900 Long Lake Road, Suite 200
St. Paul, Minnesota 55112
United States
ghd.com

Our reference: 056934-LTR-19

June 17, 2024

Brian Rath, P.E.
Senior Environmental Engineer
Solid Waste and Contaminated Sites Section
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, Iowa 50319-0034

Operating Permit No. 07-SDP-12-89 Renewal Application
Viking Pump Foundry Sand Landfill, Cedar Falls, Iowa

Dear Mr. Rath:

This letter and accompanying documents complete the renewal application for Operating Permit 07-SDP-12-89 for the Viking Pump (Viking) Foundry Sand Landfill in Cedar Falls, Iowa (Site). The current Operating Permit (2021 Permit) was issued December 8, 2021, revised on November 3, 2022, and expires December 8, 2024.

No significant changes are proposed at this time; however, contact information for Viking Pump personnel is updated in this renewal application. Revised documents are attached. Documents that did not require revision are identified with their IDNR DocDNA Identification Number provided.

Iowa Department of Natural Resources' (IDNR's) Industrial Monofill Permit Application Form 50 is submitted as Attachment A to this letter. This letter constitutes the Executive Summary of the Required Plans and Specifications.

1. Executive Summary

1.1 Summary of Modifications

There were no modifications to the approved plans and specifications during the current permit cycle.

1.2 Special Provisions

No changes are proposed to existing special conditions 1 (materials which may be placed in the permitted landfill), 2 (site operations), 3 (groundwater sampling), 4 (including barium and benzene analysis in groundwater), 5 (exemption from methane monitoring), 6 (determination of disposal mass), or 7 (site closure).

1.3 Permit Amendments

One (1) amendment was issued to the 2021 Permit. The revised 2021 Permit (**Doc 104517**) approved the Well Abandonment Documentation for Monitoring Well (MW) 18 that was submitted by GHD on behalf of Viking on October 25, 2022 (**Doc 104406**).

No other amendments have been issued to the 2021 Permit.

1.4 Documentation and Certification for New Permit Amendment Requests

No requests for new permit amendments are being made during this permit renewal permit application.

1.5 Documentation and Certification for New Variance Requests

No requests for new variances are being made during this permit renewal permit application.

2. Map or Aerial Photograph

Updated maps and aerial photographs of the Site's boundaries and features are provided as Figures 1, 2, and 3.

3. Organizational Chart

An updated organization chart is provided as Attachment B.

4. Disposal Process Description

The revised Design and Operations Plan is provided in Attachment C which describes the disposal process at the Site.

5. Equipment

The equipment used to place material at the Site may change. In general, a dump truck places partial and formed used molds in the landfill. Occasionally, the material will include green sand, which is loose and not in the form of molds. Periodically, the molds are crushed and spread. Crushing and spreading equipment will typically include a bulldozer and compactor. Currently no equipment is permanently stored at the Site and only the dump truck is typically on Site.

This is subject to change as Viking is in the process of developing a bid for the contractor role at the Site.

6. Contingency Plan

An independent contingency plan is not required for this Site. The material is inert and not a fire source. If access to the Site is lost, a rental dump truck could be used to temporarily hold foundry sand molds until access is re-established.

7. Proof of Ownership

No revision required, see **Doc 92326**, Attachment D, pages 65-68 for past documentation.

8. HIR and HMSP

No new wells or subsurface investigations have been completed this permit cycle. Therefore, the past HIR (Doc 82755, Appendix B, pages 382-499) and previously submitted supplemental boring logs incorporated into past permits remain in effect.

An updated HMSP is provided as Attachment D.

9. Design and Operations Plan

The Design and Operations Plan is provided as Attachment C. No specifications or quality control and assurance plans are necessary at this time as no new construction is planned in the next permit cycle.

Viking plans to survey the fill area and perform a fill rate and volume calculation check in 2024/2025.

10. Closure and Post-Closure Plan

An updated Closure and Post-Closure Plan is provided as Attachment E. Financial assurance reporting and cost estimates for closure and post-closure for the 2024 calendar was previously submitted as **Doc 109489.** Financial assurance reports are submitted annually by Viking.

11. Explosive Gas Control Plan

Foundry sand is not subject to generating explosive gas therefore a gas control plan is not required.

12. Emergency Response and Remedial Action Plan (ERRAP)

An updated ERRAP now contains accurate contact information and is provided as Attachment F.

13. Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael Alowitz, P.E. — Date: 6/17/24

License Number: 18160

My license renewal date: December 31, 2024

Pages or sheets covered by this seal: Permit Renewal Application

If you have any questions, don't hesitate to contact us via the methods listed below.

Regards,

Michael Alowitz
Senior Engineer

+1 515 414-3934
michael.alowitz@ghd.com

Margaret Zuckweiler
Project Manager

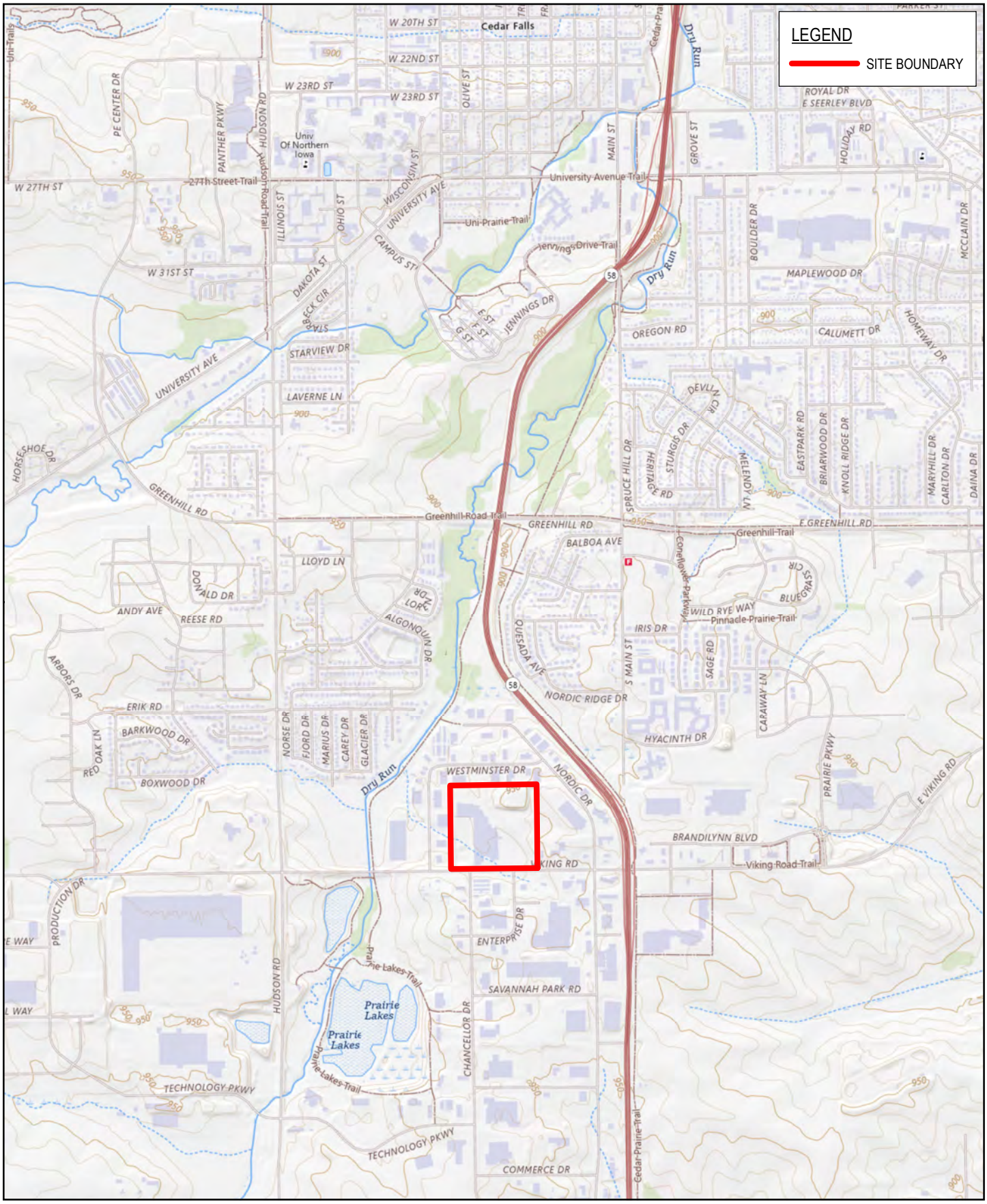
+1 612 524-6843
margaret.zuckweiler@ghd.com

MA/ls/LTR-19

Attachments:
Figure 1 – Site Location
Figure 2 – Zoning Map
Figure 3 – Site Plan
Attachment A – Industrial Monofill Permit Application Form 50
Attachment B – Organization Chart
Attachment C – Design and Operations Plan
Attachment D – Hydrologic Monitoring System Plan
Attachment E – Closure and Post-closure Plan
Attachment F – Emergency Response and Remedial Action Plan

Copy to:
Evan Arachikavitz, Viking
Becky Jolly, IDNR

Figures



Paper Size ANSI A

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Iowa North FIPS 1401 Feet

N

GHD

VIKING PUMP INC.
FOUNDARY SAND LANDFILL
CEDAR FALLS, IOWA

Project No. **056934-25**
Revision No. **-**
Date **05/15/2024**

SITE LOCATION

FIGURE 1

O:\GIS\PROJECTS\56000s\56934\Maps\Deliverables\LTR\LTR019\056934_LTR019_001_SiteLocation.mxd
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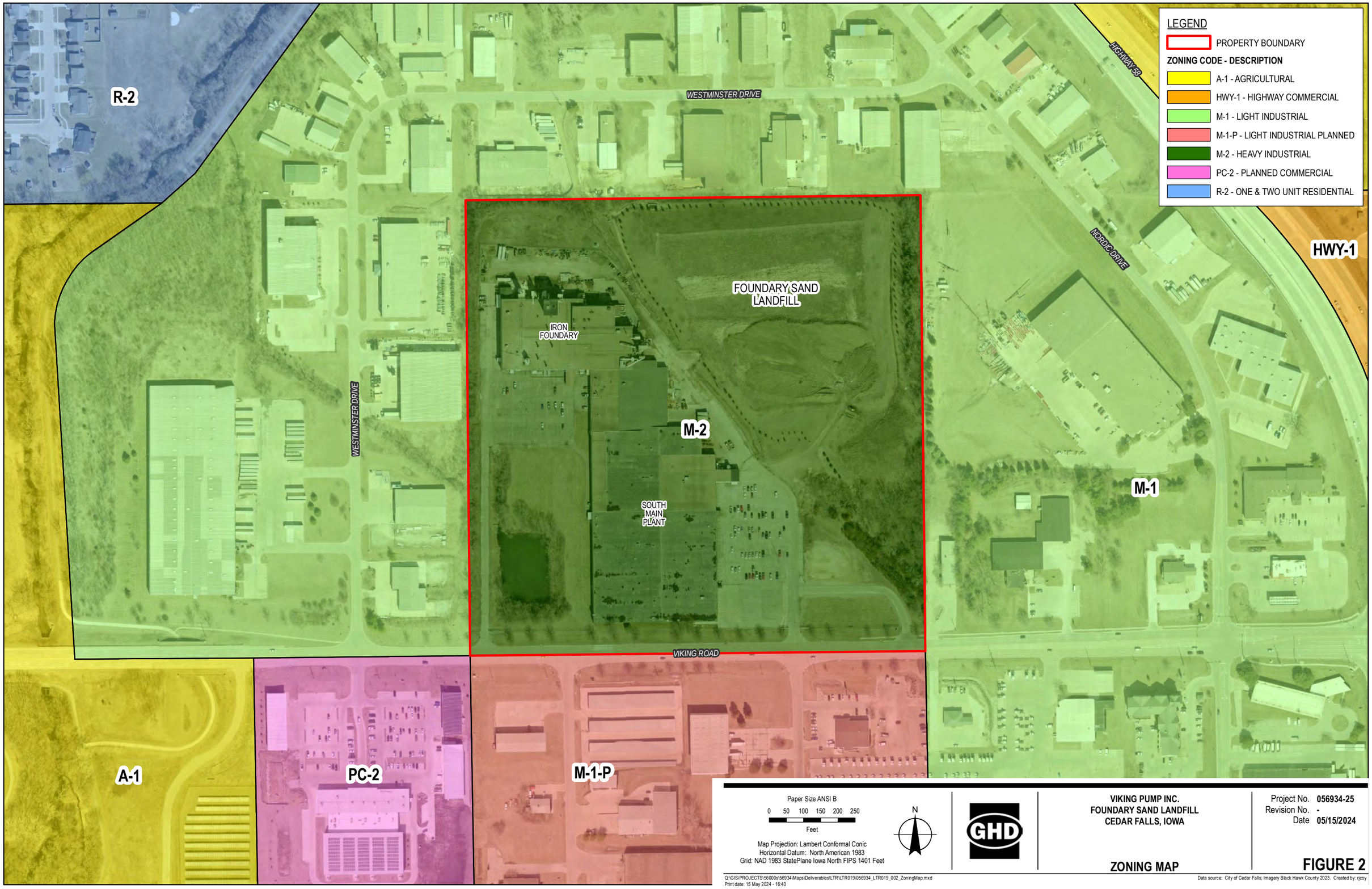
Data source: USGS The National Map. Created by: rjcoy



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Feet

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Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Iowa North FIPS 1401 Feet

N

GHD

VIKING PUMP INC.
FOUNDARY SAND LANDFILL
CEDAR FALLS, IOWA

Project No. **056934-25**
Revision No. **-**
Date **05/15/2024**

ZONING MAP

FIGURE 2

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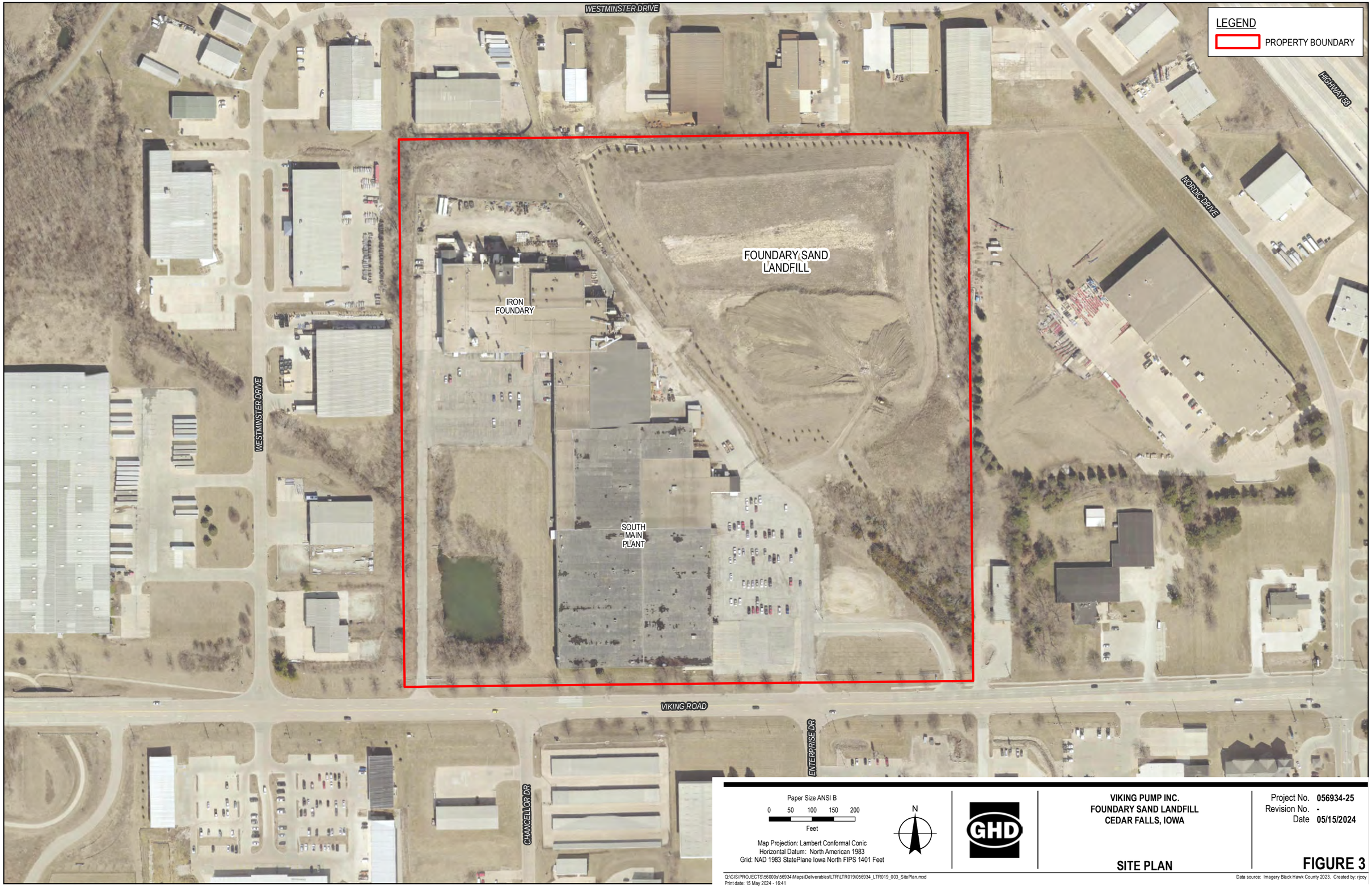

Paper Size ANSI B

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Iowa North FIPS 1401 Feet

N

GHD

VIKING PUMP INC.
FOUNDARY SAND LANDFILL
CEDAR FALLS, IOWA

SITE PLAN

Project No. **056934-25**
Revision No. **-**
Date **05/15/2024**

FIGURE 3

Q:\GIS\PROJECTS\56000s\56934\Maps\Deliverables\LTR\LTR019\056934_LTR019_003_SitePlan.mxd
Print date: 15 May 2024 - 16:41

Data source: Imagery Black Hawk County 2023. Created by: rjcoy

Attachments

Attachment A

Industrial Monofill Permit Application
Form 50

IOWA DEPARTMENT OF NATURAL RESOURCES

INDUSTRIAL MONOFILL

PERMIT APPLICATION FORM 50

☐ **New Permit**

☒ **Permit Renewal (permit number)** **07 -SDP- 12 - 89**

☐ **Closure Permit**

SECTION 1: PERMIT APPLICATION REQUIREMENTS

Owner of site

Name: Viking Pump Inc Phone: 319-222-2428

Address: 711 Viking Road Fax:

City, State, Zip: Cedar Falls, IA 50613 E-mail: earachikavitz@idexcorp.com

Certified Operator Responsible for Operation at Facility

Name: Randy Hansen Phone: 319-222-2422

Address: 711 Viking Road Fax:

City, State, Zip: Cedar Falls, IA, 50613 E-mail: rhansen@idexcorp.com

Permit Applicant

Name: Evan Arachikavitz Phone: 319-883-6920

Address: 711 Viking Road Fax:

City, State, Zip: Cedar Falls, IA 50613 E-mail: earachikavitz@idexcorp.com

Design Engineer (PE)

Name: Michael Alowitz, GHD Phone: 515-414-3934

Address: 11228 Aurora Avenue Fax:

City, State, Zip: Des Moines, IA 50322 E-mail: michael.alowitz@ghd.com

Iowa Engineer License #: 18160 Expiration Date: 12/31/2024

Responsible Official for the Facility

Name: Evan Arachikavitz Phone: 319-883-6920

Address: 711 Viking Road Fax:

City, State, Zip: Cedar Falls, IA 50613 E-mail: earachikavitz@idexcorp.com

Agency and Responsible Official of Agency Served (if any)

Name: Phone:

Address: Fax:

City, State, Zip: E-mail:

Facility

Name: Viking Pump Foundry Sand Landfill

Address: 711 Viking Road City, State, Zip: Cedar Falls, IA 50613

Legal Description:

NE 1/4 of the SW 1/4 of the SW 1/4 of Section 25, Township 89N, Range 14W

Type, source, and expected volume or weight of waste to be handled per day, per week, or year.

