF	10/25/24 21:27
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 22:28
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 22:53
Total/NA	Analysis	Field Sampling		1	437610	DN	EET CF	10/08/24 14:20

Client Sample ID: Field Blank

Lab Sample ID: 310-292667-6

Date Collected: 10/08/24 13:20

Matrix: Water

Date Received: 10/11/24 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	437303	ZRI4	EET CF	10/23/24 10:26
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	437720	A6US	EET CF	10/26/24 22:31
Total/NA	Prep	3005A			436194	QTZ5	EET CF	10/15/24 09:30
Total/NA	Analysis	6020B		1	438162	NFT2	EET CF	10/30/24 15:43
Total/NA	Analysis	SM 2540C		1	436205	MDU9	EET CF	10/14/24 22:23
Total/NA	Analysis	SM 4500 H+ B		1	436035	ZJX4	EET CF	10/11/24 22:55

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25223073

Job ID: 310-292667-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401





Environment Testing
America



310-292667 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Scg</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10/11/24</u>	TIME <u>1710</u>	Received By: <u>PH</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID.	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID: <u>R</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</u>		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Chain of Custody Record

Client Information		Lab PM: Sandie Fredrick		Carrier Tracking No(s):		COC No:	
Client Contact: Meghan Blodgett		E-Mail: Sandra.Fredrick@et.eurofins.com		State of Origin:		Page: 1 of 1	
Company: SCS Engineers		PWSID:		Analysis Requested		Job #:	
Address: 2830 Dairy Drive		Due Date Requested:		Metals total (Boron Calcium)		Preservation Codes	
City: Madison		TAT Requested (days):		TDS and pH		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other	
State/Zip: WI 53718		Compliance Project: Δ Yes Δ No		Chloride Fluoride Sulfate		M - Hexane N - None O - AshNaO2 P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Phone: 608-224-2830		PO #: 25223073		Field Filtered Sample (Yes or No)		Total Number of Containers	
Email: mblodgett@scsengineers.com		WO #: 25223073		Perform MS/MSD (Yes or No)			
Project Name: Ottumwa Midland Landfill 25223073		Project #: 25223073		Special Instructions/Note:			
Site: Ottumwa, IA		SSOW#:					
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, G=water, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Special Instructions/Note:
MW-301	10/8/24	3:02	G	W	N	X	
MW-302	10/8/24	00:20	G	W	N	X	
MW-303	10/8/24	10:54	G	W	N	X	
MW-102M	0/8/24	13:44	G	W	N	X	
MW-122M	0/8/24	14:20	G	W	N	X	
Field Blank	0/8/24	13:20	G	W	N	X	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested I, II, III, IV, Other (specify)							
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Special Instructions/QC Requirements							
Empty Kit Relinquished by				Time:			
Relinquished by: Michael Morgan		Date/Time: 10/24/24 17:10		Received by: CGC		Company: eurofins	
Relinquished by:		Date/Time:		Received by:		Company:	
Relinquished by:		Date/Time:		Received by:		Company:	
Custody Seals Intact: Δ Yes Δ No				Cooler Temperature(s) °C and Other Remarks:			



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-292667-1

Login Number: 292667

List Number: 1

Creator: Collins, Charlotte G

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Groundwater Monitoring Results - Field Parameters
Ottumwa Midland Landfill / SCS Engineers Project #25224073.00
October 2024

Sample	Date	Groundwater Elevation (ft. amsl)	Temperature (Deg. C)	pH (Std. Units)	DO (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity (NTU)
MW-301	10/08/24	684.69	14.5	6.63	0.41	1,580	-40.5	32.85
MW-302	10/08/24	683.75	13.8	7.11	0.43	1,308	-37.6	294.64
MW-303	10/08/24	684.51	14.2	6.74	0.4	1,634	-35.3	350.47
MW-102M	10/08/24	706.63	22.6	7.54	6.28	3,158	114.6	28.53
MW-122M	10/08/24	699.12	20.2	6.67	5.18	18,250	120.6	25.06

Abbreviations:

ft amsl = feet above mean sea level

mg/L = milligrams per liter

µmhos/cm = microhoms per centimeter

Created by: EMS
 Last revision by: RM
 Checked by: KMV

Date: 04/13/23
 Date: 10/18/24
 Date: 10/24/24

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ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 4/29/2025 11:19:34 AM

JOB DESCRIPTION

Ottumwa Midland Landfill 25225073

JOB NUMBER

310-304085-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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Authorization



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Authorized for release by
Sandie Fredrick, Senior Project Manager
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660



Table of Contents

Cover Page	1
Table of Contents	3
Case Narrative	4
Sample Summary	5
Detection Summary	6
Client Sample Results	8
Definitions	14
QC Sample Results	15
QC Association	17
Chronicle	19
Certification Summary	21
Method Summary	22
Chain of Custody	23
Receipt Checklists	25
Field Data Sheets	26

Case Narrative

Client: SCS Engineers
Project: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Job ID: 310-304085-1

Eurofins Cedar Falls

Job Narrative 310-304085-1

Receipt

The samples were received on 4/11/2025 4:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.8° C.

HPLC/IC

Methods 300.0, 9056A: The following sample was diluted due to the nature of the sample matrix: MW-122M (310-304085-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Eurofins Cedar Falls

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-304085-1	MW-301	Water	04/08/25 11:42	04/11/25 16:30
310-304085-2	MW-302	Water	04/09/25 13:32	04/11/25 16:30
310-304085-3	MW-303	Water	04/08/25 10:08	04/11/25 16:30
310-304085-4	MW-102M	Water	04/08/25 12:48	04/11/25 16:30
310-304085-5	MW-122M	Water	04/09/25 08:08	04/11/25 16:30
310-304085-6	Field Blank	Water	04/08/25 13:00	04/11/25 16:30

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-301

Lab Sample ID: 310-304085-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.88	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	190		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	690		100	82	ug/L	1		6020B	Total/NA
Calcium	88		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	740		50	36	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	685.29				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	49.5				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.42				mg/L	1		Field Sampling	Total/NA
Field pH	6.77				SU	1		Field Sampling	Total/NA
Field Conductivity	1247				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.3				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	8.83				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-302

Lab Sample ID: 310-304085-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.7		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	1.1		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	68		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	800		100	82	ug/L	1		6020B	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	660		50	36	mg/L	1		SM 2540C	Total/NA
pH	7.8	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	684.37				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	10.0				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.12				mg/L	1		Field Sampling	Total/NA
Field pH	7.15				SU	1		Field Sampling	Total/NA
Field Conductivity	1130				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.0				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	337.26				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-303

Lab Sample ID: 310-304085-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.6		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	1.1		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	200		5.0	2.1	mg/L	5		9056A	Total/NA
Boron	670		100	82	ug/L	1		6020B	Total/NA
Calcium	86		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	810		50	36	mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	685.16				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	97.4				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.03				mg/L	1		Field Sampling	Total/NA
Field pH	6.88				SU	1		Field Sampling	Total/NA
Field Conductivity	1332				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.1				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	105.59				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-102M

Lab Sample ID: 310-304085-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	61		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	3.5		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	1000		20	8.4	mg/L	20		9056A	Total/NA
Boron	1600		100	82	ug/L	1		6020B	Total/NA
Calcium	27		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	2700		250	180	mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	707.61				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	151.5				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	5.32				mg/L	1		Field Sampling	Total/NA
Field pH	7.67				SU	1		Field Sampling	Total/NA
Field Conductivity	3487				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.8				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	50.83				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-122M

