SCS ENGINEERS

Transmittal

West Des Moines, IA

PROJECT:	Ottumwa,2025 LF Permit Renewal,IA 27225584.00	DATE:	12/4/2025
SUBJECT:	Ottumwa Wapello County Sanitary Landfill 90-SDP-01-75P 2025 Permit Renewal Application	TRANSMITTAL ID:	00003
PURPOSE:	For Record	VIA:	Info Exchange

FROM

NAME	COMPANY	EMAIL	PHONE
Kasi Province West Des Moines, IA	SCS Engineers	KProvince@scsengineers.com	

TO

NAME	COMPANY	EMAIL	PHONE
Mike Smith 502 East 9th Street Des Moines IA 50319-0034 United States	Iowa, State of	mike.smith@dnr.iowa.gov	515-725-8200
Becky Jolly		becky.jolly@dnr.iowa.gov	

REMARKS:

Mike,

Please find included for download the Ottumwa Wapello County Sanitary Landfill 2025 Permit Renewal Application with the updated HMSP and LFG Plans.

Let me know if you have any questions.
Thank you,

Kasi Province, P.E.
SCS Engineers
West Des Moines, Iowa
(515) 779-2227 (C)
kprovince@scsengineers.com

www.scsengineers.com

Transmittal

DATE: 12/4/2025
TRANSMITTAL ID: 00003

DESCRIPTION OF CONTENTS

QTY	DATED	TITLE	NOTES
1	12/4/2025	2025 Ottumwa Wapello County Sanitary Landfill Permit Renewal Application 90-SDP-01-75P 12.4.2025.pdf	

COPIES:

Lori Creech (Ottumwa-Wapello County)
Christine Collier (SCS Engineers)

October 27, 2025
File No. 27225584.00

Mr. Michael W. Smith
Iowa Department of Natural Resources
Land Quality Bureau
6200 Park Avenue, Suite 200
Des Moines, Iowa 50321

Subject: 2025 Permit Renewal Application
Ottumwa-Wapello County Sanitary Landfill
Permit No. 90-SDP-01-75P

Dear Mr. Smith:

On behalf of the Ottumwa-Wapello Solid Waste Commission (Commission), SCS Engineers (SCS) is pleased to submit this Permit Renewal Application for the Ottumwa-Wapello County Sanitary Landfill (Landfill) for your review.

Following standard practice, the permittee and SCS have reviewed the current permit and planning documents. Form 50 for permit renewal applications has been completed. Section 1 has been reviewed and updated. Section 2 has been prepared as required with the Executive Summary. Referenced documents are either included in this submittal if updates occurred or the DocDNA number of the current approved plans has been included. Upon review of this documentation and attachments, the Commission representative has provided signature in Section 3.

Please feel free to contact us if you have any questions, require additional information, or need any further clarification.

Sincerely,

Kasi D. Province, P.E.
Project Professional
SCS Engineers

Christine L. Collier, P.E.
Senior Project Manager
SCS Engineers

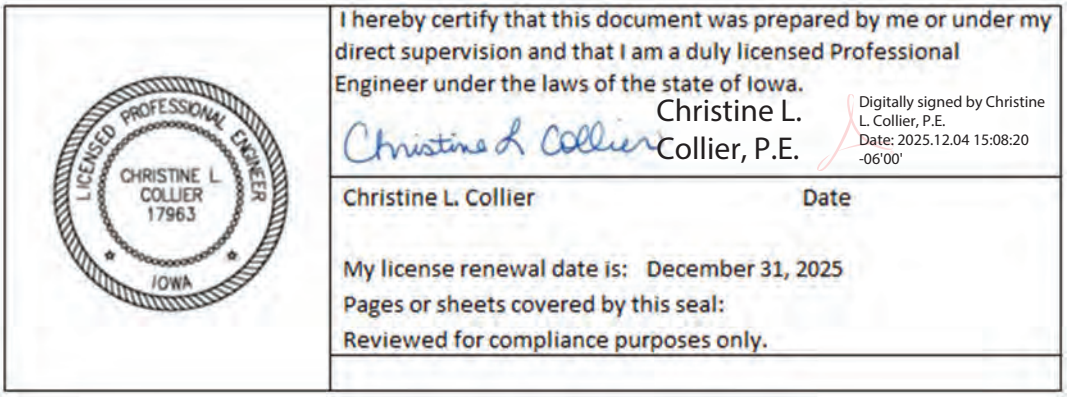
KDP/CLC

cc: Lori Creech, Ottumwa-Wapello County Sanitary Landfill

2025 Permit Renewal Application
Ottumwa-Wapello County Sanitary Landfill

Prepared For:
Ottumwa-Wapello Solid Waste Commission
13277 165th Avenue
Ottumwa, IA 52501

Permit No. 90-SDP-01-75



SCS ENGINEERS

Project No. 27225584.00 | October 2025

1690 All-State Court, Suite 100
West Des Moines, IA 50265
515-631-6160

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Section Page

Appendices

1.0 IOWA DEPARTMENT OF NATURAL RESOURCES FORM 50

IOWA DEPARTMENT OF NATURAL RESOURCES

Municipal Solid Waste Landfill

PERMIT APPLICATION FORM 50

☐ **New Permit**

☒ **Permit Renewal (permit number)** 90 **- SDP -** 01 **-** 75P **MLF**

☐ **Closure Permit**

SECTION 1: PERMIT APPLICATION REQUIREMENTS

Owner of site

Name: Ottumwa-Wapello Solid Waste Commission Phone: 641-683-0645

Address: 105 East 3rd Street Fax: 641-683-0678

City, State, Zip: Ottumwa, Iowa 52501 E-mail: creechl@ottumwa.us

Certified Operator Responsible for Operation at Facility

Name: Lori Creech, Landfill Superintendent Phone: 641-683-0645

Address: 13277 165th Avenue Fax: 641-683-0678

City, State, Zip: Ottumwa, Iowa 52501 E-mail: creechl@ottumwa.us

Permit Applicant

Name: Ottumwa-Wapello Solid Waste Commission Phone: 641-683-0645

Address: 105 East 3rd Street Fax: 641-683-0678

City, State, Zip: Ottumwa, Iowa 52501 E-mail: creechl@ottumwa.us

Design Engineer (PE)

Name: Christine L. Collier, P.E. Phone: 515-631-6160

Address: 1690 All-State Court Fax: (913) 681-0012

City, State, Zip: West Des Moines, Iowa 50265 E-mail: ccollier@scsengineers.com

Iowa Engineer License #: 17963 Expiration Date: 12/31/2025

Responsible Official for the Facility

Name: Lori Creech, Landfill Superintendent Phone: 641-683-0645

Address: 13277 165th Avenue Fax: 641-683-0678

City, State, Zip: Ottumwa, Iowa 52501 E-mail: creechl@ottumwa.us

Agency and Responsible Official of Agency Served (if any)

Name: Lori Creech, Landfill Superintendent Phone: 641-683-0645

Address: 105 East 3rd Street Fax: 641-683-0678

City, State, Zip: Ottumwa, Iowa 52501 E-mail: creechl@ottumwa.us

Facility

Name: Ottumwa-Wapello County Landfill

Address: 13277 165th Avenue City, State, Zip: Ottumwa, Iowa 52501

Legal Description:

The SE¼; the E 30 acres of the S½, S½, NE¼; and a portion of the W 10 acres of the S½, S½, NE¼; all in Section 33, T73N, R14W, Wapello County, Iowa. Also approximately 30 acres in the W½ of the NE Fractional Quarter of Section 4, T72N, R14W, Wapello County.

Landfill is part of the following solid waste comprehensive planning area:

Planning Area Name: Ottumwa-Wapello Solid Waste Commission

Date of Last Approved Plan: October 3, 2019

Service area of the landfill (include unincorporated areas and out of state generators):

The unincorporated area in Wapello County and all cities except Eddyville; and all cities and the unincorporated area in Davis County.

Population Served: 43,217

SECTION 2: PERMIT APPLICATION SUPPORTING DOCUMENTATION

PLANS AND SPECIFICATIONS

Checking the appropriate boxes below certifies that the documents submitted in conjunction with this application form are complete and in compliance with the applicable chapters of the Iowa Administrative Code. While some of the documents below may have been submitted previously, updated copies of each are required to be provided with each permit renewal application, unless a prior document remains current and is identified by Doc ID#, Section, and Page.

Required Plans and Specifications

☒ Executive Summary

An executive summary shall address the following:

- Summary of modifications, if any, to the approved plans and specifications that occurred during the current permit cycle.
- Summary of each special provision of the current permit to determine if it is to remain the same, be revised or be removed.
- Provide documentation and certification as required for new permit amendment requests, if any.
- Provide documentation and certification as required for equivalency review requests, if any.
- Provide documentation and certification as required for new variance requests from Iowa Administrative Code requirements, if any.

☒ An organizational chart in accordance with Iowa Administrative Code 567 paragraph 113.5(1)"b".

No Revision Required - See Doc ID#, Section, and Page: _____

☐ A site exploration and characterization report for the facility that complies with the requirements of subrule 113.6(4).

No Revision Required - See Doc ID#, Section, and Page: DocDNA #92083, Appendix 1, page 9 & DocDNA #34454, Appendix 2, page 19

☐ Design plans and specifications for the facility, and quality control and assurance plans, that comply with the requirements of rule 113.7(455B).

No Revision Required - See Doc ID#, Section, and Page: DocDNA #98622, Appendix 3, page 29 & DocDNA #92083, Appendix 3, page 354

☐ A development and operations (DOPS) plan for the facility, an emergency response and remedial action plan (ERRAP), and proof of MSWLF Operator Certification that comply with the requirements of rule 113.8(455B) .

No Revision Required - See Doc ID#, Section, and Page: DOPS - DocDNA #98622, Appendix 5, page 35

☒ An environmental monitoring plan that complies with the requirements of rules 113.9(455B) and 113.10(455B).

No Revision Required - See Doc ID#, Section, and Page: _____

☐ The project goals and time lines, and other documentation as necessary to comply with subrule 113.4(10) and other requirements of the Department if an RD&D permit is being requested or renewed.

No Revision Required - See Doc ID#, Section, and Page: N/A

☒ Proof of financial assurance in compliance with rule 113.14(455B).

No Revision Required - See Doc ID#, Section, and Page: _____

☐ A closure and postclosure plan that complies with the requirements of rules 113.12(455B) and 113.13(455B).

No Revision Required - See Doc ID#, Section, and Page: DocDNA #92083, Appendix 7&8, pages 466&499

☐ Comprehensive plan requirements. Attach a copy of the most recent comprehensive plan approval or amendment letter.

No Revision Required - See Doc ID#, Section, and Page: Doc #4106

In addition to the documents required above, the permit holder shall comply with the implementation plan requirements of subrule 113.2(9), the public notice requirements of subrule 113.4(12), and the record-keeping and reporting requirements of rule 113.11(455B).

If the department finds the permit application information to be incomplete, the department shall notify the applicant of that fact and of the specific deficiencies. If the applicant fails to correct the noted deficiencies within 30 days, the department may reject the application and return the application materials to the applicant. The applicant may reapply without prejudice.

SECTION 3: APPLICANT SIGNATURE

Signature of Permit Applicant: Lori Creech **Date:** 10/24/25

Printed Name: Lori Creech **Title:** Solid Waste Superintendent

Applications for sanitary disposal projects must be accompanied by the plans, specifications and additional information required by the applicable solid waste rules under Iowa Administrative Code.

Send completed applications with attached information to the DNR project officer via email or file sharing platform.

For questions concerning this application contact Brian Rath at 515-537-4051, brian.rath@dnr.iowa.gov

2.0 EXECUTIVE SUMMARY

2.1 INTRODUCTION

SCS Engineers, on behalf of the Ottumwa-Wapello Solid Waste Commission (Commission), has prepared the permit renewal application for the Ottumwa-Wapello County Sanitary Landfill (Landfill). The information required in the Executive Summary is listed in Section 2.0 of the Permit Application Form 50 and includes a summary of modifications, special provisions, permit amendments, and documentation and certification as required for new permit amendment requests and new waiver requests.

2.2 SUMMARY OF MODIFICATIONS

Modifications to the current plans and specifications during the current permit cycle (January 25, 2021, to October 27, 2025) are summarized in Table 1.

Table 1. Permit Modifications History

Date	Permit Modification
4/12/2021	Permit Revision #1: X.4.bb. Revised to incorporate well and gas vent construction document.
7/2/2021	Permit Revision #2: X.9. Incorporates solidifying liquid wastes for disposal at the landfill.
9/19/2022	Permit Revision #3: X.14. Incorporates use of composed material from Chamness Technology as an alternative daily cover.
10/10/2022	Permit Revision #4: X.9. Adds another waste stream to the previously approved liquids solidification program in Special Provision #9.
5/11/2023	Permit Revision #5; Removed reference to Chamness in special provision #10 and added waste tire storage provision #16 per their May 9, 2023 request.
9/19/2025	X.4.a. Requires monitoring for levels of methane instead of gas composition testing at vents on the southwest corner of the West unit. X. 15 Allows the use of wood chips and soil for daily cover.

2.3 SPECIAL PROVISIONS OF CURRENT PERMIT

Following is a summary of each special provision of the current permit in addition to a brief discussion regarding if it is to remain the same, be revised, or be removed.

X. Special Provisions

X. Special Provision #1.

The permit holder is authorized to accept solid waste for disposal in accordance with the approved Ottumwa-Wapello Comprehensive Plan. The Comprehensive Plan as approved by the DNR on October 3, 2019; any approved amendments to the plan; and the latest plan update, are hereby incorporated as permit plan documents.

The permitted service area includes: The unincorporated area in Wapello County and all cities except Eddyville; and all cities and the unincorporated area in Davis County.

In accordance with subrule 101.13(2), the permit holder shall submit an updated Comprehensive Solid Waste Management Plan to the DNR in accordance with the DNR's schedule.

The Round 9 Comprehensive Plan Update is due to the DNR by November 1, 2025, after an extension was granted. Please update the Comprehensive Plan approval to the 2025 approval date upon completion. There are no other changes required or requested for Special Provision #1.

X. Special Provision #2.

The permit holder shall operate the site in accordance with the Development and Operations Plan contained in Appendix 5 of the approved 2020 Permit Renewal Documentation (doc #98622), dated October 7, 2020, as submitted by Evora Consulting, and the following:

a) *Waste disposal is limited to the North Cell, the Phase 1A and 1B Cells, the Phase 2 Cell, and the Phase 3 Cell in the West MSWLF unit.*

b) *The Development Drawings and Site Maps (Appendix 2) and the Hydrogeological Investigation Plan and Report (Appendix 3) contained in the Site Development and Operational Plan for the East Horizontal Expansion (doc #16848), dated February 15, 2008, as amended by response letter (doc #19846) dated April 18, 2008, as submitted by Barker Lemar Engineering Consultants and approved on May 12, 2009, are incorporated into the permit. The East Horizontal Expansion is also referred to as the East MSWLF Unit. The permit holder is not currently authorized to construct any cells within this unit.*

c) *The permit holder shall collect leachate from the leachate control system and properly dispose of the leachate either by treatment in an on-site facility, discharge with an NPDES permit; or by discharge to the City of Ottumwa publicly owned treatment works (POTW). If the discharge is to a POTW with a pretreatment program approved by the DNR, the discharge must comply with the terms and conditions of a local permit issued for the discharge by the POTW. If the discharge is to a POTW without an approved pretreatment program a completed treatment agreement form shall be submitted to the DNR's Wastewater Section. Copies of the local permit or treatment agreement shall be provided to the DNR's Solid Waste Section and the local Field office. The treatment agreement must be on DNR Form 31 (542-3221) and must comply with the requirements of subrule 64.3(5).*

   In addition, the permit holder shall monthly measure leachate head levels and elevations at all piezometers and record the volume of leachate collected and transported to the treatment works. Records of leachate contaminants testing required by the treatment works and any NPDES permit for on-site treated leachate discharges shall be maintained.

   The following must be recorded by the permit holder and reported in the LCSPER for each leachate thickness measurement that equals or exceeds 12 inches at LPZ-13R, LPZ-14, LPZ-15, LPZ-16, or LPZ-17:

   1) *Date of original and any verification measurement.*
   2) *If 12 inch or greater leachate column is verified, specific actions taken by the certified operator to lower leachate thickness, or an explanation why specific actions were not necessary.*
   3) *Date and results of follow-up measurement.*
   4) *Repeat steps 2 and 3 as necessary until a compliant measurement is collected.*

The permit holder shall annually submit a Leachate Control System Performance Evaluation (LCSPE) Report pursuant to subparagraph 113.7(5)"b"(14) as a supplement to the facility Annual Water Quality Report, as defined in subrule 113.10(10).

d) *The permit holder shall operate and inspect the 3-inch diameter, above-ground leachate recirculation piping that runs from the south end of the West MSWLF Unit to the North Cell and whose construction is referenced in Special Provision #3k as follows:*

   1) *The pipe shall only be used during March through November (non-winter months) during non-freezing conditions.*
   2) *The permit holder shall conduct monthly inspections along the entire length of the recirculation pipe during the March through November operational period. Completed inspection forms shall be included in the annual LCSPE report.*

e) *The permit holder must maintain effective control of leachate in the unlined portion of the West MSWLF unit as determined through maintenance of the lowest feasible leachate head in this area and by complying with the environmental monitoring and corrective action requirements for groundwater. This shall be re-evaluated annually and presented in the LCSPE report.*

f) *The permit holder shall follow the approved Emergency Response and Remedial Action Plan (ERRAP) procedures during all emergencies pursuant to subrule 113.8(5). An updated ERRAP shall be submitted at the time of each permit renewal application. An updated ERRAP shall be included with any request for permit modification to incorporate a facility expansion or significant changes in facility operation that require modification of the currently approved ERRAP.*

g) *Litter control at the site shall be conducted in accordance with the Litter Control Policy adopted by the permit holder, as contained in Attachment C of the April 29, 2013 submittal from Barker Lemar Engineering Consultants (doc #76776) and approved on December 1, 2010.*

h) *The permit holder shall operate and maintain the perimeter landfill gas control system in accordance with the Operations Plan contained in Attachment C of the Southwest Perimeter Gas Control System Expansion Design (doc #86047), dated April 15, 2016 and approved on May 16, 2016, as submitted by Barker Lemar Engineering Consultants. Copies of the completed gas control system operation inspection checklist described in this document shall be included in the annual report described in special provision #6c.*

Please see the updated ERRAP included in **Appendix A**. There are no changes required or requested for Special Provision #2.

X. Special Provision #3.

Future liner and leachate collection system construction shall take place in accordance with the plans and specifications contained in Appendix 3 of the 2015 Permit Renewal Documentation (doc #84185), dated August 31, 2015; the Request for Approval to Construct the 2017 West Horizontal Expansion, dated April 12, 2018 (doc #92083) as amended by the Revised Phase 3 Groundwater Separation System design document (doc #94088), dated January 7, 2019; and the Request for Permit Amendment for the East Horizontal Expansion, dated April 10, 2012 (doc #92082), as

amended by the June 20, 2018 Response Letter (doc #92671), July 12, 2018 Base Flood Elevation Addendum (doc #92774); as submitted by Barker Lemar Engineering Consultants; and the following:

a) *The permit holder is authorized to construct the Area A1 Cell, as depicted in documents #92083 and #92671. The permit holder shall submit a Final QC&A Report regarding the construction of this cell prepared in accordance with paragraph 113.7(6)"d" documenting compliance with the approved plans. No waste disposal shall commence in the Area A1 Cell until the final construction certification has been submitted in accordance with paragraph 113.7(6)"d", and the cell has been inspected and approved by the DNR.*

   Thirty days prior to commencement of construction activities for the Area A2 cell, as depicted in the documents listed in Item #3 above, the permit holder shall submit a notice to construct the cell, including tentative construction schedule and Final QC&A submittal date.

b) *The permit holder shall notify the DNR and have the site inspected when the construction of a new MSWLF unit or significant components thereof has been completed in accordance with subrule 113.4(6). Prior to the inspection, the QC&A officer shall submit a final report to the DNR that verifies compliance with the requirements of rule 113.7 and the approved plans and specifications. No waste disposal shall commence in any newly constructed unit or portion thereof until it has been inspected and approved by the DNR.*

c) *The Leachate Piezometer Abandonment and Installation Documentation (doc #1523) dated May 8, 2007, as submitted by Barker Lemar Engineering Consultants, which included the abandonment forms for LPZ-6, LPZ-7, and LPZ-8 and installation documentation for LPZ-6R, LPZ-7R, and LPZ-8R; is incorporated into the permit.*

d) *The Construction Certification Report, North Cell Construction (doc #9381), dated November 28, 2006, as submitted by Barker Lemar Engineering Consultants and approved on September 27, 2007, is incorporated into the permit.*

e) *The Construction Certification Report for the Methane Interceptor Trench (doc #5434), dated July 10, 2007, submitted by Barker Lemar Engineering Consultants, is incorporated into the permit. The remediation system is required due to methane gas detections within the scale house at the site.*

f) *The Construction Certification Report, North Cell Abutment Construction (doc #8867), dated September 18, 2007, as submitted by Barker Lemar Engineering Consultants and approved on September 27, 2007, is incorporated into the permit.*

g) *The Construction Certification Report, Phase 1A and 1B Cell Construction (doc #47833), dated September 22, 2009, as submitted by Barker Lemar Engineering Consultants and approved on September 28, 2009, is incorporated into the permit.*

h) *The construction documentation for replacement leachate piezometers LPZ-6R2, LPZ-7R2, LPZ-9R, LPZ-10R, and LPZ-13R (doc #62378), dated December 17, 2010, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

i) *The Construction Observation Report for the Southwest Perimeter Gas Control System (doc #64833), dated April 29, 2011, as submitted by Barker Lemar Engineering Consultants and*

approved on August 1, 2011, is incorporated into the permit. This remediation system was constructed in response to 100% LEL detections at perimeter gas monitoring point 93-MW-31.

j) The Construction Observation Report, Phase 2 Cell Construction (doc #78424), dated October 29, 2013, as submitted by Barker Lemar Engineering Consultants and approved on October 30, 2013, is incorporated into the permit.

k) The Construction Observation Report Direct Leachate Recirculation Piping (doc #80398), dated May 29, 2014, as submitted by Barker Lemar Engineering Consultants and approved on September 11, 2014 is incorporated into the permit. Use of the pipe is subject to the operating conditions described in special provision #2d.

l) The construction documentation for replacement leachate piezometer LPZ-13R2 (doc #87888), dated December 6, 2016, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

m) The Construction Observation Report for the Subsurface Gas System Expansion (doc #88058), dated December 29, 2016, as submitted by Barker Lemar Engineering Consultants, is approved and incorporated into the permit. Three gas collection wells were added to the remediation system described in special provision #3i.

n) The Construction Observation Report – Leachate Collection System Improvements (doc #90125), dated August 11, 2017, as submitted by Barker Lemar Engineering Consultants and pertaining to installation of a leachate extraction well and cleanout riser extensions as a response to the 12-inch leachate head exceedances at leachate piezometer LPZ- 13R2, is approved and incorporated into the permit.

o) *The Construction Observation Report – Leachate Extraction Pump Installation (doc #94117), dated January 8, 2018, as submitted by Barker Lemar Engineering Consultants and pertaining to the installation of a leachate extraction pump in the well located near LPZ-13R2, is approved and incorporated into the permit.*

p) *The Construction Observation Report, Phase 3 Cell Construction (doc #96798), dated January 22, 2020, as submitted by Barker Lemar Engineering Consultants and approved on January 23, 2020 is incorporated into the permit.*

There are no changes required or requested to Special Provision #3.

X. Special Provision #4.

Hydrologic monitoring of the West MSWLF Unit shall be conducted in accordance with the Hydrologic Monitoring System Plan (HMSP) contained in Appendix 9A of the Request for Approval to Construct the 2017 West Expansion (doc #92083), dated April 12, 2018, as submitted by Barker Lemar Engineering Consultants; and the following:

a) The HMSP for the West MSWLF Unit shall include the following:

1) Background groundwater monitoring well MW-53;

2) *Downgradient compliance wells 91-MW-14, 93-MW-32, MW-39R, MW-40, 04-MW-56, MW-58, MW-59, MW-62, MW-63R, MW-64, and MW-65;*
3) *Downgradient attenuation zone compliance well AZPOC-81;*
4) *Supplemental attenuation zone source wells 93-MW-31R, MW-61R, MW-73, and MW-79[1];*
5) *Groundwater underdrain monitoring points GU-6 and GU-7, and*
6) *Corrective action monitoring program (CAMP) points[2].*

[1] Samples from the supplemental attenuation zone source wells shall be analyzed semiannually for the Appendix 1 parameters and annually for total organic carbon, nitrate, iron, manganese, and sulfate until the DNR approves otherwise. Since these wells are not compliance points, they are not subject to the requirements of 567 IAC 113.10(5)"c" and 113.10(6).

[2] The Selection of Remedy and CAMP letter (doc #99216), dated December 30, 2020, as submitted by Evora Consulting, was approved on January 25, 2021. Accordingly, AZPOC-81 and five (5) gas vent wells, as described in the ACM addendum dated June 11, 2020 (doc #97902) shall be initially sampled by May 1, 2021. Monitoring shall be conducted at the following CAMP points as follows until remedy completion is demonstrated at AZPOC-81 in accordance with 567 IAC 113.10(9)"e":

- *Delineation wells MW-66, MW-67, MW-68, MW-71, MW-74, MW-75, MW-78, and MW-80 – Semiannually for the analytes listed in Table A of doc #99216; and*
- *Gas vents – Quarterly for methane.*

In accordance with the request contained in the ACM addendum dated June 11, 2020 (doc #97902), an alternative Appendix I Metals analytical list consisting of arsenic, barium, cadmium, copper, cobalt, lead, nickel, and zinc is approved for monitoring wells MW-14, 93-MW-32, 04-MW-56, MW-59, MW-62, MW-64, and MW-65.

The permit holder shall analyze samples from monitoring wells MW-39R, MW-40, 04- MW-56, MW-58, MW-59, MW-63R, MW-64, and MW-65 on an annual basis for alkalinity, aluminum, iron, manganese, pH, and sulfate.

Groundwater monitoring is not required for the unconstructed East MSWLF Unit.

b) *Groundwater elevations shall be collected semiannually from 91-MW-6, 91-MW-7, 91-MW-8, MW-37, and MW-25 and included on groundwater contour maps submitted as part of the Annual Water Quality Report (AWQR).*

c) *DNR construction documentation form 542-1277 and boring logs for all monitoring wells and piezometers shall be submitted within 30 days of installation. DNR construction documentation form 542-1323 shall be submitted within 30 days of establishing surface water monitoring points.*

d) *The permit holder shall conduct background and routine semiannual groundwater sampling and analysis; as well as perform statistical tests for the approved monitoring points for the Appendix I constituents and total suspended solids (TSS) in accordance with rule 113.10(455B). Groundwater samples shall not be field-filtered prior to laboratory analysis*

and total suspended solids (TSS) shall be analyzed using Method 1376585, with a reporting limit goal of ≤ 2 mg/l). Turbidity measurement may be approved by the DNR in lieu of TSS, provided a correlation between the two is established.

e) *The permit holder shall include in each AWQR an evaluation of TSS/turbidity data and other pertinent sampling and analytical results, to determine if representative samples of groundwater have been collected. If samples are not representative, the permit holder may be required to utilize low flow or no-purge sampling methods, consider new well construction with an optimized filter pack design, and/or additional well development. If sample quality does not improve with improved well construction, well development, and/or sampling methods, the DNR will consider higher TSS/turbidity levels as representative of site groundwater conditions.*

f) The frequency for full Appendix II analysis at monitoring points that are in assessment monitoring and have had at least two (2) rounds of analysis using the entire Appendix II list may be decreased to once every (5) five years. If monitoring points exit assessment monitoring and later return to assessment monitoring an additional two (2) rounds of analysis using the entire Appendix II list is required.

g) The permit holder shall semiannually measure groundwater elevations within 1/100 of a foot in each well and immediately prior to purging, each time groundwater is sampled.

h) The permit holder shall collect semiannual groundwater elevation measurements from groundwater piezometers GWP-1 and GWP-2 to measure the separation of the base of the MSWLF unit from the groundwater table as required in paragraph 113.6(2)"i". This data shall be included in the facilities' Annual Water Quality Report (AWQR).

i) An AWQR summarizing the effects the facility is having on groundwater quality shall be submitted to the DNR's Solid Waste Section by January 31 each year. This report shall be prepared in accordance with subrule 113.10(10) by a qualified groundwater scientist pursuant to paragraph 113.10(1)"d" using the DNR AWQR Format.

The AWQR shall also include a discussion of AMD impacts at all wells with SSIs or statistically significant exceedances of groundwater protection standards, as well as any other compliance-point wells that exhibit evidence of AMD but may not currently be SSIs. The evaluation shall include time-series graphs and trend evaluations, and shall determine if AMD conditions are stable, expanding, or retracting at each point, and, if necessary, demonstrate if AMD is the likely primary alternative source of contamination identified at the site in accordance with 567 IAC 113.10(5)"c"(3) or 113.10(6)"g"(2).

Analytical data from the supplemental attenuation zone source wells shall be evaluated in each AWQR to track source area changes that could be an indication of a new contaminant release or degradation of a known one.

j) The construction documentation for 96MW-30R (doc #59126) dated March 13, 1996, as attached to the March 29, 1996, Landfill Permit Renewal from Foth & Van Dyke, Inc., is incorporated into the permit.

k) The construction documentation for monitoring point MW-37, dated August 16, 1996, as provided by the landfill operator, is incorporated into the permit.

l) The abandonment documentation for 91MW-9 dated July 21, 2000, as attached to the September 26, 2000, correspondence (doc #59051) from Barker, Lemar & Associates, is incorporated into the permit.

m) The construction documentation for MW-40 (doc #59049), dated November 20, 2000, as attached to the December 1, 2000 correspondence from Barker, Lemar & Associates, is incorporated into the permit.

n) The abandonment documentation for MW-34, MW-35, MW-38, and MW-39 (doc #59044), dated February 8, 2001, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

o) The Monitoring Well Installation & Abandonment Documentation report (doc #58956) dated June 15, 2004, which contained the construction or abandonment forms for 04- MW-56, 04-MW-57, 91-MW-15, 91-MW-16, 89-MW-3, and 96-MW-30R; as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

p) The documentation for replacement well MW-39R (doc #6787), dated August 2, 2007, submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

q) The construction documentation for MW-58, MW-59, MW-60, MW-61, MW-62, MW-63, piezometers PZ-1, PZ-2, PZ-3, and PZ-4, and landfill gas wells LFGW-W1, LFG-W2, and LFGW3 (doc #34828), dated December 22, 2008, as submitted by Barker Lemar Engineering Consultants; is incorporated into the permit.

r) The abandonment documentation for PZ-1 and PZ-2 (doc #47865), dated September 23, 2009, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

s) The construction documentation for MW-64 and MW-65, and the abandonment documentation for 91-MW-11, PZ-3 and PZ-4 (doc #67476), dated October 31, 2011, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

t) The construction documentation for MW-63R, MW-66, MW-67, and MW-68, and abandonment documentation for MW-63 (doc #74172), dated September 17, 2012, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

u) The construction documentation for MW-69 and MW-70 (doc #77449), dated June 26, 2013, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.

v) The construction documentation for MW-71 and MW-72, and the abandonment documentation for the previously unknown water supply well discovered during the Phase 2 cell construction (doc #78384), dated October 22, 2013, as submitted by Barker Lemar Engineering Consultants, are incorporated into the permit.

w) *The construction documentation for MW-73, MW-74, and MW-75 (doc #80913), dated July 31, 2014, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

x) *The construction documentation for MW-76 and MW-77, and leachate piezometers LPZ-18 and LPZ-19 (doc #83104), dated April 16, 2015, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

y) *The construction documentation for MW-78 and MW-79, and gas monitoring probe LFGW-W5 (doc #84221), dated September 8, 2015, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

z) *The construction documentation for MW-80 (doc #87888), dated December 6, 2016, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

aa) *The abandonment documentation for 93-MW-31 and construction documentation for 93-MW-31R and MW-61R (doc #93638), dated October 29, 2018, as submitted by Barker Lemar Engineering Consultants, is incorporated into the permit.*

bb) *The construction documentation for attenuation zone point of compliance well MW-81 (doc #99977) and gas vent wells GV-1 through GV-5, dated March 17, 2021, as submitted by Evora Consulting, is incorporated into the permit.*

Please update the submittal date, document number, and preparer in the opening paragraph to reflect approval of the revised HMSP included in **Appendix B**.

Delete the following from #4.a.6. Note 2: "Accordingly, AZPOC-81 and five (5) gas vent wells, as described in the ACM addendum dated June 11, 2020 (doc #97902) shall be initially sampled by May 1, 2021." The initial sampling is complete.

Downgradient attenuation zone compliance well AZPOC-81 is named MW-81, as stated in subparagraph bb).

Add groundwater piezometer GWPZ-3 to #4.h.

There are no other changes required or requested to Special Provision #4.

X. Special Provision #5.

The permit holder is authorized to recirculate leachate in the North Cell and 2008 North Lateral Expansion through surface application and recirculation trenches in accordance with the request (doc #11581) dated November 1, 2007, and subject to the following requirements:

a) *Leachate application is restricted to only those MSWLF units with a composite liner constructed in accordance with paragraph 113.7(5)"a".*

b) *The leachate recirculation system shall not contaminate waters of the state, contribute to erosion, damage cover material, harm vegetation, or spray persons at the MSWLF facility, pursuant to paragraph 113.8(2)"h".*

c) *Leachate shall not be applied on user vehicle access areas.*

d) *Leachate shall not be applied to vegetated areas or frozen waste cover. A means of frost protection must be provided for all leachate control elements.*

e) *Leachate shall be applied evenly on the working area.*

f) *Leachate recirculation shall be conducted only during hours of operation and when an operator is on duty.*

g) *Leachate shall be applied in a manner such that ponding or runoff will not occur.*

h) *Leachate recirculation shall be controlled such that not more than one foot of leachate head will be allowed to accumulate above the MSWLF unit liner.*

i) *Records shall be maintained as to the time and quantities of leachate application and be submitted with the facility Annual LCSPER.*

j) *Leachate recirculation shall be immediately terminated if it causes ponding, runoff, excessive odor, vector control problems, vapor drift, ice formation, or operational problems. The DNR's local Field office shall be immediately notified if any of the above events occur.*

There are no changes required or requested to Special Provision #5.

X. Special Provision #6.

The permit holder is authorized to apply leachate over disposal areas with intermediate cover in accordance with the following:

a) *Leachate application is restricted between May 1 and November 1 of each year and shall not be made within 24 hours of measurable rainfall or a previous application event, or when rain is forecasted within 24 hours.*

b) *Leachate application is restricted to only those MSWLF units with a composite liner constructed in accordance with paragraph 113.7(5)"a".*

c) *Leachate shall be applied evenly at a rate determined by the operator but not exceeding 1 inch per application.*

d) *Leachate shall be applied in a manner such that ponding or runoff will not occur.*

e) *Leachate applications shall not be made to areas with alternative daily cover.*

f) *Leachate application shall not contaminate waters of the state, contribute to erosion, damage cover material, harm vegetation, or spray persons at the MSWLF facility, pursuant to paragraph 113.8(2)"h".*

g) *Leachate shall not be applied on user vehicle access areas.*

h) *Leachate application shall be conducted only when an operator is on duty.*

i) *Leachate application shall be immediately terminated if it causes ponding, runoff, excessive odor, vector control problems, vapor drift, ice formation, or operational problems. The Department's local Field office shall be immediately notified if any of the above events occur.*

j) *The permit holder shall retain in the operating record, daily logs containing the following documentation for each land application event:*
   1) *Date of application and weather conditions,*
   2) *Cover soil conditions before application,*
   3) *Leachate application rate and total volume applied,*
   4) *A description of the application process and application area, including equipment used,*
   5) *Rainfall data for previous 24 hours and rainfall forecast for the next 24 hours,*
   6) *Descriptions of any permit or rule noncompliance regarding ponding, runoff, odors, vectors, or vapor drift, resulting from leachate application and actions taken to return to compliance.*

k) *The permit holder shall report the effectiveness of the application process, including leachate volumes applied, and any noncompliance with this permit amendment within the LCSPER required in subparagraph 113.7(5)"b"(14).*

There are no changes required or requested to Special Provision #6.