Approximately 7,000 tons per year of foundry sand from Viking Pump Inc operations

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 new waiver requests from Iowa Administrative Code requirements, if any.

☒ A map or aerial photograph locating boundaries and other environs in accordance with Iowa Administrative Code 567 paragraphs 115.13(3)"a-f".

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

☒ An organizational chart in accordance with subrule 115.13(5).

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

☒ A detailed description of the disposal process to be used in accordance with subrule 115.13(6).

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

☒ A table listing the equipment to be used, its design capacities and expected loads in accordance with subrule 115.13(7).

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

☒ A contingency plan detailing specific procedures to be followed in case of equipment breakdown, or fire in equipment or vehicles, including methods to be used to remove or dispose of accumulated waste in accordance with subrule 115.13(8).

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

☒ Proof of the applicant's ownership of the site or legal entitlement to use the site for the disposal of solid waste for the term of the permit for which application is made in accordance with subrule 115.13(9).

No Revision Required - See Doc ID#, Section, and Page: Doc 92326, Attachment D, pages 65-68

☒ A hydrogeologic investigation Report and a hydrologic monitoring system plan in accordance with subrules 115.14(455B) through 115.24(455B) and subrules 115.26(3) through 115.26(9).

No Revision Required - See Doc ID#, Section, and Page: HIR - Doc 82755, Appendix B, pages 382-499

☒ Design and operational plans and specifications for the facility, including quality control and assurance, in accordance with subrules 115.26(1) through 115.26(2); subrules 115.26(11) through 115.26(12); and rules 115.27(455B) through 115.29(455B).

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

☒ A closure and postclosure plan in accordance with subrules 115.13(10); 115.26(10); and 115.26(13) through 115.26(14).

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

☒ An explosive gas control plan in accordance with subrule 115.26(15).

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

☒ An emergency response and remedial action plan in accordance with rule 115.30(455B).

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

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:  **Date:** June 17, 2024

Printed Name: Evan Arachikavitz **Title:** Senior Environmental Engineer, Viking Pump Inc

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.

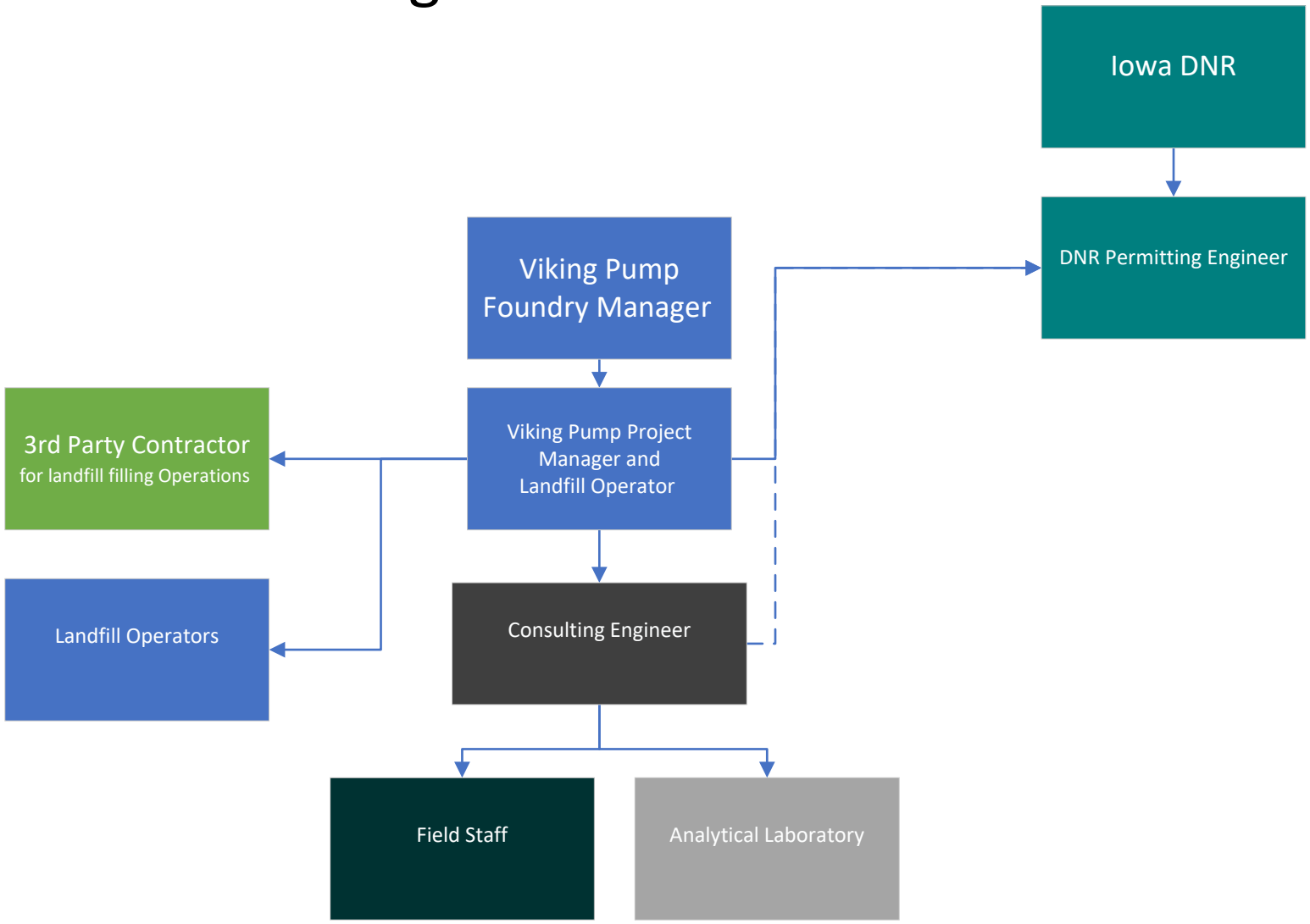
Send completed applications with attached information to the DNR project officer via email or file sharing platform.

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

Attachment B

Organization Chart

Viking Pump Landfill Organization Chart



Attachment C

Design and Operations Plan

Design and Operational Plan

Permit No. 07-SDP-12-98 Renewal Application

IDEX Corporation

June 17, 2024

→ The Power of Commitment

Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael J. Alowitz, P.E. — Date: 6/17/24

License Number: 18160

My license renewal date is: December 31, 2024

Pages or sheets covered by this seal: Entire Document

Contents

Appendices

1. Introduction

Viking Pump, Inc. (Viking) operates a Foundry and Foundry Sand Landfill (Landfill) located in the SW 1/4, of the SW 1/4 of Section 22, Township 89 North, Range 14 West in Black Hawk County, Iowa. The Landfill location is shown on drawing C-001 in Appendix A. This Design and Operational Plan for the Landfill was prepared by GHD Services, Inc. (GHD) for Viking Landfill operators and their waste filling contractor.

The Landfill has been used as a disposal area exclusively for foundry waste streams generated by Viking which include green sand, isocure chemically bonded sand and no-bake sand. The site was undeveloped prior to use as a Landfill. The Landfill operated as an unlined industrial landfill until 2014 when the unlined portion of the Landfill was closed and capped. Current operations have foundry sand being placed in lined areas with leachate collection. The cap of the initial industrial Landfill serves as a lined cell to place additional foundry sand. Existing conditions of the Landfill are shown on drawing C-051 in Appendix A and based on the data obtained from the survey conducted on October 27, 2021.

1.1 Purpose of this document

Landfill operational requirements are also included in this document. The drawing set included as Appendix A can be used to inform Viking's waste filling contractor of the planned fill pattern.

Viking is proposing to dispose of baghouse dust in the landfill as well, volume per year of this material is less than 30 tons annually and will be managed to limit airborne dust particles

1.2 Scope and limitations

This Design and Operations Plan was developed based on information provided by Viking and an aerial survey completed October 2021. Operational changes at the Foundry will impact the waste sand production rate and subsequently the deposition rate. Removal and reuse of material from the Landfill is not included in this document.

1.3 Assumptions

In preparation of this document, it was assumed the future deposition rate is consistent with recent projections and waste deposited has consisted only of the materials presented in Section 1.

2. Landfill Design

The Construction Documentation Report for the Landfill expansion back in 2014 was submitted as Doc 81938. The Landfill was designed to divert surface water around the fill area as shown in drawings C-051 through C-104 where surface water drains to either the stormwater basin south of the Landfill or into the unnamed creek northwest of the Landfill. The leachate collection system (LCS) was installed during the Landfill expansion. More detail on the LCS is provided in Section 3.6 of this Design and Operational Plan.

Drawings in Appendix A shown the development plan over periods of five (5) and ten (10) years based on the fill rates determined using the 2021 survey data. The slope stability analyses provided in **Doc 82755** remain applicable.

3. Landfill Operations

This section covers general practices and information for management of the Landfill.

3.1 Operator Certification

Viking employees certified as landfill operators by IDNR are Randy Hansen and Evan Arachikavitz. There is at least one (1) sanitary landfill operator on duty during all hours of operation of the Landfill. Certification records are maintained at the Foundry. Viking is responsible for renewing operators' certifications as required.

3.2 Non-acceptable Wastes

The following lists the wastes not acceptable in the landfill. No disposal of the following will be permitted:

- Municipal solid waste;
- Demolition and construction debris;
- Sewage sludge;
- Free liquids or waste containing free liquids and;
- All industrial wastes except foundry sand and bag house dust.

3.3 Solid Waste Unloading

Waste foundry sand will be unloaded in the Landfill only when an operator is on duty at the Foundry. Foundry sand placement will be within the active waste deposition limit marked by orange cones placed on the Landfill cell perimeters, also represented as the black dotted line on drawings C-051, C-101, C-102, and C-103. The following guidelines shall be followed to protect the liner, reduce erosion potential, and not pollute groundwater or surface waters:

- Placement of the foundry sand within the Landfill, will occur immediately adjacent to the access road. As waste foundry sand is produced, facility personnel will drive equipment on the access road and place waste material adjacent to the access road. Once filling is above the grade of the access road, the access road will require rerouting.
- The access road will be all weather construction, consisting of clean and compacted stone, geotextile fabric and/or geogrid, and foundry sand layers, and maintained in good condition. Dust shall be controlled on access roads by use of various techniques (e.g. water) as required. See details on drawing C-105 in Appendix A.
- A general positive grade of 5 percent over the surface of the landfill will be provided to meet the requirements of 115.26(1) "f" to minimize flow of surface water. However, foundry sand is very porous and readily allows infiltration. Ponding in waste areas is infrequently longer than a few hours after a rain event. Ponding does occur during/after snow melt and will be managed by the positive slope.
- As the Landfill areas are filled, a qualified contractor, familiar with liner requirements will crush and grade the waste sand placed. The baghouse dust will be disposed of and then directly covered with the foundry sand waste to minimize airborne movement of the material. Appendix B includes a TCLP showing it is non hazardous. The qualified contractor will not drive on the foundry sand protective layer unless low ground pressure equipment is used or minimum of 3 ft of sand is placed. Currently the only area of the Landfill without a minimum of 3 ft of sand are portions of the north side of the Landfill. The past 10 years have had filling practices fill the formerly lower portion of the cell of the landfill.
- The qualified contractor will minimize turning or spinning heavy equipment to minimize liner damage (where necessary) during waste grading.

– Areas along slopes where foundry sand is eroded or moved may require more attentive waste placement, crushing and grading and in extreme cases, replacement of the foundry sand.
– Areas requiring removal of foundry sand will be excavated and regraded to minimize potential for future erosion or movement. Should liner or geocomposite damage be noted by the contractor, the damage should be reported to Viking immediately. Liner damage will be repaired by calling qualified liner installers to repair the geosynthetic liner.

3.4 Fill Rate

To develop revised final contours and forecast the associated Landfill closure date, GHD calculated a fill rate for the Site based on data from the survey conducted October 2021. Based on the current grades, GHD calculated a total volume of approximately 49,300 cubic yards of foundry sand placed between the partial closure/lined expansion construction and the survey date (7 years). This corresponds to an annual fill rate of approximately 7,000 cubic yards.

This Design and Operational Plan will be updated on an as-needed basis and provided to Viking's filling contractor. Generally, the filling of the fully lined footprint will start in the middle section of the Landfill and the move southwestward until the lower and upper cells are combined and the access road allows haulers to safely access to the entire active waste surface area. The waste will be deposited on the active open face of the cell, levelled, and compacted.

Each filling phase will be accessed by the 15-foot wide road constructed of at minimum 3 ft of foundry sand such that the foundry equipment can dump from each side of the road. A cross section of the road is shown on drawing C-105 in Appendix A.

3.5 5-Year Fill Plan

Based on the estimated deposition rate, the active Landfill is expected to reach a volume of approximately 91,000 cubic yards in 2027. The access road will not need to be rebuilt since the elevation of waste will be approximately 567 ft and the general slope of the Landfill remains at positive 5 percent.

The 5-year Landfill contours are shown on drawing C-102 in Appendix A. The contours were designed to match the active waste deposition limits necessary to build up the Landfill fill to a permitted maximum elevation of 986 ft at the time of closure.

3.6 10-Year Fill Plan

The road elevation will need to be increased on an annual basis after 5 years of operation of the implemented Fill and Operations Plan to ensure the haulers can deposit waste safely. The road elevation will be increased in 1-foot lifts of compacted foundry sand annually, maintaining the general positive 5 percent grade and a 3-ft difference between the active waste and road elevations.

The estimated 10-year Landfill volume based on the estimated deposition rate is approximately 126,200 cubic yards, bringing the expected elevation to 985 ft. The access road may need to be re-designed/-built in approximately 10 years, to accommodate the estimated waste elevation of the 10-year Fill Plan contours, which are shown on drawing C-103 in Appendix A. The contours were designed to match the active waste deposition limits necessary to build up the Landfill fill to a permitted maximum elevation of 986 ft at the time of closure.

Alternatively, the roadway locations may be adjusted, or more than 1-foot of rise may be incorporated in one season to maximize work efficiency.

3.7 Leachate Control Plan

This section meets the requirements of the IAC 567 115.26(12) leachate control plan submission.

During landfill cell and partial cover construction in 2014, it was determined that the waste mass contained leachate and released it slowly through the natural clay. The unlined landfill was closed in 2014, and the active areas for future waste disposal are lined. IDNR approved the removal of the former leachate piezometers when the landfill was capped. Leachate within the closed landfill was dewatered through a drain tile that was installed during construction. The drain tile discharge line was sealed late July 2019 as flows had decreased substantially. The discharge pipe was filled with bentonite, plugged, capped, and sealed. The LCS was installed during bottom liner construction in 2014. Records drawings for the LCS are included in Appendix A in Doc 81938.

The existing lined footprint head is monitored in the sump as standard practice. There are no new fill areas that did not previously receive waste. Leachate head is recorded monthly and reported annually with the leachate volumes supplied in the Annual Water Quality Reports. The nature of the foundry sand creates a transmissive waste mass. Although capillary action is possible, most water will percolate through to the leachate collection media and toward the sump. Viking was issued a Discharge Permit allowing leachate discharge to City of Cedar Falls Water Reclamation Facility under a pretreatment agreement. Leachate is not stored at the Landfill.

Leachate samples are collected from the landfill leachate sump on a semiannual basis during the routine water monitoring events. Analytical results are included in the annual water quality monitoring report.

3.8 Landfill Maintenance

The Landfill is inspected on a semi-annual basis by a professional engineer registered in Iowa. Reports are submitted to the IDNR within 30 days of the inspection. Open burning, littering, and scavenging is prohibited at the Landfill. Since landfill gases are not generated by the accepted waste, Viking does not need to control flies, other inspects, rodents and other vermin at the Landfill. Daily soil cover is not placed on the Landfill due to the nature of the waste material (inorganic and non-flammable).

4. Site Information

Certain documents/records shall be kept onsite for safekeeping.

