November 30, 2023

Mr. Geoffrey Spain
Environmental Engineer
IDNR – Land Quality Bureau
Wallace State Office Building
502 E. 9th Street
Des Moines, Iowa 50319

RE: SDP PERMIT RENEWAL
BOONE COUNTY SLF
IDNR PERMIT NO. 08-SDP-01-75P
HLW PN 6007-22A.200

Dear Mr. Spain:

Enclosed for review and approval is the completed IDNR Form 50 for the Boone County Sanitary Landfill and documentation supporting the permit renewal application. The SDP Permit for the Boone County Sanitary Landfill expires on March 12, 2024.

Please let me know if you have any questions.

Respectfully Submitted,
HLW Engineering Group

Douglas J. Luzbetak, P.E.
Project Manager

cc: John Roosa, Landfill Administrator, Boone County SLF (electronic copy)

HLW Engineering Group, 204 West Broad Street, P.O. Box 314, Story City, Iowa 50248
(515) 733-4144 (515) 733-4146 Fax

BOONE COUNTY SANITARY LANDFILL

2023 MUNICIPAL SOLID WASTE PERMIT RENEWAL

IDNR PERMIT NO. 08-SDP-01-75P

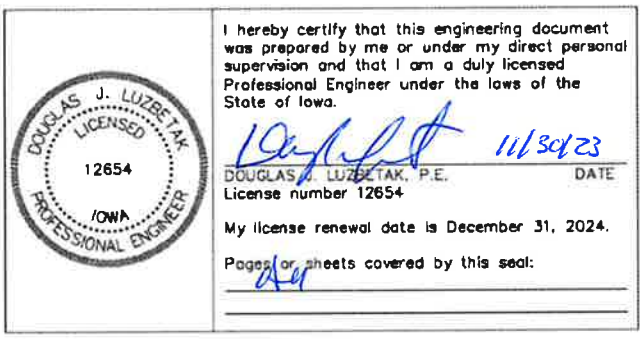
HLW Engineering Group, LLC
204 West Broad Street, PO Box 314
Story City, Iowa 50248
(515) 733-4144

HLW Project Number 6007-22A

2023 MUNICIPAL SOLID WASTE LANDFILL PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL

IDNR PERMIT NO. 08-SDP-01-75P



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.

11/30/23

DOUGLAS J. LUZBETAK, P.E. DATE

License number 12654

My license renewal date is December 31, 2024.

Pages or sheets covered by this seal: All

Prepared by
HLW Engineering Group, LLC
Consulting Engineers
Story City, Iowa 50248

IOWA DEPARTMENT OF NATURAL RESOURCES

Municipal Solid Waste Landfill

PERMIT APPLICATION FORM 50

☐ **New Permit**

☒ **Permit Renewal (permit number)** **08 - SDP - 01 -75 MLF**

☐ **Closure Permit**

SECTION 1: PERMIT APPLICATION REQUIREMENTS

Owner of site

Name: Boone County Phone: 515-433-0500

Address: Boone County Courthouse, 201 State Street Fax: 515-432-8102

City, State, Zip: Boone, IA 50036 E-mail:

Certified Operator Responsible for Operation at Facility

Name: John Roosa Phone: 515-433-0591

Address: 1268 224th Lane Fax: 515-433-0545

City, State, Zip: Boone, IA 50036 E-mail: jroosa@boonecounty.iowa.gov

Permit Applicant

Name: Boone County Phone: 515-433-0500

Address: Boone County Courthouse, 201 State Street Fax: 515-433-8102

City, State, Zip: Boone, IA 50036 E-mail:

Design Engineer (PE)

Name: Douglas J. Luzbetak, P.E. Phone: 515-733-4144

Address: 204 W. Broad St., PO Box 314 Fax: 515-733-4146

City, State, Zip: Story City, IA 50248 E-mail: dluzbetak@hlwengineering.com

Iowa Engineer License #: 12654 Expiration Date: 12/31/24

Responsible Official for the Facility

Name: John Roosa, Landfill Administrator Phone: 515-433-0591

Address: 1268 224th Lane Fax: 515-433-0545

City, State, Zip: Boone, IA 50036 E-mail: jroosa@boonecounty.iowa.gov

Agency and Responsible Official of Agency Served (if any)

Name: Boone County Phone: 515-433-0500

Address: Boone County Courthouse, 201 State Street Fax: 515-433-8102

City, State, Zip: Boone, IA 50036 E-mail:

Facility

Name: Boone County Sanitary Landfill

Address: 1268 224th Lane City, State, Zip: Boone, IA 50036

Legal Description:

Legal description and proof of Ownership included in Appendix 15 of 2007 Development and Operational Plans and Specifications (Doc #10760) and unchanged since that time.

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

Planning Area Name: Central Iowa Solid Waste Management Association

Date of Last Approved Plan: July 2, 2020

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

All cities and the unincorporated area in Boone County; all cities and the unincorporated area in Green County excluding the City of Jefferson; all cities and the unincorporated area in Story County excluding the Cities of Collins and Colo; the Cities of Bouton, Granger, and Woodward and Woodward State Hospital in Dallas County; and the Cities of Farnhamville, Lohrville, and Somers in Calhoun Cunty.

Population Served: 131,216

SECTION 2: PERMIT APPLICATION SUPPORTING DOCUMENTATION

PLANS AND SPECIFICATIONS

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

Required Plans and Specifications

☒ Executive Summary

An executive summary shall address the following:

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

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

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

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

No Revision Required - See Doc ID#, Section, and Page: 93741

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

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

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

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

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

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

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

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

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

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

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

No Revision Required - See Doc ID#, Section, and Page: 62221

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

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

☒ Household Hazardous Materials (HHM) collection certification. If applicable, include a plan for HHM temporary collection and storage in accordance with IAC 567 Chapter 123 (455B, 455D, 455F).

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

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

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

SECTION 3: APPLICANT SIGNATURE

Signature of Permit Applicant: John Roosa **Date:** 11/30/2023

Printed Name: John Roosa **Title:** Administrator

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

SECTION A

Executive Summary

EXECUTIVE SUMMARY

Summary of Modifications to the approved Plans and Specifications:

Modifications have been made to the approved Plans and Specifications during the current permit cycle. The following have been modified and included in this permit renewal documentation:

An updated Organizational Chart is included in Section B.

Discussion regarding the previously approved Site Exploration and Characterization Report is included in Section C.

Updated design plans and specifications, a current Scale Certificate, and an updated Quality Control and Assurance (QC&A) Plan are included in Section D.

An updated Development and Operations Plan and current Operator Certification Numbers are included in Section E.

An updated Environmental Monitoring Plan is included in Section F.

Project Goals and timelines for RD&D permits are not applicable for this facility.

The 2023 Financial Assurance approval is included in Section H.

The most recent Comprehensive Plan approval letter is included in Section I.

Discussion regarding the previously approved Closure/Postclosure Plan is included in Section J.

Summary of each Special Provision of the existing SDP Permit:

1. This provision should be updated to include the current approval date of July 2, 2020 for the Central Iowa Solid Waste Management Association's Comprehensive Plan. A copy of this approval is included in Section J of this permit renewal documentation.
2. An updated Development and Operations Plan is included in Appendix 1 of Section E.
   d. The Boone County Sanitary Landfill's ERRAP is a component of the Boone County Health and Safety Plan. A letter addressing the status of the ERRAP from John Roosa, Landfill Administrator, is included in Appendix 2 of Section E of this permit renewal documentation.
3. No changes.
4. Hydrologic monitoring shall be as per the Environmental Monitoring Plan submitted in Section F of this permit renewal documentation.
5. Explosive gas monitoring shall be as per the Environmental Monitoring Plan submitted in Section F of this permit renewal documentation.
6. No changes.

7. No changes.
8. No changes.
9. No changes.
10. No changes.
11. No changes.
12. No changes.
13. No changes.
14. No changes.
15. No changes.
16. No changes.
17. No changes.
18. No changes.
19. No changes.

Summary of each Permit Amendment:

IDNR has issued a revised SDP Permit with each revision or amendment issued during the current permit cycle. Since a revised SDP Permit is issued with each revision/amendment, all changes to the SDP Permit contained in each revision/amendment are incorporated into the SDP Permit at the time of the revision/amendment. Permit revisions have been issued on the following dates:

- November 22, 2019
- December 13, 2019
- September 25, 2020
- October 9, 2020
- December 2, 2020
- February 18, 2021
- April 14, 2021
- November 22, 2021
- May 17, 2022
- June 29, 2022
- December 13, 2022
- February 22, 2023
- September 19, 2023
- November 8, 2023
- November 20, 2023

Summary of new Permit Amendment Requests:

None at this time.

Summary of Equivalency Review Requests:

None at this time.

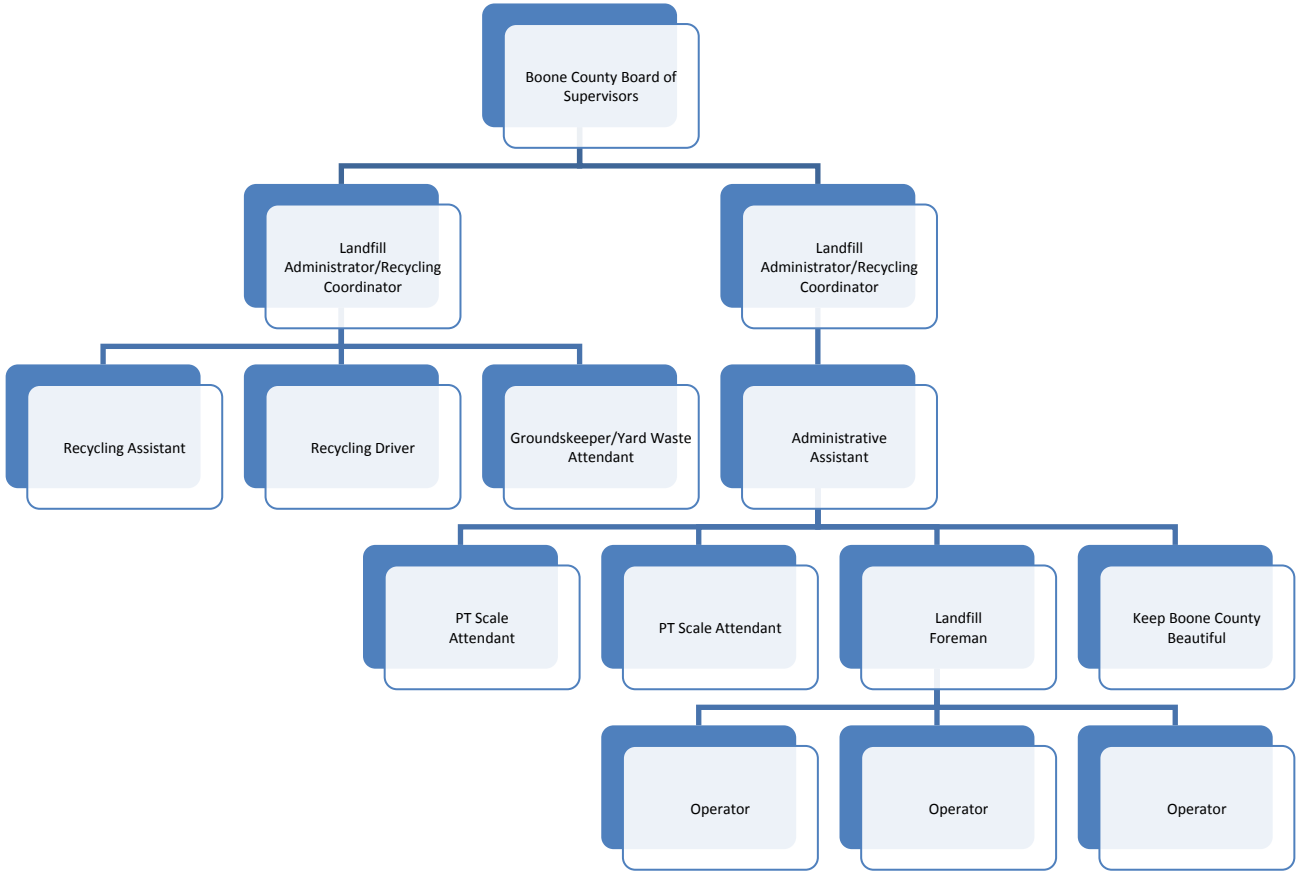
Summary of new Variance Requests:

None at this time.

SECTION B

Organizational Chart

Boone County Landfill & Recycling Organization Chart



SECTION C

Site Exploration and Characterization Report

SITE EXPLORATION AND CHARACTERIZATION REPORT

A Site Exploration and Characterization Report was included in the 2018 Permit Renewal Documentation (Doc # 93741). The previously submitted Site Exploration and Characterization Report is still applicable.

SECTION D

Design Plans and Specifications
Quality Control and Assurance Plans

DESIGN PLANS AND SPECIFICATIONS
QUALITY CONTROL AND ASSURANCE PLAN

113.7(1) Predesign Meeting with the Department

Predesign meetings will be scheduled as applicable. If designs are in general conformance with the rules and previously submitted documentation, a predesign meeting may not be necessary.

113.7(2) Plans and Specifications

Plans and specifications for all MSWLF units will be sent in to IDNR for review prior to construction. Submittals to IDNR for new MSWLF units will include a Quality Control and Assurance (QC&A) Plan, subgrade settlement calculations, leachate generation calculations, and other applicable documentation.

Figures showing typical future landfill layout, development, and construction details are included in Appendix 1 of this Section.

113.7(3) General Site Design and Construction Requirements

The facility currently meets all requirements in this subrule. A copy of the current scale license is included in Appendix 2 of this Section.

113.7(4), MSWLF Unit Subgrade

The general requirements for the subgrade of MSWLF units are discussed in the QC&A plan included in Appendix 3 of this Section.

MSWLF units will be designed so settlement or swell of the subgrade does not cause or contribute to failure of the liner and/or leachate collection system. Subgrade settlement calculations will be submitted with plans and specifications for new MSWLF units if applicable. If subgrade conditions, final grades, and waste elevations are similar to those in MSWLF units that have previously had subgrade settlement calculations submitted, the previous calculations will be referenced and the calculations not necessarily repeated for each new MSWLF unit.

113.7(5) MSWLF Unit Liners and Leachate Collection Systems

a. The current plan is for all future solid waste disposal areas to be constructed with Subtitle D compliant composite liners. Details on the construction of the Subtitle D compliant composite liners are included in Appendix 1 of this Section.

b. (1) The leachate collection system is designed and constructed to function for the entire active life of the facility and for the postclosure period.

(2) The leachate collection system will be constructed with HDPE piping. HDPE is resistant to the majority of chemicals typically found in leachate from a municipal waste landfill. Calculations for a theoretical pipe loading of 160 feet of fill (waste and final cap) over the liner are included in Appendix 4 of this Section. This fill height is greater than future fill heights based on current design parameters. These calculations show that 8" diameter SDR 11 HDPE pipe exceeds manufacturer's recommendations for ring thrust stress, ring deflection and wall buckling at the assumed maximum waste depth. Additional documentation will be provided if the maximum anticipated waste depth will be exceeded in future development areas.

(3) The leachate collection system will be designed to maintain less than a 12 inch depth of leachate on the liner. A leachate head measuring piezometer has been installed in the existing Subtitle D compliant lined area. Leachate head piezometers will also be installed in future disposal areas to monitor leachate head on the liner as warranted.

(4) Leachate recirculation at the site was approved in the November 22, 2019 Permit Revision. The approval was rescinded in the October 9, 2020 Permit Revision. It is anticipated that a request to resume leachate recirculation in Subtitle D composite lined disposal areas will be submitted during the next permit cycle.

(5) Existing leachate collection piping in the Subtitle D compliant lined areas is 8 inches in diameter. The leachate collection pipe installed in future expansion areas will have a diameter of at least 8 inches to allow cleaning activities to occur. Long radius bends and sweeps will be used at alignment changes as necessary to maintain access to the piping.

(6) The combination of the 8" diameter leachate collection pipe, the clean rock backfill in the leachate collection pipe trench, and the clean sand drainage layer material will minimize the potential for clogging of the leachate collection system due to mass loading. Clogging due to mass loading is typically minimized if the drainage layer and rock backfill around the leachate pipe are not saturated for long periods of time and if low saturated leachate levels are maintained. The leachate collection system is designed to limit levels to less than 12" above the top of liner elevation to maintain low saturated leachate levels. The use of large diameter, relatively uniform gravel as the pipe bedding also minimizes the potential for biological clogging in the leachate collection system.

(7) The drainage layer will consist of a high hydraulic-conductivity material at least 12 inches in depth with a hydraulic conductivity of at least $1x10^{-2}$ cm/sec. Clean sand will be used for the drainage layer, the sand will meet the hydraulic conductivity specified above and have less than 5% by weight passing a #200 sieve. Drainage layer material will have hydraulic conductivity and gradation verified in the laboratory before use is allowed. Laboratory hydraulic conductivity and gradation tests will be submitted to IDNR in the final QC&A Report.

(8) No manholes are proposed to be placed on the liner.

(9) It is not anticipated that the leachate drainage and collection system will be used for long term leachate storage. There may be occasions when repairs or maintenance are required on the leachate collection and/or conveyance system that will require leachate to be temporarily stored within the lined area of the landfill.

(10) Leachate conveyance, storage, and management structures outside of the solid waste boundary shall have containment structures or countermeasures to meet this requirement. Dual walled piping, bentonite/sand backfill, and low hydraulic conductivity composites have been utilized to meet this requirement to date.

(11) The facility has three separate leachate collection systems on site. The leachate collection systems are as follows:

a. Leachate collection piping was installed in the Phase 1 (1994), Phase 2 (1996), and Phase 3 (1996) disposal areas. These areas were constructed with a four foot compacted soil liner and leachate collection system; however, they were constructed prior to the Liner Performance Study for the facility (completed in 1998) so are not considered to be Subtitle D alternative liners. Leachate collection piping in these areas consists of perforated 8" diameter HDPE piping installed in clean, highly permeable rock backfill. Clean sand was used for the drainage layer. Leachate collected from Phase 1, Phase 2, and Phase 3 drains to a 10,000 gallon reinforced concrete underground storage tank (Tank #1 – installed in 1994).

b. A "Site Remedial Action Mitigation Plan" was submitted to IDNR on April 27, 2006 (Doc #21632) to address water quality issues north of the landfill. The plan recommended installation of two leachate extraction wells. The leachate extraction wells (EW-1 and EW-2) were installed in 2007. The leachate extraction wells direct leachate to a

10,000 gallon reinforced concrete underground storage tank (Tank #3 - 2007).

c. Leachate collection piping has been installed in the Subtitle D compliant lined disposal areas (Phase 4-R - 1999, Phase 5-R - 2001, Phase 6-R - 2003, Phase 7-R - 2016, and Phase 8-R - 2021) during construction. Leachate collection in these areas consists of perforated 8" diameter HDPE piping installed in clean, highly permeable rock backfill. Clean sand was used for the drainage layer in the Subtitle D compliant lined disposal areas. An underground reinforced concrete leachate storage tank (Tank #2 - 1999) with a capacity of approximately 10,000 gallons was installed in conjunction with the Phase 4-R expansion project. This tank was subsequently utilized for leachate storage for Phase 4-R, Phase 5-R, and Phase 6-R. The tank was abandoned and replaced with a dual walled steel underground leachate storage tank with a capacity of approximately 15,000 gallons (Tank #4 – 2016) during the Phase 7-R expansion. A leachate storage lagoon with a capacity of approximately 915,870 gallons was installed during the Phase 8-R expansion in 2021 to store leachate from Phase 4-R, Phase 5-R, Phase 6-R, Phase 7-R, and Phase 8-R. The lagoon is the primary method of leachate storage from the Subtitle D compliant disposal areas; however, Tank #4 remains in place as a backup storage option and leachate can be directed to either the leachate storage lagoon or Tank #4.

Leachate collection piping will be installed in all future Subtitle D composite lined disposal areas. Leachate collection in future disposal areas will consist of perforated 8" diameter HDPE piping installed in clean, highly permeable river rock backfill with a clean sand drainage layer. Tank #4 will be abandoned during future development so all leachate collected from the Subtitle D expansion areas will be directed to the existing leachate storage lagoon.

The locations of the existing leachate collection infrastructure and proposed locations of leachate collection infrastructure in future development areas is included on Figure 3 in Appendix 1 of this Section.

Accumulated leachate is hauled to the City of Boone Wastewater Pollution Control Facility (WPCF) or the Des Moines Metropolitan Waste Reclamation Authority (WRA) for treatment and disposal. The Industrial User Permit with the City of Boone WPCF and the Hauled Waste Discharge Permit with the WRA are included in Appendix G.1 of the 2022 Annual Water Quality Report (Doc #105631).

Leachate generation calculations for the Phase 8-R Expansion, which also included estimated contributions from the Subtitle D compliant disposal areas Phase 4-R, Phase 5-R, Phase 6-R, and Phase 7-R, were submitted to IDNR on February 3, 2021 (Doc #99696) and approved on February 16, 2021. Data on leachate collection volumes will continue to be gathered and will be revisited at least annually (in the Annual Water Quality Report). The leachate generation rates and calculations will also be reviewed prior to the construction of any additional disposal areas.