X. Special Provision #7.

The permit holder shall conduct subsurface gas monitoring of the West MSWLF Unit in accordance with the Landfill Gas Monitoring Plan contained in Appendix 8 of the 2015 Permit Renewal Documentation (doc #84185), dated August 31, 2015, as updated in Appendix 9B of the April 12, 2018 Request to Construct the 2017 West Expansion (doc #92083); as submitted by Barker Lemar Engineering Consultants, and the following:

a) *Landfill gas concentrations must be measured at methane monitoring points #1-5, #12-27, #31, and #36-38, as shown on Figure 1-1 in Appendix 9B within doc #92083.*

   Gas monitoring is not required for the unconstructed East MSWLF Unit.

b) *The permit holder shall quarterly monitor and annually report site methane concentrations in accordance with rule 113.9(455B). Specific actions, as defined in the rules, shall be taken in the event of methane gas level limit exceedances.*

c) *The permit holder shall annually submit a report by January 31 summarizing the methane gas monitoring results and any action taken resulting from gas levels exceeding the specified limits during the previous 12 months as a supplement to the facility Annual Water Quality Report, as defined in subrule 113.10(10). Copies of the completed inspection checklists, as described in the Gas Control System Operations and Maintenance Plan in special provision #2h, shall be included in the annual report.*

Please update the submittal date, document number, and preparer in the opening paragraph to reflect approval of the updated LFG Plan included in **Appendix C**. There are no changes required or requested to Special Provision #7.

X. Special Provision #8.

In accordance with the disposal of untreated petroleum contaminated soils (PCS) variance request to 567.109.11(2) dated November 13, 2019, as submitted by Barker Lemar Engineering Consultants, and approved on November 25, 2019, the permit holder is authorized to directly dispose of untreated PCS at the working face for a period to coincide with the solid waste permit expiration date; and the following:

a) *The PCS must be immediately buried at the working face pursuant to 567.113.8(1)"b"(3).*

b) *The untreated PCS must not contain free liquids pursuant to 567.113.8(1)"b"(1).*

c) *PCS resulting from the cleanup of petroleum underground storage tanks are exempt from RCRA hazardous waste management if the soil 1) exhibits the TC for D018-D043, and 2) are subject to the corrective action requirements in 40 CFR Part 280 of the UST regulations. This exemption does not apply to petroleum contaminated media resulting from spills or releases from above ground storage tanks, other surface spills, or if the PCS becomes contaminated with a listed hazardous waste.*

d) *PCS meeting the above-referenced criteria is deemed a "solid waste" and therefore applicable waste flow and tonnage fee requirements will need to be adhered. PCS may continue to be received for remediation pursuant to subrule 109.11(2), or accepted from outside the planning area for disposal as long as the provisions of IAC 567 Chapter 101.4 are followed (i.e. maintain written approvals).*

There are no changes required or requested to Special Provision #8.

X. Special Provision #9.

The permit holder is authorized to solidify liquid wastes in accordance with the Liquid Waste Permit Modification Request, dated July 1, 2021 (doc#100777) and the email request dated October 6, 2022 (doc#104244), as submitted by Evora Consulting, and the following:

a) *The only liquid wastes approved for solidification are filter materials from a water clarifier and rendering wastes from the JBS facility in Ottumwa, Iowa. Acceptance of any other liquid wastes is subject to likely pilot demonstration from the permit holder and subsequent DNR approval.*

b) *All liquid waste solidification processes shall be conducted over a composite liner.*

c) *Liquid wastes shall be unloaded in a pit constructed with absorbent materials, consisting of adsorptive soils stockpiled elsewhere on site.*

d) *Documentation and reporting requirements include remission of the appropriate tonnage fees for all solidified liquid wastes.*

e) *Use of any other absorbents must be approved by the DNR prior to use. The liquids will be mixed with absorbent materials and mixed until the liquids have been solidified sufficiently to pass the paint filter test. No run-off of liquids shall occur during mixing.*

f) *The solidified liquids shall be disposed at the working face.*

g) *Liquid waste solidification processes shall not be conducted during significant rain events, high wind conditions, or extremely cold temperatures.*

h) *Documentation of the following must be retained and made available for DNR review upon request:*

   1) *Waste description and quantities,*
   2) *Documentation that the accepted materials are nonhazardous, and*
   3) *EPA Method 9095B paint filter test results as required.*

i) *The permit holder shall remit quarterly, the appropriate tonnage fees for all solidified liquid wastes on the appropriate reporting forms. Provided native soils are the only adsorptive materials used, tonnage fee remission are not required for the absorbents utilized in the solidification process.*

There are no changes required or requested to Special Provision #9.

X. Special Provision #10.

The permit holder is authorized to collect and temporarily store trees, limbs and brush, and clean wood wastes free of coatings and preservatives. The maximum length of time for storage at the landfill is six (6) months.

There are no changes required or requested to Special Provision #10.

X. Special Provision #11.

The permit holder is authorized to use an alternative daily cover by the trade name Finn Waste Cover, as a substitute for the six-inch daily soil cover requirement. Use of this material is subject to the following:

a) *This product shall not be used as a substitute for intermediate or final soil cover.*

b) *All landfill operations personnel shall be trained by the alternative cover material manufacturer, or by an operator that has been trained by the manufacturer. The operator shall ensure that the product slurry is prepared according to the manufacturer's nominal slurry mix specifications.*

c) *The waste shall be compacted, before this product is applied, to provide an even surface to minimize ponding, prevent pockets, and to maximize uniform surface drainage.*

d) *This product shall be applied to the active waste face at the end of each day of operations and more frequently if necessary to control fire or fire hazards, blowing litter, scavenging,*

odors, insects, rodents, birds and other vectors. This product shall be cross applied when necessary to provide effective cover.

e) *If this product does not set within one hour of application, the workface shall be covered with six inches of compacted soil or a fresh application of this product. The term set means form a cohesive barrier layer that adheres to the waste and resists washing off by precipitation. This product shall not be exposed for more than five (5) days. After five days, any area exposed with this product shall be either covered with a new lift of waste, a fresh application of this product, or six inches of compacted soil.*

f) *The operator shall inspect each application of this product for thorough coverage and cover integrity. If operational problems arise from the use of this product or its method of application, the use of this product shall be suspended until proper corrections are made by the operator, with six inches of compacted daily cover being utilized during this interim period.*

g) *If, at any time, the DNR or permit holder deems this product to be ineffective or otherwise unsatisfactory, the permit holder shall immediately revert to soil or another previously approved alternative daily cover. The permit holder shall immediately notify the DNR's Main and local Field office through both written and verbal notification of this action. This notification is not necessary if use of this product ceases only on a temporary basis, such as during adverse operational or weather conditions.*

h) *Nothing in this provision shall be construed to authorize any waiver from the requirements of any other applicable state solid waste laws or regulations, or any deviations from permit provisions.*

i) *This provision shall not be interpreted to release the permit holder from responsibility under the Groundwater Protection Act for remedying conditions resulting from any release of contaminants to the environment.*

The Commission requests that the alternative daily cover (ADC) by the trade name "Finn Waste Cover" be replaced with "Verdac Pellets," an ADC product manufactured by LSC Environmental Products. There are no other changes required or requested to Special Provision #11.

X. Special Provision #12.

The permit holder is authorized to use geotextiles by the trade name Fabrisoil by Phillips, Typar™ by Exxon Chemical Company, Airspace Saver™ and woven polyolefin fabric L257™ by Fabrene, and 315-ST woven geotextile by Brawler Industrial Fabrics or equivalent, as an alternative cover material for the active MSWLF unit, subject to the following:

a) *The use and installation of this product shall be in conformance with the manufacturer's recommendations.*

b) *This product shall only be used as a daily alternative cover material and shall not be utilized as a replacement for soil cover if application performance in terms of litter, vector, odor, and precipitation entry control is not provided.*

c) *This product shall be applied so as not to promote water ponding, or drainage run-on from adjacent upper and side MSWLF unit areas beneath the installed geotextile.*

d) *This product shall be weighted at the close of each working day to prevent displacement by wind through the use of soil or tires.*

e) *This product shall not be exposed for longer than seven (7) consecutive days. For any waste covered with this product beyond the stipulated time frame, the product shall be removed and the underlying waste shall be immediately covered with soil in accordance with the applicable IAC rules.*

f) *This product shall not be used if it becomes damaged or worn, or if the intended performance is breached. In such instances, this product shall be disposed of as a part of the waste fill.*

g) *The operator shall inspect each application of this product for thorough coverage and cover integrity. If operational problems arise from the use of this product or its method of application, the use of this product shall be suspended until proper corrections are made by the operator, with six inches of compacted daily cover being utilized during this interim period.*

h) *If, at any time, the DNR or permit holder deems this product to be ineffective or otherwise unsatisfactory, the permit holder shall immediately revert to soil or another previously approved alternative daily cover. The permit holder shall immediately notify the DNR's Main and local Field office through both written and verbal notification of this action. This notification is not necessary if use of this product ceases only on a temporary basis, such as during adverse operational or weather conditions.*

There are no changes required or requested to Special Provision #13.

X. Special Provision #13.

The permit holder is authorized to accept street sweeping sand from the City of Ottumwa, Iowa. The permit holder is authorized to use a sand/soil combination as an alternative cover material, subject to the following:

a) *The ratio of street sweeping sand to soil shall not exceed 50% sweepings by volume. Quantities exceeding 1-week usage shall be disposed in the workface area. Only sweepings placed at a ratio of 6:1 (6 tons of waste to 1 ton of approved street sweeping sand) will be considered alternative daily cover. Any material used in excess of that ratio shall be reported as waste.*

b) *The alternative cover material may be used in lieu of the 6-inch daily cover requirement but it shall not be used as a substitute for intermediate or final soil cover.*

c) *The waste must be compacted before the alternative cover material is applied to provide an even surface to minimize ponding and maximize uniform surface drainage.*

d) *The alternative cover material shall be applied to the active waste face at the end of each day of operations and more frequently if necessary to control fire or fire hazards, blowing litter, scavenging, odors, insects, and rodents.*

e) *The soil ratio shall be increased, if necessary, to optimize cover performance relative to the criteria stated in items "c" and "d" above.*

f) *The permit holder shall scarify any alternative cover material prior to each day's use of that area as a working face.*

g) *The permit holder shall maintain in the landfill files appropriate annual laboratory analytical documentation that demonstrates that the street sweeping sand is not hazardous by TCLP testing. Documentation reporting of such testing shall be submitted to both the DNR's Main and local Field Office.*

There are no changes required or requested to Special Provision #13.

X. Special Provision #14.

The permit holder is authorized to accept composted material from the Chamness Technology composting site in Eddyville, Iowa for use as an alternative daily cover.

Please remove Special Provision #14 from the permit as this provision is no longer applicable since the Chamness Technology compositing site has closed.

X. Special Provision #15.

The permit holder is authorized to use an alternative daily cover wood/chips soil mixture (50%/50%), as a substitute for the six-inch daily soil cover requirement. Use of this material is subject to the following:

a) *This shall not be used as a substitute for intermediate or final soil cover.*

b) *The waste shall be compacted, before this mixture is applied, to provide an even surface to minimize ponding, prevent pockets, and to maximize uniform surface drainage.*

c) *This mixture shall be applied to the active waste face at the end of each day of operations and more frequently if necessary to control fire or fire hazards, blowing litter, scavenging, odors, insects, rodents, birds and other vectors.*

d) *If, at any time, the DNR or permit holder deems this mixture to be ineffective or otherwise unsatisfactory, the permit holder shall immediately revert to soil or another previously approved alternative daily cover. The permit holder shall immediately notify the DNR's Main and local Field office through both written and verbal notification of this action.*

There are no changes required or requested to Special Provision #15.

X. Special Provision #16.

The permit holder is authorized to accept and temporarily store lead acid batteries for recycling purposes. Lead acid batteries must be stored in a designated area which will curtail movement of acids and provide proper ventilation of gases from the batteries. The maximum length of time for storage is twelve (12) months.

There are no changes required or requested to Special Provision #16.

X. Special Provision #17.

The permit holder is authorized to accept and temporarily store a maximum of 1500 waste tire equivalents for the purpose of reclamation processing or disposal. Tire storage and processing shall be conducted at approved plan locations. The tires shall be removed at least once every 120 days and transported to the appropriate reclaimer/processor, or disposed of at the site. All operations shall be in accordance with subrule 109.10(3), IAC 567 Chapter 117 and the current local fire code.

There are no changes required or requested to Special Provision #17.

X. Special Provision #18.

The permit holder shall close the landfill site in accordance with the Closure and Post Closure Plans contained in Appendices 7 and 8, respectively, of the Request for Approval to Construct the 2017 West Horizontal Expansion, dated April 12, 2018 (doc #92083), as submitted by Barker Lemar Engineering Consultants; and the following:

a) *The Construction Certification Report for South Cell Closure, regarding the construction of final cover on this portion of the West MSWLF Unit (doc #9740), dated September 28, 2007, as submitted by Barker Lemar Engineering Consultants and approved on October 17, 2007, is incorporated into the permit.*
b) *The following submittals document that final cover has been constructed on the entirety of the unlined portion of the West MSWLF unit:*

    1) *The Final Cover Analysis and Construction Certification Report, documenting final cover construction on 6.8 of the 7.4 acres identified as the 1992 Slope Stabilization Area (doc #24157), dated June 9, 2008, as submitted by Barker Lemar Engineering Consultants and approved on August 5, 2008; are incorporated into the permit.*
    2) *The Petition for Variance, Alternative Final Cover for Municipal Solid Waste In Place (doc #47108), dated August 14, 2009, as submitted by Barker Lemar Engineering Consultants, and approved by DNR (doc #47110) on October 5, 2009, is incorporated into the permit. This submittal documents that the 5-foot-thick subsoil and overlying crushed rock road surface in existence over a 0.75-acre portion of the West MSWLF Unit is approved as final cover.*
    3) *The Construction Observation Report - Landfill Closure (doc #60782), dated October 13, 2010, as submitted by Barker Lemar Engineering Consultants, is approved and incorporated into the permit. This submittal documents the construction of final cover on 23 acres of the West MSWLF unit, including the previously-noncompliant 0.6-acre portion of the 1992 Slope Stabilization Area described in Special provision 14b.*

There are no changes required or requested to Special Provision #18.

Pursuant to the requirements outlined in Form 50, updates have been made to the Organizational Chart, found in **Appendix D**, and the Proof of Financial Assurance is included in **Appendix E**.

2.4 NEW PERMIT AMENDMENTS REQUESTS

The Ottumwa-Wapello County Sanitary Landfill does not have new permit amendment requests to make at this time.

2.5 EQUIVALENCY REVIEW REQUESTS

The Ottumwa-Wapello County Sanitary Landfill does not have equivalency review requests to make at this time.

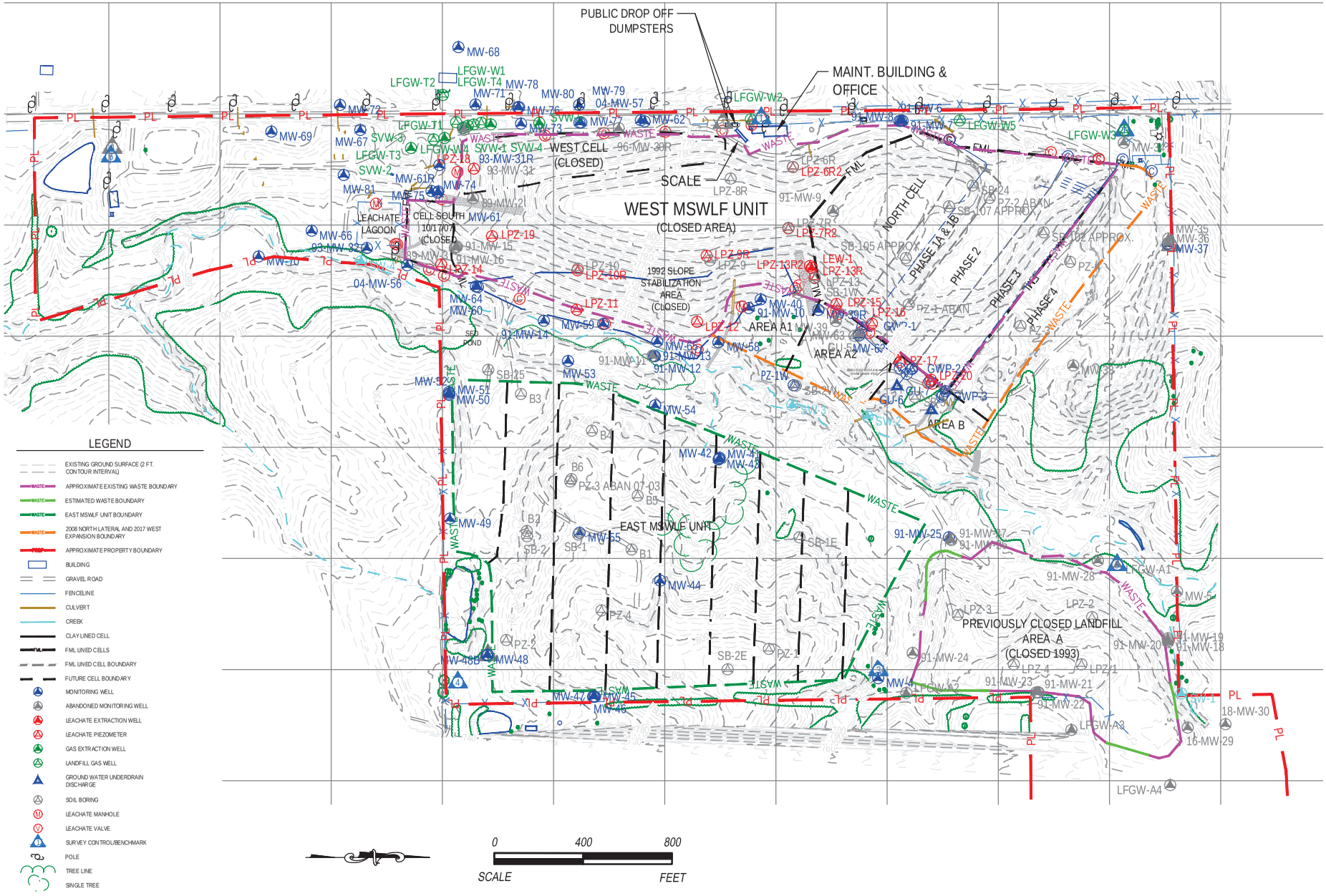
2.6 NEW VARIANCE REQUESTS

The Ottumwa-Wapello County Sanitary Landfill does not have new variance requests from Iowa Administrative Code requirements to make at this time.

2.7 REQUIRED PLANS AND SPECIFICATIONS

Appendices are included to address the updates as noted in Section 2 of Form 50 (included in Section 1 of this document). Updated plans, documentation, and information are found as follows:

Appendix A	Emergency Response and Remedial Action Plan (ERRAP)
Appendix B	Environmental Monitoring Plan – HMSP Update
Appendix C	Environmental Monitoring Plan – LFG Plan Update
Appendix D	Organizational Chart
Appendix E	Proof of Financial Assurance



G:\PROJECT\2722558400\AUTOCAD\FIGURE 1-1 SITE MAP\1-1 SITE MAP.DWG

REV.	DATE	BY	CK BY

SHEET TITLE: SITE MAP

PROJECT TITLE: OTTUMWA-WAPELLO COUNTY SANITARY LANDFILL 2025 PERMIT RENEWAL

CLIENT: OTTUMWA-WAPELLO SOLID WASTE COMMISION
105 EAST 3RD STREET
OTTUMWA, IA 52501

SCS ENGINEERS
1690 ALL STATE COURT, SUITE 100
WEST DES MOINES, IA 50265
PH: (515) 657-4100

PROJ NO.	DSN BY	PROG MGR	CLC
27225584.00	CJD	KDP	
DSN BY: CJD	CHK BY:		

CADD FILE: 1-1 SITE MAP.DWG

DATE: 10/22/25

FIGURE: 1-1

Appendix A

Emergency Response and Remedial Action Plan (ERRAP)

Emergency Response and Remedial Action Plan (ERRAP)

Ottumwa-Wapello County Sanitary Landfill

Prepared For:
Ottumwa-Wapello Solid Waste Commission
13277 165th Avenue
Ottumwa, IA 52501

Permit No. 90-SDP-01-75

SCS ENGINEERS

Project No. 27225584.00 | October 2025

1690 All State Court, Suite 100
West Des Moines, IA 50265
(515) 631-6160

Table of Contents

Attachments

1.0 EMERGENCY RESPONSE AND REMEDIAL ACTION PLANS [567 IAC – 113.8(5)(455B)]

113.8(5)b(1) Facility Information

The Ottumwa-Wapello Solid Waste Commission (Commission) owns and operates the Ottumwa-Wapello County Sanitary Landfill (Landfill). The overall site (facility) includes two discontinuous municipal solid waste landfill (MSWLF) units. Area A is a closed landfill that closed in 1993. The north end of the West MSWLF unit is the currently active disposal area and continues to receive waste. The south end of the West MSWLF unit is closed. A third fill area, referred to as the East MSWLF unit, is designated for future fill and is not expected to be developed or utilized for approximately 45 years.

In addition to the MSWLF units, the facility includes several support facilities necessary for the operation of the Landfill. These include the scale, administrative office, maintenance building, and designated areas for the storage of e-waste and white goods.

The Landfill receives municipal solid waste (MSW) from the Commission's service area.

113.8(5)"b"(1)1 Permitted Agency

Ottumwa-Wapello Solid Waste Commission

113.8(5)"b"(1)2 DNR Permit Number

90-SDP-01-75P (Open)

90-SDP-09-93C (Closed)

113.8(5)"b"(1)3 Responsible Official and Contact Information

Ottumwa-Wapello County Sanitary Landfill
13277 165th Avenue
Ottumwa, IA 52501
Contact: Lori Creech, Landfill Superintendent
Phone: (641) 683-0645

Ottumwa-Wapello Solid Waste Commission
City Hall
105 East Third Street
Ottumwa, Iowa 52501
Contact: Philip Rath, City Administrator
Phone: (641) 683-0600

113.8(5)"b"(1)4 Certified Operator and Contact Information

Ottumwa-Wapello County Sanitary Landfill
13277 165th Avenue
Ottumwa, IA 52501
Contact: Lori Creech, Landfill Superintendent
Phone: (641) 683-0645

113.8(5)“b”(1)5 Facility Description

Municipal solid waste landfill.

113.8(5)“b”(1)6 Site and Environs Map

See **Attachment 1** for Site Plan Map.

113.8(5)b(2) Regulatory Requirements

113.8(5)“b”(2)1 Iowa Code Section 455B.306(6)“d” Criteria Citation

This Emergency Response and Remedial Action Plan (ERRAP) is designed to meet the requirements of Iowa Administrative Code (IAC) 567 Chapter 113.8(5) that requires the submission of an ERRAP by all sanitary disposal projects.

This ERRAP is intended to:

- Identify possible occurrences that may endanger human health and the environment;
- Establish provisions to minimize the possibility of fire or explosion; and
- Establish provisions to minimize any releases to air, land, or water of pollutants that could threaten human health and the environment.

113.8(5)“b”(2)2 Reference to Provisions of the Permit

An updated ERRAP will be submitted at the time of each permit renewal application if a review indicates that revisions are required. The ERRAP is intended to be flexible and to meet contingencies arising at the facility. Requests for changes to the ERRAP may be submitted to the Landfill Superintendent.

113.8(5)b(3) Emergency Conditions, Response Activities and Remedial Action

113.8(5)“b”(3)1 Failure of Utilities

Utilities include gas, electricity, and water.

Natural Gas

Natural Gas Supply Failure – Short-Term and Long-Term

In the event Landfill facilities are without natural gas supply and natural gas odor is not present, contact the following:

- Landfill Superintendent – See **Attachment 2** for telephone and mobile numbers.
- Natural Gas Company – See **Attachment 2** for telephone numbers.

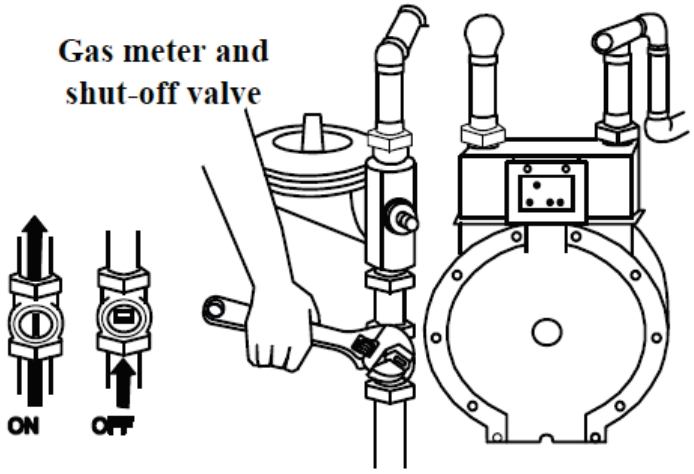
Natural Gas Leak

If a gas odor is present and it is strong, take immediate action:

- Leave the building where the odor is identified. Go to the Emergency Assembly Point. If the Emergency Assembly Point location is dangerous or non-accessible, proceed to the Secondary Emergency Assembly Point (See Site Plan Map in **Attachment 1**). Account for Landfill personnel, guests, contractors, etc.

Try to shut off the natural gas by turning the shut-off valve to the horizontal position.

- DO NOT attempt to locate gas leaks.
- Open doors and windows.
- DO NOT turn on or off or unplug electrical appliances.
- DO NOT use telephones in or around the building or office.
- DO NOT position or operate vehicles or powered equipment.
- DO NOT attempt any other repairs to the natural gas systems.
- If you turn off the gas for any reason, it must be turned back on by a professional.



Have wrench stored in a specific location where it will be immediately available

Electricity

Electricity Failure – Short-Term and Long-Term

In case of electrical failure, the following individuals must be contacted:

- Landfill Superintendent – See **Attachment 2** for telephone and mobile numbers.
- Electricity Supply Company – See **Attachment 2** for telephone number.

Scale Failure Due to Electricity Supply Failure

Scale weights may be estimated based on vehicle size (volume of waste) and converted to tons, or historical scale weights may be used for representative loads from particular vehicles or companies. Note each load for which the weight was estimated.

Buildings

Although the facility is primarily open during daylight hours, twilight and dusk operations may require supplemental light and heat if the electricity fails. Non-electrical space heaters may be used for supplemental heat; however, manufacturer's recommendations for ventilation must be observed.

- Keep portable and space heaters at least 3 feet from combustible materials.
- Electric flashlights and electric lanterns should be used for supplemental light.
- Use extreme caution if candles must be used, candles should only be used temporarily, on a limited basis until a safer form of light can be located such as flashlights, electric lanterns, etc. Candles within glass containers are preferred over those with open/exposed flame.
- Never leave a burning candle unattended. Extinguish all candles when leaving a room.
- Never use a candle for light when fueling equipment.

Water

Water Failure – Short-Term and Long-Term

In case of water failure, the following individuals must be contacted:

- Landfill Superintendent – See **Attachment 2** for telephone and mobile numbers.
- Water Supply Company – See **Attachment 2** for telephone number.

113.8(5)"b"(3)2 Evacuation Procedures During Emergency Conditions

- See the Site Plan Map (**Attachment 1**) for evacuation meeting locations and evacuation routes.

113.8(5)"b"(3)3 Weather-Related Events

Use battery-operated radios/televisions to receive the most updated information on local conditions.

Tornado and Wind Events

Tornado Terminology

- Tornado Watch – The weather conditions are possible for a tornado.
- Tornado Warning – A tornado has been sighted or indicated by weather radar.

Tornado Watch Procedures

- Listen to the radio or television for more information.
- Locate emergency supplies such as battery-powered radio, mobile telephone, and spare batteries.
- Be prepared to take shelter in the designated tornado shelter (see **Attachment 1**).
- If you see any revolving funnel-shaped clouds, report them immediately by telephone to your local law enforcement agency.
- If you are in a trailer or similar structure, move to a more secure structure.

Tornado Warning Procedures

- Take shelter with a battery-operated radio. Take shelter in area(s) designated as a tornado shelter or an interior room or hallway.
- The facility's Tornado Shelter Location is shown on the Site Plan Map (See **Attachment 1**).
- If you cannot reach the Tornado Shelter, go to a crawlspace under the scales or to an inside hallway on the lowest level. Avoid places with wide-span roofs. Stay away from windows and open spaces. Get under a piece of sturdy furniture such as a workbench, heavy table, or desk and hold onto it.
- Turn on a battery-operated radio or television and wait for the "all clear" announcement by the authorities.

Tornado Safety – Outdoors

- During tornado warning, Landfill staff and supervisors proceeding to a shelter by vehicle should keep an eye out for any other employees or customers along the way and pick them up for transport.
- If possible, get inside a substantial building.
- If shelter is not available or there is no time to get indoors, lie in a ditch, culvert, or low-lying area or crouch near a strong building. Use your arms to protect your head and neck. Be alert for potential flash flooding.

Tornado Safety – In a Vehicle

- Never try to outrun a tornado in a vehicle. Heavy rain, hail, and traffic may impede your movement. Tornadoes can change directions quickly and can easily lift up a vehicle and toss it through the air.
- Pull to the side of the road avoiding trees, power lines, and other objects that could fall or be hazardous.
- Get out of the vehicle immediately and try to take shelter in a nearby building.
- If there is not time to get indoors, get out of the vehicle and lie in a ditch, culvert, or low-lying area away from the vehicle. Use your arms to protect your head and neck.

After a Tornado

- Try to get out of damaged buildings. Once out, do not re-enter the damaged building unless necessary and use great caution.
- Extinguish all smoking and small fires.
- Monitor the radio or television for emergency information or instructions.
- Account for Landfill personnel, known guests/customers/contractors, and check on neighbors who may require special assistance.
- Check for injured victims. Render first aid if necessary. Call the necessary emergency responders such as ambulance services or fire/rescue services.
- Do not attempt to move severely injured victims unless necessary. Wait for emergency medical assistance to arrive.
- Watch out for broken glass and downed power lines.
- Report any downed power lines.
- Use the telephone only for emergency calls. Telephone lines may be down. Mobile telephone services may be used for emergency calls.

- Take photos or videotape of the damage to the property.
- If driving, be alert for hazards in the roadway.
- If unaffected by the tornado, stay out of the damaged area until allowed in by officials. Your presence may hamper emergency operations.

After a Tornado – Gas Leaks

- Check for gas leaks. If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the area.
- Call the Natural Gas Company from a mobile telephone or a telephone away from the affected property.

After a Tornado – Electrical System Damage

- Look for electrical system damage.
- If you see sparks, broken or frayed wires, or if you smell hot insulation, turn off the electricity at the main fuse box or circuit breaker.
- If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.
- See **Attachment 2** for emergency contacts.

After a Tornado – Sewage and Water Line Damage

- Check for sewage and water line damage.
- If you suspect sewage lines are damaged, avoid using the toilets and call a plumber.
- If water pipes are damaged, contact Water Company and avoid using water from tap.

After a Tornado – Methane Collection and Venting Systems

- Check methane collection/venting systems.
- If the collection/venting system lines are malfunctioning, contact a professional engineer for repair assistance.
- Monitor methane gas soon after the incident to check for hazardous methane levels. Remember that methane (by itself) is an odorless gas.

After a Tornado – Leachate Transportation and Leachate Storage Systems

- Report leachate spills to the Iowa Department of Natural Resources (See **Attachment 2** for emergency contacts).

After a Tornado – Bulk Fuel/Solvent Storage Systems

- Extinguish all smoking and small flames.
- If a spill/leak exists, attempt to stop the leak/spill or absorb fuel with inert materials.
- If bulk fuel is leaking into the environment from a storage system, take immediate steps to limit flow into drainage ways by constructing an earthen berm.
- Report spills or leaks to the Iowa Department of Natural Resources (See **Attachment 2** for emergency contacts).

Wind Storm Terminology

- Derecho – A line of intense, widespread, and fast-moving windstorms and sometimes thunderstorms that moves across a great distance and is characterized by damaging winds.
- Down Burst – A strong out rush of wind formed by rain cooled air. Strong down bursts, which produce extensive damage, are often mistaken for tornadoes. A downburst can easily overturn a mobile home, tear roofs off houses, and topple trees.

Winter Storm Terminology

- Winter Storm Watch – Indicates that severe winter weather may affect your area.
- Winter Storm Warning – Indicates that severe winter weather conditions are definitely on the way.
- Blizzard Warning – Indicates that large amounts of falling or blowing snow and sustained winds of at least 35 miles per hour are expected for several hours.

Winter Storm Procedures

- Listen to the radio or television for more information.
- Locate emergency supplies such as battery-powered radio, mobile telephone, and spare batteries.
- Be prepared to take shelter in the designated tornado shelter (see **Attachment 1**).
- If you are in a trailer or similar structure, move to a more secure structure.
- Proceed with caution as snow can hinder vision and ice can cause vehicles and people to slide.

Intense Rainstorms, Mud, and Erosion

Thunderstorm Terminology

- Severe Thunderstorm Watch – A severe thunderstorm (damaging winds 58 miles per hour or more, or hail three-fourths of an inch in diameter or greater) is likely to develop.
- Severe Thunderstorm Warning – A severe thunderstorm has been sighted or indicated by weather radar.

Thunderstorm Watch Procedures

- Locate a safe place, such as the designated tornado shelter.
- Assign someone to listen to a battery-powered radio or television for more information.

Thunderstorm Warning Procedures

- Go to a safe place, such as the designated tornado shelter.
- Turn on a battery-operated radio or television and wait for the “all clear” by the authorities.
- Tornadoes are spawned by thunderstorms and flash flooding can occur with thunderstorms. When a “severe thunderstorm warning” is issued, review what actions to take under a “tornado warning” or a “flash flood warning.”

Procedures After a Thunderstorm

- Check personnel, guests, clients, and contractors for injuries.
- Report downed utility wires.
- Check scale for proper operation. If the electricity is out, see Section 113.8(5)"b"(3)1.
- Continue to listen to the radio for flash flood and/or tornado watches and warnings and other instructions and advice.

Check Leachate Transportation and Leachate Storage Systems

- Check leachate transportation and storage systems including tank and lines.
- If leachate is leaking into the environment, attempt to shut the leachate line valve, stopping the flow of leachate.
- Report leachate spills to the Iowa Department of Natural Resources (DNR). See **Attachment 2** for Emergency Contacts.

Check Bulk Fuel Storage Systems

- Extinguish all smoking and small flames.
- If a spill/leak exists, attend to stop the spill/leak or absorb fuel with inert materials.
- See **Attachment 2** for DNR Emergency Contacts.
- See **Attachment 3** for DNR guidelines for reporting hazardous conditions and a copy of Iowa Administrative Code Chapter 131 (Section 457).

Lightning Strikes

There are relatively safe places from lightning strikes, however no location is free of risk. Large, enclosed structures are generally safer than small or open structures. The risk for lightning injury depends on whether the structure incorporates appropriate lightning protection.

Enclosed vehicles, fully enclosed farm vehicles, etc. with the windows rolled up generally provide good shelter from lightning. Avoid contact with metal or conducting surfaces outside or inside the vehicle.

Avoid being in or near:

- High places and open fields, isolated trees, unprotected sheds, communication towers, flagpoles, light poles, metal fences, and water.
- When inside, avoid the use of the telephone, contact with water or conductive surfaces with exposure to the outside such as metal door or window frames, electrical wiring, telephone wiring, cable TV wiring, and plumbing, etc.

Lightning Strike Victim

- A person who has been struck by lightning does not carry an electrical charge that can shock other people.
- A nearby strike may also cause medical problems, check personnel and call emergency medical assistance (911) if necessary.
- Provide first aid and call emergency medical assistance (911) immediately. Look for burns where lightning entered and exited the body.

Flooding

Flood Terminology

- Flash Flood Watch – A flood is possible, be alert to signs of flash flooding, and be ready to evacuate. Know the local terrain; flash floods can happen more quickly in hilly terrain or low-lying areas.
- Flash Flood Warning – A flood is already occurring and will occur soon in your area. Listen to local radio and television for local information and advice.

Flood Damage Prevention Procedures

- Move key documents, electronic files, computers, etc. to higher ground or take them with you if you must evacuate.
- Review evacuation procedures with employees.
- If necessary, attempt to build earthen dams to protect buildings and property.
- Turn on battery-operated radio or television to get the latest emergency information.
- If told to leave, do so immediately.

Procedures During a Flood

- Evacuation may be necessary. If advised to evacuate, do so immediately.
- Never drive into a flooded area.
- Never drive around road barricades.
- In case employees are separated from one another during floods or flash floods, each employee shall contact the Landfill Superintendent so all employees can be accounted for.
- Evacuation is much simpler and safer before floodwaters become too deep for ordinary vehicles to drive through.
- Listen to a battery-operated radio or television for evacuation instructions.
- Follow recommended evacuation routes – shortcuts may be blocked.
- Leave early enough to avoid being marooned by flooded roads.

Procedures During a Flood – If Outdoors

- Climb to high ground and stay there.
- Avoid walking through any floodwaters. If it is moving swiftly, even water 6 inches deep can sweep you off your feet.