4.1 Records

A copy of the current permit, engineering plans, operator certifications and reports are kept in the on-site office of the environmental manager

4.2 Signage

Access to the landfill is managed by Viking's property security. The Landfill is not open to the public and currently has a permanent sign posted near the access road to the Landfill specifying:

NO PUBLIC DUMPING
Viking Pump Foundry Sand Landfill
Site Permit Number: 7-SDP-12-89P-FSL
Site Contact: Randy Hansen (319) 222-2422 and Evan Arachikavitz (319) 883-6920

The sign may be updated to reflect changes in personnel.

Appendices

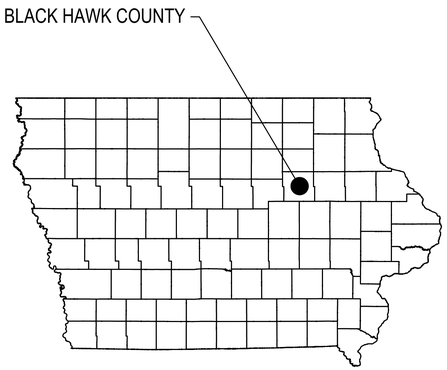
Appendix A

Landfill Drawings

VIKING PUMP
FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA
DESIGN AND OPERATIONAL PLAN

JUNE 2024

056934



AREA MAP

LOCATION MAP

DRAWING LIST	
Sheet Number	Sheet Title
C-001	COVER SHEET
C-051	EXISTING CONDITIONS
C-101	5 YEAR FILL PLAN
C-102	10 YEAR FILL PLAN
C-103	FINAL TOP OF WASTE
C-104	FINAL TOP OF WASTE CROSS-SECTIONS
C-105	DETAILS

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

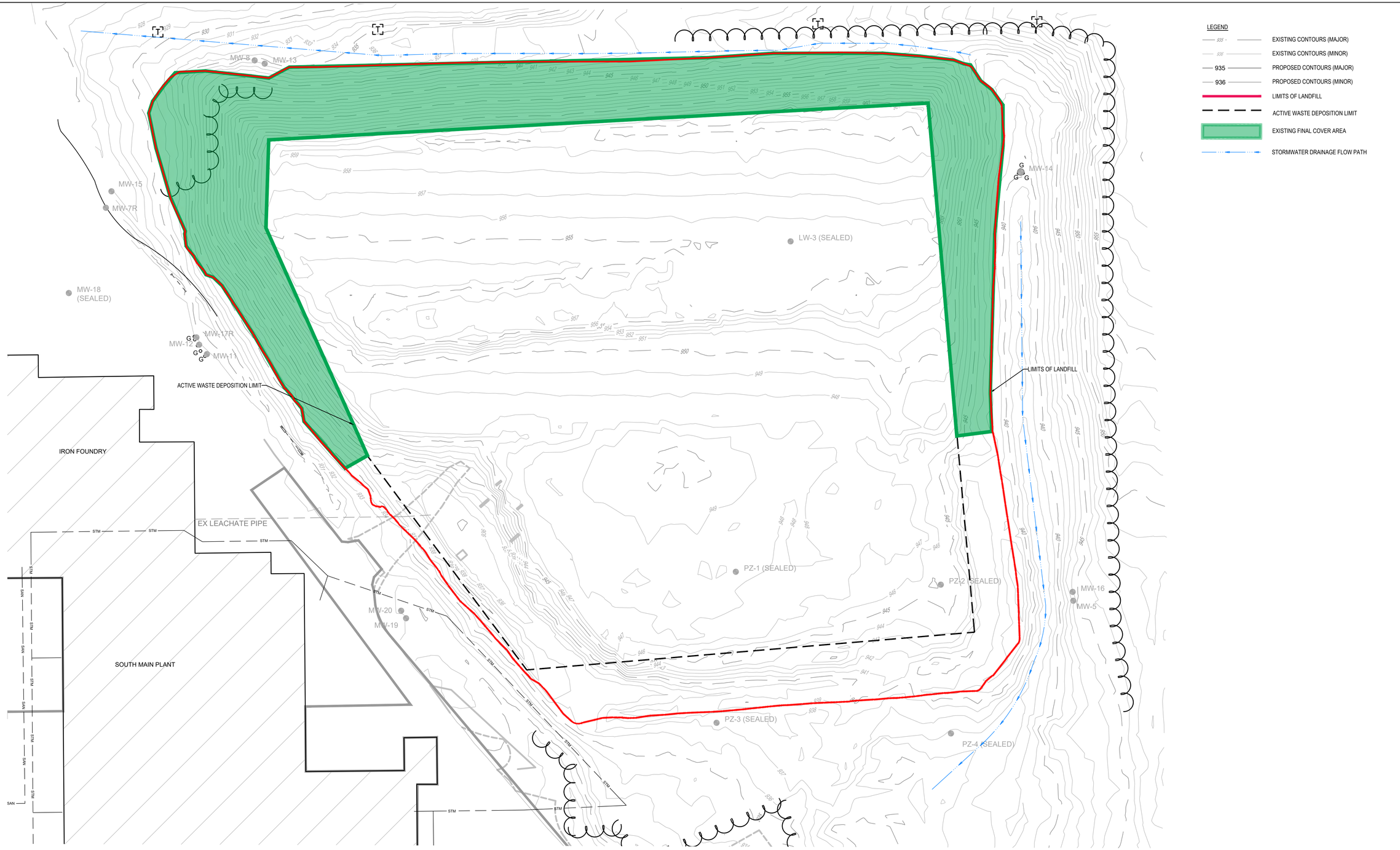
Author	S. PIKE	Drafting Check	S. PIKE
Designer	S. WHITE	Design Check	E. MITCHELL
Project Manager	M. ZUCKWIELER		
Project Director	M. ZUCKWIELER		

Bar is one inch on original size sheet
0 1"

GHD Consulting Services Inc.
285 Delaware Avenue, Suite 500
Buffalo NY 14202 USA
T 1 716 856 2142 F 1 716 856 2160 W www.ghd.com
www.ghd.com

Client: VIKING PUMP FOUNDRY SAND LANDFILL CEDAR FALLS, IOWA
Project: DESIGN AND OPERATIONAL PLAN
Title: COVER SHEET
Size: ARCH D
Project No.: 056934
Date: MAY 2024
Scale:
Sheet No.: C-001

Plot Date: 22 May 2024 - 2:06 PM
Plotted By: Sean Pike
Filename: C:\Users\srpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-001.dwg



SITE PLAN

SCALE: 1" = 40'

0 20' 40' 80'

N

REFERENCE NOTE:

1. AERIAL FLYOVER SURVEY PERFORMED BY GHD ON 10/27/21, COORDINATE SYSTEM: NORTH AMERICAN DATUM83 IOWA NORTH.

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

Author S. PIKE	Drafting Check S. PIKE	Project Manager M. ZUCKWIELER	
Designer S. WHITE	Design Check E. MITCHELL	Project Director M. ZUCKWIELER	

Bar is one inch on original size sheet

0 1"

GHD Consulting Services Inc.
285 Delaware Avenue, Suite 500
Buffalo NY 14202 USA
T 1 716 856 2142 F 1 716 856 2160 W www.ghd.com
www.ghd.com

Client VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA

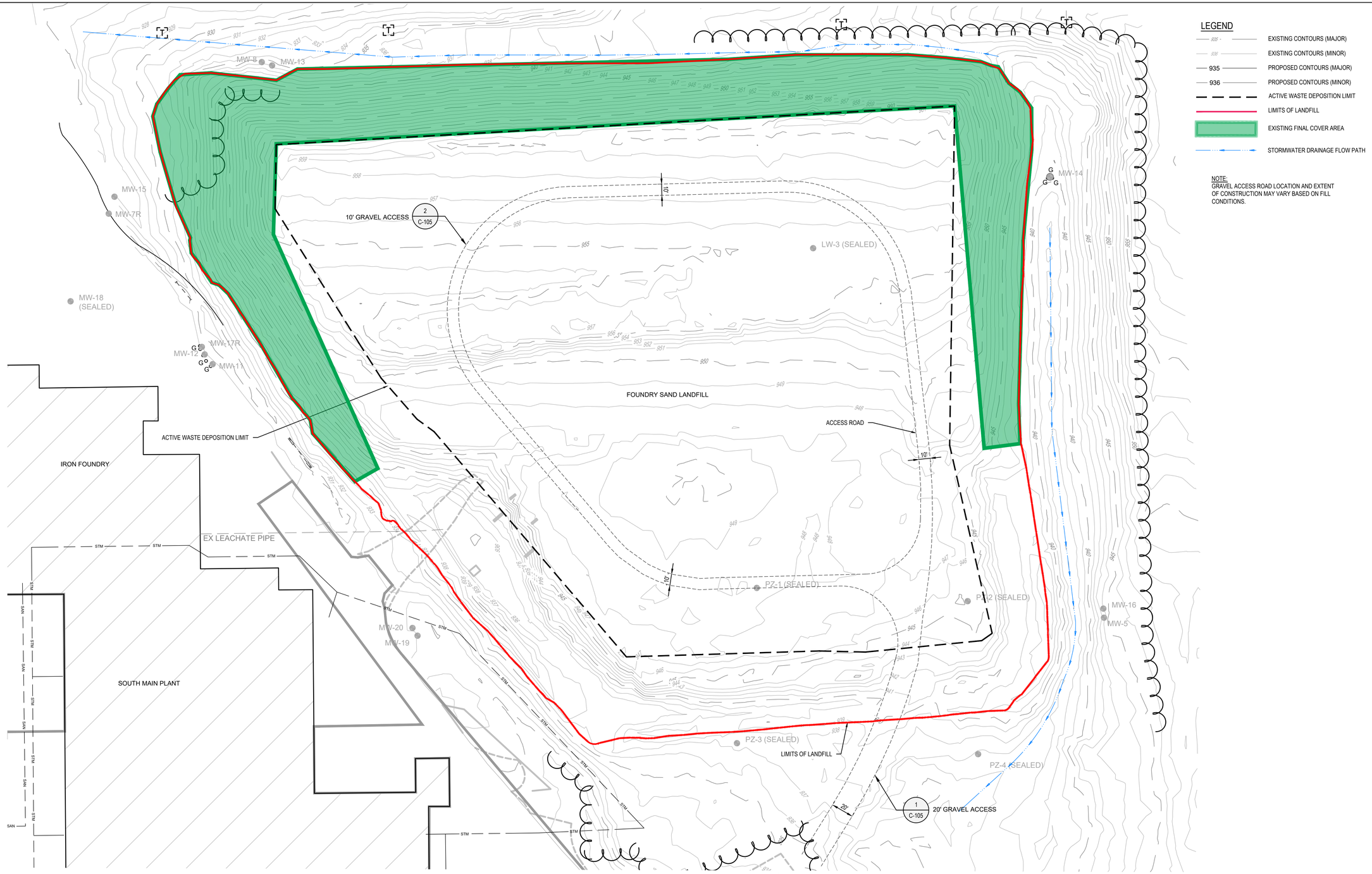
Project DESIGN AND OPERATIONAL PLAN

Title EXISTING CONDITIONS

Size ARCH D

Project No.	Date	Scale	Sheet No.
056934	MAY 2024		C-051

Plot Date: 22 May 2024 - 2:06 PM Plotted By: Sean Pike Filename: C:\Users\arpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-051.dwg



REFERENCE NOTE:
1. AERIAL FLYOVER SURVEY PERFORMED BY GHD ON 10/27/21, COORDINATE SYSTEM: NORTH AMERICAN DATUM83 IOWA NORTH.

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

Author S. PIKE | Drafting Check S. PIKE | Project Manager M. ZUCKWIELER
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Client: VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA
Project: DESIGN AND OPERATIONAL PLAN

Title: 5 YEAR FILL PLAN

Size: ARCH D

Project No.	Date	Scale	Sheet No.
056934	MAY 2024	AS SHOWN	C-101

Plot Date: 17 June 2024 - 4:40 PM Plotted By: Sean Pike Filename: C:\Users\srpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-101.dwg

REFERENCE NOTE:
1. AERIAL FLYOVER SURVEY PERFORMED BY GHD ON 10/27/21, COORDINATE SYSTEM: NORTH AMERICAN DATUM83 IOWA NORTH.

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

Author S. PIKE	Drafting Check S. PIKE	Project Manager M. ZUCKWIELER	
Designer S. WHITE	Design Check E. MITCHELL	Project Director M. ZUCKWIELER	

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0 1"

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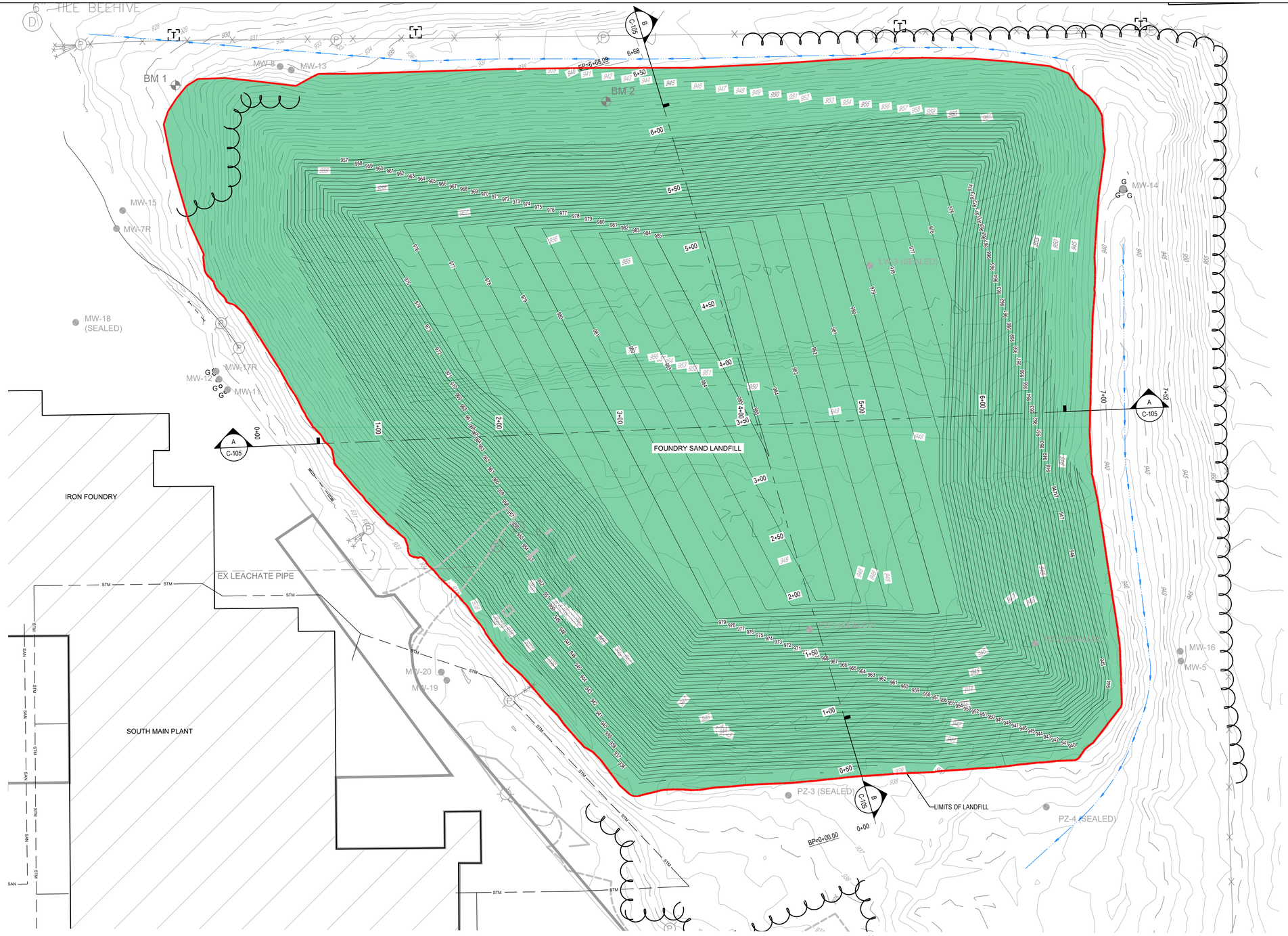
Client VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA
Project DESIGN AND OPERATIONAL PLAN

Title 10 YEAR FILL PLAN

Size ARCH D

Project No.	Date	Scale	Sheet No.
056934	MAY 2024		C-102

Plot Date: 17 June 2024 - 4:40 PM Plotted By: Sean Pike Filename: C:\Users\srpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-102.dwg



SITE PLAN

SCALE: 1" = 40'

0 20' 40' 80'

N

REFERENCE NOTE:

1. AERIAL FLYOVER SURVEY PERFORMED BY GHD ON 10/27/21, COORDINATE SYSTEM: NORTH AMERICAN DATUM83 IOWA NORTH.

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

Author S. PIKE | Drafting Check S. PIKE | Project Manager M. ZUCKWIELER

Designer S. WHITE | Design Check E. MITCHELL | Project Director M. ZUCKWIELER

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0 1"

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Client VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA

Project DESIGN AND OPERATIONAL PLAN

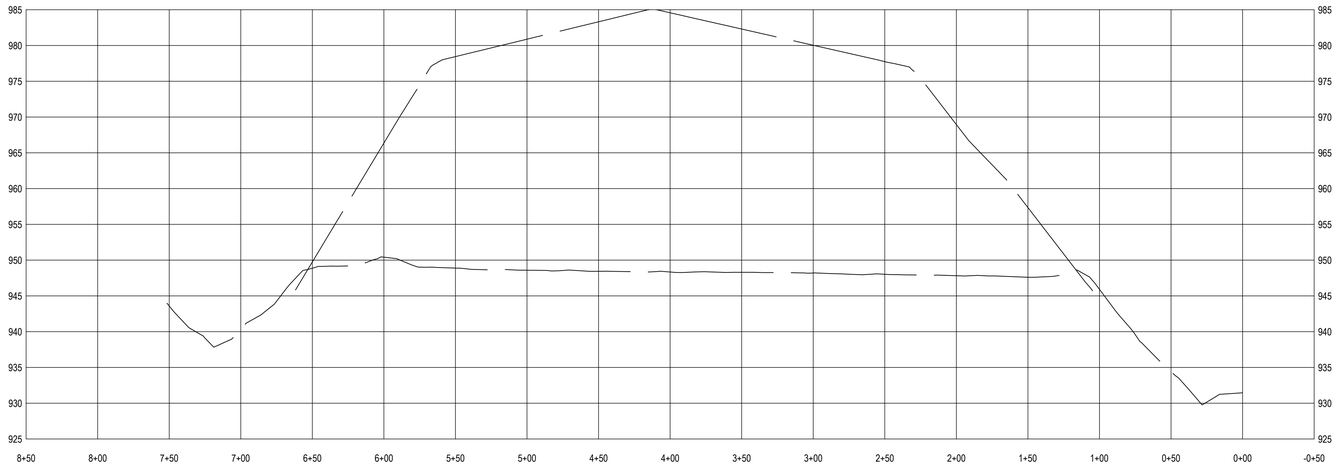
Title FINAL TOP OF WASTE

Size ARCH D

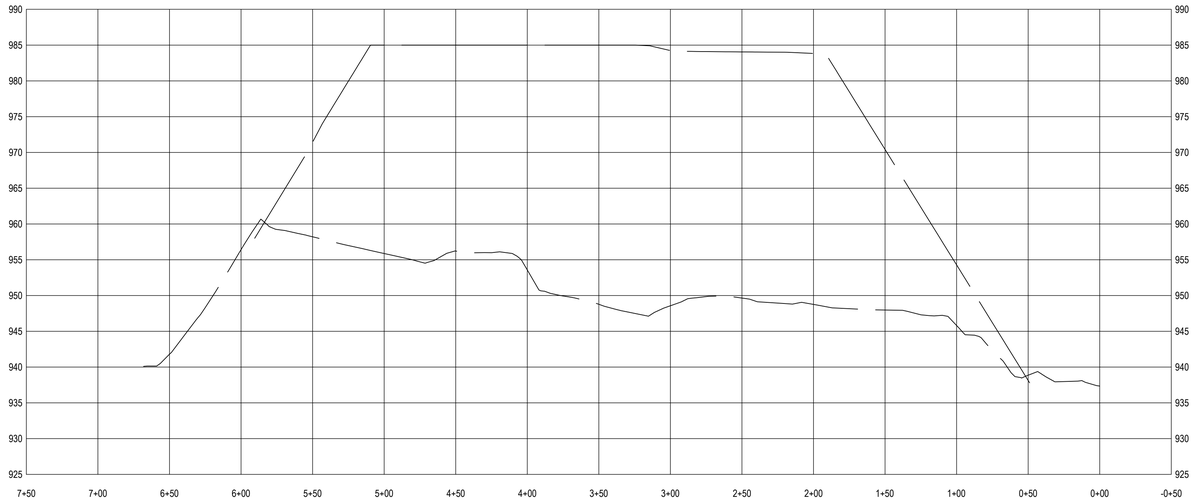
Project No. 056934 | Date MAY 2024 | Scale

Sheet No. C-103

Plot Date: 22 May 2024 - 2:07 PM | Plotted By: Sean Pike | Filename: C:\Users\arpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-103.dwg



FINAL TOP OF WASTE A-A



FINAL TOP OF WASTE B-B

PRELIMINARY

No.	Issue		Checked	Approved	Date
1	**ISSUED FOR PERMIT**		**EM**	**MZ**	**05-22-24**
Author	**S. PIKE**	Drafting Check	**S. PIKE**	Project Manager	**M. ZUCKWIELER**
Designer	**S. WHITE**	Design Check	**E. MITCHELL**	Project Director	**M. ZUCKWIELER**

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Client **VIKING PUMP FOUNDRY SAND LANDFILL**
CEDAR FALLS, IOWA
Project **DESIGN AND OPERATIONAL PLAN**

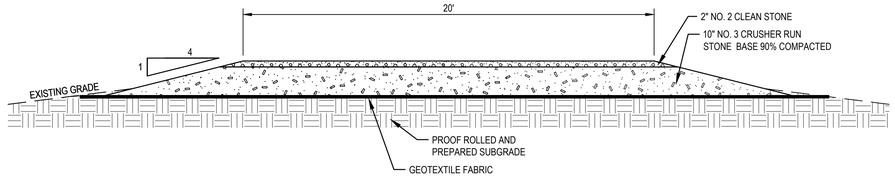
Title **FINAL TOP OF WASTE CROSS-SECTIONS**

Size **ARCH D**

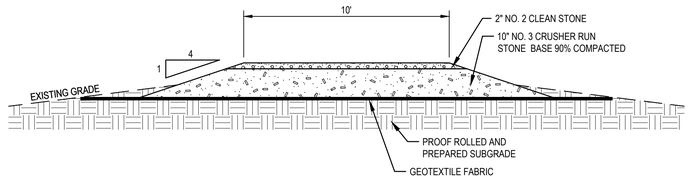
Project No. **056934**
Date **MAY 2024**
Scale

Sheet No. **C-104**

Plot Date: 22 May 2024 - 2:07 PM
Plotted By: Sean Pike
Filename: C:\Users\srpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-105.dwg



1 C102 **GRAVEL ACCESS ROAD**
NTS



2 C102 **GRAVEL ACCESS ROAD**
NTS

NOTE: Gravel Access Road Construction may be modified as conditions warrant

PRELIMINARY

No.	Issue	Checked	Approved	Date
1	ISSUED FOR PERMIT	EM	MZ	05-22-24

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Client VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA
Project DESIGN AND OPERATIONAL PLAN

Title DETAILS

Size ARCH D

Project No. 056934
Date MAY 2024
Scale

Sheet No. C-105

Plot Date: 22 May 2024 - 2:07 PM
Plotted By: Sean Pike
Filename: C:\Users\srpike\DC\ACCDocs\GHD Services Pty Ltd\056934-Viking Pump-Foundry Sand Landfill\Project Files\01 WIP\01 - Civil\Sheets\056934-C-104.dwg

Appendix B

BagHouse Dust TCLP Analysis

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Mr. Grant Anderson
GHD Services Inc.
900 Long Lake Road
Suite 200
New Brighton, Minnesota 55112

Generated 4/12/2024 12:39:13 PM

JOB DESCRIPTION

Viking Pump Landfill

JOB NUMBER

310-278364-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

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

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

Authorization

Generated
4/12/2024 12:39:13 PM

Authorized for release by
Zach Bindert, Client Service Manager
Zach.Bindert@et.eurofinsus.com
(319)277-2401

Table of Contents

Job Narrative
310-278364-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The sample was received on 4/5/2024 11:40 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.6°C.

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

Sample Summary

Client: GHD Services Inc.
Job ID: 310-278364-1
Project/Site: Viking Pump Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-278364-1	S-240405-EM-WFS	Solid	04/05/24 10:43	04/05/24 11:40

Detection Summary

Client: GHD Services Inc.
Job ID: 310-278364-1
Project/Site: Viking Pump Landfill

Client Sample ID: S-240405-EM-WFS **Lab Sample ID: 310-278364-1**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: Viking Pump Landfill

Job ID: 310-278364-1

Client Sample ID: S-240405-EM-WFS

Lab Sample ID: 310-278364-1

Date Collected: 04/05/24 10:43

Matrix: Solid

Date Received: 04/05/24 11:40

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:53	1
Barium	<0.200		0.200		mg/L		04/10/24 09:00	04/10/24 17:53	1
Cadmium	<0.0200		0.0200		mg/L		04/10/24 09:00	04/10/24 17:53	1
Chromium	<0.0200		0.0200		mg/L		04/10/24 09:00	04/10/24 17:53	1
Lead	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:53	1
Selenium	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:53	1
Silver	<0.0500		0.0500		mg/L		04/10/24 09:00	04/10/24 17:53	1

Method: SW846 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00200		0.00200		mg/L		04/10/24 10:40	04/11/24 12:57	1

Glossary

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

Client: GHD Services Inc.
Project/Site: Viking Pump Landfill

Job ID: 310-278364-1

Method: 6010D - Metals (ICP)

Lab Sample ID: LB 310-418143/1-B
Matrix: Solid
Analysis Batch: 418462

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 418254

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:16	1
Barium	<0.200		0.200		mg/L		04/10/24 09:00	04/10/24 17:16	1
Cadmium	<0.0200		0.0200		mg/L		04/10/24 09:00	04/10/24 17:16	1
Chromium	<0.0200		0.0200		mg/L		04/10/24 09:00	04/10/24 17:16	1
Lead	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:16	1
Selenium	<0.100		0.100		mg/L		04/10/24 09:00	04/10/24 17:16	1
Silver	<0.0500		0.0500		mg/L		04/10/24 09:00	04/10/24 17:16	1

Lab Sample ID: LCS 310-418143/2-B
Matrix: Solid
Analysis Batch: 418462

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 418254

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	4.00	3.899		mg/L		97	80 - 120
Barium	2.00	2.025		mg/L		101	80 - 120
Cadmium	2.00	1.827		mg/L		91	80 - 120
Chromium	2.00	1.883		mg/L		94	80 - 120
Lead	4.00	3.691		mg/L		92	80 - 120
Selenium	8.00	7.819		mg/L		98	80 - 120
Silver	2.00	2.060		mg/L		103	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: LB 310-418143/1-C
Matrix: Solid
Analysis Batch: 418535

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 418342

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00200		0.00200		mg/L		04/10/24 10:40	04/11/24 12:29	1

Lab Sample ID: LCS 310-418143/2-C
Matrix: Solid
Analysis Batch: 418535

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 418342

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.0167	0.01748		mg/L		105	80 - 120

QC Association Summary

Client: GHD Services Inc.
Project/Site: Viking Pump Landfill

Job ID: 310-278364-1

Metals

Leach Batch: 418143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-278364-1	S-240405-EM-WFS	TCLP	Solid	1311	
LB 310-418143/1-B	Method Blank	TCLP	Solid	1311	
LB 310-418143/1-C	Method Blank	TCLP	Solid	1311	
LCS 310-418143/2-B	Lab Control Sample	TCLP	Solid	1311	
LCS 310-418143/2-C	Lab Control Sample	TCLP	Solid	1311	

Prep Batch: 418254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-278364-1	S-240405-EM-WFS	TCLP	Solid	3010A	418143
LB 310-418143/1-B	Method Blank	TCLP	Solid	3010A	418143
LCS 310-418143/2-B	Lab Control Sample	TCLP	Solid	3010A	418143

Prep Batch: 418342

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-278364-1	S-240405-EM-WFS	TCLP	Solid	7470A	418143
LB 310-418143/1-C	Method Blank	TCLP	Solid	7470A	418143
LCS 310-418143/2-C	Lab Control Sample	TCLP	Solid	7470A	418143

Analysis Batch: 418462

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-278364-1	S-240405-EM-WFS	TCLP	Solid	6010D	418254
LB 310-418143/1-B	Method Blank	TCLP	Solid	6010D	418254
LCS 310-418143/2-B	Lab Control Sample	TCLP	Solid	6010D	418254

Analysis Batch: 418535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-278364-1	S-240405-EM-WFS	TCLP	Solid	7470A	418342
LB 310-418143/1-C	Method Blank	TCLP	Solid	7470A	418342
LCS 310-418143/2-C	Lab Control Sample	TCLP	Solid	7470A	418342

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-278364-1
Project/Site: Viking Pump Landfill

Client Sample ID: S-240405-EM-WFS
Lab Sample ID: 310-278364-1

Date Collected: 04/05/24 10:43
Matrix: Solid
Date Received: 04/05/24 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			418143	D0DG	EET CF	04/08/24 15:30 - 04/09/24 08:00 [1]
TCLP	Prep	3010A			418254	KM3E	EET CF	04/10/24 09:00
TCLP	Analysis	6010D		1	418462	ZRI4	EET CF	04/10/24 17:53
TCLP	Leach	1311			418143	D0DG	EET CF	04/08/24 15:30 - 04/09/24 08:00 [1]
TCLP	Prep	7470A			418342	A6US	EET CF	04/10/24 10:40
TCLP	Analysis	7470A		1	418535	A6US	EET CF	04/11/24 12:57

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

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

Accreditation/Certification Summary

Client: GHD Services Inc.
Job ID: 310-278364-1
Project/Site: Viking Pump Landfill

Laboratory: Eurofins Cedar Falls

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

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

Method Summary

Client: GHD Services Inc.
Job ID: 310-278364-1
Project/Site: Viking Pump Landfill

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
1311	TCLP Extraction	SW846	EET CF
3010A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

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

Laboratory References:

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

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310-278364 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE MN | Project:

Receipt Information

Date/Time Received: DATE 4-5-24 | TIME 1140 | Received By: MC

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☒ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☒ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 3.6 | Corrected Temp (°C): 3.6

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

dress Eurofins
3019 Venture Way
Cedar Falls, IA 50613

Chain of Custody Record 649066

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TAL-8210

Client Contact	Project Manager: Grant Anderson	Site Contact: Elizabeth Mitchell	Date:	COC No: 2
mpany Name GHD	Tel/Email: @ghd.com	Lab Contact: Zach Binder	Carrier:	1 of 1 COCs
dress 900 Long Lake Rd Ste 250	Analysis Turnaround Time			Sampler
y/State/Zip MN, 55112	☐ CALENDAR DAYS ☒ WORKING DAYS			For Lab Use Only:
one 651-639-8913	TAT if different from Below			Walk-in Client:
x	☒ 2 weeks			Lab Sampling
oject Name Viking Fury	☐ 1 week			
e Landfill	☐ 2 days			Job / SDG No
O # 056934	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP - RCRA Metals	Sample Specific Notes
-240405-EM-WFS	4/5/24	1043	C	Soil	1	N	N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ | Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
	GHD	4/5/24 1119			4/5/24 1140
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time

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4/12/2024

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-278364-1

Login Number: 278364

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Costello, Mackenzie K

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

ghd.com

The Power of Commitment

Attachment D

Hydrologic Monitoring System Plan

Hydrologic Monitoring System Plan

Permit No. 07-SDP-12-89P Renewal Application

IDEX Corporation

June 17, 2024

→ The Power of Commitment

Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael J. Alowitz, P.E. — Date: 6/17/24

License Number: 18160

My license renewal date is: December 31, 2024

Pages or sheets covered by this seal: Entire Document

Contents

Table index

Figure index

1. Introduction

This Hydrologic Monitoring System Plan (HMSP) address monitoring at the Viking Pump (Viking) Foundry Sand Landfill in Cedar Falls, Iowa (Landfill)Sanitary Disposal Project (SDP) Permit #07-SDP-12-89P. The previous HMSP was incorporated into the Hydrogeologic Investigative Report (HIR) dated March 2015. Detailed information on soil types, lithology, and cross-sections are available in the March 2015 HIR (Doc 82755, Appendix B, pages 382-499).

The proposed changes within this HMSP are to add six (6) analytes to the groundwater and surface water sampling program and to change the sampling schedule for total phenols. These six (6) analytes were detected in leachate samples at least once in the past three (3) years. The proposed analyte additions include acetone, total suspended solids (TSS), manganese, molybdenum, lead and copper. In the 2021 permit cycle, total phenols were scheduled to be sampled on an annual basis for groundwater, surface water and leachate samples. Total phenols is proposed for removal from the annual groundwater and surface water sampling since total phenols were not detected in leachate samples for the past three (3) years. If total phenols are detected in the leachate samples, total phenols will be added to the groundwater and surface water sampling schedule.

2. Monitoring Network

The current monitoring network will continue to be used with no modifications proposed at this time. Figure 1 illustrates the network indicating upgradient, downgradient, shallow and deep wells. A surface water monitoring point is located to the northwest of the Landfill. The leachate collection system (LCS) is monitored as well. The monitoring network is summarized in Table 1.

Table 1 Monitoring Network

Monitored Location	Monitored Unit	Screen Elevations (feet AMSL)	Proposed action	Notes
MW-5	Shallow Groundwater	933.58 - 941.58	Keep	Upgradient
MW-7R	Shallow Groundwater	911.34 - 921.34	Keep	Downgradient
MW-8	Shallow Groundwater	918.26 - 928.26	Keep	Downgradient
MW-11	Shallow Groundwater	904.41 - 909.41	Keep	Downgradient
MW-12	Deep Groundwater	848.17 - 858.17	Keep	Water level gauging only
MW-13	Shallow Groundwater	863.36 - 873.36	Keep	Water level gauging only
MW-14	Shallow Groundwater	925.14 - 935.14	Keep	Upgradient
MW-15	Deep Groundwater	865.64 - 875.64	Keep	Downgradient
MW-16	Deep Groundwater	865.66 - 875.66	Keep	Upgradient
MW-17R	Shallow Groundwater	920.72 - 925.72	Keep	Downgradient
MW-19	Shallow Groundwater	906.41 - 916.41	Keep	Downgradient
MW-20	Deep Groundwater	859.52 - 869.52	Keep	Downgradient

Monitored Location	Monitored Unit	Screen Elevations (feet AMSL)	Proposed action	Notes
MW-21	Shallow Groundwater	905.17 - 915.17	Keep	Downgradient
MW-22	Deep Groundwater	854.12 - 864.12	Keep	Downgradient
SW-1	Surface Water	Not Applicable	Keep	No water level gauging
LCS	Leachate Collection System	Not Applicable	Keep	No water level gauging

Note:
feet AMSL – Feet above mean sea level.

Monitoring wells MW-12 and MW-13 are monitored for groundwater elevations only; no groundwater samples are collected from these locations. All other monitoring locations are monitored semi-annually (see Section 3 for analytes). The surface water location is sampled during the semi-annual monitoring events if there is sufficient water present to sample. This sample location represents run-off from the Landfill.