(12) The leachate collection system is equipped with valves to allow the control of leachate flows during site repairs, maintenance, or emergency conditions. Future expansions of the leachate collection system will also include valves.

(13) All weather access to the various components of the leachate collection system will be maintained.

(14) A Leachate Control System Performance Evaluation Report will be provided in the Annual Water Quality Report for the facility.

113.7(6) Quality Control and Assurance Programs

A general QC&A Plan is contained in Appendix 3 of this Section. The QC&A Plan outlines the steps that will be taken to conform to the provisions of subrule 113.7(6). A QC&A Plan will be submitted with the plans and specifications for each new waste disposal area for IDNR review.

113.7(7) Vertical and Horizontal Expansions of MSWLF Units

Future designs may include some disposal capacity over existing non-Subtitle D compliant MSWLF units. These "abutment" areas will be constructed with a Subtitle D compliant composite liner in accordance with 113.7(5)"a"(1) and Figure 3 in Appendix 1 of this Section.

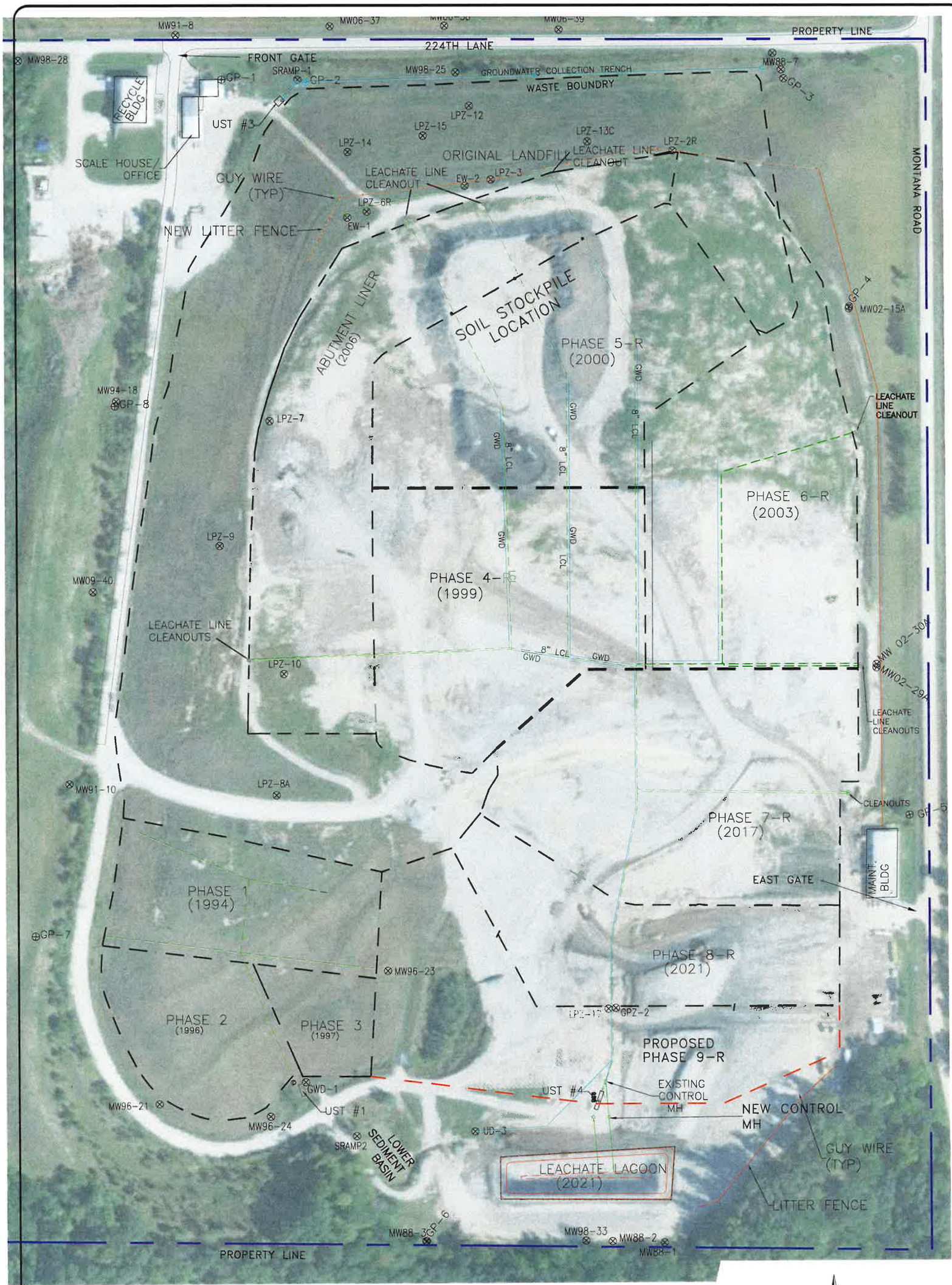
113.7(8) Run-on and Runoff Control Systems

a) A run-on control system will be utilized to prevent flow onto the active portion of the landfill. The run-on control system will be designed to prevent flow onto the active portion of the landfill during the peak discharge from a 24-hour, 25-year storm. A runoff control system will be utilized to collect and control runoff. The runoff control system will be designed to collect and control at least the water volume resulting from a 24-hour, 25-year storm. Run-on and runoff control systems will consist of berms, diversions, terraces, drop pipes, sediment basins, and other practices to control surface water at the site.

b) Any runoff that comes into contact with solid waste will be contained and treated as leachate. Berms and diversions will be utilized to control run-on and runoff at the active portion of the landfill.

APPENDIX 1

Figure List



AERIAL DATED SEPTEMBER 8, 2021

AERIAL PROVIDED BY THE IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT AND RESEARCH FACILITY IN COOPERATION WITH THE IOWA DEPARTMENT OF NATURAL RESOURCES, THE USDA NATURAL RESOURCES CONSERVATION SERVICES, AND THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

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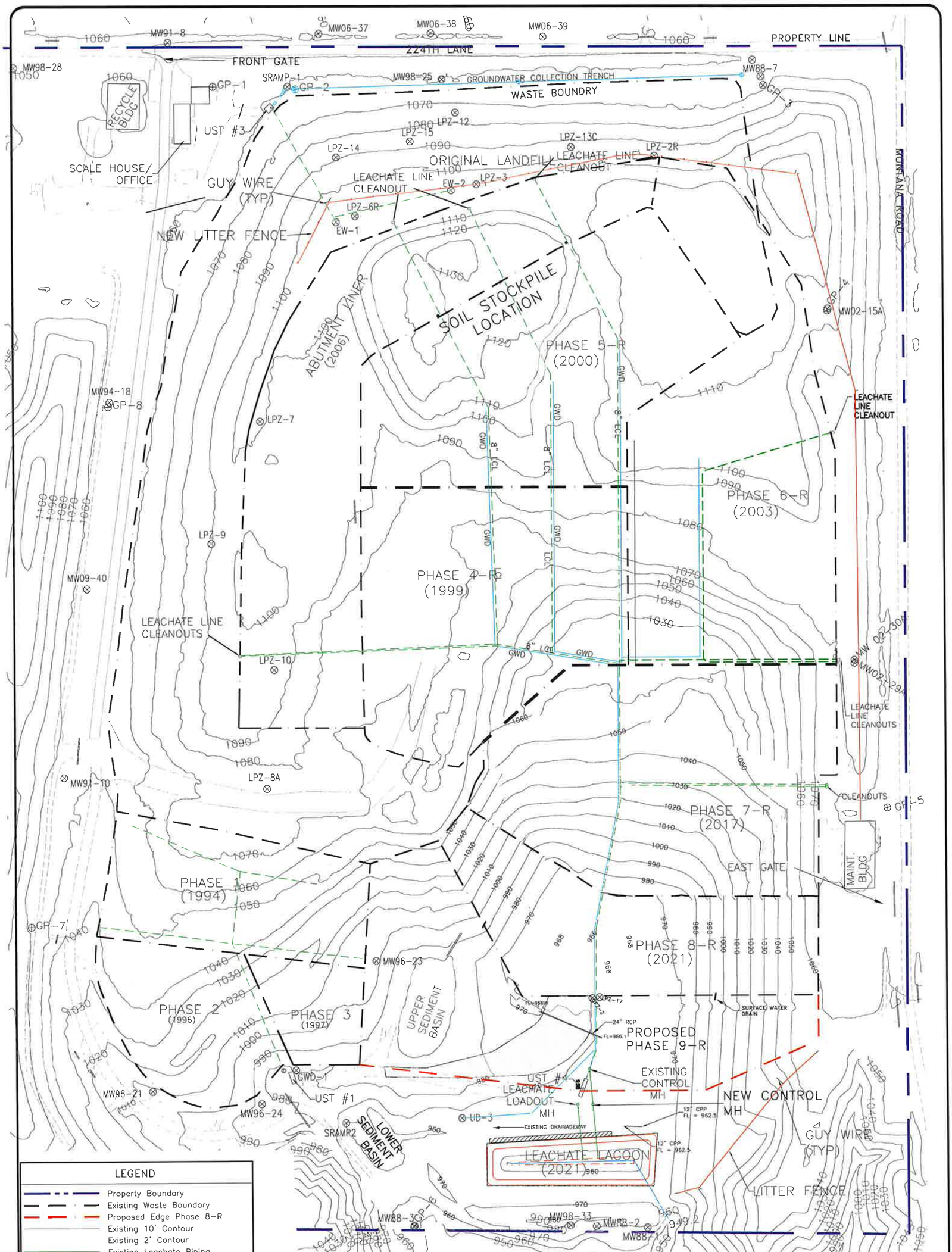
HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

OVERALL SITE VIEW
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IA

FIGURE: 1

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



LEGEND

- Property Boundary
- Existing Waste Boundary
- Proposed Edge Phase 8-R
- Existing 10' Contour
- Existing 2' Contour
- Existing Leachate Piping
- Existing Groundwater Piping
- Record Top of Liner Contour
- Design Contour

NOTES:

1. CONTOURS INSIDE PROPERTY BOUNDARY FROM DRONE SURVEY DATED JULY 12, 2017 AND VARIOUS SUBSEQUENT FIELD SURVEYS.
2. RECORD CONTOURS INSIDE PROJECT AREA FROM FIELD SURVEYS CONDUCTED 10/8/21, 10/9/21, 10/11/21 AND 11/02/21.

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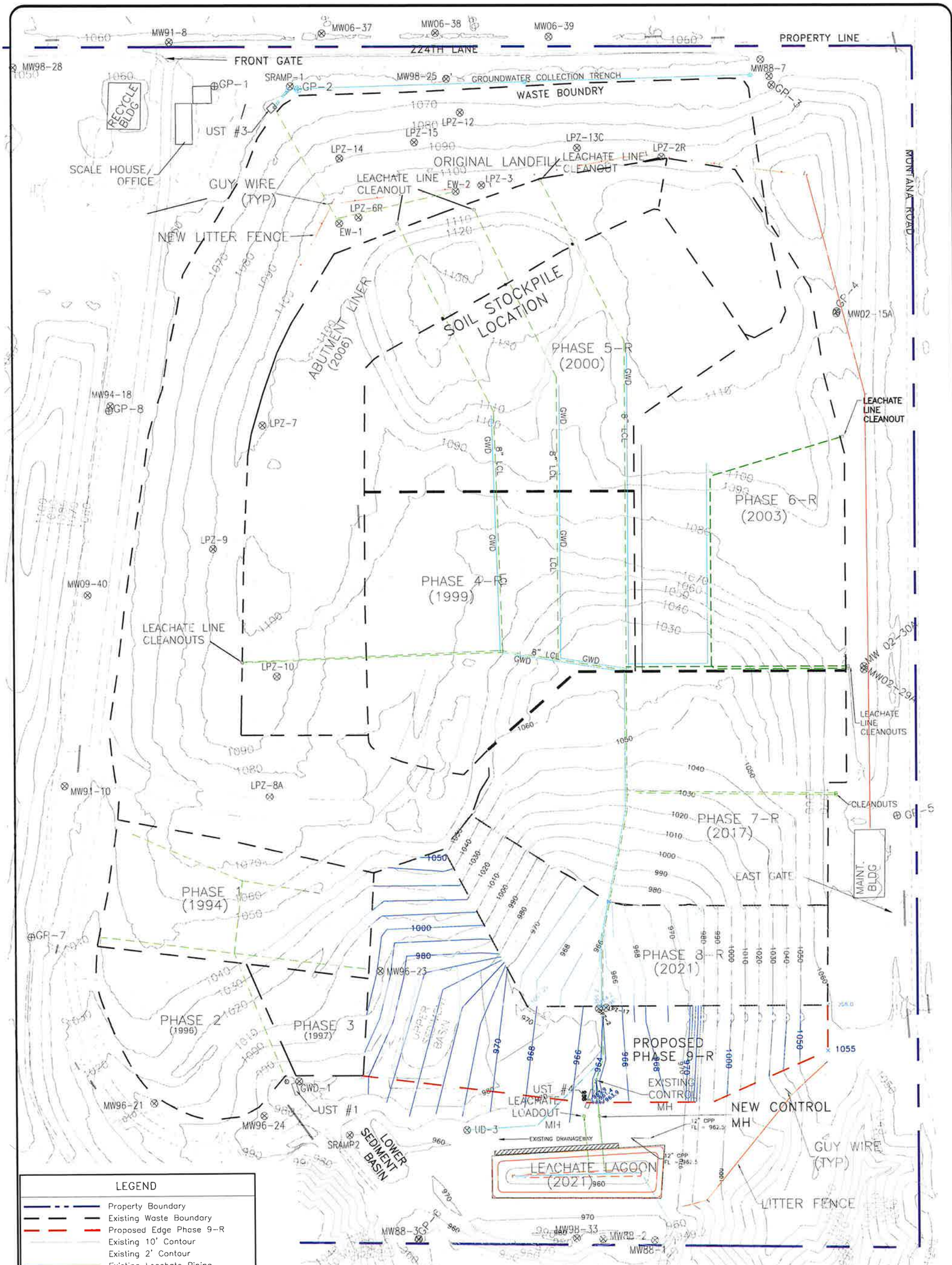
HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

OVERALL SITE PLAN
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IA

FIGURE: 2

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



NOTES:

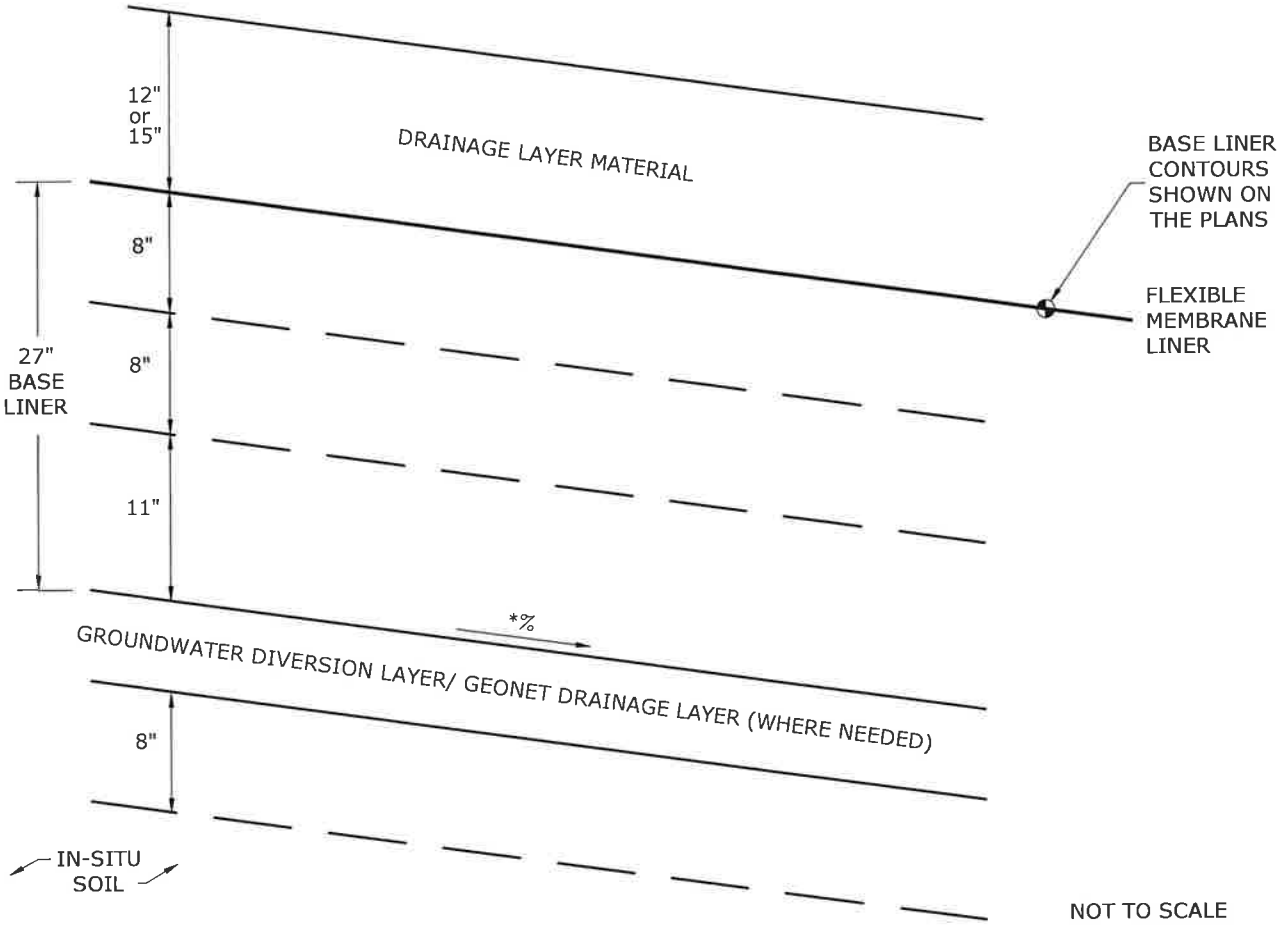
1. CONTOURS INSIDE PROPERTY BOUNDARY FROM DRONE SURVEY DATED JULY 12, 2017 AND VARIOUS SUBSEQUENT FIELD SURVEYS.
2. EXISTING CONTROL MH AND UST #4 WILL BE ABANDONED DURING PHASE 9-R CONSTRUCTION.

HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

SITE PLAN

LEACHATE COLLECTION SYSTEM
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IA

FIGURE: 3		
REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



BASE LINER CONSTRUCTION AND MATERIAL NOTES:

- The top 8" of subgrade shall be scarified and recompacted to a minimum of 95% Standard Proctor (ASTM D698) or proof rolled.
- The base liner shall be constructed in accordance with Iowa Administrative Code 567, Subrule 113.7(5)"A".
- The base liner soil shall have a lab tested hydraulic conductivity $\leq$ 1 x 10E−7 cm/sec, the Engineer shall determine the suitability of the soil for use as the base liner material based on the results of lab hydraulic conductivity tests performed by the Engineer.
- The base liner shall be constructed in 2 – 8 inch compacted lifts and 1 – 11" compacted lift to a total depth of 2.25 feet (27 inches). The base liner material shall be placed with moisture and density control. Unless specified otherwise in the plans and specifications, the soil shall be compacted to a minimum of 95% standard proctor density (ASTM D698) with moisture 0−5% above optimum.
- The bottom lift shall be placed in a single 11 inch (compacted depth) lift to meet designed base liner thickness. The entire lift shall meet the compaction and moisture requirements for base liner construction.
- The Engineer shall test for density and moisture (as per the specifications), certify and pass each 8 inch lift prior to placement of the next lift. Tests are required at the rate of five per lift per acre of base liner.
- A minimum of 5 Shelby Tube tests shall be taken from the base liner. Test results meeting or exceeding the IDNR minimum hydraulic conductivity requirement ($\leq$ 1x10E−7 cm/sec) must be obtained before FML installation can begin.
- The flexible membrane liner shall be placed in direct and uniform contact with the base liner. For details of flexible membrane liner see specifications.
- The drainage layer material shall be placed in a single lift after installation of the flexible membrane liner.
- The drainage layer material shall have a field and/or lab tested hydraulic conductivity $\geq$ 1 x 10E−2 cm/sec. The drainage layer material shall be inert, natural sands and gravels (ie. non−reactive when in contact with landfill leachate).
- Leachate collection pipes, groundwater diversion pipes, etc., shall be placed as shown on the details, plans, and specifications.