Lab Sample ID: 310-304085-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.0		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	11000		500	210	mg/L	500		9056A	Total/NA
Boron	5500		400	330	ug/L	4		6020B	Total/NA
Calcium	400		0.50	0.19	mg/L	1		6020B	Total/NA
Total Dissolved Solids	15000		2500	1800	mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	693.35				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	256.1				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	6.42				mg/L	1		Field Sampling	Total/NA
Field pH	6.78				SU	1		Field Sampling	Total/NA
Field Conductivity	14844				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	10.8				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	46.95				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-304085-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	85	J	100	82	ug/L	1		6020B	Total/NA
Total Dissolved Solids	80		50	36	mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-301
 Date Collected: 04/08/25 11:42
 Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-1
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18		5.0	2.3	mg/L			04/17/25 15:47	5
Fluoride	0.88	J	1.0	0.38	mg/L			04/17/25 15:47	5
Sulfate	190		5.0	2.1	mg/L			04/17/25 15:47	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	690		100	82	ug/L		04/16/25 09:00	04/18/25 16:55	1
Calcium	88		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 16:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	740		50	36	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	7.5	HF	1.0	1.0	SU			04/11/25 20:06	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	685.29				ft			04/08/25 11:42	1
Oxidation Reduction Potential	49.5				mV			04/08/25 11:42	1
Oxygen, Dissolved	0.42				mg/L			04/08/25 11:42	1
Field pH	6.77				SU			04/08/25 11:42	1
Field Conductivity	1247				umhos/cm			04/08/25 11:42	1
Field Temperature	13.3				Degrees C			04/08/25 11:42	1
Field Turbidity	8.83				NTU			04/08/25 11:42	1



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-302

Lab Sample ID: 310-304085-2

Date Collected: 04/09/25 13:32

Matrix: Water

Date Received: 04/11/25 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.7		5.0	2.3	mg/L			04/17/25 16:34	5
Fluoride	1.1		1.0	0.38	mg/L			04/17/25 16:34	5
Sulfate	68		5.0	2.1	mg/L			04/17/25 16:34	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	800		100	82	ug/L		04/16/25 09:00	04/18/25 17:04	1
Calcium	120		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 17:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	660		50	36	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	7.8	HF	1.0	1.0	SU			04/11/25 20:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	684.37				ft			04/09/25 13:32	1
Oxidation Reduction Potential	10.0				mV			04/09/25 13:32	1
Oxygen, Dissolved	0.12				mg/L			04/09/25 13:32	1
Field pH	7.15				SU			04/09/25 13:32	1
Field Conductivity	1130				umhos/cm			04/09/25 13:32	1
Field Temperature	14.0				Degrees C			04/09/25 13:32	1
Field Turbidity	337.26				NTU			04/09/25 13:32	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-303
 Date Collected: 04/08/25 10:08
 Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-3
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.6		5.0	2.3	mg/L			04/17/25 16:50	5
Fluoride	1.1		1.0	0.38	mg/L			04/17/25 16:50	5
Sulfate	200		5.0	2.1	mg/L			04/17/25 16:50	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	670		100	82	ug/L		04/16/25 09:00	04/18/25 17:06	1
Calcium	86		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 17:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	810		50	36	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	7.6	HF	1.0	1.0	SU			04/11/25 20:23	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	685.16				ft			04/08/25 10:08	1
Oxidation Reduction Potential	97.4				mV			04/08/25 10:08	1
Oxygen, Dissolved	0.03				mg/L			04/08/25 10:08	1
Field pH	6.88				SU			04/08/25 10:08	1
Field Conductivity	1332				umhos/cm			04/08/25 10:08	1
Field Temperature	13.1				Degrees C			04/08/25 10:08	1
Field Turbidity	105.59				NTU			04/08/25 10:08	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-102M

Lab Sample ID: 310-304085-4

Date Collected: 04/08/25 12:48

Matrix: Water

Date Received: 04/11/25 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	61		5.0	2.3	mg/L			04/17/25 17:05	5
Fluoride	3.5		1.0	0.38	mg/L			04/17/25 17:05	5
Sulfate	1000		20	8.4	mg/L			04/17/25 17:21	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1600		100	82	ug/L		04/16/25 09:00	04/18/25 17:09	1
Calcium	27		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 17:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	2700		250	180	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	8.0	HF	1.0	1.0	SU			04/11/25 20:10	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	707.61				ft			04/08/25 12:48	1
Oxidation Reduction Potential	151.5				mV			04/08/25 12:48	1
Oxygen, Dissolved	5.32				mg/L			04/08/25 12:48	1
Field pH	7.67				SU			04/08/25 12:48	1
Field Conductivity	3487				umhos/cm			04/08/25 12:48	1
Field Temperature	14.8				Degrees C			04/08/25 12:48	1
Field Turbidity	50.83				NTU			04/08/25 12:48	1



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-122M

Lab Sample ID: 310-304085-5

Date Collected: 04/09/25 08:08

Matrix: Water

Date Received: 04/11/25 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.0		5.0	2.3	mg/L			04/17/25 17:36	5
Fluoride	<0.38		1.0	0.38	mg/L			04/17/25 17:36	5
Sulfate	11000		500	210	mg/L			04/17/25 17:52	500

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	5500		400	330	ug/L		04/16/25 09:00	04/21/25 12:56	4
Calcium	400		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 17:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	15000		2500	1800	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	7.7	HF	1.0	1.0	SU			04/11/25 21:02	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	693.35				ft			04/09/25 08:08	1
Oxidation Reduction Potential	256.1				mV			04/09/25 08:08	1
Oxygen, Dissolved	6.42				mg/L			04/09/25 08:08	1
Field pH	6.78				SU			04/09/25 08:08	1
Field Conductivity	14844				umhos/cm			04/09/25 08:08	1
Field Temperature	10.8				Degrees C			04/09/25 08:08	1
Field Turbidity	46.95				NTU			04/09/25 08:08	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: Field Blank

Lab Sample ID: 310-304085-6

Date Collected: 04/08/25 13:00

Matrix: Water

Date Received: 04/11/25 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			04/18/25 11:33	1
Fluoride	<0.075		0.20	0.075	mg/L			04/18/25 11:33	1
Sulfate	<0.42		1.0	0.42	mg/L			04/18/25 11:33	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	85	J	100	82	ug/L		04/16/25 09:00	04/18/25 17:14	1
Calcium	<0.19		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 17:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	80		50	36	mg/L			04/12/25 16:17	1
pH (SM 4500 H+ B)	7.3	HF	1.0	1.0	SU			04/11/25 20:54	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-452106/3
Matrix: Water
Analysis Batch: 452106

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			04/17/25 13:27	1
Fluoride	<0.075		0.20	0.075	mg/L			04/17/25 13:27	1
Sulfate	<0.42		1.0	0.42	mg/L			04/17/25 13:27	1

Lab Sample ID: LCS 310-452106/4
Matrix: Water
Analysis Batch: 452106

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.2		mg/L		102	90 - 110
Fluoride	2.00	2.12		mg/L		106	90 - 110
Sulfate	10.0	10.0		mg/L		100	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-451684/1-A
Matrix: Water
Analysis Batch: 452124

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 451684

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<82		100	82	ug/L		04/16/25 09:00	04/18/25 16:02	1
Calcium	<0.19		0.50	0.19	mg/L		04/16/25 09:00	04/18/25 16:02	1

Lab Sample ID: LCS 310-451684/2-A
Matrix: Water
Analysis Batch: 452124

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 451684

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	200	211		ug/L		106	80 - 120
Calcium	2.00	1.81		mg/L		91	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-451431/1
Matrix: Water
Analysis Batch: 451431

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<36		50	36	mg/L			04/12/25 16:17	1

Lab Sample ID: LCS 310-451431/2
Matrix: Water
Analysis Batch: 451431

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	980		mg/L		98	88 - 110

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-451419/1
Matrix: Water
Analysis Batch: 451419

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		101	98 - 102

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

HPLC/IC

Analysis Batch: 452106

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	9056A	
310-304085-2	MW-302	Total/NA	Water	9056A	
310-304085-3	MW-303	Total/NA	Water	9056A	
310-304085-4	MW-102M	Total/NA	Water	9056A	
310-304085-4	MW-102M	Total/NA	Water	9056A	
310-304085-5	MW-122M	Total/NA	Water	9056A	
310-304085-5	MW-122M	Total/NA	Water	9056A	
310-304085-6	Field Blank	Total/NA	Water	9056A	
MB 310-452106/3	Method Blank	Total/NA	Water	9056A	
LCS 310-452106/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 451684