Procedures During a Flood – If in a Car

- Never drive into a flooded area.
- Never drive around road barricades.
- If you come to a flooded area, turn around and go another way.
- If your car stalls, abandon it immediately and climb to higher ground. Many deaths have resulted from attempts to move stalled vehicles.

Procedures After a Flood

- Return to the area only after it has been declared safe by local emergency management officials. Follow all emergency rules, laws, and regulations.
- Report and stay clear from loose power lines or damaged utilities.
- Report downed power lines to your utility company or local emergency manager.
- Some appliances, such as television sets, can shock you even after they have been unplugged. Do not use appliances or motors that have gotten wet unless they have been taken apart, cleaned, and dried.
- Be alert for gas leaks. Use a flashlight to inspect for damages. Do not smoke or use candles, lanterns, or open flames unless you are sure that the gas has been turned off and the area has been aired out.
- Look for fire hazards - broken or leaking gas lines, flooded electrical circuits, submerged furnaces, or electrical appliances, or flammable or explosive materials coming from upstream.
- Service damaged septic tanks, cesspools, pits, and leachate systems as soon as possible. Damaged sewage systems are health hazards.
- Document the damage for insurance purposes by taking notes and photographs.

Structural Stabilization: Temporary Measures

- Identify potential deficiencies and provide temporary shoring to protect life and property while the water levels are receding. All shoring measures should be planned with the assistance of qualified structural engineers or contractors.
- Support unstable or leaning structures or features with temporary bracing and reinforcement.
- Strengthen exposed foundations or brace areas of undermining by following engineer's recommendations.
- Brace and strengthen decayed or damaged floor and ceiling structure. Check bearing locations for movement or settlement.

Check Methane Collection and Venting Systems

- Check methane collection/venting systems..
- Monitor methane gas soon after the incident to check for hazardous methane levels.

Check Leachate Transportation and Storage Systems

- Check leachate transportation and storage systems including tanks, lagoons, and lines.
- If leachate is leaking into the environment, attempt to shut the leachate line valve, stopping the flow.
- If leachate is leaking into the environment from a lagoon, take immediate steps to limit flow into drainage ways by constructing an earthen berm.
- Report leachate spills to the Iowa Department of Natural Resources (See **Attachment 2** for emergency contacts).

Check Bulk Fuel Systems

- Extinguish all smoking and small flames.
- If a spill/leak exists, attend to stop the spill/leak or absorb fuel with inert materials.
- See **Attachment 2** for DNR Emergency Contacts.
- See **Attachment 3** for DNR guidelines for reporting hazardous conditions and a copy of Iowa Administrative Code Chapter 131 (Section 457).

Check for Large Scale Erosion

- Immediately cover any eroded areas exposing waste.
- Identify and repair access roads, approach ramps, and internal roads that were affected by erosion.
- Identify and repair let-down structures, berms, and terraces affected by erosion.

Acceptance of Flood Related Wastes

- Do not accept hazardous material for landfilling, even if it is flood related debris.
- Do not accept free flowing liquids, even if the container is thought to contain only flood-related liquid.
- Do not accept containers that contain unknown materials, especially drums and similar containers that "floated" to the current owner.
- Document all flood-related debris for possible credit/reimbursement from city, county or state government.
- Prepare a request to DNR to exempt exceptional event debris from goal progress and tonnage fee with the next Quarterly Solid Waste Fee Schedule & Retained Fees Report.

Event and Post Event Conditions

See Sections under Section 113.8(5)"b"(3)3 Weather Related Events.

113.8(5)"b"(3)4 Fire and Explosions

In case of any size fire, the following individual must be contacted:

- Landfill Superintendent – See **Attachment 2** for telephone number.

If a fire cannot be controlled by site personnel, report to the fire department by dialing 911 using cellular phones or the phone in the site office.

Basic Fire Safety

- Stockpile soil near the working face to assist with hot loads.
- Site will comply with local and state fire codes, including the placement and maintenance of fire extinguishers, smoke detectors, etc.
- See the Site Map (**Attachment 1**), identify Evacuation Routes, Fire Escape Routes, and Emergency Assembly Locations.
- Keep exit routes clear and well-marked.

- Cigarette, cigar, and/or pipe smoking are not allowed indoors in public places in Iowa. Make sure smoking materials are completely extinguished before entering the building. Never leave hot ashes or burning tobacco products unattended.
- Avoid using extension cords wherever possible, especially small-wired cords used with high-wattage appliances.
- Extension cords should not be run under rugs or hooked over nails.
- If a fuse blows (or a breaker "trips"), find the cause. Remove excess appliances (lamps, stereo components, space heaters, etc.) from a breaker circuit that frequently "trips."
- Discard food that has been exposed to heat, smoke, or soot.
- Do not discard damaged goods until after an inventory has been taken.
- Give first aid where appropriate.
- Stay out of damaged buildings.
- Return to the facility only when local fire authorities say it is safe.

Waste / Recyclable Materials

For fires at the working face, see Working Area in this section.

For fires in vehicles, see Hot Loads in this section.

For materials that may become ignited:

- Call the Fire Department. See **Attachment 2** for telephone numbers.
- Call the Landfill Superintendent. See **Attachment 2** for telephone number.
- If materials are in the working face and can be safely removed, remove and place near but not on, the working face, and extinguish. Use extreme caution if any attempt is made to control the fire.
- For small fires located outside of the working face, a fire extinguisher may be used.

Buildings and Site

Small Localized Fire – Building or Office

- Caution: A small-localized fire can engulf a room in less than 60 seconds.
- Act quickly. Smoke can be dangerous.
- Use a fire extinguisher to extinguish the flame; aim at the base of the flame.
- Remove nearby flammable materials such as paper, drapes, rags, etc.
- Evacuate all unnecessary personnel – go to the Emergency Assembly Location. In the event the Emergency Assembly Location is dangerous or inaccessible, proceed to the Secondary Emergency Assembly Location (See **Attachment 1**).
- If a fire cannot be controlled by site personnel, report to the local Fire Department. See **Attachment 2** for telephone number.

Out of Control Fire – Building or Office

- Get out of the building. Familiarize yourself with at least two exits from each room; for example, one window and one door.
- Go to the Emergency Assembly Location. In the event the Emergency Assembly Location is dangerous or inaccessible, proceed to the Secondary Emergency Assembly Location (See **Attachment 1**).

- Contact the local Fire Department from a mobile phone. See **Attachment 2** for telephone number.
- Never go back inside a building for any reason.

Equipment

Engine Fires

- Immediately turn off the ignition to shut down the fuel pump and the flow of fuel.
- Putting out an engine fire safely and efficiently takes two people. One holds the fire extinguisher and the other opens the hood. The fire will flare up as the fresh air hits it. Immediately spray the fire extinguisher across the base of the flames until the fire is out.
- It is important to get the hood open fast. If the fire burns through the hood release cable before you can get it open, there will be no way to get at the fire.
- Do not try to put out an engine fire by spraying the extinguisher through the radiator or through the wheel wells, this method will not work and will waste time and the fire extinguisher contents. Get at the base of the flames.
- If a fire cannot be controlled by site personnel, report to the local Fire Department. See **Attachment 2** for telephone number.
- The equipment will be thoroughly inspected and repaired, if necessary, prior to reuse.

Fuels

General Safety

- Vapors from fuels can be more flammable than liquid, always use caution when filling vehicles or containers.
- Equipment shall be refueled only at designated locations.
- In case of spillage, filler caps shall be replaced, and spillage disposed of before engines are started.
- Engines shall be stopped and operators shall not be on the equipment during refueling operations.
- Only designated persons shall conduct fueling operations.
- Smoking and open flames shall be prohibited in areas used for fueling, fuel storage, or enclosed storage of equipment containing fuel.
- Liquid fuels not handled by pump shall be handled and transported only in portable containers or equivalent means designed for that purpose. Portable containers shall be plastic, have tight closures with screw or spring covers and shall be equipped with spouts or other means to allow pouring without spilling. Leaking containers shall not be used.

Fire Event

- If possible, turn off the pump or the nozzle distributing flammable liquid.
- Evacuate the area. Stay well clear of the above ground storage tank in case of explosion. Go to the Emergency Assembly Location (See **Attachment 1**).
- Call the Fire Department. See **Attachment 2** for telephone number.
- Call the Landfill Superintendent. See **Attachment 2** for telephone number.

Utilities

Natural Gas

- Call the Fire Department. See **Attachment 2** for telephone number.
- If the Emergency Assembly Point is a safe distance away, go to that site or go to the Secondary Emergency Assembly Point.
- Caution: Exploding tanks may eject pieces of the tank several hundred feet. These pieces can be lethal.
- The Fire Department may allow the tank to burn itself out.
- Call the Landfill Superintendent (See **Attachment 2** for telephone and mobile phone numbers).

Electrical – Small Localized Fires

- Use a fire extinguisher rated Class C: Energized Electrical Equipment including Wiring, Fuse Boxes, Circuit Breakers, Machinery, and Appliances.
- Caution: A small-localized fire can engulf a room in less than 60 seconds.
- Act quickly.
- Remove nearby flammable materials such as paper, drapes, rags, etc.
- Evacuate all unnecessary personnel – go to the Emergency Assembly Location. In the event the Emergency Assembly Location is dangerous or inaccessible, proceed to the Secondary Emergency Assembly Location (See **Attachment 1**).

Electrical – Larger Uncontrolled Fires

- Get out of the building. Familiarize yourself with at least two exits from each room; for example, one window and one door.
- Go to the Emergency Assembly Location (See **Attachment 1**).
- Contact the Fire Department from a mobile phone. See **Attachment 2** for telephone number.
- Never go back inside a building for any reason.

Facilities

See Section 113.8(5)“b”(3)4 Buildings and Site. There are no additional facilities that have not been previously covered.

Working Area

Landfill fires can be started from several causes: spontaneous combustion, careless smoking, methane flash, and arson.

- Understand and be aware of warning signs.
- Always report any visible smoke to the Landfill Superintendent.
- If in doubt about a possible fire or signs of fire call the Fire Department. See **Attachment 2** for telephone number.

Once a Fire is Identified

- Control access and site security.
- All persons must be required to sign in and out.
- Establish radio communications with firefighting, public safety, and Landfill personnel.
- First aid should be available on-site.
- Warning fences should be placed around any trenches dug as fire breaks.
- Safety meetings should be held daily.
- Spotters should be used to assist equipment operators.

Controlling a landfill fire may be accomplished through local firefighting equipment, or landfill firefighting experts may need to be contacted. Follow the instructions of the firefighting professionals on site.

- Excavated waste may require a hot pad where it can be spread and soaked with water or other fire extinguishing media.
- Soaked materials may require a cool pad storage area.
- Earthmoving equipment may be required to dig firebreaks down to bare earth or to build earthen dams.

Landfill stockpile fires can be started from several causes: spontaneous combustion, careless smoking, methane flash, lightning, and arson.

- Understand and be aware of warning signs.
- Always report any visible smoke to the Landfill Superintendent. Some steam from composting piles and some other stockpiles may be normal due to the natural decomposition process. Report unusual levels of steam to the Landfill Superintendent.
- If in doubt about a possible fire, call the Fire Department (See Attachment 2 for emergency telephone numbers).
- Use caution while excavating "hot" materials, exposure to the air may create flames.
- Before attempting to excavate the "hot spot" within a stockpile, a spotter should watch equipment operators.
- Move "hot" materials to a hot pad so the materials can be sprayed with water or fire extinguishing media.

Unaffected stockpile materials and soaked stockpile materials should be moved to a cool pad while the remaining materials are excavated.

Hot Loads

Smoldering or ignited fires in a vehicle.

- "Hot loads" are loads of waste or vehicles that are smoking, smoldering, or are on fire. Hot loads may arrive at the facility without the driver aware of the risk.
- Do not dump hot loads on top of exposed waste of any kind.
- Do not stop a truck on fire or containing a hot load near a building.
- Quickly alert the driver and direct the truck toward a safe area.
- Call the Fire Department. See Attachment 2 for telephone numbers.

- If the load can be dumped without harming the driver or others, dump the load in a safe area. Caution: A fire may spread quickly or “flash” as air is introduced.
- Use soil to place over smoldering or burning loads.
- Stay out of the "zone of danger," which is the cone-shaped area directly behind a vehicle with the gas tank located in the usual position at the back. If a gas tank explodes, it sends a tremendous blast out from the rear of the vehicle. This can be lethal for 50 to 100 feet behind the vehicle.

Waste Gases

- If you witness a flash fire potentially caused by methane, leave the area immediately. If the Emergency Assembly Location is a safe distance away, go to that site or go to the Secondary Emergency Assembly Location.
- See the Site Map (**Attachment 1**) with Evacuation Routes, Fire Escape Routes, and Emergency Assembly Locations.
- Call the Fire Department. See **Attachment 2** for telephone numbers.
- Contact the Landfill Superintendent. See **Attachment 2** for telephone numbers.

Explosive Devices

- Use the alarm system and leave the area immediately. If the Emergency Assembly Point is a safe distance away, go to that site or go to the Secondary Emergency Assembly Point.
- See the Site Map (**Attachment 1**) with Evacuation Routes, Fire Escape Routes, and Emergency Assembly Locations.
- Call the Fire Department. See **Attachment 2** for telephone numbers.
- Contact the Landfill Superintendent. See **Attachment 2** for telephone numbers.

113.8(5)“b”(3)5 Regulated Waste Spills and Releases

Waste Spills and Releases Terminology

- Regulated Waste – Generally includes non-hazardous material such as leachate, municipal solid waste, and petroleum contaminated soils.
- Spill – A spill primarily involves liquids or solids that are deposited accidentally on the facility’s property in an incorrect location but remain within the facility’s property boundary. Spills include quantities of 100 gallons or less, or two tons or less.
- Release – A release may involve spills of solids or liquids greater than 100 gallons or greater than two tons that enter lagoons, sedimentation ponds, drainage ways, etc., but stay on-site.
- Off-site Release – An off-site release is a release or spill that leaves the facility’s property boundary. This section includes groundwater releases.

Waste Materials

Waste Materials Terminology

- Waste Materials – Waste materials are materials normally accepted at a landfill. Waste materials are also regulated wastes.
- On-Site Spill or Release – Use caution and remove the waste, placing it in an acceptable location, such as the working face, for proper disposal.

- Off-Site Spill or Release – If waste materials are identified beyond the property and/or waste materials are observed to be in a waterway, see Section 113.9(5)“b”(3)5.

Leachate

Lagoons

Leachate should not overflow the rim of the lined leachate collection lagoon or leak from a puncture or tear. If leachate should be observed overflowing or leaking from the leachate lagoon, actions should be taken to pump leachate into a tanker truck or other vehicle for transport to a Publicly Owned Treatment Works (POTW).

Generally, the leachate must be sampled and tested before the POTW will accept the material. Sampling and testing may take 24 to 72 hours or more.

- Contact the Landfill Superintendent (See **Attachment 2** for telephone and mobile phone numbers).
- Call the State of Iowa (See **Attachment 2** for telephone numbers).

Drainage Systems

- Leachate should not overflow into a non-leachate designated drainage system from a seep or other event such as overflow from a leachate lagoon.
- If leachate is observed overflowing into a drainage system actions should be taken to stop the flow of leachate.
- Earthen dams could be constructed to divert the leachate.
- Contact the Landfill Superintendent (See **Attachment 2** for telephone and mobile phone numbers).

Tanker Spills/Seeps/Miscellaneous Spills

Leachate from seeps and spills should not be allowed to flow beyond the Landfill property boundary and should not be allowed to enter a creek, river, or stream.

Leachate flows from seeps can often be temporarily diverted if the seep is excavated and recompacted.

Small leachate spills from tankers or other sources should be observed so they do not leave the property boundary. Absorbent materials, such as yard waste or compost, could be placed on the spill to minimize tracking.

Waste Gases

Methane gas is a by-product of waste decomposition and can be explosive in specific concentrations. Methane gas is colorless and odorless; odor emanates from other gases mixed with the methane.

- Methane gas can migrate and accumulate in enclosed buildings, under scales, crawl spaces, and other confined spaces.
- Methane gas concentration levels are often detected using an electronic meter.

If methane gas is detected within explosive limits:

- Extinguish all smoking.
- Attempt to ventilate the area by opening windows/doors.
- If the methane is detected in a scale house or other building regularly occupied, evacuate immediately and go to the Emergency Assembly Point (See **Attachment 1**).
- Contact the Landfill Superintendent (See **Attachment 2** for telephone and mobile phone numbers).
- Contact the Fire Department (See **Attachment 2** for telephone and mobile phone numbers).
- Contact the DNR Field Office (See **Attachment 2** for telephone and mobile phone numbers).
- Do not return to the building until it has been properly ventilated and the concentrations have been checked with an electronic meter.

Waste Stockpiles and Storage Facilities

This site does not have any waste stockpiles or waste storage facilities.

Waste Transport Systems

This site does not have waste transport systems.

Litter and Airborne Particulate

Litter and airborne particulates will be controlled according to the sanitary disposal project permit.

Site Drainage System

If drainage systems are observed to be functioning improperly, contact the Landfill Superintendent. See **Attachment 2** for telephone number.

Flood or Heavy Rain/Wet Situations:

- If regulated wastes enter drainage systems, use great caution removing the wastes – flowing water can have extreme force.
- Wet weather can cause embankments to become weakened and fail.

Non-Flood and Non-Heavy Rain/Wet Situations:

- Prevent the waste from washing away beyond the property boundary.
- Remove the wastes as soon as possible.

Off-Site Releases

Leachate

Leachate must be kept from entering creeks, rivers, streams, or other waterways. Leachate should not be allowed to leave the property boundaries.

If leachate is observed leaving the property boundary and/or entering a creek, river, stream, or other waterway, immediately contact the following:

- Contact the Landfill Superintendent. See **Attachment 2** for telephone number.
- Contact the State of Iowa. See **Attachment 2** for telephone numbers.

Earthen dams, excavation, compaction, and other techniques can be applied to stop the flow of leachate from leaving the property boundary or traveling further from the property boundary.

Permanent drainage systems can be installed after the leachate flow has been diverted or stopped if a lagoon and leachate collection system is available.

Waste Gases

- If waste gases are detected outside of the property boundary, contact the Landfill Superintendent.
- A second check of gas concentration levels with newly calibrated equipment may be required.
- If waste gases are detected a second time outside of the property boundary, then contact the DNR immediately (See **Attachment 2** for telephone numbers).

Regulated Waste

- Prevent the waste from traveling further off site. Earthen dams, excavation, compaction, and other techniques can be applied to stop the flow of regulated waste from traveling further from the property boundary.
- If the regulated waste is in a waterway, attempt to stop the flow of waste and if possible, stop the flow of waste downstream. Use caution working near steep banks or wet embankments.
- Contact the Landfill Superintendent. See **Attachment 2** for telephone number.
- Contact the State of Iowa. See **Attachment 2** for telephone numbers.

Household Hazardous Materials

Household hazardous materials (especially material that has been bulked) must be kept from entering creeks, rivers, streams, or other waterways. Household hazardous materials should not be allowed to improperly leave the property boundaries.

Household hazardous materials that are released beyond the property and/or are observed to be in a waterway must be managed immediately.

- If possible, safely stop the source of the leak.
- Use absorbent material to stop material from entering the waterway or leaving the site.
- If household hazardous material is observed leaving the property boundary and/or entering a creek, river, stream, or other water, immediately contact the Landfill Superintendent – See **Attachment 2** for telephone numbers.
- See **Attachment 3** – IDNR Spill Release as the type of spill will determine if the DNR must be contacted.

113.8(5)“b”(3)6 Hazardous Material Spills and Releases

- See **Attachment 3** for State Guidelines for Reporting Hazardous Conditions.
- Do not smoke. Do not create sparks.
- Be aware of the wind and avoid inhaling hazardous fumes.

- Use caution operating near hazardous materials. The material should be considered hazardous, even if the suspected material has not yet been confirmed hazardous by a professional.
- Do not let people or equipment make contact with liquids, dusts, or fumes of hazardous materials.
- Only trained professionals should attempt to clean up the hazardous materials.
- Do not come into contact with the hazardous material.
- Some hazardous materials can react violently with other chemicals and other materials - use extreme caution.

Load-Check Control Points

Load checking is performed periodically by landfills to identify banned materials, hazardous materials, and wastes that may have been generated from areas outside the solid waste planning boundaries.

If a solid waste load is identified as containing hazardous materials or hazardous markings on containers are identified, contact the following:

- See **Attachment 3** for reporting hazardous conditions to the State of Iowa.
- Landfill Superintendent - See **Attachment 2** for telephone numbers.
- Observe the safety precautions outlined in Section 113.8(5)"b"(3)6 Hazardous Material Spill & Releases.

Mixed Waste Deliveries

See Section 113.8(5)"b"(3)6 Load-Check Control Points, above.

Fuels

Fuels and oils that are spilled can be absorbed with specific material designed for this purpose – they are often called "snakes," "booms," or "pillows." These materials, after use, are moved in drums to a used oil containment area until suitable transport to an off-site disposal location can be arranged.

If a fuel/oil spill occurs:

- Stop the flow of material if possible using valves or switches.
- Do not smoke.
- Do not pass vehicles over the spilled material, as these could be a spark/ignition source hazard.
- If possible, construct an earthen dam or similar structure to contain the spill.

Waste Gases

- If waste gases are detected outside of the property boundary, contact the Landfill Superintendent. See **Attachment 2** for telephone numbers.
- A second check of gas concentration levels with newly calibrated equipment may be required.

- If waste gases are detected a second time outside of the property boundary, then contact the DNR immediately. See **Attachment 2** for telephone numbers.
- If waste gases are detected indoors, ventilate and evacuate the area.

Site Drainage Systems

This generally occurs during flood or heavy rain/flash flood situations.

If hazardous wastes enter drainage systems during flood/heavy rain/wet conditions:

- Contact 911.
- Contact the Landfill Superintendent – See **Attachment 2** for telephone numbers.
- Contact the State of Iowa – See **Attachment 2** for telephone numbers.
- Emergency/Hazardous Material professionals will aid minimize the risk downstream.

If hazardous wastes enter drainage systems during non-flood/heavy rain/wet conditions:

- Prevent the waste from washing beyond the property boundary.
- Get assistance before attempting to remove the wastes.
- Assistance should be obtained from trained professionals.

Off-Site Releases

- Contact 911.
- If possible, construct an earthen dam or similar structure to reduce the spread of contamination. Do not contact the material, contaminated dust, fumes, or gases.
- Should a spill leave the property, staff will notify a hazardous material professional. The trained hazardous material professional will supply needed resources and take charge of the response effort.

In case of an off-site release, the following individuals must be contacted:

- Landfill Superintendent - See **Attachment 2** for telephone and mobile phone numbers.
- Contact the State of Iowa - See **Attachment 2** for telephone numbers.
- See **Attachment 3** for reporting hazardous conditions to the State.

113.8(5)“b”(3)7 Mass Movement of Land and Waste

Earthquakes

During an Earthquake

- Duck, cover, and hold. If you are inside, crawl under a heavy piece of furniture and hold on or get under a doorframe.
- If you are outside, stay in an open area.
- If you are in your car or equipment, stop driving.

After an Earthquake

- Check for injuries.
- Get out of the building if it appears to be structurally unsound – do not re-enter the building. If the building is evacuated, go to the Emergency Assembly Point and account for Landfill personnel, contractors, guests, etc.
- Listen to a battery powered radio for further instructions.
- Be aware of broken glass and other sharp objects on the floor.
- Be aware of material above your head that might fall.
- Check water, natural gas, and electric lines for damage (natural gas odor) then see **Attachment 2** for information on utilities.
- Check leachate lagoons for leaks.
- Check stability of stockpiles and slopes. See Section 3.8.1.
- Check methane collection/venting systems.
- Do not use matches or smoke.
- Avoid the telephone.
- Do not go sightseeing.
- Expect aftershocks.
- Have the scale checked and re-certified by a qualified technician.

In case of earthquake, the following individuals must be contacted:

- Landfill Superintendent – See **Attachment 2** for telephone and mobile phone numbers.

Check Fuel/Solvent Storage Systems Extinguish all smoking and small flames.

- If a spill/leak exists, attempt to stop the leak/spill or absorb fuel/solvent with inert materials.
- If bulk fuel or solvent is leaking into the environment from a storage system, take immediate steps to limit flow into drainage ways by constructing an earthen dam.
- Report spills or leaks to the DNR. See **Attachment 2** for emergency contacts.

Slope Failure

Several dangers exist with slope failures including: exposing waste, leachate, bacteria, and other materials to the environment, allowing wastes to leave the site property, allowing wastes to enter wetlands or other regulated environments, and allowing wastes to overrun roads and buildings.

- Perform a head count of employees, contractors, and guests.
- Stay away from other nearby areas that may also be at risk.

Contact the following:

- Landfill Superintendent – See **Attachment 2** for telephone numbers.
- Call 911 if there are any injuries or if someone may be buried under the failed slope.

Waste Shifts

- Because of the instability of some stockpiles such as compost, some soils, and yard waste, the stockpile face should never be allowed to get higher than 15-20 feet. Borrow pits should also be constructed to ensure side slope stability.
- A professional engineer should be consulted to control side slope and stability.
- Use caution when excavating the "toe" of stockpile. Removing too much material may destabilize the upper portion of stockpile causing it to "slide" or fall down.
- In case of any stockpile slide, the following individuals/companies must be contacted: Landfill Superintendent – See **Attachment 2** for telephone and mobile phone numbers.
- The DNR should be contacted for large slope failures when waste is exposed or if waste leaves the property boundary.

Waste Subsidence

Settling of large or small areas of the Landfill is a natural occurrence; however, sudden settling may cause changes in slope stability.

Waste subsidence is generally gradual. If a large sinkhole or other large depression is created from subsidence, stay away from the area as additional subsidence may occur.

Large depressions or holes should be reported to the Landfill Superintendent.

113.8(5)"b"(3)8 Emergency and Release Notification and Reporting

Emergency reporting and notifications will be provided as needed by state, federal, and local authorities.

Federal Agencies

See **Attachment 2** for Emergency Contacts.

State Agencies

See **Attachment 2** for Emergency Contacts.

See **Attachment 3** for Reporting Hazardous Conditions.

County and City Agencies Including Emergency Management Services

See **Attachment 2** for Emergency Contacts.

News Media

See **Attachment 2** for Emergency Contacts.

Public and Private Facilities with Special Populations within Five Miles

See **Attachment 2** for a list of facilities and phone numbers.

Reporting Requirements and Forms

Emergency reporting requirements and forms will be provided as needed by the state, federal, and local authorities.

113.8(5)“b”(3)9 Emergency Waste Management Procedures

Communications

Communication between Landfill staff and any emergency personnel will be at the direction of the Landfill Superintendent if possible. The Landfill Superintendent will also advise emergency personnel of factors that may influence the evacuation efforts or response procedures.

The following systems of communication may be used in an emergency.

- A telephone is available at the scale house.
- Cellular/digital telephones are not provided by the facility; however, personal cellular/digital telephones may be available.
- Two-way radios are available at some facilities.
- Honking horns can be used to indicate an emergency.
- Personal communication can also be used to communicate an emergency situation.

Alarm System

- The employer shall establish and educate employees regarding any proposed alarm system.
- An air horn or an automobile horn can be used to alert employees about a dangerous situation.
- Two-way or C.B. radios can be used to alert employees regarding a dangerous situation.
- If possible, person-to-person contact can be used to alert landfill guests, contractors, employees, etc. regarding the dangerous situation.

Temporary Discontinuation of Services – Short-Term and Long-Term

- If telephone service is discontinued, cellular or digital telephones can be used.
- The Landfill Superintendent can dispatch messengers to deliver emergency messages in case of a discontinuation of normal communication systems.
- If the facility’s transportation, processing, or landfilling services must be discontinued, the Landfill Superintendent will contact member municipalities, county governments, and hauling companies as soon as possible to communicate rerouting instructions.

Facilities Access and Rerouting

- The Landfill Superintendent will facilitate emergency rerouting.
- If access to the facility is blocked, telephone, radio, and person to person contact at the Landfill will be used to communicate new directions and rerouting.
- The Landfill Superintendent will contact alternate disposal sites and arrange for disposal. After the emergency, normal disposal or transportation systems should resume as soon as possible.

Waste Acceptance

- The Landfill Superintendent will contact alternate disposal sites and arrange for disposal if needed.
- After the emergency, normal disposal or transportation systems should resume as soon as possible.
- If wastes must be diverted for more than one day, contact the DNR; see **Attachment 2** for telephone numbers.

Waste in Process

- During an emergency, safety to human life is a priority.
- Wastes being tipped, processed, or handled must be left in place until the threat to human life is greatly reduced.
- If an emergency does not threaten human life, the Landfill Superintendent will decide how best to manage wastes in process depending on the emergency circumstances.
- When the threat to human life is reduced, the waste should be processed according to the facility's permit.

113.8(5)"b"(3)10 Primary Emergency Equipment Inventory

Major Equipment

A bulldozer and an earth scraper are available on site. Private vehicles are also available.

Fire Hydrants and Water Sources

Fire hydrants and water sources, if available, are located on the Site Plan Map (See **Attachment 1**).

Off-Site Equipment Resources

The facility may contact other municipal and county governments to borrow machinery until replacements can be acquired.

113.8(5)"b"(3)11 Emergency Aid

A commercial first-aid kit will be maintained at the Landfill office. The site supervisor or the staff will administer minor first-aid treatment when required. Serious injuries will be handled through 911 Emergency Services (See **Attachment 2**).

- In case of accidents occurring outside normal operating hours, it will be the responsibility of the senior staff person to provide first-aid treatment and to arrange for professional assistance if required.
- Call 911, professional emergency aid workers should be notified for injuries needing immediate first aid care.
- See **Attachment 2** for Emergency Contacts.
- Landfill Superintendent should be notified of any injury (See **Attachment 2** for Emergency Contacts).

Responder Contacts

- Contact local 911 Emergency Services – See **Attachment 2** for telephone numbers.
- Contact the Landfill Superintendent if any injury occurs – see **Attachment 2** for telephone numbers.

Medical Services

- Contact 911 before transporting sick or injured individuals in a personal vehicle or non-emergency vehicle.
- Directions to the Hospital are located in **Attachment 4**.

Contracts and Agreements

- The facility does not have any contracts or agreements for emergency aid.
- 911 service is provided to county businesses and businesses of incorporated cities.

113.8(5)“b”(3)12 ERRAP Training Requirements

During the first year, after the plan is approved by the DNR, existing and new employees will review the contents of the approved ERRAP with the training provider.

The Landfill Superintendent should identify hazardous waste contractors that can service the facility in case hazardous materials are accidentally received.

Training Providers

The Landfill Superintendent will serve as the training provider, will review the ERRAP with existing and new employees, and will provide any additional training required fulfilling the roles outlined in the ERRAP.

Employee Orientation

New employees are required to review the ERRAP and become familiar with the contents of ERRAP. **Attachment 2** (Emergency Contacts) will be provided to each employee.

Annual Training Updates

The Landfill Superintendent will provide an annual review of the ERRAP with new and existing employees once per year. New information will be reviewed at that time.

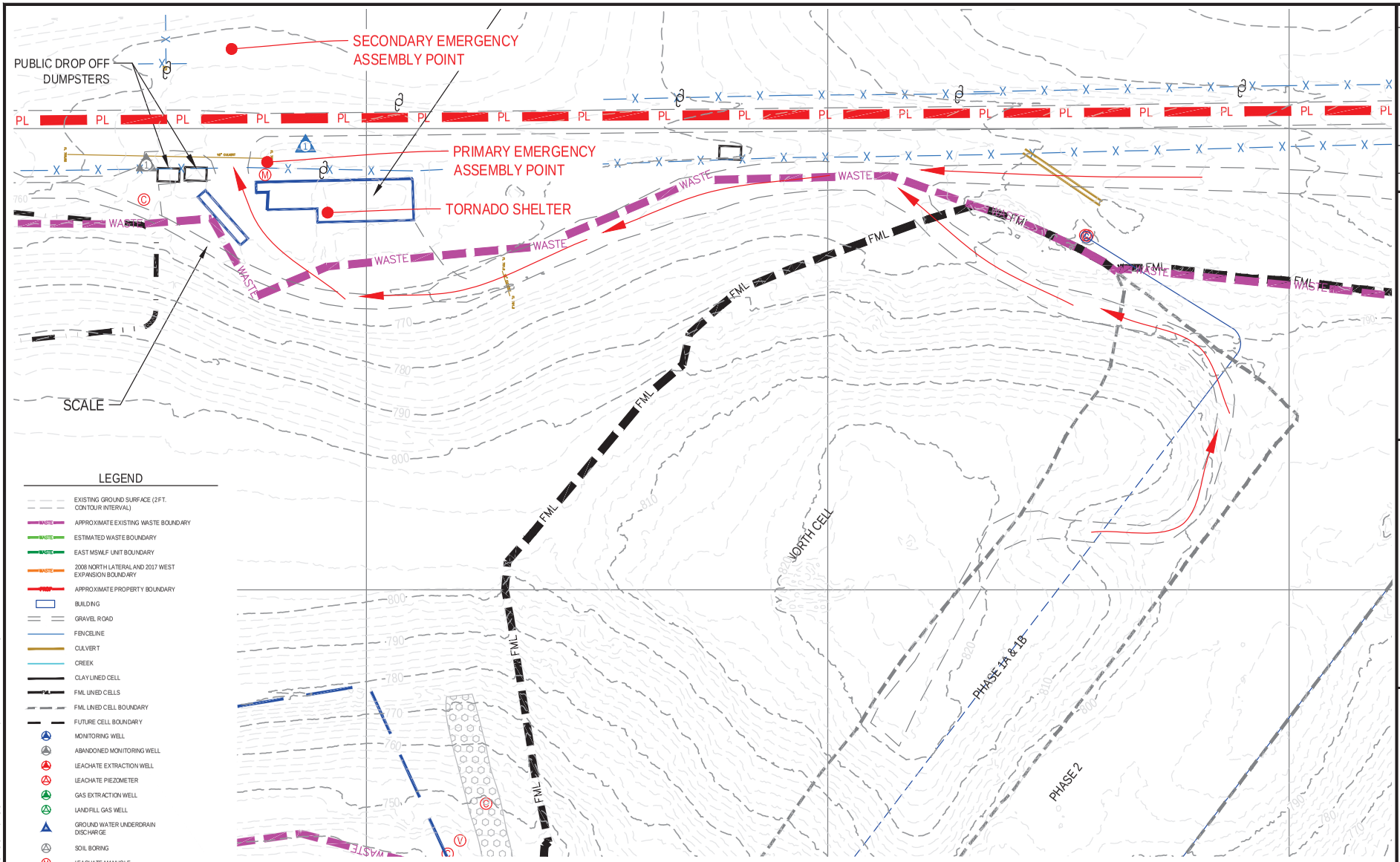
Training Completion and Record Keeping

Records of annual employee ERRAP training will be kept on file at the facility’s offices.