HLW Engineering Group

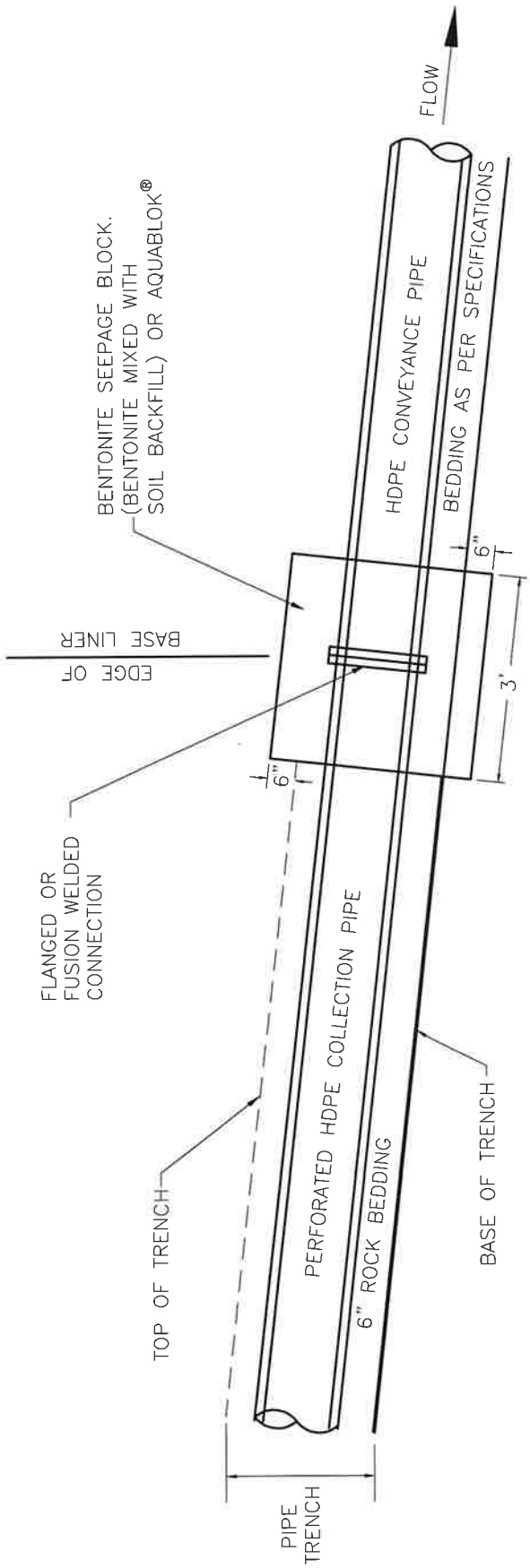
BASE LINER CONSTRUCTION

2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 4

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007−22A	DATE 11/15/23



LONGITUDINAL SECTION

NOTE:
THE PURPOSE OF THE BENTONITE SEEPAGE BLOCK IS TO FORCE GROUNDWATER MIGRATING IN THE TRENCH BEDDING INTO THE COLLECTION PIPE. BLOCKS SHALL BE PLACED AT THE DOWNGRADIENT WASTE BOUNDARY.

NOT TO SCALE

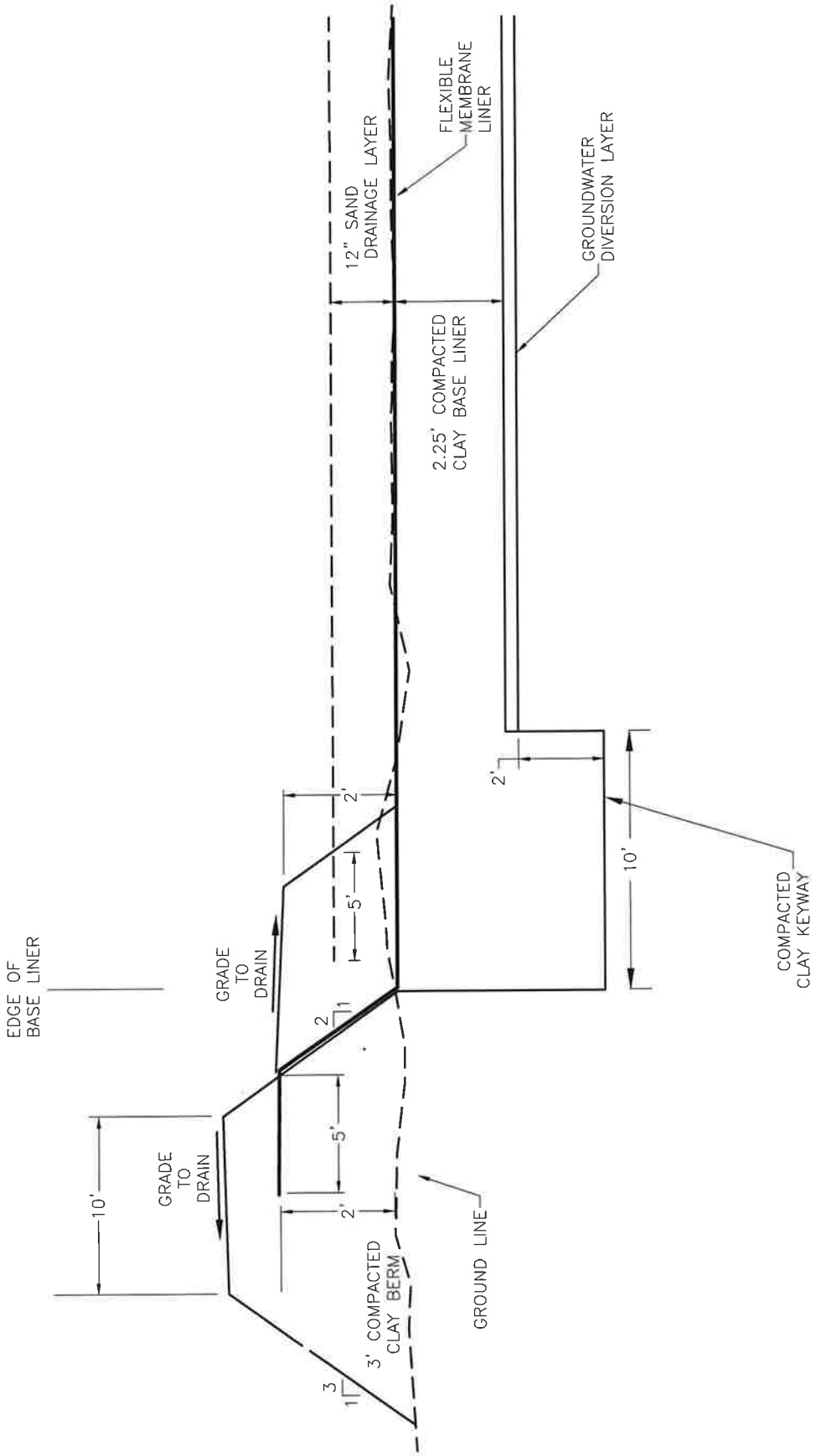
HLW
HLW Engineering Group

BENTONITE SEEPAGE BLOCK
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 5

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



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DOWNGRADIENT EDGE BERM
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 6

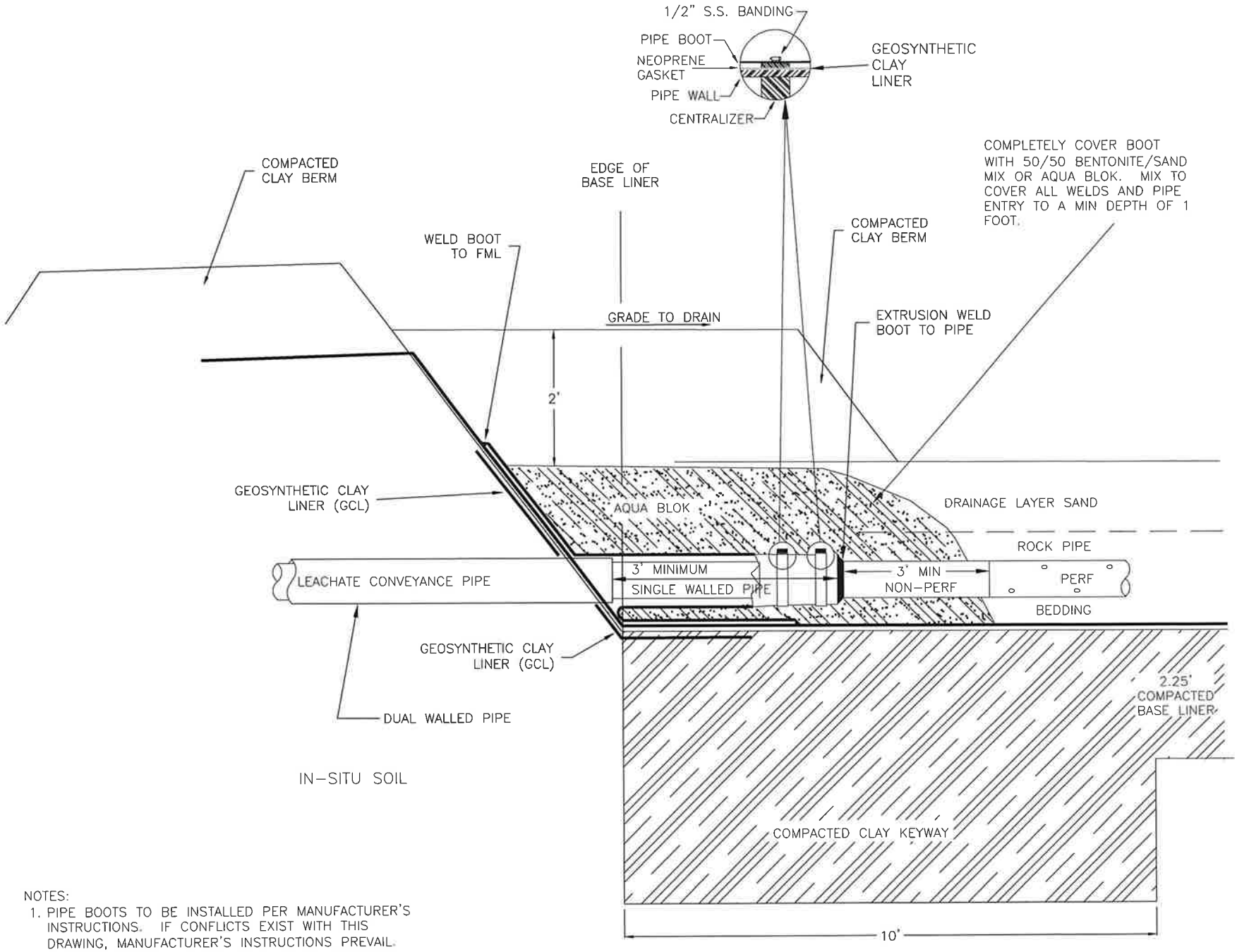
REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23

HLW Engineering Group

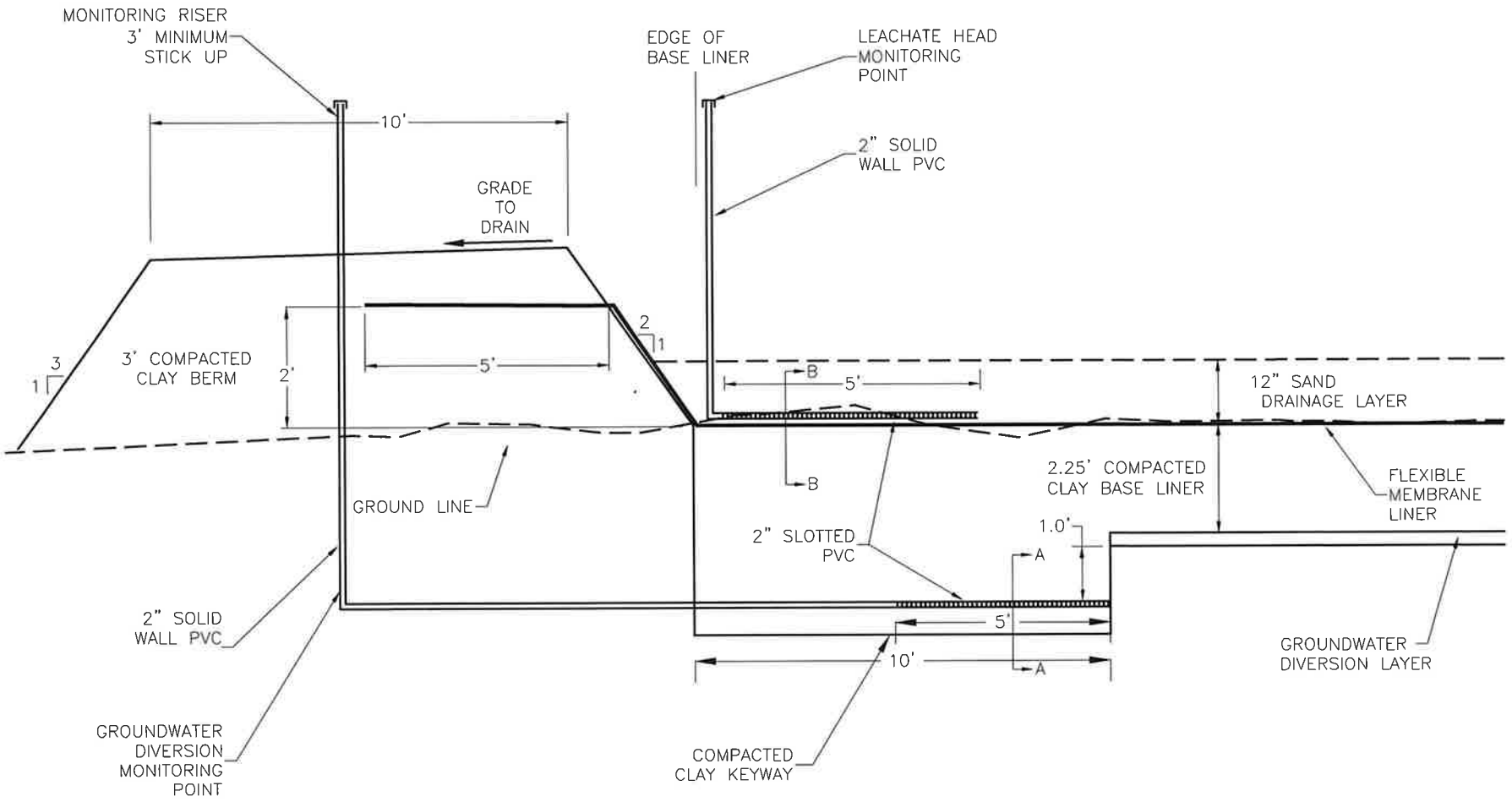
PIPE PENETRATION DETAIL
DISPOSAL AREA
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

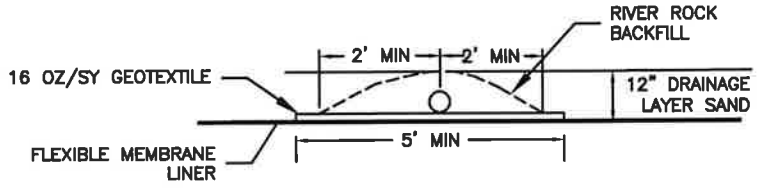
FIGURE: 7

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23

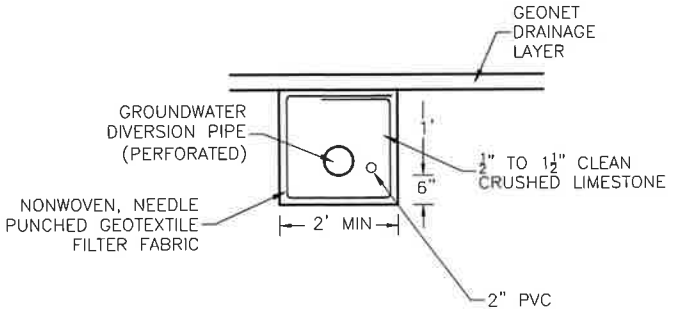


NOTES:
1. PIPE BOOTS TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. IF CONFLICTS EXIST WITH THIS DRAWING, MANUFACTURER'S INSTRUCTIONS PREVAIL.
2. GEOSYNTHETIC CLAY LINER (GCL) TO BE INSTALLED UNDER PIPE BOOT. GCL TO EXTEND A MINIMUM OF 1' PAST EDGE OF HOLE IN FML.





SECTION B–B



SECTION A–A

HLW Engineering Group

GROUNDWATER AND LEACHATE HEAD MONITORING POINTS
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 8

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23

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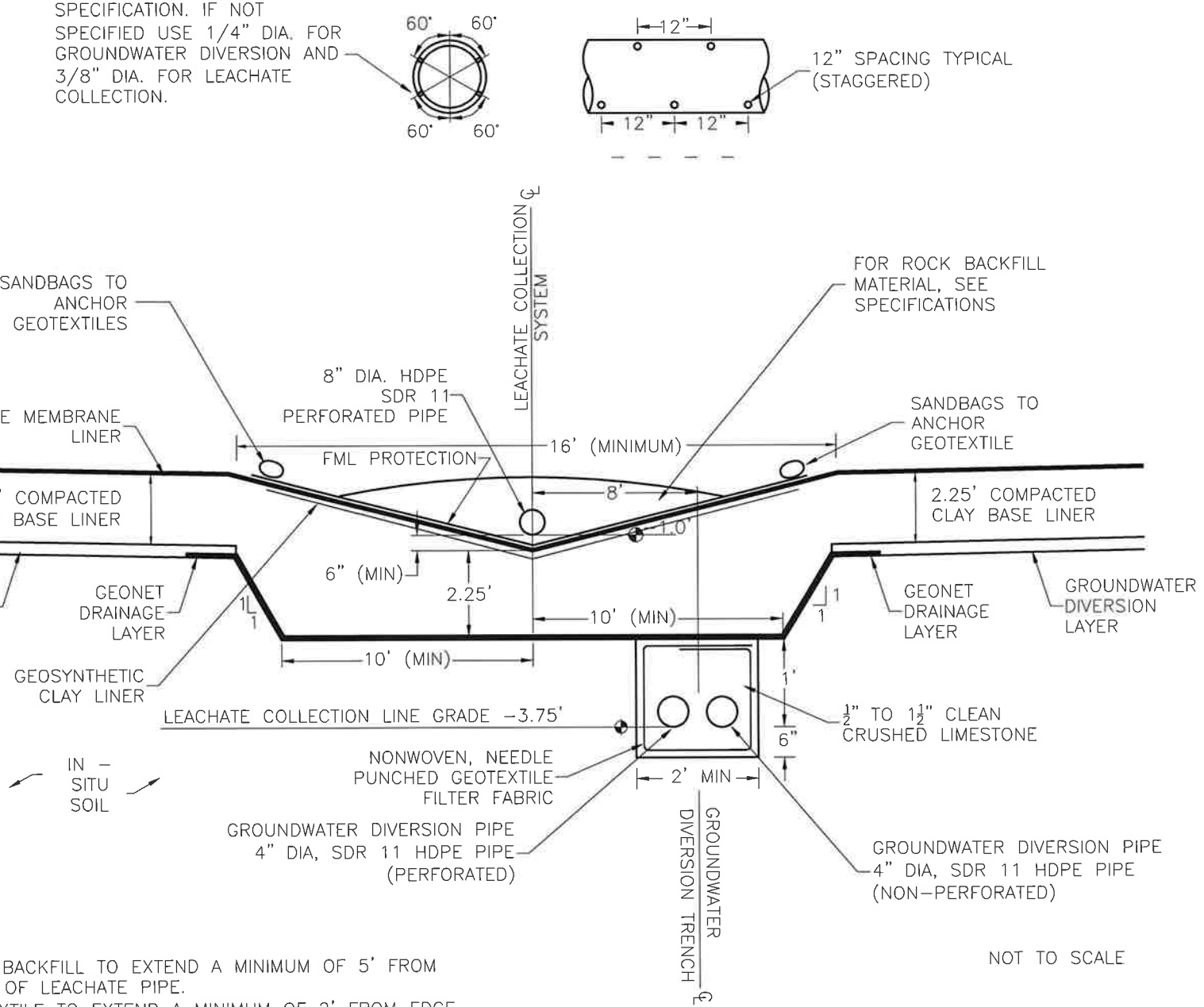
TYPICAL PIPE CROSS SECTION

LANDFILL BASE
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE COUNTY, IOWA

FIGURE: 9

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



NOTES:

1. ROCK BACKFILL TO EXTEND A MINIMUM OF 5' FROM SIDES OF LEACHATE PIPE.
2. GEOTEXTILE TO EXTEND A MINIMUM OF 2' FROM EDGE OF ROCK BACKFILL.
3. GEOTEXTILE TO BE REMOVED FROM TOP OF GROUNDWATER DIVERSION TRENCH TO EXPOSE ROCK IMMEDIATELY BEFORE GEONET INSTALLED.
4. V−TRENCH DEPTH IS 1.5 FT.