Upgradient monitoring wells MW-5, MW-14, and MW-15 are located east of the Landfill. Long-term groundwater monitoring indicates the shallow groundwater is typically flows west or south-westerly. Deeper groundwater typically has a south-westerly flow. Groundwater flow contours are included in annual water quality reports.

3. Analytes

The analyte list has developed over time and includes two parameters for groundwater and surface water samples based on the previous Groundwater Quality Assessment (GWQA), which are identified using an asterisk. The analytes for groundwater, surface water and leachate samples are listed in Table 2. Four (4) analytes are proposed to be added to the groundwater and surface water schedule. These analytes are italicized for easier identification.

Table 2 Analytical Parameters

Analyte	Groundwater and Surface Water Schedule	Leachate Schedule
Acetone	Semi-annual	Semi-annual (included in VOC analysis)
Ammonia (as Nitrogen)	Semi-annual	Semi-annual
Benzene*	Semi-annual	Semi-annual (included in VOC analysis)
Chemical Oxygen Demand (COD)	Semi-annual	Semi-annual
Chloride	Semi-annual	Semi-annual
Copper	Semi-annual	Semi-annual
Flash Point	Not monitored	Semi-annual
Lead	Semi-annual	Semi-annual (included in RCRA Metals analysis)
Manganese	Semi-annual	Semi-annual
Molybdenum	Semi-annual	Semi-annual
Nitrate	Not monitored	Semi-annual
Nitrite	Not monitored	Semi-annual
Oil and Grease	Not monitored	Semi-annual
pH	Semi-annual (field parameter)	Semi-annual (lab analysis)

Analyte	Groundwater and Surface Water Schedule	Leachate Schedule
Specific Conductivity	Semi-annual (field parameter)	Not monitored
Sulfate	Not monitored	Semi-annual
Sulfide	Not monitored	Semi-annual
Temperature	Semi-annual (field parameter)	Not monitored
Total Barium*	Semi-annual	Semi-annual (included in RCRA Metals analysis)
Total Dissolved Solids (TDS)	Not monitored	Semi-annual
Total Iron	Semi-annual	Semi-annual
Total Organic Halogens (TOX)	Annual (spring)	Annual (spring)
Total Phenols	Not monitored	Semi-annual
TSS	Not monitored	Semi-Annual

Note: * indicates analyte from previous GWQA and italics indicates a new proposed analyte.

No field parameters are measured for the leachate sample. Field parameters of , pH, temperature, and specific conductivity are measured prior to sample collection for groundwater and surface water locations.

4. Field Activities

4.1 Groundwater and Surface Water Locations

4.1.1 General

Typically, site monitoring wells are sampled via low-flow sampling techniques with a peristaltic pump or a submersible pump with a low-flow controller based on the well depth (i.e., shallow wells typically use peristaltic pumps while deep wells typically use submersible pumps). See Table 3 for typical sampling equipment used at each monitoring well. Any non-dedicated equipment that contacts purge or sample water is decontaminated between wells such as the submersible pump. Alternative pumping techniques such as pneumatic bladder pumps that minimize disruption to the water column and potential sediments may also be used. Each monitoring well has dedicated tubing to prevent cross contamination. This tubing is replaced as needed (e.g., when cracks are identified).

Table 3 Typical Sampling Equipment

Monitored Location	Monitored Unit	Sampling Equipment Used
MW-5	Shallow Groundwater	Peristaltic Pump
MW-7R	Shallow Groundwater	Peristaltic Pump
MW-8	Shallow Groundwater	Peristaltic Pump
MW-11	Shallow Groundwater	Submersible Pump
MW-14	Shallow Groundwater	Peristaltic Pump
MW-15	Deep Groundwater	Submersible Pump
MW-16	Deep Groundwater	Submersible Pump

Monitored Location	Monitored Unit	Sampling Equipment Used
MW-17R	Shallow Groundwater	Peristaltic Pump
MW-19	Shallow Groundwater	Submersible Pump
MW-20	Deep Groundwater	Submersible Pump
MW-21	Shallow Groundwater	Peristaltic Pump
MW-22	Deep Groundwater	Submersible Pump

The surface water sample is collected using a dipper or dedicated sample container such as a clean laboratory-provided bottle. If the dipper is used, it is decontaminated prior to and following sample collection.

All collected samples are placed in laboratory-supplied containers and placed in a cooler with ice following collection. The bottles are labelled with, at a minimum, the project name and number, sample identifier, date of collection, sampler's initials, sample analysis and preservatives, if any.

Sampling activities at each monitoring location will be conducted by Viking personnel or their consultant adhering to the following protocol, in the following order.

4.1.2 Sampling Protocol

Prior to sampling, personal protective equipment should be donned. At the Landfill, this may include eye protection, safety boots, high visibility vests, and chemical resistant gloves.

1. Calibrate field instruments (pH, temperature, conductivity meters and water level meters) daily prior to starting work.
2. Remove and replace chemical resistant gloves.
3. Inspect well integrity and remove well cap. Document inspection observations in either a digital or analog Well Inspection Form.
4. Rinse water level probe with distilled water, and measure and record the water level and total well depth in either a digital or analog Water Level Measurement Form. Record data to the nearest 0.01 foot.
5. For surface water monitoring location, estimate and record flow rate and water depth.
6. *Measure all monitoring well water levels prior to purging to ensure the true static water level is recorded.*
7. For shallow wells, install dedicated tubing into peristaltic pump. For deep wells, install decontaminated submersible pump into well using dedicated tubing. Care should be taken to prevent the pump and tubing from contacting any potentially contaminated surface outside the well casing. All samples will be pumped from approximately the middle of the well screen.

   For the surface water monitoring location, collect a grab sample using a decontaminated water sampler or clean laboratory-supplied container. If the surface water is less than 1 foot deep, collect the sample from as far below the water surface as feasible without disturbing sediment; otherwise target sample collection at approximately 1 foot below the water surface.
8. Turn on the pump at a low-flow setting (generally less than 0.5 liters per minute [L/min]) and purge the well until field measured water quality parameters (pH, specific conductivity, and temperature) stabilize between three (3) consecutive measurements. Stabilization guidelines for the Landfill follow the US Environmental Protection Agency's stabilization requirements. The pump setting may vary from well to well to maintain the drawdown requirements.
9. Label all sampling containers using a permanent marker.
10. Following stabilization of field measurements, record the field measurements (pH, specific conductivity, and temperature) in either a digital or analog Sampling Form. For surface water monitoring, purging will not be required, however, field measurements of pH, specific conductivity, and temperature will be recorded from the grab sample.

11. After recording field measurements, fill the sample containers with discharge from the tubing. Care should be taken to fill all sample containers and place them in a cooler with ice immediately following collection.
12. Record the time of sampling and quantity of water removed in either a digital or analog Sampling Form. Chain of custody forms must be filled out completely and accurately prior to dropping off sample coolers.
13. Close and lock the well. Decontaminate all sampling equipment and instruments that are not dedicated to the well.
14. Move to the next sampling point and repeat steps 1 through 11, making sure chemical resistant gloves are changed before collecting a sample at the next location.

4.1.3 Permeability Testing

Every five years, in-situ permeability tests will be conducted on monitoring wells to compare test data with those collected originally to determine if well deterioration is occurring. The results of these permeability tests will be included with the Annual Water Quality Report. The last test performed was in 2024 and will occur every five years thereafter.

4.2 Leachate Collection System

Prior to sampling, personal protective equipment should be donned. This may include splash goggles, safety boots, coveralls, high visibility vests, and chemical resistant gloves.

1. Prepare the dedicated sample container using an empty distilled water jug (1 gallon) by creating an opening near the handle for the LCS dedicated tubing to feed through.
2. Label all sampling containers using a permanent marker.
3. If not already set up, make sure the LCS dedicated tubing is connected to the LCS discharge outlet and slightly turn the valve to open the outlet.
4. Switch the LCS control panel from ‘Auto’ to ‘Hand’. The key to open the LCS control panel is chained to the right side of the LCS control panel.
5. When ready, turn the knob from ‘Hand’ to ‘On’ while holding the dedicated sample container so that leachate flows from the dedicated tubing into the dedicated sample container.
6. Transfer the sample collection into the laboratory provided sample containers.
7. Repeat steps 5 & 6 until all laboratory provided sample containers are filled.
8. Place all laboratory provided sample containers back into their original packaging and store in the sample cooler on ice.
9. Switch the LCS control panel from ‘Hand’ to ‘Auto’. Make sure to lock the LCS control panel.
10. Turn the LCS discharge outlet valve back to the closed position.

No field parameters are measured prior to sample collection for the LCS monitoring location.

5. Laboratory

Viking will have the groundwater and surface water samples analyzed only by laboratories certified by the State of Iowa. All analyses of parameters not covered in the Safe Drinking Water Act (SDWA) will be performed according to methods specified in SW-846 or approved by the United States Environmental Protection Agency (EPA). Any analytical method used on non-SDWA parameters deviating from those specified in SW-846 or approved by the EPA will be submitted to the IDNR for approval. All analyses will be recorded on forms which, in addition to the analytical results, show the precision of the data set, bias, and limit of detection.

6. Analysis and Reporting

6.1 Analysis

For the 2023 Annual Water Quality Report (AWQR) a more robust statistical method was applied to data analysis than in previous AWQRs. This robust statistical method involves 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.

Analytical results will also be compared to published standards such as maximum contaminant levels (MCLs), health advisory levels (HALs), and secondary drinking water regulation (SDWR) guidelines, where applicable.

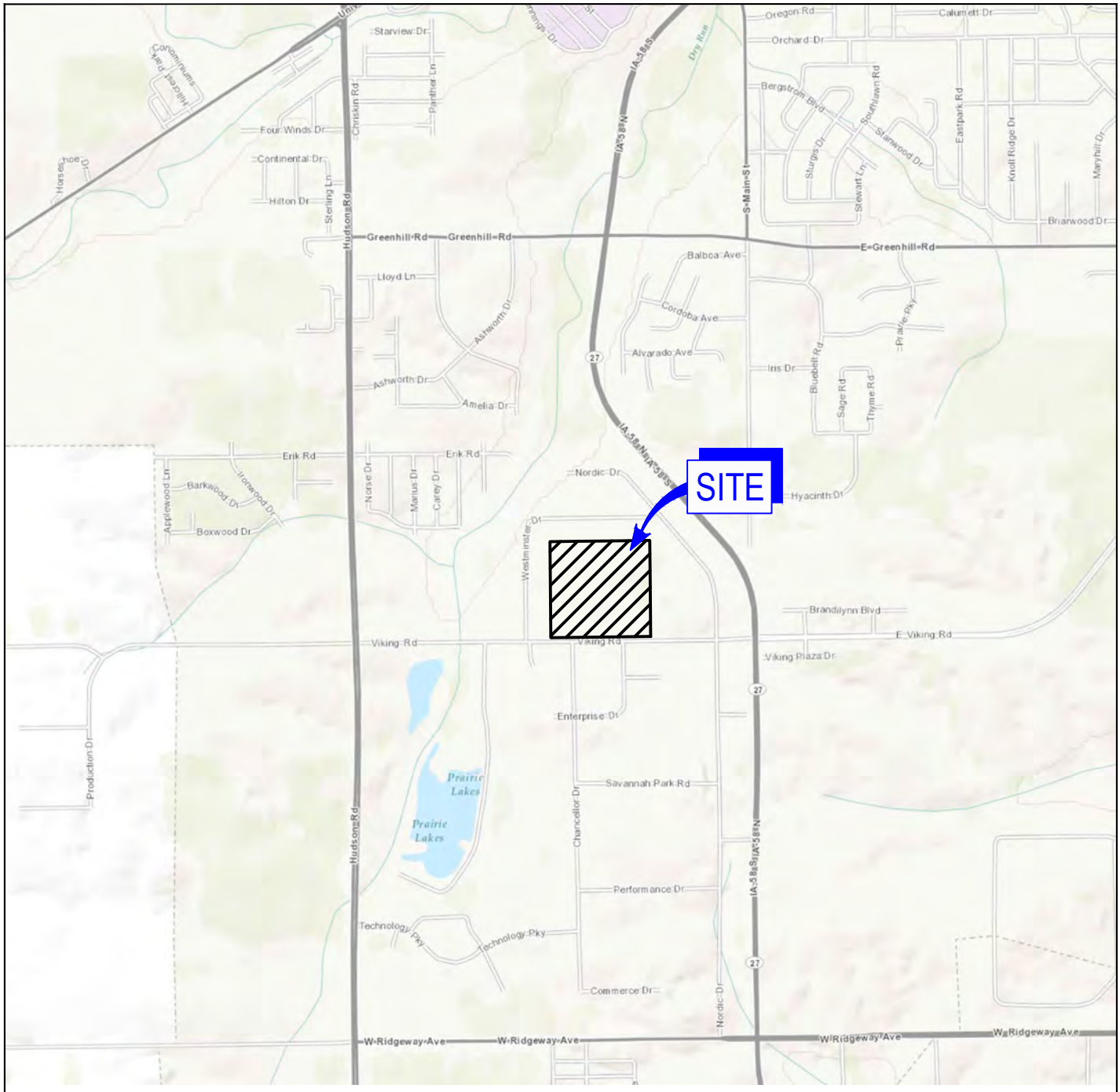
6.2 Reporting

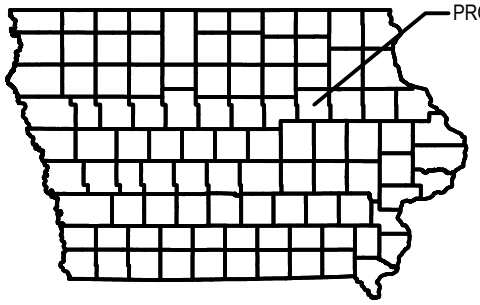
An AWQR documenting two (2) semi-annual sampling events will be prepared for IDNR review. A change in submittal date to December 15 of each year was approved during previous permit renewal application and will remain in effect.

The Annual Water Quality Report shall include:

– Summary of site activities
– Summary of sample results including tabular and graphical presentation of results
– Discussion of the results and recommendations including assessment of impact of the Landfill on groundwater
– Assessment of monitoring well conditions (such as damaged well casings or changes in total depth) including permeability testing, when applicable
– Complete laboratory reports
– Field collection records

Figures





0 1000 2000 ft

1" = 2000 ft

Coordinate System:

N

GHD

VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA

Project No. **56934**
Date **April 2024**

SITE LOCATION

FIGURE 1

Filename: \\ghdnet\ghd\US\St Paul\Projects\563\056934\Digital_Design\ACAD 2018\Figures\RPT031\056934-GHD-00-00-RPT-EN-D103_WA-031.DWG
Plot Date: 22 April 2024 3:59 PM

LEGEND

- SURFACE WATER FLOW
- MW-5 — SHALLOW GROUNDWATER MONITORING WELL
- MW-16 — DEEP GROUNDWATER MONITORING WELL
- SW-01 — SURFACE WATER SAMPLE LOCATION
- △ — INDICATES UPGRADIENT LOCATION

NOTES:

MW-12 AND MW-13 USED FOR WATER LEVEL GAUGING ONLY.

MW-18 WAS SEALED DURING THE OCTOBER 2023 SAMPLING EVENT AND HAS BEEN REMOVED FROM THE MONITORING PROGRAM.

AERIAL FLYOVER SURVEY PERFORMED BY GHD ON 10/27/21

0 50 100ft

N

GHD

VIKING PUMP FOUNDRY SAND LANDFILL
CEDAR FALLS, IOWA

GROUNDWATER MONITORING WELL AND SURFACE WATER MONITORING LOCATIONS

Project No. **56934**
Date **June 2024**

FIGURE 2

Filename: \\ghdnet\ghd\US\St Paul\Projects\563\056934\Digital_Design\ACAD 2018\Figures\RPT031\056934-GHD-00-00-RPT-EN-D101_WA-031.DWG
Plot Date: 17 June 2024 4:51 PM

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→ The Power of Commitment

Attachment E

Closure and Post-Closure Plan

Closure and Post – Closure Plan

Permit No. 07-SDP-12-89 Renewal Application

IDEX Corporation

June 17, 2024

→ The Power of Commitment

Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael J. Alowitz, P.E. — Date: 6/17/24

License Number: 18160

My license renewal date is: December 31, 2024

Pages or sheets covered by this seal: Entire Document

Contents

1. Introduction

Viking Pump, Inc. (Viking) operates a Foundry and Landfill located in the SW 1/4 of the SW 1/4 of Section 22, Township 89 North, Range 14 West in Black Hawk County, Iowa. This Closure and Post-Closure Plan describes the closure and post-closure procedures for the Landfill. This report was prepared by GHD Services, Inc. (GHD) on behalf of Viking to fulfill the Iowa Department of Natural Resources (IDNR) subrule 567 Iowa Administrative Code (IAC) 115.13(10). for solid waste facility closure

2. Closure

Based on data obtained in the 2021 survey, there is an estimated 196,000 cubic yards of capacity to final waste volume at the permitted maximum elevation of 986 ft. This gives the Landfill 28 years (from 2021) of filling until the estimated total capacity of 245,000 cubic yards is reached based on the estimated deposition rate. Two permanent survey monuments were previously established by a registered land surveyor. Surveys will also be conducted during final cover construction to confirm final cover layer thickness.

The IDNR will be notified in writing at least 180 days prior to closure. A notice of closure will be posted at the facility and published in a local newspaper at least 180 days prior to closure. Viking will submit a 30-year post-closure monitoring plan to the IDNR at least 6 months prior to landfill closure. Closure of the landfill will be initiated within 90 days of the official closure date. A notification of closure will also be made to the Black Hawk County Recorder. Upon closure of the Landfill, the following documents will be submitted to the IDNR:

- As-built plans showing changes from the original design plans
- Test results indicating compliance with final cover as applicable
  - Waste removal
  - Equipment decontamination
- A copy of the notation filed with the county recorder
- And other forms of documentation as required

2.1 Final Cover Installation

To promote optimal surface runoff and thereby minimizing infiltration potential, Viking previously proposed changing the current permitted soil cover design to a flexible membrane liner (FML) cover with geocomposite drainage and two feet of vegetative soil layer. Detailed design drawings of the final cover system will be completed prior to final cover construction. GHD recommends using the US Environmental Protection Agency's Hydrologic Evaluation of Landfill Performance model to show this alternative cover design provides equal or superior performance to the prescribed requirements in IAC 567 115.26(13).