Attachment 1

Site Plan Map

Emergency Evacuation Routes
Fire Escape Routes
Tornado Shelter
Emergency Assembly Point
Secondary Emergency Assembly Point



G:\PROJECT\27225584.00\AUTOCAD\FIGURE 2-1 ERRAP MAP\2-1 ERRAP MAP.DWG

REV.	DATE	BY	CK BY

SHEET TITLE: ERRAP SITE MAP

PROJECT TITLE: OTTUMWA-WAPELLO COUNTY SANITARY LANDFILL 2025 PERMIT RENEWAL

CLIENT: OTTUMWA-WAPELLO SOLID WASTE COMMISION
105 EAST 3RD STREET
OTTUMWA, IA 52501

SCS ENGINEERS
1690 ALL STATE COURT, SUITE 100
WEST DES MOINES, IA 50265
PH: (515) 657-4100

PROJ NO. 27225584.00 | DSN BY: CJD | DWN BY: KDP | CHK BY: CJD | PROD MGR: CLC

CADD FILE: 2-1 ERRAP MAP DWG

DATE: 10/22/25

FIGURE: 2-1

Attachment 2

Emergency Phone Numbers

Telephone Locations
Fire
Medical
Landfill Management Notification
Media
State of Iowa
EPA
Utilities

EMERGENCY PHONE NUMBERS
Ottumwa-Wapello County Sanitary Landfill

TELEPHONE LOCATIONS:

Location of Nearest Telephones .....Scale House

FIRE:

Fire Department / Rescue 911

MEDICAL / DOCTOR:

Ambulance 911

Hospital: Ottumwa Regional Health Center.....(641) 684-2300

Estimated Drive Time .....14 minutes (7.2 mi)

Directions to Hospital.....Route Directions: See **Attachment 4**

LANDFILL MANAGEMENT - NOTIFICATION LIST:

Lori Creech, Landfill Superintendent .....(641) 244-6402 Mobile

.....(641) 683-0645 Office

WAPELLO COUNTY EMERGENCY MANAGEMENT AGENCY:

Tim Richmond, Director .....(641) 814-8333

MEDIA:

Television

KTVO – Ottumwa .....(660) 627-3333

KYOU - Ottumwa .....(641) 684-5415

Radio

KBIZ (AM 1240 and FM 102.7) .....(641) 684-5563

KOTM (FM 97.7) .....(641) 684-5563

KISS (FM 101.5) .....(641) 684-5563

STATE OF IOWA:

Water Quality Bureau ..... (515) 725-8200

Environmental Protection Division ..... (515) 725-8694

IDNR Field Office 6 in Washington, Iowa ..... (319) 653-2135

Iowa Emergency Management Division ..... (515) 725-3231

IDNR Spill Response ..... (515) 725-8694 24-hour

EPA:

Region 7 ..... (800) 223-0425

*Spill/Release (24-hour)..... (913) 281-0991

UTILITIES:

Telephone (Century Link) ..... (800) 244-1111

Wapello Rural Water Association ..... (641) 682-8351

Electricity (Alliant) ..... (641) 683-8000

Natural Gas (Hamilton Produce Co) ..... (641) 682-7531

One Call (prior to digging) ..... (800) 292-8989

ENGINEER OF RECORD:

SCS Engineers ..... (515) 631-6160

Attachment 3

Iowa Department of Natural Resources

Guidelines for Reporting Hazardous Conditions

Including Iowa Administrative Code Chapter 131

"Notification of Hazardous Conditions"

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL SERVICES DIVISION
FIELD SERVICES & COMPLIANCE BUREAU

Iowa Administrative Code Chapter 131
Notification of Hazardous Conditions

24 hour number for release reporting
515/725-8694

Summary of Key Points and Definitions

Definitions

"Hazardous Condition" means any situation involving the actual, imminent or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state or into the atmosphere which, because of quantity, strength and toxicity of the hazardous substance, its mobility in the environment and its persistence, creates an immediate or potential danger to the public health or safety or to the environment.

"Hazardous Substance" means any substance or mixture of substance that presents a danger to the public health or safety and includes, but is not limited to, a substance that is toxic, corrosive, or flammable, or that is an irritant or that, in confinement, generates pressure through decomposition, heat, or other means. The following are examples of substances which, in sufficient quantity, may be hazardous: acids; alkalis; explosives; fertilizers; heavy metals such as chromium, arsenic, mercury, lead, and cadmium; industrial chemicals; paint thinners; paints; pesticides; petroleum products; poisons; radioactive materials; sludges; and organic solvents. "Hazardous substances" may include any hazardous waste identified or listed by the administrator of the United States Environmental Protection Agency under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, or any toxic pollutant listed under Section 307 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous substance designated under Section 311 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous material designated by the secretary of transportation under the Hazardous Materials Transportation Act (49 CFR 172.101)

Key Points

Who is Required to Report Hazardous Conditions. Any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance shall notify the department at (515) 725-8694 and the local police department or the office of the sheriff of the affected county of the occurrence of a hazardous condition as soon as possible but not later than six hours after the onset of the hazardous condition or the discovery of the hazardous condition. A sheriff or police chief who has been notified of a hazardous condition shall immediately notify the department. Reports made pursuant to this rule shall be confirmed in writing as provided in 131.2(2).

Reporting Subsequent Findings. All subsequent finding and laboratory results should be reported and submitted in writing to the department as soon as they become available.

Reminder ~ VERBAL REPORTS ARE REQUIRED WITHIN 6 HOURS OF INCIDENCE OCCURRENCE OR DISCOVERY.

REV. 5/2024

IOWA DNR EMERGENCY RESPONSE UNIT
6200 Park Avenue, Ste 200 / DES MOINES, IOWA 50321
515-725-8694 TDD 515-242-5967 www.iowadnr.gov

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL SERVICES DIVISION
FIELD SERVICES & COMPLIANCE BUREAU

Guidelines for Reporting Hazardous Conditions
Verbal Reporting

24 hour number for release reporting
515/725-8694

Report the Condition if:

- ☐ The hazardous substance has the potential to leave the property by run-off, sewers, tile lines, culverts, drains, utility lines, or some other conduit, or,
- ☐ The hazardous substance has the potential to reach a water of the state – either surface water or groundwater or,
- ☐ The hazardous substance can be detected in the air at the boundaries of the facility property by the senses (sight and smell) or by monitoring equipment or,
- ☐ There is a potential threat to the public health and safety or,
- ☐ Local officials (Fire department, law enforcement, Hazmat, public health, and emergency management) respond to the incident or,
- ☐ The release exceeds a Federal Reportable Quantity (RQ).

~ If in Doubt, Report It ~

IDNR REQUIRES VERBAL REPORTS WITHIN 6 HOURS OF INCIDENCE OCCURRENCE OR DISCOVERY

- It is recommended that all spills be cleaned up although a particular spill may not be reportable. A series of small spills over time can result in one big cleanup.
- Department rules stress the immediate or <u>potential</u> danger that a spill may cause.
- A written report of the Hazardous Condition is required within 30 days of the verbal notification.

*In general, Iowa reporting requirements are more stringent than Federal reporting requirements. However, the **time limit** for reporting at the Federal level is more immediate.*

IOWA DNR EMERGENCY RESPONSE UNIT
6200 Park Avenue, Ste 200 / Des Moines, IOWA 50321
515-725-8694 TDD 515-242-5967 www.iowadnr.gov

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL SERVICES DIVISION
FIELD SERVICES & COMPLIANCE BUREAU

Guidelines for Reporting Hazardous Conditions Written Report Requirements

24 hour number for release reporting
515/725-8694

The Iowa Department of Natural Resources
Requires a written report of any Hazardous Condition.
(VERBAL REPORT REQUIRED WITHIN 6 HOURS)

Written Report. The written report of such a hazardous condition shall be submitted to the department within 30 days and contain the following information:

a. The exact location of the hazardous condition.
b. The time and date of onset or discovery of the hazardous condition.
c. The name of the material, the manufacturer's name, and the volume of each material involved in the hazardous condition in addition to contaminants within the material if they by themselves could cause a hazardous condition.
d. The medium (land, water, or air) in which the hazardous condition occurred or exists.
e. The name, address, and telephone number of the party responsible for the hazardous condition.
f. The time and date of the verbal report to the department of the hazardous condition.
g. The weather conditions at the time of the hazardous condition onset of discovery.
h. The name, mailing address, and telephone number of the person reporting the hazardous condition.
i. The name and telephone of the person closest to the scene of the hazardous condition who can be contacted for further information and action.
j. Any other information, such as the circumstances leading to the hazardous condition, visible effects, and containment measures taken that may assist in the proper evaluation by the department.

The written report should include the IDNR Spill Number (assigned at the time of the verbal report) and be addressed to the duty officer responding to the spill. Reports can be sent via mail, fax, or electronic mail to the addresses listed below.

Mail	Fax	E-Mail
Iowa DNR Field Services Emergency Response 6200 Park Ave. Ste 200 Des Moines, IA 50321	515/725-8201	Emergency_Response@dnr.iowa.gov

CHAPTER 131
NOTIFICATION OF HAZARDOUS CONDITIONS

[Prior to 7/1/83, DEQ Ch 41]
[Prior to 12/3/86, Water, Air and Waste Management[900]]

Chapter rescission date pursuant to Iowa Code section 17A.7: 1/1/28

567—131.1(455B) Definitions. For purposes of this chapter:

"Corrosive" means causing or producing visible destruction or irreversible alterations in human skin tissue at the site of contact, or in the case of leakage of a hazardous substance from its packaging, causing or producing a severe destruction or erosion of other materials through chemical processes.

"Department" means the department of natural resources.

"Hazardous condition" means any situation involving the actual, imminent or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state or into the atmosphere which, because of the quantity, strength and toxicity of the hazardous substance, its mobility in the environment and its persistence, creates an immediate or potential danger to the public health or safety or to the environment.

"Hazardous substance" means any substance or mixture of substances that presents a danger to the public health or safety and includes, but is not limited to, a substance that is toxic, corrosive, or flammable, or that is an irritant or that, in confinement, generates pressure through decomposition, heat, or other means. The following are examples of substances which, in sufficient quantity, may be hazardous: acids; alkalis; explosives; fertilizers; heavy metals such as chromium, arsenic, mercury, lead and cadmium; industrial chemicals; paint thinners; paints; pesticides; petroleum products; poisons; radioactive materials; sludges; and organic solvents. "Hazardous substances" may include any hazardous waste identified or listed by the administrator of the United States Environmental Protection Agency under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, or any toxic pollutant listed under Section 307 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous substance designated under Section 311 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous material designated by the secretary of transportation under the Hazardous Materials Transportation Act (49 CFR §172.101).

"Irritant" means a substance causing or producing dangerous or intensely irritating fumes upon contact with fire or when exposed to air.

"Toxic" means causing or producing a dangerous physiological, anatomic or biochemical change in a biological system.

567—131.2(455B) Report of hazardous conditions. Any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance shall notify the department at (515)281-8694 and the local police department or the office of the sheriff of the affected county of the occurrence of a hazardous condition as soon as possible but not later than six hours after the onset of the hazardous condition or discovery of the hazardous condition. A sheriff or police chief who has been notified of a hazardous condition shall immediately notify the department. Reports made pursuant to this rule shall be confirmed in writing as provided in 131.2(2).

131.2(1) *Verbal report.* The verbal report of such a hazardous condition should provide information on as many items listed in 131.2(2) as available data will allow.

131.2(2) *Written report.* The written report of such a hazardous condition shall be submitted to the department within 30 days and contain the following information:

a. The exact location of the hazardous condition.

b. The time and date of onset or discovery of the hazardous condition.

c. The name of the material, the manufacturer's name and the volume of each material involved in the hazardous condition in addition to contaminants within the material if they by themselves could cause a hazardous condition.

d. The medium (land, water or air) in which the hazardous condition occurred or exists.

e. The name, address and telephone number of the party responsible for the hazardous condition.

f. The time and date of the verbal report to the department of the hazardous condition.

g. The weather conditions at the time of the hazardous condition onset or discovery.

h. The name, mailing address and telephone number of the person reporting the hazardous condition.

i. The name and telephone number of the person closest to the scene of the hazardous condition who can be contacted for further information and action.

j. Any other information, such as the circumstances leading to the hazardous condition, visible effects and containment measures taken that may assist in proper evaluation by the department.

131.2(3) *Reporting of subsequent findings.* All subsequent finding and laboratory results should be reported and submitted in writing to the department as soon as they become available.

These rules are intended to implement Iowa Code section 455B.115.

[Filed 2/3/78, Notice 10/5/77—published 2/22/78, effective 3/29/78]
[Filed emergency 10/31/80—published 11/26/80, effective 10/31/80]
[Filed emergency 6/3/83—published 6/22/83, effective 7/1/83]
[Filed emergency 11/14/86—published 12/3/86, effective 12/3/86]
[Filed 12/30/93, Notice 10/13/93—published 1/19/94, effective 2/23/94]

Attachment 4

Directions to Hospital

Google Maps Ottumwa Regional Health Center to 13277 165th Ave, Ottumwa, IA 52501 Drive 7.1 miles, 13 min

Imagery ©2025 Airbus, Landsat / Copernicus, Maxar Technologies, USDA/FPAC/GEO, Map data ©2025 Google 2000 ft

Ottumwa Regional Health Center
1001 E Pennsylvania Ave, Ottumwa, IA 52501

Continue to E Pennsylvania Ave

43 sec (0.1 mi)

1. Head west toward E Pennsylvania Ave

43 ft

2. Turn right toward E Pennsylvania Ave

325 ft

3. Turn left toward E Pennsylvania Ave

256 ft

4. Turn right onto E Pennsylvania Ave

2 min (1.0 mi)

Take W Woodland Ave and N Mclean St to State Hwy 23/W 2nd St

2 min (0.8 mi)

5. Turn right onto N Court St

0.1 mi

6. Turn left onto W Woodland Ave

0.3 mi

7. Continue onto N Mclean St

0.4 mi

Take Eddyville Rd to 165th Ave

6 min (4.0 mi)

8. Turn right onto State Hwy 23/W 2nd St

1.9 mi

9. Continue onto Eddyville Rd

2.2 mi

10. Turn right onto 165th Ave
Destination will be on the right

2 min (1.1 mi)

Ottumwa / Wapello Landfill
13277 165th Ave, Ottumwa, IA 52501

Attachment 5

Special Populations Within Five Mile Radius

AT-RISK POPULATIONS WITHIN A 5-MILE RADIUS

HOSPITALS/CLINICS:

Ottumwa Regional Health Care, 1001 Pennsylvania Ave., Ottumwa, IA .....(641) 684-2300
Pella Regional Health Center Medical Clinic, 920 N Quincy Ave., Ottumwa, IA.....(641) 455-5200
MercyOne Ottumwa Family and Internal Medicine, 522 N Hancock St., Ottumwa, IA.(641) 683-0800

SCHOOLS:

Ottumwa Christian School, 438 McKinley Ave., Ottumwa, IA .....(641) 683-9119
Seton Catholic School, 117 E. 4th St., Ottumwa, IA .....(641) 682-8826
James Elementary School, 1001 N. Benton St., Ottumwa, IA .....(641) 684-5411
Fahrney Elementary School, 520 S Milner St., Ottumwa, IA.....(641) 684-6753
Horace Mann Elementary School, 1523 N. Court St, Ottumwa, IA .....(641) 684-4661
Wilson Elementary School, 1102 E. 4th St., Ottumwa, IA .....(641) 684-5441
Douma Elementary School, 307 W. Mary St., Ottumwa, IA .....(641) 684-4668
Eisenhower Elementary School, 2624 Marilyn Rd., Ottumwa, IA .....(641) 684-5617
Liberty Elementary School, 50 Traxler Dr., Ottumwa, IA .....(641) 682-4502
Evans Middle School, 812 Chester Ave., Ottumwa, IA .....(641) 684-6511
Gateway High School, 907 Gateway Dr., Ottumwa, IA .....(641) 683-1342
Ottumwa High School, 501 E. 2nd St., Ottumwa, IA .....(641) 683-4444
Indian Hills Community College, 222 W 2nd St., Ottumwa, IA.....(641) 683-5111
Buena Vista University, 525 Grandview Ave., Ottumwa, IA.....(712) 749-1980
Wapello County Extension and Outreach, 13011 120th Ave, Ottumwa, IA.....(641) 682-5491

NURSING HOMES/ASSISTED LIVING:

The Kindred House, 2824 N. Ct. St., Ottumwa, IA ..... (641) 575-2378
Ottumwa Good Samaritan Society, 2035 Chester Ave., Ottumwa, IA ..... (641) 682-8041
River Valley Place of Ottumwa, 173 E Rochester Rd., Ottumwa, IA ..... (641) 684-1871
Pennsylvania Place, 1 Pennsylvania Pl., Ottumwa, IA ..... (641) 684-4000
Vista Woods Care Center, 3 Pennsylvania Pl., Ottumwa, IA ..... (641) 683-3372
Ridgewood Specialty Care, 1977 Albia Rd., Ottumwa, IA..... (641) 683-3111

DAY CARE CENTERS:

Indian Hills Community College Child Development Center,
525 Grandview Ave, Ottumwa, IA ..... (641) 683-5192
Start Smart Private Childcare, 141 E Court St., Ottumwa, IA..... (515) 257-0733
Ottumwa YMCA, 611 N. Hancock St., Ottumwa, IA..... (641) 684-6571
Pickwick Early Childhood Center, 1306 W. Williams St., Ottumwa, IA ..... (641) 684-7179

Appendix B

Environmental Monitoring Plan – HMSP Update

Revised Hydrologic Monitoring System Plan

Ottumwa-Wapello County Sanitary Landfill

Ottumwa-Wapello Solid Waste Commission
105 East 3rd St.
Ottumwa, IA 52501
641-683-0606

SCS ENGINEERS

27225584.00 | Update for October 2025
April 2018
August 2015
December 2008
Original April 2008

1690 All-State Court, Suite 100
West Des Moines, IA 50265
515-631-6160

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to review the design, operation, and maintenance of the groundwater monitoring system for the Ottumwa Wapello County Sanitary Landfill (Landfill) West municipal solid waste landfill unit (West MSWLF unit) on the west side of the intermittent creek traversing the site and the expansion area on the east side (East MSWLF unit) of the same intermittent creek. The West MSWLF unit is comprised of the closed South Cell and Inactive Area, and the active North Cell, Phase 1A and 1B cells, the Phase 2 and 3 cells, and the future cells: the remainder of the 2008 North Lateral Expansion area (Phase 4 cell), and the 2017 West Expansion consisting of Areas A1, A2, and B. No portion of the East MSWLF unit has been constructed. Portions of the East MSWLF unit footprint are used as a borrow area for fill operations in the West MSWLF unit when needed. The groundwater monitoring systems established for the East and West MSWLF units are intended to assess, if any, the impact of landfilling activities on adjacent groundwater and to enable early detection of a release from the MSWLF units.

It should be noted that a third fill area, the Area A MSWLF unit, is present on the Landfill property in the northeast corner of the site. This fill area is closed and regulated by an Environmental Covenant and is not subject to groundwater monitoring. This closed area is not part of this revised Hydrologic Monitoring System Plan (HMSP).

1.2 APPROACH

The approach used to review the groundwater monitoring systems for the East and West MSWLF units considered the expansion of both MSWLF units: the 2017 West Expansion of the West MSWLF unit and the 2017 Expansion of the East MSWLF unit. Groundwater monitoring at the Landfill is accomplished via the sampling of groundwater monitoring wells and groundwater underdrain outlets associated with the West and East MSWLF units. HMSP provisions include monitoring point installation/abandonment, operation, maintenance, monitoring, and response in the event of a release to comply with the requirements of 567 Iowa Administrative Code (IAC) 113.10.

1.3 SITE LOCATION

The landfill property is depicted in **Figure 1, Site Map**. The Landfill consists of approximately 230 acres and is located within the SE ¼; the E 30 acres of the S ½, S ½, NE ¼; and a portion of the W 10 acres of the S ½, S ½, NE ¼; all in Section 33, T73N, R14W, Wapello County, Iowa. Also approximately 30 acres in the W ½ of the NE Fractional Quarter of Section 4, T72N, R14W, Wapello County, Iowa.

1.4 REPORT CONTENTS

The HMSP for the East and West MSWLF units includes the following:

Section 1.0 Introduction – Purpose and approach for monitoring the West and East MSWLF units;

Section 2.0 Hydrogeologic Assessment Summary – Summary of hydrogeologic information used to develop the monitoring system network;

Section 3.0 HMSP – Discussion, justification, and IAC Chapter 113 compliance response/ documentation comprising the HMSP for the West and East MSWLF units.

2.0 HYDROGEOLOGIC ASSESSMENT SUMMARY

Previous hydrologic investigations of the site were conducted by Barker Lemar Engineering Consultants (November 1999 and June/July 2003), by Foth & Van Dyke (June 1997), and by Green Environmental Services (GES), Inc. (March 1992 and April 1993). Information from these reports was compiled to create the summary below.

The site is located in the Southern Iowa Drift Plain in an area of moderately well-drained rolling terrain. The surficial material generally consists of loess and glacial drift of Pleistocene age and colluvial and alluvial deposits of Holocene age. The landfill borders the valley of an unnamed and typically intermittent creek, which flows from northeast to southwest across the site and separates the West MSWLF unit from the East MSWLF unit. Holocene alluvial and colluvial deposits are found along this creek as it extends through the site.

Coal–bearing Cherokee Group bedrock of Pennsylvanian age is also exposed at the site. The west and north sides of the site were used for strip mining of coal between 1956 and 1976 and consequently have been extensively disturbed by that activity (GES, 1992). Much of the landfill was developed by excavating coal-mine spoils or the glacial till down to bedrock. In many places, the base of the West MSWLF unit was determined by the depths of coal-mine excavation, or the West MSWLF unit was established on coal-mine spoils, which were also used as daily cover.

The two areas of highest natural elevation at the site are on the northwest and east-central perimeter areas, with elevations ranging from 800 to 810 feet above sea level (ASL). The lowest natural elevation at the site is approximately 670 feet ASL along the creek bed on the southern perimeter of the site. The majority of the site slopes toward the intermittent creek that divides the site. Drainage from the site is generally to the intermittent creek and is conducted via sheet runoff and numerous natural drainage ways.

The Bedrock Map of Iowa (Iowa Geological Survey, 1969) indicates that bedrock in the vicinity of the landfill is comprised of Pennsylvanian-age shale deposits of the lower Cherokee Group or the primarily carbonate deposits of the Mississippian-age Meramec Series. Previous studies conducted at the site indicate that the bedrock beneath the landfill is comprised of thick Pennsylvanian-age shales of the Cherokee Group with minor facies changes to limestone, sandstone, and coal within the shale matrix.

Subsurface mining of coal was performed in the Ottumwa area beginning in the mid-1800s. The coal was mined from Pennsylvanian-age rocks of the lower Cherokee Group. The sedimentary strata were deposited nearly horizontally with lateral facies changes. As such, contemporaneous deposits are generally present at approximately the same elevation beneath the site. According to the GES report (1992), research indicates that the mined coal deposit near the East MSWLF unit was on the order of four feet thick and occurred at an elevation of approximately 710 feet ASL.

Materials present at the site would not qualify as aquifers for water supply wells because of low transmissivities (GES, 1992). However, the shallow materials are 100- to 1,000-fold more conductive to groundwater flow than the deep shale. These shallow materials include mine spoils, alluvium (silt, sand, and gravel), shallow till with sand lenses, and weathered shale. The higher in-situ hydraulic conductivities show that these materials constitute the uppermost aquifer.

GES (1992) did not consider small, discontinuous beds of sandstone, limestone, and coal to function as aquifers, due to lack of continuity, even though these may be permeable. The Mississippian limestone was also not thought to function as an aquifer due to low hydraulic conductivity.

The deeper part of the Pennsylvanian shale is considered to be an aquitard. This is shown by the low in-situ hydraulic conductivities, vertical flow rates, and transmissivities. The steep vertical flow paths

also show that the shale is an aquitard. Over 50 feet of shale protects the underlying Mississippian bedrock (GES, 1992).

According to the GES report (1992), the water table is located in the uppermost aquifer, which consists of mine spoils, alluvium, shallow till with sand lenses, and weathered shale. The depth to the water table across the site, as measured in previous assessments, varied from an average of 1 to 11 feet below ground surface (bgs) in the valley to 18 to 24 feet bgs on the hilltops. The deepest water table depths of 33 and 36 feet bgs measured during previous assessments were observed on the southwest corner of the site and are associated with sands in a buried channel.

The stratigraphy in the eastern portion of the site, where coal mining does not appear to have occurred, can generally be described as an overlying mantle of brown lean to sandy lean clay ranging in thickness from 0 to up to 30 feet; however, the thickness is generally less than 10 feet, underlain by shale bedrock. The shallower shales are typically weathered and range in color from red to brown to gray. With depth, the bedrock becomes predominantly shale of varying shades of gray. Within the shale mass are intermittent layers of sandstone, limestone, and coal, with limestone being the more predominant intermittent layer encountered. Coal was generally encountered associated with limestone layers, but not in all cases. The interbedded limestone, sandstone, and coal layers did not appear sufficiently consistent throughout the borings to indicate a continuous layer beneath the site.

3.0 HYDROLOGIC MONITORING SYSTEM PLAN

The hydrologic monitoring system was designed to intercept the groundwater flow paths from the West and East MSWLF units. The existing HMSP well networks for the West and East MSWLF units were appended with monitoring points to monitor the 2017 expansion portions of the units. The HMSP monitoring networks for the 2008 North Expansion and the 2017 West Expansion of the West MSWLF unit, as well as the 2017 Expansion of the East MSWLF unit, will be implemented in phases to coincide with the construction of the West and East MSWLF unit expansions. For the 2008 North Lateral Expansion in the West MSWLF unit, these phases consist of Phases 1 through 4 (Phases 1, 2, and 3 have been constructed), and the 2017 West Expansion consists of Areas A1, A2, and B. The East MSWLF unit is not currently fully phased, as it will not be constructed for numerous decades. The implementation and justification for the HMSP monitoring networks for both the West and East MSWLF units are provided in Section 3.2.1.

Groundwater monitoring will include sampling of the monitoring wells and groundwater underdrain outlets for the West MSWLF unit and East MSWLF unit (when constructed). The locations of the existing and proposed monitoring points for the West and East MSWLF units are shown in **Figures 2 and 3** (found at the end of this report), respectively.

The following subsections form the compliance demonstration of the HMSP in the form of a dialogue between rule 567 IAC 113.10 and the response or HMSP content.

3.1 GENERAL REQUIREMENTS

113.10(1) *General requirements for environmental monitoring and corrective action for groundwater and surface water. The following general requirements apply to all provisions of this rule.*

3.1.1 Surface Water Requirements

a. Surface water requirements. MSWLF units shall not:

(1) Cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402 of the Clean Water Act.

It is the intent of the Ottumwa-Wapello Solid Waste Commission (Commission) that the operation of the MSWLF units at the Landfill will not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including the National Pollution Discharge Elimination System (NPDES) requirements, pursuant to Section 402 of the Clean Water Act.

(2) Cause the discharge of a nonpoint source of pollution into waters of the United States, including wetlands, that violates any requirement of an areawide or statewide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act.

The Commission intends that the operation of the MSWLF units at the Landfill will not cause the discharge of a nonpoint source of pollution into waters of the United States, including wetlands, that violates any requirement of an area wide or statewide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act.

3.1.2 Pre-Waste Placement Compliance

b. A new MSWLF unit must comply with the groundwater monitoring requirements specified in subrules 113.10(2), 113.10(4), 113.10(5), and 113.10(6) before waste can be placed in the unit.

Background groundwater sampling from the monitoring wells and groundwater underdrain discharge points consisted of five samples for the Appendix I list. Each of the existing monitoring points in the HMSP monitoring network for the West MSWLF unit has completed background sampling.

Prior to the placement of waste in newly constructed areas of the MSWLF units, sampling will be conducted to achieve compliance with the groundwater monitoring requirements specified in subrules 113.10(2) and 113.10(4) through 113.10(6).

3.1.3 Monitoring Period

c. Once established at an MSWLF unit, groundwater monitoring shall be conducted throughout the active life and postclosure care period of that MSWLF unit as specified in rule 113.13(455B).

Groundwater monitoring of the MSWLF units of the Landfill will be conducted throughout the active life and postclosure care periods associated with each MSWLF unit.

3.1.4 Qualified Groundwater Scientist

d. For the purposes of this rule, a "qualified groundwater scientist" means a scientist or an engineer who has received a baccalaureate or postgraduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields demonstrated by state registration, professional certifications, or completion of accredited university programs that enable that individual to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.

The Commission will ensure that a qualified groundwater scientist, as defined in 567 IAC 113.10(1)"d," is utilized to evaluate modifications to the groundwater monitoring network and will oversee the evaluation of data derived therefrom.

3.2 GROUNDWATER MONITORING SYSTEM

113.10(2) *Groundwater monitoring systems. All MSWLFs shall have a groundwater monitoring system that complies with the following requirements:*

3.2.1 Groundwater Monitoring System Objectives

a. A groundwater monitoring system must be installed that meets the following objectives:

(1) Yields groundwater samples from the uppermost aquifer that represent the quality of background groundwater that has not been affected by leakage from a unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where either:

1. Hydrogeologic conditions do not allow the owner or operator to determine which wells are hydraulically upgradient; or

2. Sampling at other wells will provide an indication of background groundwater quality that is as representative as or more representative than that provided by the upgradient wells.

Interwell statistical evaluations are used to analyze the groundwater analytical data from the monitoring wells associated with the West MSWLF unit. Intrawell statistical evaluations are used to analyze the groundwater underdrain discharge points. Prior to placing waste in the East MSWLF unit, the statistical methodology will be reviewed to assess the suitability of interwell or intrawell methods for groundwater data associated with the unit. The data from the appropriate monitoring points not affected by leakage from the MSWLF units will be used to represent the background quality of groundwater for interwell methods, and historical monitoring data from individual monitoring points will be used to represent background groundwater quality for intrawell methods. The selection of statistical methods is discussed in Section 3.4.7.

(2) Yields groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the relevant point of compliance specified by the department under numbered paragraph 113.7(5)"a"(2)"2." The downgradient monitoring system must be installed at the relevant point of compliance specified by the department under numbered paragraph 113.7(5)"a"(2)"2" that ensures detection of groundwater contamination in the uppermost aquifer. When physical obstacles preclude installation of groundwater monitoring wells at the relevant point of compliance at existing units, the downgradient monitoring system may be installed at the closest practicable distance, hydraulically downgradient from the relevant point of compliance specified by the department under numbered paragraph 113.7(5)"a"(2)"2," that ensures detection of groundwater contamination in the uppermost aquifer.

The groundwater subject to regular sampling and analysis will be the first encountered groundwater at the site. Monitoring will be via the groundwater monitoring wells (West and East MSWLF units) and the groundwater underdrain system (2008 North Lateral Expansion and 2017 West Expansion portions of the West MSWLF unit, and the East MSWLF unit). Existing monitoring wells installed for previous HMSP revisions will remain at their current locations. The locations of the monitoring system points are discussed in Section 3.3.2.

(3) Provides a high level of certainty that releases of contaminants from the site can be promptly detected. Downgradient monitoring wells shall be placed along the site perimeter, within 50 feet of the planned liner or waste boundary unless site conditions dictate otherwise, downgradient of the facility with respect to the hydrologic unit being monitored. Each groundwater underdrain system shall be included in the groundwater detection monitoring under subrule 113.10(5). The maximum drainage area routed through each outfall shall not exceed 10 acres unless it can be demonstrated that site specific factors such as drain flow capacity or site development sequencing require an alternative drainage area. If contamination is identified in the groundwater underdrain system pursuant to subrule 113.10(5), the owner or operator shall manage the underdrain discharge as leachate in lieu of assessment monitoring and corrective action.

The groundwater monitoring networks for the MSWLF units will provide a high level of certainty that a release from either MSWLF unit would be promptly detected. Likely migration pathways from the units were evaluated as part of the theoretical release analysis discussed in subparagraph 4 of this rule subsection. The groundwater monitoring network for the existing portion of the West MSWLF unit includes monitoring wells installed within 50 feet of the waste boundary and spaced at 300-foot intervals along the downgradient boundary of the unit. The 2008 North Lateral Expansion and 2017 West Expansion portions of the West MSWLF unit and the East MSWLF unit have the added monitoring enhancement of a groundwater underdrain layer. The groundwater underdrain collection layers may draw groundwater into the system during dry conditions, potentially creating an inward gradient in the vicinity of the MSWLF unit boundaries. The groundwater underdrain systems include continuous geocomposite layers beneath the MSWLF units and a series of pipes mirroring the leachate piping system or a system of trenches designed to control groundwater elevations such that

the required separation is maintained. Additional monitoring wells will be installed for the East MSWLF unit and the 2017 West Expansion portion of the West MSWLF unit at locations where ravines cross the future waste boundaries.

The drainage areas routed through each groundwater underdrain upon final completion of the 2008 North Lateral Expansion and 2017 West Expansion portions of the West MSWLF unit and the 2017 East Expansion of the East MSWLF unit are found in **Table 1** below.

Table 1. Drainage Areas

Underdrain Outlet	Outlet Drainage Area
West MSWLF Unit	
2008 North Lateral Expansion	
GU-5 (Phases 1A and 1B)	3.7 acres
GU-6 (Phases 3 and 4)	11.2 acres
GU-7 (Phase 2)	5.2 acres
2017 West Expansion	
GU-8 (Areas A1, A2, and B)	11.1 acres
East MSWLF Unit	
GU-1	2.7 acres
GU-2	7.0 acres
GU-3	7.3 acres
GU-4	6.2 acres
GU-10	9.6 acres
GU-11	10.3 acres

If groundwater impact is identified in portions of the groundwater underdrain systems pursuant to subrule 567 IAC113.10(5), the Commission will manage that portion of the underdrain discharge with the leachate in lieu of assessment monitoring and corrective action.

(4) Be designed and constructed with the theoretical release evaluation pursuant to subparagraph 113.6(3)"e"(6) taken into consideration.

The theoretical release evaluation for the West MSWLF unit consisted of reviewing the site hydrogeology surrounding the waste boundary, pre-development ground surface elevation contours, historical water levels and groundwater flow directions surrounding the unit, and leachate levels measured within the unit. Based on this information, more likely pathways of migration of a theoretical release from the MSWLF unit were evaluated. Below is a discussion of the theoretical release analysis.

A theoretical release analysis is a process to determine where pollutants released from the West MSWLF unit would likely migrate. This analysis provides the basis for the design of the hydrological monitoring system. To accomplish a theoretical release analysis, the hydrogeology of the West

MSWLF unit was characterized by identifying the existing and historical wells and borings along the perimeter area of the MSWLF unit, obtaining the boring logs that characterize the geology of each well and boring, and arranging the boring log information in cross-sections to allow analysis of the soil and strata around the perimeter of the MSWLF unit. The cross-sections were generated from the data provided on the boring logs for each well or boring. The soil types reported on the boring logs were standardized to the Unified Soil Classification System classifications.

Analysis of the cross-sectional boring log information provides a visual identification of the subsurface strata that would more likely transmit groundwater. Taking into consideration the screened interval, the groundwater level, and the type of soil, an assessment of the theoretical migration pathway of released pollutants can be made.

The following theatrical release analysis for the West MSWLF unit and the 2008 North Lateral Expansion of the West MSWLF unit was previously approved in the operating permit (latest revision Doc #114145). The 2017 West Expansion of the West MSWLF unit does not change the previously existing analysis. The attachments referenced in the excerpts below are not included herein, but the attachments were included in the Revised *Hydrologic Monitoring System Plan* contained in Appendix 9A of the Request for Approval to Construct the 2017 West Expansion, dated April 12, 2018 (Doc #92083).

West MSWLF Unit

Attachment A, Sheet 1 shows the groundwater contours in the West MSWLF unit based on water level measurements taken at the perimeter wells. Attachment A, Sheet 2 shows groundwater contours based on perimeter wells and fluid level measurements taken at leachate piezometers inside the waste boundary. The thick blue line drawn around a portion of the perimeter of the West MSWLF unit as shown on Sheets 1 and 2 are identical and represent the areas where theoretically released pollutants would most likely migrate. The basis for the placement of this line is explained on Attachment A, Sheets 3A, 3B, and 3C, which show the cross-section locations and the corresponding soil profiles along the west and east sides of the West MSWLF unit, respectively. These profiles were generated from the soil boring logs for the wells and borings shown.

Attachment A, Sheet 3B shows the soil profile for the west side of the West MSWLF unit. For orientation, a plan view of the identified wells/borings is provided in the figure. The predominant soil types in terms of hydraulic conductivity are sand and silt, which would be more transmissive to groundwater flow, and clay and shale, which would be less transmissive to groundwater flow. It can be seen on Sheet 3B that higher transmissivity soils (sand and silt) are located in the vicinity of monitoring wells 93-MW-32 and 93-MW-31, which are located along the south end of the West MSWLF unit. The types of soils in the vicinity of the other wells/borings on Sheet 3B are less transmissive (clay and shale) are located along the west and north sides of the West MSWLF unit.

Attachment A, Sheet 3C shows the soil profile for the east side of the West MSWLF unit. The plan view of the identified wells/borings is provided on the figure. The higher hydraulic conductivity soils on the east side of the West MSWLF unit are located near the surface and continue from the southern end at monitoring 93-MW-32 north to the vicinity of monitoring well MW-40. The cross-section north of MW-40 indicated lower-transmissivity soils.

The groundwater contours as shown on Attachment A, Sheet 1 indicate groundwater flow in a generally southeasterly direction toward the areas along the perimeter with higher transmissivity soils, which have been delineated by the blue line. The contours shown on Attachment A Sheet 2, on which the leachate levels were contoured with the groundwater levels, indicate a generally similar flow direction to the south and east. To provide confirmatory monitoring along the west side of the West MSWLF unit, monitoring well MW-62 has been included as part of the hydrologic monitoring system.

2008 North Lateral Expansion Portion of the West MSWLF unit

Groundwater in the vicinity of the 2008 North Lateral Expansion portion of the West MSWLF unit also flows to the southeast.

However, the theoretical release evaluation for the 2008 North Lateral Expansion portion of the West MSWLF unit is simplified by the groundwater underdrain system. The groundwater underdrain system is expected to create an inward gradient in the vicinity of the 2008 North Lateral Expansion boundary. As a result, a theoretical release from the MSWLF unit would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points.

It should be noted that the groundwater underdrain discharge points in the 2008 North Lateral Expansion do not flow consistently, so an inward gradient is not achieved. Monitoring wells around the waste perimeter are the primary means of release detection.