NOT TO SCALE

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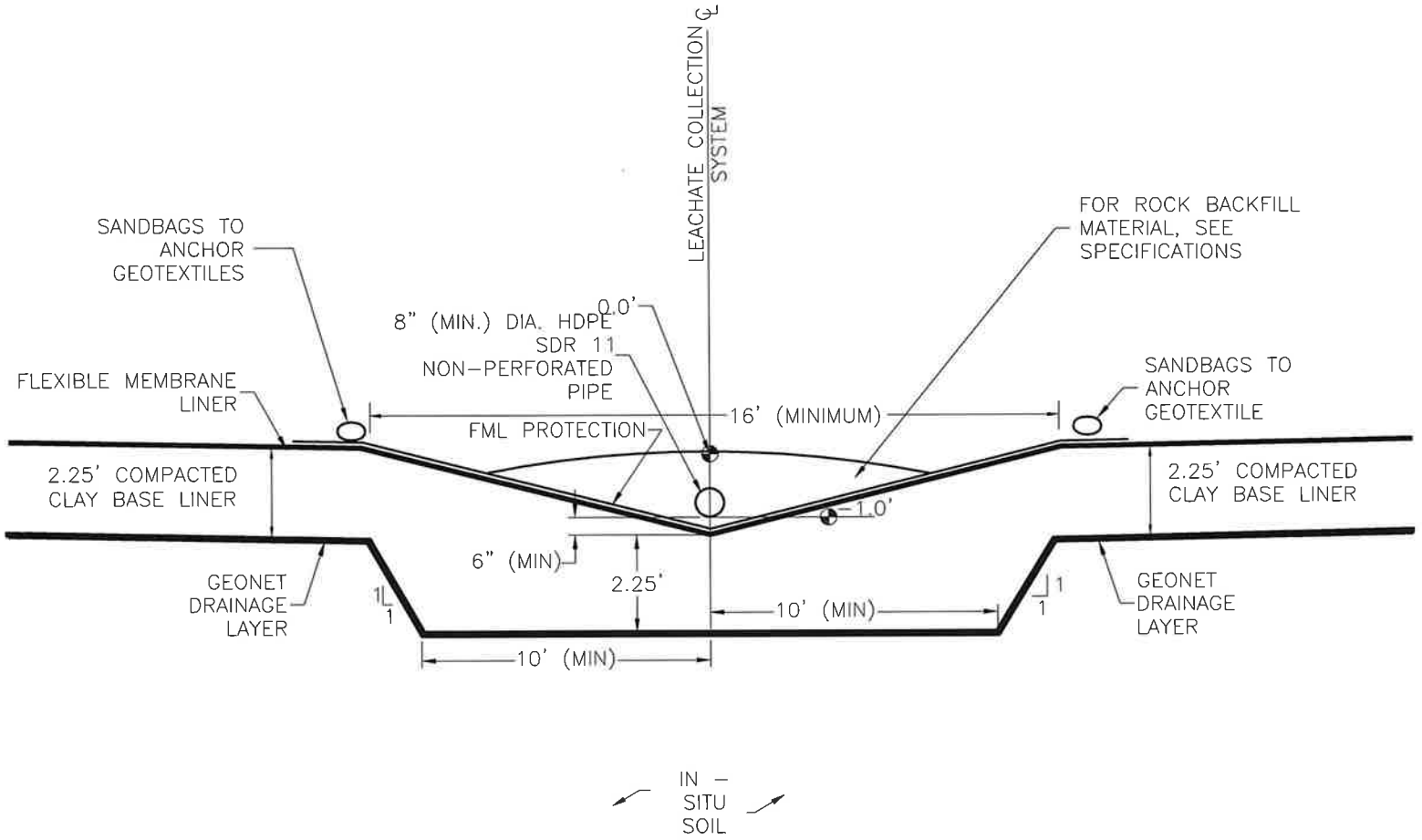
TYPICAL PIPE CROSS SECTION
LANDFILL SIDESLOPE
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA



NOTE:
1. ROCK BACKFILL TO EXTEND A MINIMUM OF 5' FROM SIDES OF LEACHATE PIPE.

NOT TO SCALE

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23

FIGURE: 10

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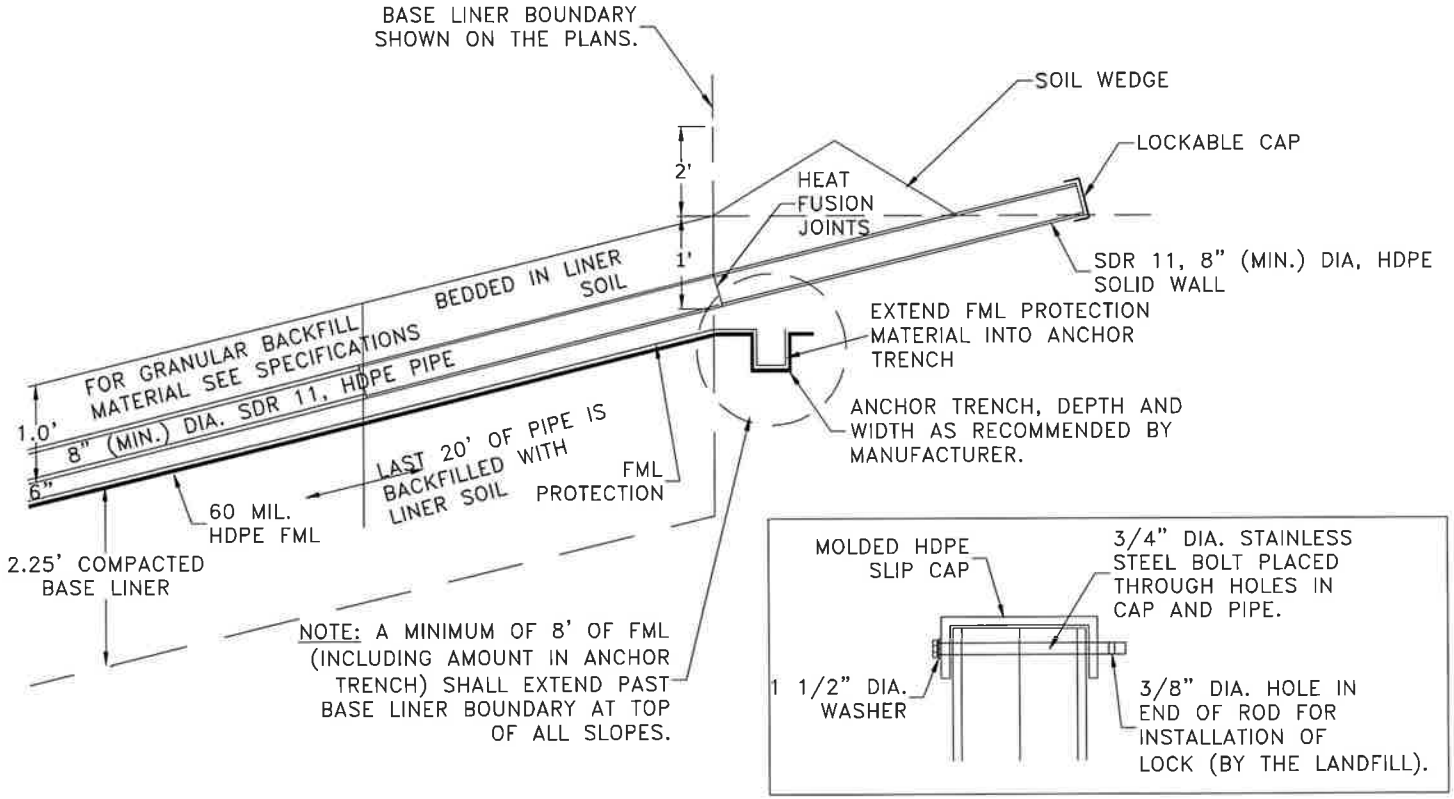
SIDEWALL ACCESS POINT

2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

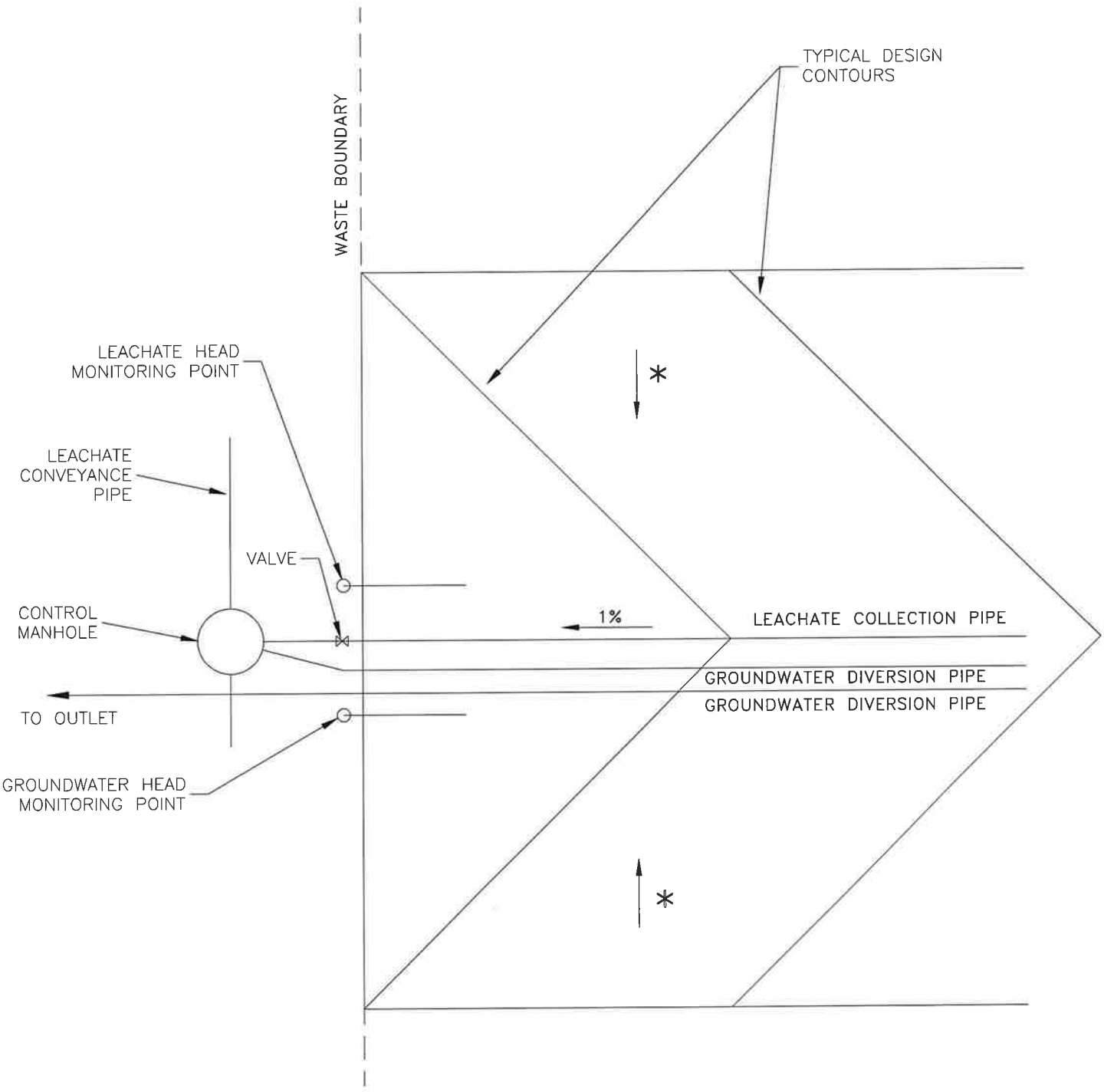


NOT TO SCALE

FIGURE: 11

REVISION	NO.	DATE

DRAWN	PROJECT NO.	DATE
JGH	6007-22A	11/15/23



* SLOPE VARIES. MINIMUM SLOPE = 2%

NOTE: FINAL LOCATION OF MONITORING POINTS WILL BE DETERMINED DURING PHASE 9R DESIGN.

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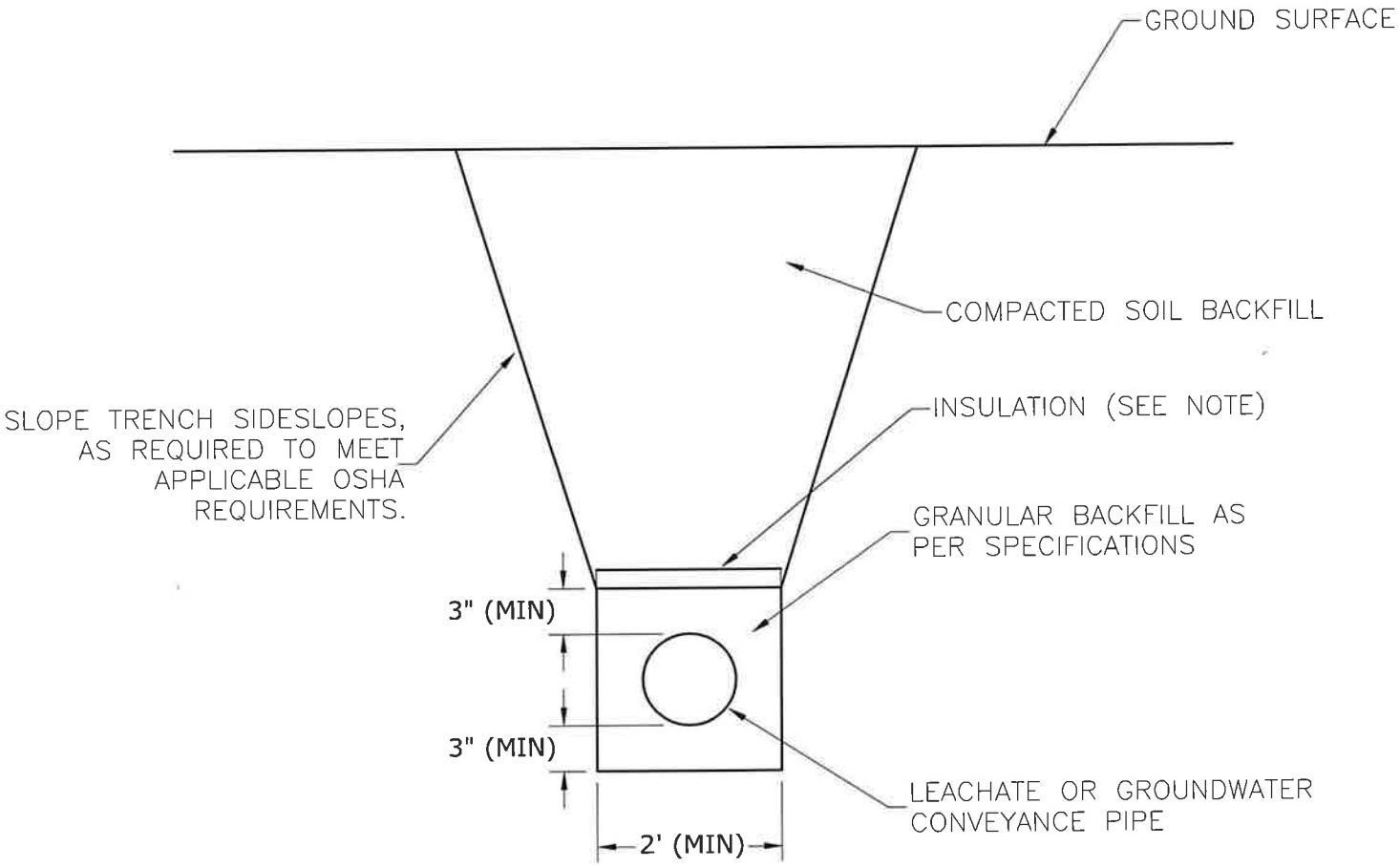
GOUNDWATER & LEACHATE MONITORING POINT LOCATIONS
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE COUNTY, IOWA

FIGURE: 12

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-23A	DATE 11/15/23



NOTE:
1. INSULATION MAY BE REQUIRED WHERE LESS THAN 5' OF SOIL COVER PROVIDED OVER TOP OF PIPE.

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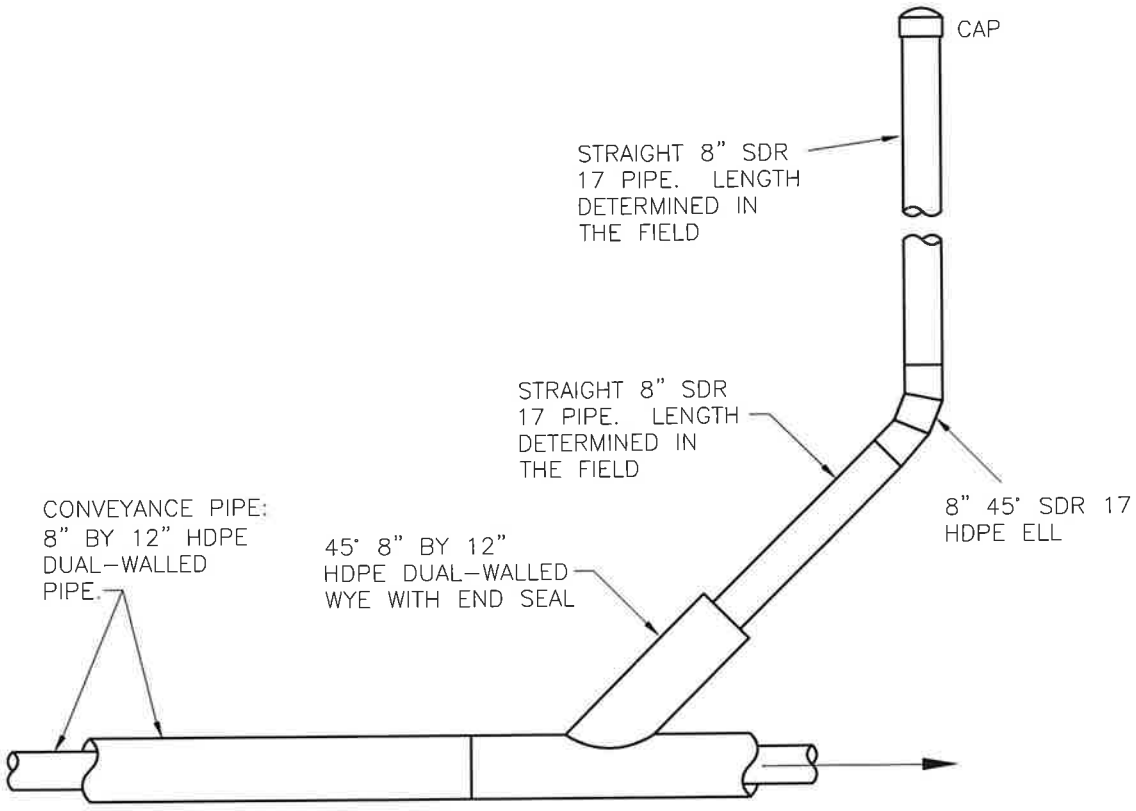
PIPE BEDDING – OUTSIDE LINED AREA
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 13

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



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PIPE CLEANOUT DETAIL
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

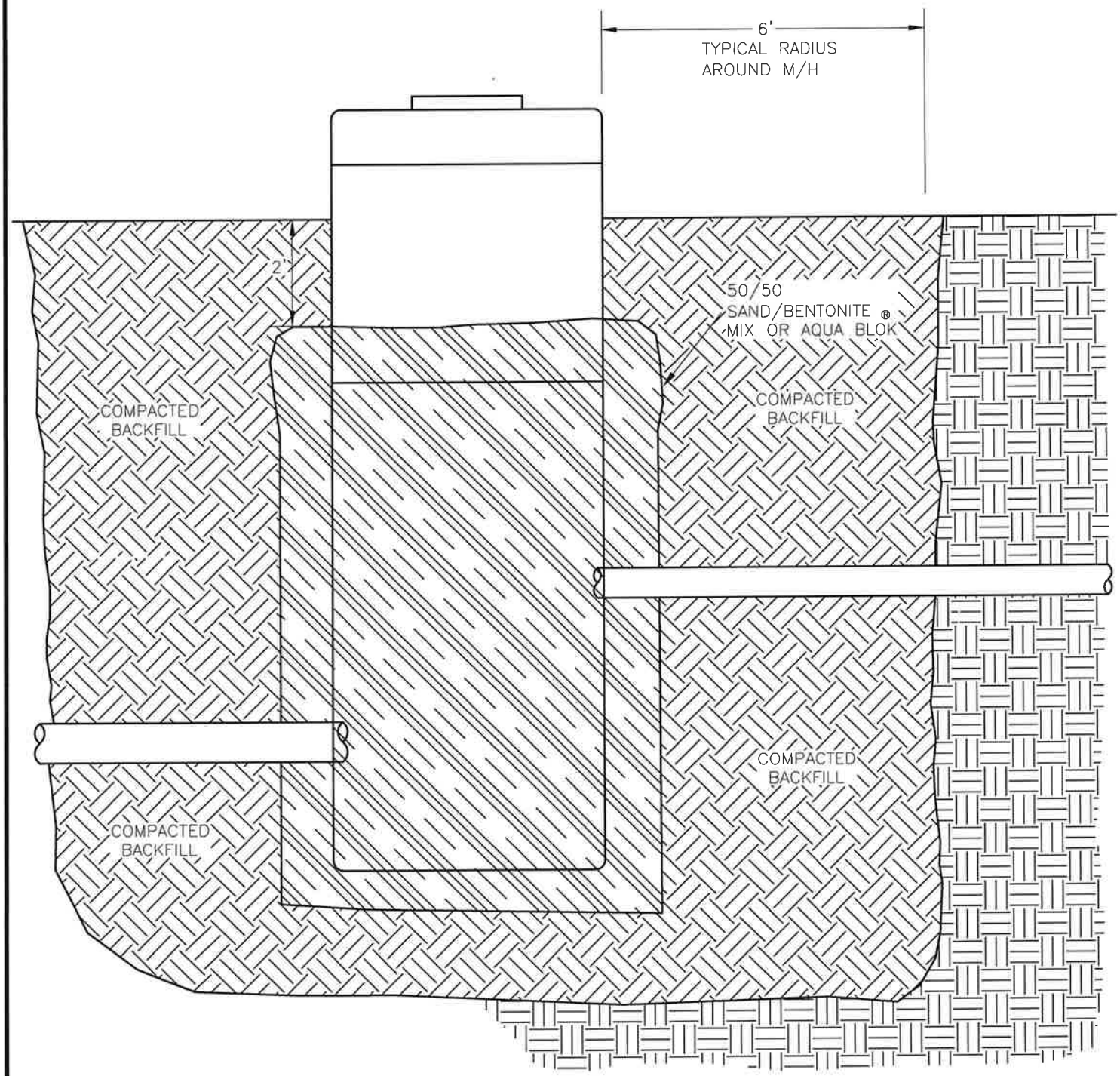
FIGURE: 14

REVISION	NO.	DATE

DRAWN	PROJECT NO.	DATE
JGH	6007-22A	11/15/23

NOTES:

1. THIS DRAWING ILLUSTRATES A CONCEPT. THE MANHOLE CONFIGURATION IS NOT SPECIFIC TO THIS PROJECT.
2. LEACHATE MANHOLES TO BE COMPLETELY SURROUNDED WITH A 50/50 SAND/BENTONITE MIX OF MIN 12" THICKNESS OR 6" AQUA BLOK®.
3. BACKFILL WITHIN 6' OF THE MANHOLE IS TO BE PLACED IN 8" LIFTS AND COMPACTED TO 95% PROCTOR.