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	3005A	
310-304085-2	MW-302	Total/NA	Water	3005A	
310-304085-3	MW-303	Total/NA	Water	3005A	
310-304085-4	MW-102M	Total/NA	Water	3005A	
310-304085-5	MW-122M	Total/NA	Water	3005A	
310-304085-6	Field Blank	Total/NA	Water	3005A	
MB 310-451684/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-451684/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 452124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	6020B	451684
310-304085-2	MW-302	Total/NA	Water	6020B	451684
310-304085-3	MW-303	Total/NA	Water	6020B	451684
310-304085-4	MW-102M	Total/NA	Water	6020B	451684
310-304085-5	MW-122M	Total/NA	Water	6020B	451684
310-304085-6	Field Blank	Total/NA	Water	6020B	451684
MB 310-451684/1-A	Method Blank	Total/NA	Water	6020B	451684
LCS 310-451684/2-A	Lab Control Sample	Total/NA	Water	6020B	451684

Analysis Batch: 452267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-5	MW-122M	Total/NA	Water	6020B	451684

General Chemistry

Analysis Batch: 451419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-304085-2	MW-302	Total/NA	Water	SM 4500 H+ B	
310-304085-3	MW-303	Total/NA	Water	SM 4500 H+ B	
310-304085-4	MW-102M	Total/NA	Water	SM 4500 H+ B	
310-304085-5	MW-122M	Total/NA	Water	SM 4500 H+ B	
310-304085-6	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-451419/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

General Chemistry

Analysis Batch: 451431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	SM 2540C	
310-304085-2	MW-302	Total/NA	Water	SM 2540C	
310-304085-3	MW-303	Total/NA	Water	SM 2540C	
310-304085-4	MW-102M	Total/NA	Water	SM 2540C	
310-304085-5	MW-122M	Total/NA	Water	SM 2540C	
310-304085-6	Field Blank	Total/NA	Water	SM 2540C	
MB 310-451431/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-451431/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 452990

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-304085-1	MW-301	Total/NA	Water	Field Sampling	
310-304085-2	MW-302	Total/NA	Water	Field Sampling	
310-304085-3	MW-303	Total/NA	Water	Field Sampling	
310-304085-4	MW-102M	Total/NA	Water	Field Sampling	
310-304085-5	MW-122M	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-301

Date Collected: 04/08/25 11:42

Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	452106	WZC8	EET CF	04/17/25 15:47
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 16:55
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 20:06
Total/NA	Analysis	Field Sampling		1	452990	FQT6	EET CF	04/08/25 11:42

Client Sample ID: MW-302

Date Collected: 04/09/25 13:32

Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	452106	WZC8	EET CF	04/17/25 16:34
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 17:04
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 20:27
Total/NA	Analysis	Field Sampling		1	452990	FQT6	EET CF	04/09/25 13:32

Client Sample ID: MW-303

Date Collected: 04/08/25 10:08

Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	452106	WZC8	EET CF	04/17/25 16:50
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 17:06
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 20:23
Total/NA	Analysis	Field Sampling		1	452990	FQT6	EET CF	04/08/25 10:08

Client Sample ID: MW-102M

Date Collected: 04/08/25 12:48

Date Received: 04/11/25 16:30

Lab Sample ID: 310-304085-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	452106	WZC8	EET CF	04/17/25 17:05
Total/NA	Analysis	9056A		20	452106	WZC8	EET CF	04/17/25 17:21
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 17:09
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 20:10
Total/NA	Analysis	Field Sampling		1	452990	FQT6	EET CF	04/08/25 12:48

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Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Client Sample ID: MW-122M

Lab Sample ID: 310-304085-5

Date Collected: 04/09/25 08:08

Matrix: Water

Date Received: 04/11/25 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	452106	WZC8	EET CF	04/17/25 17:36
Total/NA	Analysis	9056A		500	452106	WZC8	EET CF	04/17/25 17:52
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 17:11
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		4	452267	NFT2	EET CF	04/21/25 12:56
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 21:02
Total/NA	Analysis	Field Sampling		1	452990	FQT6	EET CF	04/09/25 08:08

Client Sample ID: Field Blank

Lab Sample ID: 310-304085-6

Date Collected: 04/08/25 13:00

Matrix: Water

Date Received: 04/11/25 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	452106	WZC8	EET CF	04/18/25 11:33
Total/NA	Prep	3005A			451684	QTZ5	EET CF	04/16/25 09:00
Total/NA	Analysis	6020B		1	452124	NFT2	EET CF	04/18/25 17:14
Total/NA	Analysis	SM 2540C		1	451431	XJ7V	EET CF	04/12/25 16:17
Total/NA	Analysis	SM 4500 H+ B		1	451419	MDU9	EET CF	04/11/25 20:54

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

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- 2
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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-304085-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401





Environment Testing
America



Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	<u>Monticello</u> <small>CITY</small>	<u>WI</u> <small>STATE</small>	Project:
Receipt Information			
Date/Time Received:	<u>4/14/25</u> <small>DATE</small>	<u>1630</u> <small>TIME</small>	Received By: <u>SA</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>DA</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.8</u>	Corrected Temp (°C): <u>1.8</u>	
• Sample Container Temperature			
Container(s) used.	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C).			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-304085-1

Login Number: 304085

List Number: 1

Creator: Hirsch, Preston

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

This receipt checklist is generated for all samples received in this Login. It may not be applicable to all Jobs associated with this Login.

Eurofins Cedar Falls



Groundwater Monitoring Results - Field Parameters
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00
April 2025

Sample	Date	Groundwater Elevation	Temperature	pH	DO	Specific Conductivity	ORP	Turbidity
		(ft. amsl)	(Deg. C)	(Std. Units)	(mg/L)	(µmhos/cm)	(mV)	(NTU)
MW-301	4/8/2025	685.29	13.3	6.77	0.42	1,247	49.5	8.83
MW-302	4/9/2025	684.37	14.0	7.15	0.12	1,130	10.0	337.26
MW-303	4/8/2025	685.16	13.1	6.88	0.03	1,332	97.4	105.59
MW-102M	4/8/2025	707.61	14.8	7.67	5.32	3,487	151.5	50.83
MW-122M	4/9/2025	693.35	10.8	6.78	6.42	14,844	256.1	46.95
MW-125	4/8/2025	722.27	12.9	6.64	1.21	2,893	102.8	40.58

Abbreviations:

ft amsl = feet above mean sea level

mg/L = milligrams per liter

µmhos/cm = microhoms per centimeter

Created by: EMS

Date: 4/13/2023

Last revision by: BLJ

Date: 4/25/2025

Checked by: RM

Date: 4/28/2025

C:\Users\FQT6\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\XROCJT5A\[2504_OML_GW_Field Data.xlsx]GW Field Data

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 5/21/2025 3:23:14 PM

JOB DESCRIPTION

Ottumwa Midland Landfill 25225073

JOB NUMBER

310-306244-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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Authorized for release by
Sandie Fredrick, Senior Project Manager
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(920)261-1660



Table of Contents

Cover Page	1
Table of Contents	3
Case Narrative	4
Sample Summary	5
Detection Summary	6
Client Sample Results	7
Definitions	9
QC Sample Results	10
QC Association	11
Chronicle	12
Certification Summary	13
Method Summary	14
Chain of Custody	15
Receipt Checklists	17
Field Data Sheets	18

Case Narrative

Client: SCS Engineers
Project: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Job ID: 310-306244-1

Eurofins Cedar Falls

Job Narrative 310-306244-1

Receipt

The samples were received on 5/13/2025 4:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.6° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Eurofins Cedar Falls

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
310-306244-1	MW-303	Water	05/12/25 12:39	05/13/25 16:10
310-306244-2	Field Blank	Water	05/12/25 12:46	05/13/25 16:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Client Sample ID: MW-303