Proper equipment will be used for final cover placement, as specified in the design requirements. The final cover system (FML liner, geocomposite drainage and vegetative soil layer) will be constructed after grading final contours are reached. An appropriate contractor will be identified at that time. The source of the final cover system components will be identified by the contractor at the time the final cover is needed.

2.1.1 Final Cover Preparation

The characteristics of the foundry sand disposed of at the Landfill is such that additional protective layers of soil above the placed waste may not be required. However, should conditions change prior to closure, a layer of compacted soil, incinerator ash, or similar material permitted by IDNR may be used to prepare the Landfill for placement of the final cover system.

2.1.2 40-mil Geomembrane Layer

Upon reaching final elevations, a 40-mil linear low density polyethylene layer will be installed above the placed waste. The proposed FML will have permeability less than $1x10^{-7}$ cm/sec. Based upon completed volume calculations, the quantity of material required for installation of the FML liner is 42,100 square yards (SY). The material source will be identified along with documentation provided to the IDNR of quantity, ASTM test data and any other information regarding the FML material deemed pertinent by the IDNR at least 180 days prior to closure of the landfill.

2.1.3 Geocomposite Drainage Layer

Following placement of the FML layer, a 200-mil layer of geocomposite drainage net (geonet) will be placed. Final grades of the landfill with slopes greater than 10 percent (%) will receive a double sided geonet. Those areas with slopes less than 10% will receive a single sided geonet. The geonet has a higher hydraulic conductivity than a typical sand drainage layer. Based on projected volume calculations, approximately 8,800 SY of double sided geonet and 35,200 SY of single sided geonet will be required.

2.1.4 Soil Layers

Following placement of the geonet drainage layer, an eighteen (18) inch protective soil cover will be placed. This soil will be placed using a motor scraper or equivalent equipment and will not be mechanically compacted. The uncompacted soil layer will be placed as soon as possible to prevent damage to the FML and drainage net. The uncompacted topsoil layer will be loosely placed in 8-inch lifts and monitored for foreign material, such as rocks and sticks exceeding. These items will be removed from the soil layer so as to not interfere with future maintenance operations. Based on completed volume calculations, approximately 21,200 cubic yards of uncompacted soil will be required to cover the existing landfill area.

Following placement of the eighteen (18) inch protective soil layer, 6 inches of organic topsoil will be placed. The 6 inches of topsoil will be placed using a motor scraper of equivalent equipment and will not be mechanically compacted taking special care to prevent excessive rutting and damage to the FML and geonet layers.

2.1.5 Grading

The final cover will have a slope of greater than 5% and less than 25% on the entire final surface of the landfill. Topsoil erosion from the Landfill must be minimized to preserve the integrity of the final cap system. To prevent gully erosion of the topsoil layer, terraces and a drainage channel will be installed. The terraces and drainage channel will be designed for simultaneous detention and release of runoff from a 25-year, 24-hour storm event. This diversion and drainage system will be maintained to design specifications to prevent run-on and run-off from eroding or otherwise damaging the final cover.

2.1.6 Vegetation

Following placement of the topsoil layer, the landfill cap will be seeded in order to stabilize the slope and provide for final restoration of the site. Deep-rooted crops will not be allowed for protection of the underlying FML layer. Vegetation and seeding recommendations of the Black Hawk County Soil Conservation District will be incorporated into the construction specifications. Alternative vegetation cover systems such as pollinator habitat that protect the cover system and provide additional benefits will be considered. The addition of a temporary stabilization crop of oats,

sudan grass and rye grass will assist in the establishment of an acceptable permanent vegetative cover. Permanent seeding with any one of the following is recommended: blue grass, tall fescue, smooth brome, or red fescue. Straw erosion netting or a wood excelsior mat will be used on grades which exceed 20%, to prevent erosion. The vegetative cover will be reseeded as necessary to maintain good vegetative growth. Any invading vegetation whose root system could damage the FML layer will be removed or destroyed immediately.

2.2 Groundwater Monitoring

The current Hydrologic Monitoring System Plan will remain in effect during closure activities. The plan may be modified as needed to meet the requirements of the closure permit.

2.3 Leachate Management

The current leachate collection system (LCS) will remain in operation during closure activities. The LCS may be modified as needed to meet the requirements of the closure permit.

2.4 Landfill Gas Monitoring

The only waste accepted at the Landfill is foundry sand generated at the Foundry. This material is inorganic and non-flammable and therefore has no potential to generate landfill gases. A landfill gas monitoring and collection or ventilation system is not currently required and will not be necessary for closure.

2.5 Financial Assurance

Viking has had a financial assurance instrument in place adequate to cover all closure costs since 2008. Viking has submitted and will continue to submit annual financial assurance reports as required. These estimates will continue to be reviewed annually to determine if adjustments need to be made in the amount of financial assurance provided for closure activities.

3. Post-Closure Plan

3.1 Contact Information

The following individuals will serve as contacts regarding the facility during the post-closure period.

Evan Arachikavitz
Senior Environmental & Sustainability Engineer
Viking Pump, Inc
711 Viking Road
Cedar Falls, IA 50613
(319) 222-2428

Michael Alowitz, P.E.
GHD Services, Inc
11228 Aurora Ave
Des Moines, IA 50322
(515) 414-3934

3.2 Post-closure Maintenance

In general, the integrity and effectiveness of the final cover system will be maintained by making repairs as necessary to correct the effects of settling, subsidence, erosion, or other events. The vegetative cover will be reseeded as necessary to maintain good vegetative growth and prevent damage to the FML by root systems. The diversion and drainage system will be maintained to prevent run-on and runoff from eroding or damaging the final cover system.

Two permanent surveying monuments were previously established by a registered land surveyor. These permanent monuments will be maintained and used throughout post-closure period for routine site surveys. The locations and elevations of all permanent monuments shall be determined at least once every three years or more frequently in the event of obvious disturbance of the monument.

3.3 Groundwater Monitoring

The current Hydrologic Monitoring System Plan will be utilized during the post-closure period. During the post-closure monitoring period, each of the groundwater monitoring wells will be maintained to ensure proper functionality. Damage noted to groundwater monitoring wells will be repaired using appropriate equipment. Following modifications to the groundwater monitoring wells, the well locations will be resurveyed to compensate for positional changes. Information concerning original well construction for each of the groundwater monitoring wells was previously submitted in the Hydrologic Investigation Report and can be accessed in Doc 82755, Appendix B, pages 382-499.

The following is a list of maintenance activities for the groundwater monitoring wells to be performed during the post-closure period.

– Trim vegetation around wells and bumper post, as necessary, to maintain accessibility and visibility to the wells.
– In April and October of each year, an evaluation of water level conditions in the monitoring wells will be performed to ensure that no changes in the hydrologic setting and resultant flow paths have occurred. Closure activities and other types of soil disturbance could interfere with the site groundwater flow direction and water levels. Therefore, this water elevation will be performed to determine whether the well identified as up gradient or downgradient monitoring points remain as such over time.
– During the October sampling event of each year, total depth measurements will be taken at each well to ensure that the well is physically intact and not filling with sediment.
– Every 5 years, in-situ permeability (slug) test will be performed on each monitoring well. The results of these tests will be compared to the original slug test data to determine whether well deterioration is occurring.

3.4 Leachate Management

Based upon completion of a certified risk assessment meeting the requirements outlined in IAC 455B.305(6), Viking was conditionally exempted by the IDNR from providing and implementing a leachate control plan for disposal areas that received waste prior to July 1, 1992. The entire original footprint of the Landfill had received waste prior to July 1, 1992. The operational LCS was designed to meet specifications outlined in 567 IAC 115 (455B) and shall be maintained for the duration of the post-closure period.

3.5 Landfill Gas Monitoring

The waste generated at the foundry consists of inorganic material, which does not promote the production of landfill gases. As a result, landfill gas monitoring and collection systems are not required during the post-closure period.

3.6 Reporting

Viking submits annual reports by December 15 for the preceding 12-month period regarding the general conditions at the site, groundwater monitoring results, amount of leachate collected and treated, and other information as may be required by the closure permit.

3.7 Financial Assurance

Viking has had a financial assurance instrument in place adequate to cover all post-closure costs since 2008. Viking submitted and will continue to submit annual financial assurance reports as required. These estimates will continue to be reviewed annually to determine if adjustments need to be made, and adjustment to the amount of financial assurance provided for post-closure maintenance will also be made as needed.

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The Power of Commitment

Attachment F

Emergency Response and Remedial Action Plan

Emergency Response and Remedial Action Plan

Permit No. 07-SDP-12-98 Renewal Application

IDEX Corporation

June 17, 2024

→ The Power of Commitment

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Appendices

1. Introduction

1.1 Site Background

Viking Pump, Inc. (Viking) operates a Foundry and Landfill located in the SW 1/4, of the SW 1/4 of Section 22, Township 89 North, Range 14 West in Black Hawk County, Iowa. The Landfill is located in an area that is zoned as M-2 - Heavy Industrial uses according to the Cedar Falls current zoning plan. The properties directly adjacent to the Landfill are also zoned for industrial use. The closest habitable residence is approximately 1/4 mile to the north-northwest of the Landfill. The Landfill and Foundry property is secure by fencing and an entrance gate to the Viking property.

The Landfill has been used as a disposal area for foundry waste generated at the Foundry since construction of the Foundry. These waste streams include green sand, isocure chemically bonded sand, and no bake sand. The site was undeveloped prior to that time. The Landfill operated as an unlined industrial landfill until 2014 when the unlined portion of the Landfill was closed and capped. Foundry sand is currently placed in lined cells with leachate collection. The cap of the initial industrial landfill serves as a lined cell to place additional foundry sand. Sand waste from Foundry is transported to the Landfill by dump truck. The foundry waste is spread and compacted, to an average in-place density of approximately 2,600 pounds per cubic yard.

The landfill is permitted by the Iowa Department of Natural Resources. Permit information is provided in Table 1.

Table 1 Permit Information

Permit Holder	Viking Pump, Inc.
Permit Number	07-SDP-12-89P-FSL
Responsible official and contact information	Evan Arachikavitz Viking Pump, Inc. 711 Viking Road (319) 222-2428

1.2 Regulatory Requirements

This Emergency Response and Remedial Action Plan (ERRAP) for the Landfill and is intended to fulfill the requirements of the Iowa Code Section 455B.306 (6) "d" and IAC Chapter 115.30. This ERRAP is referenced in the approved permit and will be updated as necessary with subsequent permit renewal applications.

2. Response and Remedial Actions to Emergency Conditions

2.1 Failure of Utilities

The leachate collection system (LCS) discharges to the wastewater sewer. In the event of a short-term failure (less than 48 hours), the LCS would not be compromised. The LCS is equipped with a submersible sump pump and load out system. In the event of a long-term failure of utilities (more than 48 hours), Viking would arrange for alternate

means of removing leachate from the sump which may use a backup generator to allow pump operation to discharge to the sanitary sewer.

2.2 Weather-related Events

The possibility of weather-related emergency conditions exists at the Landfill. Landfill personnel will take the following actions if weather-related emergency conditions arise.

2.2.1 Tornado

According to the National Weather Service (NWS) tornadoes occur in states such as Iowa during summer months when warm, moist gulf air extends northward. Tornadoes are usually accompanied by severe weather, which may include heavy rain, strong winds, and lightning. The NWS issues tornado watches when the conditions are favorable for a tornado to form. A tornado warning is issued when a tornado is either spotted or indicated by weather radar.

Operations at the Landfill will cease during severe weather. Landfill personnel are in radio or cell phone contact with the Foundry so they can be notified of impending weather. In the event of a tornado, personnel at the Landfill should seek immediate shelter. The Foundry is the nearest built shelter. If it is not possible to take shelter within the Foundry, it may be necessary to lie down in a ditch or low-lying area. When seeking shelter outside, the possibility of flooding should be taken into account.

After the tornado passes, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible.

2.2.2 Windstorms

The emergency conditions associated with windstorms are similar to those identified above for tornadoes.

Following any severe windstorms, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible.

2.2.3 Intense Rainstorms and Erosion

Intense rainstorms, which could result in significant erosion events, commonly accompany tornado-like weather. All erosion control structures have been designed according to a 25-year, 24-hour storm event. The emergency conditions associated with intense rainstorms are similar to those identified for tornadoes.

After the severe weather passes, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible. Erosion control structure repair may be required if the severe weather damaged the structures to a point of failure.

2.2.4 Lightning Strikes

Lightning commonly accompanies severe weather such as thunderstorms; however, according to the NWS, lightning strikes can occur as far away as 10 miles from any rainfall. To determine if the threat of lightning is in your area, the NWS suggests counting the seconds between sighting lightning and hearing thunder. If this time is 20 second or less, lightning is close enough to your area to be a threat.

When the potential for lightning is high, Landfill personnel should leave the area and seek shelter inside a large building. Since there are no buildings at the Landfill, the Foundry would be the nearest shelter. According to the NWS you should avoid open high ground and isolated large trees or poles during lightning strike events. If it is necessary to seek shelter outside, go to a low area such as a ravine or valley and remember to take the potential for flooding into account when seeking shelter.

After the severe weather passes, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible.

2.2.5 Flooding

When a flash flood warning is issued for the area of the Landfill, Landfill personnel should immediately go to high ground and leave areas that may be subject to flooding. Landfill personnel are in radio or cell phone contact with the Foundry so that they can be notified of flood conditions. After flood conditions have subsided, the Landfill will be inspected for damage and cleanup activities will be completed to return the landfill to normal operation as soon as safely possible.

2.2.6 Event and Post-Event Conditions

Landfill personnel will attempt to monitor the potential for weather-related emergency conditions while at the Landfill. This may include, but is not limited to, monitoring local weather stations, weather television stations, and visual observations of the sky and current weather conditions. Landfill personnel are also in radio or cell phone contact with the Foundry so they can be apprised of impending severe weather. Following any severe weather, the landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible.

2.3 Fire and Explosions

2.3.1 Waste Materials

The only material accepted at the Landfill is foundry sand and baghouse dust generated at the Foundry. These are nonflammable, inorganic material is not associated with explosive landfill gases. Smoking and open burning is prohibited at the Landfill. The potential for fuel fires and explosions, associated with Landfill operating equipment, and grass fires exists at the Landfill.

2.3.2 Buildings and Site

Buildings have not been developed at the Landfill. Therefore, the potential for fire and explosion emergency conditions does not exist for buildings. The potential for grass or brush fires at the site does exist.

In the event of a grass or brush fire at the Landfill, personnel should first ensure their own safety. Once Landfill personnel safety has been ensured, the local fire department should be contacted to extinguish the fire. Landfill personnel are in radio or cell phone contact with the Foundry to request emergency assistance. After the fire is contained and extinguished, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible. An attempt will be made to determine the cause of the fire or explosion and steps taken to prevent future occurrences. If remedial actions are required, Viking will notify the IDNR of the incident and provide a summary of steps taken and planned to take to address environmental and safety concerns as warranted.

2.3.3 Equipment

The equipment used at the Landfill may include dump trucks, front-end loaders, bulldozers, and compactors. The potential for fuel fires or explosions associated with this equipment exists. Each vehicle is equipped with fire extinguishing equipment. In the event of a vehicle fire, Landfill personnel will first secure their own safety. Once Landfill personnel safety has been ensured, personnel will assess the situation and determine if the fire can safely be extinguished by personnel who have been trained how to properly use fire extinguishing equipment, or if necessary, contact the local fire department.

After the fire is contained and extinguished, the Landfill will be inspected for damage and cleanup activities will be completed to return the Landfill to normal operation as soon as safely possible. An attempt will be made to determine the cause of the fire and steps taken to prevent future occurrences.

2.3.4 Fuels

Emergency conditions associated with vehicle fuels exist for landfill operating equipment at the landfill. Emergency conditions that exist for fuels are addressed in a similar fashion to those discussed above for equipment.

2.3.5 Utilities

The risk for explosion or fire related to leachate discharge is very low as the leachate is not explosive.

2.3.6 Facilities

Facilities have not been developed at the Landfill, due to the close proximity of the Foundry; therefore, the potential for emergency conditions associated with facilities at the Landfill is not a concern.

2.3.7 Working Area

Working areas in the Landfill include the lined cell using landfill-operating equipment and recyclable waste recovery. Emergency conditions that exist for the Landfill operating equipment are addressed in a similar fashion to those discussed above for equipment.

2.3.8 Hot Loads

The only waste material accepted at the Landfill is waste foundry sand. This material is not flammable. Therefore, the potential for hot loads and fire or explosions associated with waste foundry sand is not a concern.

2.3.9 Waste Gases

The only waste material accepted at the Landfill is foundry sand. This material is not flammable and is not associated with explosive landfill gases; therefore, the potential for fires or explosions associated with waste gases from the Landfill is not a concern.

2.3.10 Evacuation

In the event of an evacuation of the Landfill, personnel will exit the Landfill using the safest route possible and report to the east entrance (Door 3) of the foundry building.

2.4 Regulated Waste Spills and Releases

For the purpose of this ERRAP, a release is considered to be an unplanned emission, discharge, spillage, or leakage of material at the Landfill. For the purpose of this ERRAP, an off-site release is considered to be a release of material, specifically intended for the Landfill, but not released on Landfill property while in transit to or from the Landfill. The only waste material regulated at the Landfill is the waste foundry sand.

2.4.1 Waste Materials

The foundry sand and baghouse dust are not considered a hazardous materials, are the only material accepted at the Landfill. In the event of a spill involving foundry waste, the material will be gathered up and placed into the current working area of the landfill.