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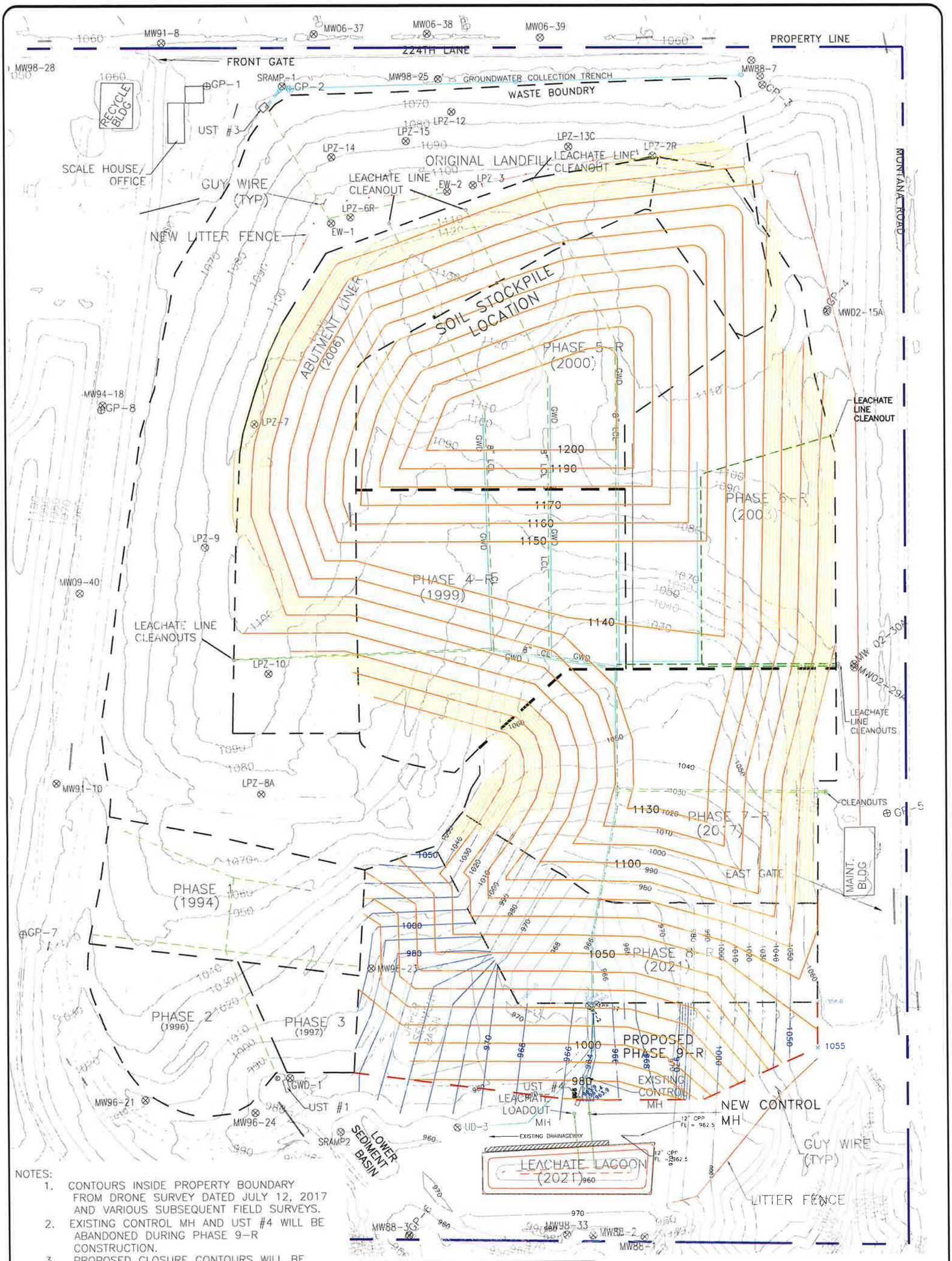
TYPICAL MANHOLE BACKFILL
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 15

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



NOTES:

1. CONTOURS INSIDE PROPERTY BOUNDARY FROM DRONE SURVEY DATED JULY 12, 2017 AND VARIOUS SUBSEQUENT FIELD SURVEYS.
2. EXISTING CONTROL MH AND UST #4 WILL BE ABANDONED DURING PHASE 9-R CONSTRUCTION.
3. PROPOSED CLOSURE CONTOURS WILL BE REVISED IF AN ABUTMENT LINER IS CONSTRUCTED IN PHASE 1/PHASE3.
4. TERRACES WILL BE CONSTRUCTED ON THE CAP AS NEEDED TO LIMIT EROSION AND PROMOTE THE ESTABLISHMENT OF VEGETATION. THE TERRACES WILL BE DESIGNED AND LOCATED DURING FUTURE CLOSURE PROJECTS.

HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

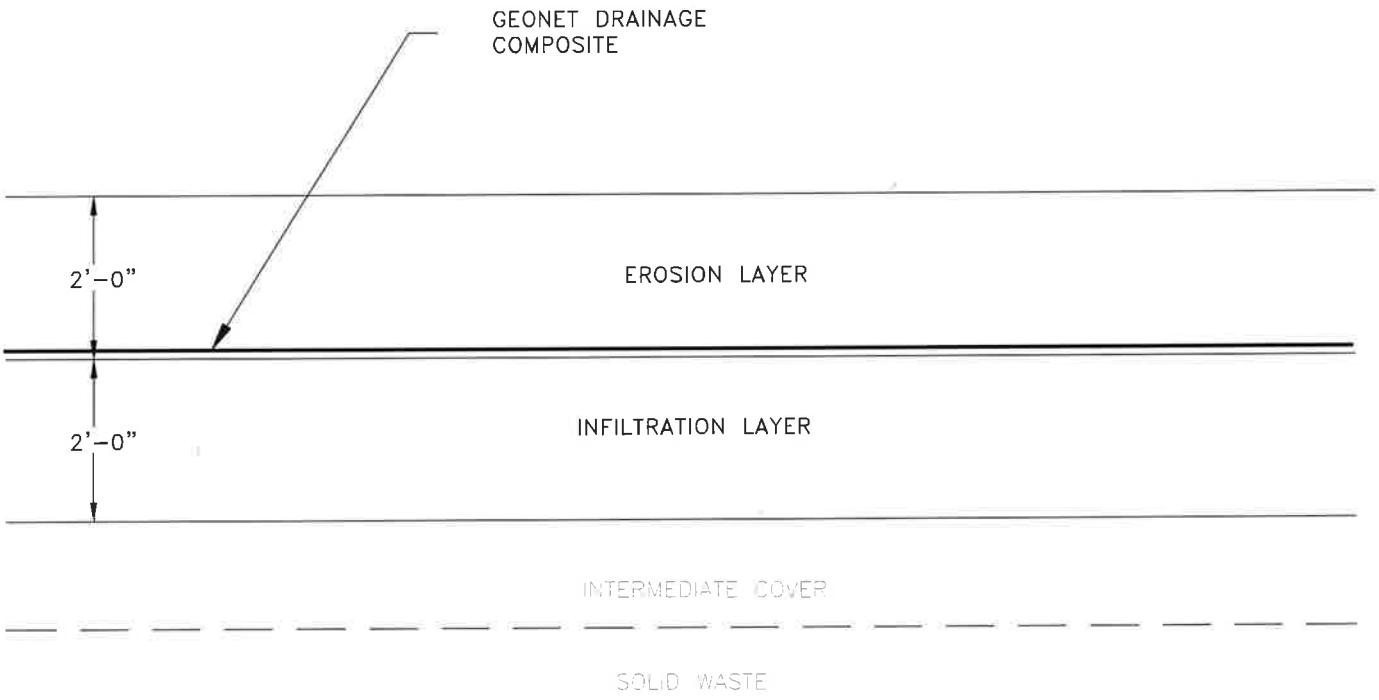
SITE PLAN – FINAL CONTOURS

2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IA

FIGURE: 16

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



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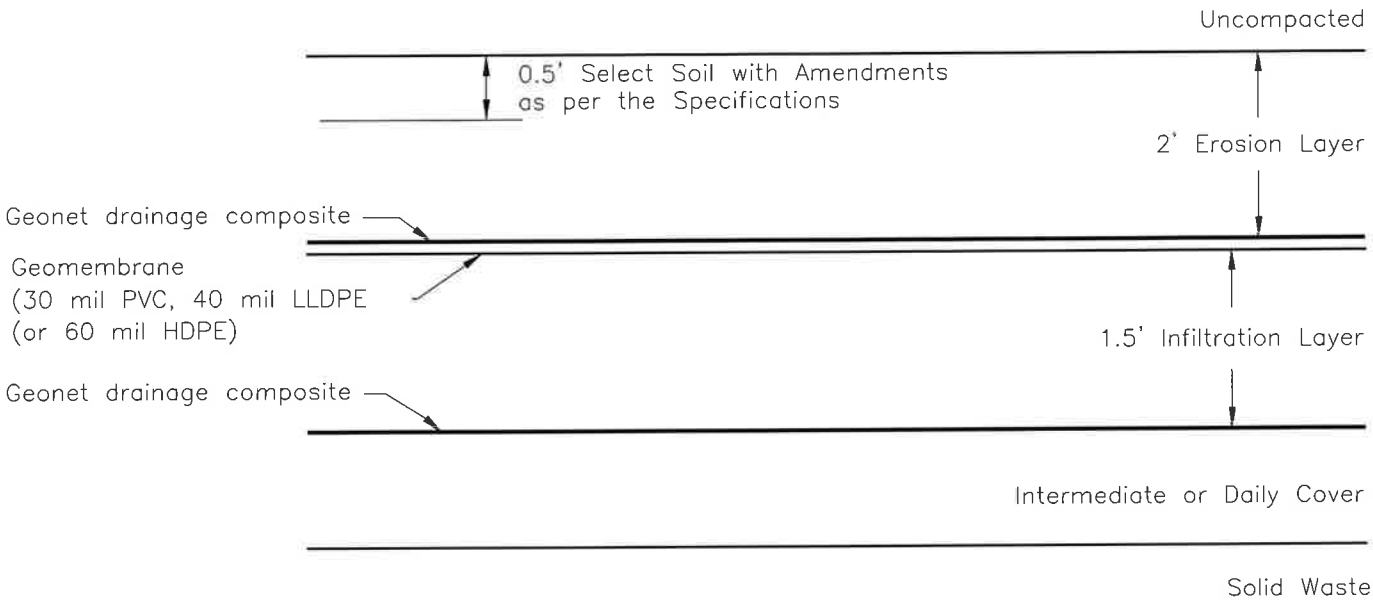
FINAL COVER DETAIL
ALTERNATE CAP
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 17

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



CONSTRUCTION AND MATERIAL NOTES:

- The Engineer shall determine the suitability of soil for use in the infiltration layer based on the results of lab hydraulic conductivity tests.
- The lower geonet composite will serve as the gas control layer. Gas control layer shall be vented as shown in Figure 20.
- The select soil shall be from the best available soil for vegetative growth from borrow areas or stockpiles. Soil amendments shall be applied as per the specifications. The layer should be disked and prepared for seeding and mulching as required in the specifications.
- The upper geonet drainage composite will outlet into drainage piping on the slope and at the toe of the slope.

NOT TO SCALE

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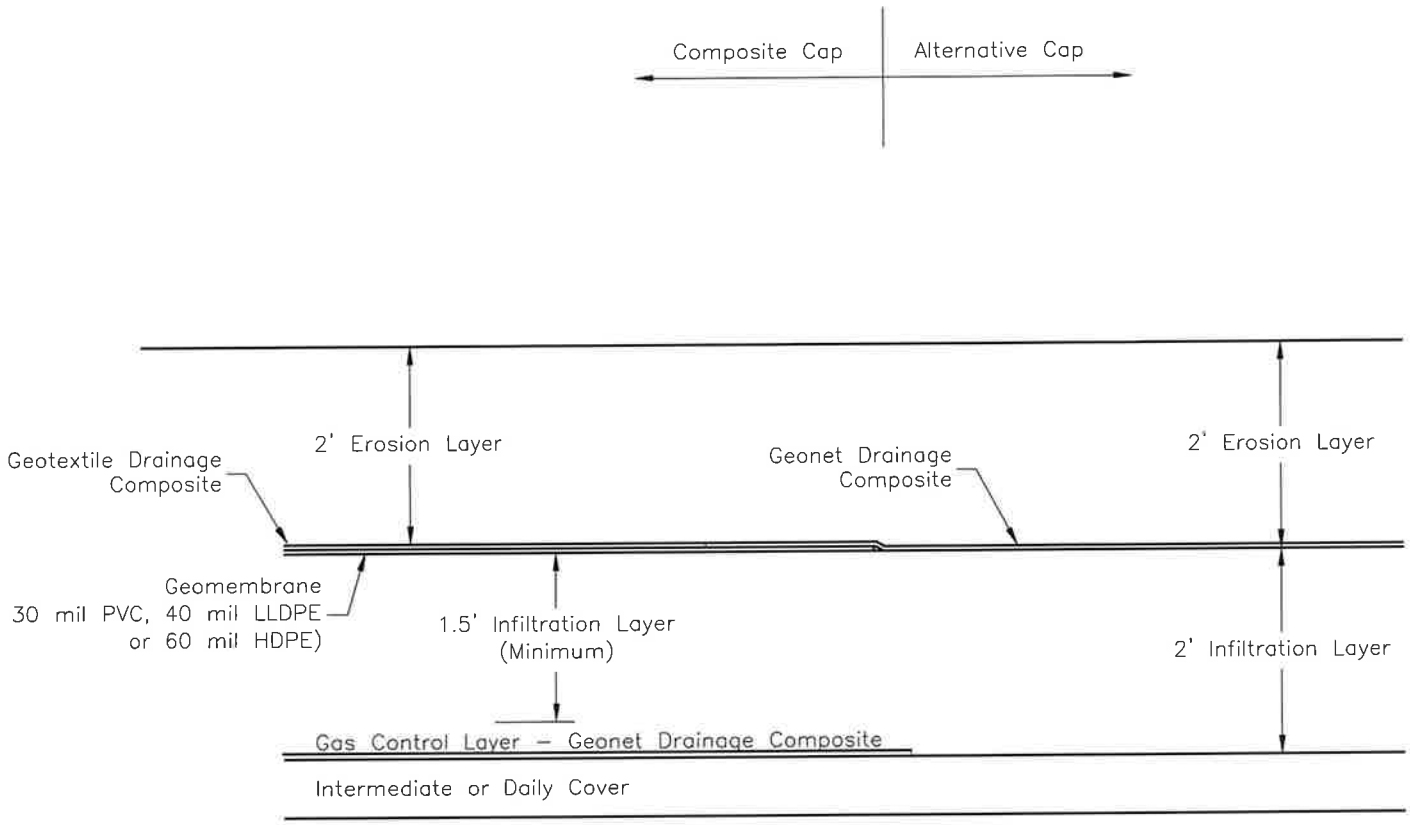
FINAL COVER DETAIL
COMPOSITE CAP
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 18

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23



Notes:

1) Composite cap/soil cap joints will be located to maintain drainage in geonet layer.

2) Thickness of infiltration layer in composite cap will be increased to 2' at cap joint.

NOT TO SCALE

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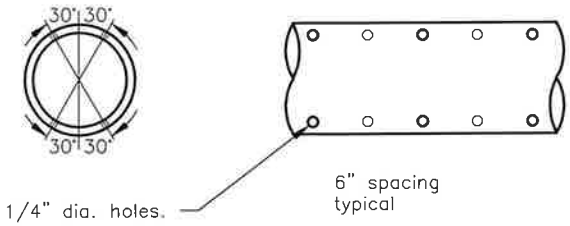
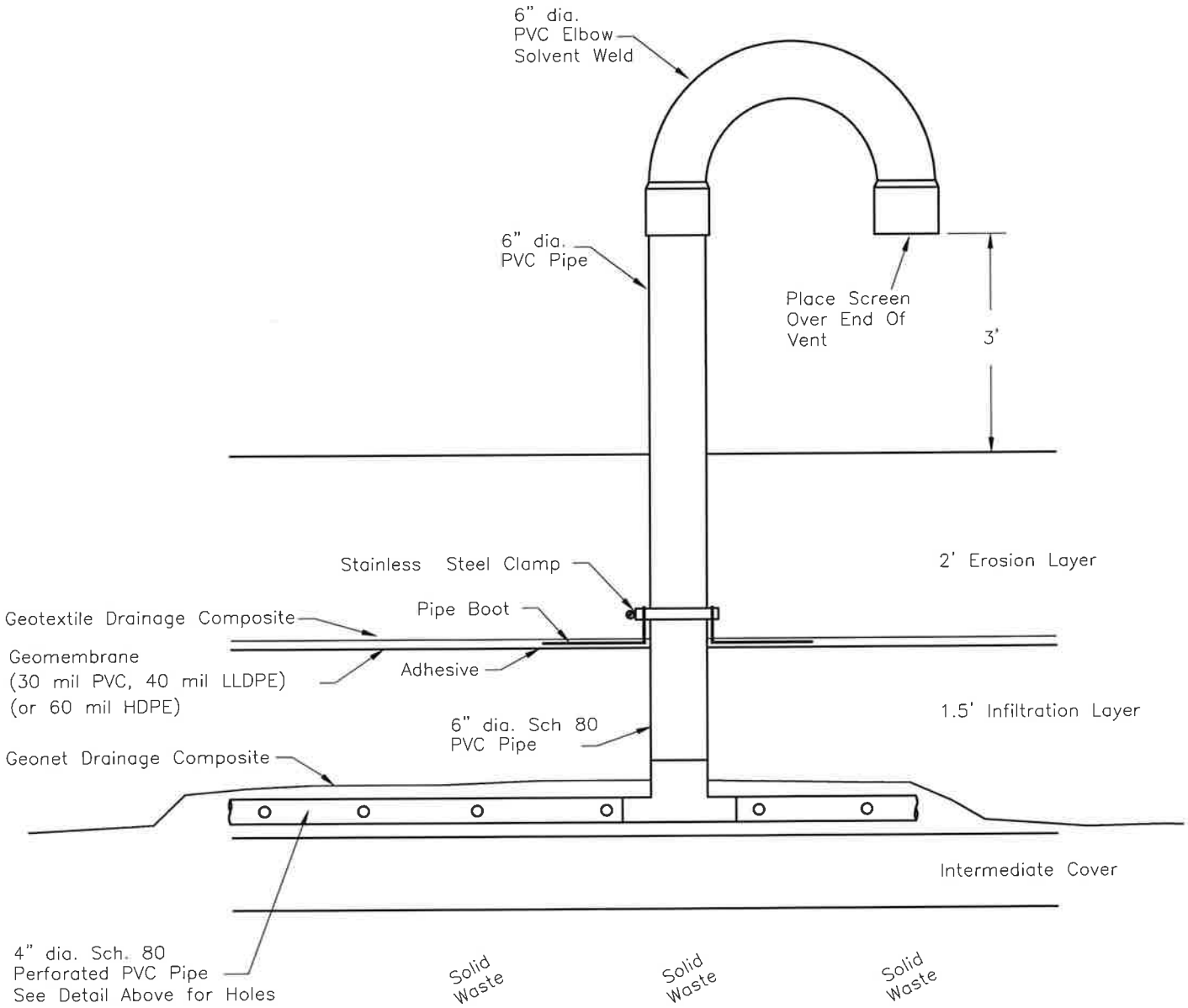
COMPOSITE TO ALTERNATIVE CAP CONSTRUCTION JOINT DETAIL
2023 PERMIT RENEWAL
BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 19