Lab Sample ID: 310-306244-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.1		5.0	2.3	mg/L	5		9056A	Total/NA
Groundwater Elevation	685.39				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	25.9				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.49				mg/L	1		Field Sampling	Total/NA
Field pH	6.88				SU	1		Field Sampling	Total/NA
Field Conductivity	1546				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	15.5				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	145.34				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-306244-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14		1.0	0.45	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Client Sample ID: MW-303
 Date Collected: 05/12/25 12:39
 Date Received: 05/13/25 16:10

Lab Sample ID: 310-306244-1
 Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.1		5.0	2.3	mg/L			05/20/25 20:33	5

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	685.39				ft			05/12/25 12:39	1
Oxidation Reduction Potential	25.9				mV			05/12/25 12:39	1
Oxygen, Dissolved	0.49				mg/L			05/12/25 12:39	1
Field pH	6.88				SU			05/12/25 12:39	1
Field Conductivity	1546				umhos/cm			05/12/25 12:39	1
Field Temperature	15.5				Degrees C			05/12/25 12:39	1
Field Turbidity	145.34				NTU			05/12/25 12:39	1



Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Client Sample ID: Field Blank

Lab Sample ID: 310-306244-2

Date Collected: 05/12/25 12:46

Matrix: Water

Date Received: 05/13/25 16:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14		1.0	0.45	mg/L			05/21/25 09:13	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-455379/3
Matrix: Water
Analysis Batch: 455379

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			05/20/25 13:48	1

Lab Sample ID: LCS 310-455379/4
Matrix: Water
Analysis Batch: 455379

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.4		mg/L		104	90 - 110



QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

HPLC/IC

Analysis Batch: 455379

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-306244-1	MW-303	Total/NA	Water	9056A	
310-306244-2	Field Blank	Total/NA	Water	9056A	
MB 310-455379/3	Method Blank	Total/NA	Water	9056A	
LCS 310-455379/4	Lab Control Sample	Total/NA	Water	9056A	

Field Service / Mobile Lab

Analysis Batch: 454899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-306244-1	MW-303	Total/NA	Water	Field Sampling	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Client Sample ID: MW-303

Date Collected: 05/12/25 12:39

Date Received: 05/13/25 16:10

Lab Sample ID: 310-306244-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	455379	QTZ5	EET CF	05/20/25 20:33
Total/NA	Analysis	Field Sampling		1	454899	FQT6	EET CF	05/12/25 12:39

Client Sample ID: Field Blank

Date Collected: 05/12/25 12:46

Date Received: 05/13/25 16:10

Lab Sample ID: 310-306244-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	455379	QTZ5	EET CF	05/21/25 09:13

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland Landfill 25225073

Job ID: 310-306244-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
Field Sampling	Field Sampling	EPA	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

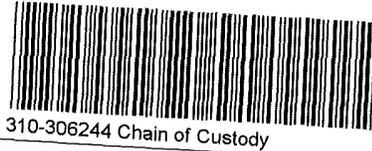
Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401





Environment Testing
America



310-306244 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>5-13-25</u>	TIME <u>1610</u>	Received By: <u>PH</u>
Delivery Type	<input type="checkbox"/> UPS	<input type="checkbox"/> FedEx	<input type="checkbox"/> FedEx Ground
	<input checked="" type="checkbox"/> Lab Courier	<input type="checkbox"/> Lab Field Services	<input type="checkbox"/> Client Drop-off
		<input type="checkbox"/> US Mail	<input type="checkbox"/> Spee-Dee
			<input type="checkbox"/> Other: _____
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice	<input type="checkbox"/> Blue ice	<input type="checkbox"/> Dry ice
			<input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE
Thermometer ID: <u>AA</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-0.6</u>	Corrected Temp (°C): <u>-0.6</u>		
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-306244-1

SDG Number:

Login Number: 306244

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Groundwater Monitoring Results - Field Parameters
Ottumwa Midland Landfill / SCS Engineers Project #25225073.00
May 2025

Sample	Date	Groundwater Elevation	Temperature	pH	DO	Specific Conductivity	ORP	Turbidity
		(ft amsl)	(Deg C)	(Std. Units)	(mg/L)	(µmhos/cm)	(mV)	(NTU)
MW-303	5/12/2025	685.39	15.5	6.88	0.49	1,546	25.9	145.34

Abbreviations:

ft amsl = feet above mean sea level
mg/L = milligrams per liter
µmhos/cm = microhoms per centimeter

Std. Units = Standard Units
mV = millivolts
NTU = Nephelometric Units

Deg C = Degrees Celsius

Created by: EMS
Last revision by: RM
Checked by: EMS

Date: 4/13/2023
Date: 5/14/2025
Date: 5/15/2025

C:\Users\FQT6\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\1766GR6N\[2505_OML_GW_Field Data.xlsx]GW Field Data



Appendix D

Historical Monitoring Results

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-102M

Number of Sampling Dates: 26

Parameter Name	Units	5/4/2016	6/22/2016	6/23/2016	8/10/2016	10/25/2016	10/26/2016	1/18/2017	4/20/2017	6/21/2017	8/22/2017	11/8/2017	4/17/2018	10/16/2018	4/18/2019	10/15/2019
Boron	ug/L	1510	1440	--	1480	--	1420	1480	1460	1410	1440	1480	1550	1340	1400	1500
Calcium	mg/L	45.9	147	--	129	--	31.5	23.6	26	67.7	79.7	10.4	25.3	12.9	51	14
Chloride	mg/L	16.3	13.8	--	13.4	--	13	12.3	12.5	12.8	13.1	12.3	13.5	13.6	14	15
Fluoride	mg/L	4.2	4.2	--	4.4	--	4.6	4.1	4	4.6	4.5	4.6	4.5	4.7	5.7	4.5
Field pH	Std. Units	8.09	7.68	--	--	--	--	7.62	7.35	7.64	6.89	8.16	8.34	7.8	8.55	7.81
Sulfate	mg/L	378	350	--	354	--	384	415	348	356	358	335	352	384	340	350
Total Dissolved Solids	mg/L	1670	1530	--	1620	--	1420	1530	1620	1480	1400	1410	1540	1500	1700	1400
Antimony	ug/L	0.38	0.19	--	0.17	--	0.51	0.26	0.1	0.21	0.16	--	--	--	--	--
Arsenic	ug/L	0.64	0.68	--	0.78	--	0.9	0.89	0.92	0.9	0.9	--	--	--	--	--
Barium	ug/L	48.5	39.5	--	55.4	--	28.2	21.1	28.4	37.2	31	--	--	--	--	--
Beryllium	ug/L	0.74	1.4	--	1.1	--	0.37	0.19	0.34	0.54	0.41	--	--	--	--	--
Cadmium	ug/L	<0.029	0.12	--	0.078	--	0.11	<0.029	0.046	0.063	0.062	--	--	--	--	--
Chromium	ug/L	20.5	17.9	--	27.1	--	11.8	2.8	8.7	16	9.6	--	--	--	--	--
Cobalt	ug/L	3.5	4.5	--	7.3	--	2.4	0.74	1.7	2.1	2.5	--	--	--	--	--
Lead	ug/L	3.1	3.6	--	3.8	--	1.7	0.87	1.4	2.2	1.8	--	--	--	--	--
Lithium	ug/L	46.7	80.7	--	52.3	--	75.4	71.8	73.6	52.7	54	--	--	--	--	--
Mercury	ug/L	<0.039	<0.039	--	<0.039	--	<0.039	<0.039	<0.046	<0.046	<0.046	--	--	--	--	--
Molybdenum	ug/L	21.7	10.3	--	20.9	--	11.7	10.6	10.8	11.1	9.5	--	--	--	--	--
Selenium	ug/L	0.42	1	--	1.4	--	0.31	0.24	0.4	0.49	0.43	--	--	--	--	--
Thallium	ug/L	<0.5	<0.5	--	<0.5	--	<0.5	<0.5	0.04	0.084	0.067	--	--	--	--	--
Total Radium	pCi/L	2.64	--	1.66	1.17	--	0.814	0.567	1.57	1.12	0.594	--	--	--	--	--
Radium-226	pCi/L	-0.058	--	0.58	0.144	--	0.444	0.209	0.754	0.285	0.368	--	--	--	--	--
Radium-228	pCi/L	2.64	--	1.08	1.03	--	0.37	0.358	0.816	0.832	0.226	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7.9	7.9	--	7.9	--	7.8	8.1	7.9	8	8	7.8	8	8	8.2	7.9
Collected By		--	--	--	0	--	--	0	0	0	0	--	--	--	--	--
Groundwater Elevation	feet	728.73	718.74	--	730.49	716.94	--	717.91	717.8	714.83	713.23	713.53	717.38	717.05	717.97	715.5
Field Oxidation Potential	mV	128.2	-102.4	--	--	--	--	--	--	--	--	219.9	-77.8	-104.7	--	--
Field Specific Conductance	umhos/cm	2197	2037	--	--	--	--	--	--	--	2751	2085	2113	0	--	--
Field Temperature	deg C	14	14.2	--	--	--	--	--	--	--	13.4	12.9	10.1	12.9	--	--
Oxygen, Dissolved	mg/L	0.79	3.06	--	--	--	--	--	--	--	--	0.73	4.51	2.14	--	--
Turbidity	NTU	350.9	614.3	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-102M