2.4.2 Leachate

Waste placed prior to the construction of the lined expansion was exempt from implementing a leachate collection system for the Landfill through completion of a certified risk assessment of the Landfill. Wastes in the original footprint were covered with a final cover system that now serves as the bottom liner for new wastes. Leachate generated from wastes disposed after liner construction will be collected and removed from the Landfill. Collected leachate is discharged to the Cedar Falls sanitary sewer and treated as wastewater.

The potential for a release from a broken leachate transport pipe in the conveyance to the Cedar Falls sanitary sewer exists. In the event pipeline integrity is known or suspected of being compromised, the LCS will be turned off to prevent further release. A groundwater monitoring program is in place to address potential releases to groundwater.

2.4.3 Waste Gases

Waste foundry sand consists of inorganic material, which does not promote the production of landfill gases. Therefore, the potential for a release of waste gases from the Landfill is not a concern.

2.4.4 Waste Stockpiles and Storage Facilities

Upon entering the Landfill, dump trucks deposit the waste foundry sand in the working area. Front-end loaders or bulldozers spread the waste foundry sand to minimize the amount stored in stockpiles, as there are no storage facilities at the Landfill. The possibility of spills or releases associated with waste stockpiles and storage facilities is not a concern.

2.4.5 Waste Transport Systems

The Landfill is located adjacent to the Foundry and waste material does not leave Viking property to enter the Landfill. In the event of a waste foundry sand spill during transportation, the material will be gathered up and transported to the landfill.

2.4.6 Litter and Airborne Particulates

In order to reduce the amount of airborne particulate, the working face is wetted down, if necessary, to reduce fugitive dust emissions. In the case of baghouse dust the material will be placed on the landfill and covered immediately to minimize windblown material. IF needed the baghouse dust will be lightly sprinkled with water to minimize material movement.

2.4.7 Site Drainage Systems

Stormwater currently directed to the north generally flow overland and into an existing stream channel. Stormwater from the south side of the landfill is directed through a stormwater pond and to the City of Cedar Falls storm sewer system. Landfill construction prevent run-on of stormwater prevents pooling water along the toe of the Landfill.

2.4.8 Off-site Releases

The Landfill is located adjacent to the Foundry and the waste material never leaves Viking property; therefore off-site releases are not a concern.

2.5 Hazardous Material Spills and Releases

The only hazardous material that has the potential to be released at the landfill is fuel used for the operation of landfill equipment.

2.5.1 Load-Check Control Points

There are no load check control points at the Landfill. However, the operator visually inspects the load prior to final placement of waste to ensure no prohibited or hazardous wastes are placed within the Landfill.

In the event a prohibited item, or hazardous item is identified, Viking will ensure the item is removed from the waste and disposed of at a proper facility authorized to accept the hazardous or prohibited item.

2.5.2 Mixed Waste Deliveries

Waste generated at the foundry is the only material accepted at the Landfill and is not considered a hazardous material. Therefore, the potential for emergency conditions associated with mixed waste delivery spills or releases is not a concern.

2.5.3 Fuels

Since landfill operating equipment use internal combustion engines, the potential for emergency conditions associated with fuel spills or releases exist. In the event of a fuel release, an attempt will be made to safely contain the release. The Foundry will be notified immediately and will advise Landfill personnel on what further actions to take. A spill kit is maintained within the Foundry. A summary of the incident will be provided per SPCC requirements and follow up will be completed. The IDNR will be notified per protocols within Viking's SPCC plan.

2.5.4 Waste Gases

The waste generated at the foundry consists of inorganic material, which does not promote the production of landfill gases. Therefore, the potential for a release of waste gases from the landfill is not a concern.

2.5.5 Site Drainage Systems

The perimeter drainageway at the Landfill diverts surface water away from the Landfill to minimize stormwater run on into the landfill. Any precipitation that comes into contact with the waste will be contained and discharged to the Cedar Falls sanitary sewer via the liner system and LCS.

2.5.6 Off-Site Releases

The Landfill is located adjacent to the Foundry and the waste material never leaves Viking property; therefore, off-site releases are not a concern.

2.6 Mass Movement of Land and Waste

Mass movement of land or waste may occur at the landfill as a result of an earthquake, slope failure, waste shifts, or waste subsidence.

2.6.1 Earthquakes

Although unlikely, the possibility of an earthquake does exist for the area. In the event of an earthquake, all activities at the Landfill will cease. During an earthquake Landfill personnel should move to an open area away from anything that may fall and cause injury. Aftershocks commonly occur after the earthquake has ended and Landfill personnel should be aware of this possibility and take precautions. Following the earthquake, the Landfill will be inspected for damage and cleanup or repair activities will be completed so the landfill can resume normal activities as soon as safely possible.

2.6.2 Slope Failure, Waste Shifts, and Waste Subsidence

Foundry waste is spread and compacted into an average in-place density estimated to be 2,600 pounds per cubic yard. In the event of a waste shift, or waste subsidence, the Landfill will be inspected, and repairs completed as soon as safely possible. An attempt will be made to determine the cause of the mass movement and corrective measure will be taken to prevent any future occurrences.

A slope stability analysis has been completed and is presented in Appendix B of Tab 3 of Doc #82755. The slope stability analysis indicates under normal loading applications there is enough shear force resistance on the proposed liner material to provide adequate support to prevent slope failure for the lined areas.

2.7 Emergency and Release Notifications and Reporting

The following table includes relevant information for federal, state, local, and site individuals and agencies to contact in the event of an emergency.

Table 2 Emergency Contact List

Entity	Contact Information	Phone Number
Federal Agencies	National Response Center US EPA Emergency Response Region 7	(800) 424-8802 (913) 281-0991
State Agencies	IDNR Emergency Response IDNR Field Office No. 1 Manchester IDNR Water Quality Bureau Iowa Department of Public Safety Poison Control Information	(515) 204-3352 (563) 927-2640 (515) 725-8200 (515) 725-6000 (800) 222-1222
County and City Agencies	Police, Sheriff, Fire, Rescue Black Hawk County Emergency Management MercyOne Cedar Falls Emergency Care (see directions below): Take Viking Road west to Hudson Road, turn north on Hudson Road. Proceed on Hudson Road to W 4th Street, turning right onto W 4th Street. Continue on W 4th Street and hospital will be on your right (corner of W 4th and College Street). There are entrances to the parking lot on W 4th St and College Street.	911 (319) 291-4373 (319) 268-3000
Site Contacts	Evan Arachikavitz, Viking Margaret Zuckweiler, GHD	(319) 222-2428 (612) 382-2390
Local news media	KCNZ - Cedar Falls KBBG- Waterloo KFMW - Waterloo KWWL TV - Waterloo KWKB TV-Waterloo	(319) 277-1918 (319) 234-1441 (319) 234-5369 (319) 291-1240 (319) 643-5952
Public and private facilities with special populations within five miles	Cedar Heights Elementary School Hansen Elementary School Lincoln Elementary School North Cedar Elementary School	(319) 553-2855 (319) 553-2783 (319) 553-2950 (319) 553-2810

Entity	Contact Information	Phone Number
	Orchard Hill Elementary School	(319) 553-2465
	Southdale Elementary School	(319) 553-2900
	Holmes Junior High	(319) 553-2650
	Peet Junior High	(319) 553-2710
	Cedar Falls High School	(319) 553-2500
	University of Northern Iowa	(319) 273-2311
	MercyOne Cedar Falls Emergency Care	(319) 268-3000

Issues that require remedial actions will be summarized and the IDNR will be informed of the circumstances and events of each incident.

2.8 Emergency Waste Management Procedures

Landfill personnel are in radio or cell phone contact with the Foundry so they can be notified emergencies.

If the Landfill is temporarily closed, foundry waste will be transported to the Black Hawk County Sanitary Landfill and deposited in accordance with a special waste authorization. If the Landfill will be closed for a longer period, Viking with coordinate with regulatory agencies and Black Hawk County Sanitary Landfill to develop a temporary operations plan or permit as needed.

If access to the Landfill is unavailable due to unforeseen circumstances, Viking will work to repair access or remove obstructions as needed. This may involve contracting services to a third-party that uses heavy equipment not available on site. If rerouting the haul route is possible, Viking will work to establish a temporary or permanent road to access the Landfill. If rerouting is not possible, foundry waste will be transported to the Black Hawk County Sanitary Landfill and deposited in accordance with a special authorization.

2.9 Primary Emergency Equipment Inventory

Viking will depend upon emergency first responders for emergency personnel and major equipment. There are no fire hydrants or water sources on the Landfill. The only emergency equipment Viking maintains at the Landfill is vehicle-mounted fire extinguishers and spill kits.

2.10 Emergency Aid

The contact information included above is a listing of all numbers to contact for emergency aid. Viking does not have a specific company contracted to respond to an emergency situation. In the event of an emergency situation requiring additional aid, Viking will acquire local contractors, as necessary.

2.11 ERRAP Training Requirements

Viking will provide Landfill personnel with appropriate initial and ongoing training and orientation for safe Landfill operation. Viking will maintain all relevant documentation pertaining to training that has been completed by employees for Landfill operation. An acknowledgement form is included in Appendix A of this ERRAP, which landfill personnel are required to read and sign, to confirm they have reviewed and understand this ERRAP.

Appendices

Appendix A

ERRAP Review Acknowledgement Form

ERRAP Acknowledgement Form for the Viking Pump Foundry Sand Landfill

This is to certify that I have reviewed and understand the procedures and requirements of this ERRAP. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

Print Name	Signature	Date

Appendix B

Slope Stability Analysis

MEMORANDUM

To: Margaret Zuckweiler, PE Date: June 4, 2014

From: Hassan Gilani Reference: 056934

Re: Slope Stability Analyses – Viking Pump Foundry Sand Landfill, Cedar Falls, Iowa

1.0 INTRODUCTION

The Viking Pump Station Landfill is located on South Main Street (Site or Property) in Cedar Falls, Black Hawk County, Iowa. Viking Pump manufactures metal pumps and related equipment using the Iron Alloy Foundries, generating foundry sand, which is disposed in the landfill located on the Viking Pump Property. It is estimated that approximately 8,000 tons of foundry sand (monofill) is disposed in the landfill per annum; contributions of the Iron and Alloy Foundries being approximately 88 and 12 percent, respectively.

Conestoga-Rovers & Associates (CRA) is preparing a permit renewal application package required for the continued operation of the landfill. The permit renewal application proposes to construct a cover over the existing wastes, allow wastes to be placed on top of the closed area and expand the landfill to the south. The purpose of proposing the cover design over the existing waste and expansion to the south is to meet Iowa Department of Natural Resources (IDNR) new rules that require all monofills to be closed and any new monofill cells to be lined. As final elevations have not yet been reached in the existing footprint area, the design allows continued use of the remaining capacity. Additionally the expansion to the south will add 2.3 acres for a total area for basegrade of 6.5 acres. Prior to the cover installation at side slopes of 3 Horizontal to 1 Vertical (3H:1V), the existing landfill will be re-graded to allow installation of a leachate collection system to allow for continued placement of foundry sand to permitted final elevations.

This memorandum prepared by Inspec-sol Inc., the geotechnical division of CRA provides a summary of the geotechnical evaluation of the global stability of the proposed permanent side slopes (global slope stability) of the completed landfill at 3H:1V. The geotechnical assessment of the proposed landfill cap at 3H:1V side slope has also been carried out with respect to stability of the cap components against sliding over the geosynthetic elements in the proposed final cap, hereafter referred to as the veneer slope stability.

The geotechnical slope stability evaluations are based on the following documents:

1. Hydrogeological Investigation Report, Viking Pump Foundry sand Landfill dated May 1992 (Revised March 1995) prepared by Montgomery Watson;
2. Completed Landfill Plan and Cross-Sections A-A, B-B and C-C provided by CRA;
3. Limited Laboratory Geotechnical Test Results

2.0 SUMMARIZED SUBSURFACE SOIL AND GROUNDWATER CONDITIONS

A review of the logs of the monitoring wells MW-8, MW-13 and MW-14 installed in or close to the landfill footprint shows that the soils below the landfill are generally comprised of sandy silty clay deposits that extend to depths of approximately 60 ft. The sandy silt clay deposits are shown to be interbedded with sand and gravel layers in MW-8, but these layers are not shown in the logs of MW13 and MW-14 indicating that the sand and gravel layers are laterally discontinuous.

A review of the laboratory test results shows that the sandy silt clay deposits are comprised of 0 to 6 percent gravel (>4.75 mm) 16 to 45 percent sand (4.75 to 0.074 mm) and percent fines (<0.074 mm) range from 52 to 84 percent. The Atterberg Limits analyses results shows that the Liquid Limit (LL) of the soil samples range from 27 to 29 and Plasticity Index (PI) values range from 10 to 13. Based on the grain size and Atterberg Limits test results, the samples have been classified as sandy lean clay (CL) using the Unified Soil Classification System (USCS) as described in ASTM D2487.

CRA monitored the groundwater levels in the existing monitoring wells at the Site in September 2013. The groundwater was measured in monitoring wells MW8, MW13 and MW14 at elevations of 925.68, 913.63 and 936.68 ft. Above Mean Sea Level (amsl) below the landfill base levels. The significant variation in the groundwater elevations also indicates that a free groundwater table is not present, which is consistent with the low permeability sandy lay soil deposits, and the observed water levels are indicative more of the localized perched conditions.

3.0 GLOBAL STABILITY EVALUATION

3.1 General

Global stability refers to the potential of a slope to undergo a relatively deep seated circular failure. The side slopes of the landfill are proposed to be constructed at a 3H:1V. The slope stability analyses of the proposed landfill side slope configuration have been carried out to evaluate the stability of the planned 3H:1V slopes.

3.2 Analyses Methodology and Software

The slope stability analyses were performed using the Morgenstern & Price Method using the module Slope/W of the computer software Geo-Studio 2012 developed and distributed by Geo-Slope International Ltd.

3.3 Cross-Sections Analyzed

Five cross-sections of the landfill, A-A, B-B, and C-C shown on the attached CRA Drawing 56394- dated June 4, 2014, depicting the final closure conditions of the landfill, were selected for global slope stability analyses. The locations of the cross-sections are also shown on the above referenced drawing. At each cross-section location opposite side slopes of the landfill were analyzed for stability as shown on Figures 1 to 6 attached.

The cross-sections were selected based on a combination of subsurface conditions and the above grade landfill slope geometry that would result in representative conditions. The cross-sections were analyzed for the proposed closure conditions to determine the relative effect of the proposed horizontal and vertical expansion on the landfill slopes.

3.4 Material Properties

The properties required for the stability analyses of the slopes are the bulk densities and shear strength parameters of the materials involved. Relevant geotechnical properties comprising bulk density and shear strength of the different subsoil units have been determined from the available laboratory analyses and literature search and are shown on the graphical outputs of the slope stability analyses attached as Figures 1 to 6 with this memorandum, and the rationales for selecting these values are discussed below.

The material contained in the existing and the final closure landfill slopes will be comprised of foundry sand. Foundry sand is typically high quality silica sand used in the molding and casting operations with a small addition of bentonite to act as the binder material. Chemical binders are also used. Depending on the use of bentonite and/or chemical binders, the foundry sand can comprise of 85 to 99 percent silica sand and 0 to 12 percent clay, which are finer than 0.002 mm. CRA has provided a grain size analysis of a sample of the foundry sand which shows that the sample is comprised 5 percent gravel sized particles, 91 percent sand sized particles and 4 percent fines passing the No. 200 sieve (0.074 mm). A review of the Federal Highway Authority (FHWA) publication FHWA-IF-04-004 dated May 2004 'Foundry Sand Facts for Civil Engineers' shows that the bulk density of loosely placed foundry sand with little or no clay can range from 80 to 90 pounds per cubic feet (pcf). The shear strength parameters of angle of internal friction (φ) and cohesion can range from 30 to 36 degrees (^{o}) and cohesion 'c' can range from 3700 to 6100 pounds per square feet (psf). For the purposes of these analyses, foundry sand has been divided into old and new foundry sand materials. Old foundry sand which be consolidated by the load imposed by the new foundry sand placed on top of it has been assigned slightly higher shear strength properties than the new foundry sand albeit still conservative values when compared to the FHWA publication values.

The underlying clayey soils are low to medium plasticity soils with PI values of 10 to 13. A literature search shows that the natural undisturbed clayey soils with PI of 10 to 13 have drained φ of 25 to 35^o with c in the range of 1000 to 2000 psf. For the purposes of these analyses, conservative parameters of φ of 28^o and c of 200 psf have been assumed.

3.5 Piezometeric Conditions

Piezometeric surfaces, if passing through the soil mass above the critical slip circle/plane, affect the results significantly. The natural groundwater is generally below the base of the landfill, and has been included in the analyses at generally 1 ft below the base of the landfill. Groundwater is generally more than 1 foot for much of the landfill basegrade.

The significant variation in the groundwater elevations in the existing monitoring wells at the Site indicates that a free groundwater table is not present, which is consistent with the low permeability sandy lay soil deposits, and the observed water levels are indicative more of the localized perched conditions.

The landfill itself has leachate collection and disposal system installed in the cells, which is capable of handling 1 in 100 years storm event, and has been designed to maintain leachate head levels less than 1 inch above the basegrade. As such no leachate accumulation in the

cells in anticipated, however a leachate head up to elevation 947 ft. AMSL has been conservatively included in the analyses to see if this head will affect the stability of the existing berms and the overlying closed landfill.

3.6 Minimum Factors of Safety

A factor of safety (FS) in slope stability analysis can be defined as the ratio of the available shear strength to that of the applied stresses along a potential failure plane. A factor of safety of 1 or greater indicates stable conditions and a value of less than 1 represents unstable conditions. A value of 1.5 was targeted for the static analyses.

3.7 Slope Stability Evaluation Results

The graphical outputs of the slope stability analyses are provided on Figures 1 to 6. The global stability analyses were generally comprised of finding the most critical circular slip plane; the critical slip plane being the slip plane for which the minimum factor of safety can be calculated. A review of the slope stability analyses results shows that at all locations factors of safety of more than 1.5 were achieved for the proposed 3H:1V.

In view of the conservative soil parameters assumed for the analysis, the proposed landfill side slopes at 3H:1V are considered to be stable.