2017 West Expansion Portion of the West MSWLF unit

Groundwater in the vicinity of the 2017 West Expansion portion of the West MSWLF unit flows to the southeast.

The theoretical release evaluation for the 2017 West Expansion portion of the West MSWLF unit is simplified by the groundwater underdrain system. The groundwater underdrain collection layers may draw groundwater into the system, potentially creating an inward gradient in the vicinity of the 2017 West Expansion boundary. As a result, a theoretical release from the MSWLF unit would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points. Additional groundwater monitoring wells at approximately 300-foot intervals will be installed surrounding the 2017 West Expansion unit. Well spacing may exceed 300 feet in areas where groundwater flow may converge in pre-development ravines.

The existing hydrologic monitoring system for the West MSWLF and the proposed monitoring system for the 2017 West Expansion are shown in Figure 2. The proposed monitoring points for monitoring the West MSWLF unit are listed in **Table 2** by development phase. It should be noted that HMSP monitoring wells MW-39R, MW-40, MW-58, and MW-63R, and non-HMSP monitoring well 91-MW-10, will be properly abandoned in conjunction with the construction of the 2017 West Expansion. Groundwater underdrain discharge points GU-6 and GU-7 will be rerouted in conjunction with the construction of the 2017 West Expansion.

Table 2. West MSWLF Unit Monitoring Points by Phase

Phase	Monitoring Points
Existing	91-MW-14, 93-MW-32, MW-39R, MW-40, MW-53, 04-MW-56, MW-58, MW-59, MW-62, MW-63R, MW-64, MW-65, MW-81, GU-6, and GU-7.
Phase 4	91-MW-14, 93-MW-32, MW-39R, MW-40, MW-53, 04-MW-56, MW-58, MW-59, MW-62, MW-63R, MW-64, MW-65, MW-81, **MW-83, MW-84**, GU-6, and GU-7.
Area A1	91-MW-14, 93-MW-32, ~~MW-39R~~, ~~MW-40~~, MW-53, 04-MW-56, ~~MW-58~~, MW-59, MW-62, MW-63R, MW-64, MW-65, MW-81**, MW-82**, MW-83, MW-84, **PZ-1W**, GU-6, GU-7, and **GU-8.**
Area A2	91-MW-14, 93-MW-32, MW-53, 04-MW-56, MW-59, MW-62, ~~MW-63R~~, MW-64, MW-65, MW-81, MW-82, MW-83, MW-84, PZ-1W, GU-6, GU-7, and GU-8.
Area B	91-MW-14, 93-MW-32, MW-53, 04-MW-56, MW-59, MW-62, MW-64, MW-65, MW-81, MW-82, MW-83, MW-84, PZ-1W, ~~GU-6, GU-7~~, and GU-8.

Note: **Bolded** points are new points.
Strikethrough indicates points removed as phasing advances.

Table 3 below describes the proposed HMSP wells for the West MSWLF unit.

Table 3. Description of West MSWLF Unit HMSP Monitoring Points

Monitoring Point	Comments
MW-39R	This is an existing monitoring well located downgradient of the North Cell.
MW-40	This is an existing monitoring well located downgradient of the North Cell and the northeast portion of the closed area of the West MSWLF unit.
91-MW-14	This monitoring well is located east and downgradient of the closed area of the West MSWLF unit. The screen of this well is located in soils typically having higher hydraulic conductivities than clays and shales.
04-MW-56	This monitoring well is located at the southeast corner of the closed South Cell. According to the boring log, the screen is situated in a higher permeability soil and is located within a downgradient area.
93-MW-32	This monitoring well is located south of the South Cell and southeast of the leachate lagoon. According to boring log information, this well is screened in well-graded sand, silt, and clayey sand, which generally has a higher hydraulic conductivity than the clay and shale soils in other parts of the site.
MW-53	This is an existing groundwater monitoring well located east of the intermittent creek and adjacent to the future East MSWLF unit expansion area. This is a designated background monitoring well for the monitoring network.
MW-58	This is an existing groundwater monitoring well located within the more permeable material and is located within 300 feet of the existing monitoring well MW-40.
MW-59	The location of this existing groundwater monitoring well is based on the groundwater gradient from historical well data, indicating that this boundary segment is considered downgradient, and the boring log showed a higher-permeability material. This well was placed within 300 feet of the adjacent wells.

Monitoring Point	Comments
MW-62	This monitoring well is located west of the West MSWLF unit. According to boring log information, MW-62 is screened within the weathered shale with a coal seam layer, which may contain higher permeability material. It should be noted that, in addition to the unlikely event of a release migrating to the west, based on hydraulic gradient and subsurface geology, the West Cell contains a clay liner and a leachate collection underdrain, further decreasing the likelihood of a release along this boundary.
MW-63R	This is an existing monitoring well located near the southeast corner of the 2008 North Lateral Expansion. This well is downgradient of Phase 1A and 1B.
MW-65	The location of this existing monitoring well is based on the groundwater gradient from historical well data, indicating that this boundary segment is considered downgradient. This well was placed within 300 feet of the adjacent wells.
GU-6	This monitoring point is the groundwater underdrain outfall for existing Phase 3 and future Phase 4 of the 2008 North Lateral Expansion portion of the West MSWLF unit.
GU-7	This monitoring point is the groundwater underdrain outfall for Phase 2 of the 2008 North Lateral Expansion portion of the West MSWLF unit. Former monitoring point GU-5, which was the outfall for Phases 1A and 1B, was tied into the GU-7 outfall during construction of the Phase 3 Cell.
GU-8	This monitoring point is the groundwater underdrain outfall for the 2017 West Expansion portion of the West MSWLF unit.
PZ-1W	This is an existing monitoring well located at a downgradient location along the east boundary of the 2017 West Expansion and is downgradient of Area A2.
MW-82	This is a future monitoring well to be located downgradient of Area A1 of the 2017 West Expansion.
MW-83	This is a future monitoring well to be located downgradient of the 2008 North Lateral Expansion Phase 4 and Area B of the 2017 West Expansion, in an area of convergent flow.
MW-84	This is a future monitoring well to be located downgradient of the 2008 North Lateral Expansion Phase 4 and Area B of the 2017 West Expansion, in an area of convergent flow.

East MSWLF Unit

The following theatrical release analysis for the East MSWLF unit was approved in the operating permit (latest revision Doc #11145). The 2017 Expansion of the East MSWLF unit does not change the previously existing analysis. The attachments referenced in the excerpt below are not included herein, but the attachments were included in the Revised *Hydrologic Monitoring System Plan* contained in Appendix 9A of the Request for Approval to Construct the 2017 West Expansion, dated April 12, 2018 (Doc #92083).

> *The theoretical release evaluation for the East MSWLF unit is simplified by the groundwater underdrain system. The groundwater underdrain system is expected to create an inward gradient in the vicinity of the East MSWLF unit boundary. As a result, a theoretical release from the MSWLF unit would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points. Additional groundwater monitoring wells at approximate 600-foot intervals have been installed surrounding the East MSWLF unit final boundary to supplement groundwater underdrain system monitoring and provide verification of an inward gradient in the vicinity of the unit boundary.*
>
> *The groundwater underdrain design is provided in the document, Site Development and Operational Plan for the East Horizontal Expansion, Barker Lemar Engineering*

Consultants, Updated February 2008 (2008 HEP), Appendix 2, Attachment 1, Sheet 11 (Doc #16848). The boundary of the proposed East MSWLF unit with the perforated drain pipe and solid pipe outfalls of the groundwater underdrain system are shown on Attachment A, Sheet 4.

Attachment A, Sheet 5A shows cross-section locations from which the soil profile for the northwest and north sides of the East MSWLF unit were generated and shown on Attachment A, Sheet 5B. The plan view of the identified wells/borings is provided on the figure. According to the boring logs, the soil profile along the northwest and north sides of the East MSWLF unit did not indicate sand or silt layers but consisted of clays near the surface and a thick shale layer below the clay. The boring logs for the southern boundary of the East MSWLF unit as shown on Attachment A, Sheet 5C were similar to those shown along the northwest and north sides of the East MSWLF unit.

The soil profiles of the East MSWLF unit indicate a fairly consistent pattern around the perimeter of the proposed facility consisting of clay near the surface underlain by an indeterminately thick layer of shale. Based on this stratigraphy, it appears that, in the absence of the groundwater underdrain system, a theoretical release would move along the pathway of the groundwater flow. With the groundwater underdrain, however, a theoretical release would be intercepted by the groundwater underdrain and routed to one of the groundwater underdrain outfalls. To provide supplemental and confirmatory monitoring, several groundwater monitoring wells along the groundwater downgradient sides of the East MSWLF unit were included in the hydrologic monitoring system. Since the groundwater monitoring wells would be considered secondary monitoring devices, the spacing between the wells is greater than 300 feet.

The proposed hydrologic monitoring system for the East MSWLF unit is shown in **Figure 3**. The proposed monitoring points by phase for the East MSWLF unit are included in **Table 4**. It should be noted that monitoring wells within the waste boundary will be properly abandoned and reinstalled, if appropriate, to coincide with the construction of the coinciding phases of the East MSWLF unit.

Table 4. East MSWLF Unit Monitoring Points by Phase

Cell	Monitoring Points
1	**GU-1**, ***MW-49***, **and *MW-50*.**
2	GU-1, **GU-2**, ***MW-48B***, *MW-49, MW-50*, **MW-53**, and **MW-56.**
3	GU-1, GU-2, **GU-3**, ***MW-45***, *MW-48B, MW-49, MW-50*, MW-53, and MW-56.
4	GU-1, GU-2, GU-3, **GU-4**, *MW-45, MW-48B, MW-49, MW-50*, MW-53, **MW-54**, and MW-56.
5	GU-1, GU-2, GU-3, GU-4, **GU-10**, *MW-45, MW-48B, MW-49, MW-50*, MW-53, MW-54, and MW-56.
6	GU-1, GU-2, GU-3, GU-4, GU-10**,** *MW-45**,** MW-48B, MW-49, MW-50*, MW-53, MW-54, MW-56, and **MW-57**.
7	GU-1, GU-2, GU-3, GU-4, GU-10, **GU-11**, *MW-45, MW-48B, MW-49, MW-50*, MW-53, MW-54, MW-56, MW-57, and **MW-85**.
8	GU-1, GU-2, GU-3, GU-4, GU-10, GU-11, *MW-45, MW-48B, MW-49, MW-50*, MW-53, MW-54, MW-56, MW-57**,** MW-85, and **MW-86**.

Cell	Monitoring Points
9	GU-1, GU-2, GU-3, GU-4, GU-10, GU-11, **MW-4**, *MW-45, MW-48B, MW-49, MW-50*, MW-53, MW-54, MW-85, MW-86, **MW-87,** and **MW-88.**

Note: **Bolded** points indicate points added to the monitoring network for the individual Cell (e.g. GU-1 is in the monitoring network beginning with Cell 1, while the bolded GU-2, MW-48B, MW-53, and MW-56 in the Cell 2 row are new additions to the monitoring network beginning with Cell 2.)
Italicized points indicate points that are currently shown as being within the waste boundary of the cell they will monitor. Construction is not anticipated to occur on the East MWSLF unit for over 40 years. These wells will be abandoned and redrilled prior to cell construction if no other factors change prior to construction.

Table 5 describes the existing and proposed HMSP monitoring points for the East MSWLF unit.

Table 5. Description of East MSWLF Unit Monitoring Points

Monitoring Points	Comments
GU-1	This monitoring point is the groundwater underdrain outfall for Cell 1. Groundwater intercepted by the underdrain will be routed to the collection pipes and to the GU-1 outfall, where the groundwater can be sampled and tested.
MW-49	This monitoring point is an existing groundwater monitoring well located along the south boundary of Cell 1. Although it is anticipated that groundwater will be intercepted by the groundwater underdrain, this point was selected for use as a secondary monitoring point for Cell 1 for water quality and verification of inward gradient.
MW-50	This monitoring point is an existing groundwater monitoring well located near the southwest corner of Cell 1. Although it is anticipated that groundwater will be intercepted by the groundwater underdrain, this point was selected for use as a secondary monitoring point for Cell 1.
GU-2	This monitoring point is the groundwater underdrain outfall for Cell 2. Groundwater intercepted by the underdrain will be routed to the collection pipes to the outfall, where the groundwater can be sampled and tested.
MW-53	This is an existing monitoring well located west and downgradient of Cells 2 and 3. Although groundwater from Cells 2 and 3 will be intercepted by the groundwater underdrain and drained to groundwater outfalls GU-2 and GU-3, this well will be used as a secondary monitoring point for Cells 2 and 3.
MW-48B	This is an existing monitoring well located at a downgradient location south of Cell 2. Although groundwater from Cell 2 will be intercepted by the groundwater underdrain and drained to groundwater outfall GU-2, this well will be used to provide for water quality and verification of the inward gradient.
GU-3	This monitoring point is the groundwater underdrain outfall for Cell 3. Groundwater intercepted by the underdrain will be routed to the collection pipes to the outfall, where the groundwater can be sampled and tested.
MW-45	This is an existing monitoring well located downgradient of the east portion of Cell 3. Although groundwater from Cell 3 will be intercepted by the groundwater underdrain and drained to groundwater outfall GU-3, this well will be used to provide secondary groundwater quality. Due to the secondary function of this well, it is spaced at a greater interval than 300 feet.
GU-4	This monitoring point is the groundwater underdrain outfall for Cell 4. Groundwater intercepted by the underdrain will be routed to the collection pipes to the outfall, where the groundwater can be sampled and tested.

Monitoring Points	Comments
MW-54	This is an existing monitoring well located at a downgradient location west and downgradient of Cell 4. Although groundwater from Cell 4 will be intercepted by the groundwater underdrain and drained to groundwater outfall GU-4, this well will be used to provide secondary groundwater quality. Since this well is not a primary groundwater monitoring point, this and other wells along the south boundary of the East MSWLF unit are spaced at greater than 300-foot intervals.
MW-56	This is an existing monitoring well located west and downgradient of Cells 1 and 2. Although groundwater from Cells 1 and 2 will be intercepted by the groundwater underdrain system and drained to groundwater outfalls GU-1 and GU-2, this well will be used as a secondary monitoring point for Cells 1 and 2.
MW-57	This is a future monitoring well located at a downgradient location at the southwest corner of Cell 6. Although groundwater from Cell 6 will be intercepted by the groundwater underdrain and drained to groundwater outfall GU-10, this well will be used to provide secondary groundwater quality.
MW-85	This is a future monitoring well that will be located west and downgradient of Cell 7.
MW-86	This is a future monitoring well that will be located west and downgradient of Cell 8.
MW-4	This monitoring point is an existing groundwater monitoring well located along the northeast boundary of Cell 9.
MW-87	This is a future monitoring well that will be located west and downgradient of Cell 9.
MW-88	This is a future monitoring well that will be located north and downgradient of Cell 9.
GU-10	This future monitoring point is a groundwater underdrain outfall for Cells 5 and 6. Groundwater intercepted by the underdrain will be routed to the collection pipes to the outfall, where the groundwater can be sampled and tested.
GU-11	This future monitoring point is a groundwater underdrain outfall for Cells 7, 8, and 9. Groundwater intercepted by the underdrain will be routed to the collection pipes to the outfall, where the groundwater can be sampled and tested.

3.2.2 Monitoring Point Installation Phasing

b. For those facilities which are long–term, multiphase operations, the department may establish temporary waste boundaries in order to define locations for monitoring wells. The convergence of groundwater paths to minimize the overall length of the downgradient dimension may be taken into consideration in the placement of downgradient monitoring wells provided that the multiphase unit groundwater monitoring system meets the requirements of paragraphs 113.10(2)"a," 113.10(2)"c," 113.10(2)"d" and 113.10(2)"e" and will be as protective of human health and the environment as the individual monitoring systems for each MSWLF unit, based on the following factors:

(1) Number, spacing, and orientation of the MSWLF units;
(2) Hydrogeologic setting;
(3) Site history;
(4) Engineering design of the MSWLF units; and
(5) Type of waste accepted at the MSWLF units.

The 2008 North Lateral Expansion portion of the West MSWLF unit is a multiphase development consisting of five phases. Phase development will progress from the south towards the north. Phases 1A and 1B, located along the north boundary of the existing North Cell, Phase 2, and Phase 3 have been constructed. Phase 4 is yet to be constructed. Groundwater flow is generally in a south-southeast direction under pre-development conditions toward the intermittent creek that traverses the site, making the eastern boundary of the 2008 North Lateral Expansion a downgradient boundary, notwithstanding the influence of the groundwater underdrain system. There is a limited

area of possible groundwater flow convergence under pre-development conditions along the eastern downgradient boundary where natural ravines exit the area. Groundwater monitoring well MW-63R was installed to monitor Phases 1A, 1B, and 2 of the 2008 North Lateral Expansion.

The 2017 West Expansion portion of the West MSWLF unit is a multiphase development consisting of three areas. Area development will progress from south to north. Area A1 is located along the east boundary of a portion of the Closed Area, Area A2 is located east of the North Cell, Phases 1A and 1B, and parts of Phase 2 of the 2008 North Lateral Expansion, and Area B is located east of Phase 3 and future Phase 4 of the 2008 North Lateral Expansion. Groundwater flow is generally in a south-southeast direction toward the intermittent creek that traverses the site, making the eastern boundary of the 2017 West Expansion a downgradient boundary, notwithstanding the influence of the groundwater underdrain system. There is a limited area of possible groundwater flow convergence under pre-development conditions along the eastern downgradient boundary where natural ravines exit the area.

The original East MSWLF unit is a multiphase development consisting of eight cells. Groundwater flow is generally to the west under pre-development conditions toward the intermittent creek that traverses the site, making the western boundary of the MSWLF unit a downgradient boundary, notwithstanding the influence of the groundwater underdrain system. The eastern portion of the south East MSWLF unit boundary is also downgradient under pre-development conditions, making that portion of the south boundary downgradient, notwithstanding the influence of the groundwater underdrain system. There is a limited area of possible groundwater flow convergence under pre-development conditions in the northwestern portion of the East MSWLF unit, where natural ravines exit the area. A portion of the final perimeter monitoring wells was installed as part of the hydrogeological assessment in 2003. Incorporation of various points into the HMSP will occur over time as development progresses.

The 2017 Expansion expanded the future footprint of the East MSWLF unit to the north and changed the phasing, resulting in Cells 1-9. Monitoring wells spaced at approximately 300-foot intervals along the downgradient western and northern boundaries will be installed to monitor the expansion area. Existing monitoring well MW-4, located at the northeastern corner of the 2017 Expansion, will also provide monitoring of the area.

The locations of the existing and proposed monitoring points for the West MSWLF unit and the East MSWLF unit are shown in **Figures 2 and 3**, respectively.

The hydrologic monitoring system network will be reviewed annually as part of the Annual Water Quality Report. The review will determine whether the installation of additional monitoring points is necessary or if sufficient data has been collected to justify altering the sampling frequency, discontinuing sampling, or abandoning one or more monitoring points.

3.2.3 Monitoring Well Construction Requirements

c. Monitoring wells must be constructed and cased by a well contractor certified pursuant to 567—Chapter 82 in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable the collection of groundwater samples. The annular space (i.e., the space between the borehole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater. Monitoring wells constructed in accordance with the rules in effect at the time of construction shall not be required to be abandoned and re-constructed as a result of subsequent rule changes unless the department finds that the well is no longer providing representative

groundwater samples. See Figure 1 [note: the monitoring well diagram is provided in **Attachment B**, Sheet B-1] *for a general diagram of a properly constructed monitoring well.*

(1) The owner or operator must notify the department that the design, installation, development, and decommission of any monitoring wells, piezometers and other measurement, sampling, and analytical devices documentation has been placed in the operating record.

The Commission will place documentation of the design, installation, development, and decommission of monitoring wells, piezometers, and other measurement, sampling, and analytical devices associated with this HMSP in the operating record and will notify the Iowa Department of Natural Resources (DNR) when such placement has been made.

(2) The monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program.

The Commission will ensure that the monitoring wells, piezometers, and other measurement, sampling, and analytical devices associated with this HMSP are operated and maintained in a manner such that they perform to design specifications throughout the life of the monitoring program.

(3) Each groundwater monitoring point must have a unique and permanent number, and that number must never change or be used again at the MSWLF. The types of groundwater monitoring points shall be identified as follows:

1. *Monitoring wells by "MW# (Insert unique and permanent number)".*
2. *Piezometers by "PZ# (Insert unique and permanent number)".*
3. *Groundwater underdrain systems by "GU# (Insert unique and permanent number)".*

The Commission will designate monitoring wells by MW-#, piezometers by PZ-#, and groundwater underdrains by GU-#. Each monitoring point will receive a unique and permanent number and that number designation will not be used again at the Landfill. Monitoring points that were designated before October 1, 2007, will retain their original designation.

(4) Monitoring well construction shall be performed by a certified well contractor (pursuant to 567—Chapter 82) and shall comply with the following requirements:

1. In all phases of drilling, well installation and completion, the methods and materials used shall not introduce substances or contaminants that may alter the results of water quality analyses.

2. Drilling equipment that comes into contact with contaminants in the borehole or aboveground shall be thoroughly cleaned to avoid spreading contamination to other depths or locations. Contaminated materials or leachate from wells must not be discharged onto the ground surface or into waters of the state so as to cause harm in the process of drilling or well development.

3. The owner or operator must ensure that, at a minimum, the well design and construction log information is maintained in the facility's permanent record using DNR Form 542–1277 and that a copy is sent to the department.

Monitoring well construction will be performed by a certified well contractor pursuant to 567 IAC Chapter 82. Drilling and well installation activities will be conducted in a manner that will not introduce substances or contaminants that may alter the results of water quality analysis. Monitoring

well materials will be delivered to the site in the protective wrapping provided by the manufacturer and will not be removed until immediately before well installation. Monitoring wells will be constructed using PVC well screens and casings. PVC is not expected to absorb, desorb, react, or otherwise alter the screened soil stratum or the groundwater being sampled. Galvanized metal, glues, welding solvents, pipe thread lubricants, and other foreign substances of like material will not be used. Contaminated materials or leachate from wells will not be discharged onto the ground surface or into waters of the state so as to cause harm in the process of drilling or well development. Monitoring well design and construction log information will be recorded on DNR Form 542-1277 and maintained in the facility's operating record. Copies will be sent to the DNR.

(5) Monitoring well casings shall comply with the following requirements:
1. The diameter of the inner well casing (see Figure 1) of a monitoring well shall be at least 2 inches.
2. Plastic–cased wells shall be constructed of materials with threaded and nonglued joints that do not allow water infiltration under the local subsurface pressure conditions and when the well is evacuated for sampling.
3. Well casing shall provide sufficient structural stability so that a borehole or well collapse does not occur. Flush joint casing is required for small-diameter wells installed through hollow stem augers.

The monitoring well casings used to construct monitoring wells at the Landfill will be at least 2 inches in diameter and will be plastic (PVC). The PVC monitoring well casings will feature flush-jointed, threaded, non-glued joints, which prevent water infiltration under local subsurface pressure conditions, including during well evacuation for sampling. The monitoring well casings will provide sufficient structural stability so that borehole or well collapse will not occur under normal conditions.

(6) Monitoring well screens shall comply with the following requirements:
1. Slot size shall be based on sieve analysis of the sand and gravel stratum or filter pack. The slot size must keep out at least 90 percent of the filter pack.
2. Slot configuration and open area must permit effective development of the well.
3. The screen shall be no longer than 10 feet in length, except for water table wells, in which case the screen shall be of sufficient length to accommodate normal seasonal fluctuations of the water table. The screen shall be placed 5 feet above and below the observed water table, unless local conditions are known to produce greater fluctuations. Screen length for piezometers shall be 2 feet or less. Multiple–screened, single–cased wells are prohibited.

The screen size for monitoring wells will be 0.010" (10-slot), which is consistent with monitoring well screens installed previously at the site and is compatible with the filter pack specified in 567 IAC 113.10(2)"c"(7). The screen slot configuration is three rows of slots providing approximately 1.77 square inches of open area per linear foot of screened section. Based on the previously measured hydraulic conductivities at the site, this is expected to be a sufficient area to permit effective development of the monitoring wells. The monitoring wells will have a minimum of 5 feet and a maximum of 10 feet of screen unless expected water table fluctuations necessitate a longer screened interval. Based on field observations, an attempt will be made to position the screen of the water table monitoring wells so that the water table intersects the approximate midpoint of the screen length. Multiple-screened, single-cased monitoring wells will not be installed.

(7) Monitoring well filter packs shall comply with the following requirements:
1. The filter pack shall extend at least 18 inches above and 12 inches below the well screen.

2. The size of the filter pack material shall be based on sieve analysis when sand and gravel are screened. The filter pack material must be 2.5 to 3 times larger than the 50 percent grain size of the zone being monitored.

3. In stratum that is neither sand nor gravel, the size of the filter pack material shall be selected based on the particle size of the zone being monitored.

The monitoring well filter packs will extend at least 18 inches above and 12 inches below the well screen. The size of the filter pack material will be 2.5 to 3 times larger than the 50 percent grain size of the zone being monitored. In stratum that is neither sand nor gravel, the size of the filter pack material will be selected based on the particle size of the zone being monitored. If appropriate, pre-packed monitoring well screens may be used to satisfy the filter pack requirements.

(8) Monitoring well annular space shall comply with the following requirements:

1. Grouting materials must be installed from the top of the filter pack up in one continuous operation with a tremie tube.

2. The annular space between the filter pack and the frostline must be backfilled with bentonite grout.

3. The remaining annular space between the protective casing and the monitoring well casing must be sealed with bentonite grout from the frostline to the ground surface.

Grouting materials will be installed in one continuous operation with a tremie tube. The annular space between the filter pack and the frostline will be backfilled with bentonite grout. The remaining annular space between the protective casing and the monitoring well casing will be sealed with bentonite grout from the frostline to the ground surface.

(9) Monitoring well heads shall be protected as follows:

1. Monitoring wells shall have a protective metal casing installed around the upper portion of the monitoring well casing as follows:

- *The inside diameter of the protective metal casing shall be at least 2 inches larger than the outer diameter of the monitoring well casing.*
- *The protective metal casing shall extend from a minimum of 1 foot below the frostline to slightly above the well casing top; however, the protective casing shall be shortened if such a depth would cover a portion of the well screen.*
- *The protective casing shall be sealed and immobilized with a concrete plug around the outside. The bottom of the concrete plug must extend at least 1 foot below the frostline; however, the concrete plug shall be shortened if such a depth would cover a portion of the well screen. The top of the concrete plug shall extend at least 3 inches above the ground surface and slope away from the well. Soil may be placed above the plug and shall be at least 6 inches below the cap to improve runoff.*
- *The inside of the protective casing shall be sealed with bentonite grout from the frostline to the ground surface.*
- *A vented cap shall be placed on the monitoring well casing.*
- *A vented, locking cap shall be placed on the protective metal casing. The cap must be kept locked when the well is not being sampled.*

2. All monitoring wells shall have a ring of brightly colored protective posts or other protective barriers to help prevent accidental damage.

3. All monitoring wells shall have a sign or permanent marking clearly identifying the permanent monitoring well number (MW#).

4. Run–on shall be directed away from all monitoring wells.

Monitoring well wellheads will be protected by installing protective metal casings around the upper portions of the monitoring wells. The inside diameter of the protective metal casings will be at least 2 inches larger than the outside diameter of the monitoring well casings. The protective metal casings will be installed to extend from a minimum of 1 foot below the frost line to approximately 3 inches above the top of casing. The inside of the protective casing will be sealed with bentonite grout from the frost line to the ground surface. The protective casing will be sealed and immobilized with a concrete plug around the outside, the bottom of which will extend to at least 1 foot below the frost line and the top of which will extend at least 3 inches above the ground surface and slope away from the monitoring well to direct run-on away from the wellhead. Both the protective metal casing and the concrete plug will be shortened if the specified depths cover a portion of the monitoring well screen. A vented cap will be placed on the monitoring well casing, and a vented, locking cap will be placed on the protective metal casing. The cap will be kept locked when the well is not being accessed for groundwater sample collection or other measurements.

Brightly colored protective posts will be installed around the monitoring wells to help prevent accidental damage. Three protective posts will be installed at approximately 120-degree angles around single monitoring wells, and four protective posts will be installed at approximately 90-degree angles around well nests. The monitoring wells will each have a sign or permanent marking clearly identifying the permanent monitoring well designation (e.g., MW-#).

(10) Well development is required prior to the use of the monitoring well for water quality monitoring purposes. Well development must loosen and remove fines from the well screen and gravel pack. Any water utilized to stimulate well development must be of sufficient quality that future samples are not contaminated. Any gases utilized in well development must be inert gases that will not contaminate future samples. Following development, the well shall be pumped until the water does not contain significant amounts of suspended solids.

Monitoring well development will be conducted prior to the use of the monitoring well for water quality monitoring purposes. Monitoring wells will be developed using a pump or a clean disposable bailer until field measurements (pH, conductivity, and temperature) are within 10% of previous measurements or five well volumes have been removed, whichever occurs first. Following development, groundwater will be extracted from the monitoring wells until visual field observation of color and opacity indicates that the water does not contain a significant concentration of suspended solids. If water must be added to the monitoring well to facilitate its development, the water will be of sufficient quality to prevent contamination of future samples. If gases are used for monitoring well development, they will be inert, ensuring they do not contaminate future samples.

3.2.4 Groundwater Monitoring Point Abandonment

d. Groundwater monitoring points that are no longer functional must be sealed. Groundwater monitoring points that are to be sealed and are in a future waste disposal area shall be reviewed to determine if the method utilized to seal the monitoring point needs to be more protective than the following requirements. All abandoned groundwater–monitoring points (e.g., boreholes, monitoring wells, and piezometers) shall be sealed by a well contractor certified pursuant to 567—Chapter 82 and in accordance with the following requirements.

(1) The following information shall be placed in the operating record and a copy sent to the department:

1. *The unique, permanent monitoring point number.*
2. *The reasons for abandoning the monitoring point.*
3. *The date and time the monitoring point was sealed.*
4. *The method utilized to remove monitoring point materials.*

5. The method utilized to seal the monitoring point.
6. Department Form 542–1226 for Water Well Abandonment Plugging Record.

Groundwater monitoring points that are no longer functional will be abandoned. The methods for abandoning groundwater monitoring points in future waste disposal areas will be reviewed to determine if the sealing method used needs to be more protective than the requirements of 567 IAC 113.10(2)"d"(2-4). Abandoned groundwater monitoring points will be sealed by a well contractor certified pursuant to 567 IAC Chapter 82. The information required by 113.10(2)"d"(1) will be placed in the operating record, and a copy will be submitted to the DNR.

(2) The monitoring point materials (e.g., protective casing, casing, screen) shall be removed. If drilling is utilized to remove the materials, then the drilling shall be to the maximum depth of the previously drilled monitoring point. All drilling debris shall be cleaned from the interior of the borehole.

Monitoring point abandonment will consist of removing the monitoring point materials (e.g., protective metal casing, casing, screen) from the borehole prior to grouting. If the monitoring well casing and screen cannot be successfully removed prior to grouting, then the remaining materials will be removed via drilling to the maximum depth of the monitoring point. Drilling debris will be cleaned from the interior of the borehole prior to sealing.

(3) The cleared borehole shall be sealed with impermeable bentonite via a tremie tube. The end of the tremie tube shall be submerged in the grout while filling from the bottom of the borehole to the top of the ground surface. Uncontaminated water shall be added from the surface as needed to aid grout expansion.

The boreholes will be sealed with impermeable bentonite grout via a tremie tube. The end of the tremie tube will be submerged in the grout while filling from the bottom of the borehole to the top of the ground surface. Uncontaminated water will be added from the surface as needed to aid grout expansion.

(4) After 24 hours, the bentonite shall be retopped if the bentonite has settled below the ground surface.

The abandoned monitoring point locations will be checked approximately 24 hours after sealing. The bentonite will be retopped if the bentonite has settled below the ground surface.

3.2.5 HMSP Monitoring Points

e. Hydrologic monitoring system plan (HMSP). Unless otherwise approved by the department in writing, the number, spacing, and depth of groundwater monitoring points shall be:
(1) Determined based upon site–specific technical information, including but not limited to the soil and hydrogeologic investigation pursuant to subrule 113.6(3) and the site exploration and characterization report pursuant to subrule 113.6(4), that must include thorough characterization of:
1. Aquifer thickness, groundwater flow rate, and groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

According to the Hydrogeologic Investigation Report and Hydrologic Monitoring System Report, Green Environmental Services, March 1992, (1992 HAR, Doc #59136), as reported in Appendix 3 of the 2005 North Lateral Expansion Plan, Barker Lemar Engineering Consultants, May 2005, the water

table beneath the West MSWLF unit is located in the uppermost aquifer, which consists of mine spoils, alluvium (silt, sand, and gravel), shallow till with sand lenses, and weathered shale. The depth to the water table across the site, as measured in previous assessments, varies from an average of 1 to 11 feet below ground surface (bgs) in the valley to 18 to 24 feet bgs on the hilltops. The deepest water table depths of 33 and 36 feet bgs measured during previous assessments were observed on the southwest corner of the site and are associated with sands in a buried channel. Groundwater flow rates and groundwater flow directions, including seasonal and temporal fluctuations in groundwater flow, were also discussed in detail in Appendix 3 of the 2008 HEP for the East MSWLF unit. This site-specific technical information was used as a basis for developing the HMSP monitoring network described in Section 3.1.2 of this document.

2. Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to: thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities; and

The first encountered saturated unit beneath the MSWLF units was considered the uppermost aquifer (see 2008 HEP, Appendix 3 and 1992 HAR). The unsaturated geologic units overlying the uppermost aquifer, the materials comprising the uppermost aquifer, and the materials comprising the confining unit defining the lower boundary of the uppermost aquifer were described in detail in Appendix 3 of the 2008 HEP and the 1992 HAR. This site-specific technical information was used as a basis for developing the HMSP for the monitoring network described in Section 3.1.2 of this document.

3. Projected paths and rates of movement of contaminants found in leachate pursuant to subparagraph 113.6(3)"e"(6).

The projected paths and rates of movement of contaminants generated within the 2008 North Lateral Expansion are simplified by the groundwater underdrain system. As discussed in Section 3.2.1 of this HMSP, and as shown in Appendix 2, Attachment A, Sheet 2-E1, the groundwater underdrain system may create an inward gradient in the vicinity of the 2008 North Lateral Expansion boundary. As a result, the projected path of a release from the 2008 North Lateral Expansion would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points. Specific rates of contaminant movement have not been calculated, as the groundwater underdrain system is expected to provide capture of contaminants in the event of a release. Along the downgradient portion of the West MSWLF unit, there is no apparent point of groundwater convergence; therefore, downgradient monitoring wells are proposed for 300-foot spacing.

The projected paths and rates of movement of contaminants generated within the proposed 2017 West Expansion are simplified by the groundwater underdrain system. The groundwater underdrain system may create an inward gradient in the vicinity of the proposed 2017 West Expansion boundary. As a result, the projected path of a release from the proposed 2017 West Expansion would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points. Specific rates of contaminant movement have not been calculated, as the groundwater underdrain system is expected to provide capture of contaminants in the event of a release. Along the downgradient portion of the 2017 West Expansion, there are apparent points of groundwater convergence where pre-development ravines cross future waste boundaries; therefore, some downgradient monitoring wells are proposed for a greater than 300-foot spacing.

The projected paths and rates of movement of contaminants generated within the East MSWLF unit are simplified by the groundwater underdrain system. The groundwater underdrain system may create an inward gradient in the vicinity of the East MSWLF unit boundary. As a result, the projected path of a release from the East MSWLF unit would be directed to and captured by the groundwater underdrain system. The release would then be detected in the samples collected regularly from the groundwater underdrain discharge points. Specific rates of contaminant movement have not been calculated, as the groundwater underdrain system is expected to provide capture of contaminants in the event of a release. In addition to the groundwater underdrain system, the 2017 East Expansion of the East MSWLF unit will be monitored by monitoring wells installed at a 300-foot spacing along the downgradient (west and north) boundaries, as areas of groundwater flow convergence were not apparent.

(2) Designed and constructed with a maximum of 300 feet between downgradient groundwater monitoring wells, unless it is demonstrated by site-specific analysis or modeling that an alternative well spacing is justified. The convergence of groundwater paths to minimize the overall length of the downgradient dimension may be taken into consideration in the placement of downgradient monitoring wells provided that the groundwater monitoring system meets the requirements of paragraphs 113.10(2)"a", 113.10(2)"c", 113.10(2)"d", and 113.10(2)"e."

