



December 19, 2023

FID # 663038310
Vernon County
SW/Correspondence

Ms. Stacie Sanborn
Vernon County, Director of Solid Waste
S3075 County Road LF
Viroqua, WI 54665

Subject: Incompleteness Determination for the Feasibility Report for the Proposed Vernon County
Landfill Eastern Expansion, License #3268

Dear Ms. Sanborn:

The Department of Natural Resources (department) has reviewed for completeness the report entitled "Feasibility Report - Proposed Eastern Expansion (WDNR License No. 3268)" dated September 11, 2023. The feasibility report (the report) was prepared by Short Elliot Hendrickson Inc., (SEH) on behalf the Vernon County Solid Waste Department. The department received the report on September 15, 2023. Based on the report review, the department has determined that the feasibility report does not contain the minimum information required by ch. NR 512, Wis. Adm. Code. Therefore, the report is not complete.

Part A below lists the items needed to determine the report is complete. Part B below provides comments and information the department wishes to share with you regarding the proposal. In your response, please include the information listed in part A and any additional information to address items listed in part B as an addendum to the feasibility report. This information is intended for use by the public as well as the department in reviewing the proposed project. Be sure to provide a copy of all information submitted to the department to each recipient of the feasibility report as required by s. 289.23(4), Wis. Stats.

The lists below are placed in the sequential order of the code citations, followed by the sequential order of the feasibility report sections with the exception of all items related to the geotechnical investigation. These items are grouped together because it is a significant subject and responses to some items may relate to other geotechnical items.

A. The following information must be provided for the department to issue a determination that the feasibility report is complete:

Geotechnical Information

1. **Site-Specific Geotechnical Information [s. NR 512.09(1)(c) and (d), Wis. Adm. Code]:** Soil boring B-21 does not extend to at least 25 feet below sub-base grade.
2. **Site-Specific Geotechnical Information [s. NR 512.09(2)(a), Wis. Adm. Code]:** The minimal requirement to adequately define the water table surface and horizontal gradients is not met to the east of the proposed expansion area, in part because new groundwater monitoring wells MW-15WT and MW-16WT are dry. The flow toward the merger point of the perched aquifer and regional water table aquifer near the MW-16/MW-16WT groundwater monitoring well point as interpreted in the report needs to be more accurately defined by additional hydrogeological investigation (i.e., data from additional borings and

groundwater monitoring wells), as this area would likely be the collection point of a hypothetical discharge from the proposed expansion. Once the assumed merger zone of the perched and regional water tables is confirmed, downgradient regional water table wells will be needed to monitor transport of a hypothetical discharge once it reaches the regional water table as required in s. NR 507.19 (1), Wis. Adm. Code.

3. **Subsurface Data Analysis [s. NR 512.10(4), Wis. Adm. Code]:** The report appendices do not include raw data for groundwater level measurements. Either field notes/forms or inclusion of measured depth-to-water readings on the data tables would satisfy the requirement.
4. **Data Presentation [s. NR 512.11(2)(a), Wis. Adm Code]:** Inferred or questionable lithostratigraphic boundaries are not marked with a dashed line or question mark.
5. **Section 1.3.1, Baseline Sampling of New Wells Subsection, Section 4.9, Section 5.4:** Manganese concentrations in groundwater monitoring well MW-14WT are significantly higher than in other groundwater monitoring wells at the facility, including but not limited to upgradient groundwater monitoring wells and groundwater monitoring wells for which manganese exemptions have been previously granted. Additional discussion on the potential source of the manganese in MW-14WT is needed to evaluate the requested exemption under s. NR 140.28, Wis. Adm. Code.
6. **Section 5, Alternative Geotechnical Investigation Plan and Geophysical Investigation:** Statements and other information provided in the feasibility report, including the boring logs, indicate that there is a respectable amount of fractured or preferential flow in the dolostone for the perched aquifer and the regional aquifer. Fractured and preferential groundwater flow may be challenging to effectively monitor because it may be difficult or impossible to determine the appropriate locations for groundwater monitoring wells with the capability to detect any hypothetical landfill leakage as required in s. NR 507.19 (1), Wis. Adm. Code. In addition, the reported horizontal flow velocities in section 5.4.2.10 of the report indicate a relatively fast groundwater flow regime. A relatively fast flow matrix is consistent with fractured flow behavior and makes it more difficult to effectively monitor groundwater at the landfill. It is not known if additional geotechnical work would provide sufficient additional information regarding the fractured flow matrix. The department is concerned about the ability to effectively monitor groundwater quality at the site. Vernon Co. may propose additional geophysical methods as part of the installation of additional borings and groundwater monitoring wells to define the groundwater flow of the perched aquifer as it converges with the regional aquifer or as part of any other additional work.