4.0 VENEER (COVER) SLIDING STABILITY

The final cover system could comprise either of the following two alternatives in a top-to-bottom order:

Cover System Component	Component Thickness and/or type
Vegetative Layer	6 inches
Protective Layer	General Fill – 18 inches
Composite Drainage Layer	Geonet(1)
Impermeable Layer	40 mil textured HDPE
Subgrade	Foundry Sand

(1) The geonet will consist of a plastic grid core sandwiched between two layers of non-woven geotextile.

The cover system sliding stability analyses were performed using the infinite slope methodology for the critical interfaces between the geosynthetic layers and between geosynthetic layers and landfill soils or cover system soils. The interface shear strength parameters have been assumed based on the literature review and past experience with similar components.

Due to the relative steepness of the 3H:1V slope and presence of the composite drainage layer no water head is expected to develop over the landfill cap that could impact the sliding stability of the overlying general fill and topsoil layer.

The interface shear strength parameters used and the results of the analyses are presented in Table 1. A review of Table 1 shows that for the assumed interface-shear strength parameters and conditions, the calculated factors of safety of 1.5 or more is achieved for the proposed 3H:1V side slopes.

Figure 1
Cross-Section A-A
Global Stability Analyses
East Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934

Name: Old Foundry Sand Unit Weight: 90 pcf Cohesion: 50 psf Phi: 32 °
Name: New Foundry Sand Unit Weight: 80 pcf Cohesion: 50 psf Phi: 28 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

Asssumed Leachate level shown is conservative - no leachate mounding is expected

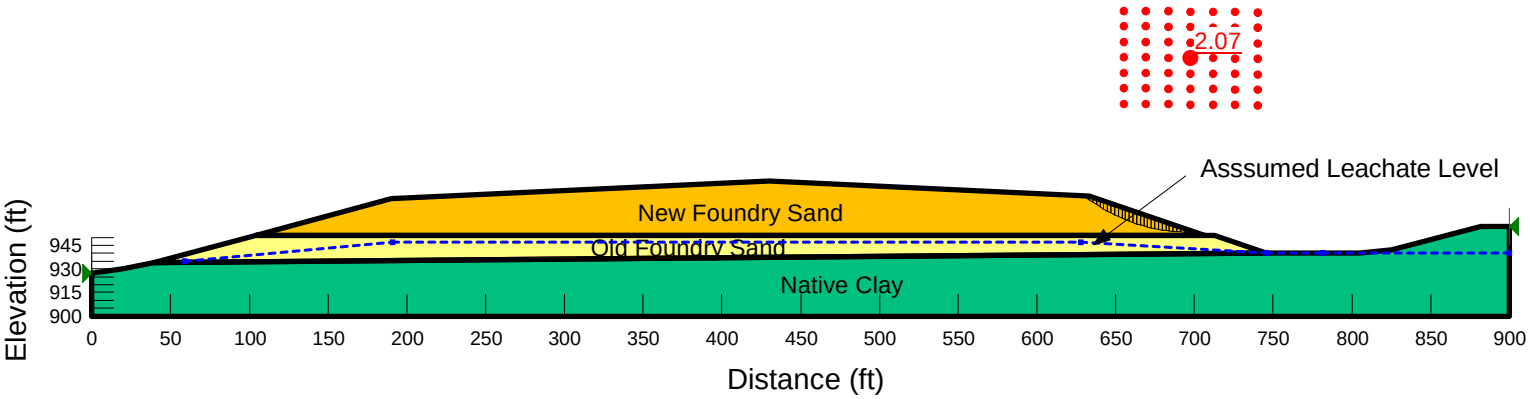


Figure 2
Cross-Section A-A
Global Stability Analyses
West Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934

Name: Old Foundry Sand Unit Weight: 90 pcf Cohesion: 50 psf Phi: 32 °
Name: New Foundry Sand Unit Weight: 80 pcf Cohesion: 50 psf Phi: 28 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

Asssumed Leachate level shown is conservative - no leachate mounding is expected

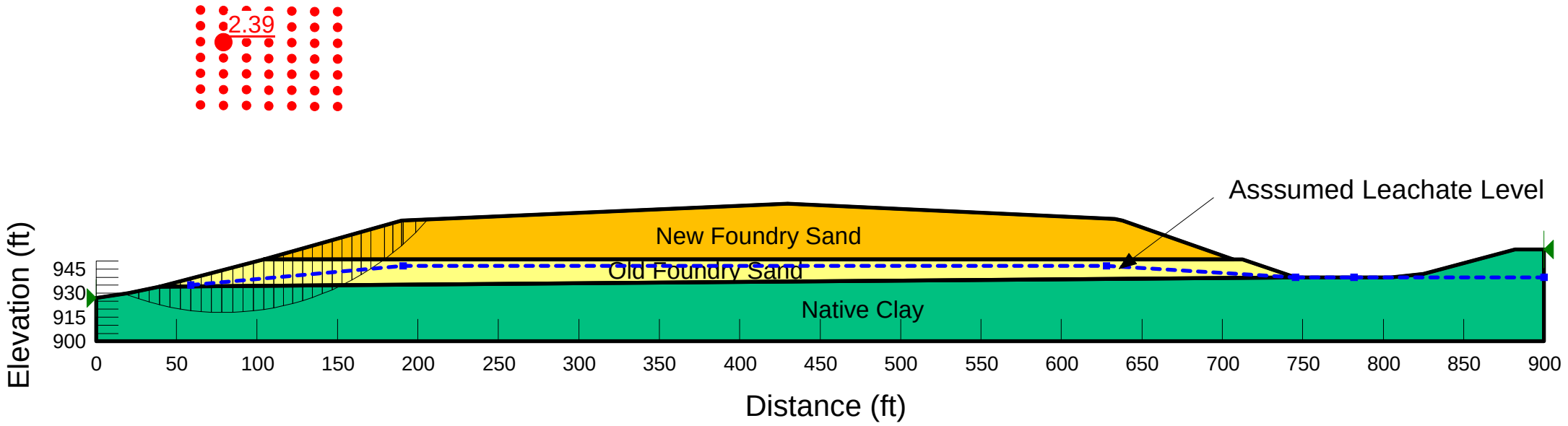


Figure 3
Cross-Section B-B
Global Stability Analyses
East Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934

Name: New Foundry Sand Unit Weight: 80 pcf Cohesion: 100 psf Phi: 28 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

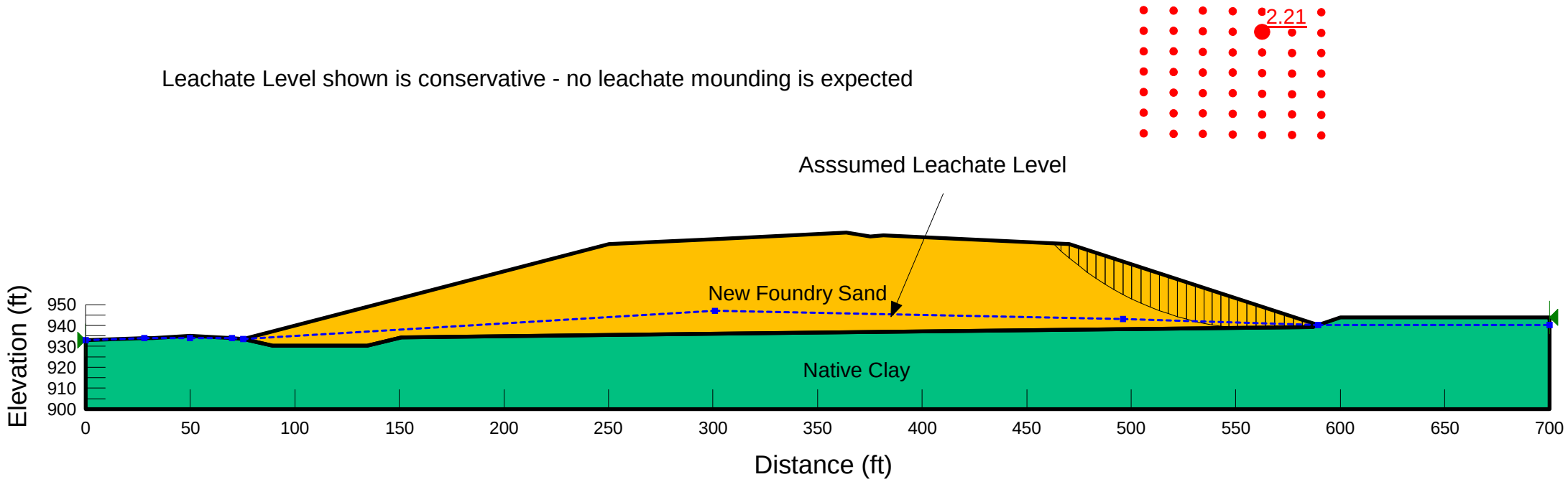
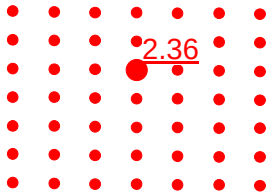


Figure 4
Cross-Section B-B
Global Stability Analyses
West Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934



Name: New Foundry Sand Unit Weight: 80 pcf Cohesion: 100 psf Phi: 28 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

Leachate Level shown is conservative - no leachate mounding is expected

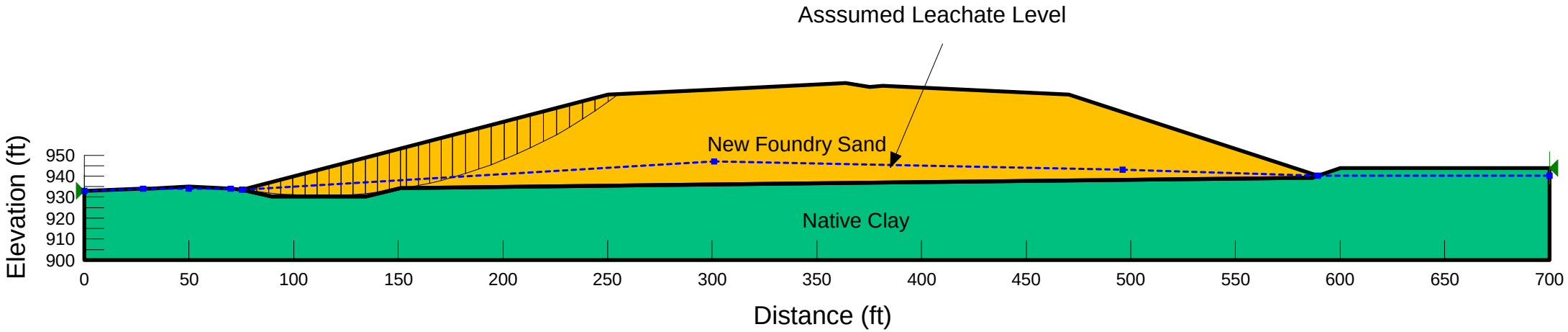


Figure 5
Cross-Section C-C
Global Stability Analyses
South Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934

Name: Old Foundry Sand Unit Weight: 90 pcf Cohesion: 50 psf Phi: 32 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

Asssumed Leachate level shown is conservative - no leachate mounding is expected

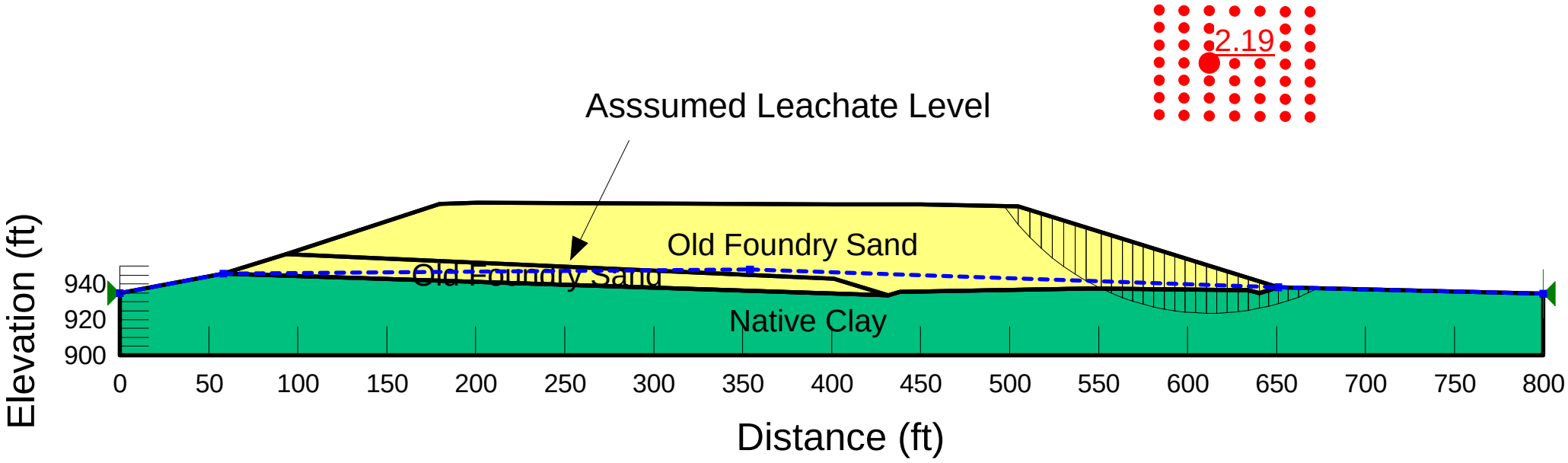


Figure 6
Cross-Section C-C
Global Stability Analyses
North Side Slope
Viking Pump Foundry Sand Landfill
Cedar Fall, Iowa

CRA Project No. 056934

Name: Old Foundry Sand Unit Weight: 90 pcf Cohesion: 50 psf Phi: 32 °
Name: New Foundry Sand Unit Weight: 80 pcf Cohesion: 50 psf Phi: 28 °
Name: Native Clay Unit Weight: 110 pcf Cohesion: 200 psf Phi: 28 °

Asssumed Leachate level shown is conservative - no leachate mounding is expected

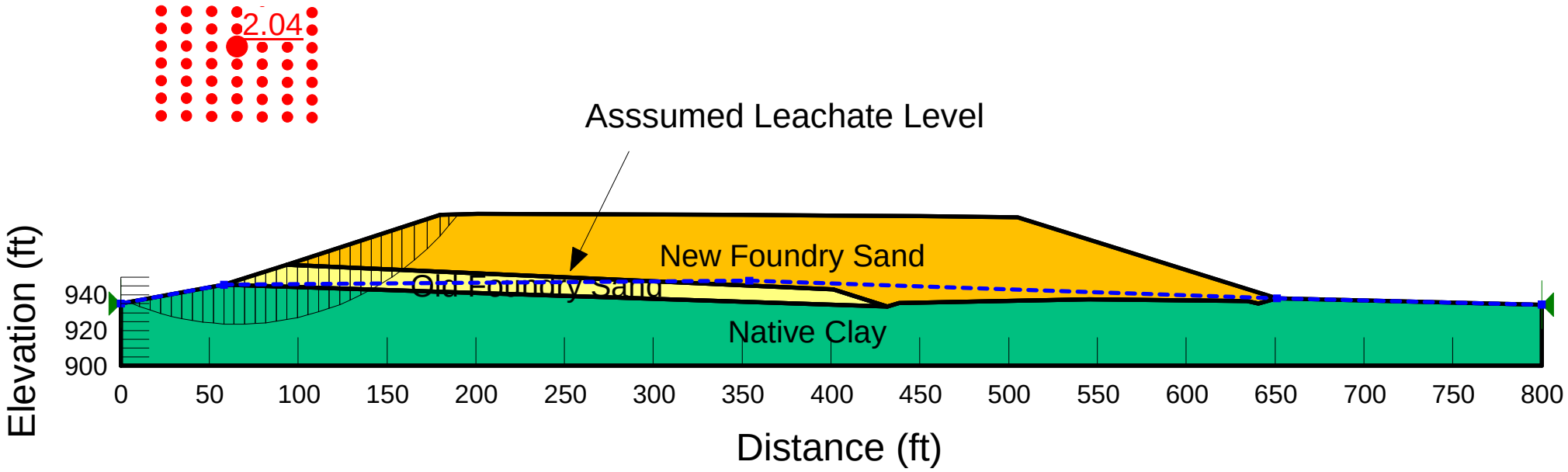


TABLE 1

COVER STABILITY ANALYSES - 4H:1V SIDE SLOPE
VIKING PUMP FOUNDRY SAND LANDFILL, CEDAR FALLS, IOWA

Critical Interface	*Cover Density* γ *(lbs/ft^3)*	*Cover Soil Thickness (ft)*	*Depth to Failure plane z (ft) (Note 1)*	*Depth to Water d_w (ft) (Notes 1, 2)*	*Interface Shear Strength*		*Landfill Slope* β		*Factor of Safety*
					Cohesion c (psf)	*Angle of friction (ϕ)*	*H:V*	*Degrees*	
0.5 ft Vegetative Layer + 1.5 ft Protective Layer Vs 12 Ounce Nonwoven Geotextile (upper face of geonet)	120	2.00	2.11	2.11	0	26	3.0 :1	18.4	1.5
12 Ounce nonwoven Geotextile (lower face of geonet) Vs 40 mil textured LLDPE Liner	120	2.00	2.11	2.11	0	28	3.0 :1	18.4	1.6
40 mil Textured HDPE liner Vs Landfill Foundry Sand	120	2.00	2.11	2.11	0	26	3.0 :1	18.4	1.5

Factor of Safety (FS) =

$$\frac{c/(\gamma.z.\cos^2\beta) + \tan\phi\,[1-\gamma_w(z-d_w)/(\gamma.z)] - k_s \tan\beta \tan\phi}{k_s + \tan\beta}$$

γ_w (density of water lb/ft^3) = 62.4

1) Depth to critical surface/water measured vertically from the ground surface.
2) Water depth of 2" assumed over the geonet.
3) The calculated factors of safety are based on assumed interface friction values from published technical-literature, and must be confirmed by Site-specific laboratory testing.

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