The groundwater monitoring system was designed based on site-specific analysis that justified an alternative well spacing. The groundwater underdrain system is the primary component of the groundwater monitoring system. The groundwater underdrain system provides a form of continuous spatial monitoring resulting from the continuous nature of the underdrain layer and the gradient created by the groundwater drawdown of the system. This monitoring system is not expected to have the gaps between monitoring points that would be present in a conventional monitoring system comprised only of monitoring wells at a 300-foot spacing. As a secondary monitoring measure and to confirm an inward groundwater gradient to the groundwater underdrain system, new and existing groundwater monitoring wells will be monitored in areas of groundwater convergence or in downgradient areas (notwithstanding the influence of groundwater underdrains).

(3) Certified by a qualified groundwater scientist, as defined in paragraph 113.10(1)"d," and approved by the department. Within 14 days of this certification and approval by the department, the owner or operator must notify the department that the certification has been placed in the operating record.

The monitoring network as described herein for the West and East MSWLF units is hereby certified by Nathan Ohrt, who is considered a "qualified groundwater scientist" by the definition contained in 567 IAC 113.10(1)"d".

3.2.6 Monitoring Well Maintenance and Performance Reevaluation Plan

f. Monitoring well maintenance and performance reevaluation plan. A monitoring well maintenance and performance reevaluation plan shall be included as part of the hydrologic monitoring system plan. The plan shall ensure that all monitoring points remain reliable. The plan shall provide for the following:

(1) A biennial examination of high and low water levels accompanied by a discussion of the acceptability of well location (vertically and horizontally) and exposure of the screened interval to the atmosphere.

A biennial examination of high and low water levels accompanied by a discussion of the applicability of well locations and other monitoring point locations (vertically and horizontally) and exposure of the

screen interval to the atmosphere (as applicable) will be performed and presented in each Annual Water Quality Report (AWQR) due in odd-numbered years. Water level measurements will be conducted in accordance with the Standard Operating Procedure (SOP), Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

(2) A biennial evaluation of water level conditions in the monitoring wells to ensure that the effects of waste disposal or well operation have not resulted in changes in the hydrologic setting and resultant flow paths.

A biennial evaluation of water level conditions in the monitoring wells will be performed to ensure that the effects of waste disposal or well operation have not resulted in changes in the hydrologic setting and resultant flow paths. Water level measurements will be collected from monitoring wells (currently semi-annually) for the West MSWLF unit in accordance with the phased implementation schedules and at the frequency required by the DNR. The biennial evaluation will include a review of the groundwater monitoring well static water levels in the vicinity of the West MSWLF unit and the groundwater underdrain system influence on water table elevations and flow paths, specifically with regard to the creation and maintenance of an inward gradient toward the boundaries of the 2008 North Lateral Expansion and 2017 West Expansion portions of the West MSWLF unit. The results of the biennial evaluation will be presented in each AWQR due in odd-numbered years. Water level measurements will be conducted in accordance with the requirements of the SOP contained in **Attachment A**.

(3) Measurements of well depths to ensure that wells are physically intact and not filling with sediment. Measurements shall be taken annually in wells which do not contain dedicated sampling pumps and every five years in wells containing dedicated sampling pumps.

The monitoring wells associated with the West MSWLF unit have been equipped with low-flow sampling systems, either dedicated tubing for use with a peristaltic pump (for wells with depth to water less than 25 feet) or dedicated submersible pumps (for water depths greater than 25 feet). Measurement of well depths to ensure that the wells are physically intact and not filling with sediment will be taken every fifth year for wells with dedicated pumps. Measurement of well depths will be conducted during each sampling event in wells that do not have dedicated pumps. Well depth measurements will be conducted in accordance with the requirements of the SOP. A copy of this SOP is contained in **Attachment A**.

(4) A biennial evaluation of well recharge rates and chemistry to determine if well deterioration is occurring.

A biennial evaluation of well recharge rates and chemistry will be performed to determine if well deterioration is occurring. The well recharge rate evaluation will consist of reviewing the purging rates from the sampling events. Consistent purging rates during sampling events would be an indication that well deterioration is not occurring. Data from indicator parameters (specific conductance, pH, and temperature) measurements, along with analysis of the required detection or assessment monitoring parameters, will be evaluated. Changes in chemistry that can be attributed to well deterioration and not associated with a properly functioning well, which may indicate a possible release, will be considered an indication that well decline is occurring. Measurements of average purge rates, purged volumes, and field parameters will be conducted in accordance with the requirements of Section E of the SOP. A copy of this SOP is contained in **Attachment A**.

3.3 SURFACE WATER MONITORING SYSTEMS

113.10(3) Surface water monitoring systems. The department may require an MSWLF facility to implement a surface water monitoring program if there is reason to believe that a surface water of the state has been impacted as a result of facility operations (i.e., leachate seeps, sediment pond discharge) or a groundwater SSI over background has occurred.

3.3.1 Surface Water Monitoring Points

a. A surface water monitoring program must be developed that consists of a sufficient number of monitoring points, designated at appropriate locations, to yield surface water samples that:

(1) Provide a representative sample of the upstream quality of a surface water of the state if the surface water being monitored is a flowing body of water.

(2) Provide a representative sample of the downstream quality of a surface water of the state if the surface water being monitored is a flowing body of water.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.2 Surface Water Measurements

b. Surface water levels must be measured at a frequency specified in the facility's permit, within 1/10 of a foot at each surface water monitoring point immediately prior to sampling, each time surface water is sampled. The owner or operator must determine the rate and direction of surface water flow, if any, each time surface water is sampled. Surface water level and flow measurements for the same surface water of the state must be measured on the same day to avoid temporal variations that could preclude accurate determination of surface water flow and direction.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.3 Monitoring Point Decommissioning

c. The owner or operator must notify and receive approval from the department for the designation or decommission of any surface water monitoring point, and must place that approval in the operating record.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.4 Monitoring Point Longevity

d. The surface water monitoring points shall be designated to maintain sampling at that monitoring point throughout the life of the surface water monitoring program.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.5 Monitoring Point Designation

e. Each surface water monitoring point must have a unique and permanent number, and that number must never change or be used again at the MSWLF. Surface water monitoring points shall be identified by "SW# (Insert unique and permanent number)".

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.6 Monitoring Point Locations

f. The number, spacing, and location of the surface water monitoring points shall be determined based upon site–specific technical information, including:
(1) Water level, including seasonal and temporal fluctuations in water level; and
(2) Flow rate and flow direction, including seasonal and temporal fluctuations in flow.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.3.7 Discontinuing Monitoring

g. The MSWLF may discontinue the surface water monitoring program if monitoring data indicates that facility operations are not impacting surface water.

The DNR has not required the Commission to implement a surface water monitoring program for the MSWLF units.

3.4 GROUNDWATER SAMPLING AND ANALYSIS REQUIREMENTS

113.10(4) *Groundwater sampling and analysis requirements.*

3.4.1 Sampling and Analysis Procedures

a. The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells installed in compliance with subrule 113.10(2). The groundwater monitoring program shall utilize a laboratory certified by the department. The owner or operator must notify the department that the sampling and analysis program documentation has been placed in the operating record, and the program must include procedures and techniques for:
(1) Sample collection;

Due to concerns that total suspended solids (TSS) concentrations may impact measured total metals concentrations, low-flow purging and sampling procedures will be followed. Low-flow purging is defined as purging at a flow rate of less than 0.5 liter per minute (L/min) or the equivalent of 0.13 gallons per minute (gpm); low-flow sampling is defined as sampling at a flow rate of 0.1 to 0.5 L/min or the equivalent of 0.03 to 0.13 gpm; however, flow rates will be adjusted to 0.2 to 1.0 L/min based on the water level drawdown and turbidity observations. Sampling will occur via a peristaltic pump and dedicated in-well tubing if the depth to water is less than 25 feet. For wells in which the depth to water is greater than 25 feet, a dedicated submersible pump will be used for sampling. All sampling devices and monitoring equipment will be calibrated and operated according to the manufacturer's recommendations and field sampling plan.

Groundwater sample collection will be conducted in accordance with the requirements of Section E of the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

(2) Sample preservation and shipment;

Groundwater sample preservation and shipment will be conducted in accordance with the requirements of Section E of the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

(3) Analytical procedures;

A laboratory certified by the DNR will be utilized for sample analysis.

(4) Chain of custody control; and

Chain of custody control will be prepared in accordance with the requirements of Section E-1h of the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

(5) Quality assurance and quality control.

Quality assurance and quality control procedures will be conducted in accordance with the requirements of Section E-1h of the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

3.4.2 Sampling and Analytical Methods

b. The groundwater monitoring programs must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. Groundwater samples shall not be field–filtered prior to laboratory analysis.

The groundwater sampling and analytical methods that will be used for the collection and analysis of groundwater samples associated with the West and East MSWLF units are discussed in the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**. As indicated therein, groundwater samples will not be field-filtered prior to laboratory analysis.

3.4.3 Sampling Procedure Performance

c. The sampling procedures and frequency must be protective of human health and the environment, and consistent with subrule 113.10(5).

The sampling procedures as described in the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring, are protective of human health and the environment and are consistent with subrule 567 IAC 113.10(5). A copy of this SOP is contained in **Attachment A**. The sampling frequency will be semi-annually unless the DNR approves an alternative schedule or frequency.

3.4.4 Groundwater Elevation Measurement

d. Groundwater elevations must be measured at a frequency specified in the facility's permit, within 1/100 of a foot in each well immediately prior to purging, each time groundwater is sampled. The owner or operator must determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area must be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.

Groundwater elevation measurements will be collected from monitoring wells in the West MSWLF unit with each sampling event (currently semi-annually) at the frequency specified by the DNR. The groundwater elevation measurements will be used to estimate the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area will be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction. Water level measurements will be conducted in accordance with the requirements of the Standard Operating Procedure, Sanitary Landfill Groundwater Monitoring. A copy of this SOP is contained in **Attachment A**.

3.4.5 Background Groundwater Quality

e. The owner or operator must establish background groundwater quality in a hydraulically upgradient or background well(s) for each of the monitoring parameters or constituents required in the particular groundwater monitoring program that applies to the MSWLF unit, as determined under paragraph 113.10(5)"a" or 113.10(6)"a." Background groundwater quality may be established at wells that are not located hydraulically upgradient from the MSWLF unit if the wells meet the requirements of subparagraph 113.10(2) "a"(1).

Monitoring well MW-53 is the designated background monitoring well for the West MSWLF unit. Background water quality for the groundwater underdrain monitoring points is historical data from the individual monitoring points. Background monitoring wells for the East MSWLF unit will be selected when the East MSWLF unit is constructed.

3.4.6 Number of Background Samples

f. The number of samples collected to establish groundwater quality data must be consistent with the appropriate statistical procedures determined pursuant to paragraph 113.10(4)"g." The sampling procedures shall be those specified under paragraphs 113.10(5)"b" for detection monitoring, 113.10(6)"b" and 113.10(6)"d" for assessment monitoring, and 113.10(7)"b" for corrective action.

At least five background samples have been collected from the existing HMSP monitoring points for the West MSWLF unit. Five background samples from future additional groundwater monitoring wells, collected within one year, will be taken at times determined by developmental phasing. If statistical evaluation methods require additional background data, appropriate statistical comparisons will be made between the background data and subsequently collected data to update the background data set with future sampling events, as appropriate.

An interwell statistical evaluation is currently being utilized for the West MSWLF unit monitoring wells, and an intrawell statistical evaluation is used for the groundwater underdrain monitoring points. Statistical evaluation methods have not yet been selected for the East MSWLF unit. Final

determination of whether an interwell or an intrawell statistical evaluation will be used for the East MSWLF unit will be made following the collection of initial background samples and the evaluation of the groundwater analytical data.

3.4.7 Statistical Methods

g. The owner or operator must specify in the operating record which of the following statistical methods will be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen shall be conducted separately for each hazardous constituent in each well.

(1) A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph 113.10(4)"h." The owner or operator must place a justification for this alternative in the operating record and notify the department of the use of this alternative test. The justification must demonstrate that the alternative method meets the performance standards of paragraph 113.10(4)"h."

The statistical methods to be used for the West MSWLF unit at the Landfill in evaluating groundwater monitoring data for each required constituent are outlined as follows:

Diagnostic and Exploratory Evaluations and Tests of Assumptions

The detection and assessment/corrective action monitoring statistical programs include diagnostic and exploratory evaluations and statistical tests of assumptions, as appropriate, including the following:

- Time Series Plots
- Shapiro-Wilk test for normality
- Ohio Environmental Protection Agency (EPA) Method for outliers
- Mann-Kendall/Sen's Slope trend test

Management of Non-Detect Data

Non-detect values in the dataset are managed using simple substitution or the Kaplan-Meier estimator. If less than 15% of the data are non-detects, simple substitution is used, where non-detect values are assigned a concentration of one-half (½) of the practical quantification limit (PQL). If greater than 15% but less than 50% of the data are non-detects, the Kaplan-Meier estimator is used to define the distribution for the dataset. If non-detects comprise greater than 50% of the available data, non-parametric statistical methods are used.

Management of Outliers

Background datasets are evaluated for outliers using the Ohio EPA Method as included in the Sanitas™ statistical software program and described below, which consists of the use of Dixon's, Rosner's, and Tukey's outlier tests, as appropriate based on the diagnostic tests, for the datasets that contain less than 75% of the measured concentrations below the PQL. Outliers are not confirmed unless a physical cause or explanation for the outlier is determined.

3.4.8 Management of Data (ND data < 75%)

If less than 75% of the background dataset is below the PQL, outliers are statistically evaluated using the following guidelines.

- A parametric dataset with n < 20 is evaluated with the Dixon's outlier test.
- A parametric dataset with n ≥ 20 is evaluated with the Rosner's outlier test.
- A non-parametric dataset is evaluated with the Tukey's outlier test.

In accordance with the Ohio EPA Method, if a statistically significant outlier is not found using the above tests, but the highest value data point exceeds the second highest data point by an order of magnitude, the highest point is considered an outlier.

3.4.9 Management of Data (ND data ≥ 75%)

If greater than or equal to 75% of the background dataset is less than the PQL, outliers are statistically evaluated using the following guidelines.

- Single detection ≥ the PQL:
  - If ≥ 50% of the background dataset has detections ≥ the method detection limit (MDL), any value ≥ two times the PQL of background is considered an outlier.
  - If < 50% of the background dataset has detections ≥ the MDL, any value ≥ the PQL of background is considered an outlier.
- Two or more detections ≥ the PQL:
  - If ≥ 50% of the background dataset has detections ≥ the MDL, any value ≥ three times the PQL of background is considered an outlier.
  - If < 50% of the background dataset has detections ≥ the MDL, any value ≥ two times the PQL of background is considered an outlier.

Confirmed outliers, if any, are shown in the Summary of Groundwater Chemistry included in the Annual Water Quality Report.

3.4.10 Statistical Method Performance Standards

The statistical methods selected for the West and East MSWLF units at the Landfill in accordance with IAC 567-113.10(4)"g" comply with the performance standards listed in IAC 567-113.10(4)"h"(1) through (6) when applicable.

h. The statistical method required pursuant to paragraph 113.10(4)"g" shall comply with the following performance standards:

(1) The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be

inappropriate for a normal theory test, then the data shall be transformed or a distribution–free theory test shall be used. If the distributions for the constituents differ, more than one statistical method may be needed.

The test for normality will be performed before conducting prediction limit determination, constructing confidence intervals, and determining if a well can be returned to detection monitoring. The test for normality, the Shapiro-Wilk normality test, will determine whether parametric or non-parametric statistical methods are appropriate.

(2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level not less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experimentwise error rate for each testing period shall be not less than 0.05; however, the Type I error level of not less than 0.01 for individual well comparisons must be maintained.

To be able to limit the annual SWFPR to no more than 10% and to maintain the minimum statistical power at each contaminant-well pair, a minimum of eight background data points is required, along with a retesting scheme (either 1-of-2, 1-of-3, or 1-of-4 on observations) when conducting interwell prediction limit testing. The retesting scheme may be changed if necessary to limit the annual SWFPR to no more than 10%.

(3) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be protective of human health and the environment. The parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

Not applicable since a control chart approach is not proposed as a statistical method for the West and East MSWLF units.

(4) If a tolerance interval or a predictional interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be protective of human health and the environment. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

The groundwater protection standards, if the MCL or regulatory limit does not exist, will be calculated as an upper tolerance limit (UTL) with 95% confidence and 95% coverage. The confidence interval will be computed with 99% statistical confidence.

(5) The statistical method shall account for data below the limit of detection (LD) by recording such data at one–half the limit of detection (i.e., LD/2) or as prescribed by the statistical method. Any practical quantitation limit (PQL) that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

The practical quantitation limit (PQL) that a laboratory reports is the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility. The selected statistical methods will account for data below the limit of detection by recording such data at one-half the limit of detection.

(6) If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

The selected statistical methods account for seasonal and spatial variability as well as temporal correlation in the data. If necessary, detailed procedures will be developed to control or correct for variability.

3.4.11 SSI Over Background Determination

i. The owner or operator must determine whether or not there is an SSI over background values for each parameter or constituent required in the particular groundwater monitoring program that applies to the MSWLF unit, as determined under paragraph 113.10(5)"a" or 113.10(6)"a."

(1) In determining whether an SSI has occurred, the owner or operator must compare the groundwater quality of each parameter or constituent at each monitoring well designated pursuant to subrule 113.10(2) to the background value of that constituent, according to the statistical procedures and performance standards specified under paragraphs 113.10(4)"g" and 113.10(4)"h."

(2) Within 45 days after completing sampling and analysis, the owner or operator must determine whether there has been an SSI over background at each monitoring well.

The statistical methods selected in accordance with 567 IAC 113.10(4)"g" in compliance with the performance standards in 113.10(4)"h" will be used to determine whether or not an SSI has occurred. The determination of whether or not an SSI has occurred will be completed within 45 days of receipt of laboratory analytical data.

3.5 DETECTION MONITORING PROGRAM

Detection Monitoring Statistical Program/Inorganic Acid Mine Drainage Statistical Evaluation

Groundwater monitoring data associated with the West MSWLF unit for the detection monitoring program and inorganic data from acid mine drainage (AMD) impacted monitoring wells are statistically analyzed by the diagnostic evaluations listed above and by interwell prediction limits, intrawell prediction limits, and the double quantification method. The procedures for these evaluations are described below.

For acid mine drainage wells, both interwell and intrawell prediction limits were selected for the determination of statistically significant increases (SSIs) over background for inorganic constituents with historical detections in background. An SSI must be indicated in both the interwell and intrawell statistical evaluation for the SSI to be considered. Data from the most recent sampling event is compared to the prediction limits for the determination of SSIs.

3.5.1 Interwell Prediction Limits with Retesting

- If the dataset has a normal distribution (or can be transformed to a normal distribution using Ladder of Powers), parametric interwell prediction limits are calculated if at least five datasets have been collected from the background monitoring point(s).
- If the dataset does not have a normal distribution (and cannot be transformed to a normal distribution using Ladder of Powers) or has greater than 50% non-detects, nonparametric interwell prediction limits are calculated if at least five datasets have been collected from the background monitoring point(s).

- If an SSI above the prediction limit is indicated, retesting samples using the 1-of-2 retesting scheme should be collected before the next regularly scheduled sampling event, with temporal sample spacing consideration to provide samples with greater independence. If the retesting result exceeds the prediction limit, the SSI is confirmed. The monitoring point should then be placed into the assessment monitoring program for the monitoring wells or treated with the leachate for the groundwater underdrains. If the retesting sample concentration is below the prediction limit, the SSI is not confirmed, and the monitoring point continues in the detection monitoring program.
- If an SSI above the prediction limit is indicated for AMD wells using both interwell and intrawell statistical methods, further evaluation will be performed regarding the impact of AMD on affected parameters.

3.5.2 Intrawell Prediction Limits with Retesting

- If the dataset has a normal distribution (or can be transformed to a normal distribution using Ladder of Powers), parametric intrawell prediction limits are calculated if at least six samples have been collected.
- If the dataset does not have a normal distribution (and cannot be transformed to a normal distribution using Ladder of Powers) or has greater than 50% non-detects, non-parametric intrawell prediction limits are calculated if at least six samples have been collected.
- If an SSI above the prediction limit is indicated for AMD wells using both interwell and intrawell statistical methods, further evaluation will be performed regarding the impact of AMD on affected parameters.
- If an SSI above the prediction limit is indicated for the groundwater underdrains, retesting samples using the 1-of-2 retesting scheme should be collected before the next regularly scheduled sampling event, with temporal sample spacing consideration to provide samples with greater independence. If the retesting result is above the prediction limit, the SSI is confirmed, and the discharge will be treated with the leachate. If the retesting sample concentration is below the prediction limit, the SSI is not confirmed, and the monitoring point continues in the detection monitoring program.

Updating the Background Dataset for Intrawell Prediction Limits

If no SSI is confirmed for any two-year period, the intrawell background datasets are updated using the following procedure:

- Test the new dataset for normal distribution either outright or through a transformation using Ladder of Powers using the Shapiro-Wilk test.
- Test the new dataset for statistically significant outliers using the Ohio EPA Method and remove the confirmed outliers (see the “Management of Outliers” section).
- Test the new dataset for statistically significant trends using the Mann-Kendall/Sen’s Slope trend test. If a statistically significant increasing trend is detected, the monitoring point will be placed into the assessment monitoring program or treated with the leachate, whichever is appropriate.
- If the dataset has a normal distribution and no statistically significant increasing trend is present, a two-sample Welch’s t-test at a 0.01 significance level is performed to compare the current background to the most recent two years of detection monitoring data. If the Welch’s t-test is significant and shows that the most recent two years of concentration data appear to be increasing, the background will not be updated.

- If the dataset does not have a normal distribution and no statistically significant increasing trend is present, a two-sample non-parametric Wilcoxon rank-sum test (also known as the Mann-Whitney test) at a 0.01 significance level is performed to compare the current background to the most recent two years of detection monitoring data. If the Wilcoxon rank-sum test is significant and shows that the most recent two years of concentration data appear to be increasing, the background will not be updated.
- If the Welch's t-test or the Wilcoxon rank-sum tests are not significant, the most recent two years of detection monitoring data will be added to the intrawell background dataset. The process will repeat every two years in which an SSI is not confirmed.

3.5.3 Double Quantification Method

The quasi-statistical "double quantification" method is used for constituents not detected in the background dataset. If a constituent is detected in the compliance dataset that has not been historically detected in the background dataset, that constituent must be retested before the next regularly scheduled sampling event. If the retesting results confirm the original detection with a quantifiable detection, the SSI is confirmed, and the monitoring point must be placed into the assessment monitoring program or treated with the leachate for the groundwater underdrain discharges.

113.10(5) *Detection monitoring program.*

3.5.4 Monitoring Parameters

a. Detection monitoring is required at MSWLF units at all groundwater monitoring wells defined under subrule 113.10(2). At a minimum, a detection monitoring program must include the monitoring for the constituents listed in Appendix I and any additional parameters required by the department on a site–specific basis. An alternative list of constituents may be used if it can be demonstrated that the constituents removed are not reasonably expected to be in or derived from the waste contained in the unit and if the alternative list of constituents is expected to provide a reliable indication of leachate leakage or gas impact from the MSLWF unit.

(1) The department may establish an alternative list of inorganic indicator parameters for a MSWLF unit within Appendix I, in lieu of some or all of the heavy metals (constituents 1-15 in Appendix I) if the alternative parameters provide a reliable indication of inorganic releases from the MSWLF unit to the ground water. In determining alternative parameters, the department shall consider the following factors:

1. The types, quantities and concentrations of constituents in wastes managed at the MSWLF unit;

2. The mobility, stability and persistence of waste constituents or their reaction products in the unsaturated zone beneath the MSWLF unit;

3. The detectability of indicator parameters, waste constituents and reaction products in the ground water; and,

4. The concentration or values and coefficients of variation of monitoring parameters or constituents in the groundwater background.

An alternative list of inorganic indicator parameters in lieu of some or all of the heavy metals is not being requested at this time.

3.5.5 Monitoring Frequency

b. The monitoring frequency for all constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph 113.10(5)"a"(1) shall be at least semiannual (i.e., every six months) during the active life of the facility (including closure) and the postclosure period. Where insufficient background data exists, a minimum of five independent samples from each well, collected at intervals to account for seasonal and temporal variation, must be analyzed for the Appendix I constituents or in the alternative list approved in accordance with subparagraph 113.10(5)"a"(1) during the first year. At least one sample from each well must be collected and analyzed during subsequent semiannual sampling events. The department may specify an appropriate alternative frequency for repeated sampling and analysis for Appendix I constituents or in the alternative list approved in accordance with subparagraph 113.10(5)"a"(1) during the active life (including closure) and the postclosure care period. The alternative frequency during the active life (including closure) shall be not less than annually. The alternative frequency shall be based on consideration of the following factors:

(1) Lithology of the aquifer and unsaturated zone;
(2) Hydraulic conductivity of the aquifer and unsaturated zone;
(3) Groundwater flow rates;
(4) Minimum distance between upgradient edge of the MSWLF unit and downgradient monitoring well screen (minimum distance of travel); and
(5) Resource value of the aquifer.

The monitoring frequency for all the constituents listed in Appendix I will be semi-annually. An alternative frequency for repeated sampling and analysis for Appendix I constituents is not being requested at this time.

3.5.6 Response to SSI Over Background

c. If the owner or operator determines, pursuant to paragraph 113.10(4)"i," that there is an SSI over background for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph 113.10(5)"a"(1) at any monitoring well specified under subrule 113.10(2), then the owner or operator:

(1) Must, within 14 days of this finding, place a notice in the operating record indicating which constituents have shown statistically significant changes from background levels, and notify the department that this notice was placed in the operating record.
(2) Must establish within 90 days an assessment monitoring program meeting the requirements of subrule 113.10(6) except as provided in subparagraph 113.10(5)"c"(3).
(3) The owner or operator may demonstrate that a source other than an MSWLF unit caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the department, and placed in the operating record. If re-sampling is a part of the demonstration, re-sampling procedures shall be specified prior to initial sampling. If a successful demonstration to the department is made and documented, the owner or operator may continue detection monitoring as specified in subrule 113.10(5). If, after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in subrule 113.10(6).

If an SSI over background for one or more of the constituents listed in Appendix I is observed in any of the monitoring wells included in the HMSP, a notice will be placed in the operating record within 14 days of the finding. The notice placed in the operating record will indicate which constituents

have shown statistically significant changes from background levels. The DNR will be notified that this notice was placed in the operating record.

Within 90 days, an assessment monitoring program meeting the requirements of subrule 567 IAC 113.10(6) will be established unless it can be demonstrated that a source other than the MSWLF unit caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.6 ASSESSMENT/CORRECTIVE ACTION/ORGANIC ACID MINE DRAINAGE MONITORING PROGRAM STATISTICAL EVALUATION

The assessment/corrective action monitoring programs, along with organic data from AMD-impacted monitoring wells, are evaluated statistically using confidence intervals or confidence bands. The most recent eight samples are used, or all samples if fewer than eight samples are available. Transformation of the distribution is not considered. The analysis is performed for detected Appendix II parameters for the assessment/corrective action monitoring programs and for organic parameters and sulfide for the AMD-impacted monitoring wells.

Confidence Intervals or Confidence Bands

- A parametric confidence interval around a normal mean is calculated if the dataset has a normal distribution and no statistically significant trend is present.
- A non-parametric confidence interval around a median is calculated if the dataset does not have a normal distribution and no statistically significant trend is present.
- Non-parametric confidence bands around a Theil-Sen trend line are calculated if the dataset has a statistically significant trend.

If the lower confidence limit or any part of the lower confidence band, as appropriate, exceeds the GWPS, then the monitoring point is declared out of compliance, and an assessment of corrective measures (ACM) is required.

3.7 ASSESSMENT OF CORRECTIVE MEASURES

An ACM report for the West MSWLF unit was submitted on September 23, 2019 (Doc #95983) and approved in correspondence dated July 29, 2020 (Doc #98166). The West MSWLF unit will comply with the requirements of 567 IAC 113.10(7).

3.8 SELECTION OF REMEDY

A public meeting as required under 567 IAC 113.10(7)“d” occurred on October 21, 2020; minutes of the meeting were submitted November 11, 2020 (Doc #98914). Following the public meeting, a remedy was selected in accordance with the requirements of 113.10(8), as submitted in correspondence dated December 30, 2020 (Doc #99216).

3.9 IMPLEMENTATION OF THE CORRECTIVE ACTION PLAN

The implementation of a corrective action plan occurred in accordance with the schedules developed under 567 IAC 113.10(8). The West MSWLF unit continues to comply with the requirements of 113.10(9).

3.10 REPORTING

There are numerous reporting requirements of varying degrees of effort associated with groundwater monitoring at an MSWLF facility. The requirements are ultimately summarized on an annual basis in the AWQR. The reporting requirements are delineated and addressed below.

Detection Monitoring

In compliance with 567 IAC 113.10(5)“c”(1), upon finding that there is an SSI over background for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph 113.10(5)“a”(1) at any monitoring well specified under subrule 113.10(2), the owner or operator will place a notice in the operating record indicating which constituents have shown statistically significant changes from background levels and notify the DNR that this notice has been placed in the operating record.

Assessment Monitoring

Pursuant to IAC 567-113.10(5)”c”, an assessment monitoring program is required whenever an SSI over background has been confirmed at a monitoring point and is determined to be the result of a release from the facility. The assessment/corrective action monitoring statistical analyses for the West MSWLF unit will be performed in accordance with IAC 567-113.10(6).

Assessment of Corrective Measures

For the West MSWLF unit and in compliance with 567 IAC 113.10(7)“a”, an assessment report documenting the results of activities performed in compliance with 113.10(6)“g” and 113.10(7)“c” will be completed and submitted to the DNR. An ACM report for the West MSWLF unit was submitted on September 23, 2019 (Doc #95983) and approved in correspondence dated July 29, 2020 (Doc #98166).

Selection of Remedy

If the selection of a remedy is required and in compliance with 113.10(8)“a”, a remedy will be selected. The selection will occur within 60 days of the public meeting held with interested and affected parties. A report will be submitted to the DNR within 14 days of selecting a remedy. The report will describe the selected remedy, state that a copy of the report has been placed in the operating record, and explain how the remedy meets the standards in paragraph 113.10(8)“b”.

A public meeting as required under 567 IAC 113.10(7)“d” occurred on October 21, 2020; minutes of the meeting were submitted November 11, 2020 (Doc #98914). Following the public meeting, a remedy was selected in accordance with the requirements of 113.10(8), as submitted in correspondence dated December 30, 2020 (Doc #99216). The selected remedy was source control via subsurface venting coupled with monitored natural attenuation.

Implementation of the Corrective Action Plan

The progress of ongoing corrective actions is included in each AWQR. Within 14 days of achieving compliance with 113.10(9)“e”, the DNR will be notified that a certification verifying that the remedy has been completed has been placed in the operating record. The certification will be signed by the owner or operator and by a qualified groundwater scientist and approved by the DNR.

1st Semi-Annual Statistical Results Notifications

Following the 1st semi-annual sampling and statistical evaluation, the notifications will include indicated SSIs for monitoring points in the detection monitoring program and exceedances of the GWPS at statistically significant levels (SSLS) for monitoring points in the assessment or corrective action monitoring programs.

Annual Water Quality Reports

113.10(10) Annual water quality reports. The owner or operator shall submit an annual report to the department detailing the water quality monitoring sampling locations and results, assessments, selection of remedies, implementation of corrective action, and the results of corrective action remedies to address SSIs, if any, during the previous year. This report shall include a site map that delineates all monitoring points where water quality samples were taken, and plumes of contamination, if any. The report shall contain a narrative explaining and interpreting all of the data collected during the previous year. The report shall be due each year on a date set by the department in the facility's permit.

Annual Water Quality Reports will be prepared and submitted by January 31 of each year. The reports will detail the following for the previous calendar year:

- Water quality monitoring sampling locations and results,
- Assessments (if applicable),
- Selection of remedies (if applicable),
- Implementation of corrective action (if applicable), and
- Results of corrective action remedies to address SSLs (if applicable).

The AWQRs will include the following:

- A site map that delineates the monitoring points where water quality samples were taken,
- A narrative explaining and interpreting the data collected during the previous year.

Evaluations that occur on a biennial frequency will be reported in the AWQRs due in the odd-numbered years.

Site Map

Legend

- Monitoring Well
- Groundwater Underdrain
- Leachate Monitoring Point
- Existing Groundwater Underdrain Cleanout
- Future Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Perforated Pipe
- Existing Groundwater Underdrain Solid Pipe
- Future Groundwater Underdrain Perf Pipe
- Future Groundwater Underdrain Solid Piping
- Approximate Property Boundary
- Approximate West MSLWF Unit Waste Boundary
- Approximate Future Waste Boundary
- Approximate East MSLWF Unit Waste Boundary
- Approximate Location of Cell Boundary
- Stream

Ottumwa-Wapello County
Landfill
Ottumwa, IA
Project No: 27225584.00
Drawing Date: October 2025

Figure 1

W N E S

0 300 600 1,200 Feet

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HMSP Wells	Monitoring Program
MW-53	Background
91-MW-14	Detection
93-MW-32	Assessment
MW-39R	AMD Detection
MW-40	AMD Detection
04-MW-56	AMD Detection
MW-58	AMD Detection
MW-59	AMD Detection
MW-62	Assessment
MW-63R	AMD Detection
MW-64	AMD Detection
MW-65	AMD Detection
MW-81 (AZPOC)	Corrective Action
GU-6	Detection
GU-7	Detection
Source Characterization Wells	
93-MW-31R	MW-73
MW-61R	MW-79
Corrective Action Wells	
MW-66	MW-74
MW-67	MW-75
MW-68	MW-78
MW-71	MW-80
Future Monitoring Points	
MW-82	MW-84
MW-83	PZ-1W
GU-8	

West MSWLF Unit HMSP Monitoring Network

Legend

- HMSP Monitoring Well
- Corrective Action Monitoring Well
- Source Monitoring Well
- Future Monitoring Well
- Future HMSP Groundwater Underdrain
- HMSP Groundwater Underdrain
- Monitoring Well
- Groundwater Underdrain
- Leachate Monitoring Point
- Future Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Perforated Pipe
- Existing Groundwater Underdrain Solid Pipe
- Future Groundwater Underdrain Perf Pipe
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- Approximate Property Boundary
- Approximate West MSLWF Unit Waste Boundary
- Approximate Future Waste Boundary
- Approximate East MSLWF Unit Waste Boundary
- Approximate Location of Cell Boundary
- Stream

Ottumwa-Wapello County Landfill
Ottumwa, IA
Project No: 27225584.00
Drawing Date: October 2025

0 300 600 1,200 Feet

Figure 2

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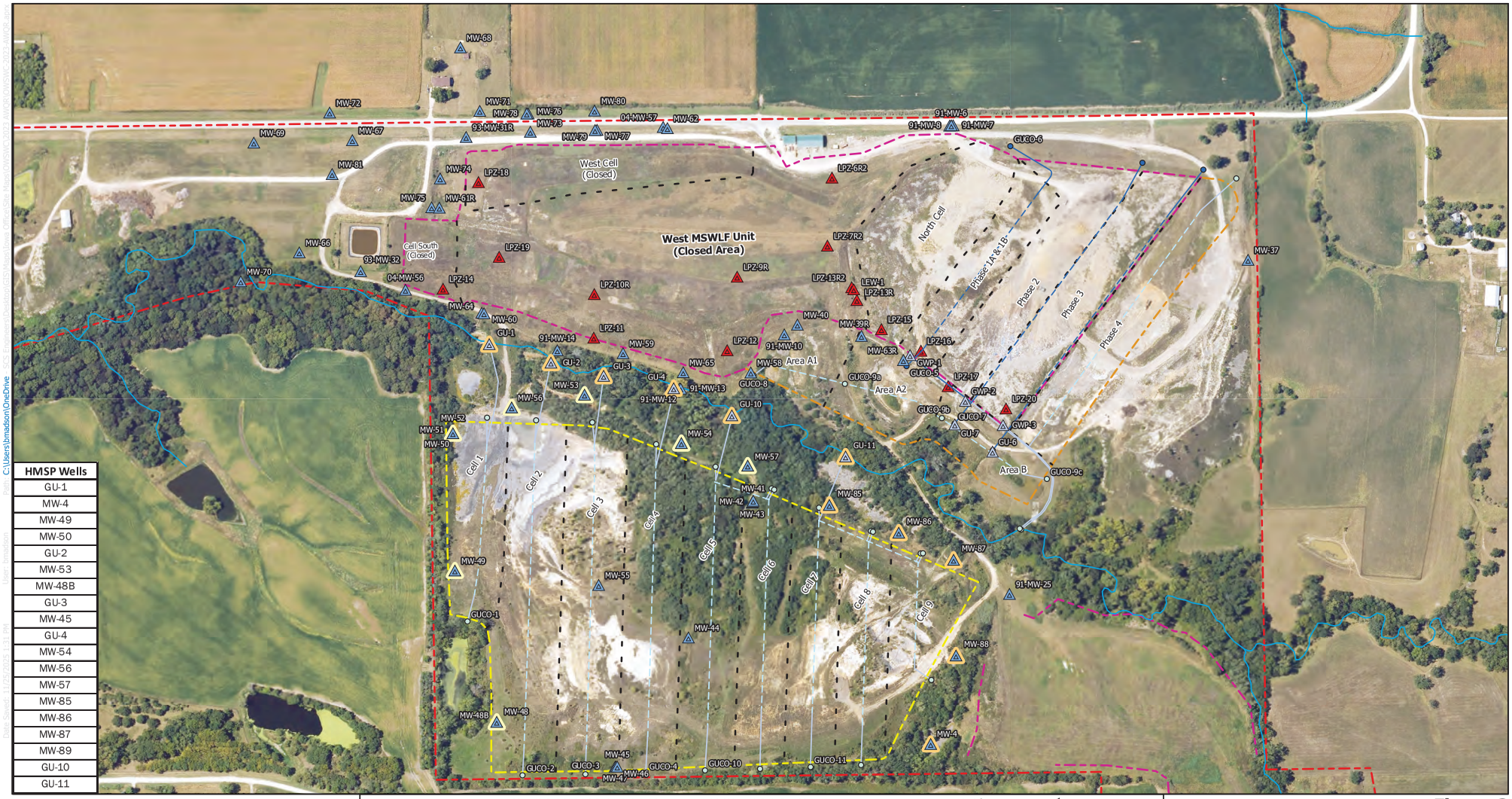

HMSP Wells
GU-1
MW-4
MW-49
MW-50
GU-2
MW-53
MW-48B
GU-3
MW-45
GU-4
MW-54
MW-56
MW-57
MW-85
MW-86
MW-87
MW-89
GU-10
GU-11

East MSWLF Unit HMSP Monitoring Network

Figure 3

Legend

- Future HMSP Groundwater Underdrain
- HMSP Monitoring Well
- Corrective Action Monitoring Well
- Source Monitoring Well
- Future Monitoring Well
- Monitoring Well
- Groundwater Underdrain
- Leachate Monitoring Point
- Existing Groundwater Underdrain Cleanout
- Future Groundwater Underdrain Cleanout
- Future Groundwater Underdrain Solid Piping
- Future Groundwater Underdrain Perf Pipe
- Existing Groundwater Underdrain Solid Pipe
- Existing Groundwater Underdrain Perforated Pipe
- Approximate Property Boundary
- Approximate West MSLWF Unit Waste Boundary
- Approximate Future Waste Boundary
- Approximate East MSLWF Unit Waste Boundary
- Approximate Location of Cell Boundary
- Stream

Ottumwa-Wapello County Landfill
Ottumwa, IA
Project No: 27225584.00
Drawing Date: October 2025

0 300 600 1,200 Feet

SCS ENGINEERS
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Attachment A

Standard Operating Procedure

Sanitary Landfill Groundwater Monitoring

Standard Operating Procedure

Sanitary Landfill Groundwater Monitoring

SCS ENGINEERS

SOP | October 2025

1690 All-State Court, Suite 100
West Des Moines, IA 50265
515-631-6160

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Section Page

Tables

Appendices

1.0 INTRODUCTION

This document provides guidelines regarding water sampling procedures for personnel responsible for sampling groundwater and/or surface water to comply with the requirements of 567 Iowa Administrative Code (IAC) 113.10. This document discusses sampling procedures, sampling equipment, laboratory procedures, analysis of sample data, record keeping, and recording for groundwater monitoring wells, surface water sampling points, and other water sampling points. This guideline stresses the importance of thorough pre-sampling preparation, consistent sampling procedures, and detailed documentation. The goal of the guidelines is to provide consistent sampling techniques that will ensure that all groundwater data collected is representative of actual groundwater quality and can be used to reliably evaluate the performance of a site. The person conducting the sample collection should be familiar with the monitoring well maintenance and performance re-evaluation requirements as specified in 567 IAC 113.10(2)"f".