Additional geophysical methods to be considered should be applicable to investigation in an open borehole and may include, but not are not limited to: electrical methods (e.g., resistivity and similar methods) electromagnetic methods (e.g., electromagnetic induction); additional nuclear methods; physical/imaging methods (e.g., caliper log, acoustic televiewer, optical televiewer, video camera); and fluid column methods (applicable to saturated portions of a borehole). Multiple test methods for each borehole would provide additional lines of evidence to predict groundwater flow. Again, it is not known how feasible any of these additional methods would be and if they would yield sufficient additional information or additional information favorable to the expansion of the landfill.

7. **Section 5.4.1.2:** Provide the following additional information and clarification regarding the MW-16 groundwater monitoring well nest drilling.
 - a. The MW-16 boring log provided in Appendix J states that the borehole lost water from 70 feet to termination. Further explain the interpretation provided in the report text that the water loss was due to the head pressure exerted by the confinement of weathered sandy dolostone between two shale layers, and whether the pressure/fluid loss characteristics changed after the lower shale layer was

penetrated and the borehole advanced through similar sandy dolostone material. In addition, please indicate if a fractured flow regime and/or other reasons were considered as the cause of the water loss, and why the confining layer was selected as the most probable reason.

- b. Clarify the source of the observation of groundwater at 68.4 feet below ground surface (bgs) on 8/24/2022 (during advancement of MW-16) on the MW-16WT boring log. This information was not provided on the MW-16 boring log.
8. **Section 5.4.1.3:** Please clarify the statement that dissolution cavities and fractures are primarily present above groundwater and address or discuss what information indicates the absence of fractures and voids below the water table. Cored borings MW-10, MW-12, and MW-14Z document vugs and fractures, and other boring logs provided in Appendix K document numerous crevices below groundwater in bedrock.
9. **Section 5.4.1.4 Geophysical Horizons:** Explain the access issues that prevented geophysical investigation at the MW-16/ MW-16WT groundwater monitoring well nest, and whether the access issues are ongoing.
10. **Section 5.4.2.4, Section J-J' and Flow Net:** Based on the information provided in the feasibility report, the department questions the assumption stated in this section and others that the site represents a homogenous, isotropic system due to soil classifications and hydraulic conductivity values. Other comments pertinent to this section and the other sections referenced in the flow net assumptions discussion are as follows:
 - a. Hydraulic conductivity values within each of the three dolostone zones identified (perched water table, regional water table, piezometers) vary by two or more orders of magnitude.
 - b. Variations in lithology within the residuum layer and portions of saprolite and competent bedrock above groundwater, and variations in vertical hydraulic conductivity measurements, do not provide sufficient evidence to support a low likelihood of potential impacts from the landfill to the water table.
 - c. Based on the limited data, vertical gradients within the upper portion of the regional water table formation vary by approximately one order of magnitude.
 - d. Bedrock quality data with respect to fracture regimes or voids collected during the geotechnical investigation are limited; however, it is observed in Section 5.4.1.3 that bedrock is highly fractured in general with a likelihood of interconnected fractures. Boring logs are marked with zones consisting of fractures, vugs and voids.

Depending on the resolution of this comment and the results of any further groundwater investigation at the landfill, the flow net presented in cross section J-J' may need to be modified. The department notes that map view flow nets of both the perched water table and regional water table may enhance understanding of flow from the proposed expansion area to and within groundwater.

11. **Appendix J:** Explain the differences in the SEH boring logs and the Braun Intertec Logs for the same borings, in particular differences in total borehole depth (B-19 and B-20), differences in depth to bedrock/saprolite (B-18 through B-20, MW-14WT, MW-16, MW-17WT), and differences in bedrock/saprolite lithology (B-20, MW-16, MW-17WT).

12. **Table 5-4:** Clarify the “Frozen” designation for the March 2023 water table elevation at MW-17WT. Given that the static water level in this groundwater monitoring well is generally significantly below ground surface, a frozen water surface does not seem likely.

General Information

13. **General Submittal Requirements [s. NR 500.05(6)(g), Wis. Adm. Code]:** The local survey grid used does not appear to be referenced to state plane coordinates or other datum accepted by the department, and the department did not find discussion or documentation that the coordinate system is based on monuments in the field.
14. **Performance Standards [s. NR 504.04(4)(d), Wis. Adm. Code] and General Submittal Requirements [s. NR 512.05, Wis. Adm. Code]:** The department was unable to locate in Appendix Q the recent nitrate + nitrite data that was referenced in Section 5.4.3.1. These data are necessary to justify how applicable s. NR 140.28, Wis. Adm. Code criteria are met.
14. **Proposed Physical Changes [s. NR 512.16(2)(b), Wis. Adm. Code]:** The discharge rates provided are anticipated during active operations and do not compare to existing rates or rates anticipated following closure conditions.
15. **Environmental Review [s. NR 512.16(2)(e), Wis. Adm. Code]:** Please provide clarification regarding whether the perimeter access road will be designed on the east side of the proposed expansion and how that may affect perimeter storm water ditches, toe drains, and other engineering features. Revise the plan set for consistency in depiction of the eastern side of the landfill.
16. **Existing Environment [s. NR 512.16(3), Wis. Adm. Code]:** The report does not discuss the dominant animal species found in the area of the expansion.
17. **Environmental Review [s. 512.16(2)(c), Wis. Adm. Code]:** The report does not discuss the miles of access roads (or estimated length using other units) to be constructed.
18. **Environmental Review [s. 512.16(2)(d), Wis. Adm. Code]:** The report does not discuss the potential for post-closure gas production, emissions, or discharges.
19. **Section 6.3 and 8.8.1, Maximum Open Area:** Clarify the maximum open acreage of landfill in these sections of the narrative.
20. **Section 8.8.2 Geotextile:** Clarify the minimum thickness of the geotextile used.
21. **Table 8-1:** Include quantities of structural fill needed for support berms and other structure features for the expansion in the soil balance table.
22. **Section 11, Need and Design Capacity:** Resolve the following apparent discrepancies in the needs and site life analysis:
- a. The starting estimated disposal rate for the landfill provided in Table 11-7 (59,000 cubic yards) is not consistent with the average waste acceptance rate at the landfill presented in Table 11-2 (25,235 cubic yards). Evaluate the service area and needs analysis factors to explain this discrepancy and whether a more representative starting disposal rate would be appropriate.