Number of Sampling Dates: 26

Parameter Name	Units	5/21/2020	10/7/2020	4/15/2021	10/5/2021	4/13/2022	10/27/2022	4/4/2023	10/11/2023	4/4/2024	10/8/2024	4/8/2025
Boron	ug/L	1500	1600	1600	1300	1400	1400	1500	1500	1500	1400	1600
Calcium	mg/L	38	150	43	71	32	14	31	15	15	20	27
Chloride	mg/L	16	14	14	16	14	16	16	28	31	43	61
Fluoride	mg/L	5	5.3	4.3	2.9	4.3	4.8	4.2	5	4.5	3.6	3.5
Field pH	Std. Units	7.82	8.29	7.85	7.81	7.91	7.55	7.93	7.73	7.61	7.54	7.67
Sulfate	mg/L	350	350	330	360	330	390	370	400	430	690	1000
Total Dissolved Solids	mg/L	3700	1700	1500	1300	1300	1500	1500	1500	1500	1800	2700
Antimony	ug/L	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7.9	8.1	8	7.9	7.9	7.8	7.9	8.3	7.7	7.9	--
Collected By		--	--	--	--	--	--	--	--	--	--	--
Groundwater Elevation	feet	717.61	712.05	710.95	714.85	710.24	709.07	701.93	720.93	709.84	706.63	707.61
Field Oxidation Potential	mV	21.2	22	164	82.2	-25.9	25.7	13.2	8.4	-53.5	114.6	--
Field Specific Conductance	umhos/cm	2260	2123	2145	2041	1954	1912	--	2272	2095	3158	3487
Field Temperature	deg C	13.1	14.5	11.5	13.5	8.5	10.5	12	20	8.9	22.6	14.8
Oxygen, Dissolved	mg/L	1.59	5.11	5.24	2.32	4.4	7.53	7.92	6.39	8.8	6.28	5.32
Turbidity	NTU	297	--	196	28.1	121	19.23	116	17.31	20.43	28.53	50.83
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	8
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	151.5

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-122M

Number of Sampling Dates: 27

Parameter Name	Units	5/4/2016	5/5/2016	6/22/2016	6/23/2016	8/10/2016	10/25/2016	10/26/2016	1/18/2017	4/20/2017	6/21/2017	8/22/2017	11/8/2017	4/17/2018	10/16/2018	4/17/2019	10/15/2019
Boron	ug/L	--	3140	--	1720	4550	--	4060	4720	4480	4710	4980	5220	5560	4580	5500	4100
Calcium	mg/L	--	599	--	312	419	--	415	386	382	386	386	383	402	366	400	400
Chloride	mg/L	--	16.4	--	21.9	11.8	--	8.2	8.3	8	7.8	7.8	7.2	8	8.6	8.8	10
Fluoride	mg/L	--	1.1	--	0.89	0.74	--	0.48	<0.027	0.88	1.1	0.6	0.5	<0.063	<0.19	0.7	<0.23
Field pH	Std. Units	--	6.97	--	6.68	--	--	--	6.06	--	6.42	6.32	6.16	6.65	6.31	7.34	6.6
Sulfate	mg/L	--	8260	--	5330	8950	--	8600	9680	14300	17500	9190	9440	10400	<0.24	8300	8400
Total Dissolved Solids	mg/L	--	11500	--	7430	14200	--	13200	14100	18100	12800	14300	13400	14400	13300	13000	13000
Antimony	ug/L	--	0.36	--	1	0.26	--	0.29	0.12	<0.079	<0.13	<0.13	--	--	--	--	--
Arsenic	ug/L	--	<0.52	--	<0.52	<0.21	--	<0.52	0.11	0.19	<0.26	<0.26	--	--	--	--	--
Barium	ug/L	--	31.5	--	17.9	14.5	--	16.8	11.8	13	11.2	10.3	--	--	--	--	--
Beryllium	ug/L	--	<0.4	--	<0.24	<0.16	--	<0.24	<0.4	0.054	<0.035	<0.058	--	--	--	--	--
Cadmium	ug/L	--	<0.14	--	<0.14	<0.058	--	<0.14	<0.029	<0.053	<0.089	<0.089	--	--	--	--	--
Chromium	ug/L	--	<1.7	--	<1.7	<0.68	--	1.3	0.51	0.26	<0.27	0.56	--	--	--	--	--
Cobalt	ug/L	--	5.3	--	6.5	3.5	--	6	2.1	1.4	1.2	0.96	--	--	--	--	--
Lead	ug/L	--	<0.96	--	<0.96	<0.39	--	<1.9	<0.19	0.22	<0.16	<0.16	--	--	--	--	--
Lithium	ug/L	--	450	--	332	601	--	544	679	643	640	667	--	--	--	--	--
Mercury	ug/L	--	<0.039	--	<0.039	<0.039	--	<0.039	<0.039	<0.046	<0.046	<0.046	--	--	--	--	--
Molybdenum	ug/L	--	2.6	--	2.6	0.57	--	0.58	0.15	2.1	0.6	0.43	--	--	--	--	--
Selenium	ug/L	--	<0.92	--	<0.92	<0.37	--	<0.92	<0.18	0.33	<0.43	<0.43	--	--	--	--	--
Thallium	ug/L	--	<2.5	--	<2.5	<1	--	<5	<0.5	<0.11	<0.18	<0.18	--	--	--	--	--
Total Radium	pCi/L	--	2.12	--	1.25	2.26	--	1.83	1.07	1.1	1.55	1.09	--	--	--	--	--
Radium-226	pCi/L	--	0.157	--	0.56	0.75	--	0.392	0.32	0.796	0.333	0.559	--	--	--	--	--
Radium-228	pCi/L	--	1.96	--	0.691	1.51	--	1.44	0.752	0.305	1.22	0.532	--	--	--	--	--
pH at 25 Degrees C	Std. Units	--	6.5	--	6.7	6.1	--	6.2	6.1	6.4	6.2	6	6.2	6.4	6.4	6.6	6.7
Collected By		--	--	--	--	0	--	--	0	0	0	0	--	--	--	--	--
Groundwater Elevation	feet	729.27	--	725.67	--	710.32	724.61	--	742.02	724.04	723.51	722.02	720.52	723.25	723.36	723.43	708.94
Field Oxidation Potential	mV	--	34.3	--	-50.7	--	--	--	--	--	--	-7.7	195.4	-61.1	-53.5	--	--
Field Specific Conductance	umhos/cm	--	3025	--	8161	--	--	--	--	--	--	--	13375	13773	0	--	--
Field Temperature	deg C	--	16.1	--	14.9	--	--	--	--	--	--	16.2	13.1	13.4	11.8	--	--
Oxygen, Dissolved	mg/L	--	1.92	--	2.29	--	--	--	--	--	--	--	0.49	0.36	1.48	--	--
Turbidity	NTU	--	212.1	--	-46.36	--	--	--	--	--	--	--	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-122M