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23





NOT TO SCALE

HLW Engineering Group

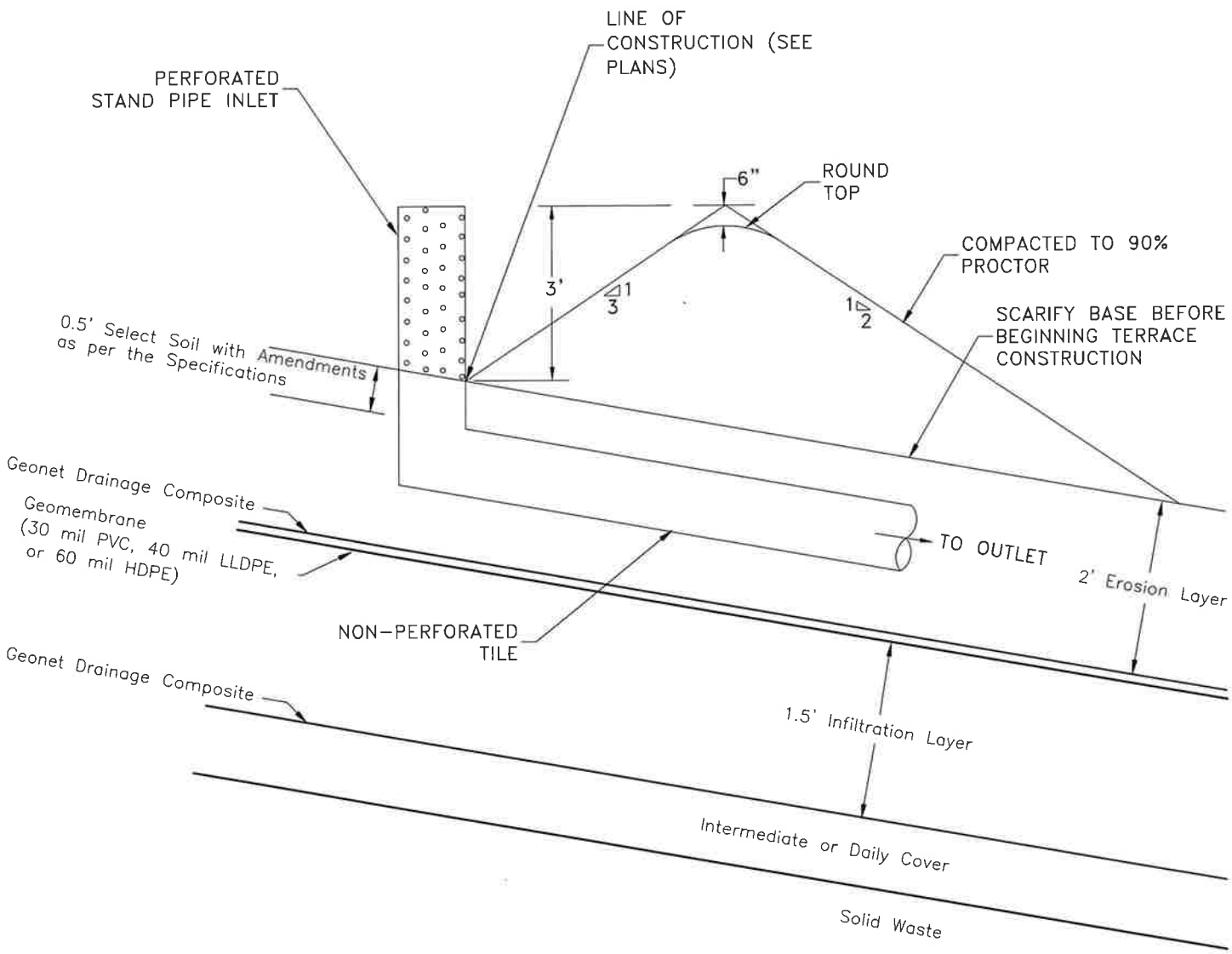
GAS VENT DETAIL

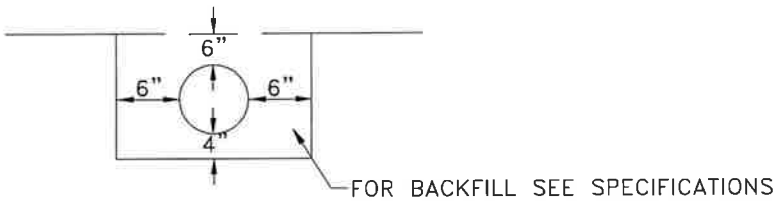
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 20

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23





PIPE BEDDING DETAIL
NO SCALE

HLW Engineering Group

TYPICAL TERRACE CROSS SECTION
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IOWA

FIGURE: 21

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/15/23

APPENDIX 2

POST IN CONSPICUOUS PLACE

NONTRANSFERABLE

STATE OF IOWA

DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

License No. 7929

DES MOINES

SCALE LICENSE

BOONE COUNTY LANDFILL
1268 224TH LANE
BOONE IA 50036

SCALE LOCATION
BOONE COUNTY LANDFILL
1268 224TH LANE
BOONE IA 50036

IS GRANTED THE ABOVE LICENSE PURSUANT TO SECTIONS 214, CODE OF IOWA. THIS LICENSE SHALL REMAIN IN FULL FORCE FROM THE DATE OF ISSUE UNTIL ITS EXPIRATION DATE, UNLESS REVOKED OR SUSPENDED FOR CAUSE BY THE SECRETARY OF AGRICULTURE FOR NONCOMPLIANCE WITH CHAPTER 214, CODE OF IOWA OR RULES ADOPTED PURSUANT THERETO.

DATE OF ISSUE 8/2/2023

EXPIRATION DATE
12/31/2024

This license is non-transferable and non-refundable

Mike Naig

SECRETARY OF AGRICULTURE

TYPE OF DEVICE	--- NUMBER
0 THRU 500 LBS	0
501 THRU 5000 LBS	0
5001 THRU 50000 LBS	0
50001 THRU 120000 LBS	1
OVER 120000 LBS	0
MOISTURE METERS	0
COUNTY	08

APPENDIX 3

Quality Control and Assurance Plan

QC&A Officer: Douglas J. Luzbetak, P.E.
HLW Engineering Group, LLC
204 West Broad Street
PO Box 314
Story City, Iowa 50248
(515)733-4144
FAX: (515)733-4146
Cell: (515)290-0247
dluzbetak@hlwengineering.com

Resident Project Representative (RPR):
To be determined at the time of construction

The quality control and assurance requirements will be as specified below. Specific details for the construction of individual disposal or closure areas will be submitted to IDNR along with the plans and specifications for each project prior to construction. Listed below are general requirements for the Quality Control and Assurance (QC&A) Plan.

Subgrade: The RPR will observe subgrade preparation and look for the presence of trees, stumps, roots, boulders, debris, frozen soil, litter, and other unsuitable materials. Unsuitable materials are as listed above or are defined as any material not having adequate stability to act as a proper foundation for the liner or cap system. Suitability of materials shall be determined by the QC&A Officer. Unsuitable materials on the subgrade will be removed and replaced with suitable material as necessary. If core outs are required, the unsuitable foundation materials shall be cored out to a minimum depth of 2' below surface elevation and be replaced with material capable of providing a suitable foundation.

The subgrade will be proof rolled or scarified to a minimum depth of 8" (liner subgrade) or 6" (cap subgrade) and recompacted prior to installation of the groundwater diversion layer or infiltration layer. The minimum allowable density after recompaction is 95% (liner subgrade) or 90% (cap subgrade) of the determined Standard Proctor Density. If the subgrade is scarified and recompacted, the subgrade will be tested for density control with a nuclear density meter at a *minimum* interval of one test per acre of prepared subgrade. Areas where the tests fail will be recompacted and retested until passing tests are achieved.

Groundwater Diversion Layer: Two different types of groundwater diversion layer will be utilized during future development projects: a 200 mil HDPE geonet with 8 ounces per square yard nonwoven, needle punched geotextile bonded to each side of the geonet (under the leachate collection pipe trenches and on side slopes) or a 4" layer of crushed limestone overlain by a 10

ounce per square yard non-woven, needle punched geotextile (on the landfill base outside of the leachate collection pipe trenches).

Prior to geonet and/or geotextile installation the Contractor shall provide the manufacturer's raw materials and roll certifications to the Owner. The materials delivered to the project shall be checked against the roll certifications to document that the proper material was delivered to the site. Geonet and/or geotextile rolls that do not have proper certifications will not be allowed to be used on the project. Roll certifications will be submitted to IDNR in the final QC&A Report.

The subgrade will be surveyed prior to the start of groundwater diversion layer installation to establish starting grades. The thickness of the rock will be surveyed to document rock layer thickness of a minimum of 4". The surface of the rock shall be graded to a tolerance of 0 to 0.1'.

Geonet cores will be connected to adjacent geonet cores using plastic zip ties or other methods recommended by the Manufacturer. For both types of groundwater diversion layer construction, top layer geotextile seams shall be heat tacked or sewn to limit fabric movement during soil placement.

Compacted Clay Component of the Base Liner: The compacted clay component of the base liner will be constructed from glacial till materials approved by the QC&A Officer. The hydraulic conductivity of potential base liner soils will be evaluated in the laboratory by determining the hydraulic conductivity of sample soils in relation to the Standard Proctor Density and Standard Proctor moisture content. The maximum allowable hydraulic conductivity of a base liner soil is 1×10^{-7} cm/sec.

The material will be placed in lifts no thicker than 8 inches after compaction. The base liner will be tested for moisture and density control with a nuclear density meter at a minimum interval of five tests per 8 inch lift per acre of base liner constructed. The minimum allowable density is 95% of the determined Standard Proctor Density or the minimum allowable density as determined by an acceptable zone determination. Minimum moisture content is the optimum moisture content as determined by the Standard Proctor Method or the minimum allowable moisture content as determined by an acceptable zone determination. The maximum moisture content is 5% above the optimum moisture content as determined by the Standard Proctor Method. Note that reference to the acceptable zone determination above does not establish that this method will be utilized. Areas where the moisture/density tests fail will have moisture adjusted (if necessary), be recompacted, and be retested until passing tests are achieved. The soil may have to be removed and replaced to obtain passing tests.

Laboratory hydraulic conductivity tests using shelby tubes will also be performed. A minimum of five (5) shelby tube samples will be collected from the compacted clay component of the base liner. The minimum of five shelby tube samples was chosen to represent the potential variation

of conditions during sampling as well as to allow a statistical analysis to be performed on the shelby tube test results. The shelby tube sample results will be analyzed at mean plus two standard deviations to document hydraulic conductivities of no more than $1x10^{-7}$ cm/sec. The laboratory and statistical results will be included in the QC&A Report submitted at the conclusion of each liner construction project. Additional shelby tube samples may be taken at the discretion of the QC&A Officer if the statistical analysis does not result in a mean plus two standard deviation value of hydraulic conductivity of less than $1x10^{-7}$ cm/sec or if inconsistencies in the sampling results are noted by the QC&A Officer. The voids created by the shelby tubes in the compacted clay component of the base liner will be backfilled with bentonite material.

The subgrade will be surveyed prior to the start of clay liner installation to establish starting grades for the liner. Progress stakes will be provided for the clay liner as necessary, and the surface of the compacted clay liner will be surveyed prior to the installation of the FML to document liner thickness of a minimum of 2.25'. The grade will be spot checked as needed to determine elevation compliance with the Contractor's GPS equipment. The surface of the clay liner shall be graded to a tolerance of 0 to 0.1'.

All laboratory test results, hydraulic conductivity/compaction/moisture content curves and plots, and field density reports will be submitted to the IDNR in the QC&A Report prior to certification of the area for solid waste deposition.

Note that the testing regimen detailed above will also apply to the infiltration layer in a closure cap.

Flexible Membrane Liner: The flexible membrane liner (FML) will be 60 mil HDPE. Both sides of the FML will be textured on the sideslopes of landfill cells that are steeper than 5%. Smooth FML is allowed on slopes flatter than 5%. The FML shall meet the requirements of Geosynthetic Research Institute (GRI) GM-13 "Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes" and applicable sections of the construction specifications.

Prior to FML installation the Contractor shall provide the manufacturer's raw materials and roll certifications to the Owner. The materials delivered to the project shall be checked against the roll certifications to insure that the proper material was delivered to the site. Geomembrane rolls that do not have proper certifications will not be allowed to be used on the project.

The FML installer shall provide written acceptance of the subgrade surface prior to the commencement of FML installation.

All field seams shall be made by either double fusion (hot wedge) or extrusion welding. The RPR will be on site during welding of the FML. All seams shall be non destructively tested by

the FML installer using air pressure testing for double fusion seams and vacuum box testing for extrusion welded seams.

A minimum of one destructive test will be performed by the FML installer per 500 linear feet of seam. This distance may be decreased during construction at the discretion of the QC&A Officer. The location of destructive tests will be determined by the RPR. Destructive tests will be done on the side slope as much as practical, tests on the base will be conducted as far from leachate collection infrastructure as possible. The destructive tests must meet the requirements listed in GRI GM-19a "Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes/Barriers". A minimum of two destructive test samples will be sent to an Independent Laboratory for testing.

Seams that fail the non-destructive or destructive testing shall be repaired and retested until passing tests are obtained.

Panel information, roll certifications, and test results on the FML will be submitted to IDNR in the final QC&A Report.

Note that the testing regimen detailed above will also apply to the flexible membrane liner in the composite closure cap unless a PVC geomembrane is utilized in the closure cap. If a PVC geomembrane is utilized QC&A requirements for the geomembrane will be submitted in the QC&A Plan for the specific project.

Groundwater Diversion/Leachate Piping: The HDPE piping used for the groundwater diversion and leachate piping will be fusion welded in accordance with manufacturers recommendations. Connections between new and existing piping will be made in the presence of the RPR. Rock backfilling of the pipes will also be done in the presence of the RPR. Note that limestone is not allowed for bedding of the leachate piping within the solid waste boundary. Leachate conveyance piping outside of the solid waste boundary must have containment measures as per IAC 567-113.7(5)b(10). Dual wall pipe, backfill consisting of a 50:50 mixture of bentonite and sand, AquaBlok as manufactured by AquaBlok, Ltd., or an equivalent material will be used to satisfy containment requirements. Tees, fittings, and other appurtenances shall conform to the manufacturers recommendations.

Manholes: Manholes will be backfilled with either a 50:50 mixture of bentonite and sand, AquaBlok, or an equivalent material to provide secondary containment around the structures as per IAC 567-113.7(5)b(10).

The manholes will be installed and backfilled in the presence of the RPR.

Drainage Layer: The drainage layer will be composed of a minimum of 12 inches of a high hydraulic conductivity material with a hydraulic conductivity of at least 1 x 10^{-2} cm/sec. If sand is used as the primary drainage layer, it will meet the hydraulic conductivity requirement above and have no more than 5% of the material passing a #200 sieve. Drainage layer material will have hydraulic conductivity verified in the laboratory before use is allowed. A copy of the laboratory hydraulic conductivity and gradation tests will be submitted to IDNR in the final QC&A Report.

Drainage layer material will be installed in the presence of the RPR. Drainage layer thickness will be physically measured by the RPR incrementally as the sand is installed to document drainage layer material thickness. Measurement shall be at least once for every 100 foot by 100 foot area of drainage layer installed, and will also be checked at the toe of slopes and other significant grade changes. The surface of the drainage layer shall be graded to a tolerance of 0 to +0.1'.

Soil or geosynthetic cover over the drainage layer may be provided as necessary to protect the drainage layer from erosion and to reduce leachate generation from the exposed drainage layer. Potential drainage layer covering(s) are discussed below.

Reinforced Landfill Cover over Drainage Layer: A reinforced landfill cover (RLC) placed on the 12" (minimum) thickness of drainage layer sand upon completion. The RLC will be scrim reinforced polyethylene and will be ballasted, anchored, and seamed in accordance with Manufacturer's recommendations.

The RLC will be installed in the presence of the RPR.

As operations require, landfill staff will remove portions of the RLC from the drainage layer sand prior to placing choice MSW waste. Typically, the RLC will be removed on an as needed basis from an area approximately equal to the typical daily waste cell size. When the RLC is removed, landfill staff will visually review the sand surface to look for the presence of soil or other debris on the sand prior to waste deposition. Photos will be used for documentation purposes as necessary. If there is visible debris on the drainage layer sand surface, the debris will be removed and the depth of sand reconfirmed. Waste will not be placed on the drainage layer until the surface of the sand is visually reviewed by staff.

Protective Soil Cover over Drainage Layer: A minimum of 2' of protective soil cover placed on 15" (minimum) thickness of drainage layer sand upon completion. Compaction of the protective soil cover will not be necessary. The additional thickness of drainage layer sand will be used to allow for some of the material to be disturbed/removed during protective soil cover removal.

Protective soil cover over the drainage layer will be installed in the presence of the RPR.

As operations require, landfill staff will remove portions of the protective soil cover from the drainage layer sand prior to placing choice MSW waste. Typically, protective soil cover will be removed on an as needed basis from an area approximately equal to the typical daily waste cell size. When the protective soil cover is removed, landfill staff will visually review the sand surface to look for the presence of soil or other debris on the sand prior to waste deposition. Photos will be used for documentation purposes as necessary. If there is visible soil or other debris on the drainage layer sand surface, the soil or debris will be removed and the depth of sand reconfirmed. Waste will not be placed on the drainage layer until the surface of the sand is visually reviewed by staff.

Quality Control and Assurance Report: A final QC&A Report will be submitted to IDNR upon the completion of construction. A copy of the final report will also be maintained at the landfill. At a minimum, the final report shall include the following:

- Title page and table of contents
- Name and permit number of the Boone County SLF
- Contact information for the QC&A Officer
- Contact information for all contractors associated with the construction of the project
- Applicable soil, FML, and drainage layer test results
- Copies of the Resident Project Representative's reports
- Representative photos from various stages of the construction process
- A signed/sealed statement by the QC&A Officer that the unit was constructed in general accordance with rule 113.7 (455B) and the approved plans and specifications

Record Drawings showing variations from the plans will also be submitted to the IDNR. Note that the Record Drawings may be submitted separately from the QC&A report to expedite the submission of the QC&A report.

APPENDIX 4

PIPE STRENGTH CALCULATIONS

Note: All equations and references are from Chapter 6 of the the Plastics Pipe Institute® Handbook of Polyethylene Pipe unless otherwise stated.

Analyze three aspects of potential failure of the pipe. The three aspects are:

1. Compressive Ring Thrust Stress
2. Ring Deflection
3. Constrained Pipe Wall Buckling

Due to the depth of waste over the pipe, use the methodology listed in the Section titled "Installation Category #3: Deep Fill Installation" in Chapter 6.

Compressive Ring Thrust Stress

Calculate the compressive stress on the pipe to determine if the pipe can withstand the applied vertical load due to the waste and cover at final closure elevations.

$S = (P_E+P_L)DR/288$ Eqn. 3-13

S - Pipe wall compressive stress, psi

P_E - Vertical soil pressure due to earth load, psf

P_L - Vertical soil pressure due to live load, psf

DR - Dimension ratio of pipe

However, for deep fills (fills > 50 feet), the vertical load can be reduced by a "Vertical Arching Factor", VAF.

$P_{RD} = (P_E)(VAF)$ Eqn. 3-23

P_{RD} - Radial directed earth pressure, psf

VAF - Vertical Arching Factor

$VAF = 0.88-0.71((S_A-1)/(S_A+2.5))$ Eqn. 3-21

S_A - Hoop Thrust Stiffness Ratio

$S_A = (1.43)(M_S)(r_{CENT})/EA$ Eqn. 3-22

M_S - one-dimensional modulus of soil, psi

r_{CENT} - radius to centroidal axis of pipe, in

E - Apparent modulus of elasticity of pipe material, psi

A - Profile wall average cross section (in^2/in) or pipe wall thickness (in)

Leachate pipe will be 8" diameter, SDR 11 HDPE pipe placed in river rock backfill. HDPE pipe has the following typical characteristics:

DR =	11		
r_{CENT} =	3.92	in	
E =	28,000	psi	Table B.1.1 (Chapter 3)
A =	0.39	in	

Ultimate waste heights in the existing and future design areas will be less than 160 feet based on current site layout. This analysis assumes a design cap height of 160 feet over the liner. Assume loading on pipe due to landfill at final grade is:

Layer	Thickness (ft)	Unit Weight (pcf)	Load (psf)
Final Cap	4	120	480
MSW + Cover *	155	64	9,920
Drainage Layer Material	1	120	120
Rock Pipe Bedding	1	125	125
Total Thickness =	161	Total Load =	10,645

* Assume "MSW + Cover" consists of 1/5 cover at 120 pcf and 4/5 MSW at 50 pcf

M_S =	3,080		Table 3-12
P_E =	10,645	psf	
P_L =	0	Assume no live load due to depth of fill over pipe	
S_A =	1.58		
VAF =	0.78		
P_{RD} =	8,291	psf	

S = 317 psf

which is less than the allowable long term compressive stress for PE pipe (1,000 psi - Table C.1, Chapter 3) typically used in landfill applications.

Ring Deflection

Calculate the deflection of the pipe to determine if pipe deflection due to the vertical load is within acceptable limits.

$\%\ \text{deflection} = D_F E_S \times 100$ Eqn. 3-28

D_F - Deformation Factor

E_S - Soil Strain

D_F is determined using Figure 3-6 using the pipe rigidity factor, R_F

$R_F = 12E_S(DR-1)^3/E$ Eqn. 3-24

E_S - Secant modulus of the soil, psi

DR - Dimension Ratio of Pipe

E - Apparent modulus of pipe material, psi

$E_S = M_S((1+\blacklozenge)(1-2\blacklozenge)/(1-\blacklozenge))$ Eqn. 3-26

M_S - One-dimensional modulus of soil, psi

$\blacklozenge$ - Poisson's Ratio

E_S = Vertical Soil Pressure/$144E_S$ Eqn. 3-27

Vertical Soil Pressure = Load on pipe due to earth loading. Do not adjust for Vertical Arching (do not use Vertical Arching Factor to reduce load).