2.0 SAMPLING EVENT

1. Equipment for Measuring Depth to Water and Total Well Depth

When reaching the site to be monitored, a field investigation begins by measuring water levels in the monitoring wells. The depth to water is measured with an electronic water level indicator. The electronic water level indicator locates the water surface by completing a circuit between two electrodes on a probe lowered down the well. When the electrodes contact the water, a light and a buzzer at the surface indicate a completed circuit. These instruments are occasionally subject to false readings due to water on the inside of the well casing or electrical problems and are of questionable accuracy due to wire kinking and inaccurate gradation. However, they do make repeated measurements over a short time easier. These probes should be re-calibrated for length at least quarterly.

2. Equipment for Well Purging and Sample Withdrawal

Most wells installed for groundwater quality monitoring are constructed with small diameter casings (less than 4.0 inch inside diameter, most commonly 2.0 inch inside diameter). Since groundwater is generally under different temperature, pressure, gas content, and oxidation-reduction (redox) potential conditions than water at the surface, precautions should be taken to ensure that sampling devices disturb the water in the well as little as possible and transport unaltered representative samples to appropriate storage containers.

Sampling methods include bottom-loading bailers, Waterra® pumps, and low-flow sampling devices. Each method has advantages and disadvantages. Low-flow sampling will be utilized when conditions allow it.

3. Equipment for In-Field Measurements

Several water quality parameters are subject to rapid change caused by aeration, oxidation, or degassing of a sample when the groundwater is removed from its natural environment and exposed to the atmosphere. These parameters, particularly temperature, specific conductance, and pH must be measured on an unfiltered sample at the time of collection,

i.e., in the field. Ideally, all in-field measurements should be taken either in situ or by use of a flow-through, closed cell so that the sample is not subjected to the chemical or physical changes caused by exposing it to the atmosphere. However, flow-through cells are not widely available, and the more conventional methods of measurement are most often used. Temperature, specific conductance, and pH will be measured in the field as an indication of well stability prior to sample collection and not for water quality analysis. (See Section E.1.f.)

a. Thermometer

The thermometer should be marked such as to indicate the temperature to the nearest 0.5°C.

b. Specific Conductivity and pH meter

Specific Conductance. Because the conductance is temperature dependent, it is necessary to standardize its measurement to 25°C so that all reported values can be compared. Therefore, the temperature of the sample must be measured at the same time as the conductivity in order to obtain an accurate measurement that can be corrected to 25°C. The specific conductance meter should provide measurements to the nearest whole number in microsiemens per centimeter (µS/cm).

The pH reading is a measurement of the concentration of hydrogen ions in solution. It is important to measure pH in the field. The meter should provide measurements in standard units (S.U.) to the nearest 0.01.

Although individual specific conductance meters and pH meters are available, in most instances, a meter that measures specific conductance, pH, and temperature is used in the field.

4. Sample Containers as provided by the Laboratory

a. Containers for Appendix I Parameters:

See Table 1 "Summary of Appendix I Parameters" in Attachment 1.

b. Containers for Appendix II Parameters:

See Table 2 "Summary of Appendix II Parameters" in Attachment 1.

5. Miscellaneous Sampling Equipment

a. Site Map with the location of monitoring points clearly identified.
b. Field Notebook to record all observations.
c. Chain of custody and field forms.
d. Well information forms.
e. Keys for locked well caps.
f. Plastic bags or plastic sheets to place on the ground around the well.
g. Calibrated bucket to measure the volume of water removed when purging the well.
h. Electronic water level indicator.
i. Pump and flow cell manuals.
j. Geotech™ Geopump (peristaltic pump), controller, and spare tubing.
k. Battery and battery charger.
l. 12V/120V inverter.
m. Spare submersible pump, tubing, and wellhead.

n. Flow-through cell.
o. Submersible pump power supply and controller.
p. Laboratory-prepared sampling containers.
q. Extra rope and tubing.
r. Cooler and ice.
s. Detergent for cleaning sampling equipment.
t. Deionized water for rinsing of equipment after cleaning.
u. Gloves, face shields, and other personal protective equipment as needed .
v. Any additional site-specific equipment.

3.0 SAMPLING POINTS

1. Groundwater Monitoring Wells

   Groundwater monitoring wells are installed to monitor the quality of groundwater at the site. Usually, monitoring wells are located upgradient and downgradient of the site. If more than one aquifer is monitored, several up and downgradient wells at distinct depths will be monitored. In this case, more than one well is installed at each location (well clusters).

   Depending on the permeability of the formation in which the screen of the well is installed, a monitoring well can be purged dry or not.

2. Surface Water Sampling Points

   Surface water sampling points may include ponds, surface impoundments, streams, seeps, or springs. They are sampled to determine the environmental impact of the landfill on the surrounding surface waters. If a stream is monitored, a sampling point upstream of the landfill and a location downstream of the landfill are usually chosen.

3. Underdrains, Tiles, Sumps, Manholes, and other Structures

   These sampling points are monitoring groundwater that may have come in contact with leachate released by the landfill and to determine the environmental impact on the surrounding surface waters.

4.0 PREPARATION FOR THE SAMPLING EVENT

For the sampling event to run smoothly in the field, the equipment should be checked and calibrated as necessary before leaving for the site. All information should be verified, and sufficient numbers of sampling containers and other supplies should be assembled and checked against a checklist for completeness.

1. Site Map

   The site map should indicate the location of the monitoring wells and other sampling points. If possible, it should also show access roads and other pertinent features of the site.

2. Field Sampling Sheets

   The field sampling sheets should list all the sampling points and the order in which they are to be sampled. Usually, water from upgradient sampling points is collected first to reduce the potential for cross-contamination. The sampling sheet may also indicate the installed well depth and the parameters to be analyzed for each water sample.

3. Sample Containers

   The laboratory that will perform the analyses usually provides sample containers. Different sample containers and different preservatives are required for the different parameters. See Attachment 1, Tables 1 and 2 for a list of sample containers, required preservatives, and volumes for various parameters.

   The purpose of sample preservation is to stabilize the constituents of interest to stop or retard any chemical or biological change. Improper preservation or allowing too much time to elapse between sampling and analysis can affect the quality of the final result. Correct preservation will help to ensure that the sample analyzed is representative of the sample collected.

4. Checklist of Necessary Equipment

   A checklist of all necessary equipment, tools, and supplies should be maintained to ensure that the field activity can be performed efficiently and professionally. See Section B-5.

5.0 ON-SITE ACTIVITIES

1. Groundwater Monitoring Well Sampling

   a. Measuring Groundwater Levels and Well Depths

      Before each sampling event, the area around the wellhead should be observed for indicators of inadequate surface seals, inadequate well seals, standing water, or other indicators of potential surface impact to groundwater. The presence of a secure wellhead seal and/or lock will also be noted.

      The water level and total depth of the well will then be measured using an electronic water level indicator from the top of the casing. Water level measurements are recorded to the nearest one-hundredth foot interval (0.01 ft) and well depth measurements are recorded to the nearest one-tenth foot (0.1 ft) interval. Water level data should be recorded in the field logbook.

   b. Determination of Flow Rates and Drawdown Data

      As specified in 567 IAC 113.10(2)"f"(4), a biennial evaluation of well recharge rates is required to determine if well deterioration is occurring. This will be accomplished by verifying the low-flow sampling rates are less than 0.5 liters per minute and that minimal drawdown is maintained. These conditions indicate the monitoring well is functioning properly.

c. Decontamination of Equipment between Sampling Points

Since detection levels of the compounds in water are at the nanogram and/or microgram per liter level, no contamination must be introduced to the well during the sampling process. If possible, sample from the least contaminated well to the most contaminated well. In practice, this means that upgradient sampling points should be sampled before any other well on-site.

Groundwater sampling and field measurement equipment will be cleaned before and after use. If dedicated water collection equipment is used, the equipment remains in the well and decontamination is not required. Otherwise, after the groundwater sample has been retrieved from the well and properly transferred to the sample container, the sampling equipment will be washed with non-phosphate detergent (Alconox) followed by rinsing with de-ionized water.

The level measuring equipment and the probe of the field measurement equipment must be decontaminated with the same procedures.

Clean nitrile gloves should be worn for each sampling point when handling field equipment and during the execution of field activities.

d. Purging Procedure

The groundwater standing in a well before sampling is usually not representative of the in-situ groundwater. The water quality can be affected by several processes: heavy metals can be depleted by bacterial activity in the water; metals can be dissolved due to the concentration of some gases such as oxygen or carbon dioxide in the water; foreign material could have entered through the top of the well.

The following procedures will be followed when collecting samples using low-flow sampling procedures:

i. Ensure that the equipment does not touch a contaminated surface. If necessary, place a clean plastic sheet or other protective covering around the base of the well to prevent the equipment from contacting a nearby contaminated area.
ii. Unlock the protective metal casing.
iii. Measure and record the static water level before any other activities are conducted within the well.
iv. Ensure that the pump tubing and/or dedicated pump are properly installed. Securely fasten the power cable and sample tubing at the top of the wellhead. Connect the power source and controller to the pumping equipment.
v. Connect the sample tubing to the water entry point of the flow-through cell. Make sure the probe sensors are completely submerged in water during use.
vi. Record the “time at start of purging,” and start purging the well at the pump’s lowest speed setting and slowly increase the speed until discharge occurs. Check the water level. Adjust pump speed until there is minimal water level drawdown and there is no turbidity increase. If the minimal drawdown that can be achieved remains stable, continue purging until indicator field

parameters are stable. Record the "purging flow rate" as an average. Use a calibrated bucket, graduated beaker, cylinder, or other device to measure the flow rate while purging.

vii. Purge the well until the readings for indicator parameters (temperature, dissolved oxygen, specific conductance, pH, and ORP) vary within ±10 percent over three or more consecutive readings, spaced approximately 2 to 5 minutes apart. The flow-through cell will indicate when stability has been achieved.

    1. Wells with insufficient recharge may run dry during purging. To avoid this, purging should stop before the water level drops below the top of the pump (submersible) or end of the tubing (peristaltic). Purging should continue once the water level has recovered enough to continue purging and sample collection.
    2. If one or more indicator parameters fail to stabilize within 12 minutes, one of two options should be considered as directed by the PM: 1) discontinue purging, do not collect samples and document attempt to reach stabilization or 2) secure well, then purge and collect samples later in the day, the following day, or soon afterward.
    3. If groundwater is highly turbid or colored, continue purging until water becomes clear; this can take a few minutes.
    4. If the peristaltic pump is unable to pump due to a static water level greater than 25 feet, the spare pump and tubing will then be installed, recorded on the field data sheet, and the well will not be sampled during that sampling event. Also, record the amount of time to prep and install the submersible pump and fill out the pump installation field form.

viii. Record the "volume purged," "time at end of purging," "purged dry (Y/N)," and any issues encountered during the purging process.

ix. Collect samples as described in "Collection of Groundwater Samples" on the following pages. Record pertinent information related to the sampling event.

When low-flow sampling procedures are not feasible, the water standing in and directly adjacent to the well must be purged using a bailer or a manual inertial pump (Waterra®) before sampling the well. The method of purging may vary depending on the hydrogeologic properties of the aquifer in which the well is screened. In general, wells will be purged until dry to remove stagnant water from the well. Then allow the well to recharge until at least two (2) feet of groundwater is present before collecting a water sample. To obtain a sample that is representative of the water in the aquifer, collect the sample as soon as there is a sufficient volume of water needed for the intended analyses. It is not necessary for the well to fully recover.

For monitoring wells that are screened in high permeability formations, complete evacuation of water is not possible or desirable. In this situation, a well will be purged of a volume equivalent to approximately three (3) standing well casing volumes. The volume to be removed can be calculated utilizing the following formula.

$$V = 0.816d^2h$$

where:

V = Total Volume of Water needed to purge (gallons)
d = Inside Diameter of Well Casings (inches)
h = Depth of standing water in well before pumping (feet)

Additional purging may be required if high sediment loads are encountered or if significant variations in field water quality measurements are observed. Regardless of the purging method used, equipment should be cleaned before and after contacting the groundwater.

When measurements of pH, specific conductivity, and temperature are taken before collection of groundwater samples, well purging should be considered adequate if consecutive measurements indicate less than ten percent (10%) variation.

e. Collection of Groundwater Samples

Samples should be collected shortly after purging is completed to reduce interaction of the water with the well casing material or contact with the atmosphere. Sample the least contaminated wells first to prevent cross-contamination. Samples will be collected with the purging devices described above.

The following procedures will be followed when collecting samples using low-flow sampling procedures:

i. Laboratory-prepared sample containers of the appropriate volume, material, and preservative will be used. These sample containers will be prepared in accordance with the United States Environmental Protection Agency quality assurance/quality control (QA/QC) procedures by the laboratory.
ii. The groundwater samples will be collected immediately after purge parameters indicate stability.
iii. When purging is complete, the flow-through cell will be disconnected and samples will be collected directly from the pump tubing.
iv. Record the parameter in the units indicated:

- pH (Standard Units)
- Conductivity (µS/cm)
- ORP (mV)
- Temperature (°C)
- Dissolved Oxygen (mg/L)
- Turbidity (NTU)

v. Samples for analysis of volatile organic compounds (VOCs) and alcohols require containment with zero headspace. To collect samples with zero headspace, sample vials or bottles will be filled to the point that they are slightly overflowing and a positive meniscus is formed, after which the vials or bottles will be capped immediately. Immediately after samples are collected, place all sample containers in a cooler with ice to ensure appropriate sample preservation. Record sampling date and time on the chain-of-custody.
vi. If sampling is performed using a peristaltic pump, the well depth should be measured following each sampling event. Well depths for wells with dedicated pumps are required once every five years; the mobe will indicate when well depths should be measured.
vii. Following sample collection, secure the well.

viii. Decontaminate equipment before continuing to the next sampling point. If using a peristaltic pump, the silicone tubing must be replaced after each sampling point.

When low-flow sampling procedures are not feasible, the following collection procedures will be followed:

i. Lower the bailer slowly into the water in the well to avoid agitation. Do not allow the bailer to touch the bottom of the well to prevent sediment from being incorporated into the sample. Retrieve the bailer smoothly, but do not allow the rope to touch the ground. Discard the first 0.5 feet of water in the bailer to reduce the oxidized portion of the sample.
ii. Laboratory-prepared sample containers of the appropriate volume and material will be used. These sample containers are usually provided by the laboratory conducting the analysis and are prepared in accordance with EPA QA/QC procedures.
iii. Samples for analysis of VOCs will be collected first, and efforts will be made to minimize sample agitation and contact with air. Fill the vials so that it is slightly overflowing and a positive meniscus is formed. Cap immediately.
iv. Pour an unfiltered portion into a sample container treated with preservative, as necessary for other unfiltered analyses, and cap quickly.

f. In-Field Measurements

Pour an unfiltered portion into a sample container for the field measurements of temperature, conductivity, and pH When measurements of pH, specific conductivity, and temperature are taken before collection of groundwater samples, well purging should be considered adequate if consecutive measurements indicate less than ten percent (10%) variation. It is important to measure conductivity and temperature at the same time because conductivity is affected by temperature.

This equipment must be cleaned before and after each well to prevent cross-contamination.

g. Record Keeping On-Site

It is important not only to use proper procedures to collect the water samples but also to document thoroughly the sampling procedures. The field data sheet should provide the following information:

1) Site Name, site location, facility type, license or permit number.
2) Record date and weather conditions.
3) Record the name of the person collecting the samples.
4) Record manufacturer name and model of equipment used for water level measurements.
5) Record manufacturer name and model of equipment used for field measurements.
6) Record sampling point identification number.
7) Record the initial water level, water level after purging, well depth, and water level at the time of sampling.

8) Record the type of purging equipment used.
9) Record the physical condition of the well.
10) Record time of purging and sample collection, volume purged.
11) Record temperature, conductivity, and pH.
12) Record the color, odor, and turbidity of the sample.
13) Mark the sample containers with the site name, well identification number, date, and time sampled.

h. Quality Assurance/Quality Control.

In many instances, quality control samples are collected to measure the quality of the water sampling procedures. QA/QC samples will be collected if specifically requested for the project. Use of trip blanks and equipment blanks may be used in a quality control program.

Trip blanks are supplied by the laboratory and contain carbon-filtered or helium-purged distilled water in a sealed container. Trip blanks, if required, are submitted in each cooler containing samples for VOC analysis and are used to indicate the presence of background chemicals during sampling.

Equipment blanks consist of a sample of de-ionized water that is poured or pumped through the sample and/or purging device and transferred to laboratory prepared container while at the site. If required, generally one equipment blank is collected and submitted after groundwater and surface water samples have been collected. Laboratory analysis of equipment blanks will be used to identify potential sources of cross-contamination of samples.

A field blank is a sample of the de-ionized water processed through the sampling equipment to determine if field cleaning procedures are adequate.

Field duplicates are two samples collected independently at a single sampling location during a single act of sampling. One duplicate sample will be submitted for each ten samples collected. Laboratory analysis of duplicate samples is used to indicate the reproducibility of analytical results.

i. Sample Container Handling, Storage, and Shipping

Laboratory-prepared sample containers of the appropriate volume and material will be used. These sample containers will be provided by the laboratory conducting the analyses and will be prepared in accordance with EPA quality assurance, IAC, and QA/QC procedures.

Once the sample container is filled with the water sample, it should be capped immediately and labeled with the site name, well identification number, date and time sampled, name of the collector, and method of preservation.

Samples will be preserved by the use of refrigeration and preservatives as specified by current EPA or state-approved methods. The sample containers will be placed in an insulated cooler on ice immediately after collection to maintain a temperature of approximately 4˚ C.

Sample containers will be packed with loose ice or re-freezable packs in insulated coolers. Filler material will be used to prevent breakage of containers. Plastic bags will be used to prevent samples from leaking out of the cooler in the event of breakage. In addition to sample temperature, the maximum holding time for each requested analysis will be observed.

j. Chain-of-Custody Procedures

Chain-of-custody records provide a means of tracing a sample from the time of collection through shipment and final analysis. Such documentation includes labeling to prevent mix-ups, container seals to prevent unauthorized tampering with the sample, secure custody, and the necessary records to support potential legal action. Following the collection of samples, the Chain-of-Custody document will be prepared. The document will include the information from each sampling point as referenced previously, and the following information:

1) Signature of Sampler.
2) Time Relinquished to Laboratory or Shipper.
3) Signature of Recipient.
4) Analysis and Methods Requested.

k. Equipment Cleaning

Besides cleaning the equipment after the collection of each sample, groundwater sampling and field measurement equipment will be cleaned before and after each field trip. The method of cleaning includes washing with Alconox detergent followed by rinsing with de-ionized water.

2. Surface Water Sampling

Many types of surface water can be sampled to determine the environmental impact of a particular facility. Surface water sampling points may include ponds, surface impoundments, streams, seeps, or springs.

The field logbook will be used to record field procedures and measurements at the time of sampling.

a. Sample Location

Describe the location from which the surface water sample is taken in enough detail so that subsequent samples will be collected from the same location. For a surface water body, include the distance and direction from shore, as well as the depth at which the sample is taken. Record the depth, width, and flow rate of the stream. If the water appears stagnant due to inadequate flow, or water is too shallow for sampling by the above means, a sample may not be collected at this location during the event.

Describe the condition of the sampling point and note in the field logbook if there is ponded water, litter, or waste near the site. Indicate the color if discolored and note

whether the surface water is turbid or has an odor.

b. Sample Collection Procedure

Proceed from sampling points least likely to be affected (upstream of the facility) to those most likely to be affected (downstream) to avoid cross-contamination of the samples. Do not stand in the surface water or stir up sediment, if possible.

Efforts should be made to obtain representative samples by sampling flowing water, if present, and by sampling water from the surface, mid-depth, and bottom depth of the stream or impoundment. Water samples may be collected using a disposable polyethylene bailer or by dipping a laboratory-cleaned glass container and transferring the sample to laboratory-prepared containers. Follow the same procedures for decontamination of equipment between sampling points as described previously.

c. In-Field Measurements

Use the same procedures as described for groundwater monitoring.

d. Record Keeping On-Site

Use the same procedures as described for groundwater monitoring.

e. Quality Assurance / Quality Control

Use the same procedures as described for groundwater monitoring.

f. Sample Container Handling, Storage, and Shipping

Use the same procedures as described for groundwater monitoring.

g. Chain-of-Custody Procedures

Use the same procedures as described for groundwater monitoring.

3. Underdrain and Tile Sampling

Groundwater underdrains and agricultural tiles may be sampled. These monitoring points shall be sampled only when the line is flowing and shall be sampled according to the Surface Water Sampling procedures above.

4. Sampling from Sumps, Manholes, and Other Structures

When sampling from sumps, manholes, and other structures, the following standard operating procedure shall be used.

a. Carefully remove the grate, cover, or lid.

   This may require a manhole pick, wrenches, crowbar, ladder, etc. Other equipment that will be required are a flashlight, tape measure, folding ruler, and a long-handled "dipper" that allows a sample bottle/jar to be attached and removed.

b. Note the measurements and information required on the sampling form.

   With the flashlight, confirm that water/fluid is flowing.

   i. If the fluid is flowing and no pump is present (i.e., this is a manhole vs. a lift station or sump), sample from the incoming flow using the dipper. If there is more than one incoming pipe/connection flowing, sample the flowing portion of the water/fluid near the outlet (i.e. self-compositing sample).
   ii. If the fluid is not flowing and no pump is present (i.e., this is a manhole vs. a lift station or sump), then do not sample.
   iii. If the fluid is not flowing but a pump is present, then note the measurements and information required on the sampling form.

      1. Override the pump controls by moving the switch to manual or as noted on the operating directions. If unfamiliar with the pump controls, please request assistance from the landfill operator. After sampling, return the switch to auto pump.
      2. Pump the fluid down below the bottom(s) of the incoming pipes. Note that at some times, this may take a considerable period of time. **Therefore, it is recommended this be initiated upon arrival at the facility.**
      3. If the fluid level began above the top of the incoming pipe after pumping has been completed, wait for the flow to stabilize (i.e., backed up fluid has run out).
      4. Once stabilized, sample from the incoming flow using the dipper. If there is more than one incoming pipe/connection flowing, create a time-weighted composite sample.

c. On the sampling form, note if the point was flowing, if there were any problems with operating the pump (where applicable), what incoming flow(s) were sampled, how far the fluid level was above the top of the incoming pipes before pumping (where applicable), the depth of flow that was sampled, the diameter of pipe sampled, and time-weighted composite information.

d. If the incoming pipe elevation is below the water surface, allow the pump to completely expose itself by pumping down the water level, then sample from the vicinity of the pipe after the pump shuts off.

APPENDIX A

Table 1. Summary of Appendix I Parameters

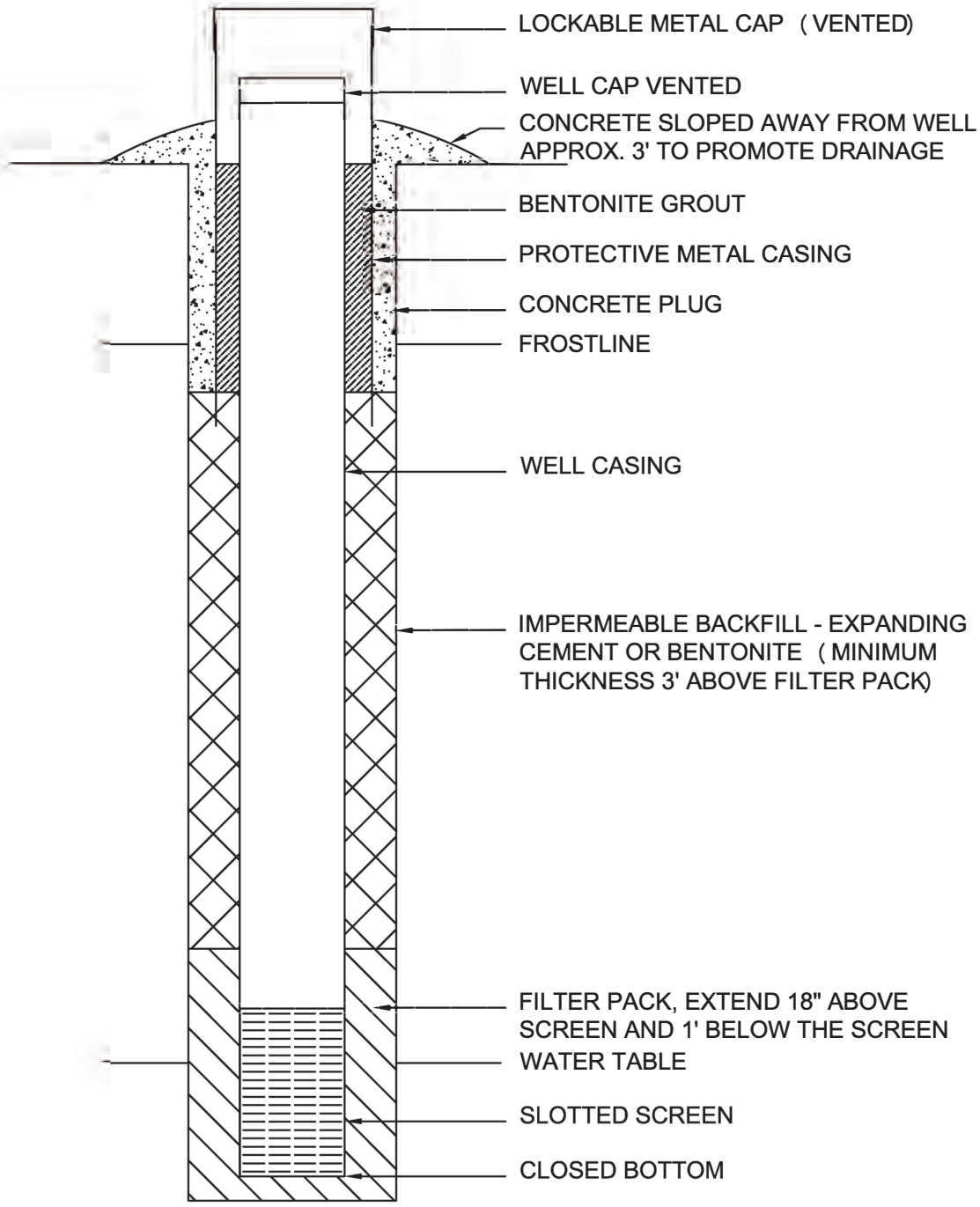
Container	Preservative	Qt	Analytes	Notes
500-ml Plastic Bottle	Nitric Acid	1	Total Metals	None
40-ml Purge Vial	Hydrochloric Acid	3	Volatile Organic Compounds	Cap with zero headspace

Table 2. Summary of Appendix II Parameters

Container	Preservative	Qt	Analytes	Notes
500-ml Plastic Bottle	Nitric Acid	2	Total Metals	None
40-ml Purge Vial	Hydrochloric Acid	3	Volatile Organic Compounds	Cap with zero headspace
40-ml Purge Vial	None	2	Alcohols	Cap with zero headspace
250-ml Plastic Bottle	Sodium Hydroxide	1	Cyanide	None
500-ml Plastic Bottle	Sodium Hydroxide/ Zinc Acetate	1	Sulfide	None
1,000-mL Amber Glass Bottle	None	6	Other Appendix II parameters	None

Attachment B

Sheet B-1: Well Construction Diagram



PLASTIC CASED WELL CONSTRUCTION DETAIL

NOTE:
RECREATED FROM 567 IAC 113, FIGURE 1

- NOT TO SCALE -

TYPICAL MONITORING WELL CROSS-SECTION

DRAWING DATE: October 2025

SCS ENGINEERS
Environmental Consultants and Contractors

SHEET
B-1

Appendix C

Environmental Monitoring Plan – LFG Plan Update

Revised Landfill Gas Monitoring Plan

Ottumwa-Wapello County Sanitary Landfill

Ottumwa-Wapello Solid Waste Commission
105 East 3rd St.
Ottumwa, IA 52501
641-683-0606

SCS ENGINEERS

27225584.00 | October 2025
Original December 2008

1690 All-State Court, Suite 100
West Des Moines, IA 50265
515-631-6160

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to review the design, operation, and maintenance of the landfill gas (LFG) monitoring network for the Ottumwa Wapello County Sanitary Landfill (Landfill) active fill area on the west side of the intermittent creek traversing the site (West municipal solid waste landfill (MSWLF) unit) and the expansion fill area on the east side of the same intermittent creek (East MSWLF unit). The West MSWLF unit is comprised of the South Cell (closed), the Inactive Area (closed), the North Cell, the 2008 North Lateral Expansion area (Phase 1A and 1B, Phase 2, Phase 3, and Phase 4), and the 2017 West Expansion Area (Area A1, Area A2, and Area B). The Phase 4 cell and the 2017 West Expansion Area are not yet constructed. No portion of the East MSWLF unit has been constructed. The East MSWLF unit footprint is the current borrow area for fill operations in the West MSWLF unit. The landfill gas monitoring systems for the East and West MSWLF units are intended to monitor the facility's compliance status with regard to 567 IAC 113.9(455B).

It should be noted that a third fill area, the Area A MSWLF unit, is present on the Ottumwa-Wapello County Landfill property in the northeast corner of the site. This fill area is closed and regulated by an Environmental Covenant and is not subject to landfill gas monitoring. This closed area is not part of this revised Landfill Gas Monitoring Plan (Plan).

1.2 APPROACH

The approach used to revise the landfill gas monitoring system for the East and West MSWLF units involved a review of the vadose zone geology beneath and in the vicinity of the MSWLF units with specific interest in potential routes of landfill gas migration and the proximity of structures near the outside of the facility to which or along which subsurface migration of landfill gas may occur.

1.3 SITE LOCATION

The landfill property is depicted in **Figure 1, Site Map**. The landfill consists of approximately 230 acres and is located within the SE ¼; the E 30 acres of the S ½, S ½, NE ¼; and a portion of the W 10 acres of the S ½, S ½, NE ¼; all in Section 33, T73N, R14W, Wapello County, Iowa. Also, approximately 30 acres in the W ½ of the NE Fractional Quarter of Section 4, T72N, R14W, Wapello County, Iowa.

1.4 REPORT CONTENTS

The Landfill Gas Monitoring Plan for the East and West MSWLF units includes the following:

- Section 1.0 Introduction – Purpose and approach for landfill gas monitoring of the East and West MSWLF units.
- Section 2.0 LFG Monitoring Plan – Discussion, justification, and IAC Chapter 113 compliance response/documentation comprising the Plan for the East and West MSWLF units.

2.0 LFG MONITORING PLAN

The landfill gas monitoring network was designed to intercept potential routes of gas migration that could impact on-site structures and nearby off-site properties or structures. The landfill gas monitoring points for the property boundary and on-site structures will continue to be utilized. Subsurface landfill gas monitoring points were installed to comply with the requirements of subrule 113.9(2) paragraph "b". The justification for subsurface landfill gas monitoring point locations and a description of the monitoring point design are discussed in Section 2.2.2 (Routine Methane Monitoring Program). The subsurface landfill gas monitoring point network for the West MSWLF unit is largely installed. New phases of the West MSWLF unit and the entirety of the East MSWLF unit will be installed in phases to coincide with the phased development of the units.

Landfill gas monitoring will include collecting methane readings at the locations indicated in **Figure 2, LFG Monitoring Network**.

The following subsections form the compliance demonstration of the Plan in the form of a dialogue between rule 113.9 and the response or Plan content.

2.1 AIR CRITERIA

113.9(1) Air criteria. Owners or operators of all MSWLFs must ensure that the units do not violate any applicable requirements developed under a state implementation plan (SIP) approved or promulgated by the department pursuant to Section 110 of the Clean Air Act.

The Ottumwa-Wapello Solid Waste Commission (Commission) will ensure that the MSWLF units do not violate any applicable requirements developed under a state implementation plan (SIP) approved or promulgated by the Iowa Department of Natural Resources (DNR) pursuant to Section 110 of the Clean Air Act. Currently, there are no SIPs applicable to the Landfill.

2.2 LANDFILL GAS

113.9(2) Landfill gas. All MSWLFs shall comply with the following requirements for landfill gas. For purposes of this subrule, "lower explosive limit" means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure.

2.2.1 Methane Gas Concentration Limitations

a. Owners or operators of all MSWLF units must ensure that:

(1) The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas pipeline, control or recovery system components);

The Commission will ensure that methane gas generated from the MSWLF units does not exceed 25 percent of the lower explosive limit (LEL) for methane in MSWLF facility structures (excluding gas pipeline, control, or recovery system components). In the event that methane gas generated by the MSWLF units does exceed 25 percent of the LEL for methane in a MSWLF facility structure, Landfill personnel will take the necessary steps to protect human health as required in subrule 113.9(2) paragraph "c". Such actions have been enacted previously, as described in the Construction Certification Report dated July 10, 2007 (Doc #5434), for the methane interceptor trench near the

scale house between the scale house and a portion of the western boundary of the West MSWLF unit.