Number of Sampling Dates: 27

Parameter Name	Units	5/21/2020	10/7/2020	4/15/2021	10/5/2021	4/14/2022	10/27/2022	4/4/2023	10/11/2023	4/4/2024	10/8/2024	4/9/2025
Boron	ug/L	5100	4100	5100	5500	4800	6400	4300	4400	5500	4000	5500
Calcium	mg/L	430	430	410	440	420	440	430	450	450	430	400
Chloride	mg/L	9	8.3	8	8.7	8.5	14	9	8.2	8.6	8.3	9
Fluoride	mg/L	0.23	<0.23	0.3	<0.28	<0.22	<0.22	0.52	0.57	<0.38	<0.38	<0.38
Field pH	Std. Units	6.91	7	6.78	7.18	6.7	6.79	6.49	--	7.04	6.67	6.78
Sulfate	mg/L	9800	8700	8700	8800	460	9300	8900	10000	9000	10000	11000
Total Dissolved Solids	mg/L	16000	14000	14000	12000	13000	11000	11000	15000	--	13000	15000
Antimony	ug/L	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7	6.9	6.7	7	6.7	6.9	7.6	7.9	--	6.9	--
Collected By		--	--	--	--	--	--	--	--	--	--	--
Groundwater Elevation	feet	724.23	718.39	720.52	717.76	704.81	719.03	706.9	707.9	700.9	699.12	693.35
Field Oxidation Potential	mV	-4.4	-28.2	159.2	-5.9	22.3	14	140.3	--	-36.6	120.6	--
Field Specific Conductance	umhos/cm	14090	13603	13983	13044	13222	13350	13367	--	13249	18250	14844
Field Temperature	deg C	13	13.6	9	13.3	15.3	12.2	10.2	--	7.3	20.2	10.8
Oxygen, Dissolved	mg/L	0.61	0.56	5.03	0.84	2.43	5.47	5.84	--	9.58	5.18	6.42
Turbidity	NTU	2.31	--	0	29	56.9	62.39	18.3	--	33.24	25.06	46.95
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	7.7
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	256.1

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-301

Number of Sampling Dates: 24

Parameter Name	Units	5/4/2016	6/22/2016	8/9/2016	10/26/2016	1/17/2017	4/20/2017	6/20/2017	8/22/2017	11/7/2017	4/17/2018	10/15/2018	4/16/2019	10/15/2019	5/26/2020	10/6/2020	4/12/2021
Boron	ug/L	2280	1860	1770	1410	1310	1040	1040	994	1010	854	784	660	600	660	770	790
Calcium	mg/L	596	472	479	393	337	224	202	158	161	131	135	110	100	120	180	160
Chloride	mg/L	42.4	112	46.6	43.4	32.6	58	38.9	40.8	28.9	33.9	26.9	45	46	61	24	28
Fluoride	mg/L	0.68	0.38	0.55	0.72	0.77	0.72	0.93	0.78	0.77	0.87	0.84	0.85	0.85	0.77	0.67	0.73
Field pH	Std. Units	6.44	6.62	7.81	6.33	6.31	6.15	6.73	6.51	6.56	7.09	6.59	7.1	6.67	5.67	7.22	6.62
Sulfate	mg/L	5160	5370	4050	2630	1780	1170	1180	902	926	638	837	360	310	390	620	530
Total Dissolved Solids	mg/L	6260	5380	5810	4030	2830	1990	2060	1870	1760	1400	1550	970	860	1100	1400	1300
Antimony	ug/L	<0.58	<0.12	<0.12	<0.058	0.089	<0.026	0.058	0.04	--	--	--	--	--	--	--	--
Arsenic	ug/L	<1	0.84	0.29	0.3	0.64	0.56	0.42	0.56	--	--	--	--	--	--	--	--
Barium	ug/L	28.1	26.6	24.2	32.1	41.5	41	47.1	45.7	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.8	<0.24	<0.16	<0.08	<0.08	<0.012	<0.012	<0.012	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.29	<0.058	<0.058	<0.029	<0.029	<0.018	<0.018	0.04	--	--	--	--	--	--	--	--
Chromium	ug/L	<3.4	<0.68	<0.68	0.46	0.5	0.31	0.16	0.2	--	--	--	--	--	--	--	--
Cobalt	ug/L	<5	<1	<1	<0.5	<0.5	0.21	0.22	0.17	--	--	--	--	--	--	--	--
Lead	ug/L	<1.9	<0.96	<0.39	<0.19	<0.19	0.046	0.038	0.091	--	--	--	--	--	--	--	--
Lithium	ug/L	274	268	195	171	156	110	111	114	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	--	--	--	--	--	--	--
Molybdenum	ug/L	4.6	2	2.1	2.9	2.9	6.3	5.3	6.5	--	--	--	--	--	--	--	--
Selenium	ug/L	<1.8	<0.37	<0.37	<0.18	<0.18	<0.086	<0.086	0.12	--	--	--	--	--	--	--	--
Thallium	ug/L	<5	<2.5	<1	<0.5	<0.5	<0.036	0.076	0.068	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.99	0.285	1.89	1.68	1.96	1.34	1.56	1.5	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.565	0.071	0.606	0.66	0.44	0.855	0.734	0.6	--	--	--	--	--	--	--	--
Radium-228	pCi/L	1.42	0.214	1.28	1.02	1.52	0.488	0.829	0.896	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	6.2	6.2	6.2	6.2	6.2	6.9	6.4	6.4	6.4	6.8	7.5	6.8	7	7.3	6.9	6.6
Collected By		--	--	0	--	0	0	0	0	--	--	0	--	--	--	--	--
Groundwater Elevation	feet	686.46	686.4	686.19	683.7	685.57	685.72	685.88	684.96	684.5	684.85	684.58	686.38	686.56	687.29	686.8	687.25
Field Oxidation Potential	mV	-58.5	-49.7	-53	-79.4	-57.8	-49.8	-63.1	-20.6	144.3	-102.8	88.2	-50.2	-58.4	-57.8	-105.9	-79.6
Field Specific Conductance	umhos/cm	7267	5132	5607	4377	3607	2631	2384	3187	2395	1910	2112	1603	1512	1546	1820	1875
Field Temperature	deg C	13.4	14.3	13.9	13.5	13.1	13	13.8	13.9	13.4	13	13.6	13.87	13.68	15.8	14.5	13
Oxygen, Dissolved	mg/L	0.27	0.14	0.1	0.55	0.19	0.18	0.16	0.11	0.37	0.16	0.2	1.27	0.4	0.41	0.25	0.46
Turbidity	NTU	2.86	3.34	1.05	0.92	0.63	1.12	2.69	0.99	1.91	1.13	4.91	8.88	4.75	21.8	21.4	4.6
Collected Date		--	--	--	--	--	--	--	--	--	--	10	--	--	--	--	--
Collected Time		--	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-301