- b. The annual growth rate used in Table 11-5 is 1.56% which is taken from Table 11-2. However, this annual growth rate is significantly higher than the annual population growth rate of 0.22%. While the 1.56% growth rate may be the most conservative calculated from Table 11-2, the actual waste volumes accepted at the landfill fluctuate slightly from year to year. The 1.56% growth rate does not represent a rate that is exponential in growth to be compounded annually like the behavior of a population growth rate. Furthermore, the latest trend is a declining waste acceptance rate at the landfill. If the population growth rate is used, the proposed expansion volume would exceed a 15-year site-life. The department is allowed to approve landfills with a maximum 15-year site-life. Please provide any additional explanation available regarding this that may assist the department in its determination of estimated site-life.
 23. **Appendix S, Leachate Treatment Agreements [s. NR 512.13(3), Wis. Adm. Code]:** The leachate treatment agreements provided have expired prior to the submittal of this feasibility report. Provide updated leachate treatment agreements.
 24. **Plan Sheet 32, Detail 3-32, Leachate Extraction Building (Phase VII):** Please clarify the thickness of clay liner and rooting zone layer, as these thicknesses are inconsistent with other details provided on the plan sheets and in the narrative.
 25. **Appendix R, Sub Appendix B, Sheet 16 Leachate Headwells:** This sheet notes that multiple headwells on the landfill are damaged; please provide a current list of the headwells on site and the status of them as well as provide a history of headwells that are damaged, lost, or abandoned.
 26. **Plan Sheets:** Provide a plan sheet with labeled leachate headwells, cleanouts, and leachate lines for the entire site with the proposed expansion.
 27. **Plan Sheet 24, Plan Sheet 33, Detail 2-33, Leachate Headwell:** Please provide narrative on the general design of the sweep bend noted on Plan Sheet 24 Note 8 for the leachate collection line cleanouts.
 28. **Plan Sheet 23 Horizontal Footprint:** Please discuss the design rationale behind the divot in the waste limits between exiting Phase III Modules 1&2 and proposed Phase VII and the exiting Phase III Modules 3&4 and proposed Phase IX.
 29. **Storm Water Controls:** Please discuss the impacts of the expansion to the existing sedimentation basin.
- B. The department noted the following additional issues with the report during our review. Some of the items may affect the department's feasibility determination or plan of operation decision which Vernon County Landfill may choose to address. Should the department issue decisions favorable to the report, these items may result in conditions of either the feasibility determination or plan of operation approval if not addressed.
1. The following apparent typographical errors are noted for the record.
 - a. Plan Sheet 9: Based on the groundwater elevation data presented, the date in the title should be May 2023.
 - b. Plan Sheet 15. The label of the D' location should be east instead of west.

This incompleteness determination is not a denial of your report, but merely indicates that additional information is needed to continue the review. Submittal of this information does not ensure a favorable determination, nor does it preclude the department from requiring additional information if continued review indicates it is needed. Upon receipt of the additional information, the department has 60 days to determine whether or not the feasibility

report is complete. Please be aware if additional review indicates the feasibility report is twice incomplete, the department may require an additional plan review fee as specified in ch. NR 520, Wis. Adm. Code, Table 3 (Note 1).

Please do not hesitate to contact Mark Peters, Hydrogeologist at (608) 516-0820 or mark.peters@wisconsin.gov or Colin Maus, Waste Management Engineer at (608) 516-2462 or colin.maus@wisconsin.gov if you have any questions about this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "Bridget Kelly". The signature is stylized with a large initial "B" and a long, sweeping underline.

Bridget Kelly
Waste and Materials Management Program Supervisor
South Central Region

cc: Brian Kent- SEH (bkent@sehinc.com)
Colin Maus- DNR/WA (e-copy)
Mark Peters – DNR/WA (e-copy)
Tess Brester – DNR/WA (e-copy)
Joe Lourigan – DNR/WA (e-copy)