(2) The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary; and

The Commission will ensure that methane gas generated from the MSWLF units does not exceed the LEL for methane at a facility property boundary. If methane gas generated by the MSWLF unit does exceed the LEL for methane at a facility property boundary, Landfill personnel will take the necessary steps to protect human health as required in subrule 113.9(2) paragraph "c".

2.2.2 Routine Methane Monitoring Program

b. Owners or operators of all MSWLF units must implement a routine methane–monitoring program to ensure that the standards of paragraph 113.9(2)"a" are met. Such a program shall include routine subsurface methane monitoring (e.g., at select groundwater wells, at gas monitoring wells).

(1) The type and frequency of monitoring must be determined based on the following factors:

1. Soil conditions;

2. The hydrogeologic conditions surrounding the facility;

3. The hydraulic conditions surrounding the facility;

4. The location of facility structures (including potential subsurface preferential pathways such as, but not limited to, pipes, utility conduits, drain tiles and sewers) and property boundaries; and

5. The locations of structures near the outside of the facility to, or along, which subsurface migration of methane gas may occur. Examples of such structures include, but are not limited to, houses, buildings, basements, crawl spaces, pipes, utility conduits, drain tiles and sewers.

The previously approved monitoring program for facility structures will be maintained in its current state. These previous monitoring points, along with the existing and future subsurface monitoring points, are shown in **Figure 2**.

Subsurface landfill gas monitoring points for both the East and West MSWLF units were selected based on geology and hydrogeology, potential subsurface conduits, and proximity to off-site structures. The sheets described below are not included herein but are available in the *Permit Application for the 2008 North Lateral Expansion*, dated December 22, 2008 (Doc #34454).

Sheets 1A through 1C include cross-sections near the perimeter of the constructed portion of the West MSWLF unit and Sheets 2A through 2C include cross-sections near the perimeter of the East MSWLF unit. These sheets are provided in Attachment A. Cross-sections representing the subsurface beneath the 2008 North Lateral Expansion are provided in Attachment B. These cross-sections depict the geology and hydrogeology of the subsurface through which landfill gas migration pathways would have to travel to leave the Landfill property. Information from these cross-sections was used to propose appropriate locations and screen depths for landfill gas monitoring points. Table 1 discusses the rationale for the East MSWLF unit subsurface landfill gas monitoring points.

Table 1. East MSWLF Unit Subsurface LFG Monitoring Points

Monitoring Point	Comments
MW-50	This monitoring point is an existing groundwater monitoring well with unsaturated screen near the base of proposed Cell 1. The well is located off the southwest corner of the East MSWLF unit and close to the facility property boundary.
GUCO-1	This monitoring point is the groundwater underdrain cleanout for Cell 1. The monitoring point will be located at the east end of Cell 1. This point will facilitate monitoring along the facility's south property boundary.
MW-48B	This monitoring point is an existing groundwater monitoring well with unsaturated screen near the base of proposed Cell 2. Residences are located to the southeast of the East MSWLF unit. This point will monitor the subsurface between the East MSWLF unit and the residences.
GUCO-2	This monitoring point is the groundwater underdrain cleanout for Cell 2. This monitoring point will be located on the east end of Cell 2. This point will facilitate monitoring along the facility's east property boundary.
GUCO-3	This monitoring point is the groundwater underdrain cleanout for Cell 3. This monitoring point will be located on the east end of Cell 3. This point will facilitate monitoring along the facility's south property boundary.
MW-45	This monitoring point is an existing groundwater monitoring well with unsaturated screen near the base of proposed Cell 3. The well is located east of the East MSWLF unit and close to the property boundary.
MW-44	This monitoring point is an existing groundwater monitoring well with unsaturated screen near the base of proposed Cell 5. This well is located within the proposed Cell 5.
GUCO-4	This monitoring point is the groundwater underdrain cleanout for Cell 4. This monitoring point will be located on the east side of Cell 4. This point will facilitate monitoring along the facility's east property boundary.
GUCO-10	This monitoring point is the groundwater underdrain cleanout for Cells 5-6. This monitoring point will be located on the east side of Cell 5. This point will facilitate monitoring along the facility's east property boundary.
GUCO-11	This monitoring point is the groundwater underdrain cleanout for Cells 7-9. This monitoring point will be located on the east side of Cell 7. This point will facilitate monitoring along the facility's east property boundary.

Subsurface landfill gas monitoring points were not included along the west side of the East MSWLF unit, as the intermittent creek along this boundary serves as a natural barrier to subsurface migration. Subsurface landfill gas monitoring points were not included along the northwest side of the East MSWLF unit based on the distance to the facility property boundary and ravines in this area, which would not be conducive to lateral gas migration. It should also be noted that, in addition to a number of groundwater underdrain cleanouts serving as landfill gas monitoring points, the geocomposite groundwater underdrain layer should deter subsurface landfill gas migration across the entire unit by acting as a preferential flow layer.

The subsurface landfill gas monitoring points for the East MSWLF unit will be installed and/or utilized in phases to coincide with the phase development of the unit. Table 2 below summarizes, by phase, the subsurface landfill gas monitoring points for the East MSWLF unit, including the proposed installation and utilization schedule.

Table 2. East MSWLF Unit Subsurface LFG Monitoring Points by Phase

Cell	Gas Monitoring Network Change	Subsurface LFG Monitoring Network
1	Add: MW-50 and GUCO-1	MW-50 and GUCO-1
2	Add: MW-48B and GUCO-2	MW-48B, MW-50, GUCO-1, and GUCO-2
3	Add: MW-45 and GUCO-3	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, and GUCO-3
4	Add: MW-44 and GUCO-4	MW-44, MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, and GUCO-4
5	Add: GUCO-10 Remove: MW-44	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, GUCO-4, and GUCO-10
6	No changes	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, GUCO-4, and GUCO-10
7	Add: GUCO-11	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, GUCO-4, GUCO-10, and GUCO-11
8	No changes	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, GUCO-4, GUCO-10, and GUCO-11
9	No changes	MW-45, MW-48B, MW-50, GUCO-1, GUCO-2, GUCO-3, GUCO-4, GUCO-10, and GUCO-11

The subsurface landfill gas monitoring points for the West MSWLF unit are largely installed, and new points will be installed and/or utilized in phases to coincide with the unit's phased development.

Table 3 below contains a summary by phase of the subsurface landfill gas monitoring points for the West MSWLF unit.

Table 3. West MSWLF Unit Subsurface LFG Monitoring Points

Monitoring Point	Comments
91-MW-6	Vadose zone west of the West MSWLF unit. The location provides monitoring to the northwest of the West MSWLF unit and is near the property boundary.
93-MW-31R	Deep vadose zone off the southwest corner of the West MSWLF unit. The well is located close to the facility property boundary and between the West MSWLF unit and a residence located on the west side of 165th Avenue.
LFGW-W1	This monitoring point is the shallower monitoring point in a monitoring point nest with 93-MW-31R. LFGW-W1 is screened near the top of the relatively higher conductivity geologic layer in this area. The monitoring point enhances the monitoring of landfill gas between the West MSWLF unit and the residence located on the west side of 165th Avenue.
LFGW-W2	This monitoring point monitors potential subsurface landfill gas migration to the west of the scale house between the scale house and utilities located in the right of way of 165th Avenue.
LFGW-W3	This monitoring point monitors between the West MSWLF unit and the residence located just north of the northwest corner of the facility property.

Monitoring Point	Comments
GUCO-5	This point monitors the vadose zone beneath 2008 North Lateral Expansion, Phase 1A & 1B, east side.
GUCO-6	This point monitors the vadose zone beneath 2008 North Lateral Expansion, Phase 1A & 1B, west side.
GUCO-7	This point monitors the vadose zone beneath 2008 North Lateral Expansion, Phase 3, east side.
GUCO-8	This future point will monitor the vadose zone on the south side of 2017 West Expansion Area groundwater underdrain.
GUCO-9a	This future point will monitor the vadose zone on the north side of the 2017 West Expansion Area groundwater underdrain (after construction of Area A1)
GUCO-9b	This future point will monitor the vadose zone on the north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A2)
GUCO-9c	This future point will monitor the vadose zone on the north side of the 2017 West Expansion Area groundwater underdrain (after construction of Area B)

The subsurface landfill gas monitoring points for the 2008 North Lateral Expansion portion and the 2017 West Expansion of the West MSWLF unit will be installed and/or utilized in phases to coincide with the unit's phase development. Table 4 below summarizes, by phase, the subsurface landfill gas monitoring points for the 2008 North Lateral Expansion and 2017 West Expansion, including the proposed installation and utilization schedule.

Table 4. West MSWLF Unit Subsurface LFG Monitoring Points by Phase

Cell	Gas Monitoring Network Change	Subsurface LFG Monitoring Network
Current	Current network	91-MW-6, 93-MW-31R, LFGW-W1, LFGW-W2, LFGW-W3, LFGW-W5, LFGW-T1, LFGW-T2, LFGW-T3, LFGW-T4, GUCO-5, GUCO-6, GUCO-7, Beneath scale house
Phase 4	No change	91-MW-6, 93-MW-31R, LFGW-W1, LFGW-W2, LFGW-W3, LFGW-W5, LFGW-T1, LFGW-T2, LFGW-T3, LFGW-T4, GUCO-5, GUCO-6, GUCO-7, Beneath scale house
Area A-1	Add: GUCO-8, GUCO-9a	91-MW-6, 93-MW-31R, LFGW-W1, LFGW-W2, LFGW-W3, LFGW-W5, LFGW-T1, LFGW-T2, LFGW-T3, LFGW-T4, GUCO-5, GUCO-6, GUCO-7,GUCO-8, GUCO-9a, Beneath scale house
Area A-2	Add: GUCO-9b Remove:GUCO-9a	91-MW-6, 93-MW-31R, LFGW-W1, LFGW-W2, LFGW-W3, LFGW-W5, LFGW-T1, LFGW-T2, LFGW-T3, LFGW-T4, GUCO-5, GUCO-6, GUCO-7,GUCO-8, GUCO-9b, Beneath scale house
Area B	Add: GUCO-9c Remove: GUCO-7 and GUCO-9b	91-MW-6, 93-MW-31R, LFGW-W1, LFGW-W2, LFGW-W3, LFGW-W5, LFGW-T1, LFGW-T2, LFGW-T3, LFGW-T4, GUCO-5, GUCO-6, GUCO-8, GUCO-9c, Beneath scale house

Subsurface landfill gas monitoring points were not included along the east and southeast sides of the West MSWLF unit, as the intermittent creek along this boundary serves as a natural barrier to subsurface migration. Subsurface landfill gas monitoring points were also not included to the

northeast based on distance to facility property boundaries, the ditch along the northern border of the north cell intercepting lateral gas flow, and the extensive amount of excavation that has occurred to the north of the West MSWLF unit, likely eliminating preferential pathways or making migration to the surface more likely in this area.

Subsurface landfill gas monitoring points for the West MSWLF unit will be brought online in phases as indicated in Table 2. Table 5 below summarizes the landfill gas monitoring network for the West MSWLF unit.

Table 5. West MSWLF Unit LFG Monitoring Points

Monitoring Point	Type	Description
Office	Indoor	Inside office building.
Shop	Indoor	Inside shop building.
Scale	Indoor	Beneath scale.
Maintenance Building	Indoor	Inside maintenance building.
South Shed	Indoor	Inside shed on the south side of the facility property.
Passive Trench Outlet	Outdoor	Adjacent to the outlet of the passive vent for the landfill gas interceptor trench.
93-MW-31R	Subsurface	Deep vadose zone off the southwest corner of the West MSWLF unit, across from a residence.
LFGW-W2	Subsurface	Vadose zone west of the scale house.
91-MW-6	Subsurface	Vadose zone off the northwest corner of the West MSWLF unit.
LFGW-W3	Subsurface	Vadose zone in the northwest corner of the facility property, across from a residence.
Scale house	Subsurface	Subsurface vent for void space under the scale house.
LFGW-T4	Subsurface	Shallow vadose zone, off landfill property, southwest of the West MSWLF unit
LFGW-T1	Subsurface	Shallow vadose zone off the southwest corner of the West MSWLF unit, across from a residence
LFGW-T2	Subsurface	Shallow vadose zone off the southwest corner of the West MSWLF unit, across from a residence
LFGW-T3	Subsurface	Shallow vadose zone off the southwest corner of the West MSWLF unit, across from a residence
LFGW-W1	Subsurface	Shallow vadose zone off the southwest corner of the West MSWLF unit, across from a residence
LFGW-W4	Subsurface	Shallow vadose zone off the southwest corner of the West MSWLF unit, across from a residence
Exhaust	Other	Between knockout and blower in landfill gas extraction trailer
GUCO-5	Subsurface	Vadose zone beneath Phase IA & IB, east side
GUCO-6	Subsurface	Vadose zone beneath Phase IA & IB, west side
LFGW-W5	Subsurface	Shallow vadose zone, west of GUCO-6
GUCO-7	Subsurface	Vadose zone beneath Phase 2, east side
GUCO-8	Subsurface	Vadose zone on south side of 2017 West Expansion Area groundwater underdrain
GUCO-9a	Subsurface	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A1)

Monitoring Point	Type	Description
GUCO-9b	Subsurface	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A2)
GUCO-9c	Subsurface	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area B)

The process of monitoring the landfill gas from the monitoring points will involve removal of the casing cap and the installation of a special valved cap over the casing. A negative pressure will be applied through the valved cap to draw gas from the subsurface through the screened interval and through a methane detection/measuring instrument. The elapsed monitoring time will be set to provide a representative sample of the subsurface soil gases, which will be based on the type of equipment used for monitoring. A field data sheet will be used to record the date, weather data, type of equipment used, and the percentage LEL detected. A copy of the field data sheet is included in Attachment A.

(2) The minimum frequency of monitoring shall be quarterly.

Monitoring occurs quarterly.

2.2.3 Corrective Action Requirements

c. If methane gas levels exceeding the limits specified in paragraph 113.9(2)"a" are detected, the owner or operator must:

(1) Immediately take all necessary steps to ensure protection of human health and notify the department and department field office with jurisdiction over the MSWLF;

If methane gas levels exceeding the limits specified in paragraph 113.9(2)"a" are detected, Landfill personnel will take all necessary steps to ensure protection of human health and ensure that the DNR and the DNR field office with jurisdiction over the Landfill (Field Office #6) are notified. Steps to ensure protection of human health will include notifying on-site personnel and evacuating them to safe locations. The site operator will notify nearby residents if levels of methane are detected above the action level at the facility property boundary. If necessary, the site operator will enlist the aid of the County Sheriff's Department, State Highway Patrol, and the nearest fire department for assistance. For more specifics, please refer to the facility Emergency Response and Remedial Action Plan (ERRAP).

(2) Within 7 days of detection, place in the operating record and notify the department and department field office with jurisdiction over the MSWLF of the methane gas levels detected and a description of the steps taken to protect human health; and

Within 7 days of methane gas levels exceeding the limits specified in 13.9(2)"a" the DNR and the DNR field office with jurisdiction over the Landfill (Field Office #6) will be notified of the methane gas levels that were detected. A description of the steps taken to protect human health will also be provided. Both a listing of the methane gas levels detected and the description of the steps taken to protect human health will be placed in the facility's operating record.

(3) Within 60 days of detection, implement a remediation plan for the methane gas releases, place a copy of the plan in the operating record, and notify the department and department field office with jurisdiction over the MSWLF that the plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.

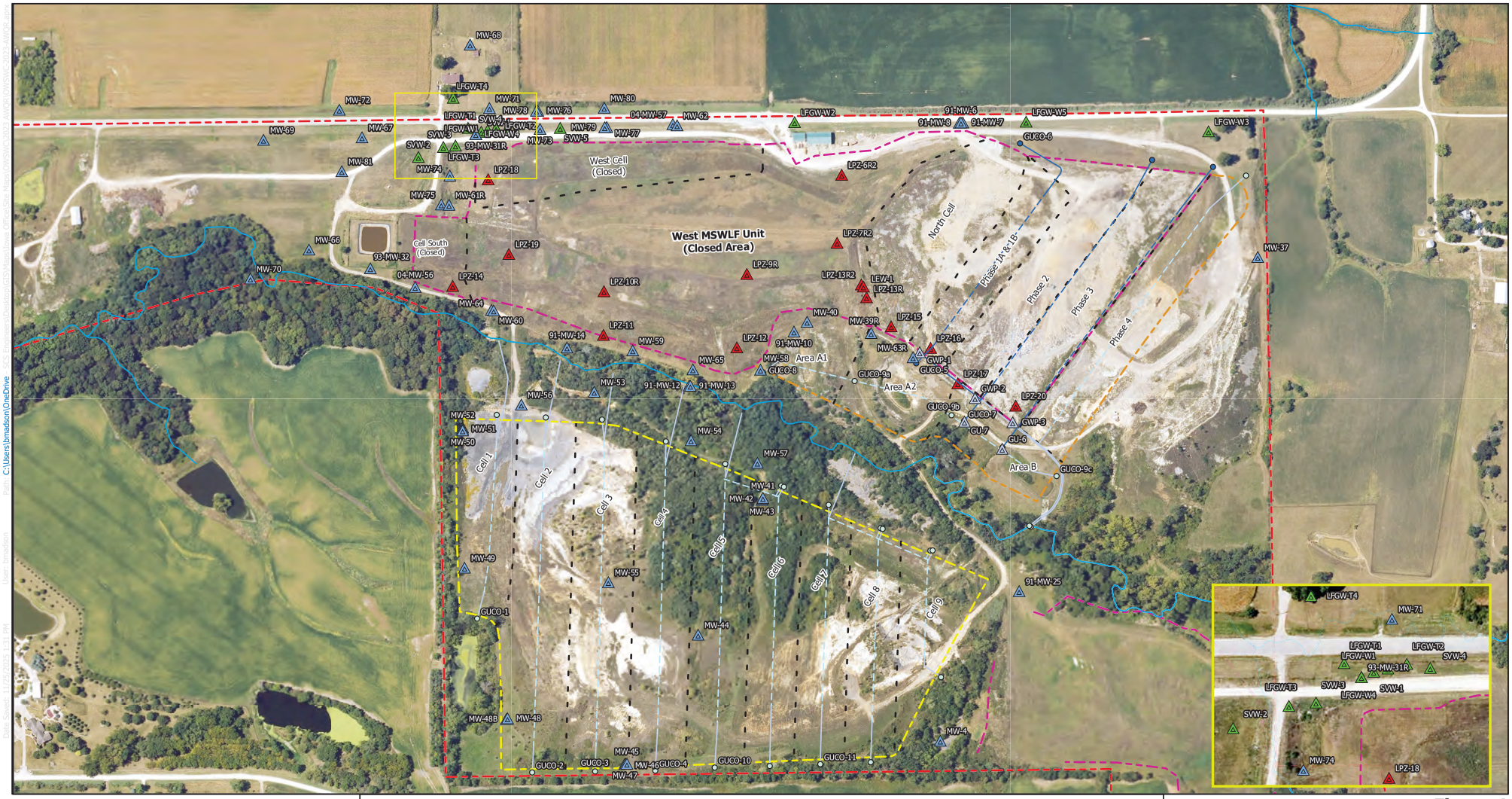
Within 60 days of an action level exceedance, a remediation plan for the methane gas release will be developed and implemented. The remediation plan will describe the nature and extent of the problem and the proposed remedy. A copy of the remediation plan will be sent to the DNR prior to implementation. Following implementation, a copy of the remediation plan will be placed in the facility's operating record and the DNR and the DNR field office with jurisdiction over the Landfill (Field Office #6) will be notified that the plan has been implemented.

2.2.4 Reporting Requirements

d. The owner or operator shall submit an annual report to the department detailing the gas monitoring sampling locations and results, any action taken, and the results of steps taken to address gas levels exceeding the limits of paragraph 113.9(2)"a" during the previous year. This report shall include a site map that delineates all structures, perimeter boundary locations, and other monitoring points where gas readings were taken. The site map shall also delineate areas of landfill gas migration outside the MSWLF units, if any. The report shall contain a narrative explaining and interpreting all of the data collected during the previous year. The report shall be due each year at a date specified by the department in the facility's permit.

An annual landfill gas monitoring report will be submitted to the DNR by January 31 of each year as a supplement to the Annual Water Quality Report. The report will contain the following:

1. Details of the landfill gas monitoring sampling locations and the monitoring results;
2. Any action taken with regard to the landfill gas monitoring system;
3. The results of steps taken to address gas levels exceeding the limits of paragraph 113.9(2)"a" during the previous calendar year;
4. A narrative explaining and interpreting the data collected during the previous calendar year; and
5. A site map depicting the following:
    - Site structure monitoring locations
    - Perimeter boundary monitoring locations
    - Subsurface monitoring locations
    - Other monitoring points where readings were taken
    - Delineation of landfill gas migration, if any, outside the MSWLF units



Site Map

Figure 1

Legend

- Monitoring Well
- Groundwater Underdrain
- Leachate Monitoring Point
- Landfill Gas Well
- Future Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Cleanout
- Future Groundwater Underdrain Solid Piping
- Future Groundwater Underdrain Perf Pipe
- Existing Groundwater Underdrain Solid Pipe
- Existing Groundwater Underdrain Perforated Pipe
- Approximate Property Boundary
- Approximate West MSLWF Unit Waste Boundary
- Approximate Future Waste Boundary
- Approximate East MSLWF Unit Waste Boundary
- Approximate Location of Cell Boundary
- Stream

Ottumwa-Wapello County Landfill
Ottumwa, IA
Project No: 27225584.00
Drawing Date: October 2025

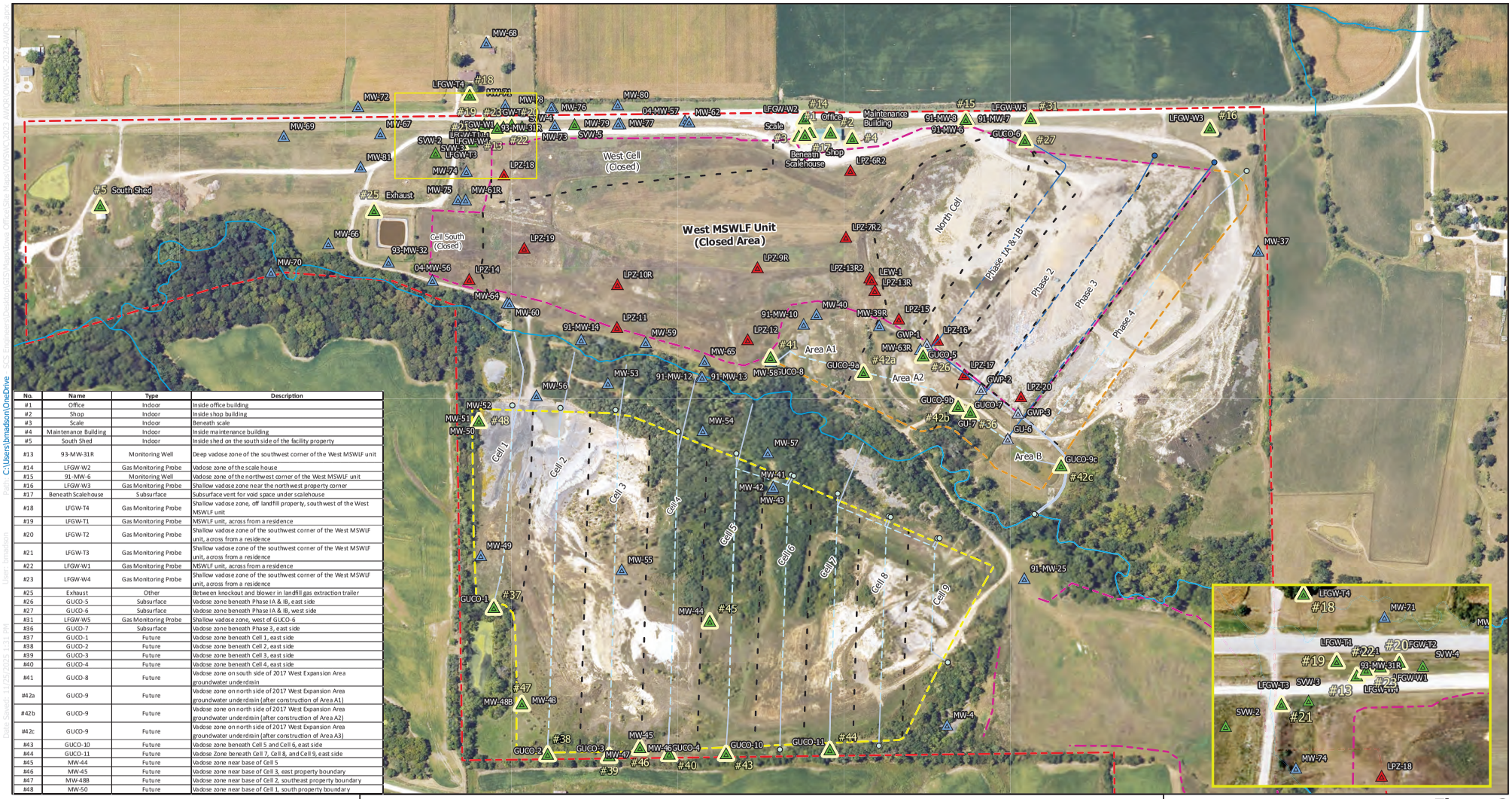
Overview Map Scale

0 80 160 320 Feet

0 300 600 1,200 Feet

W S N E

SCS ENGINEERS
environmental consultants and contractors



No.	Name	Type	Description
#1	Office	Indoor	Inside office building
#2	Shop	Indoor	Inside shop building
#3	Scale	Indoor	Beneath scale
#4	Maintenance Building	Indoor	Inside maintenance building
#5	South Shed	Indoor	Inside shed on the south side of the facility property
#13	93-MW-31R	Monitoring Well	Deep vadose zone of the southwest corner of the West MSWLF unit
#14	LFGW-W2	Gas Monitoring Probe	Vadose zone of the scale house
#15	91-MW-6	Monitoring Well	Vadose zone of the northwest corner of the West MSWLF unit
#16	LFGW-W3	Gas Monitoring Probe	Shallow vadose zone near the northwest property corner
#17	Beneath Scalehouse	Subsurface	Subsurface vent for void space under scalehouse
#18	LFGW-T4	Gas Monitoring Probe	Shallow vadose zone, off landfill property, southwest of the West MSWLF unit
#19	LFGW-T1	Gas Monitoring Probe	MSWLF unit, across from a residence
#20	LFGW-T2	Gas Monitoring Probe	Shallow vadose zone of the southwest corner of the West MSWLF unit, across from a residence
#21	LFGW-T3	Gas Monitoring Probe	Shallow vadose zone of the southwest corner of the West MSWLF unit, across from a residence
#22	LFGW-W1	Gas Monitoring Probe	MSWLF unit, across from a residence
#23	LFGW-W4	Gas Monitoring Probe	Shallow vadose zone of the southwest corner of the West MSWLF unit, across from a residence
#25	Exhaust	Other	Between knockout and blower in landfill gas extraction trailer
#26	GUCO-5	Subsurface	Vadose zone beneath Phase IA & IB, east side
#27	GUCO-6	Subsurface	Vadose zone beneath Phase IA & IB, west side
#31	LFGW-W5	Gas Monitoring Probe	Shallow vadose zone, west of GUCO-6
#36	GUCO-7	Subsurface	Vadose zone beneath Phase 3, east side
#37	GUCO-1	Future	Vadose zone beneath Cell 1, east side
#38	GUCO-2	Future	Vadose zone beneath Cell 2, east side
#39	GUCO-3	Future	Vadose zone beneath Cell 3, east side
#40	GUCO-4	Future	Vadose zone beneath Cell 4, east side
#41	GUCO-8	Future	Vadose zone on south side of 2017 West Expansion Area groundwater underdrain
#42a	GUCO-9	Future	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A1)
#42b	GUCO-9	Future	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A2)
#42c	GUCO-9	Future	Vadose zone on north side of 2017 West Expansion Area groundwater underdrain (after construction of Area A3)
#43	GUCO-10	Future	Vadose zone beneath Cell 5 and Cell 6, east side
#44	GUCO-11	Future	Vadose Zone beneath Cell 7, Cell 8, and Cell 9, east side
#45	MW-44	Future	Vadose zone near base of Cell 5
#46	MW-45	Future	Vadose zone near base of Cell 3, east property boundary
#47	MW-48B	Future	Vadose zone near base of Cell 2, southeast property boundary
#48	MW-50	Future	Vadose zone near base of Cell 1, south property boundary

LFG Monitoring Network

Figure 2

Legend

- Methane Monitoring Point
- Monitoring Well
- Groundwater Underdrain
- Leachate Monitoring Point
- Landfill Gas Well
- Future Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Cleanout
- Existing Groundwater Underdrain Perforated Pipe
- Existing Groundwater Underdrain Solid Pipe
- Future Groundwater Underdrain Perf Pipe
- Future Groundwater Underdrain Solid Piping
- Approximate Property Boundary
- Approximate West MSLWF Unit Waste Boundary
- Approximate Future Waste Boundary
- Approximate East MSLWF Unit Waste Boundary
- Approximate Location of Cell Boundary
- Stream

Ottumwa-Wapello County Landfill
Ottumwa, IA
Project No: 27225584.00
Drawing Date: October 2025

Overview Map Scale

0 80 160 320 Feet

0 305 610 1,220 Feet

SCS ENGINEERS
environmental consultants and contractors

Appendix A

Sample Field Data Sheet

Landfill Gas Monitoring - Field Measurement Recording Sheet

Name of Facility: Ottumwa-Wapello County Landfill

Monitoring Equipment Used: _____

Date of Measurement: _____

Equipment Calibration Date: _____

Equipment Calibration Time: _____

Weather Conditions:

Name of Sampler: _____

Temperature: _____

Barometric Pressure: _____

Other: _____

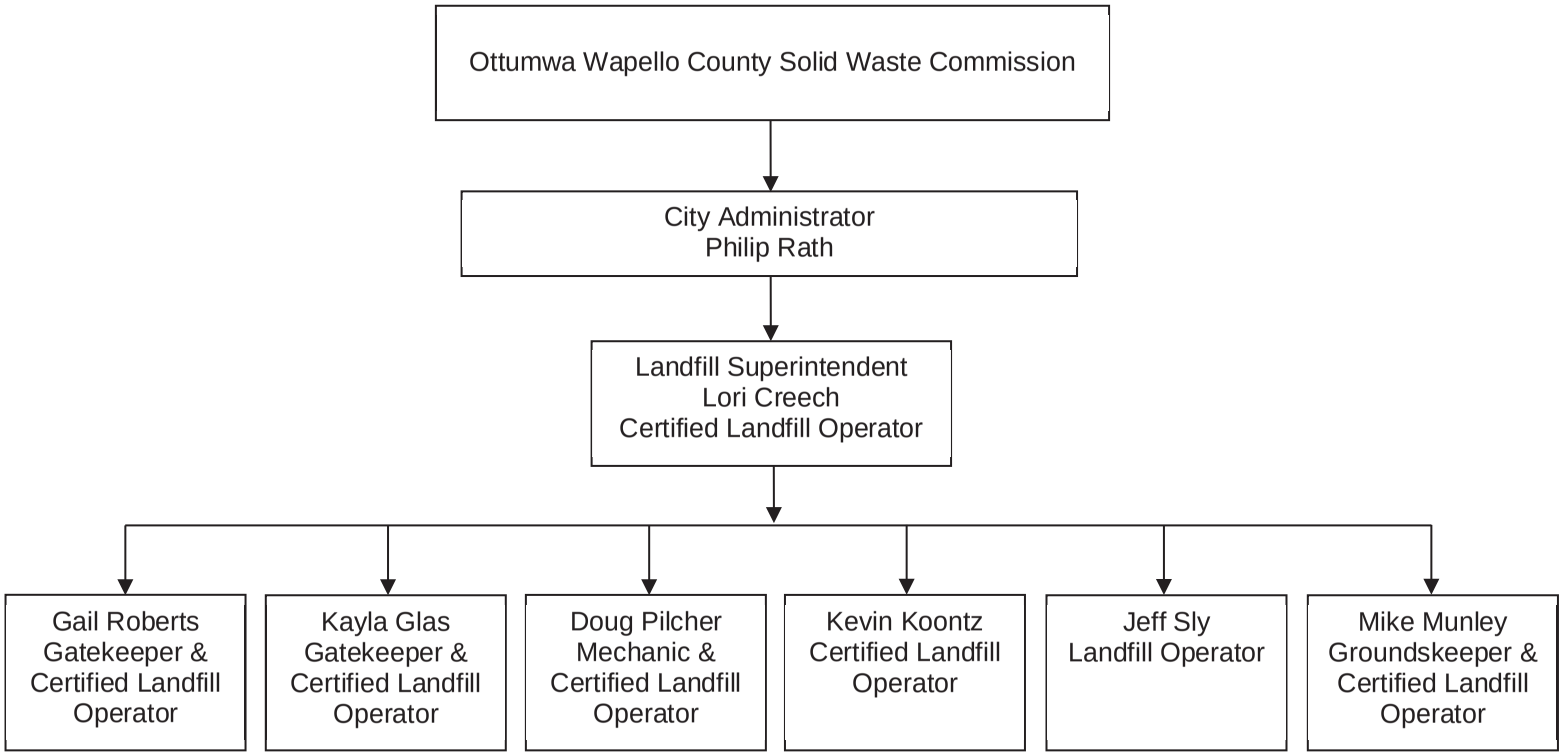
Sample Point	Static Water Level	Total Depth	Methane Concentration % of LEL	Comments
#1 Office	X	X		
#2 Shop	X	X		
#3 Scale	X	X		
#4 Maintenance Building	X	X		
#5 South Shed	X	X		
#12 Passive Trench Outlet	X	X		
#13 93-MW-31R				
#14 LFGW-W2				
#15 91-MW-6				
#16 LFGW-W3				
#17 Scalehouse	X	X		
#18 LFGW-T4				
#19 LFGW-T1				
#20 LFGW-T2				
#21 LFGW-T3				
#22 LFGW-W1				
#23 LFGW-W4				
#25 Exhaust	X	X		
#26 GUCO-5	X	X		
#27 GUCO-6	X	X		
#31 LFGW-W5				
#36 GUCO-7	X	X		

Appendix D

Organizational Chart and

Operator Certification

Ottumwa-Wapello County Sanitary Landfill Organizational Chart



Notes:

1. The organizational chart is subject to change without prior notification to the DNR.

Ottumwa-Wapello County Sanitary Landfill
Proof of MSWLF Operator Certification

Name	Certification Number	Expiration Date
Lori Creech	31160	June 30, 2026
Gail Roberts	31060	June 30, 2026
Kevin Koontz	31274	June 30, 2026
Doug Pilcher	30829	June 30, 2026
Kayla Glas	31308	June 30, 2026
Mike Munley	31287	June 30, 2026

*Jeff Sly will be taking his operator's certification in November 2025.

Appendix E

Proof of Financial Assurance

IOWA DEPARTMENT OF NATURAL RESOURCES

GOVERNOR, KIM REYNOLDS
LT. GOVERNOR, CHRIS COURNOYER
DIRECTOR, KAYLA LYON

July 16, 2025

PHILIP RATH
CITY ADMINISTRATOR
OTTUMWA-WAPELLO COUNTY SOLID WASTE COMMISSION
105 EAST THIRD STREET
OTTUMWA IA 52501

Re: Ottumwa-Wapello County Sanitary Landfill
Permit Number 90-SDP-01-75P
Approval of Financial Assurance

Dear Mr. Rath:

This is notification by the Iowa Department of Natural Resources (DNR) that the Ottumwa-Wapello County Solid Waste Commission (Commission) has adequately complied with the financial assurance requirements of 567 IAC 113.14(455B) for the Ottumwa-Wapello County Sanitary Landfill. The Commission's financial assurance documentation (Doc #113336), received June 30, 2025, and revisions (Doc #113434), received July 11, 2025, have been placed in the DNR's record files.

The projected deposit of **$34,629** to the Commission's restricted closure and post-closure account should have been made by July 30, 2025. The deposit amounts are as stated in the "Formula for Projected Deposits" component of Section 7 of the Board's Financial Assurance Report Form.

Please note that the Commission may withdraw money from the closure and post-closure account without DNR approval for the purpose of funding closure, including partial closure, or post-closure activities in accordance with 567 IAC 113.14(8)"d." As a reminder, compliance with 567 IAC 113.14(455B) is to be submitted annually, by April 1st, confirming that all applicable financial assurance documents are updated as required.

Please feel free to contact me with any questions. I can be reached at (515) 802-8835 or mary.klemesrud@dnr.iowa.gov.

Sincerely,

Mary Klemesrud
Program Planner
Land Quality Bureau

Cc: Christine Collier, P.E., SCS Engineers
Iowa DNR Field Office #6, Washington