M_S =	3,080 psi	Table 3-12
$\blacklozenge$ =	0.2	Table 3-13
E_S =	2,772 psi	
R_F =	1,188	
D_F =	1.5	Figure 3-6
E_S =	0.03	

Defl = 4.0 %

which is less than the 7.5% deflection limit for HDPE pipe used in non-pressure applications as per Page 218 of the Handbook of Polyethylene Pipe.

Constrained Pipe Wall Buckling

Calculate the constrained wall buckling pressure to determine if the pipe has satisfactory resistance to constrained pipe buckling.

P_{WC} = (5.65/N)*((R*B'*E'*E)/(12(DR-1)^3))^1/2 Eqn. 3-15

P_{WC} - Allowable constrained buckling pressure, psi
N - Factor of Safety
R - Buoyancy reduction factor
B' - Constant
E' - Soil reaction modulus, psi
E - Apparent modulus of elasticity of pipe material, psi

$R = 1 - 0.33*(H_{GW}/H)$ Eqn. 3-17

H_{GW} - Height of groundwater above pipe, ft
H - Depth of cover, ft

H_{GW} =	2.33	ft	(assumes 2' head on liner)
H =	161	ft	
R =	1.0		

$B' = 1/(1+4*e^{(-0.065H)})$ Eqn. 3-18

B' =	1.0		
N =	2		
E' =	3,000	psi	Table 3-7

P_{WC} =	235.4	psi
	33,892	psf

Since the calculated constrained buckling pressure exceeds the earth load calculation the pipe has satisfactory resistance to constrained pipe buckling.

SECTION E

Development and Operations Plan
Emergency Response and Remedial Action Plan
MSWLF Operator Certification Numbers

DEVELOPMENT AND OPERATIONS PLAN
EMERGENCY RESPONSE AND REMEDIAL ACTION PLAN
MSWLF OPERATOR CERTIFICATIONS

113.8(4) Development and Operations Plan

The Development and Operations Plans (DOP) has been revised and is included in Appendix 1 of this Section.

113.8(5) Emergency Response and Remedial Action Plan

The Emergency Response and Remedial Action Plan (ERRAP) for the Boone County Sanitary Landfill is a component of the Boone County Health and Safety Plan. A letter from the Landfill Administrator discussing the ERRAP and Boone County Health and Safety Plan is included in Appendix 2 of this Section.

113.8(6) MSWLF Operator Certifications

MSWLF Operator Certification numbers for Boone County Sanitary Landfill employees are included in Appendix 3 of this Section.

APPENDIX 1

DEVELOPMENT AND OPERATIONS PLAN

The following is intended to comply with the requirements of subrule 567 IAC 113.8(4):

113.8(4) DEVELOPMENT AND OPERATIONS PLAN (DOPs)

Owner of the Facility

Boone County Board of Supervisors
Boone County Courthouse
201 State Street
Boone, IA 50036
515-433-0500

Official Responsible for Operation of Facility/Emergency Contact

John Roosa, Landfill Administrator
Boone County Sanitary Landfill
1268 224th Lane
Boone, IA 50036
515-433-0591
jroosa@boonecounty.iowa.gov

Service Area of the Facility

Boone County is a member of the Central Iowa Solid Waste Management Association (CISWMA) planning area. The service area of the CISWMA is: All cities and the unincorporated area in Boone County; all cities and the unincorporated area in Greene County excluding the city of Jefferson; all cities and the unincorporated area in Story County excluding the cities of Collins and Colo; the Cities of Bouton, Granger, and Woodward and Woodward State Hospital in Dallas County; and the Cities of Farnhamville, Lohrville, and Somers in Calhoun County.

Days and Hours of Operation

Monday through Friday, 8 AM – 3 PM
Saturday, 8 AM – 11 AM

Holidays Closed:
New Years Day
Memorial Day
July 4th
Labor Day
Veterans Day

Thanksgiving Day
Christmas Day

567-113.8(1) – Prohibited Operations and Activities

113.8(1)a. Waste screening for prohibited materials

1. The landfill staff inquires about non-accepted and prohibited items (e.g. tires, appliances, waste oil, etc.) at the scale. Operators at the working face visually screen every load of waste during the spreading and compaction process, removing all prohibited items and reporting back to the Scale Attendant.

2. A more thorough waste screening of a random load (random load check) is conducted at least once a week. Records of random load checks are maintained in the scale house.

3. Landfill staff receive training for waste screening as applicable.

4. Any prohibited waste observed by staff will be removed and handled as required by the operations plan and any State and Federal regulations. The appropriate State and Federal authorities will be notified if regulated hazardous waste or PCB waste is discovered at the facility.

5. Staff will maintain records of any rejected or problem waste discovered. Staff will also maintain records of any rejected loads and any actions that result in response to the presence of hazardous materials and/or PCB wastes in any load.

113.8(1)b. Materials prohibited from disposal

All materials listed in subrule 113.8(1) "b" are prohibited from disposal either by State or Federal regulation at the Boone County SLF. The Boone County SLF accepts the following materials for recycling:

- Household Hazardous Materials
- Tires
- Lead acid batteries
- White goods
- Scrap metal
- Pallets (not currently being recycled)
- Rigid Recyclables
- Fiber Recyclables
- Glass
- Electronics

The Boone County SLF Special Waste Acceptance Criteria (SWAC) contains guidance for the acceptance and disposal of special wastes. The Boone County SLF accepts petroleum-contaminated soil for landfilling at the active work area as per the variance approved November 15, 2017 (SDP Permit Amendment #5). The Boone County SLF also accepts asbestos from within the planning area. Other non-hazardous items that may require special handling are accepted on a case-by-case basis.

113.8(1)c. Open burning and fire hazards

Open burning is prohibited within the permitted boundary of the Boone County SLF. The fueling of all equipment and vehicles, and any other activities that may produce sparks, will be conducted at least 50 feet away from the working face.

113.8(1)d. Scavenging and salvaging

Scavenging is prohibited at the Boone County SLF.

113.8(1)e. Animal feeding and grazing

No domestic animal feeding or grazing is allowed at the Boone County SLF.

567-113.8(2) – Disposal Operations and Activities

113.8(2)a. Survey controls and monuments

1. The property boundary and the permitted boundary of the Boone County SLF has been surveyed and marked by a professional land surveyor.

2. The boundaries of all new MSWLF units will be surveyed and marked by a professional engineer prior to the placement of waste.

3. Survey monuments have been established to check vertical elevations and the progression of fill sequencing. Permanent monuments will be established by a professional land surveyor as needed.

4. All survey stakes and monuments are clearly marked.

5. A professional engineer will inspect the permanent survey monuments biennially. Any missing or damaged monuments will be repaired or replaced.

113.8(2)b. First lift

1. Waste will not be placed in a new disposal unit until the Quality Control and Assurance (QC&A) officer has submitted a signed and sealed final report to the IDNR pursuant to subrule 113.7(6) "d" and IDNR has approved the disposal unit for use.

2. Construction and earth-moving equipment will not operate directly on the liner and leachate management system. Waste disposal operations will begin at the edge of the new disposal unit by pushing waste out over the liner and leachate collection system. Compactors and other similar heavy equipment will not operate directly on the leachate collection system until a minimum of 4 feet of waste has been mounded over the top of the leachate collection system.

3. Construction and demolition debris and materials clearly capable of spearing through the leachate collection system and liner will not be placed in the first 4 feet of waste over the top of the leachate collection system. The first 4 feet of waste shall consist of select waste that is unlikely to damage the liner and performance of the leachate collection system. The first 4 feet of waste shall also be lightly compacted to promote leachate migration to the drainage layer.

4. Documentation will be placed in the operating record and submitted to the IDNR that adequate cover material was placed over the top of the leachate collection system in any new disposal unit and/or that freeze/thaw effects had no adverse impact on the compacted clay component of the liner for all new waste disposal units. Note that the liner cover material is not required for side slopes "greater than 10 feet above the base liner". This is in accordance with the IDNR correspondence to all landfills dated September 26, 2012.

113.8(2)c. Fill sequencing

1. The fill sequencing will be planned and conducted in a manner and at a rate that does not cause a slope failure, lead to extreme differential settlement, or damage the liner and leachate collection system.

2. The fill sequencing will be planned and conducted in a manner compliant with the run-on and runoff requirements of subrule 113.7(8) and surface water requirements of subrule 113.10. Earthen berms and terraces will be strategically placed about the workface to control run-on and runoff, and to help contain leachate and direct it into the leachate collection system.

113.8(2)d. Working face

1. The working face will be no larger than necessary to accommodate the rate of disposal in a safe and efficient manner. The size of the working face will be determined on a daily basis by landfill operators depending on weather conditions, wind speed and direction, anticipated waste volume, anticipated large loads, anticipated special waste, the available daily cover, surface water drainage, and other applicable factors.

2. The working face will not be so steep as to cause heavy equipment and solid waste collection vehicles to roll over or otherwise lose control.

3. Litter will be controlled primarily through the operational activities at the working face. The working face is sized using the factors discussed in Item (1) above to minimize blowing litter as much as practical. Temporary and boundary fences are also used to control litter. Litter will be collected as discussed in Section 113.8(3)"f" below.

4. Proper operating activities at the working face will prevent the harborage of vectors and minimize the attractions of vectors. This is mainly accomplished by the proper use of cover materials including approved alternative daily cover (ADC).

5. Employees at the working face have been trained to visually recognize universal symbols, markings, and indications of prohibited wastes pursuant to subrule 113.8(1)"b". Such training was discussed in Section 113.8(1)"a"(3) above.

113.8(2)e. Special wastes

The Boone County SLF has a Special Waste Acceptance Criteria (SWAC). Special wastes are not accepted unless authorized by a special waste authorization (SWA) issued by the IDNR or as provided for in 567 IAC-109 and the landfill's permit. SWA's are not required for general special wastes consisting of asbestos-containing material; petroleum-contaminated soil; and stabilized grit, bar screenings, and grease skimmings. The acceptance of these special wastes at the landfill is not required. The disposal of special wastes and general special wastes will be in accordance with the instructions, conditions, and limitations contained in the SWA and/or the SWAC.

113.8(2)f. Cover material and alternative cover material

1. Daily Cover. Daily cover material will be applied to the waste at the working face at the end of each operating day, or more frequently if necessary to control vectors, fires, odors, blowing litter, and scavenging. At least six inches of soil cover material or an approved alternative daily cover material will be used. Soil cover material is

available from on site soil stockpiles.

At this time the Boone County has been approved to use the following as Alternative Daily Cover (ADC): Posi-shell spray on cover, ground tree and brush debris from the August 10, 2020 derecho mixed with soil, and Class I or Class II biosolids from the Boone Wastewater Treatment plant.

2. Intermediate Cover. The landfill operator will apply at least one foot of intermediate cover of compacted earth to any area of the site that will not be utilized for further disposal of solid waste for more than 30 days. The landfill operator will apply at least two-feet of compacted earth to any area of the site that will not be utilized for further disposal of solid waste for more than 180 days. The cover will be graded to allow surface water runoff. The intermediate cover will be seeded if the area will not receive waste for a full growing season.

3. Scarification of Cover. Any cover that might prevent the downward migration of leachate and is at least 5 feet from the disposal unit boundary will be scarified prior to the use of that area as a working face. The removal of the cover material prior to the use of an area as a working face is encouraged to promote the vertical migration of leachate to the leachate collection system.

4. Final Cover. Final cover over a waste disposal area that is to be closed shall be constructed and maintained according to the closure and postclosure requirements of 567 IAC 113.12 and 113.13 and in accordance with the approved Closure/Postclosure Plan unless amended and authorized by the IDNR.

113.8(2)g. Leachate seeps

Upon being identified, leachate seeps will be contained and repaired when weather and surface conditions allow. Any soils outside of the waste boundary that are contaminated by a leachate seep will be excavated and disposed of within the landfill waste boundary. Soils contaminated with leachate may be used for daily cover material.

113.8(2)h. Leachate recirculation

Leachate recirculation at the site was approved in the November 22, 2019 Permit Revision. The approval was rescinded in the October 9, 2020 Permit Revision. It is anticipated that a request to resume leachate recirculation in Subtitle D composite lined disposal areas will be submitted during the next permit cycle.

113.8(2)i. Differential settlement

Those areas of differential settlement sufficient to interfere with runoff and run-on will be brought back up to the appropriate elevation of the surrounding cover and drainage restored

as soon as practical. Areas where differential settlement occurs will be monitored after restoration.

567-113.8(3) Facility Operations and Activities

113.8(3)a. Controlled access

The entrance gate is locked during non-operating periods and restricts access to the site. Site perimeter fencing restricts access to waste disposal areas and aids in litter control. In addition, natural buffers and site topography also restrict access to the site.

113.8(3)b. Scales and weights

All solid waste collection and transport vehicles are weighed on a scale upon entering the site. The current scale license from the Iowa Department of Agriculture and Land Stewardship is included in Appendix 2 of Section D of this Permit Renewal Documentation.

Information on the waste received and disposed of at the Boone County SLF is retained on site and is reported to the IDNR quarterly as part of the Quarterly Solid Waste Fee Schedule and Retained Fees Report, Form 542-3276.

113.8(3)c. All-weather access to disposal

All major internal roads are paved or have granular surfacing and are maintained in good condition for all weather access. The landfill maintains an all-weather fill area that is accessible during all weather conditions when solid waste is being accepted.

113.8(3)d. Salvaged and processed materials

The materials accepted by the Boone County SLF for recycling are listed under Section 113.8(1)b above. All salvaged (recyclable) materials are stored and regularly removed in accordance with the special provisions of the landfill permit and any specific rules. The materials are stored in a manner that does not create a nuisance or encourage the attraction or harborage of vectors.

113.8(3)e. Vector control

The landfill operators maintain adequate cover over the workface and closed areas, which has proven to be effective in controlling flies, birds, rodents, and other vermin. Odors are also kept to a minimum by maintaining adequate cover.

113.8(3)f. Litter control

Litter will be confined to the property boundary through the use of fences and unloading and

cover operating practices. Portable litter fences near the working face serve to control blowing litter and to keep litter from entering neighboring properties as much as practical. A 25' tall net litter fence has also been placed on portions of the perimeter of the active area to further limit litter movement. Landfill staff collect litter on an as-needed basis. The litter log is maintained on site to document litter collection efforts and weather related data.

113.8(3)g. Dust

All major internal roads are paved or have granular surfacing and are maintained in good condition for all weather access. Commercially available dust control products will be used to control dust as needed.

113.8(3)h. Mud

All major internal roads are paved or have granular surfacing and are maintained in good condition for all weather access. Trucks leaving the working face travel on paved and granular surfaced access roads for a minimum of 1/2 mile prior to leaving the site. The maintenance of site roads along with the travel distance between the working face and the site entrance combine to limit the deposition of mud off the landfill site. If mud is ever noted on the pavement at the landfill entrance, the Boone County SLF staff will use its equipment and personnel to remove the mud from the roadway as soon as practical.

113.8(3)i. Leachate and wastewater treatment

The leachate management system is managed and maintained pursuant to the requirements of subrule 113.7(5)"b". The leachate collection system piping is cleaned at least once every three years. Leachate is stored on site in a leachate storage lagoon with a capacity of approximately 915,870 gallons and three underground leachate storage tanks. Two of the tanks have a capacity of approximately 10,000 gallons each, the other tank has a capacity of approximately 15,000 gallons. Accumulated leachate is hauled to the City of Boone Wastewater Pollution Control Facility (WPCF) or the Des Moines Metropolitan Waste Reclamation Authority (WRA) for treatment and disposal. The Industrial User Permit with the City of Boone WPCF and the Hauled Waste Discharge Permit with the WRA are included in Appendix G.1 of the 2022 Annual Water Quality Report (Doc #105631).

113.8(3)j. Financial assurance

The Boone County SLF currently utilizes a Dedicated Fund to meet Financial Assurance requirements. Updated closure/postclosure cost estimates, along with the "Municipal Waste Sanitary Landfill Financial Assurance Annual Report" form and the audit report, are submitted to IDNR prior to April 1 of each year if possible. The Financial Assurance approval for 2023 is included in Section H.

APPENDIX 2

BOONE COUNTY
Landfill & Recycling

1268 224th Lane
Boone, Iowa 50036
515-433-0591
info@boonelandfill.org
www.boonecounty.iowa.gov

November 9, 2023

Iowa Department of Natural Resources
Wallace Building
502 East Ninth Street
Des Moines, Iowa 50319

Re: 08-SDP-01-75P – ERRAP Updates for Boone County Landfill

This correspondence serves as the description of changes made to the Emergency Response and Remedial Action Plan for the Boone County Landfill, updated since the previous permit renewal request submitted in 2018. The ERRAP for the Boone County Landfill is a component of the Boone County Health and Safety Plan, on which the Landfill Administrator serves.

No significant changes have been made to date, with only minor changes involving updated contact names and phone numbers.

Landfill staff receives annual trainings, at minimum, for all aspects of safety programs and components pertaining to our ERRAP. Additionally, all full-time staff have received the initial 25-hour Hazardous Waste Operations and Emergency Response training, plus the 10-hour annual refresher course.

Boone County also provides additional safety trainings as appropriate, including active shooter situations.

Please contact me if you have questions or need further information.

Sincerely,

John Roosa

John Roosa
Administrator, Boone County Landfill

APPENDIX 3

Certified Landfill Operators for Boone County Sanitary Landfill

Todd Fisher - #30720

William Reed - #30883

Carrie Self - #30977

Corey McGrauth - #31019

John Roosa - #31086

Joe Smith - #31207

Guy Hay - #31238

SECTION F

Environmental Monitoring Plan

ENVIRONMENTAL MONITORING PLAN

113.9 ENVIRONMENTAL MONITORING AND CORRECTIVE ACTION REQUIREMENTS FOR AIR QUALITY AND LANDFILL GAS

113.9(1) Air Criteria

The Boone County SLF has three separate Air Quality Construction Permits:

- Permit Number 11-A-092, February 9, 2011, for operation of the municipal solid waste landfill.
- Permit Number 12-A-167, May 31, 2012, for operation of the portable grinder to process wood waste
- Permit Number 12-A-168, May 31, 2012, for operation of the portable grinder to process wood waste

113.9(2) Landfill Gas

Gas monitoring shall be as per the approved GMSP submitted November 13, 2018 (Doc # 93741) and summarized below:

2018 Monitoring Points
GP-1
GP-2 (lower SRAMP Manhole)
GP-3 (upper SRAMP manhole)
GP-4
GP-5
GP-6
GP-7
GP-8
GWD-1 (manhole)
GU-3
Scale Pit
Office/Scale House
Shop attached to the Office
Detached Shop near Office
Maintenance Building (Montana Road)
Recycle Building

The only monitoring point that needs to be added in 2023 is the lagoon underdrain discharge point **GU-4.** A map is included in Appendix 1 of this Section illustrating the locations.

113.10 ENVIRONMENTAL MONITORING AND CORRECTIVE ACTION REQUIREMENTS FOR GROUNDWATER AND SURFACE WATER

113.10(1) General Requirements for Environmental Monitoring and Corrective Action for Groundwater and Surface Water

Surface water monitoring is not included in the Monitoring Program at this site.

113.10(2) Groundwater Monitoring Systems

Groundwater monitoring shall be as per the Revised Permit, dated November 20, 2023 (Doc #108260) and by methods described in the 2018 Permit Renewal Documents, Section F – Environmental Monitoring Plan (Doc #93741). The Monitoring Points are described below and illustrated on the map included in Appendix 1 of this Section.

Monitoring Point
MW91-8 - background
MW02-15A - background
MW98-28 - background
MW02-30A - background
MW88-2 - background
MW94-18
MW09-40
MW91-10
MW96-21
MW96-24
MW88-3
MW96-23
MW21-43
GWD-1
UD-3 (GU-3)
SRAMP-1
SRAMP-2
MW98-25
MW06-37
MW06-38
MW06-39

Monitoring points **PEC-3** (the passive engineered conveyance structure below UD-3) and the lagoon underdrain **UD-4 (GU-4)** are recently completed and should be included as monitoring points in the groundwater monitoring system.

113.10(3) Surface Water Monitoring Systems

Surface water monitoring is not included in the Monitoring Program at this site.

113.10(4) Groundwater Sampling and Analysis Requirements

HMSP Monitoring Points include (see figure in Appendix 1 of this Section):

Background Wells – MW91-8, MW02-15A, MW88-2, MW02-30A, and MW98-28.

Downgradient Points – MW94-18, MW09-40, MW91-10, MW96-21, MW96-24, MW88-3, MW96-23, MW21-43, and groundwater underdrains GWD-1, and UD-4(GU-4).

Corrective Action Points – SRAMP #1, SRAMP #2, MW96-25, MW06-37, MW06-38, and MW06-39, UD-3(GU-3), and PECS-3.

113.10(5) Detection Monitoring Program

Monitoring points that remain in detection monitoring include; MW91-8, MW02-15A, MW88-2, MW02-30A, MW98-28, MW88-3, MW91-10, MW94-18, MW96-23, MW96-24, MW09-40, MW21-43, GWD-1, and UD-4(GU-4).

113.10(6) Assessment Monitoring Program

The single monitoring point that is in assessment monitoring is MW96-21.