Number of Sampling Dates: 24

Parameter Name	Units	10/5/2021	4/14/2022	10/25/2022	4/5/2023	10/11/2023	4/4/2024	10/8/2024	4/8/2025
Boron	ug/L	700	710	640	650	710	770	580	690
Calcium	mg/L	150	150	140	130	120	110	99	88
Chloride	mg/L	29	24	27	22	21	22	22	18
Fluoride	mg/L	<0.28	<0.22	0.85	0.71	0.99	0.77	0.84	0.88
Field pH	Std. Units	6.71	6.84	6.58	6.75	6.74	6.66	6.63	6.77
Sulfate	mg/L	590	450	440	370	360	310	220	190
Total Dissolved Solids	mg/L	1200	1000	1100	970	960	850	780	740
Antimony	ug/L	--	--	--	--	--	--	--	--
Arsenic	ug/L	--	--	--	--	--	--	--	--
Barium	ug/L	--	--	--	--	--	--	--	--
Beryllium	ug/L	--	--	--	--	--	--	--	--
Cadmium	ug/L	--	--	--	--	--	--	--	--
Chromium	ug/L	--	--	--	--	--	--	--	--
Cobalt	ug/L	--	--	--	--	--	--	--	--
Lead	ug/L	--	--	--	--	--	--	--	--
Lithium	ug/L	--	--	--	--	--	--	--	--
Mercury	ug/L	--	--	--	--	--	--	--	--
Molybdenum	ug/L	--	--	--	--	--	--	--	--
Selenium	ug/L	--	--	--	--	--	--	--	--
Thallium	ug/L	--	--	--	--	--	--	--	--
Total Radium	pCi/L	--	--	--	--	--	--	--	--
Radium-226	pCi/L	--	--	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	6.8	6.8	7.1	6.8	7.6	6.6	7	--
Collected By		--	--	--	--	--	--	--	--
Groundwater Elevation	feet	686.87	687	686.01	686.58	684.55	684.96	684.69	685.29
Field Oxidation Potential	mV	-66.1	-76	-48.2	-91.2	-97.3	-92.7	-40.5	--
Field Specific Conductance	umhos/cm	1717	1581	1539	1485	1562	1332	1580	1247
Field Temperature	deg C	13.8	11.3	13	12.5	13.4	12.2	14.5	13.3
Oxygen, Dissolved	mg/L	0.35	0.27	0.28	0.17	0.39	0.44	0.41	0.42
Turbidity	NTU	32.1	22.9	14.23	16.8	6.55	14.94	32.85	8.83
Collected Date		--	--	--	--	--	--	--	--
Collected Time		--	--	--	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	7.5
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	49.5

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-302

Number of Sampling Dates: 24

Parameter Name	Units	5/4/2016	6/22/2016	8/10/2016	10/26/2016	1/17/2017	4/19/2017	6/20/2017	8/22/2017	11/7/2017	4/17/2018	10/15/2018	4/16/2019	10/15/2019	5/21/2020	10/6/2020	4/12/2021
Boron	ug/L	853	796	802	784	824	777	767	783	848	834	752	760	780	780	870	820
Calcium	mg/L	72.1	56.6	48.8	42.8	42.9	41	46.1	50.2	74	77.3	66.9	44	68	41	65	58
Chloride	mg/L	9.2	8.1	7.5	6	7.7	8	8	8.5	7.8	8.6	9.2	10	7.3	8.9	7.2	6.6
Fluoride	mg/L	1.1	1	0.98	1	0.97	1	1.1	1	1.2	1	1.1	1.5	1.2	1	1.1	1.1
Field pH	Std. Units	7.38	7.76	9.55	7.22	7.23	7.6	7.29	7.12	7.41	7.8	7.25	7.49	7.21	7.05	7.14	7.13
Sulfate	mg/L	201	133	102	78.9	76.7	76.7	79.3	77.2	77.5	79.3	80.9	83	73	79	73	64
Total Dissolved Solids	mg/L	784	715	671	644	639	671	656	672	607	690	708	690	680	930	700	620
Antimony	ug/L	0.12	0.15	0.095	<0.058	0.1	<0.026	0.094	0.056	--	--	--	--	--	--	--	--
Arsenic	ug/L	0.19	0.39	0.28	0.24	0.31	0.23	0.25	0.38	--	--	--	--	--	--	--	--
Barium	ug/L	39.3	45.4	50	54	57.2	48.9	49.9	47.5	--	--	--	--	--	--	--	--
Beryllium	ug/L	0.22	0.16	<0.08	<0.08	<0.08	0.051	0.084	0.15	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.029	<0.029	<0.029	<0.029	<0.029	<0.018	0.018	<0.018	--	--	--	--	--	--	--	--
Chromium	ug/L	5.5	6.2	1.9	1.8	1.4	1.4	2.2	2.9	--	--	--	--	--	--	--	--
Cobalt	ug/L	1.1	1.1	<0.5	<0.5	<0.5	0.24	0.38	0.66	--	--	--	--	--	--	--	--
Lead	ug/L	1.1	0.9	0.32	0.26	0.26	0.25	0.36	0.54	--	--	--	--	--	--	--	--
Lithium	ug/L	81.1	81.2	75.9	79.8	80.8	79.6	78.5	82	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	--	--	--	--	--	--	--
Molybdenum	ug/L	0.32	0.49	0.31	0.18	0.24	0.2	0.17	0.24	--	--	--	--	--	--	--	--
Selenium	ug/L	0.19	0.39	<0.18	<0.18	<0.18	<0.086	0.21	0.21	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.036	0.065	0.089	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.874	0.677	1.17	1.17	1.57	1.65	1.54	2.6	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.412	-0.066	0.426	0.505	0.525	0.872	0.987	1.74	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.462	0.677	0.744	0.663	1.04	0.777	0.549	0.863	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7.3	7.1	7.3	7.4	7.6	7.5	7.6	7.4	7.2	7.6	7.5	7.4	7.5	7.5	7.6	6.7
Collected By		--	--	0	--	0	0	0	0	--	--	0	--	--	--	--	--
Groundwater Elevation	feet	685.8	685.79	685.48	684.94	685.68	684.73	684.76	683.89	683.38	683.87	683.52	685.35	685.44	686.25	685.86	686.26
Field Oxidation Potential	mV	-153.3	-114.6	-100.7	-126.7	-109.6	-64	-66.8	-96.2	112.3	-138.7	-103.6	8.13	-56.4	-83.4	-169.4	-74.2
Field Specific Conductance	umhos/cm	1326	1132	1102	1075	1081	1081	1018	1429	1079	1091	1102	1168	1067	1129	1025	1079
Field Temperature	deg C	13.6	14	13.9	13.5	12.9	14	14	13.7	13.1	12.7	13.4	13.63	14.26	13.1	13.5	13.2
Oxygen, Dissolved	mg/L	0.08	0.09	0.1	0.66	0.29	0.17	0.22	0.11	0.3	0.3	0.22	1.59	0.75	1.06	0.28	0.28
Turbidity	NTU	170.8	167.5	74.76	29.05	43.07	39.01	58.63	77.96	202.4	200.6	131.5	44.2	102.8	12.5	136	127
Collected Date		--	--	--	--	--	--	--	--	--	--	10	--	--	--	--	--
Collected Time		--	--	--	--	--	--	--	--	--	--	14	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-302

Number of Sampling Dates: 24

Parameter Name	Units	10/5/2021	4/13/2022	10/25/2022	4/5/2023	10/11/2023	4/3/2024	10/8/2024	4/9/2025
Boron	ug/L	740	730	790	800	790	840	770	800
Calcium	mg/L	52	50	54	52	40	45	60	120
Chloride	mg/L	7.1	5.3	5.4	6.2	5.6	6.2	7.4	6.7
Fluoride	mg/L	0.5	1.1	0.93	0.91	1.2	1.1	1.2	1.1
Field pH	Std. Units	7.2	7.3	7.13	7.19	7.24	7.15	7.11	7.15
Sulfate	mg/L	70	61	64	66	72	73	65	68
Total Dissolved Solids	mg/L	400	630	600	550	640	630	620	660
Antimony	ug/L	--	--	--	--	--	--	--	--
Arsenic	ug/L	--	--	--	--	--	--	--	--
Barium	ug/L	--	--	--	--	--	--	--	--
Beryllium	ug/L	--	--	--	--	--	--	--	--
Cadmium	ug/L	--	--	--	--	--	--	--	--
Chromium	ug/L	--	--	--	--	--	--	--	--
Cobalt	ug/L	--	--	--	--	--	--	--	--
Lead	ug/L	--	--	--	--	--	--	--	--
Lithium	ug/L	--	--	--	--	--	--	--	--
Mercury	ug/L	--	--	--	--	--	--	--	--
Molybdenum	ug/L	--	--	--	--	--	--	--	--
Selenium	ug/L	--	--	--	--	--	--	--	--
Thallium	ug/L	--	--	--	--	--	--	--	--
Total Radium	pCi/L	--	--	--	--	--	--	--	--
Radium-226	pCi/L	--	--	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7.6	7.5	7.6	7.4	8	7.2	7.6	--
Collected By		--	--	--	--	--	--	--	--
Groundwater Elevation	feet	685.85	685.07	684.97	685.65	684.12	684	683.75	684.37
Field Oxidation Potential	mV	-66.5	-43.2	-98.7	-81.5	-100.9	-111	-37.6	--
Field Specific Conductance	umhos/cm	993	1002	1130	1034	1129	1009	1308	1130
Field Temperature	deg C	13.5	12	12.9	12.8	13.6	12	13.8	14
Oxygen, Dissolved	mg/L	0.35	0.36	0.1	1.31	0.44	0.6	0.43	0.12
Turbidity	NTU	67.1	75.3	122.97	99	68.96	37.92	294.64	337.26
Collected Date		--	--	--	--	--	--	--	--
Collected Time		--	--	--	--	--	--	--	--
pH	Std. Units	--	--	--	--	--	--	--	7.8
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	10