113.10(7) Assessment of Corrective Measures

Assessment of Corrective Measures is not warranted at this site. A corrective measure, known as the North Side Corrective Action System, was constructed at this facility in 2008, prior to current rule. Corrective Action Monitoring Points for the 2008 system are designated SRAMP #1, SRAMP #2, MW96-25, MW06-37, MW06-38, and MW06-39. UD-3(GU-3), and PECS-3 are also included in the Corrective Action Monitoring Plan.

113.10(8) Selection of Remedy

Not applicable at this time.

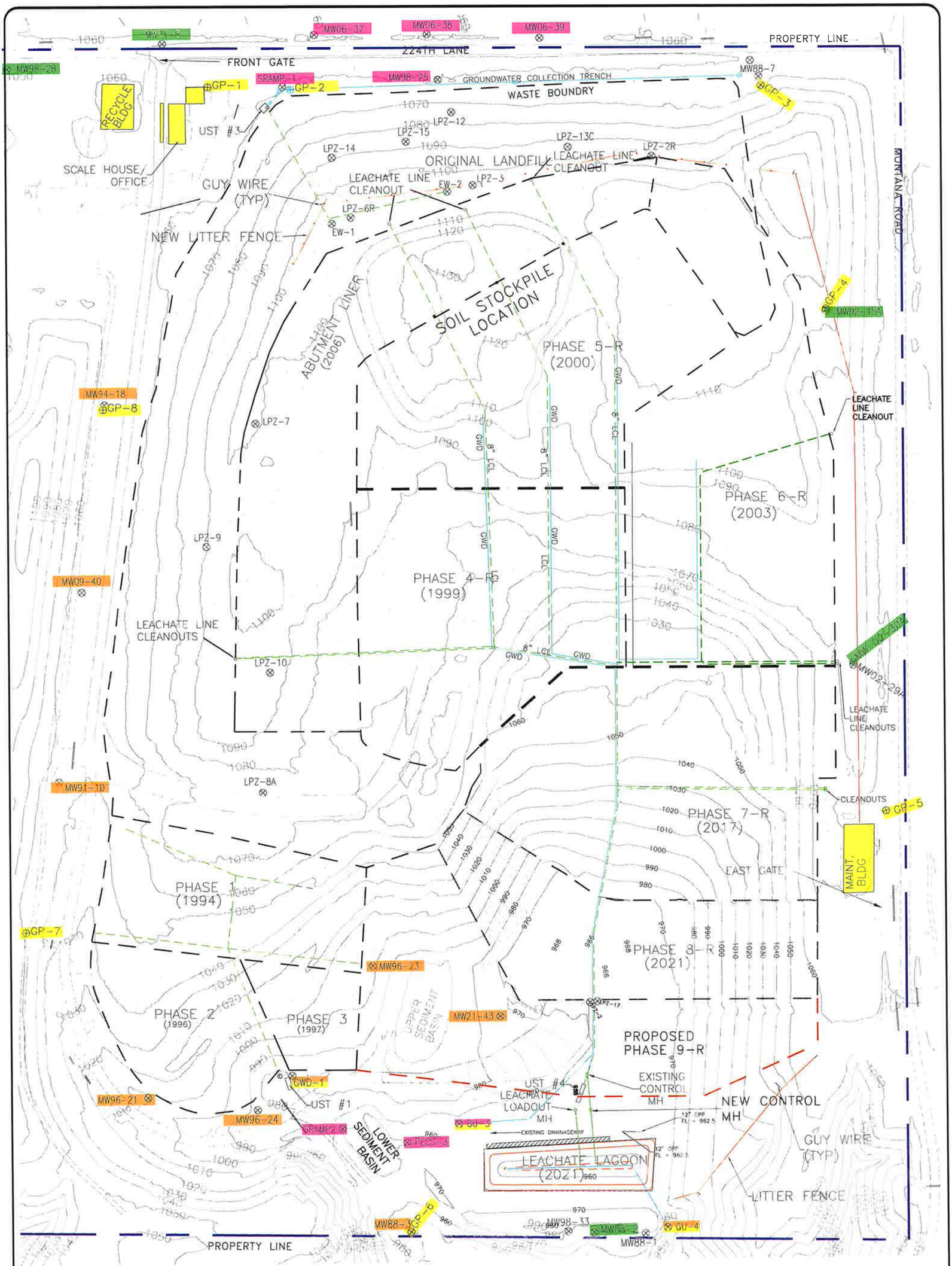
113.10(9) Implementation of the Corrective Action Plan

Not applicable at this time, with the exception of on-going monitoring of SRAMP #1, SRAMP #2, MW96-25, MW06-37, MW06-38, MW06-39, UD-3(GU-3), and PECS-3.

113.10(10) Annual Water Quality Reports

Annual Water Quality Reports (AWQR) will be submitted prior to January 31 of each year. A Semi-Annual Water Quality Notification Letter will be submitted following receipt of the Spring Statistical Report.

APPENDIX 1



HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

ENVIRONMENTAL MONITORING PLAN
2023 PERMIT RENEWAL

BOONE COUNTY SANITARY LANDFILL
BOONE, IA

FIGURE: 1

REVISION	NO.	DATE
DRAWN JGH	PROJECT NO. 6007-22A	DATE 11/29/23

SECTION G

Project Goals and Timelines for RD&D Permits

RESEARCH, DEVELOPMENT AND DEMONSTRATION PERMITS

The Boone County Sanitary Landfill currently has no EPA RD&D Permits.

SECTION H

Proof of Financial Assurance

October 24, 2023

JOHN ROOSA
LANDFILL ADMINISTRATOR
BOONE COUNTY SANITARY LANDFILL
1268 224th LANE
BOONE IA 50036

Re: Boone County Sanitary Landfill
Permit #08-SDP-01-75P
Approval of Financial Assurance Documents for Calendar Year 2023

Dear Mr. Roosa:

This is notification by the Department of Natural Resources (DNR) that the Boone County Board of Supervisors (the Board) has, for calendar year 2023, adequately complied with the financial assurance requirements of Iowa Administrative Code [567] section 113.14 for the Boone County Sanitary Landfill. The DNR has placed in its record files the Board's financial assurance documentation received here October 12, 2023, and as augmented by selected pages of the Board's annual audit found at the State Auditor's website.

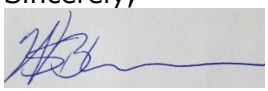
It's expected that the Projected Deposit of $183,795 to the Board's Closure/Postclosure Dedicated Fund has been timely made. That projected deposit is as shown in the calculations in Section 7 of the Board's Financial Assurance Report Form.

The Board may withdraw money from the Closure/Postclosure Fund without DNR approval for just closure, partial closure, or postclosure costs. Withdrawals for other than closure or postclosure costs must receive prior written approval from the department. If, however, the balance of the Closure/Postclosure Fund exceeds the current combined Cost Estimates for Closure/Postclosure, excess funds may be withdrawn for any Board purpose. In that event, however, the Closure/Postclosure Fund Balance cannot be reduced below the amount of the current combined Closure/Postclosure Cost Estimates.

As a reminder, compliance with IAC 567-113.14 is to be submitted annually, by April 1st, confirming that all applicable financial assurance documents are updated as required.

Please contact me with any questions at (515) 240-6048 or bill.blum@dnr.iowa.gov.

Sincerely,



Bill Blum, program planner
Land Quality Bureau

Cc: Iowa DNR Field Office #5, Des Moines, IA

SECTION I

Closure and Postclosure Plan

CLOSURE AND POSTCLOSURE PLAN

A Closure and Postclosure Plan was included in the 2010 Permit Renewal Documentation (Doc #62221). The Closure and Postclosure Plan was approved in 2009 Permit Revision #1 dated December 13, 2011 (Doc #67848). The approved Closure and Postclosure Plan is still applicable except as noted below:

113.13(3) Written Postclosure Plan

b) The following will be the contact during the postclosure period:

John Roosa, Landfill Administrator
Boone County SLF
1268 224th Lane
Boone, IA 50036
Phone: (515)433-0591
jroosa@boonecounty.iowa.gov

The IDNR will be notified if the contact person changes prior to or during the postclosure period.

SECTION J

Comprehensive Plan Approval

IOWA DEPARTMENT OF NATURAL RESOURCES

GOVERNOR KIM REYNOLDS
LT. GOVERNOR ADAM GREGG
DIRECTOR KAYLA LYON

July 2, 2020

Mr. John Roosa
jroosa@boonecounty.iowa.gov

Dear Mr. Roosa:

Central Iowa Solid Waste Management Association
8th Round Solid Waste Comprehensive Plan Update
NOTICE OF APPROVAL

The Central Iowa Solid Waste Management Association submitted their plan update regarding integrated solid waste programs and activities. Information was included regarding proposed activities that represent an action plan for the next five years.

The official planning area Goal Progress determination for is 31.28% for Fiscal Year 2019. This figure was determined using the Base-Year Adjustment Method. Goal Progress may be recalculated annually, once new data is available and upon request by the planning area.

The planning area's tonnage fees will change due to the drop in the Planning Area's diversion rate to less than the state average of 36%. The new fee structure, as outlined in the attached Tonnage Fee Distribution Fact Sheet, will begin on October 01, 2020. Questions regarding tonnage fee submittal may be directed to Becky Jolly at 515-725-8308 or becky.jolly@dnr.iowa.gov.

The DNR's Financial and Business Assistance (FABA) Section has resources available to assist communities, businesses, and solid waste planning areas with programs. The webpage may be found at http://www.iowadnr.gov/faba. Waste reduction, pollution prevention and financial assistance are all areas of emphasis. In addition, the voluntary Environmental Management System (EMS) program provides benefits beyond waste reduction.

Should you have questions or like further information about DNR programs or this letter, please contact me at 515-725-8319 or Laurie.Rasmus@dnr.iowa.gov.

Sincerely,

Comprehensive Planning and Assistance, Land Quality Bureau

Enclosures: Tonnage Fee Distribution sheet, Base-Year Adjustment Report Table, Checklist
Cc email: Bill Schmitt, City of Ames Resource Recovery Plant, Glenn Hunter of HLW Engineering Group
Cc DNR email: Amie Davidson, Jennifer Wright, Becky Jolly, Geoff Spain, Ted Petersen - Field Office #5, Shelene Codner - IWE
File

TONNAGE FEE DISTRIBUTION

Fees are paid on each ton of Municipal Solid Waste (MSW) landfilled in Iowa. The base fee is $4.25 per ton; however based on penalties and rewards for the landfill's waste diversion efforts, each landfill pays slightly more or slightly less than the base amount. Landfill operators remit a portion of the fee to the state each quarter. The remaining funds are to be used for planning and environmental protection activities at the local level. Note: Environmental Management System program participants pay a tonnage fee of $3.65/ton, remitting $2.10/ton to the DNR (state average rate).

Determining Your Landfill's Tonnage Fee

Planning areas with less than 25% diversion:

collect	$4.75/ton
remit	$3.30 to DNR
retain	$1.45 ($0.95 for planning, $0.50 for environmental protection)

Planning areas over 25% diversion, under 36% state average, and under 50%:

collect	$3.65/ton
remit	$2.20 to DNR
retain	$1.45 ($0.95 for planning, $0.50 for environmental protection)

Planning areas over 25% diversion, over 36% state average, and under 50%:

collect	$3.65/ton
remit	$2.10 to DNR
retain	$1.55 ($1.05 for planning, $0.50 for environmental protection)

Planning areas over 25% diversion, over 36% state average, and over 50%:

collect	$3.25/ton
remit	$1.95 to DNR
retain	$1.30 ($0.80 for planning, $0.50 for environmental protection)

Fees remitted to DNR are placed in the solid waste account of the Groundwater Protection Fund for DNR Operations and Statewide Program Support.

74¢	DNR Operations, including • $8,000 - Dept. of Health Transfer • Solid Waste Permitting • Comprehensive Planning • Special Waste Authorization • Solid waste activities at Field Offices • Solid waste Legal Services
25¢	Iowa Waste Reduction Center (IWRC)
10¢	Iowa Waste Exchange; includes $30,000 to IWRC for technical support
5¢	Regional Collection Centers (establishment)
15¢	RCC Collection and Transportation (reimbursement for disposal costs)
13¢	Toxic Clean-up Days (additional TCDs or support RCCs {establishment and disposal} & special events for HHM collection); **GIS**; business loan program reimbursements.
5¢	Dept. of Economic Development Transfer (Recycle Iowa Office)
8¢	Waste Reduction and Assistance Program
$1.55	

Remainder of the remitted fee is used for:

- $50,000 for Special Waste Authorization Program
- $165,000 Iowa Waste Exchange
- Solid Waste Alternatives Program
  - Up to 30% for Environmental Management Systems
  - $400,000 for Derelict Building Grant Program

BASE-YEAR ADJUSTMENT METHOD REPORT TABLE

NAME OF PLANNING AREA: Central Iowa Solid Waste Management Association

CURRENT YEAR (CY): FY2019
BASE YEAR: FY1988

FACTORS	DATA	TIME-PERIOD / SOURCE
STEP 1: Basic Information		
1 Base Year Residential Waste Disposal	45,863.49	Adjusted 2014
2 Base Year Commercial/Industrial Waste Disposal	60,924.98	Adjusted 2014
3 Base Year Total Waste Disposal	106,788	Adjusted 2014
4 CY Waste Disposal	97,463	FY2019 Tonnage fee schedules
5 Base Year Population	106,909	Adjusted 2014
6 CY Population	131,216	FY2018 Census Estimate
7 Base Year Employment	45,098	Adjusted 2014
8 CY Employment	65,996.19	FY2019 Place of work
9 Base Year Taxable Sales	$492,326,657	Adjusted 2014
10 CY Taxable Sales	$1,342,955,840	FY2019, DRF
11 Base Year Consumer Price Index	115.8417	From last approved Plan
12 CY Consumer Price Index	253.2683	FY2019 - CPI-U
STEP 2: CY Taxable Sales Corrected for Inflation	213576.94	
13 Inflation Correction Factor	0.4573872	
14 CY Corrected Taxable Sales	$614,250,844	
STEP 3: Base Year and Current Year Ratios		
15 Population Ratio (PR)	1.2273616	
16 Employment Ratio (ER)	1.4634085	
17 Taxable Sales Ratio (TR)	1.2476490	
STEP 4: Adjustment Factors		
18 Base Year Commercial/Industrial Adjustment Factor	1.3555287	
19 Base Year Residential Adjustment Factor	1.2914452	
STEP 5: Adjusted Base Year Disposal Tonnages		
20 Base Year Adjusted Residential Waste Disposal	59,230	
21 Base Year Adjusted Commercial/Industrial Waste Disposal	82,586	
22 Base Year Adjusted Total Waste Disposal	141,816	
STEP 6: Goal Progress and Reduction Percentage Results		
23 CY Waste Disposal (from line #4)	97,463	
24 Maximum Allowable Disposal to Attain 25 Percent Goal	106,362	
25 Actual Tonnage Over (or Under) 25 Percent Goal	-8,899	
26 Maximum Allowable Disposal to Attain 50 Percent Goal	70,908	
27 Actual Tonnage Over (or Under) 50 Percent Goal	26,555	
28 CURRENT DISPOSAL REDUCTION (PERCENTAGE)	**31.28%**	

Planning Area Name: Central Iowa Solid Waste Management Association

Planning Area Description:
All cities and the unincorporated area in Boone County; all cities and the unincorporated area in Greene County excluding the city of Jefferson; all cities and the unincorporated area in Story County excluding the cities of Collins and Colo; the Cities of Bouton, Granger, and Woodward and Woodward State Hospital in Dallas County; and the Cities of Farnhamville, Lohrville, and Somers in Calhoun County. Amended June 2014 when Colo joined Marshall County

FY2018 Population Estimate

2018 Census Update & Woodward State Hospital average daily census

	Boone County	26,346		Boone in PA	
	Greene County	8,981	0.5381	Greene in PA	
MWA	(Jefferson, Greene)	(4,148)			
	Story County	98,105	98.67%	Story in PA	96,797
Marshall	(Collins, Story)	(474)			
Marshall	(Colo, Story)	(834)			
	Bouton, Dallas	119		Dallas in PA	2439
	Granger, Dallas	1,165			
	Woodward, Dallas	971			
	Woodward Resouce Center, Dallas	184	https://dhs.iowa.gov/mhds/disability-services/resource		
	Farnhamville, Calhoun	346	8.26%	Calhoun in PA	9699
	Lohrville, Calhoun	348			
	Somers, Calhoun	107			

Total Current Year Population: 131,216.00 v

FY2019 Employment Data

Iowa Workforce and Development

	Boone	Greene	Story	Dallas* (MSA)	Calhoun
Jul-18	9,528	3,270	49,000	372,000	2,869
Aug-18	9,375	3,239	50,900	372,300	2,857
Sep-18	9,335	3,360	55,400	370,800	2,962
Oct-18	9,327	3,428	56,000	374,300	2,978
Nov-18	9,326	3,422	56,100	375,700	2,968
Dec-18	9,308	3,422	55,100	375,400	2,953
Jan-19	9,107	3,360	52,600	369,700	2,886
Feb-19	9,116	3,355	55,300	368,800	2,870
Mar-19	9,135	3,403	55,200	369,900	2,898
Apr-19	9,210	3,398	56,000	377,100	2,946
May-19	9,310	3,418	55,300	382,400	3,004
Jun-19	9,481	3,434	50,700	385,300	3,027
Average	9,297	3,376	53,967	374,475	2,935
% in PA	100.00%	53.81%	98.67%	0.37%	8.26%
Avg in PA	9,296.50	1,816.61	53,247.15	1,393.55	242.38

Total Current Year Employment: 65,996.19 v

*Dallas County is part of the Des Moines Metropolitan Statistical Area (MSA). To compute the place of work employment for the portion of the MSA in the planning area, take the proportion of the employment average that is equal to the proportion of

FY2019 Taxable Sales

Iowa Revenue & Finance, Quarterly Retail Sale Tax and Use Report

	July-Sept 18	Oct-Dec 18	Jan-Mar 19	Apr-Jun 19	FY2019
Boone County	$ 53,646,393	$ 56,456,024	$ 48,296,644	$ 58,924,694	$ 217,323,755
Farnhamville, Calhoun	$ 259,441	$ 318,153	$ 202,355	$ 234,446	$ 1,014,395
Lohrville, Calhoun	$ 910,007	$ 775,381	$ 340,469	$ 681,618	$ 2,707,475
Somers, Calhoun*	na	$ 153,236	na	na	$ 153,236
Bouton, Dallas	$ 2,928,119	$ 2,752,477	$ 2,633,789	$ 2,720,099	$ 11,034,484
Granger, Dallas	$ 3,456,078	$ 2,669,350	$ 2,512,589	$ 2,707,638	$ 11,345,655
Woodward, Dallas	$ 2,923,761	$ 1,538,010	$ 1,411,691	$ 1,893,493	$ 7,766,955
Greene County	$ 21,237,011	$ 20,374,191	$ 15,673,386	$ 19,897,416	$ 77,182,004
(Jefferson, Greene)	$ (16,784,752)	$ (15,459,069)	$ (11,994,019)	$ (14,944,223)	$ (59,182,063)
Story County	$ 285,824,003	$ 277,916,796	$ 233,007,179	$ 283,712,553	$ 1,080,460,531
(Collins, Story)	$ (215,480)	$ (122,547)	$ (112,358)	$ (194,948)	$ (645,333)
(Colo, Story)	$ (1,625,485)	$ (1,610,260)	$ (1,253,075)	$ (1,716,434)	$ (6,205,254)
Total	$ 352,559,096	$ 345,761,742	$ 290,718,650	$ 353,916,352	$ 1,342,955,840

Total Current Year Taxable Sales: $ 1,342,955,840 v

*Somers did not have any reported $ in quarters 1, 3 and 4 and was not included.

FY2019 Tonnage

Boone County LF	97,462.65
Exemptions	0
Total W/O RDF	97,462.65 v

FY2019 Consumer Price Index

U.S. Bureau of Labor Statistics, Consumer Price Index - All Urban Consumers (CPI-U)

Jul-18	252.006
Aug-18	252.146
Sep-18	252.439
Oct-18	252.885
Nov-18	252.038
Dec-18	251.233
Jan-19	251.712
Feb-19	252.776
Mar-19	254.202
Apr-19	255.548
May-19	256.092
Jun-19	256.143
	253.2683

Current Year Consumer Price Index: **253.2683** v

SECTION K

Household Hazardous Materials Collection

HOUSEHOLD HAZARDOUS MATERIALS COLLECTION CERTIFICATION

The Boone County Sanitary Landfill operates a satellite temporary storage center for collection of eligible household hazardous material (HHM) and conditionally exempt small quantity generator (CESQG) wastes in accordance with an agreement with Metro Waste Authority. Materials are transported to the Metro Waste Authority HHM RCC facility under permit #77-SDP-46-94P-HHM for lab packing and transport to a permitted hazardous waste disposal facility.

The satellite building meets the requirements of the RCC.

Employees who handle household hazardous materials have "Hazardous Waste Site Worker" certification. All Certified Landfill Operators at the site also have the "Hazardous Waste Site Worker" certification. The list of Certified Landfill Operators is included in Appendix 3 of Section E of this permit renewal documentation.

An operations plan for the HHM satellite in accordance with Subrule 123.3(3) was submitted on January 27, 2009 (Doc #36264).