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-303

Number of Sampling Dates: 27

Parameter Name	Units	5/4/2016	6/22/2016	8/9/2016	10/26/2016	1/17/2017	4/19/2017	7/19/2017	8/22/2017	11/7/2017	4/17/2018	10/16/2018	4/16/2019	6/6/2019	10/15/2019	5/26/2020	6/29/2020
Boron	ug/L	3510	2430	1640	1100	955	800	755	737	738	738	661	850	--	760	770	--
Calcium	mg/L	686	462	250	157	116	97.4	87.7	94	94.9	103	90.5	150	--	120	120	--
Chloride	mg/L	13.5	11.5	8.7	7.5	7.1	6.9	7.2	7.3	6.9	7.3	7.4	8.1	8	7.5	8.5	6.9
Fluoride	mg/L	0.68	0.47	0.9	0.87	0.86	0.86	0.86	0.85	0.77	0.8	0.84	<0.23	--	0.87	0.81	--
Field pH	Std. Units	6.24	6.93	7.84	6.66	6.69	7.12	7.1	6.71	6.96	7.32	6.87	6.97	6.71	6.76	6.21	6.74
Sulfate	mg/L	6230	4690	1950	780	497	329	255	287	232	262	310	600	--	390	440	--
Total Dissolved Solids	mg/L	9540	7120	2750	1500	1080	931	809	868	783	839	891	1300	--	1100	1100	--
Antimony	ug/L	<0.58	<0.058	<0.12	<0.058	0.082	<0.026	0.042	0.041	--	--	--	--	--	--	--	--
Arsenic	ug/L	<1	0.3	<0.21	0.13	0.2	0.24	0.59	0.53	--	--	--	--	--	--	--	--
Barium	ug/L	55.8	47.6	19.3	13.4	11.7	11.9	12.8	13.1	--	--	--	--	--	--	--	--
Beryllium	ug/L	1.2	<0.24	0.16	0.11	0.099	0.13	0.24	0.24	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.29	<0.029	<0.058	0.037	<0.029	<0.018	0.019	0.026	--	--	--	--	--	--	--	--
Chromium	ug/L	22.1	3.1	2.7	2.6	1.1	2.6	5.1	4.5	--	--	--	--	--	--	--	--
Cobalt	ug/L	12.7	1.6	1.2	1	<0.5	1.1	2.5	2.1	--	--	--	--	--	--	--	--
Lead	ug/L	5.7	1.6	0.51	0.57	0.3	0.57	1	1.2	--	--	--	--	--	--	--	--
Lithium	ug/L	289	270	126	102	96.5	92.4	90.8	92.8	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	--	--	--	--	--	--	--
Molybdenum	ug/L	3	0.38	0.69	0.43	0.29	0.3	0.26	0.29	--	--	--	--	--	--	--	--
Selenium	ug/L	<1.8	0.38	<0.37	<0.18	<0.18	0.26	0.4	0.42	--	--	--	--	--	--	--	--
Thallium	ug/L	<5	<2.5	<1	<0.5	<0.5	<0.036	0.049	0.048	--	--	--	--	--	--	--	--
Total Radium	pCi/L	10.6	7.5	3.59	2.18	1.47	1.82	1.33	0.803	--	--	--	--	--	--	--	--
Radium-226	pCi/L	2.51	2.96	1.26	0.634	0.199	0.481	0.273	0.559	--	--	--	--	--	--	--	--
Radium-228	pCi/L	8.08	4.54	2.33	1.55	1.27	1.34	1.06	0.244	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	6.2	6.2	6.4	6.6	6.9	7	7	6.9	6.8	7.2	7.1	6.8	--	7	7.3	--
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--
Groundwater Elevation	feet	686.04	687.72	687.77	685.56	685.6	685.51	684.92	684.7	684.26	684.68	684.33	686.13	686.05	686.08	687.14	687.36
Field Oxidation Potential	mV	-50	-49.5	-76.7	-102.1	-93.5	-56.6	-83.6	-72.6	125.7	-103.8	-117.7	-20	-40	-55.6	-30	-53.3
Field Specific Conductance	umhos/cm	8206	6426	3419	2120	1681	1451	1300	1836	1307	1358	0	2209	1331	1628	1963	1739
Field Temperature	deg C	14	14	14	13.7	13	13.7	14.5	14	13.2	13.3	13.5	14.07	16.7	15.44	14.4	16.1
Oxygen, Dissolved	mg/L	0.16	0.11	0.08	0.46	0.16	0.17	0.5	0.31	0.45	0.38	0.41	1.41	0.42	0.43	2.31	0.49
Turbidity	NTU	677.5	160.2	169.9	84.13	113.7	120.3	179.4	161.5	258.2	248	61.64	99.2	169.9	27.9	57.1	59
pH	Std. Units	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Single Location
Name: IPL - Ottumwa
Midland Landfill

Location ID: MW-303

Number of Sampling Dates: 27

Parameter Name	Units	10/6/2020	4/12/2021	10/5/2021	4/13/2022	10/24/2022	4/4/2023	10/11/2023	4/3/2024	10/8/2024	4/8/2025	5/12/2025
Boron	ug/L	740	730	630	680	640	730	740	760	660	670	--
Calcium	mg/L	100	100	92	100	91	110	110	110	100	86	--
Chloride	mg/L	7.3	7.6	8.3	7	7.2	7.8	7.9	8.1	7.3	9.6	8.1
Fluoride	mg/L	0.88	0.74	0.39	0.97	0.88	0.78	0.92	0.7	0.49	1.1	--
Field pH	Std. Units	7.01	6.8	6.76	6.89	6.76	6.86	6.81	6.73	6.74	6.88	6.88
Sulfate	mg/L	230	260	270	250	190	330	350	300	220	200	--
Total Dissolved Solids	mg/L	840	850	820	840	740	950	930	890	830	810	--
Antimony	ug/L	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	--	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	--	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	--	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	--	--	--	--	--	--	--
pH at 25 Degrees C	Std. Units	7.2	7	7.3	7	7.2	7	7.8	6.9	7.1	--	--
Collected By		--	--	--	--	--	--	--	--	--	--	--
Groundwater Elevation	feet	686.35	689.05	686.84	686.91	685.86	686.51	684.95	684.82	684.51	685.16	685.39
Field Oxidation Potential	mV	-137.3	-64.6	-55	-37.8	-51.9	-49.3	-85.7	-92.5	-35.3	--	--
Field Specific Conductance	umhos/cm	1262	1431	1287	1344	1318	1544	1617	1458	1634	1332	1546
Field Temperature	deg C	13.9	14.2	13.8	12.5	13.5	11.6	14.1	12.3	14.2	13.1	15.5
Oxygen, Dissolved	mg/L	0.3	0.38	0.48	0.35	0	0.19	0.55	0.46	0.4	0.03	0.49
Turbidity	NTU	240	168	79.6	61.2	183.4	--	64.61	102.35	350.47	105.59	145.34
pH	Std. Units	--	--	--	--	--	--	--	--	--	7.6	--
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	--	--	97.4	25.9